“A Midwestern Doctor” (AMD)'s DMSO POSTS AS OF JANUARY 1, 2025

Table of Contents

How DMSO Treats "Incurable" Autoimmune and Contractile Disorders

The decades of research that could have prevented an immense amount of human suffering

•DMSO is a remarkably safe substance that effectively treats a variety of conditions (e.g., chronic pain, acute injuries, and strokes) that medicine has struggled with for decades. Many readers here have already experienced profound benefits from using it.

•DMSO is a powerful (but safe) anti-inflammatory agent that is often extremely helpful for autoimmune conditions. For example, it's frequently used to treat asthma, inflammatory bowel diseases (e.g., ulcerative colitis and irritable bowel syndrome), interstitial cystitis (painful bladder syndrome), ITP, lupus, multiple sclerosis, myasthenia gravis, scleroderma, Sjogren's syndrome, and uveitis.

•DMSO is also remarkably effective at stabilizing and refolding proteins. This allows it to treat a variety of "untreatable" genetic disorders, and conditions characterized by the abnormal accumulation of misfolded proteins in the body (e.g., amyloidosis) or chronic deposits of excessive contractile collagen (e.g., surgical scars, abdominal adhesions, Dupytren's contractures, and Peyronie's disease). Two of the most dramatic examples of this are scleroderma and fibrodysplasia ossificans progressiva—both "untreatable" conditions where DMSO be lifesaving.

•In this article, I will present the wealth of evidence substantiating each of those uses, share my theory on how the unusual antimicrobial properties of DMSO explain some of these benefits, and present DMSO treatment protocols for many of those disorders. Additionally, here is a simplified guide on how to use DMSO orally or topically.

Dimethyl sulfoxide (DMSO) is a simple and readily available naturally occurring chemical that rapidly enters the body through the skin and has a variety of remarkable therapeutic properties. When it was discovered, its proponents believed it (much like antibiotics) represented a new therapeutic principle in medicine and once adopted, would completely change how medicine was practiced. Unfortunately, the FDA conducted a reprehensible campaign against it and was able to successfully bury it.

Were it adopted, DMSO would completely change the management of neurological injuries. Millions would no longer be disabled from the common emergencies medicine views as insurmountable such as stroke and paraplegia after a spinal cord injury.

DMSO Could Save Millions From Brain and Spinal Injury

In turn, after I posted this, I began to receive testimonials from readers who'd found DMSO treated neurological and circulatory disorders they had always thought could not be treated.

In the second part of this series, I discussed how DMSO is remarkably effective for treating injuries and chronic pain:

DMSO is a Miraculous Therapy for Chronic Pain and Musculoskeletal Injuries

In turn, after I published this article (since those conditions are some of the most common things people struggle with), I received a lot of comments from readers

who expressed their understandable skepticism something like this could actually exist (which is part of why I began this with the wealth of evidence DMSO was paradigm shifting in neurology). At the same time, many were encouraged to try it, and I received numerous testimonials of the astonishing recovery it facilitated from a significant injury they'd suffered since the article had come out. More importantly however, many readers with chronic pain (or immobility) decided to try it, and were overjoyed to discover that after years they could at last get their lives back.

Taking a step back, the fact that something this effective could exist no one knows about is difficult to believe, which in turn suggests there has to be a reason for why no one knows about it—such as DMSO being extremely toxic. In reality, it is purely politics, and to support that, I compiled a detailed article summarizing everything that is known about the safety and toxicity of DMSO, which in my eyes, made the case that **DMSO is one of the safest pharmaceutical products in existence** and that the widely used alternatives to it (e.g., NSAIDs) are incredibly dangerous and orders of magnitude more harmful than DMSO.

A human study proves its safety in pregnancy (where DMSO was successfully used to treat infertility) that I forgot to include and have now added to the previous article.

Now that I've established there is something truly remarkable to DMSO (e.g.,you can read the hundreds of testimonials I've received from readers here), I would like to focus on another area where DMSO upends the existing medical paradigm—autoimmune and severe connective tissue disorders. I believe this is necessary because many individuals suffer from autoimmune and contractile conditions, but more importantly, because some of the conditions DMSO has been shown to treat effectively are otherwise death sentences that for decades the medical community has made almost no progress addressing.

DMSO and Protein Disorders

One of DMSO's remarkable properties is its ability to function as a chemical chaperone and stabilize the three dimensional structure proteins assemble (fold) themselves into. This is important as many complex illnesses (e.g., many genetic disorders) result from misfolded proteins and presently can only be (ineffectively) managed with expensive drugs that aim to normalize the function of the abnormal proteins.

In turn, a few drugs have been developed to refold misfolded proteins, and to my knowledge, the most helpful ones on the market were the ones developed to treat cystic fibrosis (after the Cystic Fibrosis Foundation gave 150 million to bring these medications to market which currently are priced at roughly 300,000.00 a year). However, unlike the existing pharmaceutical chaperones (which are very specific to the misfolded protein), **DMSO's effect is remarkably universal.**

Note: improving the physiologic zeta potential (as explained here) can also stabilize protein folding (while worsening it causes aggregation and misfolding). Likewise, DMSO has been shown to dissolve numerous enzymes without irreversibly inhibiting them, which authors felt suggested DMSO could compensate for genetically defective enzymes.

Studies have shown DMSO can improve the functionality of the dysfunctional proteins that are seen in genetic disorders like cystic fibrosis,[1] hereditary nephrogenic diabetes insipidus,[1,2] Machado-Joseph disease,[1] Niemann–Pick disease,[1,2,3,4,5,6] and a defective protein that causes motor disorders and early death in mice.[1] Likewise, it can also treat a variety of complex diseases which result from misfolded proteins damaging surrounding tissue.

For example, amyloidosis is a challenging condition that results from aggregates of insoluble proteins accumulating in the surrounding tissues. DMSO in turn has been shown to solubilize the amyloid aggregates and enabling the body to break down and eliminate them (e.g., one study tested 125 Bence Jones proteins and found that DMSO prevented their conversion to amyloid fibrils and stopped most of them from precipitating). As a result, at least 40 studies and case reports

have shown that DMSO can treat numerous types of amyloidosis.[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39,40]

Likewise, DMSO has also been shown to revert the protein responsible for the devastating neurological prion diseases Creutzfeldt-Jakob disease[1] and scrapie[1] (which suggests it could also be helpful for mad cow disease).

Note: the previously mentioned studies are discussed in more detail here.

Presently, numerous human studies have shown that DMSO can treat amyloidosis, and one showed that it treated Neiman-Pick's disease. Additionally, DMSO in this and this animal study and in this human study has been shown to treat Alzheimer's disease, another condition linked to misfolded proteins (along with another one where adults with a variety of different degenerative brain conditions were treated). Likewise, we've clinically observed Parkinson's (another disease that can be linked to misfolded proteins) responds to treatment with DMSO, and recently, one reader here reported:

I ordered DMSO immediately after your first article appeared. I am now in the 4th week of testing DMSO for Parkinson's disease. [The initial dose I took was too high so I stopped] On the second day of the break my Parkinson's symptoms almost disappeared and I felt better than I had felt for ages. The biggest improvement was in relief from bradykinesia. After being slow for the past years, I suddenly became Mr. Speedy. At [a lower] dose I get minor brain fog for about one hour and the benefits of DMSO for the rest of the day.

In terms of symptom response to DMSO, in these first 4 weeks, pain, speed and the range of movement were most improved, followed by stiffness. Tremor seems to take more time to respond but there are already subtle signs of improvement. I and my family have also noted improvements in a whole range of other symptoms: brighter facial expression, eye comfort (more irrigation), stronger voice, more energy, better left/right hand coordination (fewer typing errors when using computer keyboard) and improved handwriting. Most importantly, I have periods of feeling really good which were previously absent. I have no doubt that DMSO is doing something good.

Note: since many cancer causing proteins are misfolded, it is thought that this may partly explain DMSO's anticancer properties.

While I am very open-minded to unconventional medical ideas and knew DMSO could treat a variety of otherwise incurable neurological diseases (e.g., ALS), there was one thing I always had a bit of difficulty believing. DMSO allegedly had been shown to cure Down Syndrome, demonstrated both in three clinical trials (e.g., this one and this one) and numerous remarkable case reports that were presented by multiple corroborating medical witnesses in Congressional testimony, along with numerous studies showing DMSO improved the cognition and behavior of developmentally delayed children. To explain this impossible benefit, I theorized it was likely due to DMSO's protein stabilizing benefits, as Down Syndrome is characterized by "the aberrant accumulation of unfolded/misfolded proteins resulting from over-burdened protein quality control systems."

In turn, one reader recently shared:

We've been giving some [DMSO] to our young daughter who has Down Syndrome. We've been giving her extra vitamins based on the treatment protocol of some studies that I found after reading your previous posts on this topic.

Almost immediately we noticed that our little girl was sleeping better through the night, and she's become more verbal. She'll be 2 in less than a week and she suddenly seems like she wants to say words more intentionally now, even if we mostly can't understand them yet. Also, her appetite has improved substantially. She just seems more active, and that's really awesome!

After which I received this comment:

This is such a helpful article! My husband is the one you quoted about using DMSO on our daughter with Down Syndrome...let me tell you, even in the time since he made that comment, we have seen changes in our little girl. The biggest one is that she is now CRAWLING-she had seemed for the longest time like she

wasn't even interested, but now she's doing it (she started on her 2nd birthday, in fact!). And her coordination and motor skills are steadily improving as well. She is super close to sitting up on her own, something I was getting really worried about. There have been many other small improvements, and it's almost like she's not even the same kid she was two weeks ago. I write a blog here in Substack about raising a DS kid as naturally as possible, and this is going to give me PLENTY to write about. I am so grateful for your articles about it, and I am so excited to keep learning and seeing what's possible! Thank you so much!

What I find particularly noteworthy about this is that the "untreatability" of genetic disorders (which typically result from a dysfunctional protein) has justified spending incredible amounts of money on both research and treatments for them (e.g., the industry is still in its early stages but 20.4 billion is already spent each year on gene therapies in the United States—which in part explains why there was such a push to bring the unsafe mRNA platform onto the market and open up a massive new drug sector). In contrast, DMSO is virtually free and has been shown to treat many of these disorders we ***still*** *do not have a good option for.*

Collagen Disorders

Irregular depositions of collagen underlie many different diseases (e.g., many rheumatologic disorders and many degenerative results of aging). Fortunately, much in the same way DMSO can address the accumulation of abnormal proteins, it can also address a variety of collagen disorders by "softening" collagen. For example, in a recent article I highlighted how, in addition to DMSO aiding the healing of chronic wounds and surgical scars, it:

•Attenuate excessive MMP-9 activity (which when excessive creates disordered healing and is linked to a variety of fibrotic diseases).

•Decreases experimentally induced intestinal adhesions (a common complication of abdominal surgeries) and eliminates subcutaneous radiation-

induced fibrosis (the pathologic deposition of collagen).

•Disrupt the links between collagen fibers and treats keloid scars by flattening and loosening their associated collagen bundles (a result also found in this study of ten patients with keloid scars) and has been shown to allows tight tissues to expand by loosening and relaxing collagen fibers and change the collagen structure detected by advanced imaging approaches.

•Strengthens the tensile strength of healing surgical incisions and post-surgical scars and prevents hypertrophic (excessive) post-surgical scar formation.

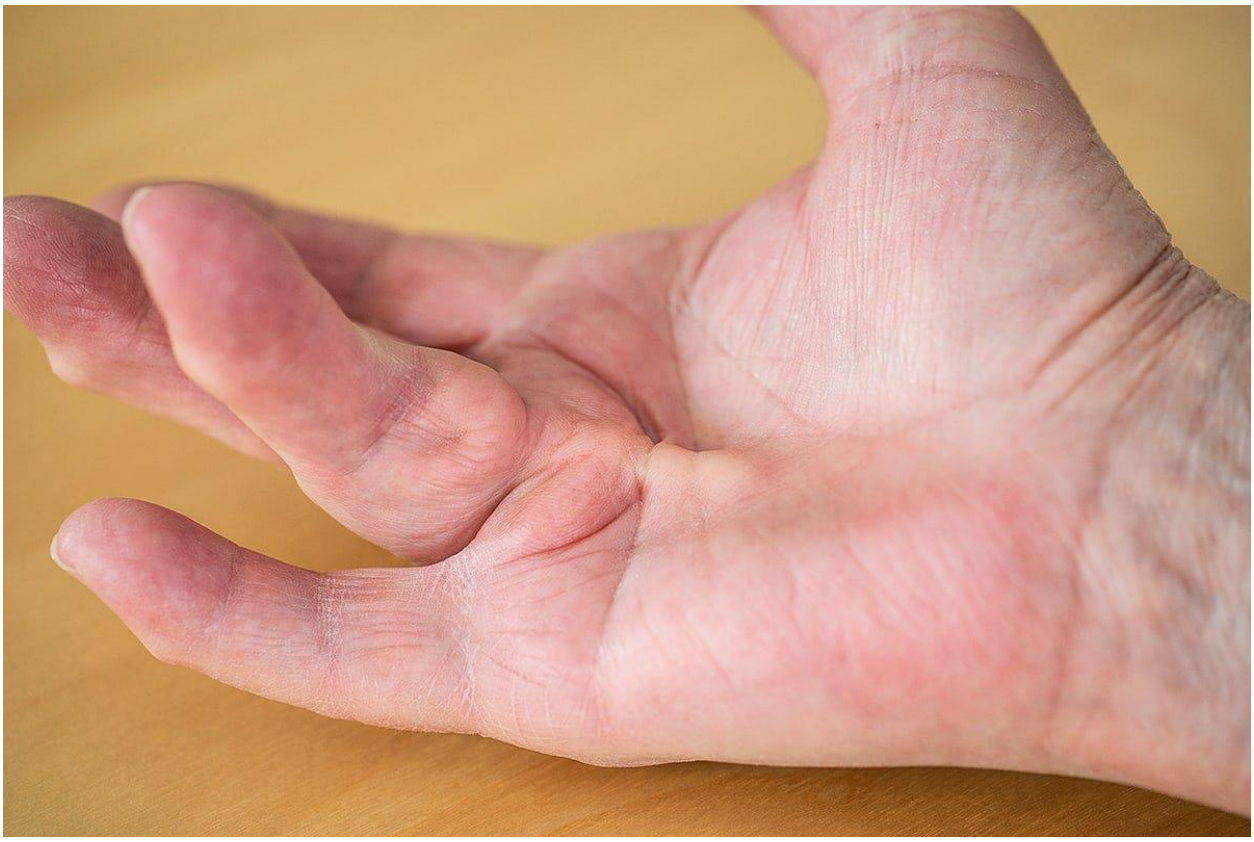
Beyond all of this being incredibly beneficial for surgical outcomes and preventing (the fairly common) chronic complications of surgery, it (along with DMSO's previously mentioned ability to eliminate abnormal protein deposits) also indicates DMSO can help with other collagen disorders.

In turn, the earliest study I know of that found a benefit in collagen disorders was this 1965 study, which reported that over three months of treatment, 5 out of 4 patients with scleroderma had an improved range of motion and softening of their skin, while 3 out of 3 patients with a Dupuytren's contracture had a reduction in plaque size in the palmar fascia and increased finger motion.

Note: many other reports of DMSO benefitting collagen disorders (e.g., this symposium which provided data on 9,521 patients with a variety of conditions such as Dupuytren's contractures) also exists.

DMSO and Contractures

Dupuytren's contractures occur when the collagen under the palm builds up and abnormally thickens.



A variety of treatment options exist to address this issue (e.g., injecting an enzyme to digest the collagen, breaking the collagen up with a needle, or surgically removing it), but all have downsides (e.g., complications from the procedure or a recurrence of the contracture). In turn, there is still insufficient evidence to build a consensus on the best way to approach this common condition.

Before the FDA shut down DMSO, this is what Merck reported to their clinical investigators (after roughly 4,000 patients had received DMSO for up to 18 months):

Dupuytren's contracture—Long-term administration has caused some improvement in fibrous scar contractures. 90 percent is recommended.

In addition to the study mentioned above where 3 out of 3 patients with Dupuytren's contracture improved from DMSO, another study gave DMSO to

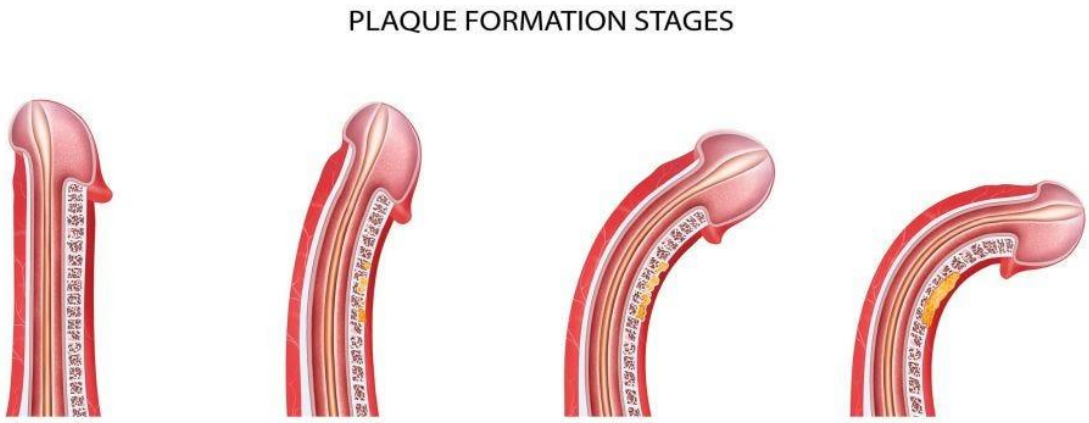
29 patients with Dupuytren’s contracture and found 2 had a complete remission, 14 had a partial remission, and 13 had no response (along with a single patient with a Cicatricial contracture who had a partial remission).

In another study, DMSO yielded good results for 6 out of 9 Dupuytren’s contractures (and 1 out of 3 Peyronie's disease).

Conversely, in another trial of 23 patients with Dupuytren’s contractures that had been present for over 5 years, receiving 80% DMSO 3 times a day for a month did not help any of them. This suggests that DMSO works best early in the disease process, that a month is not long enough to get results, and that 90% rather than 80% may be necessary for this application.

Peyronie's disease

Peyronie's disease is a condition in which fibrous scar tissue builds up in the penis, producing extreme pain whenever a patient gets an erection and gradually curves one’s erection.



The exact cause of it is unknown, but it is thought to be due to a disordered wound healing process and, since 1828 has been recognized to occur in association with Dupuytren’s contractures. Due to the sensitive nature of the

condition, men are often reluctant to report it, and estimates vary greatly on how common it is (ranging from 0.3% to 16%).
Note: In addition to us hearing about this from our female patients, I have numerous friends who've confided with me they experience chronic discomfort from their husband having a slightly curved penis (which results in uneven pressure being applied to the vaginal wall), so I am inclined to believe a significant number of men are affected by the less severe stages of this disorder. As such, DMSO's use here is something ***I really wish*** *more men knew about.*

Since the penis is more challenging to modify than the hands, many different approaches are used to address this collagen deposition, most of which have side effects and don't always lead to satisfactory outcomes (and in most cases, the penis can never be completely straightened). However, DMSO was found to be effective, especially if used early in the disease process and applied for a prolonged period (e.g., a year).

Peyronie's disease patients at the DMSO clinic in Portland receive topical application of DMSO directly in the penis, and Stanley Jacob reports relief in about 50 percent of the cases he treats. "We're not seeing rapid, significant improvement in curvature but the newer DMSO preparations we are employing are superior to DMSO water."

Likewise, this is what Merck reported in a bulletin sent to their investigators:

Peyronie's disease—In a few patients so far treated, decreased size of the plaques and straightening of the penis has been noted.

In one of the few studies on DMSO and Peyronie's disease, two Cleveland urologists, Lester Persky and Bruce H. Stewart, reported that of thirteen men with the condition who applied DMSO for 8-12 weeks, six were improved enough to resume reasonably normal intercourse. One patient showed a complete disappearance of the plaque caused by the disease.

In another study, four patients used 90% DMSO on the affected area several times daily for 2-3 months. Two patients responded with softening or disappearance of plaques and deformity was corrected in one.

Finally, in a 1980 Russian study (which used a slightly more complex treatment regimen that included rubbing 50-70% DMSO onto the affected area 2 times a day for a month), of 9 patients who started the protocol, 6 completed it (while 3 stopped for varying reasons) and of those who did it, 5 had a complete recovery while the 6th had a large improvement (no further progression and normalization of sexual function).

While DMSO does not have a 100% cure rate for either of these conditions, **it often works and unlike the other options is devoid of side effects.** Because DMSO works best when used early and can be applied discreetly at home, it offers a powerful and accessible option for those dealing with these conditions—especially Peyronie's disease.

Lastly, other types of contractures can also be helped. For example, in this study of 20 rheumatoid arthritis patients with flexion contractures in various joints, DMSO (plus hydrocortisone) was found to increase joint flexion by 20-30 degrees, and after 30-40 days of post treatment follow up, there were no contractural relapses.

Fibrodysplasia Ossificans Progressiva

One of the most remarkable connective tissue disorders DMSO treats is fibrodysplasia ossificans progressiva (FOP), a rare genetic disorder (affecting 1 in 2 million people) where bone rather than connective tissue is created each time tissue heals, causing these people to gradually turn to human statues

FOP is classically considered to be impossible to cure since the extra bone can’t be removed because healing from the bone removal simply creates even more bone. FOP in short is one of those diseases where I just have always felt really sad thinking about what people who suffer from it go through:

Like Down Syndrome, non-profits have “worked” for decades to find a cure for FOP and come to accept nothing can be done for it but somehow are unaware of what DMSO did:

A man in his thirties had had the disease for twenty years. In 1964, Stanley Jacob started him on DMSO, and after a few months of topical application, he had improved. When they had started out, a good deal of his body had calcified. He couldn't move any of his joints; he couldn't lie, or sit other than rigidly, and he couldn't bend his neck or move his fingers. His knees, his hips, his ankles were all rigid. He could open and close his mouth, so he could eat, and, for a time, survive.

"We concentrated on his shoulders," Jacob told me, ' 'because I felt that if we could get a little motion in the upper part of his body, it would make him less of a vegetable. After a couple of months, he did recover some shoulder motion [and his pain significantly decreased].

Later, some of the calcified soft tissue lumps gradually shrank.

"When the FDA halted studies in November 1965, the young man had regained much use of his fingers; he wrote, literally, hundreds of letters—to the FDA, the Congressmen, and to the President. The FDA sent him stereotyped letters. The President, who receives a lot of touching appeals every day, overlooked this one.

Additionally, one reader here knew one of those patients (who may have been the previously mentioned individual):

My Uncle Red (Walter Kummer) took DMSO as part of a study at OHSU [with Stanley Jacob] in the '80s... maybe even late '70s for treatment of FOP - Fibrodysplasia Ossificanas Progressiva....his muscles turned into bone. He was diagnosed when he was 11 or 13 years old and wasn't supposed to live past 15, then 20 and eventually the medical doctors gave up guessing his lifespan. When he started taking DMSO it was first topical then he ingested it. I was very young but I remember dark colored bottles of DMSO on the counter. Uncle Red must

have been in his late 40s or 50s by that time that OHSU studied him. I think it helped him live as long as he did. He died in the early 1990s when he was in his late 60s. I have never forgotten those bottles and Uncle Red.

Likewise, I spoke to another person who knew a younger woman with FOP Stanley Jacob treated who greatly benefitted from DMSO.

Scleroderma

During the eight months I have been testing DMSO, 1) I have been able to walk and drive a car (I had been consigned to a wheelchair by doctors at the University of Michigan Medical Center); 2) my terrible swallowing problem due to a calcified esophagus, has improved al- though I still eat baby food meats; 3) I still have nine fingers left, free so far from amputation. I'm fighting for a change in drug evaluation to give thousands of other people a future of some promise.

Scleroderma is another horrible disorder, that despite decades of work still has a poor prognosis; patients with it are 3.5 times more likely to die than the general population.Rheumatologists I know have very few patients with this condition because they eventually die under their care, whereas most of the other conditions they manage survive indefinitely.

The cause of scleroderma remains unknown. It is characterized by hardening and thickening of the skin, which effectively compresses the body like saran wrap. This is due to abnormal growth of connective tissue (e.g., collagen). It and is thought to begin in the blood vessels, then enters muscles and joints, and eventually penetrates internal organs, which is typically fatal. Two major complications of this disease are poor peripheral circulation (frequently creating ulcers and often progressing to finger and toe often need to be amputated poor mobility due to a stiffening of the body.

From the start, DMSO was observed by many researchers to be immensely helpful in treating scleroderma. Some of the most vocal protest the FDA got on

their ban of DMSO came due to their refusal to approve it for scleroderma despite extensive evidence compiled by leading rheumatologists supporting its use.

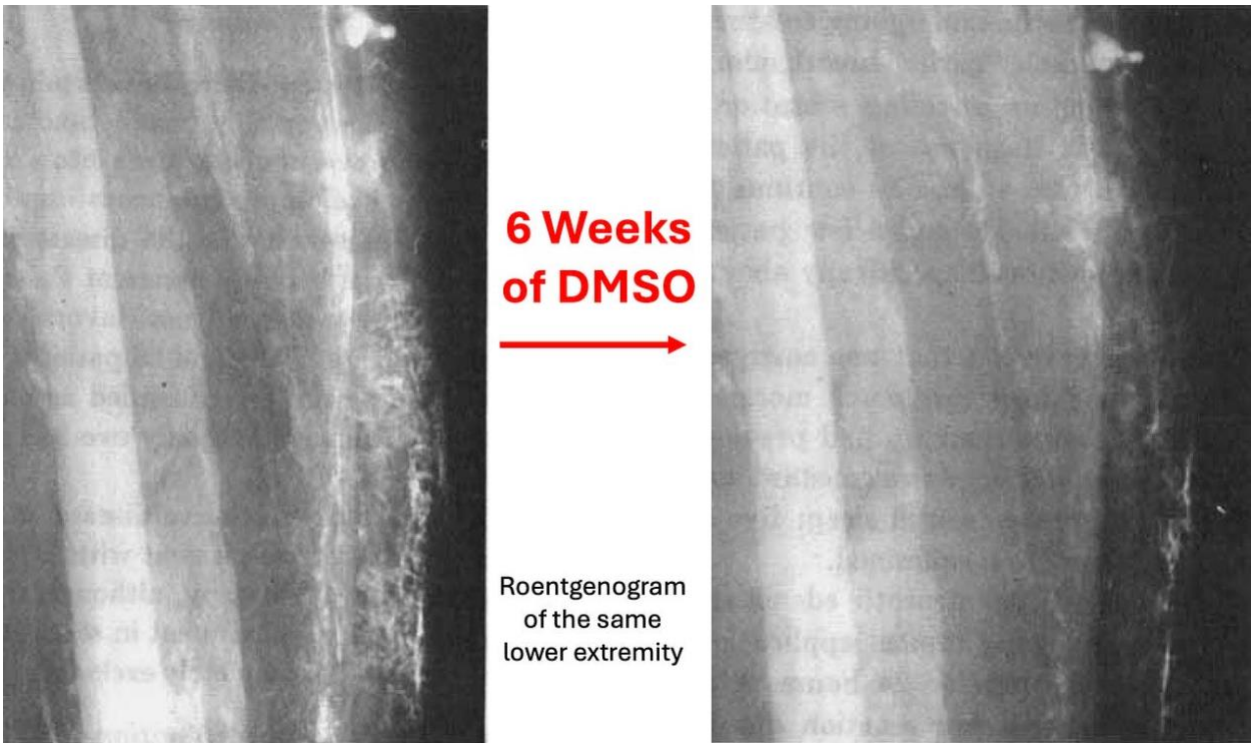
•An early study gave DMSO to six scleroderma patients with ulcers on their fingers (initially at 50% but gradually raised to 100%). Five significantly improved (four had their ulcers begin to heal in one or two days and were completely healed in two weeks, while the fifth took six weeks). The final patient could not tolerate DMSO and left the study. While DMSO was initially painted on the affected areas, many patients found they had a better response covering large parts of their body with it or immersing their affected fingers in it for one minute every two hours. Additionally, this study determined that the collagen deposition under the skin decreased with DMSO treatment.

Note: this study was initially inspired by the recognition that DMSO is very effective at treating pain, and scleroderma is often quite painful.

A follow up study reported the results of 42 patients with chronic scleroderma who had not responded to any previous treatment. Many had significant organ involvement of the disease. DMSO was given at a dose they could tolerate (ranging from 30-100% and often could be raised over time) and then either was just given to the affected part of the body, a significant part of it, the entire body, or in some cases by immersing the affected region in DMSO), and then after 2-3 weeks only administered to the hands, forearms, feet and occasionally the face. Additionally, 9 patients with circumscribed and interstitial calcinosis, tendon contractures, and capsular adhesions who had not responded to topical DMSO received 5-10ml of 1-5% DMSO injected subcutaneously once a day for four weeks.

In many cases, 1-2 years of therapy was needed to obtain a significant skin improvement, and of the 42 patients, 16 showed fair or poor response (6 with late stage scleroderma died from their illness during the study) while 26 showed good or excellent improvement to DMSO. Of the 26, (62%) with a good response, most had to remain on it, but DMSO caused complete remissions in

three and they were able to stop it. Nine had to resume DMSO within four weeks because their symptoms of pain and stiffness returned. Of the 19 patients with ulcers, the majority healed using topical DMSO, a few required immersion in DMSO, and it is unclear from the study what happened to the rest. There were also 2 patients with interstitial calcinosis that restricted joint motion and disappeared after DMSO.



Additionally, like the previous study, they determined that pathologic collagen deposits under the skin were being broken down and returned to their normal form, with collagen breakdown products increasing by approximately 50% in the urine— (whereas typically in scleroderma and other rheumatologic disorders that does not happen). This, in turn, is similar to how DMSO increases the urinary excretion of amyloid degradation products.

Note: if the FDA were at all reasonable, this study would have gotten approval to use DMSO to treat scleroderma, especially given the professional reputation of the rheumatologist who conducted the study.

In a final study, a Cleveland Clinic rheumatologist gave DMSO to 19 patients with systemic sclerosis and 3 with local sclerosis who'd had it for 1-20 years (averaging roughly 7 years) with a similar but more refined DMSO treatment protocol. This study had the most precise data, showing that DMSO softened the skin, improved joint motion and grip strength, and eliminated ulcers. Additionally, in this study, DMSO was only applied to one hand (so an untreated "control" would exist), but due to DMSO's systemic absorption, the other hand also improved (although never more than the treated hand). In all cases, the effect of DMSO was temporary, so it had to be continued to sustain its benefits.

Note: a similar 1966 study concluded there was "no benefit" from DMSO because the changes observed in both the treated and untreated hand were similar (as the authors appeared to be unaware of the systemic effects of DMSO). I believe this issue characterizes the small number of other studies that found no benefit from DMSO in scleroderma (but I could not access the articles to confirm this).

Other data includes:

A study of 10 patients with scleroderma showed that their skin had greatly improved from DMSO to the point where the skin became supple and ulcers healed. That author then conducted a subsequent study on 20 patients, noting they "had increased mobility, rapid relief of pain and healing of persistent ulcers, arrest of the spread of cutaneous disease, regrowth of hair, and return of sensation and sweating."

A study of 29 patients with systemic scleroderma that assessed blood flow (as scleroderma significantly impairs circulation) in the skin and muscles with a radioactive isotope. It found that 50% DMSO slightly improved it, increased it by 1.2 times when given with another agent, and by 6 times when given with 1% nicotinic acid. When the DMSO nicotinic acid combination was given, it also cured their Raynaud's syndrome, gross edema and hyperpigmentation of the skin. Additionally, when 50% DMSO was given with another agent, within

a month it completely healed the ulcers on the fingers of 6 six patients it was tried on. Finally, the authors noted they'd used DMSO on roughly 2,500 rheumatologic patients (e.g., rheumatoid arthritis, scleroderma, amyloidosis) with excellent results.

Note: another paper detailed how DMSO causes a dilation of the blood vessels in the upper dermis of scleroderma patients. Additionally, in scleroderma, the sedimentation rate is elevated (which indicates blood cells are clumping together and disrupting the microcirculation), so since DMSO disperses clumped blood cells, This may also partly explain why it improves circulation in this illness.

A Russian study (I verified it by translating) gave 30-90% DMSO 1-2 times a day to 52 women and 6 men with progressive scleroderma (that was often quite severe) for several months to 2 years. Within 1-2 months, significant improvement was observed in the skin and connective tissue, and in time, all ulcers disappeared. DMSO stopped the disease's progression for all but 2 of them (96.6%), and clinical recovery occurred in 34 of the 40 with plaque scleroderma (while the remaining 6 improved but had to remain on DMSO). Linear scleroderma also responded to DMSO, but took much longer to regress. Of the 8 patients who had generalized scleroderma, one had a complete regression after 2 years, while the other seven at the time of publication (after two to three months of treatment) had shown significant improvement in a wide range of areas. All 40 patients who completed the treatment course were monitored for up to 5 years, and no relapses occurred.

[Russian] patients commented on the suddenness with which the ugly old disabilities began to disappear and the rapidity of the healing process.

"Many patients in that group have said they were happy to experience washing with DMSO," the scientists said. "It reportedly improved their well-being immediately, and they simply could not imagine life without DMSO. The results we have obtained have proven the high effectiveness of DMSO.

Another study found DMSO yielded good results for 3 out of 4 scleroderma patients.

Finally, when a Congressional Committee (unsuccessfully) pressured the FDA to legalize DMSO, as part of their case, they randomly surveyed 250 rheumatologists, of whom 68% responded, of whom 33% had used DMSO in their practice. Of them, 49% felt DMSO was effective (along with 23 more who did not have direct experience using it). Most of their uses were for musculoskeletal disorders, but many also reported using it for scleroderma. Sadly however, nowadays, it's exceedingly rare for me to find rheumatologists who know much about DMSO.

Note: there are dozens of testimonials from scleroderma patients (e.g., at the committee hearing that I attached here) who experienced life-saving changes from DMSO and gave many heartfelt pleas to both the FDA and Congress for DMSO to be legalized for this condition.

Other Autoimmune Conditions

In the first two parts of this series (which can be read here and here), I provided numerous studies demonstrating DMSO's ability to prevent or resolve experimentally induced inflammation (or tissue necrosis) and many others that mapped out its specific anti-inflammatory properties (e.g., it inhibits numerous inflammatory cytokines), and a wealth of data showing it was an effective treatment for rheumatoid arthritis.

Note: in the previous article, I forgot to mention that topical DMSO is often very helpful for insect and animal bites.

DMSO in turn, is well recognized for its anti-inflammatory actions, and some of my colleagues have used it for this purpose for years. Likewise, many authors have discussed its use in a variety of autoimmune disorders (e.g., this author discussed how DMSO can often be quite helpful for idiopathic

thrombocytopenic purpura). In the section below, I will discuss its use in autoimmune conditions.

Note: chemoattractants are molecules that play a key role in the pathogenesis of autoimmune diseases by recruiting immune cells to affected tissues and when the chemoattractant system is dysregulated, it can contribute to immunopathology. DMSO has been found to prevent the recruited immune cells from sticking to the affected tissue, which in turn may also play a key role in how DMSO prevents immune disease.

Interstitial Cystitis

Interstitial cystitis (also known as painful bladder syndrome) is defined as an unexplained irritation of the bladder wall that frequently is extremely painful (especially as the bladder fills) and often causes the patients to need to frequently urinate (e.g., up to 50 times one day—including at night), frequently causes bloody urine and in time can lead to scarring in the bladder which further reduce its maximum volume (hence making everything even worse).

Note: estimates on how common this disease (which is more common in women) vary, but they generally range from 0.87% - 17.3% as sometimes more or less stringent diagnostic criteria are used to diagnose it.

Remarkably, despite how common and debilitating this condition is (e.g., readers have emailed me about it), there still is no "good" way to deal with it, so various approaches are used that sometimes give varying degrees of symptomatic improvement.

Fortunately, the only medical condition DMSO (at 50%—sold as RIMSO-50) is approved to treat is interstitial cystitis (IC). This it got approved before the FDA decided to stonewall all DMSO approvals (e.g., for scleroderma). DMSO is thought to help IC by doing the following:

•It reduces bladder inflammation and pain (see this study, this study, this study, this study, and the studies I linked to here).

•It relaxes the bladder and pelvic detrusor muscles, and appears to address detrusor fibrosis is found in approximately 53% of IC patients (which are common issues in untreatable IC).

•It reduces bladder scar tissue by preventing collagen buildup inside the bladder.

•It reduces erosion and thinning of the bladder by reducing inflammation (e.g., see thisand this study).

To illustrate:

A 38 year old lady had severe abdominal pain and blood in her urine. She needed to urinate approximately every 30 minutes, and said she was sure that she would be dead in a few months. She also thought she had cancer. After a complete examination and tests she was diagnosed with interstitial cystitis. She was treated with a bladder instillation of DMSO and told to drink one teaspoonful of DMSO twice a day in cranberry juice and felt better almost immediately. Two months later, her symptoms had disappeared. She had also complained about depression and aches and pains in various parts of her body. These were gone, and she said she felt like a new woman.

Additionally, it's quite safe (e.g., 100% DMSO put into the bladders of dogs for an hour each day produced no structural or functional changes to the bladder).

Similarly, since it is FDA-approved (and hence easy to research), a significant amount of evidence has accumulated over the years showing DMSO helps IC. That includes:

•A 1967 study that found DMSO was of great benefit for IC.

•A 1972 study of 21 patients that found 50% DMSO successfully controlled over half of the cases.

•A 1978 study (which can also be read here) of 213 patients with a variety of inflammatory conditions involving the lower genitourinary tract such as

intractable IC, radiation cystitis, chronic prostatitis, and chronic female trigonitis who received intravesical (DMSO applied to the bladder through a catheter), most of whom were women and the majority of whom had a good response to DMSO. This study included 100 women with chronic classic interstitial cystitis (and 14 men with it) along with 31 women with atypical chronic cystitis.

TABLE I. *Chronic interstitial cystitis — female: symptomatic response to intravesical DMSO**

Type of Response	Number			Percentage	
	Ohio	Alabama	Total		
Excellent	7	14	21	27	54
Good	12	9	21	27	
Fair	3	2	5	6	35
Poor	9	14	23	29	
Relapse	3	6	9	11	11

*Seventy-nine patients treated: 34 in Ohio and 45 in Alabama.

TABLE II. *Improvement in bladder capacity in 60 patients undergoing intermittent intravesical DMSO*

Bladder Capacity (cubic centimeters)	Patients — No.	Patients — Per Cent
> 300	11	67
100–300	29	
50–100	6	33
< 50	14	

Additionally:

- Of the 31 women with atypical IC, 13 had an excellent response, 10 a good response, 4 a fair response, and 4 a poor response. The visual appearance of the bladder improved in over 90% of the cases, but an improved bladder capacity over at least 100cc was only seen 20% of the time.
- Of the 14 men with IC, 3 had an excellent response, 6 a good response, 4 had a transient improvement but ultimately required surgery, and at the time of publication, it was unclear if the last person would require surgery.
- Of the 12 patients with radiation cystitis (e.g., from prostate cancer therapy) 50% had a positive response to it (3 “excellent,” 2 “good” and 1 “fair”).
- Of the 35 patients with chronic prostatitis, 75% benefited significantly, with 12 having a “excellent” response, 14 a “good” response, and in 90% of cases, inflammation of the prostatic urethra improved.

Note that study was preceded by this 1976 study.

•A 1978 study of 17 IC patients (including one man) found DMSO treated symptoms in 12 patients (sometimes in a dramatic fashion) while 5 did not respond.

•A 1988 study of 33 IC patients (including 3 men), found 53% had a marked improvement after DMSO (compared to 18% of placebo) and 93% had an objective improvement (compared to 35% of placebo).

Additionally, as this 1993 study and this 2012 study show, cases of IC that do not respond to DMSO often respond if another agent (e.g., heparin, corticosteroids, hyaluronic acid or analgesics) is mixed with the DMSO.

Lupus

I occasionally hear of DMSO being used to treat Lupus. For example, this author discusses how it greatly reduces the symptoms of Lupus and is more effective for the condition than steroids (which unlike DMSO are quite damaging if taken for a prolonged period).

The only publication I know of which evaluated DMSO's effect on Lupus reported on two women with Lupus that was causing (pathologically confirmed) lupus interstitial cystitis and had not responded to prednisone. Both had a complete remission of their interstitial cystitis after intravesical DMSO.

Asthma

Numerous patients have found DMSO is helpful for asthma, often reducing the dose of the harmful medications they need to manage the condition, and in some cases eliminating the need for it. Typically, this is done with topical applications that sometimes mix in other agents which are beneficial in asthma. Additionally, DMSO can help with allergies and patients taking DMSO for other issues sometimes notice their allergies disappear.

While many others (e.g., this author) have shared anecdotal reports that DMSO helped asthma, I only know of one study (summarized in this book) that directly

evaluated this. It gave 153 adults (84 men and 69 women) DMSO mixed with a bronchodilator, a steroid, and an antihistamine all administered by intramuscular injections of whom 43 of whom had frequent asthmatic crises (with asymptomatic periods) and 110 with more intense and frequent crises (despite receiving the standard therapies for asthma). The evaluations included all the standard pulmonary assessments, and it was found that the DMSO solution gave 37 (24.5%) an excellent result, 92 (60%) a good response, while 24 (15.5% had no change).

Note: many have observed that DMSO increases the potency of cortisol (thereby allowing many patients who require cortisone for an autoimmune disorder to drop to a lower and less toxic dosage). Similarly, a variety of effective potent topical products that combine DMSO with cortisol have been created. Two studies have also corroborated this effect in cells. One found that mixing DMSO with a steroid made the steroid between 10 to 1000 times more potent in stabilizing lysozymes (assessed by how many enzymes the lysozymes leaked), while the other found DMSO greatly increased steroids ability to reduce the proliferation of fibroblasts. Additionally, another study found that in adrenal cells from newborn pigs, 3-5% DMSO stimulated their secretion of cortisol while 10% DMSO inhibited it.

Multiple Sclerosis

Numerous authors have reported dramatic results in Multiple Sclerosis (MS) patients. For example, a 29 year patient who was paralyzed from MS and trying to get access to dialysis (when very few units were available) saw Stanley Jacob, who decided to risk giving her DMSO orally (despite her kidney failure).

Her improvement was dramatic—as dramatic as any benefit I have ever seen ," Jacob told me. Her renal problem seemed to come under control. Then—after a few more weeks—she walked again.

"Now, six years after her first DMSO treatment, she still has wobbly knees. But she walks. She drives her car. She takes care of her two children and her

husband. But she is going downhill. I wish we could help her again, but we just don't seem able to. Despite this, however, I am not convinced that DMSO alone is useful in multiple sclerosis.

Likewise, another author shared the case of a California woman who was confined to bed, typically was in the fetal position, and was living at a convalescent hospital as she was expected to die within a few months. She was then given DMSO through multiple routes (e.g., injectable, oral and topical).

Shortly after treatment started, this lady complained that the treatment was causing pain in her legs. Prior to treatment she had very little feeling in her legs so even this pain was considered to be positive. Slightly over a year after treatment was started, this lady was able to move her legs. She later was able to feed herself. Improvement continued until this lady was moved to another state to be closer to some members of her family who thought the same treatment would be available in her new location.

The only study I know of that evaluated DMSO for MS was conducted on 34 patients in Russia in 1984. Overall, the investigators felt DMSO had a very positive result for MS, with the best results seen in patients who had remitting MS, while the results were more inconsistent in patients with rapidly progressive MS. The investigators assessed this was due to DMSO causing remyelination, a reduction in edema, and improved communication between nerve cells alongside DMSO having a positive effect on immunity and antiallergic and reparative action on the injured tissues.

Note: there was also a reported case of Stanley Jacob treating a patient with ALS which resulted in "some instant, overnight and slightly delayed wonders of therapy," and this user reported she saw it visibly improve the condition. In our own experience IV DMSO is one of the only things which can treat ALS (typically it halts the progression of the disease).

Uveitis

One study induced uveitis (inflammation of the middle layer of the eye) in dogs, and found that subsequently giving DMSO decreased intraocular pressure and fibrin production—suggesting DMSO has therapeutic value in this condition.

Note: another study used DMSO to treat endogenous iridocyclitis (inflammation of the vascular layer of the eye).

Inflammatory Bowel Diseases

Quite a few of my colleagues believe the most important use of DMSO is that it is profoundly anti-inflammatory (but safe), and that it is particularly useful for inflammatory bowel disorders—especially when done early in the illness. Likewise, many DMSO authors report the same.
Note: others believe DMSO's best use is healing brain tissue (e.g., after a stroke).

The only study I know that directly evaluated this question (and can be read here) took patients with recurrent attacks of proctosigmoidal ulcerative colitis that was not prevented by 2mg prophylactic sulfasalazine and then gave them 500 mg sulfasalazine and 10 mg of prednisolone four times a day, and a 20mg prednisolone enema at night. After two weeks passed, 45 (51%) were free of symptoms, and 45 were given DMSO while 46 were given allopurinol (in addition to the existing regiment), resulting in 84% being free of symptoms. After two weeks, they were then put on 2 mg of sulfasalazine alone each day, or it with either allopurinol or DMSO. After a year, 25% of those on sulfasalazine had a relapse, while 5% of those who also received allopurinol and 5% of those who also received DMSO relapsed. Additionally, the data showed DMSO significantly reduced the sedimentation rate DMSO over 2 weeks (by 77% compared to 37% with the standard approach), the (high) white blood cell count (by 65% vs. 41%) and raised the low albumin (by 9% vs. 7.8%). While all of that is a bit confusing to follow, it essentially says that DMSO, when compared to standard therapies, improved ulcerative colitis and prevented its recurrence.

Additionally, while not a study, I thought this passage by Pat McGrady should be included:

At 12:50 p.m., February 5, 1968, E. Rottenberg of the Ozothine Laboratories, Hauts-de-Seine, France, [unsuccessfully] applied for a patent for DMSO 'for treatment of all irritating conditions of the alimentary canal.'

He cited as support for his application these examples:

Acute gastritis—Twenty-eight patients unable to work went back to their labors following five to eight days of treatment, rid of such symptoms as nausea, vomiting, pain, gastric heaviness; their stomach secretions became normal and so did their general condition. One year later, twenty-one were still free of symptoms, working and off their diets. During this time about ten had undergone treatment again for about fifteen days.

Chronic gastritis—Thirteen patients on assorted treatments all relapsed on stopping treatment. On DMSO by mouth for one to two months, symptoms cleared up and all of them went back to work. At the end of a year, all of them remained improved, although some had resumed treatment two or three times.

Peptic Ulcer—Five patients were completely cured of recent peptic ulcers with oral DMSO, without recurrence during the following year.

Enterocolitis—Six patients with abdominal pain for several months and with diarrhea, emaciated and asthenic, began to improve after eight days on oral DMSO, and all were back at work in two months, pain-free and in good shape.

Mucomembranous colitis—Three patients were "cured" after three weeks of oral DMSO.

When the DMSO is combined with star anise, the appetite improves, the application stated.

Myasthenia Gravis

In order for skeletal muscles to fire, they need to receive acetylcholine from the nerve that directs them. In myasthenia gravis (MG) the body forms antibodies to the muscle's acetylcholine receptors (AChRs), and as they are destroyed, the muscles need more and more acetylcholine to be sent by the nerves to activate. In turn, MG is managed by various immune suppressing medications, filtering the AChR antibodies out of the blood and acetylcholine esterase inhibitors (which boost acetylcholine levels). Since DMSO both reduces harmful immune activity and is also an acetylcholine esterase inhibitor, there is a rational basis for using it to treat MG.

That possibility was initially discovered (accidentally) in 1980, when two researchers tested a variety of agents for their ability to reduce AChR antibodies, and realized that the DMSO being used as a vehicle for the various agents they were testing was independently reducing those antibodies. They then found giving rats daily intraperitoneal injections of 1 mL DMSO for two weeks resulted in a 52% decrease in AChR antibodies (but not total IgG levels) that were observed for an additional six weeks after treatment was terminated.

Note: after this discovery, the researchers expressed their eagerness to test DMSO in humans with MG (the New York Times even covered it).

A follow-up rat study then found DMSO suppressed anti-AChR antibody levels by an average of 53%–76%, with the effect being similar regardless of whether DMSO was given orally, rectally, or intraperitoneally. Additionally, DMSO treatment was observed to suppress the anti-AChR antibody response in rats to a weak primary antigenic stimulus.

Sadly, no human studies have ever been performed for DMSO with MG. However, patients and integrative healthcare providers sometimes do it and report success from doing so (along with again cautioning that if cortisone is being used, DMSO will significantly increase its effect on the body).

Note: this research inspired a 1982 study to determine if DMSO suppressed thyroid autoantibodies (which were experimentally induced in rats). It did, and also was found to increase the ratio of IgM to IgG plaque forming cells (which

suggested a true immunoregulatory effect). In turn, some patients report that DMSO benefits autoimmune thyroiditis.

Sjogren's syndrome

Sjogren's syndrome (autoimmunity of the parotid gland) results in a loss of saliva and the mouth becoming very dry. Since it is a very difficult condition to treat, this table within a larger study caught my eye:

TABLE 5

EFFICACY OF DMSO APPLICATIONS ON PAROTID GLANDS IN PATIENTS WITH SJÖGREN'S SYNDROME

Mode of Treatment	Total Number of Patients	Improvement			
10 applications		Significant N (%)	Moderate N (%)	Slight N (%)	Without Effect N (%)
DMSO Only	41	21 (51)	14 (34)	5 (12)	1 (2.5)
DMSO + ascorbic acid	10	6 (60)	3 (30)	2 (20)	
DMSO + heparin	10	5 (50)	2 (20)	2 (20)	1 (10)
DMSO + hydrocortisone	4	2 (50)	2 (50)		
Overall	65	34	20	9	2

30% DMSO, 5 ml of 5% ascorbic acid, 125 IU heparin, 125 mg hydrocortisone

Pleomorphism and Autoimmunity

Over the years, I've seen many accepted mechanisms of action for pharmaceutical drugs later be discarded (e.g., the chemical imbalance theory of depression was pseudoscience from the start, and it is now becoming accepted antidepressants don't work by raising brain serotonin levels—which if anything actually increases the risk of suicide).

One of DMSO's widely recognized properties is it causes cancerous cells to revert to being normal. In researching that (which will be covered later in this series), I came across a fascinating study that tested cancer patients for pleomorphic bacteria (something many previous pioneers of successful but suppressed alternative cancer therapies like Rife and Naessens also believed caused many cancers) and found those bacteria were present. It then tested all 27 isolated organisms and found that 12.5-25% DMSO caused an almost complete inhibition of their growth (without affecting intact red blood cells).

The pleomorphic model of bacteria (discussed further here) essentially states that bacteria can significantly change their morphology (to the point they are almost unrecognizable from their original form), that these changes are often done in response to their environment, and that some forms are relatively harmless to the body, while others cause disease. In turn, since things that kill bacteria often transform them into ones that are more pathogenic, a longtime belief within certain schools of natural medicine is that the goal should be to change the terrain of the body to encourage a benign morphology of bacteria rather than trying to kill them all off.

Note: some of these schools also believe this applies to viruses and fungi, and that, in some cases, they can transform from one type to another (e.g., a bacteria becoming fungal).

A large group of modern researchers studied this subject for decades (e.g., hundreds of research studies they conducted are summarized in this wonderful textbook by Lida Mattman). Five of their key observations were:

•Antibiotics will often fail to kill every bacteria present and then trigger those that survive to enter a primitive survival state known as a "cell wall deficient" (CWD) form resembling a mycoplasma. This process in turn, was most commonly triggered by antibiotics that attack bacterial cell walls (which characterizes many commonly used antibiotics).

•CWD bacteria are very hard to detect (most standard microbial methods will determine that no organisms are there when CWDs are present).

•When conditions are more optimal for survival, CWD organisms can revert to the active form and cause an infection that had been eliminated with antibiotics to suddenly and inexplicably recur (which, for example, we frequently see with urinary tract infections).

•Once present, CWD bacteria will often enter cells and cause chronic inflammation because the immune system will attack cells with the CWD bacteria.

•Many different unexplained autoimmune disorders (e.g., sarcoidosis) have characteristic CWD bacteria present that can be repeatedly identified from their inflamed tissue (the textbook cites an exhaustive amount of data substantiating this).

•While standard antibiotics are ineffective in treating CWD infections, non-standard ones (e.g., erythromycin or minocycline) often are, but the sensitivity to those antibiotics is highly variable depending on the causative organism.

In practice, we find 10-15% of chronic illnesses (including blood clots and cancers) have a pleomorphic etiology, but rather than try to eliminate those organisms with antibiotics (which always have side effects), we instead give signaling products derived from healthy bacteria that cause the pathologic bacteria to transform into a non-harmful form, which in those applicable cases, frequently yields remarkable results (e.g., this approach is very useful for lupus and many cancers). Likewise, I believe this model explains a longstanding belief within natural medicine that giving antibiotics for an acute infection often transforms it into a chronic illness down the road.

Note: ultraviolet blood irradiation is also quite effective at eliminating these organisms and the diseases they cause. For example, a case report discussed a cohort of 5 family members who had a variety of chronic diseases (e.g., Crohn's disease, asthma, complex regional pain syndrome, hypothyroidism, type 1

diabetes mellitus, and lymphangiomatosis) and found that 4 had a MAP (mycobacterium paratuberculosis) infection. Two patients received antibiotics and UVBI, and then experienced a resolution of their autoimmune symptoms.

As it so happens, many of the most commonly used rheumatologic drugs also function as antibiotics (e.g., see this study, this study, and this study). For example, the most commonly used drug in rheumatology (methotrexate) works by blocking the enzyme that converts folate into the active form which is needed for DNA synthesis, and likewise, two commonly used antibiotics (sulfamethoxazole and trimethoprim—typically sold in the combination bactrim) work by blocking the folate converting enzymes in bacterial cells. In turn, when bactrim is given in conjunction with methotrexate, the combination is often much more toxic to patients than either is alone.

In the case of methotrexate, my suspicion there might be another mechanism at work for the drug began early in my training when I learned that it worked by blocking folic acid production but that "the side effects of methotrexate can be prevented by giving supplemental folic acid" (which essentially defeats the stated point of the drug) and once I learned about the pleomorphic model of autoimmunity, I hence suspected it had antimicrobial effects on those organisms. As the previously mentioned studies show, it does, but it is typically considered to be a poor antibiotic because it has poor bacterial permeability (difficulty entering them). However, unlike normal bacteria, cell-wall deficient bacteria lack a cell well and hence are much more permeable.

Likewise, over the years, many have observed using non-standard antibiotics (particularly minocycline) can provide dramatic improvement for autoimmune conditions like rheumatoid arthritis or ALS. Still, since none of them ever worked consistently, they never became standard of care. That said, many forgotten trials exist, such as this Lancet publication showing minocycline frequently helped early-stage scleroderma.

Note: on Sept. 29, 1998, the National Enquirer had an article titled: "Deadly Disease That Turns People To Stone Cured By Simple Antibiotic." I have been

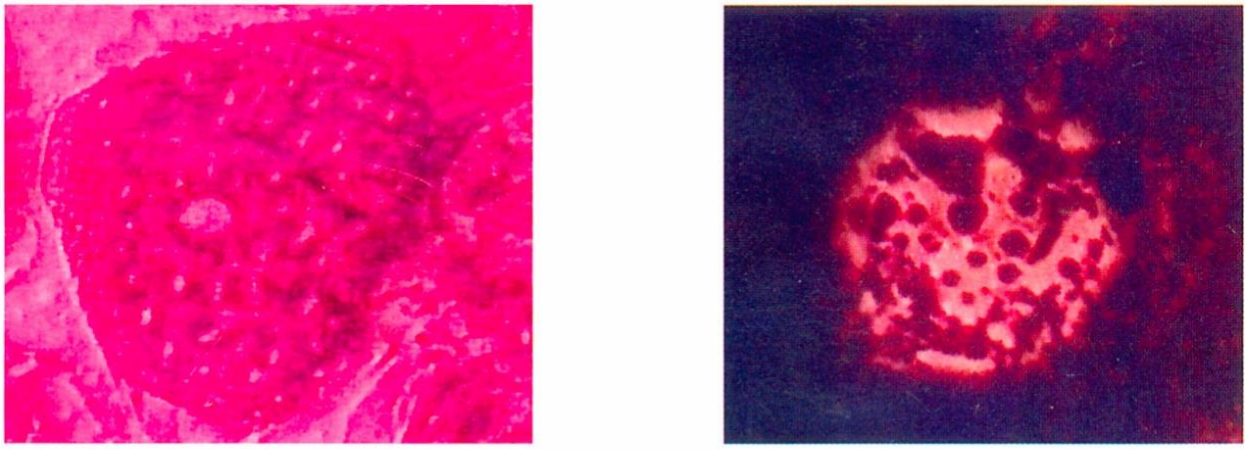
trying to find a copy of it (as Mattman referenced it in her Scleroderma chapter, but the title seems to describe fibrodysplasia ossificans progressiva).

In the case of both interstitial cystitis and scleroderma, many suspected they might have a bacteria component, but since they could not be isolated with conventional methods, the cause of these illnesses remains "unknown." However:

•A study of bladder biopsies from interstitial cystitis patients (using methods that can detect CWD organisms) was able to identify a gram-negative organism (not found in controls) they described as "the forms contain nucleic acids and resemble cell wall-deficient bacteria in gross morphology; however, their swirled myelin-like ultrastructure is unusual and suggests a heretofore unclassified microbe." Later, another study was able to also identify these organisms in the blood of interstitial cystitis patients and determined that it was highly resistant to antimicrobials (e.g., it could replicate in 5% phenol and was not inhibited by chloromycetin or streptomycin).

Note: numerous studies have shown interstitial cystitis makes someone 2-5 times as likely to develop bladder cancer, a cancer which is often treated with the (live) tuberculosis vaccine. As tuberculosis is a mycoplasma, I have often wondered if this therapy works by stimulating the immune system to eliminate a related CWD in the bladder.

•In the case of scleroderma, one researcher has consistently found acid-fast pleomorphic organism in the tissues of Scleroderma patients.[1,2,3,4,5,6,7] Likewise, Mattman was able to consistently culture a pleomorphic organism from the blood of those patients.



PLATES 5A AND B Slide blood cultures of two scleroderma patients in buffered auramine-rhodamine. (Contains 5% phenol.) Growth was microaerophilic.

In short, I suspect that beyond DMSO being anti-inflammatory, a key reason why it helps so many autoimmune conditions is because it effectively inhibits the growth of pleomorphic bacteria. Unfortunately, in some conditions (e.g., scleroderma), this also requires it to be consumed for life as rather than eliminate the bacteria it only inhibits their growth.

Note: I also suspect one of the reasons the COVID-19 vaccines cause a variety of autoimmune conditions is because the immune suppression they create allows already existing CWD infections to grow out of control. Likewise, a case can be made the childhood vaccines trigger this process either through immune suppression or by the adjuvants they contain triggering bacteria to change to their CWD forms.

Presently, I feel more comfortable suggesting this model for IC than scleroderma, as we have found two specific therapies aimed at correcting the pleomorphic balance of the bladder are very helpful for IC, whereas scleroderma patients are so much rarer, there hasn't been the opportunity to adequately explore this hypothesis there. Likewise, one of the only other things that really helps IC is avoiding the dietary triggers for it, and within the terrain theory model, a large focus is always given to eating foods that encourage a healthy morphology of the bacteria present within the body.

DMSO Protocols

One of the things that's very challenging about using DMSO is that there is a significant amount of variation in what each individual will best respond to. Because of this, in the first and second parts of this series, I attempted to provide a very detailed explanation that could try to account for each possibility. From the feedback I have gotten, I've realized that it is also necessary to make a more straightforward set of instructions for using DMSO that is more accessible.

DMSO Could Save Millions From Brain and Spinal Injury

The decades of evidence showing DMSO revolutionizes the care of many "untreatable" circulatory and neurologic conditions.

•DMSO is a remarkably safe chemical that protects cells from otherwise fatal stressors (e.g., freezing, burning, shockwaves, ischemia). Since the heart, brain, and spinal cord are particularly vulnerable to injury, DMSO can produce miraculous results for those conditions.

•The usage of DMSO completely transforms the management of strokes (including brain bleeds), heart attacks, and spinal cord injuries. As I will show here, had the FDA not sabotaged DMSO's adoption, in addition to countless lives being saved, millions could have been protected from a lifetime of disability or paralysis.

•DMSO has many other remarkable properties. For example, it stabilizes proteins, and thus treats many challenging protein disorders (e.g., amyloidosis and numerous genetic disorders).

•Many conditions DMSO treats are typically considered to be incurable. In this article, I will focus on DMSO's remarkable utility for the conditions that respond best to intravenous DMSO (e.g., a variety of circulatory disorders like varicose veins or Raynaud's) and complex neurological disorders (e.g., Down Syndrome, Developmental Delay, ALS, Alzheimer's, Parkinson's), along with how to administer IV DMSO and DMSO stroke protocols.

If I were stranded on a desert island or knew the world was ending and I could only bring a few therapies with me, one of them, without a doubt, would be DMSO. This is because:

•It treats a wide range of severe illnesses which are often otherwise incurable

and frequently fatal or lead to a lifetime of permanent disability.

•It effectively treats acute injuries and rehabilitates chronic musculoskeletal disorders (e.g., arthritis). Because of this, it's one of the best "pain medicines" out there and has allowed many to get their lives back.

•It has a variety of unique properties that open up a completely different dimension to how medicine can be practiced.

•It is one of the safest medically active substances in existence.

Remarkably, in the 1960s, this was recognized and DMSO took the nation by storm (e.g., people everywhere were clamoring for it, gas stations would often advertise they sold it, and tens of thousands of research studies were conducted by enthusiastic scientists around the globe). Now however, outside of it being a laboratory chemical or an alternative therapy some people use for joint pain, few are even aware of DMSO's existence.

This was due to the FDA waging a multi-decade long war against DMSO (despite widespread outcry from Congress and the public), which I believe was ***arguably*** the worst thing the FDA has ever done to the country.

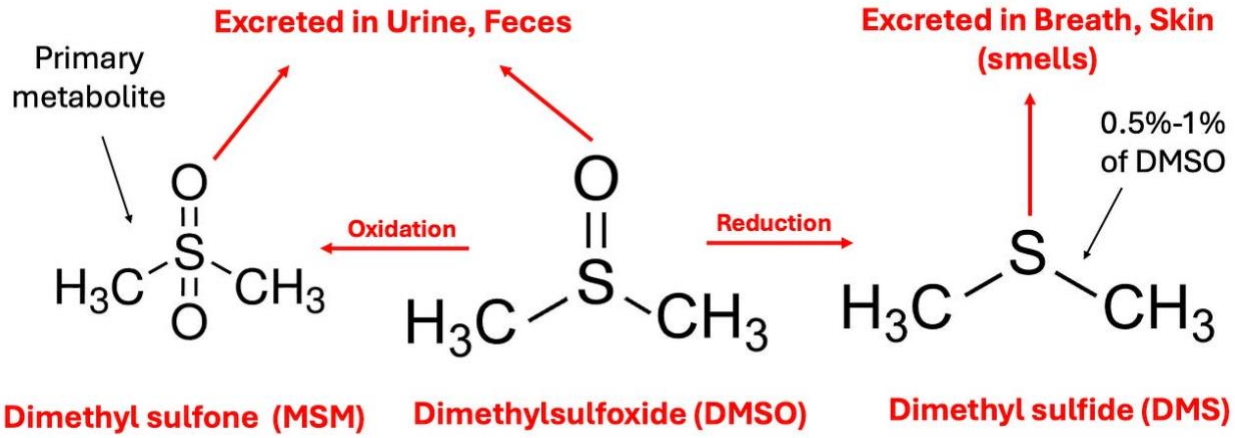
Since I am uniquely positioned to present many of the forgotten sides of medicine to the public, I've long felt the DMSO story needs to be told. Simultaneously however, since there is a wealth of data on this topic, I wanted to ensure I honored the importance of this subject and accurately present it. For this reason, I've spent the last three months reading and arranging thousands of pages of literature. Since there is so much to say on this topic, this series will be broken into a few parts. In the first installment, I will cover the key properties of DMSO and the challenging conditions where it provides the most profound benefits.

The Forgotten Side of Medicine is a reader-supported publication. To receive new posts and support my work, please consider becoming a free or paid subscriber. To show how others have benefitted from this newsletter, click here!

Subscribe

What is DMSO?

Dimethyl sulfoxide, as the name implies, is comprised of two methyl groups and an oxygen atom bonded to sulfur. This simple chemical and its breakdown products exist in nature (e.g., they can be found in small amounts in milk, tomatoes, tea, coffee, beer clams, and cooked corn, while the salty smell of the ocean is, in part, due to microalgae near the surface creating dimethyl sulfoxide—some of which also makes it into the rain).



In the body, DMSO is then oxidized or reduced, with the oxidized form (more commonly known by the name methylsulfonylmethanethe or MSM—a common joint healing supplement) being the primary fate of it, while the reduced form DMS (which naturally exists in trace amounts in the body) is the more notorious metabolite because it is responsible for DMSO's characteristic "side effect," a distinctive garlic or clam-like odor (or taste) that is excreted through the mouth and skin which certain individuals have difficulty tolerating (and forcing certain

long-term DMSO users to creatively arrange their social life). This effect typically lasts a few hours, but in certain cases can last up to 72 hours, and appears to be reflective of the overall health of the body (since as people detox, their DMSO odor decreases).

Note: one school of thought in integrative medicine (e.g., Dr. Mercola is a strong proponent of this model) argues that insufficient oxidation, which leads to a build-up of reduced molecules in the body (termed reductive stress), is a root cause of many illnesses (e.g., the mitochondria cannot function properly if the electron transport chain is reduced). The susceptibility to the DMSO odor is one of the best illustrations I have found of this model, particularly since there are many reports showing that concurrently taking chlorine dioxide (an oxidizing agent) eliminates it (as does a user's overall health improving over time). Likewise, some DMSO users and one study have found that when DMSO was taken at the same time as alcohol (another oxidizing agent), the odor was reduced, whereas when alcohol was given an hour after DMSO, ***the opposite occurred (****which touches upon the fact DMSO can sometimes cause excessive drowsiness if combined with a sedative).*

Due to its relatively small size, having both a polar and non-polar half, being able to form hydrogen bonds slightly stronger than those found between water molecules, and not releasing protons, DMSO has two remarkable properties:

•It acts as a near-universal solvent (e.g., it interacts with a vast range of biomolecules and can easily mix with any concentration of water).

•It's able to pass through biological membranes without damaging them (something to my knowledge, nothing else can do).

Because of this, DMSO will rapidly enter the body (including the brain) regardless of its route of administration (e.g., within 5 minutes after going on the skin it can be found in the blood, and within an hour, it can be found within the bones), but simultaneously does not accumulate within the body after prolonged use (and virtually none remains a week after administration).

Note: in one study of rats, radio-labeled DMSO was found to enter all tissues of the body within 30 minutes (with the highest levels seen in the plasma, kidney, spleen, lung, heart, and testes and the lowest in the lens of the eye), with DMSO levels declining to minimal levels after 24 hours, another study found over 90% of topically applied DMSO is absorbed with tissue concentrations peaking 1.5 to 2 hours after topical administration (and 85% being excreted unchanged in the urine after 24 hours) while another study found orally administered DMSO reached a peak blood level in 4 hours and was undetectable after 120 hours, while MSM appeared in the blood after 48 hours and disappeared after 400 hours (with another human study finding similar results).

DMSO, in turn, has an almost endless amount of uses as it can be applied in almost any manner (e.g., it is frequently applied through the skin—although less is absorbed in this manner than the other routes of administration). Almost any drug or substance can be combined with it and administered through the skin (e.g., steroids, NSAIDs, numerous antibiotics or antivirals, glucose, vitamin C, hydrogen peroxide, or chlorine dioxide). In many cases, the effect of those drugs is enhanced, and simultaneously, their toxicity is reduced (although, in some cases, the toxicity increases).

Note: DMSO is less effective at bringing larger molecules into the body (e.g., it had been hoped it could be mixed with insulin so diabetics could have a way to bypass the need for injecting insulin—but this didn't work).

Cellular Protection

DMSO's ability to spread throughout the body (including into the brain) initially seems concerning—however rather than be toxic to cells, DMSO heals them and protects them from damage **and a wide range of otherwise lethal stressors**. Since DMSO does not expand when it freezes (at 65.4°F), this property (and the fact that a 66% DMSO 33% water mixture freezes at -99.4°F), has made it a revolutionary substance for preserving frozen cells (e.g., stem cells). In contrast, very few other substances exist that cells can tolerate such a high concentration of.

Note: since some of the information I need to present here is a bit technical for those wanting more references, if you find some of the information is too dense, skip over it. Additionally, I need to acknowledge many of these experiments were cruel and go against my own values of supporting animal welfare.

DMSO, in turn, has been shown to:

•Protect tissue from dying when its blood supply is cut off (e.g., in skin flaps, in the kidneys [replicated here], in the small intestine, in the liver, or in the heart—particularly when hydrogen peroxide is given concurrently as an oxygen donor), prevent a reperfusion injury when its blood flow is restored, prevent the formation of clots when blood flow is restored (e.g., in mesenteric veins), reduce the amount of permanently damaged tissue following a myocardial infarction and maintain the heart's ability to circulate blood when its blood supply is cut off.

•Prevent heart damage caused by dietary copper deficiency and kidney failure caused by toxic mercury exposure.

•Increase the production of ATP in c ells (e.g., minute concentrations of DMSO have been shown to increase metabolism by shunting metabolites from glycolysis to the mitochondrial Krebs cycle), which likely both accounts for some of DMSO's protective effects and its anticancer effects.

•Prevent a rapid influx of calcium or sodium ions, a process which frequently occurs when a cell's viability is threatened (and then results in the death of the cell).

•Prevent asphyxiation from being lethal (e.g., one study put rats into a pure nitrogen environment for 210 seconds, and found that 90% who received DMSO in advance survived compared to 15% of those that received saline).

•Protect cells from being destroyed by sonic disruption via an ultrasonic vibrator (with 78% of cells receiving 10% DMSO surviving compared to 13% of controls).

•Save the fingers of individuals with severe frostbite that would otherwise require amputation. DMSO has also been shown to protect cells from freezing damage, and to protect rabbit ears and thighs from being damaged by frostbite induced by immersion in a -42°C bath.

•Treat a variety of burns (e.g., superficial burns or partial thickness burn wounds) without being prone to producing infections (e.g., a 1985 study by Russian burn specialists, in adolescents, found DMSO was superior to the other treatment options [nitrofurazone, trimecaine, and monomycin] while another study also found DMSO prevents burns from becoming infected). This includes severe acid skin burns (along with preventing their progress), and both acidic and alkaline burns that erode the esophagus (e.g., by inhibiting the destructive inflammatory response following those esophageal burns) or alkali burns to the eye.

Finally, a study of 1371 patients with skin disorders (including 173 patients with second or third-degree burns on the hands, feet, and legs) who received a topical DMSO spray approximately three times a week found that 95.04% had a complete recovery, with the majority of the remaining 4.96% being due to premature cessation of DMSO or the patient no longer being under observation.

Note: a dog study showed DMSO also aids in the elimination of damaged (burned) skin.

There are also countless cases of severe burns that within minutes of DMSO stopped hurting (a major problem with burns), didn't blister, and subsequently fully recovered (e.g., no skin contractures). One of the most extraordinary ones (reported by William Campbell Douglass) involved six year old girl who'd slipped her index finger in a light socket for a prolonged period, after which it was cooked through and burned ash white at the tip. Within 30 minutes Douglass got the finger into a full-strength DMSO bath, and after 20 minutes, the searing pain had disappeared, the next day the finger turned pink, and then rather than be lost, fully recovered.

In practice, provided DMSO can administered quickly enough, it will prevent injured (burned) tissue from dying, a property that is repeatedly seen with DMSO various applications (e.g., through it rescuing neurons after a stroke).

Note: patients have also reported DMSO relieves sunburns in 10-30 minutes.

•Protect cells from being damaged by (often otherwise fatal) radiation (and can be used prophylactically). For example, numerous reports showed applying DMSO to newborn rat skin protected them from damage from x-ray exposure, while in fruit flies, DMSO significantly reduced x-ray mortality and mutations of their sperm , and in golden hamster embryos, DMSO protected them from gamma rays—the strongest form of radiation. DMSO has also been shown to prevent damage to mouse eyes following radiation exposure and to prevent the harmful (bystander) signals irradiated cells emit in their vicinity from damaging non-radiated cells (a fascinating phenomenon which I believe is mediated through mitogenic radiation). Likewise, DMSO has been repeatedly shown to reduce chromosome damage from radiation.

Note: DMSO has also been found to prevent damage from radiation therapy in non-cancerous cells and thus has been used as a complementary cancer treatment.

•Neutralize harmful free radicals (e.g., those caused by radiation like hydroxyl) through scavenging charged ions (e.g., H^+) and forming protective DMSO radicals. This, for example, was shown to be a mechanism behind DMSO's ability to protect DNA from being damaged by radiation. Additionally, one study found DMSO prevented 80% of the DNA damage caused by gamma radiation and 100% of the DNA damage caused by a free radical generating system (which used iron and hydrogen peroxide).

Finally, due to these protective qualities, DMSO's toxicity is extremely low (e.g., due to the immense scrutiny DMSO has been subject to, a large number of animal safety studies were conducted, and in these, animals survived extraordinarily high doses of DMSO). Many human studies have also been done, the most significant of which involved 78 prisoners over the course of 14

and then 90 days applying 1 g/kg to their skin (over 3-30 times the maximum amount of DMSO typically used) and then being subject to an extensive battery of toxicology tests—all of which showed DMSO was safe. In turn, despite millions of treatments having been given, no death has ever been linked to DMSO (and the only two ever considered, one in 1965, and one in 1994 did not make a strong case DMSO was the cause of death).
Note: thousands of papers have been published on the biological effects of DMSO and I have not yet found one that reported an adverse event from DMSO. Because of that, I've mostly avoided mentioning each study I site here, "detected no adverse events from DMSO."

Along with the garlic breath, the most common side effect (affecting 50-75% of users) is (reversible) irritation at the site when 70% DMSO is applied topically on the skin (which can be mitigated by applying a lower concentration of DMSO and frequently decreases with increasing topical application), that occasionally after prolonged used can lead to minor reversible changes in the skin (e.g., scaling). In roughly 15% of patients this skin reaction is marked and in 3.5% it is significant enough that they stop treatment.

Less common side effects include nausea, increased urination, sleepiness, and difficulty tolerating high IV doses. The most consequential (but fairly rare) side effect is an allergic reaction to it (which affects roughly 1 in 2000 users—although it does not ever seem to manifest in an anaphylactic fashion). Additionally, there is a high theoretical risk of a poison being on the skin when DMSO is applied and brought into the body (hence why patients are advised to wash their skin before applying DMSO) but significant instances of this have been extraordinarily rare despite millions of DMSO treatments being performed (rather the more common issue arises from using incompatible IV tubing which DMSO can dissolve as it travels to the body). Lastly, it is generally advised not to inhale DMSO (although it rarely vaporizes).

Circulatory Disorders

In addition to protecting tissues from death, DMSO is remarkably effective at removing excess fluid from outside the bloodstream, increasing circulation, and eliminating circulatory obstructions (e.g., clots). As each of these issues comes up quite frequently, DMSO is often extremely helpful in a variety of circulatory disorders.

For example, the leading DMSO researcher found that 50% of patients with Raynaud's syndrome had their symptoms eliminated with DMSO and that thrombophlebitis responds excellently to DMSO and two researchers, using plethysmographic methods, demonstrated objective improvement in peripheral artery insufficiency in a large number of patients receiving topical DMSO . Likewise, DMSO has been shown to improve diabetic circulatory impairments such as peripheral neuropathy, or diabetic ulcers (where one study of hundreds of patients reported over a 94% treatment success rate) and prevent future amputations.

DMSO (topically and especially intravenously) is also quite helpful for varicose veins, in some cases improving the varicose veins within minutes and having the wiggly veins not reappear for months, which has been hypothesized to result from DMSO strengthening the vessel walls and their tone alongside generally improving venous and capillary circulation. Likewise, a study of 67 patients with varicose ulcers (39 females and 28 males), found they had a remarkable response to DMSO (even chronic ulcers which had been present for years and not responded to other treatments).

Additionally, DMSO has been shown to help many other circulatory disorders:

TABLE 1

TREATMENT OF ACUTE OR CHRONIC VENOUS DISORDERS OF THE EXTREMITIES

Group	Condition	Results		
		Good	Fair	Poor
1	Spontaneous superficial phlebitis (varicophlebitis, thrombophlebitis)	14	3	4
2	Phlebitis after infusion treatment	16	3	8
3	Subjective complaints due to chronic venous disorders (mostly varicose veins)	29	10	8
4	Postphlebitic leg with dermatosclerosis, indurations, hyperkeratosis, etc., and subjective complaints	17	6	9
5	So-called additive factors in chronic venous insufficiency (tendo-periostitis, myogelosis, arthropathy of the knee joint, static insufficiency)	6	2	4
	Total numbers (overall total 139)	82 (59%)	24 (17%)	33 (24%)

Note: another DMSO study found that of 57 patients with peripheral vascular diseases, 35 had a complete remission of symptoms, 10 had a partial remission, and 12 had no response.

This is likely because, in addition to the previously mentioned properties:

DMSO can also increase or decrease the force of heart contractions (e.g., a 70 mM DMSO concentration or less has a positive inotropic effect, while a higher one can do the opposite or create a mild hyperpolarization that prolongs the action potential) in a manner independent of beta-adrenergic receptors, and does not alter cardiac rhythm. A slow infusion of DMSO can also cause a reduction of systemic vascular resistance and an increase in cardiac output (which was also shown in this study that simulated a heart attack).

DMSO prevents blood clot formation in the body and is a powerful platelet deaggregator (which prevents clotting). For example, it was found to reverse the reduction of coronary blood flow induced by a critical stenosis on the canine [dog] circumflex coronary artery without changing their other circulatory

parameters, and it's been shown with electron microscopy that DMSO prevented clots from forming at surgically blocked carotid arteries.

DMSO's effects on platelets are thought to be because:

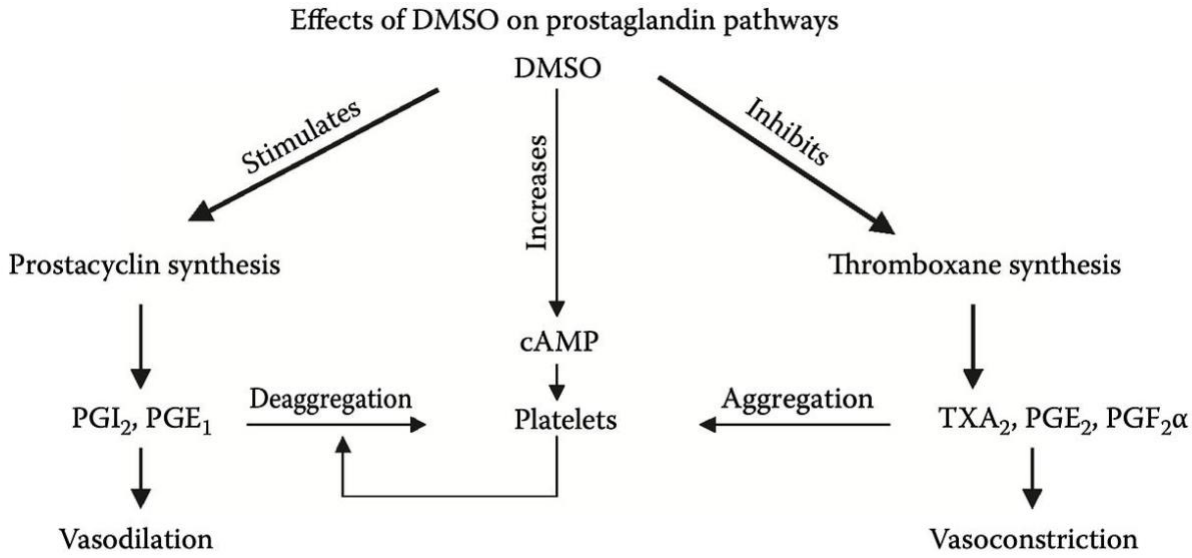
•DMSO is a sulf-hydryl inhibitor (which platelets need to bond) and a hydroxyl radical scavenger (which also inhibits platelet function).

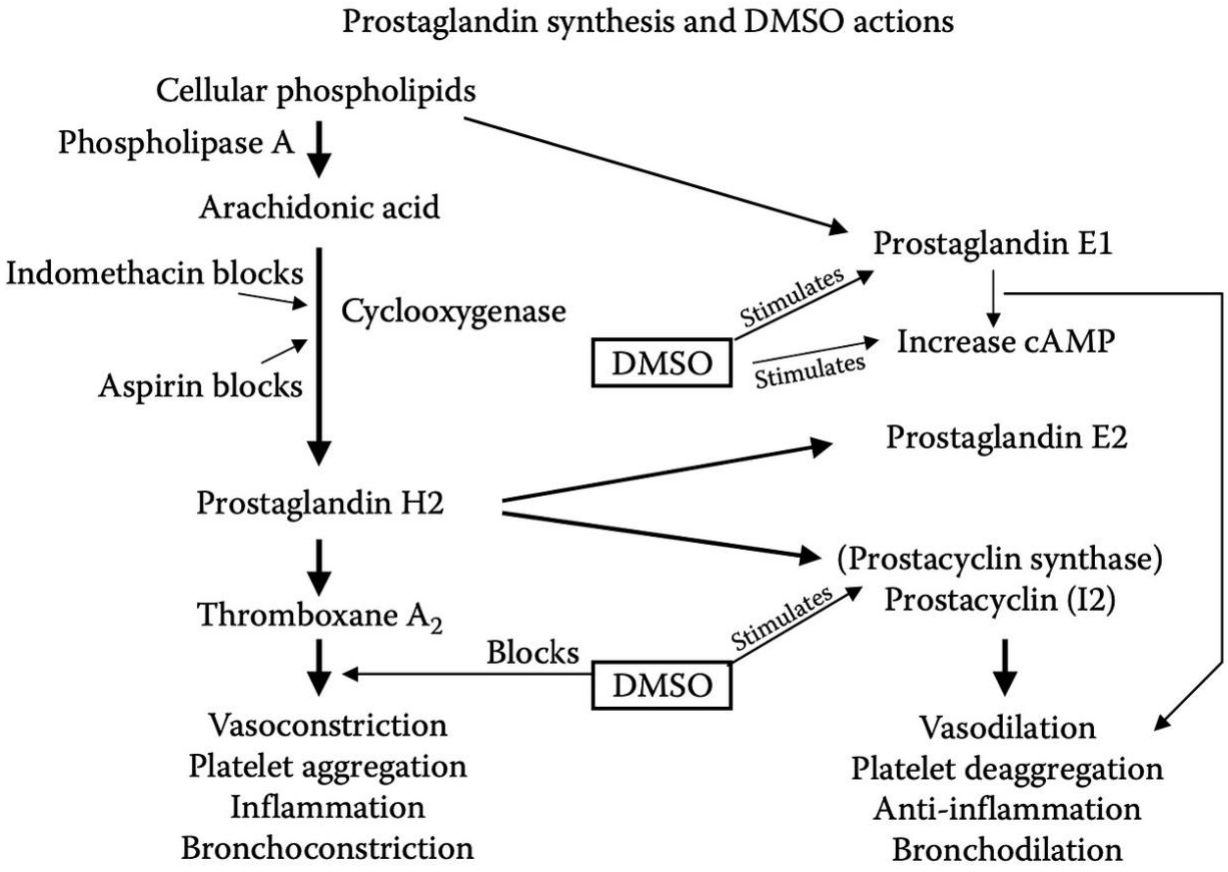
•DMSO inhibits tissue factor (TF) expression (a key part of clot formation—especially in the presence of TNF-α), thrombus (clot) formation, and vascular smooth muscle cell activation. TF (a platelet protein) is a key link between inflammation and blood clotting.

•It increases cAMP (cAMP inhibits platelet aggregators) by inhibiting one or more of the platelet enzymes that breaks cAMP down (PDE2, PDE3, and PDE5—which is how many circulation improving drugs like Viagra also work, along with certain cognitive improving ones).

•It is a selective inhibitor of COX-1, it stimulates PGE1, and inhibits PGF2α, blocks PGE2 synthesis and likely blocks the release of thromboxane A2.

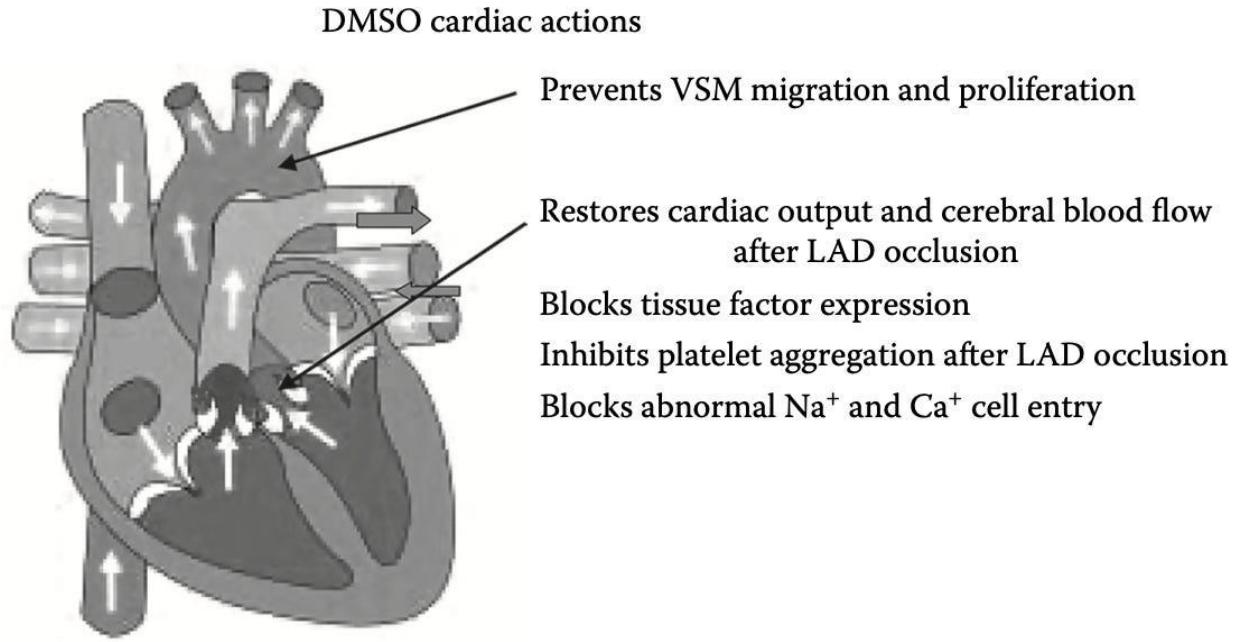
In short, DMSO provides a variety of anti-clotting activities which are similar to (but eclipse) the effects of aspirin and unlike aspirin, does not have any associated adverse effects, which leads to a remarkable number of potential uses for it (e.g., incorporating it into a drug eluting coronary stent). These charts in turn tie together much of the above:





Note: a review paper on this entire subject can be read here.

Heart Attacks



Given all of these protective and circulatory enhancing properties, DMSO appears to be an immensely promising treatment for heart attacks. Unfortunately, relatively little research exists in this area and likewise, a situation where it could be done does not frequently come up (e.g., by the time you start chest compressions it's unlikely you'll also be applying DMSO). Nonetheless, I have had colleagues who have cases of having successfully treated heart attacks with DMSO (or a zeta potential enhancing regimen).

In turn, most of the research that's been done in this region has not happened in humans, but rather through stimulating a heart attack (e.g., by temporarily cutting off the blood supply in an animal's coronary artery), and in those cases, the resulting damage to the heart was greatly reduced.

Note: the only other study I know that looked at this was an unpublished one (discussed here) where a total of 240 rats were given isoproterenol subcutaneously on two consecutive days which caused portions of the heart

muscle to die and decay. Those who received 0.5 ml of 90% DMSO subcutaneously each day had much less heart damage and had no evidence of heart muscle aneurysm or rupture.

Additionally, a study attempted to model atherosclerosis by overloading rabbits with dietary cholesterol. It found that oral DMSO reduced the eventual atherosclerosis by 30-40% and halved the accumulation of cholesterol in the tissues.

Current Stroke Management

Roughly 3.1% of adult Americans have experienced a stroke (a figure I expect to rise from the COVID-19 vaccines). Each year, this translates to about 800,000 people in the United States having a stroke, and in 2022, 165,393 died (making it the fifth most frequent cause of death in the United States), with between 20-40% of survivors experiencing long term disability from the stroke.

Because of the harm strokes pose to society, and the rate at which brain tissue deteriorates once its blood supply is lost, the medical system emphasizes doing everything that can be done to identify and treat strokes as soon as possible.

Unfortunately, different types of strokes exist. In most cases, the blood supply is cut off due to something (e.g., a clot) blocking the artery (an ischemic stroke). However in 13% of cases it's instead due to a blood vessel rupturing and leaking out. This is problematic because the primary treatment for strokes is to inject a powerful clot busting medication (tPA) but in cases where the stroke is coming from a bleed, this can be disastrous. As a result, nothing can be done until the patient is accurately diagnosed (which requires a brain CT scan at the hospital), which in turn results in an even longer delay before tPA can be used to save a patient's brain tissue.

Note: there are a few diagnostic signs that are more suggestive of a hemorrhagic stroke (e.g., a severe headache or unusual neurologic symptoms),

but to our knowledge, no reliable method besides a CT scan exists to differentiate the two.

Worse still, the statistics on tPA (approved in 1996 and still the only FDA approved treatment for ischemic strokes) aren't actually that good. Presently, tPA is only approved to be given within 3 hours of a stroke starting (as its likelihood of benefitting a patient decreases with time)and in practice, it is often given up to 4.5 hours after symptoms start (since some degree of benefit still exists).

When that window is met (which only happens about 25% of the time and ultimately results in roughly 1.8%-8.5% of ischemic stroke patients receiving tPA), the existing data shows that only 13% percent of patients who receive tPA significantly benefit from it (39% return to normal, compared to 26% who would return to normal without treatment), with an additional 19% of tPA users experiencing some degree of improvement (but not a full recovery) from it.

Worse still, tPA can cause significant bleeding, which is sometimes minor (e.g., gum bleeding), but also carries a 6.4% risk of a symptomatic brain bleed, and a 1.6% risk of a serious systemic hemorrhage (along with other issues such as a 1.3% to 5.1% risk of angioedema and tPA frequently causing reperfusion injuries). In turn, many risk factors exist for the increased bleeding (e.g., a few common risk factors can lead to a 33% chance of tPA causing a fatal bleed), and there have been many lawsuits for either giving or not giving tPA to a stroke patient. Additionally, tPA is a poor choice for larger obstructions (e.g., one within the internal carotid artery), which instead must be physically removed. In short—many ICU doctors I know are quite hesitant to use tPA as they have seen cases where it dramatically improved patients, many where it did not do anything, and quite a few disasters (especially in the early days of the therapy where it was used for heart attacks and then often caused the patient to have a fatal or debilitating brain bleed).

Note: the best data exists for tPa being injected directly into the obstructed artery with interventional radiology. Unfortunately, while many premier

institutions offer this, it is a specialized procedure that is not available at most hospitals.

Finally, there is essentially no therapy for recovery from stroke—which in short explains why stroke is the second leading cause of death and the third leading cause of disability worldwide.

In turn, it would be paradigm shifting if an effective stroke therapy existed which:

•Effectively treated ischemic strokes.
•Had no risk of worsening a hemorrhagic stroke.
•Could easily be taken at home, and more importantly, be quickly given on ambulances.
•Protected brain tissue from dying.
•Prevented reperfusion injuries.
•Healed damaged brain tissue after a stroke.

The fact that it's been known DMSO does that for over 50 years (it's even therapeutic for hemorrhagic strokes and can cross the blood-brain barrier to heal damaged neurons), in a nutshell, summarized why quite a few people I know harbor great animosity towards the FDA.

For example, a 2002 clinical trial (which can be viewed here) was conducted where DMSO and FDP (fructose diphosphate, a metabolite which cells turn into energy through glycolysis) mixed in 5% dextrose was administered intravenously twice a day (averaging 12 days) to 11 patients (average age 65) who presented with an acute or subacute ischemic stroke. After being subject to an extensive series of tests, it was concluded that DMSO was well-tolerated, that it benefited patients if given with 12 hours of symptom onset, and that 63% of the patients achieved 'improved' or 'markedly improved' neurological status (whereas for the patients receiving standard treatment, only 20% achieved an "improved" status three months later.

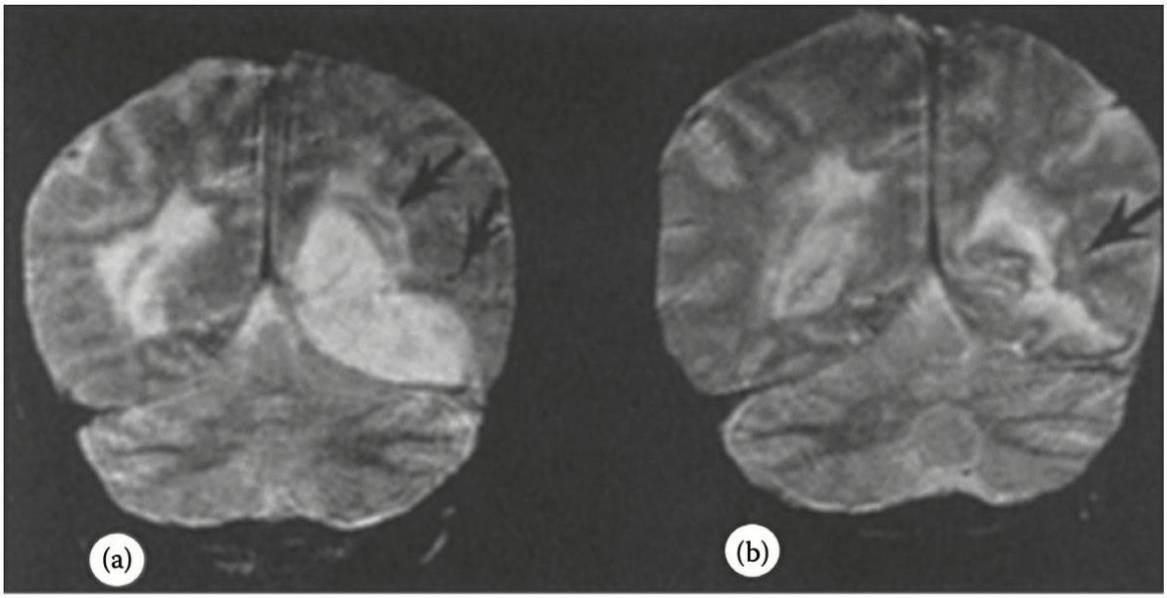
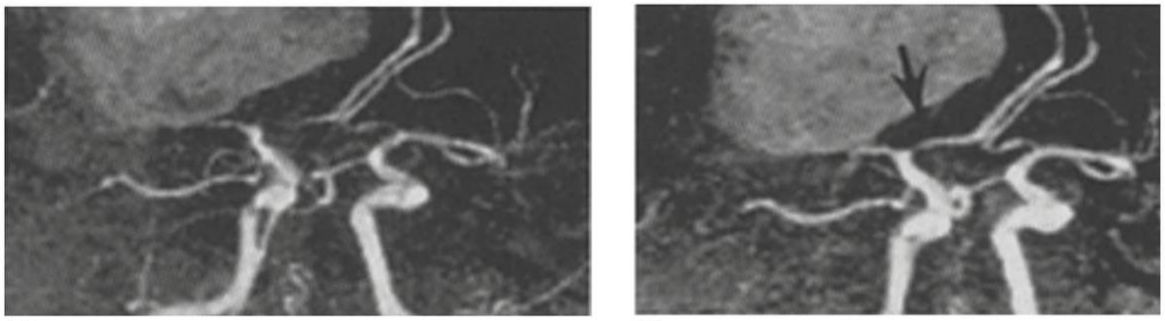


FIGURE 9.6 (a) T2-weighted coronal view MRI of posterior cerebral artery (PCA) territory infarct before treatment. White matter changes are seen with lateral mass effect on lateral ventricle, left thalamus involvement, and widespread edema involving the brainstem (arrows). (b) After 11 days of daily DMSO–FDP IV administration, dramatic reduction of edema and lower signal intensity are seen with an apparent improvement of gray matter and thalamic involvement (arrow). (From Karaça, M. et al., *Neurol. Res.*, 24(1), 73, 2002.)

Note: since older patients are the most vulnerable to strokes and have had such a significant recovery (without adverse reactions), this indicates DMSO is an even more promising therapy for younger patients with strokes.

A magnetic resonance angiogram is shown in Figure 9.7 of an 80-year-old patient who was diagnosed with a right MCA infarct that resulted in a mild mass effect and large hematoma affecting the basal ganglia territory. This patient was treated with DMSO–FDP twice daily after 48 h poststroke and showed improved perfusion in the MCA territory and reduced basal ganglia involvement.



(a) (b)

FIGURE 9.7 Sagittal view of magnetic resonance angiograph of internal carotid artery territory. A right MCA infarction with mild mass effect, large hematoma, and midline shift involving basal ganglia before treatment is seen (a) in an 80-year-old patient 48 h before DMSO–FDP treatment. (b) Eight days of twice daily DMSO–FDP infusions revealed no change in hematoma size, but there appeared an increased perfusion of the MCA ischemic territory, increased blood flow of MCA (arrow), and lessened basal ganglia involvement. (From Karaça, M. et al., *Neurol. Res*., 24(1), 73, 2002.)

One of the most important aspects of this trial was that while DMSO is the most helpful when given immediately after a stroke, the trial showed DMSO could save the neurons long after the stroke had happened.

Patient		Treatment	After 1 month	After 3 months	Tx time (h)
ES	(90/♀)	PHA-56	Markedly improved	Markedly improved	6–12
FG	(62/♀)	PHA-56	Slightly improved	Slightly improved	>48
IU	(80/♂)	PHA-56	Unchanged	Unchanged	>48
NT	(41/♂)	PHA-56 DMSO+FDP	Improved	Markedly improved	>48
NC	(61/♀)	PHA-56	Slightly improved	Improved	>48
HD	(59/♂)	PHA-56	Unchanged	Unchanged	>48
GK	(80/♀)	PHA-56	Markedly improved	Markedly improved	>48
FO	(75/♀)	PHA-56	Markedly improved	Markedly improved	13–48
EF	(60/♀)	PHA-56	Unchanged	Unchanged	>48
AE	(62/♂)	PHA-56	Improved	Markedly improved	6–12
IC	(63/♂)	PHA-56	Improved	Markedly improved	6–12
HH	(74/♂)	Standard tx	Unchanged	Slightly improved	6–12
RK	(59/♂)	Standard tx	Unchanged	Slightly improved	6–12
NA	(64/♀)	Standard tx	Slightly improved	Improved	6–12
MA	(61/♀)	Standard tx	Unchanged	Slightly improved	13–48
HK	(48/♂)	Standard tx	Unchanged	Unchanged	6–12

"Tx time" designates how long after the stroke symptoms treatment was initiated.

Given the existing options for strokes, a trial like this should have been immediately replicated by premier institutions around the world—but instead almost no one even knows it happened.

Note: there are also animal studies on the DMSO-FDP mixture.

- *In a rabbit study, blood flow to their brains was cut off (via hypoxemia, hypotension, and a bilateral common carotid artery occlusion), which eventually caused them to develop isoelectric (flatlined) brainwaves. After 5 minutes of no brain activity, they received either DMSO and FDP or saline, and then after roughly 2 minutes had their blood supply restored (with the DMSO group having an extra 1.4 minutes of no blood flow). The DMSO group regained brain activity much faster (a result frequently seen in animal experiments), all survived and all had minimal brain tissue damage, whereas only 22% of the saline group survived (and were severely disabled with significant brain tissue damage).*
- *In a mouse study (which can be read here), mice were subjected to moderate or severe head impacts and then treated 5 minutes later with various compounds, then evaluated for motor function (via a grip test),*

brain tissue damage, and survival. DMSO-FDP was the most protective, DMSO the second best, while the rest (e.g., FDP alone) did not provide a benefit.

Ischemic Strokes

After I learned how unconscionable the FDA's prohibition against DMSO was, I made a point to begin telling people (e.g., friends, relatives, patients) I felt were at risk of a stroke to stock DMSO at home, and since then, I've had instances where someone (or their caretaker) called me up, described a stroke, I gave them instructions on what to do (since they already had DMSO at home), and by the time they got to the ER, the stroke was "resolved" and in some cases, the ER was confused by the CT scan because it both looked like a stroke had happened and simultaneously that one had not.

Note: in my opinion, IV DMSO would have been ideal (and more effective) in those situations, but in each case, it was not feasible to implement.

Likewise, many compelling cases have been recorded of individuals who treated their strokes with DMSO:

A Los Angeles school teacher had a major stroke shortly after the start of the Christmas break. She was unconscious on her living room floor. DMSO treatment was started immediately after the stroke. The DMSO was first applied topically to her head within minutes of the stroke. Less than one hour after the stroke she was given DMSO by intramuscular injection. This patient was never taken to the hospital for this stroke. A prominent surgeon who was a family friend told the husband of this patient that it was important to keep her out of the hospital. The surgeon said that even though the treatment was completely legal, it would be difficult to get approval to give the DMSO especially by injection at his hospital.

This patient made a dramatic recovery. She regained consciousness later in the day in which she had her stroke. Treatment continued for the next week. Each

day she received two topical applications of DMSO, one intramuscular injection of DMSO, and two doses of one teaspoonful of DMSO in juice. Her condition improved each day. When school resumed after the first of January, this teacher was back in the school teaching the students as if nothing had happened during the Christmas vacation. She never even mentioned it to the other people at the school. She continued teaching until she retired. She retired healthy with no disability.

Note: if you drive someone to the ER (and call in ahead to let the ER know you are coming), you have numerous opportunities to administer DMSO prior to placing the patient in the ER without delaying their care there (e.g., emergency brain surgery for a hemorrhagic stroke).

A lady was in a coma in a convalescent hospital and had been in the coma since her stroke three months ago. She was given little chance of recovery and was expected to remain in a vegetative state until her death.

When I first observed this lady, there was no response to any type of stimulus. She was alive, but appeared lifeless. It was decided that her treatment should be topical DMSO applied to her head daily either by her husband or by one of the nurses at the facility.

One month after the start of treatment, there were positive signs in the lady. Her brain was starting to respond to the DMSO. The treatment continued, and four months after treatment started this lady was able to return to her home. After her return to her home, this patient started drinking one teaspoonful of DMSO in a small glass of water each day in addition to the daily topical treatment. This treatment continued for a period of years.

Three years after the start of DMSO treatment this writer returned to visit this patient. At this time the lady was living a normal life, not the life of a stroke victim. She was able to look after the house and walked normally.

The only lingering effect of the stroke was a slight speech defect. At this time she said that her memory was better than that of her husband who had not had a stroke and who was considered to be completely normal.

Note: there are also many reported cases of individuals who took DMSO for musculoskeletal or pain disorders (by far the most common use of DMSO) who then experienced a permanent improvement of stroke symptoms.

As shown earlier in this article, DMSO has numerous properties that make it uniquely suited to protect from the damage of ischemic strokes. These benefits have in turn been shown to occur for brain tissue. For example:

DMSO was shown to preserve the neurological function of brain tissue samples once their oxygen or glucose were withdrawn (with similar results seen in this study).

Giving DMSO to rats 30 minutes prior to cutting off the blood flow in their MCA (a key artery in the brain) significantly reduced the amount of permanently damaged brain tissue. Additionally, this study and this study had similar results.

A more recent rat study found giving DMSO 20 hours before blocking the MCA reduced the damaged brain tissue by 65%, by 44% when given an hour after, and by 17% when given two hours afterwards.

Note: these results argue that giving IV DMSO beforehand could reduce the complications of many challenging surgeries (e.g., a coronary bypass). Unfortunately, much in the same way ultraviolet blood irradiation dramatically reduces bad surgical outcomes, neither has been adopted for this purpose.

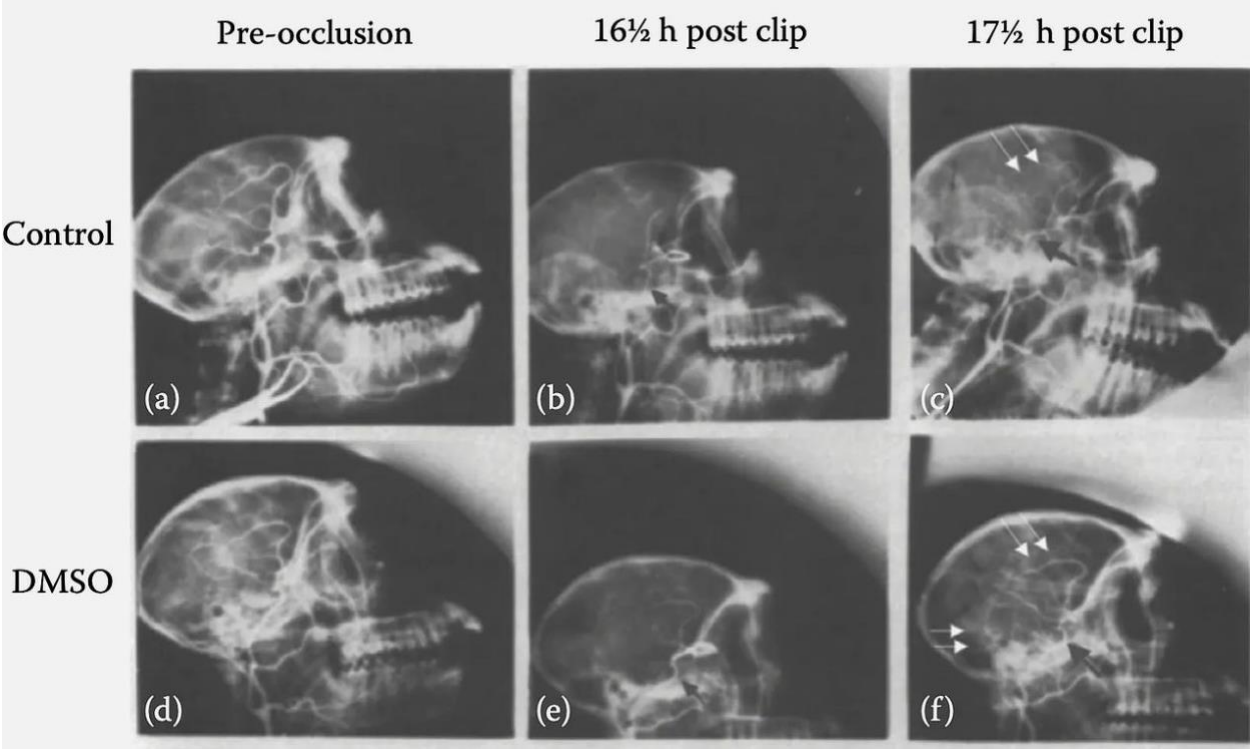
A gerbil study (this species is more susceptible to strokes) found blocking carotid blood flow to the brain and then restoring blood flow to the brain caused significantly less neuronal loss if DMSO was given 30 minutes before the carotid blood supply was cut off. Another gerbil study had similar results.

A dog study cut off cerebral blood flow, then restored it and used a variety of biochemical measurements to monitor cellular metabolism (along with EEGs). Dogs who received DMSO (and an anti-platelet agent) had significantly higher mitochondrial function (which was almost identical to controls who had not suffered the occlusion).

Another dog study induced a stroke by introducing an embolus (clot) into the MCA and then giving DMSO. Compared to controls, those given DMSO were observed to have normal behavior and no neurological deficits afterward, whereas 3 of the 9 controls died (with significant tissue death in the brain), while the survivors had contralateral paralysis (a typical stroke consequence) and impaired consciousness.

A cat study found DMSO protected brain tissue from MCA occlusion and increased cerebral blood flow (CBF) by 27%. When DMSO was given in conjunction with PGI2, a greater improvement was seen (e.g., a 68% increase in CBF).

A rhesus monkey study blocked the MCA for 4 hours, gave DMSO, dexamethasone, or nothing, and then opened the MCA after it had been blocked for 17 hours. DMSO gave significant protection from the severe neurological deficits and loss of arterial blood flow the other two groups developed.



A squirrel monkey study blocked the left MCA for 4 hours, and then given a variety of different treatments (e.g., saline, hemodilution, or hyperbaric oxygen at 2 atmospheres). Seven days after treatment, 8 of 10 DMSO treated monkeys were alive (with 2 having mild contralateral muscle weakness), while 75% of those receiving hyperbaric survived, and just 34% of those receiving hemodilution survived (with the last two groups **also having more significant neurological deficits**). Finally, combining either of these treatments with DMSO produced slightly worse results than just DMSO alone.

Lastly, a rat study found that when hemorrhagic shock was induced, DMSO downregulated the inflammatory response (NF-kappaB) and upregulated a key protein cells use for survival (HSP70).

Note: small strokes can still cause significant long-term issues (which DMSO often completely prevents), so as a general rule, I advise using DMSO anytime someone has a suspected stroke.

Lastly, DMSO has been shown to treat Bell's palsy (facial paralysis caused by either microstrokes, inflammation, or ischemic strokes). In one study of 65 patients, DMSO mixed with 1% nicotinic acid applied to the affected part of the face as a compress 10-12 times and was shown to provide a statistically significant improvement in the number cured and the duration of therapy they required.
Note: DMSO has also been used to treat diseases of the peripheral nervous system.

Hemorrhagic Strokes and Traumatic Brain Injuries

While ischemic strokes are difficult to treat, hemorrhagic ones (and other traumatic brain injuries) are even more challenging, and after decades, there has been surprisingly little progress in neurologic intensive care, particularly in preventing long-term paralysis and disability.

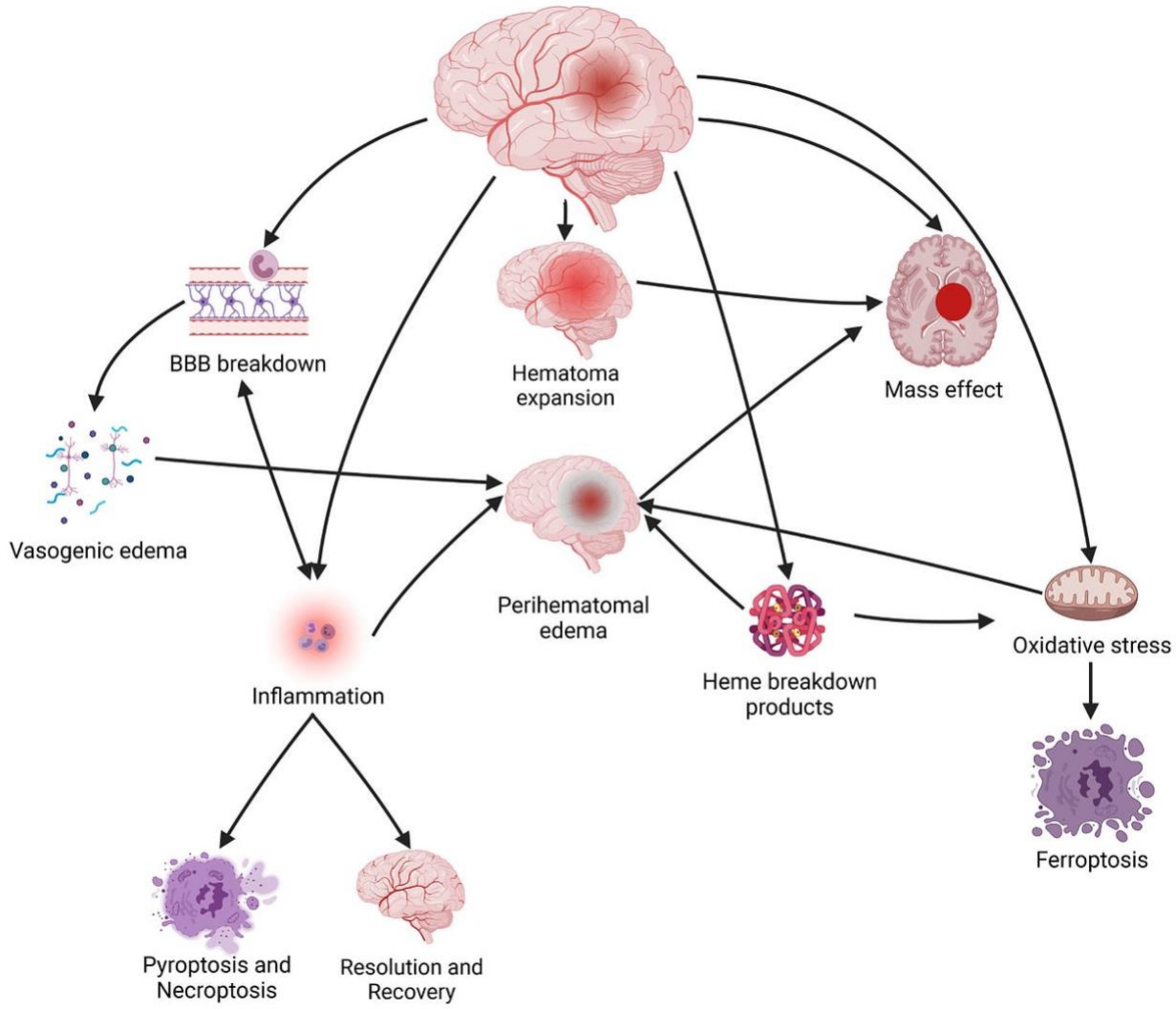
Note: conflicting evidence exists supporting the use of progesterone, hypothermia, and hyperbaric oxygen therapy for traumatic brain injuries, but none of these approaches are in widespread use. Strong evidence also supports the use of methylene blue but it also is rarely used. Finally, certain trials (e.g., with progesterone or with an adenosine kinase inhibitor) find those therapies work even better if combined with DMSO.

It was, as if the hand of God had somehow touched the [experimental] animal's forehead. 'I don't believe it', I stammered. But it was true. I felt a tingling in my spine because this reawakening of a virtually dead animal had all the markings of a medical breakthrough [Jack de la Torre MD].

Instead, the discovery, the potential for saving lives and the continued research that should have uncovered other uses for dimethyl sulfoxide and similar agents was quietly laid to rest in the coffers of forgotten medicine.

Note: Torre's observations were partly based on the fact he saw numerous animals with flatlined EEGs (which typically precede brain death and then actual death) have the EEGs come back within 10 minutes of receiving DMSO.

When treating severe brain bleeds, a few major challenges exist.



First, swelling and the leaking of blood into the brain can dramatically increase the pressure on the brain (known as intracranial pressure or ICP). The brain's tissue in turn is very sensitive to increased ICP or masses (e.g., a large blood clot) compressing it. Unfortunately, there is no good agent for reducing ICP

(e.g., the most commonly used agents like mannitol can create a "rebound ICP" which is higher than it was at the start).
Note: there can also often be a breakdown of the blood brain barrier which causes even more fluid to enter the brain.

Additionally, inflammatory processes begin once the blood enters the brain which injures brain tissue (and triggers cell death), while simultaneously, the iron released by dying blood cells generates free radicals which then destroy brain cells.

Remarkably DMSO addresses each of these issues. For example, it rapidly lowers ICP(without the risk of a rebound) and unlike many other ICP lowering agents, does not cut the blood supply to the brain (rather it increases cerebral perfusion without increasing blood pressure or heart rate—which is important because brain cells rapidly die without a sufficient blood supply to maintain their metabolism). Likewise, improved cerebral blood flow is necessary to remove the blood that leaked into the brain (with DMSO in turn being excellent for reducing brain edema). Finally, DMSO lowers many of the inflammatory cytokines (e.g., IL-1α, IL-1β, and IL-6) associated with strokes and tissue injury (along with macrophage chemoattractant protein-1).
Note: I suspect rebound ICP is the brain's attempt to get enough blood, and since DMSO ensures this, that's why it doesn't cause rebound ICP.

In short, as far as I know, no comparable agent exists for lowering ICP (one of the greatest challenges in neurocritical care), and in turn, many (unsuccessful) agents have been tried (in part because what works in animals often does translate to human brains).

Note: one monkey study that compared mannitol to DMSO in experimentally induced missile (bullet) injuries found DMSO created significantly better cerebral perfusion, and had a 86% survival rate (vs. 75% for mannitol and 55% for the untreated group). Those results were then confirmed in a followup study.

Furthermore, beyond directly removing edema (water) from the brain and bringing it back to the bloodstream (which is how it lowers ICP), limited

experiments done in humans show DMSO is somehow able to reduce the spilling of blood into the brain (the mechanisms of which has not been worked out).

Additionally, DMSO also addresses many other critical aspects of traumatic brain injuries and brain bleeds (which under conventional care requires many different drugs):

Pathologic Event	DMSO
intracranial pressure increase (ICP)	reduces [20, 42, 44]
cerebral edema	reduces [9, 37, 53]
free radical formation	Scavenges [60, 63, 64]
cerebral ischemia	increases flow [16, 18, 41]
inflammation	suppresses [24, 34, 66]
calcium influx	attenuates [46]
Na^+ channel activation	blocks [46]
NMDA-AMPA channel activation	suppresses [46]
arterial thrombosis	suppresses [8]
glutamate excitotoxic death	antagonism [46]
tissue factor expression	suppresses [8]
vascular smooth muscle cells (VSMC)	prevents proliferation & migration [8]
neurologic disability	reduces [13, 16, 41]

The sources for each of the above citations can be found here.

Note: DMSO also lowers the JAK2/Stat pathway, suppresses neurotoxic NMDA-AMPA-induced ion currents, prevents iron induced lipid peroxidation and focal edema, and as mentioned above, protects cell membranes.

A variety of studies have been conducted that demonstrate DMSO's remarkable therapeutic potential in these situations:

•Ten patients with closed head trauma and elevated ICP (40-127 mmHg compared to the normal 5-13 mm Hg) received IV DMSO, with an ICP drop in most cases happening within 30 minutes, and averaging 28mmHg after 24 hours, and 58mmHg after six days. Most patients then took 2-10 days to have the fluctuations in their ICP diminish (*this study can be read here*).

The reduction in brain swelling following DMSO treatment was confirmed by CT scans. All patients had a neurological assessment six days after the DMSO treatment. Six patients had mild or no problems, two had moderate impairment, and two had severe impairment (two patients eventually died of their injuries). Three months later, seven patients had minimal to no impairment, while one patient showed no improvement. No adverse effects from DMSO were observed.

•A follow-up study (at the same hospital) of 10 patients with severe closed head injuries (causing brain edema and increased ICP) found DMSO rapidly reduced ICP, increased cerebral perfusion without affecting the systemic blood pressure and patient responsiveness (except only in one patient), and most importantly improved the neurological course and outcome of the illness.

•A study examined 11 adult patients with high ICP and a GCS score of 4–6 following brain trauma or subarachnoid hemorrhage (standard therapy did not work) who were on the verge of dying. DMSO was then given, which immediately reduced the ICP (and induced diuresis), with 3 (who had been expected to die) then surviving.
Note: it was also concluded this study demonstrated the value in keeping the cerebral perfusion pressure above 60mmHg (something DMSO helps with) even in the presence of high ICP.

•At a 1980 Congressional hearing on DMSO, Dr. Stanley Jacob discussed data presented at his medical school on 11 patients with severe head injuries and markedly elevated ICP, 6 of whom did not respond to other ICP treatments, but within 3-5 minutes all had their ICP come down to normal, along with similar 5 patients who were started on DMSO and ultimately had a much better outcome than those where DMSO was started later.

•One paper reported on nine patients who suffered a partial or total hemiplegia (paralysis) after surgical repair of an aneurysm:

- In a 61 year old male (R. MCA and R. carotid), DMSO was initiated after surgery due to blood pressure climbing and left-sided paralysis developing, and in 30 minutes, blood flow increased in the right brain region by 20% (and 11% on the left), the patient's condition greatly improved. DMSO was then stopped day 5, and paralysis (and confusion) rapidly came back, after which DMSO was resumed and the patient fully recovered.
- A 67-year-old woman (L. MCA) lost the ability to speak and developed right-sided paralysis after surgery. After 8 hours DMSO was started (as mannitol didn't work), and within 45 minutes she became fully alert and regained her strength, within 2 hours her cerebral blood flow improved, and within 12 hours her motor strength permanently normalized.
- A 25-year-old woman was hospitalized with severe headache and high blood pressure from a L. MCA aneurysm (and spasm in the internal carotid). 12 days after surgery, she suddenly developed right-sided weakness, right-leg paralysis, and difficulty speaking. After 8 hours of mannitol didn't help, DMSO was started, and within 90 minutes she could lift her leg, and by the following day she had fully recovered.
- A 28-year-old woman developed excruciating headache and right sided weakness from an MCA aneurysm who then developed a severe internal carotid spasm that did not respond to standard care but did from DMSO (allowing her to have a completely recovery).
- The remaining five cases of a hemorrhaging aneurysm had a similar course to the above cases after rapidly responding to DMSO, with all but

one patient (who had a variety of severe exacerbating factors) making a full recovery. Additionally, no adverse events were observed in any cases.

•Finally a report discussed by Dr. de la Torre (which I could not locate), detailed five patients with closed head injuries and a high ICP which rapidly lowered from IV DMSO. A 1.5 year old with a GCS of 7 and ICP of 30mmHg fully recovered over 3 weeks, while a 7-year old child admitted with a GCS of 5 and an ICP of 25 mmHg fully recovered after 8 weeks at the hospital. The three other patients (aged 17-52 with GCS scores of 3-5 and two having ICPs above 50 mmHg) initially responded to DMSO but did not survive.

Animal research in turn supports the above results:

•A rabbit study created lethal brain edema (and increased ICP) by freezing part of the brain. DMSO was observed to significantly reduce ICP after 5 minutes while increasing cerebral perfusion and not changing central venous pressure. This was then followed up with a study that had similar result, with a study that achieved similar results with a different DMSO dose and a final study that showed indomethacin blocked DMSO's reduction of ICP.

•A monkey study, had an expanding balloon (designed to stimulate a hematoma) was placed in the brains of 40 monkeys, 15 of whom received DMSO. Of the DMSO treated monkeys, 1 (7%) died, and 1 developed mild right side paralysis. In contrast, 90% of those who received saline died (with the survivor having severe neurological deficits and dying the next day).

Note: in animal experiments simulating severe brain injury, DMSO has also been shown to strengthen their respiration (whereas in many cases it instead becomes shallow and may eventually stop). Additionally, in both humans and animals, DMSO (due it functioning as a diuretic) will often significantly increase urination.

To put all of this into context:

A January 11, 1981, a news report in the *Ocala Star Banner* [page 6], carried the headline: “DOCTOR CLAIMS DMSO SAVED 11.” The story read:

SAN DIEGO (AP)—A doctor at the University of San Diego credits the controversial drug DMSO with saving the lives of 11 people who suffered severe head injuries.

Dr. Perry E. Camp, a UCSD Medical School neurosurgeon, said Friday that dimethyl sulfoxide was effective for 11 of 30 people judged near death and for which other lifesaving methods have proved useless.

“To take patients like that and have even one out of 10 survive is phenomenal,” Camp said. “The fact that we have any survivorship at all . . . doesn’t sound like much, but it is extremely encouraging,” Camp said.

Sadly, however, despite the immense amount of research conducted and these results **being dramatically better than what the standard of care can offer**, this remains an almost completely forgotten side of medicine. That said, one treatment for brain bleeds (Onyx) is composed of a polymer dissolved in DMSO which solidifies into a solid coating which “patches” the leaking vessel.

Concussions

Many of the same principles hold true for concussions, and the pioneers of DMSO felt it was an essential treatment for athletes after they experienced one—particularly since concussions can predispose the athlete to long-term cognitive issues (e.g., both boxers and professional football players have a threefold risk of dementia).

One study for example applied pressure to the brain that was sufficient to cut off its blood supply (in an attempt to mimic a concussion), with DMSO being

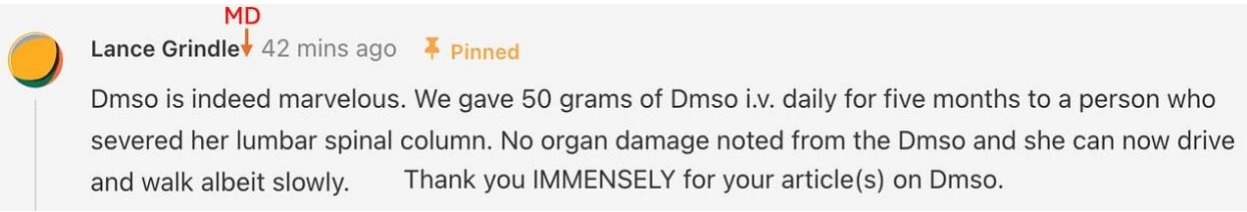
administered prior to this and every 12 hours for the next 3 days. DMSO was compared to other commonly used agents and found to be the most effective at preventing nervous tissue damage and neurobehavioral changes. Additionally, this study demonstrated giving alcohol beforehand (a common factor in drunk driving) increased the damage that the "concussion" caused (which DMSO alleviated).

In humans, there are also periodic cases of dramatic concussion recoveries following DMSO. For example, one author shared the case of a woman who had received a severe concussion from falling off a horse, after which she had trouble walking, would suddenly neurological decompensate (e.g., she would drop something), and had memory issues alongside foggy headaches. Thirteen years later, she received an injection of DMSO, immediately had a large improvement, and further improved with subsequent injections.

Spinal Cord Injuries

We used to think that the damage caused at the moment of injury in a severe head or spinal cord injury was irreversible. But now there are animal studies and a handful of clinical cases that tell us something different. **There is still a little bit of time before the injured cells die**. Based on what we've seen in animal studies and a handful of human situations, we think that if you can treat a head injury victim within a few hours of the injury, or a spinal cord victim within one hour, there is a good chance of preventing death or the paralysis that would otherwise occur.—Dr. Jack de la Torre"

We have had three patients come into our medical center paralyzed after injury: one five hours, a second six hours, and the last nine hours. Historically, we thought their chances of recovery were just about zero. Two of those three are now walking as a result of our administering IV DMSO despite the time being beyond an hour-and-a-half of the injury.—Stanley Jacob MD



Since central nervous tissue does not regenerate, classically, strokes and spinal cord injuries are considered to be incurable (e.g., despite decades of research, the standard of care is still using steroids—work and them having many side effects).

Note: one survey found that the primary reasons spinal surgeons use steroids for spinal cord trauma is to avoid being sued.

As much of the same pathology that causes permanent damage in the brain also occurs in the spinal cord (the loss of blood flow and compressive post-traumatic swelling), DMSO can produce miraculous results. In turn, when the pioneer of medical DMSO, Stanley Jacob MD, was asked who would benefit the most from DMSO being adopted by medicine, his response was immediate:

'As I get to know the quadriplegics, ever so many of them eventually will say to me, 'You know, Dr. Jacob, I couldn't even commit suicide.'

In turn, like strokes, the greatest benefit from DMSO is seen if it is given (intravenously) within 90 minutes of the injury (e.g., de la Torre found that giving DMSO to dogs shortly after a spinal cord injury that typically produced permanent paralysis were spared from it and regained almost normal function within a few weeks). Likewise, the sooner to an injury, the more dramatic the improvement is:

At this time, Jacob was treating eight quadriplegics; and of them only one had presented a recently incurred injury. He felt, as do most doctors, that treatment is more fruitful in new than old conditions. The one fresh case was that of a sixteen-year-old girl, a fine athlete, who dove off a board and landed on her neck on the bottom of the pool.

Her doctor was pessimistic but willing to try almost anything that offered a glimmer of hope. She was a complete quadriplegic—utterly helpless.

She was on DMSO for an entire year. Gradually—one by one, it seemed—her organs began to function again. Eventually she walked. And now she is in college, doing very well.

However, at the same time, DMSO can often provide significant rehabilitation for far older injuries.

An Orange County, California, engineer suffered a severe back injury in an automobile accident. He was paralyzed below the point of injury and was confined to a wheelchair. However, his spinal cord was not severed. It did suffer damage, but there was no break. DMSO treatment was offered, but this man refused the treatment. He was convinced that it would not work, and he would never walk because a few months after the accident he still had no feeling in his legs.

Twelve years after the accident this man changed his mind and decided to try topical treatment with a DMSO lotion. The lotion was applied twice a day to the entire back of this patient. After three months this man was able to move the toes on his right foot. He never regained the ability to walk, but the treatment restored some feeling and the ability to move a part of his body below the injury site.

Our son had been in a coma due to an auto accident. After six months in the hospital we brought him home. His Drs. said that he would probably never regain bladder control. In 1973 he became a patient of Dr. Jacob. Within months of using DMSO he had full bladder control.

“We have had experience at our medical school in Oregon with two patients in which DMSO was given as early as an hour after what was considered an irreversible injury—an immediate, complete quadriplegia—and in both people there was total recovery with them walking out of the hospital,” said Dr. Jacob.

The neurosurgeon told me [his mother] that henceforth Grey's only motion would be to move his head from side to side and grin [due to a C4-C5 fracture that had blocked the cord there]…Grey listened attentively and thought a minute; then said to the doctor, "One day I will swing my legs off my bed and I will offer to bet you I am going to walk. At that time, put your money where your mouth is now.

In insisting that her son would find help, Dorothy Keinsley did not delight all the doctors. "One doctor bellowed at me like a bull moose in rutting season," she said. "Don't you know your son is paralyzed?" He screamed. I explained that no one knew it as well as I."

Grey read Ann Sullivan's article about DMSO…He wrote to Jacob, and his physician made the tests Jacob had required. On February 13, 1965, Jacob came to [Gray's] Littleton [CO] home free of charge and swabbed Grey's neck with DMSO.

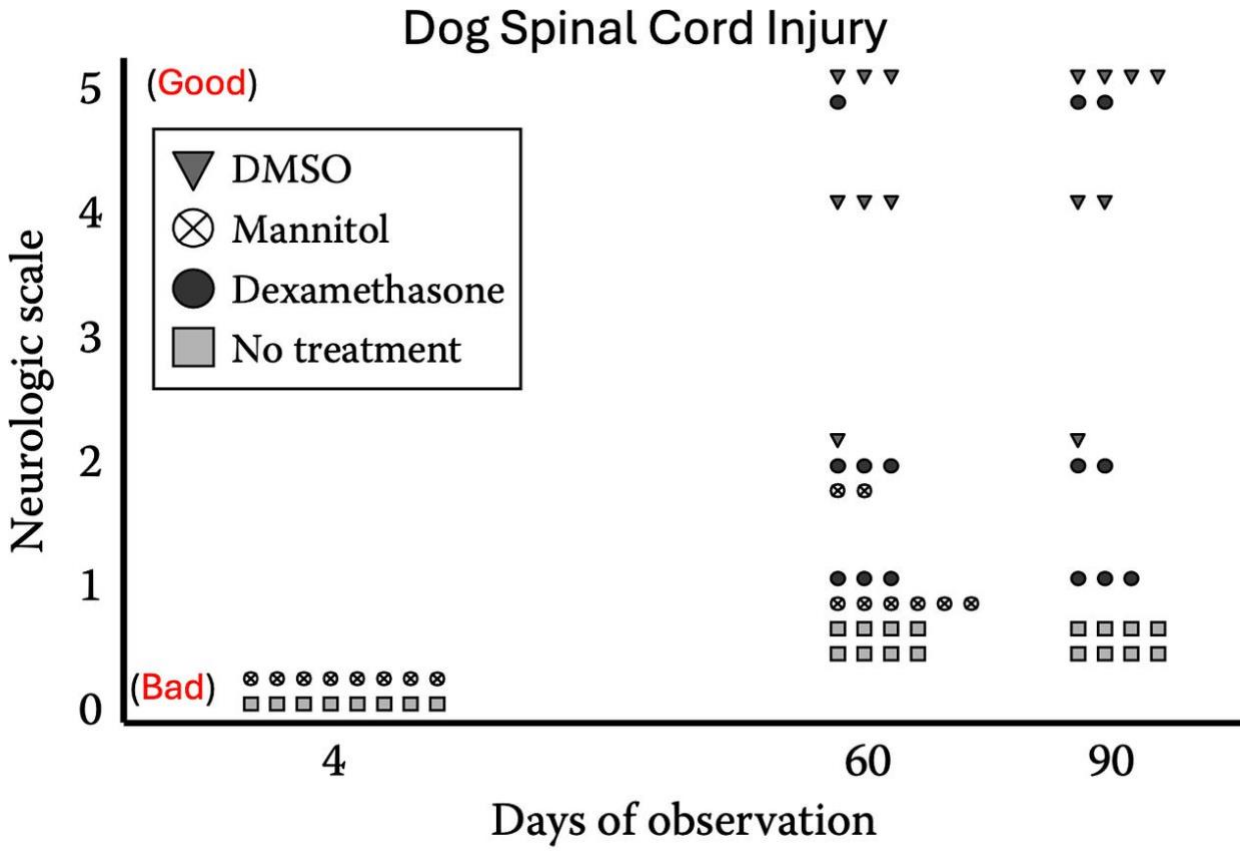
'The most dramatic change happened that first day," Dorothy told me. "Grey had had a constant pain in his right shoulder from the time of the accident, and he had learned to live with it. Late that day, Grey discovered the pain had gone. He was almost incredulous. He expected the pain to return, but it never has.

"Other improvements were gradual, as Dr. Jacob had predicted they would be."

Note: Gray made remarkable improvements which eventually stopped (but did not regress) due to the FDA unconscionably revoking the medical use of DMSO.

As far as I know, while many compelling cases (e.g., those just mentioned) exist, unlike strokes and severe blunt head traumas, no formal studies on DMSO after spinal injuries have been conducted in humans. However, as shown previously, mechanistically there is evidence to support that use (e.g., this study showed that DMSO prevented the degenerative changes in spinal cord nerves after blunt trauma), and a variety of corroborating animal studies, all of which led the leading researcher in this field to conclude that if a severe spinal

cord trauma is treated with intravenous DMSO within 2 hours, paralysis may be prevented.
Note: animal studies also showed the greatest benefit from DMSO occurred if it was given within 2 minutes, and that higher DMSO doses also increased the speed and likelihood of recovery.



Scale: 0 = flaccid paraplegia, 1 = some muscle tone, 2 = reflex standing, 3 = spastic walking, 4 = walking, running with deficit, 5 = normal, full recovery

Note: I was unable to view the referenced study, but I was able to find an earlier version of the above data here.

Numerous other studies (e.g., in cats) have demonstrated that DMSO is superior to any of the other available options for spinal cord injuries. For example:

•One investigator found that after transecting rat spinal cords a variety of changes occurred in the spine which were mitigated by DMSO (e.g., it was

hypothesized that DMSO removing fluid pockets commonly seen after spinal cord injuries created space for nerves to regrow).

•In one study where T5 was transected, DMSO following the injury was found to be superior to both hyperbaric oxygen and placebo in allowing the rats to avoid being paralyzed and in reducing the subsequent damage to the spinal cord (additionally, when both were given together, there was less scarring, collagen formation and damaged nerve fibers). This was then corroborated by a subsequent study.

When the sensory nerve signals (somatosensory-evoked potentials) and motor function of the hind legs of rats were evaluated after a spinal cord injury that was followed by a therapy, DMSO given intraperitoneally 1 hour after therapy, 14 days later, produced significantly better results than methylprednisone (a steroid) or naloxone. In another study, after cats had their spinal cord become gradually compressed, DMSO restored the somatosensory evoked, and half regained some of their ability to walk.
Note: numerous studies have found DMSO improved somatosensory-evoked potentials and that their presence correlates with an improved prognosis and an eventual full recovery.

Another dog study where blunt trauma was applied to the spinal cord at T12 found that neurological surgery and IV DMSO (one hour after injury, and once daily for the first two post operative days) resulted in the recovery of walking, running ability, cortical-evoked potentials, and histological improvements (less cavitation, meningeal hyperplasia, and necrosis of the cord), whereas dexamethasone (a steroid), reserpine and hypertonic dextrose did not offer any improvements.

When neurons from guinea pig spinal cords were cut, DMSO was shown to repair neuronal membranes, and enhance the ability of their axons to reseal and regain their membrane potential, possibly due to DMSO reducing inflammation and removing fluid cavitations from the spinal cord while increasing blood flow.

When the blood supply to the spinal cord was cut off in dogs, DMSO was shown toprevent ischemic myelopathy (damage) to the spinal cord and paralysis. In a rabbit study where its blood supply was cut off and then restored, DMSO protected the lumbar spinal cord from damage (assessed through electron microscopy), reduced the degree of oxidative damage, and protected the neurological motor function of the rabbits (assessed through the Tarlov score).

Note: DMSO has also been shown to treat many other complications of spinal cord injuries. For example, many paraplegics suffer from retrograde ejaculation (where the semen goes backwards into the bladder), and Dr. Jacob found these patients responded to DMSO (e.g., having less bladder infection), along with other benefits such as less bedsores and better body temperature control.

DMSO and Protein Folding

Chemical chaperones are small molecules that help proteins be folded into their correct configuration, and hence can ensure protein stability or help the body eliminate misfolded protein. Since many challenging diseases (particularly genetic ones) are a result of misfolded or non-functional proteins, chemical chaperons offer a potentially invaluable therapeutic strategy.
Note: I believe the physiologic zeta potential has an important role in ensuring the correct folding of proteins.

Some of the best-known chemical chaperones include glycerol, deuterated water, **and DMSO (**which is thought to be in part due to it creating a tighter packing around proteins and stabilizing their confirmation). DMSO, in turn, has shown promise in the following misfolding diseases:

•In nephrogenic diabetes insipidus (by rescuing mutant vasopressin V2 receptor proteins). Additionally, this study showed DMSO created a functional improvement of the cells.

•In cystic fibrosis by helping transport functional CTFR proteins to the cell membrane.

•In Machado-Joseph disease (a neurodegenerative disease characterized by discoordinated movement and eventually paralysis) by preventing aggregation of the ataxin protein and cell death caused by those aggregation.

•Increase the ability of impaired immune cells (due to them having defective HLA-DM) to present the antigens necessary to mount an immune response.

In Creutzfeldt-Jakob disease (a horrible and terminal condition), it reverts the mutant prion protein back to normal and prevents neurons from dying. DMSO has also been shown to prevent the aggregation of the scrapie protein (a related neurodegenerative condition).

Note: since many cancer causing proteins are misfolded proteins, it is thought that this may partly explain DMSO's anticancer properties.

Amyloidosis

One of the most well-known protein misfolding conditions (which sadly is has also been linked to the COVID vaccines) is amyloidosis, a challenging to treat condition where misfolded proteins are produced in excess, clump together in the body, and gradually fill up organs, increasingly disrupting their function.

DMSO appears to have the ability to both dissolve amyloid aggregates and eliminate them from the body, and in all cases where it has been attempted, no adverse effects were observed (e.g., see this study). Those studies are as follows:

•Amyloidosis was induced in mice by repeatedly injecting them with casein and then treating them with DMSO. In mice that did not receive DMSO, their livers were loaded with amyloid, whereas in the treated mice, their livers were free of amyloid deposits, and broken up amyloid fibrils were found in their urine—demonstrating that DMSO dissolves the amyloid protein. Similar results were obtained in another studywhich concluded DMSO caused amyloid protein fragments to be eliminated in the urine and another study that found DMSO was effective in inducing the resorption of amyloid.

A study of low leukocyte mice (who spontaneously develop amyloidosis after one year of age with amyloid deposits in the spleen, liver, and kidney) found subcutaneous DMSO, given for two to five weeks, prevented amyloid formation in eight of ten mice. Amyloid-like material was not detected in the urines of treated or control mice.

A study that found hereditary amyloidosis in the white Pekin duck was ameliorated by administration of oral DMSO.

•A human study found DMSO caused amyloid proteins to be eliminated in the urine.

•A case report discussed a dog diagnosed with hypoalbuminemia, proteinuria, and renal amyloidosis. Two years after the initiation of DMSO treatment, the 24 hour urinary protein excretion returned to normal, while serum albumin concentrations increased to within the normal range.

•A case report discusses a woman with multiple myeloma and systemic amyloidosis who took DMSO for 4 years and had her cutaneous lesions improve (she, in turn, remained in good health 4 years after diagnosis—in comparison to a median survival time of 14.7 months). In another case report, a woman with pulmonary amyloidosis (due to multiple myeloma) received transdermal DMSO for 8 weeks, and experienced a dramatic regression of her pulmonary infiltrates (shown by x-ray) and a corresponding improvement of her arterial blood gasses.

Finally another case report also showed DMSO significantly benefitted pulmonary amyloidosis.

•A retrospective study evaluated 10 patients who had developed secondary amyloidosis from rheumatoid arthritis, Crohn's disease or Adult Still's disease (that were developing gastrointestinal complications and early stage of renal dysfunction from their amyloidosis) who took 3 daily doses of oral DMSO (in juice) after meals, dosed at 3–20 g/day in a 33% solution. This improved the renal function in 5 out of 10 renal amyloidosis patients (those given it earlier in the disease process), but did not help those who already had severe or advanced renal dysfunction. In six patients, specific improvements were seen in gastrointestinal amyloidosis, and GI symptoms such as diarrhea, and protein-losing gastroenteropathy.

•In patients with amyloidosis secondary to leprosy, like the previous study, DMSO was found to improve those with moderate but not severe renal failure (whereas the prior placebo gave no improvement).

•In another study of patients with primary or secondary amyloidosis, oral DMSO improved the kidney function of those with secondary amyloidosis and the authors emphasized that DMSO may significantly improve the length of survival for patients with secondary amyloidosis. These results were also seen in another study where patients with secondary amyloidosis from rheumatoid arthritis, following 3-6 months of DMSO, had an improvement in their kidney function and a decrease in the inflammatory activity of their rheumatoid arthritis.

•Two patients with secondary amyloidosis (due to rheumatoid arthritis) with renal failure received oral DMSO, 15 g daily, for one year and had an improvement in creatinine clearance, proteinuria, SSA (amyloid A) and CRP. Another case study had similar results.

•A girl with amyloidosis secondary to juvenile rheumatoid arthritis received topical DMSO and experienced a significant improvement in her

gastrointestinal symptoms, kidney function (improved creatine clearance and a large decrease in her proteinuria), and heart (the amyloidosis had caused decreased left ventricular function).

•DMSO was given to patients with familial amyloidosis [FA], and was observed to cause urinary excretion of degraded amyloid proteins, with roughly half of the patients experiencing some degree of clinical improvement. In another report, two patients with FA causing peripheral neuropathy experienced significant improvement from DMSO.

•Another study of 13 patients who developed amyloidosis from a variety of causes found secondary amyloidosis was improved with DMSO.

•A small study of patients with primary amyloidosis localized to the bladder (a challenging condition) found the majority of patients benefitted from DMSO, that DMSO can be a bladder saving measure, and that it can help resolve obstructions between the bladder and ureters. This case report and this case report, and this case report (of two patients) had similar results.

•Six patients with amyloidosis were treated with oral DMSO, with improvement noted in two.104

•A study (reported at a symposium) found DMSO successfully treated human amyloidosis secondary to rheumatoid arthritis (which was also further discussed at the symposium).

Many other studies also exist in this area. For example:

Table 2: DMSO Therapy for Amyloidosis

Amyloid Type	Therapy	Result	Study
Lichen skin	10% DMSO twice daily for 4 mo	Reduced itch, flattening of papules	67
Lichen skin	DMSO every day for 2 wk	Reduced itch, papules flattened at 5 days	68
Skin	DMSO twice daily for 8 mo	Hair regrowth and darkening	69
Skin	DMSO orally for 4 yr	Skin lesions markedly improved	70
AA, renal	DMSO orally every day	Renal function improved	71
AA, renal, 2 patients AL, renal, 2 patients	DMSO orally every day for 7 mo	Stable creatinine in all, proteinuria decreased in 1 AA patient	72
AA, GI tract	Topical DMSO for 3 mo with prednisolone	Improved endoscopic appearance, decreased amyloid by biopsy	73
AA, 2 patients AL, 2 patients	Oral DMSO for 3-6 mo	AL, no benefit AA, improved renal function	74
AA, renal, 5 patients AL, renal, 5 patients	DMSO for all AA Colchicine for AL	AA, 3 of 5 improved renal function; AL, no benefit	75
AL, renal 3 patients AA (FMF), renal, 3 patients AA, renal, 7 patients	DMSO orally for 7-10 mo	No benefit in AL or AA (FMF), all 7 AA improved creatinine clearance and reduction in proteinuria	76
AA, renal, 4 patients	DMSO orally 10 g/day	Nephrotic syndrome resolved in 2 of 4 patients	77
AL, 17 patients	DMSO for 3 mo-4 y	Benefit in 5 patients	78

Abbreviations: AA, secondary systemic amyloidosis; AL, primary systemic amyloidosis; DMSO, dimethyl sulfoxide; FMF, familial Mediterranean fever; GI, gastrointestinal.

Links to above studies: 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77. 78-[only a citation]

Lastly, Niemann–Pick disease (a fatal and incurable condition) results from a genetic defect which causes metabolites to excessively accumulate with cells because the proteins that should remove them don't function properly. This disease frequently leads to severe complications such as severe neurological impairment, gradual loss of cognitive function, and organ swelling.
In this, this, this, this, and this study, DMSO increased the cell's ability to remove those metabolites, and according to this paper, oral DMSO clinically improved Niemann–Pick type C patients (e.g., there was a reduction in hepatosplenomegaly and seizure frequency).

Cognitive Impairment and Dementia

Since many neurological disorders are linked to poor blood flow to the brain, previous traumas (e.g., concussions or microstrokes), the accumulation of misfolded proteins (e.g., this characterizes Alzheimer's disease), or an autoimmune process (something DMSO also helps greatly with), it stands to reason that many cognitive disorders would respond to DMSO.

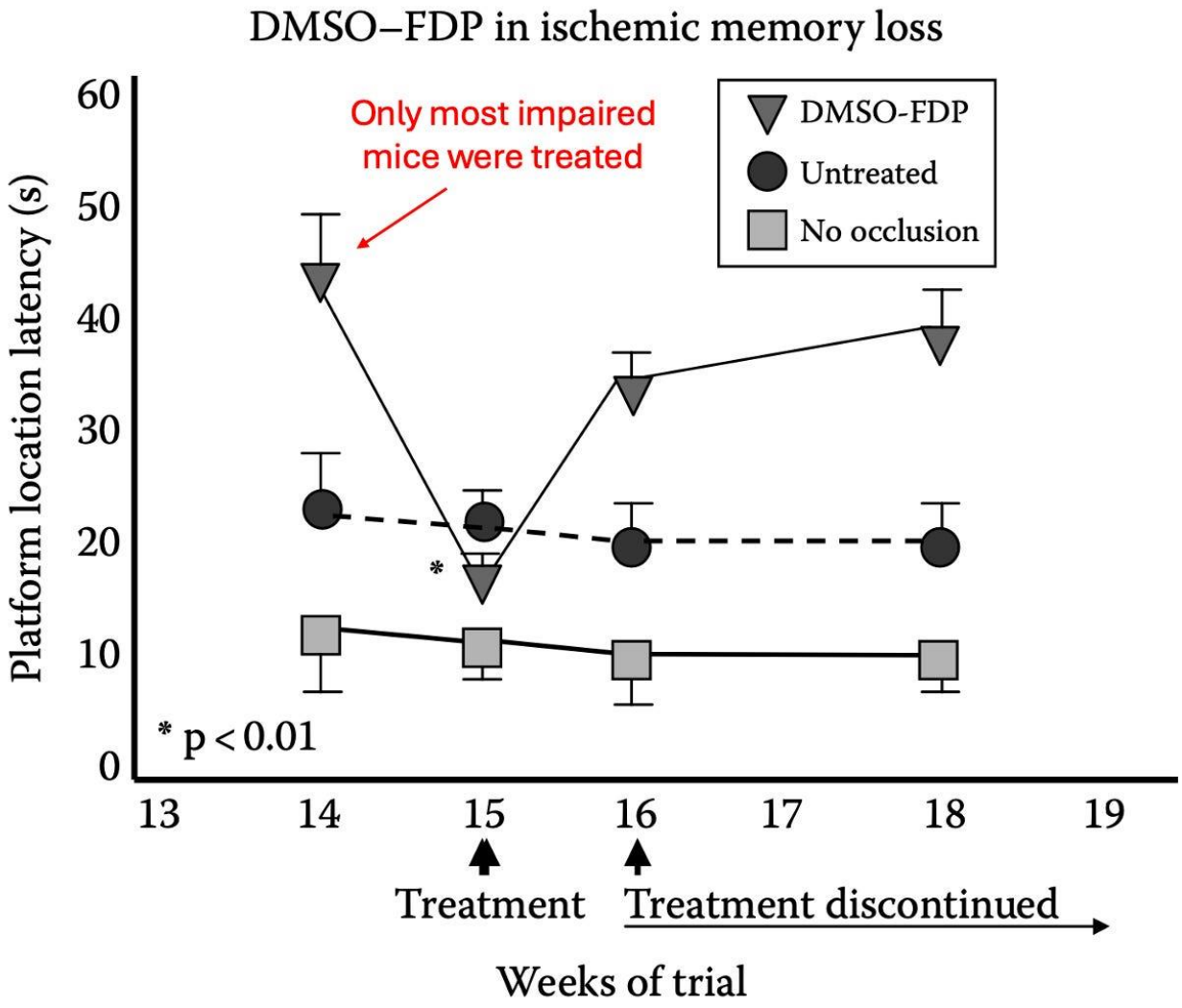
In turn, this is what we find, and that much in the same way DMSO reverses many other complications of aging (e.g., skin issue, hair loss, poor organ function) IV DMSO is one of the most effective anti-aging therapies for the brain (along with ultraviolet blood irradiation or improving the physiologic zeta potential). Likewise, IV DMSO is one of the only therapies I know of which can help challenging neurological diseases Parkinson's or ALS (where in both cases, while not curative, typically halts the progression of the disease). In turn, I periodically come across anecdotes of DMSO consuming centenarians who have no cognitive impairment despite their age.

Note: later in the series, I will also discuss how DMSO helps multiple sclerosis.

The animal research in this field is as follows:

•A study surgically modified rat carotid arteries to significantly reduce the amount of blood going to their brain. After 3 months, it was found that DMSO prevented both the neuronal damage and the significant loss of spatial memory and learning that otherwise resulted from that chronic loss of cerebral blood flow.

•In a similar study, rats 14 weeks old were subjected to either permanent bilateral carotid artery occlusion or sham occlusion (mimicking the chronic vascular impairments many experience with increasing age) and then tested the rats for visuospatial memory function. After 14 weeks, four rats who had shown persistent and severe memory impairment received DMSO and FDP for 7 days, which improved their memory by 54%, almost reaching the cognitive function of the controls. Unfortunately, this improvement was partially lost once DMSO-FDP were discontinued.



•In mice genetically engineered to have Alzheimer's disease [AD], DMSO has been shown to increase neuronal density in the hippocampus (a brain region vulnerable to AD) and enhance their spatial memory and smell (while decreasing their anxiety).

Note: DMSO has also been shown to greatly delay (48-98%) the paralysis caused by amyloid beta in C. elegans (one of the most popular organisms for aging research) and to extend the lifespan of C. elegans by 23.0-24.4%. The researchers attributed this delay in paralysis to DMSO modulating

neurotransmission (e.g., DMSO is an acetylcholine esterase inhibitor, a therapeutic strategy also used to treat Alzheimer's disease).

•Lurcher mice are used to study olivary and cerebellar disorders because their Purkinje cells can't survive (e.g., by 30 days of age their walking is grossly abnormal). When these mice received DMSO, it prevented the age-related deterioration of certain cognitive functions (e.g., memory and spatial learning abilities)

While human research has also been conducted, I could not locate any of it online. Those studies are as follows:

•In this study 18 patients with probable Alzheimer's were treated with DMSO and tested regularly for nine months, with great improvements being noted after only three months of treatment, and becoming especially noticeable after six months of treatment. Areas of improvement included memory, concentration, and communication alongside a significant decrease of disorientation in time and space.

•Another study evaluated 104 elderly adults with organic brain disease due to cerebrovascular diseases (e.g., a previous stroke, cerebral embolism or a hardening of the arteries of the brain), a previous head injury, senility, or degenerative disease (e.g., Parkinson's, hyperthyroidism or epilepsy). They received two DMSO mixes, Merinex (DMSO with amino acids) and Ipran (DMSO with vasoactive substances), typically alternating between the two, and for the majority of the time as an injection, and a minority of the time orally (with the fastest results occurred if both routes were used simultaneously), all of which resulted in remarkable improvements. To quote the author:

The DMSO aminoacid therapy is undoubtedly valuable in the treatment of numerous organic cerebral diseases. At the same time, thanks to the improved cerebral blood irrigation achieved by DMSO used in combination with vasoactive substances, a highly favorable effect on the psychic and somatic functions of senile patients was achieved.

•A Chilean study evaluated 100 patients with cerebrovascular diseases (e.g., a previous stroke, cerebral embolism, or a hardening of the arteries of the brain), many of whom were senile, that received DMSO orally and through intramuscular injections over the course of 50 days. There it was noted that their coronary heart disease (i.e., atherosclerosis) and high blood pressure had a good improvement in 74.35% of DMSO recipients, a fair response in 21.77%, and no response for 3.88%. The neurologists overseeing these patients remarked that:

"Recovery from the general symptoms was positive; there were favorable changes which were reflected in a feeling of well being, the recovery of agility, changes of mood from depressed to gay, improvement of sleeping, and clearer speech. As regards the 'focal' results, accelerated recovery from hemiplegia and hemiparesia was registered. A speedier recovery of speech in cases of defined or indicated aphasia took place."

Psychiatric Conditions

Another one of my favorite therapies, ultraviolet blood irradiation, essentially works by increasing circulation throughout the body, decreasing inflammation, and reawakening cells that have entered a dormant state (before they die). In turn, since these issues underlies so many different disease processes, a vast body of literaturedemonstrates its remarkable efficacy for a wide range of conditions, including psychiatric ones. As DMSO also essentially does these three things, ***some data has accumulated on its value in psychiatry.***

In a study at a Peruvian psychiatric hospital, 42 patients (25 schizophrenics, 4 manic depressive psychotics, 4 alcoholic psychotics, 4 compulsive-obsessive neurotics and 5 patients with severe anxiety) were taken off all their medications then given 2-5 intramuscular injections each day (with more given to the most psychotic patients) and compared to 16 controls receiving standard care.

Of the schizophrenic, **all 14 of the acute cases** experienced a rapid and dramatic improvement (particularly in their agitation—especially for the catatonic-paranoid patients), with all being discharged within 45 days (three having a

complete recovery 15 days after admission) and not having a recurrence. To quote one of them:

“I have been out of my mind. I don’t know what happened to me. I wonder what my children are going to say.”

Of the 11 chronic schizophrenics, 4 periodically needed hospitalization and had a complete remission following DMSO (allowing them to be discharged much faster than normal), and in those who later relapsed, there was again a positive response to DMSO. The remaining 7 were more severe cases (e.g., they had been hospitalized for over 6 years and failed years of therapies) and experienced an improvement from DMSO, but it was not enough to leave the hospital.

Note: results like this (I’ve seen similar ones with other therapies as well) lead me to believe that the existing understanding of schizophrenia is extremely incomplete. To further support that contention, this author also shared a case of a severely delusional paranoid schizophrenic responding to DMSO.

The 4 manic-depressive psychotics (who were in the manic phase, averaging 15 days of psychomotor agitation) rapidly calmed down and lost their mania after DMSO (with their recovery being much faster than what they’d previously experienced from conventional therapy).

The 4 alcoholic psychotics (2 with hallucinations and 2 with delirium tremens) had previously been hospitalized for these issues. They rapidly responded to DMSO, with restlessness improving in the first few days while the hallucinations took longer.

The remaining patients (obsessive-compulsive neurosis and severe anxiety) also had a good response to DMSO (e.g., they were calmer, ideas did not upset them as before, they were able to act in a more spontaneous way, and they were able to overcome their obsessive compulsions).

Developmental Disabilities

One of the most remarkable effects of DMSO is its effects on developmental disabilities. For example, at a hearing Congress convened to (unsuccessfully) pressure the FDA to end its embargo on DMSO, testimony was given of a child with Down Syndrome (classically considered incurable) having a miraculous response to DMSO.

1980 DMSO hearing
21.9MB · PDF file
Download

There, Melody Clark, was discussed, who at 11 months (unable to stand or walk, had protruding tongue and all the classic Down Syndrome symptoms) was started on DMSO. She improved and at eight years of age, was able to walk, run, talk, read, and spell almost normally—something her teachers had never seen in another child with Down Syndrome. Specifically, she functioned at a second-grade level (with verbal competency and excelling in arithmetic), could engage in normal physical activities, and was very socially minded (allowing her to be quite popular with her peers).

In short, she transitioned from a vegetative existence (e.g., initially she couldn't stand and her eyes were constantly out of focus) to having a minor developmental disability.

Note: Melody' dentist provided testimony that her mouth and palate had largely normalized (another common issue in Down Syndrome), something he had never seen occur in this patient population.

Two other similar cases have also been reported:

•At 10 months of age, Bronwyn Nash (who had Down Syndrome) was frail and unable to gain weight, so her mother started her on DMSO. She began gaining weight and developed an increased awareness of the people and objects around her and then started reaching out to touch things. At 18 months, she was able to stand up, and then became able to get into her mother's cupboards, started to

feed herself, and held her water glass well. At the time a health journalist visited her at 28 months of age, she was an alert, cheerful little girl much enjoyed and well loved by her family and improving steadily.

•At 14, Billy King could walk and feed himself but had the mental capacity of a ten month old. He then began drinking milk with DMSO each morning, and two years later, had the mental capacity of a seven year old and began losing the characteristic Down "Syndrome appearance.

Before treatment, 1 year into treatment and 2 years into treatment.

He continued to improve and was eventually able to hold a job in a Portland bookstore.

Note: another account of Billy King's story has a different chronology (e.g., he started DMSO at 8 not 14, and also took the amino acid formula).

Research in turn exists to support these unbelievable anecdotes.

•In Oregon, 67 moderately or severely mentally disabled children (aged 4-17) with Down Syndrome were randomized to receive a high or low DMSO dose and then were compared to 23 similar children whose parents did not want them

to receive an experimental drug. No side effects occurred and a dose dependent improvement was observed:

MEAN SCORE CHANGES, DERIVED FROM PRE-TEST AND POST-TEST DATA

Test	High-Dose Group (N = 34)	Mean Change Low-Dose Group (N = 33)	Non-Study Group (N = 23)
ITPA total language age			
Mean months	+ 6.35	+ 4.79	+ 8.22
Range in months	– 1 to 41	– 7 to 47	0 to 39
PPVT mental age			
Mean months	+ 8.65	+ 3.32	not tested
Range in months	– 29 to 29	– 20 to 27	
IQ			
Mean points	+ 5.50	+ 1.42	not tested
Range in points	– 17 to 22	– 14 to 20	
DAM (raw scores)			
Mean months	– 0.25	+ 1.37	– 0.65
Range in months	– 5 to 5	– 2 to 16	– 8 to 4
Beery VMI age equivalent			
Mean months	+ 9.40	+ 4.95	+ 0.78
Range in months	– 6 to 49	– 38 to 64	– 11 to 36
Lincoln-Oseretsky motor development			
Mean months	+ 3.05	+ 2.05	+ 1.47
Range in months	– 10 to 12	– 6 to 17	– 4 to 17
AAMD Part I (raw score)			
Mean months	+ 11.30	+16.52	not tested
Range in months	– 14 to 44	– 34 to 65	
AAMD Part II (raw score)			
Mean months	+ 20.50	+ 9.26	not tested
Range in months	– 13 to 72	– 55 to 69	

In Chile, 55 children with severe mental disability caused by Down syndrome (the oldest being 14) were given DMSO and amino acids by intramuscular injection or served as controls. The vials for injection consisted of DMSO along with gamma aminobutyric acid (GABA), gamma amino beta hydroxybutyric

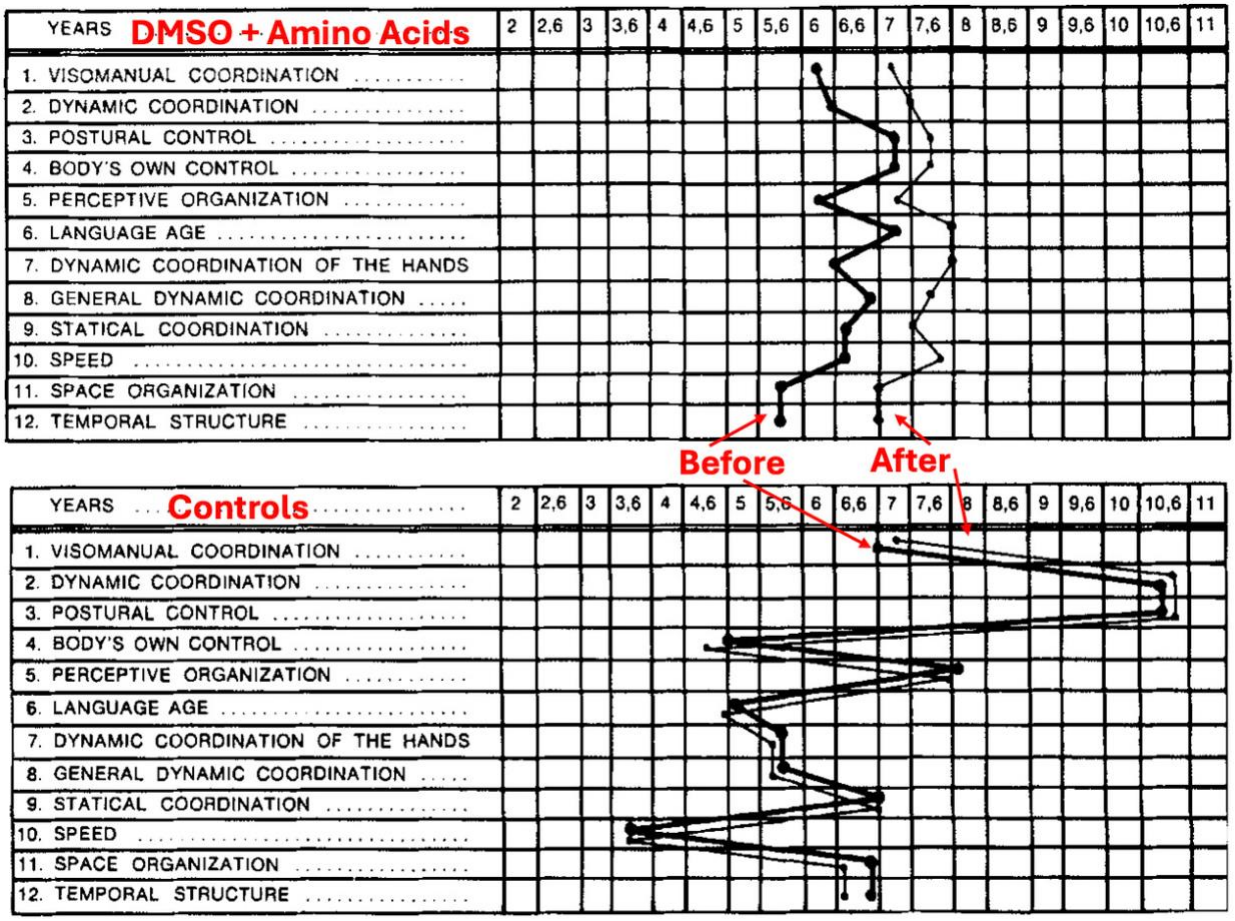
acid (GABOB), and acetyl glutamine (with lower doses given to those under 3 1⁄2 years of age). The children's development was then evaluated with Gessel scores and a massive improvement was seen in the DMSO group:

Under 3.5 years old	Motor Function before treatment	Motor Function after 1 year	Adaptivity before treatment	Adaptivity after treatment	Language area before treatment	Language area after treatment
DMSO	56	72	50	60	52	58
Controls	56	58	52	49	56	54

Over 3.5 years old	Motor Function before treatment	Motor Function after 1 year	Speech before treatment	Speech after 1 year	Comprehension before treatment	Comprehension after 1 year	IQ Before Treatment	IQ After 1 year
DMSO	38	49	27	37	42	52	29	40
Controls	34	36	21	23	25	34	34	33

Note: this study (and the additional improvements that occurred) can be viewed here and here.

In Argentina, 13 mentally disabled children (5 severe cases, **4** moderate cases, and **4** mild ones), who did **not** have Down Syndrome, received a DMSO amino acid mixture (known as Merinex) three times a week by injection for 180 days (with periodic 15 day periods where the amino acids without DMSO were administered orally)



Note: other authors have reported young patients (and older ones) with learning difficulties, low intelligence, ADHD, anxiety disorders, epilepsy, nervousness, dyscalculia, dyslexia, exhaustion, and concentration problems all benefit from this protocol. Additionally, some have argued adding galactose to it enhances its efficacy.

In a 1969 study, 44 severely developmentally delayed children received the DMSO amino acid mix, with many experiencing a heightened capacity for learning in them in a relatively short time and over 70% having favorable responses such as a “increase of the IQ, an evident and accelerated progress in basic achievements, an overall improvement of intellectual capacity, evident progress in reading, writing, and mathematics, better coordination of movements and improved manual skill, and a decrease of behavioral problems,"

along with gaining better psychomotor control, no longer having anger for no reason, a general reduction of irritability, and a lessening of disobedience.

Another 1969 study gave the DMSO amino acid mixture for six months to 30 learning disabled children with language disorders (who did not have an accompanying neurological illness) and compared them to 20 controls, and observed it resulted in:

1. Disappearance of mental lethargy.
2. Evidence of sensorial reactions.
3. Disappearance of automatic movements.
4. Disappearance of inertia, passivity, and negativity.
5. Growing interest and initiative in tasks and activities.
6. Improvement of the physiognomic expression and of the spoken language.
7. Lucid activity, group contact, and disappearance of unprovoked aggressiveness.
8. Losing shyness and developing self-esteem.
9. Successful training to carry out chores, to do shopping, to eat, and to dress without help, etc.
10. Learning to read and to write and to do homework.

Lastly, one author reported on an Argentinian study (I could not find) conducted by this physician. where 18 children with Down syndrome received DMSO and amino acids and were compared to 91 controls, and to quote the author this resulted in:

a tendency towards accelerated maturity in the children treated, with marked progress in language integration; this could be established in statistically significant degrees in the children treated

Note: a different book authored by the leading DMSO researcher reported that veterinarian Jack Metcalf had found horses developmentally disabled at birth (to the point they can't nurse) once given IV DMSO three times daily regain the ability to nurse and that DMSO accelerates their overall development.

DMSO in Context

Because DMSO had the fortune to be discovered at a time when there was still an unbridled enthusiasm within the scientific community to investigate an unorthodox idea (something which has largely disappeared now because career scientists are so dependent upon not rocking the boat to ensure a lifetime supply of research grants) and it fell into the right people's lap (exceptionally talented, ethical and driven physicians who'd earned the support of their superiors) the scientific community rallied behind it and published thousands of papers on DMSO.

Nonetheless, the FDA was still able to squelch it, and all of the research behind it (along with all the animals that were sacrificed to attain it) have been consigned to the dustbins of history. In the case of DMSO, this is particularly tragic because of how much suffering (and economic cost) many of the disorders discussed here create and the fact that decades of research and billions of research dollars have brought us no closer to solving them.

I thus made the decision to present this in a neutral tone and do my best to accurately present that science behind DMSO (which has required hundreds of hours of work) so I could give DMSO the best chance of flourishing now and helping those it could help—but in truth—words cannot begin to express my disdain over how DMSO was treated or the human cost of the callous bureaucratic dictates which have kept it from being adopted within the medical system (a sentiment I believe will be shared by many of you). For example, this is what Pierre Kory said after I asked him to review this article:

In the over 15 years I spent running ICU's managing many kinds of brain injuries, strokes and bleeds, it both infuriates and saddens me to know of an intervention that could've helped so many of the hundreds of devastating neurological illnesses that I valiantly and often largely unsuccessfully tried to reverse to health. The therapeutic strategies that I had to rely on like tPa were often quite limited in impact or introduced major risks to the patient.

Note: the reason this project has taken so long is because even here, I only touched the tip of the iceberg, and there are still many other paradigm shifting uses for DMSO (e.g., it is a safe and effective painkiller, it treats both acute musculoskeletal injuries and chronic ones creating significant physical impairment, and it provides a way to treat many other challenging conditions that still do not have an effective therapy within the standard of care). In turn my hope is provide the rest of the DMSO in the near future.

As so much has been forgotten about DMSO, few are aware of its intravenous applications (even its proponents). In the final part of this article, I will discuss everything we know on the subject (e.g., where to procure it, what supplies to use, how to dose it) and the non-IV protocols we've used for strokes (since IV DMSO was often not feasible in those situations) and other traumatic injuries both at the time of injury and afterward for recovery (e.g., IV DMSO is one of the best options for stroke rehabilitation).

How DMSO Cures Eye, Ear, Nose, Throat and Dental Disease

Many of those "incurable" conditions respond remarkably to DMSO

DMSO can often significantly improve one's vision, treat conditions such as macular degeneration, retinitis pigmentosa, and at times allow blind individuals to regain their sight. It is also often very helpful for sore and strained eyes and relieves excessive irritation and inflammation, along with many other eye conditions (e.g., cataracts).

•DMSO frequently treats a variety of ear conditions such as tinnitus, hearing loss, airplane ear, and a variety of infections inside the ear (e.g., otitis media).

•DMSO often is very helpful for sinusitis and a variety of infections of the nose and throat. Likewise, it is extremely helpful in dentistry, both for cleaning the mouth (e.g., by preventing bleeding gums), and by allowing the mouth to rapidly heal after dental surgeries.

•In this article, I will review the evidence supporting each of those uses, along with the data demonstrating the safety of these methods of DMSO administration and instructions on how to do them.

DMSO is a phenomenally effective medicine that can treat a wide variety of common, debilitating, or incurable conditions, which allowed it to rapidly take the country by storm (as both the public and the medical community saw its results and rapidly embraced it). Unfortunately, the widespread enthusiasm behind something that completely changed medicine and allowed people to care for themselves independently was unacceptable to the FDA. For the next two decades, the agency went to incredible lengths to suppress it (e.g., it actively defied Congress for over 16 years) and eventually made DMSO become a

Forgotten Side of Medicine.

Note: extensive data shows that DMSO is a very safe substance with negligible toxicity.

In turn, one of the truly ironic things about this was that many of those who attacked DMSO later needed it. For example, the pioneer of DMSO discusses how Former President Lyndon Johnson sought his help in 1971 —after his FDA commissioner had just spent almost three years weaponizing the FDA against anyone wishing to use DMSO (which in turn set the stage for many of the police-state tactics the FDA would illegally use against natural medicine in the decades to come).

Note: in the previous article I erroneously stated this conversation took place in 1981 not 1971 (at which point LBJ was deceased).

I have now received hundreds of unbelievable reports from readers (which can be read here) of what DMSO did for them—many of which are almost identical to what people reported fifty years ago before the FDA wiped DMSO off the map.

For context, the majority of those reports were for the most common uses of DMSO, such as chronic pain, acute injuries, and arthritis (discussed further here). However, as discussed here, DMSO is also immensely valuable for a variety of circulatory and neurological disorders (e.g., varicose veins, hemorrhoids, Down Syndrome, and Parkinson's)—all of which readers here reported significant improvement from. Likewise, (as discussed here) DMSO also helps various autoimmune conditions.

In this article, I will focus on another group of conditions DMSO was found to be extraordinarily effective—those within the head.

Note: headaches were covered in a previous article and will not be discussed here.

Cause or Effect?

There are two common ways to view medical problems someone has—as a specific disease process of a particular part of the body or as one manifestation of a systemic issue. Neither approach is entirely correct, as in some cases, you need one more than the other, but our medical system is very much biased towards the first one.

This, I would argue is in part because this makes medicine easier to practice (e.g., a specific set of symptoms goes with a specific drug rather than having to go the extra mile to figure out what is causing a nebulous set of symptoms), and in part because it makes it possible to sell far more patentable medicines (as by viewing each symptom as a different disease, far more diseases exist to market products for). **Unfortunately, this also frequently lends itself to a situation where modern medicine "treats the symptoms rather than the cause."**

I personally believe that most chronic disease processes can have a variety of ways they manifest throughout the body. Typically the manifestation you see is a result of a pre-existing weakness in the body being the first spot to give out after a stressor is put on the entire body (e.g., one of the most common symptoms individuals with COVID vaccine injuries had was a pre-existing site of minor inflammation or an old scar becoming highly inflamed). Similarly, I believe this paradigm answers a critical question medicine never quite addresses—why do some people get so sick from the same thing that others quickly shrug off?

In turn, I've tried to focus on the forgotten areas of medicine that I believe often underlie various seemingly unrelated disease processes. For example, I believe that microcirculation is critical for health, but since it is not easy to measure, our focus instead has gone to blood pressure—which while sometimes useful for determining circulatory health, often is not. In turn, I've provided a variety of strategies for improving the microcirculation (e.g., improving the physiologic zeta potential). Beyond cardiovascular health improvement, many readers here who did that reported a variety of other chronic symptoms also having

noticeable and unexpected improvement.
Note: all the previous also holds true for the cell danger response—a defensive mechanism cells go into where their mitochondria shut down that can only be treated by finding a way to coax the mitochondria out of it.

DMSO is also a systemic agent that has the ability to address some of the common root causes of disease. Because of how dramatically it helps injuries, arthritis, and chronic pain (of which I've received many remarkable testimonials from readers you can read here), those are its typical uses. However before long, many patients on DMSO would report some other chronic issue they never thought could improve also begin getting better (which likewise, many readers here have noticed). These reports caused the early pioneers of DMSO to begin researching other novel uses of DMSO.

In this article, I will look at the variety of remarkable benefits that have been observed for DMSO for conditions within the head. These results, I believe are a product of DMSO:

•Being able to increase microcirculation and treat circulatory or neurological disorders(e.g., strokes, traumatic head injuries, spinal cord injuries, and dementia or mental disability).

•Being able to re-awaken cells that were dormant or on the verge of dying due to a previous stressor.

•Being able to increase parasympathetic activity.

•Having strong anti-inflammatory properties.

• Having anti-bacterial properties.

•Being able to easily pass through biological membranes without harming them and spread throughout the body (while also carrying anything mixed with it into the body).

DMSO and the Eyes

Many DMSO users have noticed that their vision improved while they used it for something else (e.g., see this, this and this testimonial from a reader here), which in turn inspired physicians to begin applying it to the eyes of patients with vision problems.

Note: to my knowledge, every route of administration for DMSO except intrarectally has been researched. Of these, the only one that ever caused issues was nebulizing it (as rats who regularly breathed DMSO eventually developed toxicity). As a result, the DMSO field has recommended against nebulizing it, although I periodically read cases of individuals who had a positive response to nebulized DMSO

Ocular DMSO Distribution

The logic behind putting DMSO in the eyes is that a much stronger dose can get to the eyes than what would arise from systemic applications of DMSO. To evaluate DMSO's distribution (and that of its metabolic breakdown products), radioactive forms of DMSO (DMSO synthesized from either ^{35}S or ^{3}H or both) were placed in animals and then their entire bodies were monitored for radiation emissions.

In one study, it was noted that while DMSO tended to distribute evenly throughout the body (typically being at a lower concentration in the tissue than in the blood), in the iris and ciliary body, it matched the blood's concentration, while in the cornea (the surface of the eye), after 2 hours it was 2.2 times higher than the blood in rabbits and 4 times higher in rats. In other words, DMSO specifically concentrates in the cornea when administered into the body (after which it rapidly cleared), suggesting that DMSO is indicated for treating corneal and uveal diseases.
Note: concentrations did not increase with repeated administrations (indicating DMSO does not accumulate in the body).

More importantly, that study helps to explain why consuming DMSO can often directly impact and improve eye health.

Conversely, in another study, rats eyes were exposed to DMSO, and it was found regardless of the route of administration or the concentration used, DMSO rapidly cleared from the eyes:

CONCENTRATIONS OF DMSO IN WET OCULAR TISSUE UP TO TWO HOURS AFTER ADMINISTRATION

Length of Time after DMSO Administration	Concentration of DMSO Remaining in Tissue*		
	Group I 50% DMSO by EyeCup Immersion	Group II 50% DMSO by Eye Drops	Group III 100% DMSO by Eye Drops
min	mmol of DMSO × 10^{-7}/mg tissue		
5	82.7 ± 42.9†	69.4 ± 18.3	144.5 ± 58.1
10	23.7 ± 9.9	61.9 ± 26.2	25.8 ± 3.5
30	8.4 ● 6.1	10.5 ± 2.8	16.5 ± 10.2
60	6.9 ± 2.9	4.0 ± 0.7	7.6 ± 3.2
120	2.3 ± 0.8	1.6 ± 0.3	6.4 ± 1.1

This in turn, suggests that DMSO can rapidly extract things from the eyes that should not be there (e.g., excessive fluid) as whatever is in the eye will be drawn out into the rest of the body with the DMSO that leaves the eyes.

Note: DMSO has also long been used to preserve corneas, which will be transplanted to someone else, again indicating that DMSO is relatively non-toxic to the cornea.

DMSO Eye Safety

Since the idea of putting DMSO into the eyes understandably makes one uneasy, I've tried to locate all the safety data relating to this. Regarding the systemic administration of DMSO, there was a longstanding concern that DMSO could (temporarily) change the refractive index of the eyes. This finding was found in certain animals at very high doses of DMSO but never, despite

extensive evaluation, found in monkeys or humans (e.g., see this study). For those interested, I summarized all the data on DMSO induced lens changes here, and the most detailed summary I found of exactly what changed in animal lenses can be found here.

Note: in humans, when DMSO was taken each day at 3-30 times the standard dose (achieved by covering the entire body in DMSO), 9% of participants experienced burning or aching eyes. This (like the previously mentioned effects) I suspect is due to the fact DMSO will concentrate in the cornea, but at the same time, realistically will never be an issue for a DMSO user because the effect only appears at very high doses (and has no real consequence besides the temporary irritation).

A few animal studies have been conducted which evaluated the effects of applying DMSO directly to animal eyes. The most detailed study put various combinations of steroids, 15% DMSO, or a saline placebo into rabbit's eyes. A wide range of parameters inside the eyes were studied (e.g., regular body weights, intraocular pressure, retinoscopy, ophthalmoscopic, and biomicroscopic examinations alongside dissection of the eyes and examinations of their contents) alongside ones outside the eye (e.g., urine volume, urine composition, blood work, autopsies of organs) were then assessed. From this, it was found that 15% DMSO **created no adverse effects**, but did:

•Increase urine volume—DMSO alone increased it by 14.6%, while when added to varying concentrations of fluocinolone acetonide (a steroid), it increased by 4%, 29%, or 58% (which again illustrates that DMSO moves into the bloodstream after being applied to the eyes).

•Cause a slight decrease in urea in the aqueous humor of the eyes (which was small enough that it may have been due to chance).

•Decrease intraocular pressure (which is often quite helpful for the eyes).

TABLE 1
WEEKLY INTRAOCULAR PRESSURE READINGS OF RABBITS RECEIVING DAILY OCULAR PREPARATIONS OF STEROID AND STEROID WITH DMSO*

Solution	Intraocular Pressure (mm Hg) 0–6 Weeks†						
	0	1	3	3-1/2	4	5	6
Fluocinolone acetonide, 0.001%	18.9± 1.4	18.8± .6	17.1± 1.7	16.7± 2.3	17.6± 1.6	17.9± 1.2	16.3± 1.0
Fluocinolone acetonide, 0.001%; DMSO, 15%	18.9± 1.8	19.9± 1.7	21.9± 2.9	21.9± 3.4	21.3± 2.6	17.8± 1.4	17.0± 0.0
Fluocinolone acetonide, 0.025%	19.7± 1.9	18.3± 1.2	23.8± 2.2	19.8± 1.4	20.1± 1.6	17.6± 1.5	16.8± 1.9
Fluocinolone acetonide, 0.025%; DMSO, 15%	20.6± 2.5	19.2± .5	22.4± 4.0	22.0± 1.2	20.4± 2.3	18.1± 1.5	16.5± .9
Fluocinolone acetonide acetate, 0.001%	17.7± .8	17.9± 1.2	23.9± 1.6	22.0± 1.4	21.3± 2.1	17.6± 1.0	17.5± 1.7
Fluocinolone acetonide acetate, 0.001%; DMSO, 15%	17.7± .8	17.4± 1.1	20.6± 2.9	22.0± 2.5	23.3± 2.5	16.0± 1.2	16.1± 1.1
Placebo, DMSO, 15%	18.3± 1.3	19.0± 0.0	20.3± 2.2	19.5± 1.5	19.3± 1.9	14.5± 1.5	14.5± 2.5
Placebo, fluocinolone	18.6± .8	18.5± 1.4	21.5± 3.2	22.1± 1.8	18.1± 1.8	14.0± 2.9	17.5± 2.2
Water control	17.3± 0.0	17.5± .6	19.3± 3.1	19.2± .5	19.1± 1.7	16.5± .5	16.8± .5

Additionally, this study also applied 30% and 100% DMSO to rabbit eyes. In both cases, no evidence of change was seen in any part of the eye (the iris, cornea, lens, retina, conjunctiva, and lids), but 100% DMSO was observed to cause temporary lacrimation (tearing).

A separate paper on the known toxicology of DMSO also noted that:

•A Draize eye test (applying DMSO to an animal's eye and keeping it on the eye) resulted in a slight conjunctivitis (eye irritation) which disappeared after 24 hours.

•One study found ocular instillation of 0.1 ml of 100% DMSO in rabbits caused reversible irritation of conjunctivae, while another author failed to observe this effect.

•Administering high doses of DMSO to rats (14.5g/kg) through the air resulted in hyperemia and eye inflammation.

.

•In humans, two drops of greater than 50% DMSO applied to the eye caused a temporary burning sensation and vasodilation; concentrations of less than 50% exhibited no toxic effects.

Another study found that DMSO gave eye drops at 66% concentration to four patients, and one of the four experienced a temporary burning each time the drops were applied. Likewise, varying degrees of irritation and burning occurred as higher concentrations were used. However, no damage (as shown by a fluorescein stain) occurred to either their eyes or the animals in the study after ocular DMSO applications.

That same study also gave 4 rabbits 90% DMSO to the eyes six times a day, and then after 2 weeks, DMSO at 66% six times a day. At 90%, 2 of the rabbits experienced a temporary severe conjunctival injection (red eyes from swelling and inflammation of the blood vessels in the eye), but no keratitis (inflammation of the cornea) or damage to the lens was observed, and of the 6 total rabbits who received ocular DMSO, 3 had some degree of conjunctival irritation from DMSO.

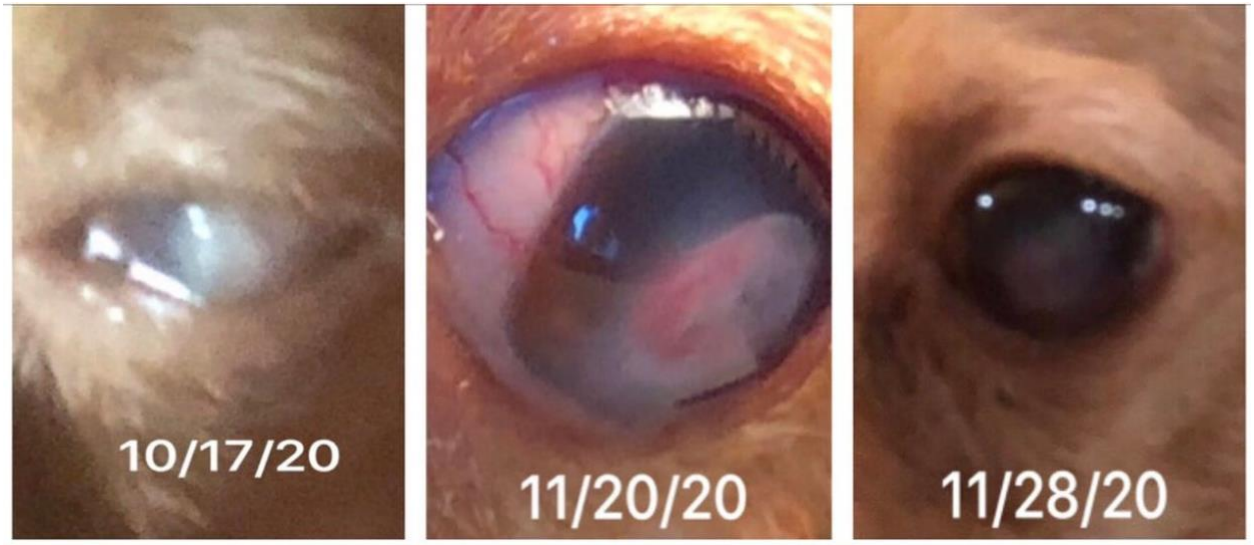
I will now discuss two human studies that evaluated both the safety and efficacy of applying DMSO to the eyes, both of which found no toxicity from doing so.

DMSO and Eye Inflammation

One study reported giving topical DMSO to 108 patients (for a total of 157 eyes) at a higher concentration than others used. That author noted that no toxicity or eye issues were observed, including in patients with pre-existing eye issues (e.g., 8 glaucoma patients who frequently had their intraocular pressure rise when given a steroid did not have it rise from DMSO and likewise 17 patients with pre-existing cataracts did not have them worsen from DMSO).

In that study, of the 43 whose results were listed in detail, 3 had improved vision (including one who was blind prior to DMSO treatment). Additionally, 4 severe cases of episcleritis (which had previously failed to respond to the use of corticosteroids) all responded to DMSO topically, and 4 cases with chronic corneal edema all exhibited some improvement on this regime. Other types of eye inflammation were also studied (e.g., conjunctivitis, keratitis, and uveitis). Still, the therapeutic response was more varied, leading to the investigator concluding more standardized approaches needed to be developed to assess DMSO's benefits.

Note: somewhat similarly, I received a report of a dog that developed an eye ulcer from a scratch, making the dog blind, and a veterinarian wanting to remove the eye to spare the dog from further suffering. The owner however, went against the vet's advice, and after a month of applying DMSO, it was cured and the dog's sight returned.



Note: DMSO has also been used in conjunction with antibiotics to eliminate organisms from the anterior segment of the eye from patients with inflammatory eye diseases, to treat inflammatory diseases of the eyelids, and when combined with monomycin to treat corneal burns.

Retinitis Pigmentosa and Macular Degeneration

Retinitis pigmentosa (RP) refers to a group of genetic disorders that cause gradual vision loss (starting in the periphery). It results from rod cells in the eyes not secreting a substance that prevents cone cells in the eye from dying (through apoptosis). It affects 1 in 4,000 people and is thought to be incurable, with the exception of one subtype of RP (comprising between 0.3-1.0% of cases), which has a $850,000 gene therapy that works about half the time (although others are in the pipeline).

Since RP is "incurable," it immediately caught a few doctor's attention that their patients with it had their vision improve while receiving DMSO for something else. This prompted a series of clinical studies a preliminary 1973 investigation that found DMSO did indeed help this condition.

That author then published a larger 1975 study where he shared:

When his DMSO treatment was started (February 10, 1972), this patient could see hand motion only with his right eye, and had a visual acuity of 20/200 (Snellen) in his left eye. Five days later (February 15, 1972), his vision was measured as 20/70 + 1 in the left eye, and he could count fingers at 5 ft with his right eye. Three months later, his visual acuity was 20150 in the left eye. This patient has continued his treatments daily, except for a 1-week trial interval without DMSO. He noted that his vision began to get worse during this interval, and when he restarted treatment, his vision returned to the level he had just before discontinuance. His most recent visual acuity measurement (January 2, 1974) is still 20/50 in the left eye, and he is able to count fingers at 6 ft with his right eye.

Following this, 50 more patients with RP or macular degeneration received DMSO applied to the eyes, of whom 22 had improved visual acuity, 9 had improved visual fields, and 5 had improved dark adaption, 2 continued to worsen, while the rest noticed no changes in their vision (which could potentially mean DMSO stopped the degenerative process).

To evaluate for toxicity, the eyes were examined through serial fundus photography and slitlamp photomicrography, and no adverse tissue reactions were noted. Patients often reported temporary stinging (usually 20 to 30 sec) and occasional burning and dryness of the skin of the lid (likewise a reader here reported when applying DMSO to the eyes, they have a temporary stinging which quickly disappears, while another reported no issue with using a DMSO eyewash).

Additionally, patients in this study also reported a "glare or blur effect" in their vision that was often accompanied by an increased sensitivity to light, or photophobia. This typically lasted for a few days to weeks, after which it disappeared and was replaced with an improved ability to get around at night, and improved visual acuity experienced as better perception of contrast.

The author also stated they had initiated a controlled clinical study and were in phase III clinical trials with the FDA (which is where the above data originated from), but I could not figure out what happened to it.

Note: the author of that paper suspected that DMSO was helping here by rescuing dormant cells in the eye which would otherwise eventually die.

Conversely, a follow up controlled study was unable to detect a clear benefit for DMSO in patients with retinitis pigmentosa, did find a complete lack of toxicity from applying DMSO to the eyes.

Human Case Studies

In addition to those two studies, a variety of individual case histories support DMSO's value for the eyes.

One author reported on DMSO being used by Stanley Jacob for more severe cases of eye damage such as:

•A man who had been blind for more than 30 years after having dynamite explode in his face who started seeing flashes of light after applying DMSO to the head.

•A man who lost sight in the right eye (along with other functions of the eye like focusing) and gradually lost it in the other after an almost fatal impact by an automobile while skating down the road. After trying DMSO for hair loss, he noticed a sensation in the back of his right eye, so Stanley Jacob decided to try applying DMSO to that eye, eventually settling on a high concentration (that stung for several minutes, caused tears, and left the eyes bloodshot for about 20 minutes). After this, sight rapidly returned to the right eye.

•A man who had been blind for many years in one eye (only able to distinguish light and dark) regained his sight in that eye with DMSO (e.g., he demonstrated this by walking unaided in public areas and describing objects and events while his good eye was covered).

•A man who was almost blind (leading to him being completely dependent on others like his wife to take him anywhere, cut his meat or keep his house clean) after a year on DMSO regained his sight and no longer needed assistance to do anything (which was of great relief to his family).

Note: these results led to Jacob testing DMSO on a series of patients with incurable blindness. Sadly, in many cases (which ophthalmologists had pronounced incurable), regardless of the remarkable results, the ophthalmologists tended to insist there was either no improvement or it was just a coincidence.

To quote another author:

Ophthalmologist Norbert J. Becquet, M.D., of Little Rock, Arkansas, reported to the American Academy of Medical Preventics (AAMP) in May 1980 that he

had great success using DMSO in treating cataracts and other eye problems. "I've treated two hundred patients in the last year for macular degeneration, macular edema, and traumatic uveitis…In using DMSO, glaucoma drugs are potentiated, including those required for treating wide-angle glaucoma. But DMSO alone is better for macular degeneration.

Note: AAMP is now called ACAM, and other ACAM physicians at that meeting also stated that DMSO treats cataracts and glaucoma. Additionally, in a recent article, I discussed DMSO's value for treating uveitis (so it will not be discussed here).

Another author who has worked with many doctors using DMSO reported that they've found applying DMSO to the eyes seems to help with a variety of vision issues and eye pain, and that typically, there will be a stinging sensation for 30-40 seconds after applying DMSO to the eyes, after which the eyes typically feel better than before treatment. Likewise, he also cited a Los Angeles doctor who had several patients who were able to read fine print more easily after only one week of applying DMSO to their eyes.

Note: that author also frequently applies DMSO to his own eyes when they feel tired and notices an immediate and rapid improvement. Likewise, one reader here who started taking DMSO for Parkinson's noted they had less discomfort due to more eye irrigation.

In one case he cited, a 90 year old man who was unable to read (due to macular degeneration and other eye problems) who was treated daily with DMSO eye drops (along with oral DMSO) and after a month, could resume reading his books (along with thinking more clearly, and his whole body feeling better).

In another case, a 78 year old man had a variety of eye problems that were making it difficult for him to walk around his home. His doctors told him that since there was nerve damage to his eye, nothing could be done, and he should not waste his money on any unproven treatments. However, that man decided not to give up and convinced another doctor to try applying DMSO to his eyes (along with oral DMSO). At the start, he was 20/200, then in two weeks 20/100,

two weeks after that 20/70, and then eventually 20/50 with glasses, allowing him to regain his independence (which persisted along with him being in excellent health for a man in his 80s).

Similarly, a reader here who had always been nearsighted reported that after taking DMSO internally for a few months, they stopped being able to see clearly through their glasses and then realized their vision had normalized (e.g., they could see the smallest print quite clearly) and had not needed reading glasses since.

Another author reports that patients on DMSO sometimes report an improvement in their eyesight as an unexpected but pleasant side effect (e.g., he cited a woman no longer needing her glasses the morning after she took DMSO). He found DMSO was often helpful for macular degeneration.

Note: the most common terminology for this condition (age-related macular degeneration) is AMD. Had I realized at the start that this was also the abbreviation of "A Midwestern Doctor," I would have chosen a different name (and likewise, that is why I always refer to the condition as macular degeneration rather than AMD).

That author reported success using DMSO to treat eye conditions such as, macular degeneration, macular edema, uveitis (inflammation of the middle structures of the eye) due to trauma, cataracts, glaucoma, and various retinal diseases.

In turn, many DMSO doctors would use DMSO for perplexing eye conditions when they weren't sure what to do. Likewise, readers here have reported that DMSO helped with a variety of other challenging eye conditions. For example:

•A firefighter injured his upper eyelid after some hot tar fell on it, which caused chronic inflammation that did not respond to any treatment from his doctor. After 10 years, he tried topical DMSO, and within a week it was gone forever.

•A reader has a very rare condition (less than 200 cases have been reported) that

causes the eye to randomly spasm and jump all over the place (which makes it very difficult to drive) and is thought to be linked to migraines or concussions (both conditions I associate with impaired blood flow in the head). It's considered to be essentially incurable, but after reading this series, he decided to try using DMSO applied as an eye drop and found it would stop the episodes.

•One reader who found DMSO helped many other symptoms they had, began applying DMSO drops to the eyes because they had symptoms of a vitreous detachment (floaters and flashes), and afterward noticed that they had less floaters and flashes, resulting in a clearer field of vision.

DMSO and the Ears

To establish the safety of DMSO in the ear, a study gave the eardrums of 10 volunteer prisoners five drops of 50% DMSO (in water) or 60% DMSO (in glycerin) three times per day for 74 days. During each application, they first laid on their side (with the ear facing up) for 15 minutes, then had a cotton plug placed in the ear so they could stand up but not have the DMSO leak out (which was then removed an hour later). Various tests and examinations were performed, and no signs of toxicity were detected besides a transient decrease in white blood cells (which regressed on its own and may have been related to a circulating infection in the prison). Once that study established the safety of putting DMSO directly into contact with the ear's tympanic membrane, a variety of other studies were conducted utilizing a similar approach.

Impaired Hearing

I believe poor hearing often results from impaired circulation to the ear, and in turn, you will sometimes encounter people who report their hearing improves as a side effect of DMSO usage. For example, after reading an earlier article about how to use DMSO to heal circulatory disorders (e.g., strokes) and starting oral DMSO, this reader reported:

Within 5 days several things were noticeable a) I pass water far more easily, b) my hearing accentuated, c) my eyesight improved somewhat, d) my mind was that much sharper and e) my blood pressure dropped from 160/90 to 150/80 and I just sense my heart is that much better.

Likewise, I recently spoke to a friend of Stanley Jacob who told me that he had success in treating hearing loss with DMSO and that they vaguely remembered Jacob had also treated cases of tinnitus with it.

Tinnitus

Like macular degeneration, most of the treatments I have come across that help tinnitus also improve circulation to the affected sensory organ. Additionally, I have seen many signs suggesting tinnitus is linked to excessive sympathetic activity (e.g., many other treatments I've seen help tinnitus address this component of the disease), which again argues for DMSO's role in this condition (as by being an acetylcholine esterase inhibitor it increases parasympathetic activity).

While numerous patients with tinnitus have reported DMSO helped them (or their tinnitus improved incidentally from DMSO), I only know of one study that formally evaluated it.

In it, fifteen patients with tinnitus of unknown origin were selected for a study (while 2 hearing voices and 3 with tinnitus preceded by acoustic trauma or an aneurysm of the internal carotid were excluded). Each had tinnitus for a prolonged period (6 months was the shortest amount of time) and had not been able to adapt to the noise. At baseline, their characteristics were:

Examination	Number of Patients	
	Normal	Altered
Otoscopy	15	0
Audiometry:		
Tonality	9	6 highs
Discrimination	13	2
Positional vertigo	10	5
Radiography of paranasal sinuses	11	4
Tympanic temperature	4	11
(slightly decreased—36.8 ± 0.4°C vs. 38.1 ± 0.7"C in normal patients)		

Note: in 3 cases, the ear ringing was localized approximately between 3,000 and 4,000 Hz, with an intensity of between 15 and 30 dB. In 12 cases, it was masked with a "white" noise between 10 and 12 dB.

Following one month of receiving a spray with DMSO and a few other drugs, all significantly improved.

TABLE 2

PRINCIPAL SYMPTOMS AND PROGRESS OF PATIENTS WITH SUBJECTIVE TINNITUS OF UNKNOWN ORIGIN AFTER ONE MONTH'S TREATMENT WITH DMSO INTEGRATED WITH ANTI-INFLAMMATORY AND VASODILATORY AGENTS*

Symptom	Number of Patients	Complete Recovery	Lower Intensity of Symptoms	Only Occasional Symptoms
Tinnitus	15	9	2	4
Dizziness	10	5	2	3
Vertigo	5	5	–	–
Insomnia	15	8	7	–
Otalgia	3	2	–	1
Headache	11	7	1	2
Hypacusis (sensorial-neural highs)	6	–	3	–
Discrimination	2	2	–	–

*The average temperature of tympanic membrane before treatment was 36.08 ± 0.4°C; after 1 month's treatment it was 37.9 ± 0.6°C.

Note: this improvement was sustained for at least a year.

The increase in tympanic membrane temperature coinciding with an improvement of tinnitus made the investigators suspect poor blood flow (which DMSO improves) was linked to tinnitus. Likewise, in the four patients who only had occasional symptoms, they reported their symptom reoccurrence was tied to exposure to cold weather in the morning, further strengthening the circulatory hypothesis. Additionally:

A notable improvement was observed in the patients who at the beginning of the treatment had suffered from dizziness and positional vertigo. The insomnia of eight patients disappeared, and seven slept better. There was also improvement in headache and otalgia (the latter was not related to temporal-maxillar articulation). Very noteworthy was the modification in the sensorial-neural hypacusis of some of the patients, as expressed subjectively by the patients and confirmed by audiometric examination.

Note: at the 1974 symposium, this author also presented a paper on how DMSO could be used to treat hearing loss.

Another author reported on a clinic in New York City that treated a number of tinnitus patients with DMSO. They noted that in most cases, their ear noises were immediately reduced with DMSO, and that in most cases, the patients were permanently cured within a month, and if it recurred, a second course of DMSO would typically eliminate their tinnitus much faster than the original treatment. Additionally, in many cases, the patients did not report they had tinnitus until they shared that systemic administration of DMSO had improved their tinnitus (which then was fully improved with targeted DMSO treatment).

Airplane Ear (Aerositis)

Some individuals have immense difficulty tolerating altitude changes (to the point their eardrums can rupture), which in some cases follows an infection that inflames the Eustachian tubes, making them unable to open and accommodate

the pressure changes created by increased elevation (which can be extremely painful—I know people who stopped flying because of it).

In 1967, a former president of the Aerospace Medical Association reported that DMSO could treat aerositis and aerosinusitis by spraying into their noses.

DMSO and Head Infections

One ENT doctor observed that DMSO would often significantly calm inflammation from an infection in the head (including severe ones that were difficult to treat with antibiotics). However, the improvement often only lasted for 2-4 hours. However, when he mixed DMSO with an antibiotic, it frequently eliminated the infection in a dramatic fashion (e.g., the eardrum of an otitis media patient would begin shrinking in 10-15 minutes)—especially if the infection was treated early. Unfortunately, because of how rapidly the symptoms often improved, it often caused patients not to follow up when they needed to for the subsequent treatment.

Note: mixing an antibiotic with DMSO increases its potency, in part because it more easily travels into the body (e.g., in this study, the antibiotic was dissolved in DMSO, directly applied to the eardrum, and then was able to enter the ear), partly because DMSO has its own antibacterial properties, and partly because DMSO decreases antibiotic resistance in bacteria (which will be discussed later in this series).

Additionally, he also found:

•Because of the marked drying up activity of DMSO, a subsequent treatment with a high-fat cortisone ointment was sometimes necessary to use afterward when treating otitis media.

•For irritating nasal infections or inflamed hair follicles, that the feeling of tension and pain significantly diminished within half an hour of DMSO and typically, 2-4 applications were required.

•That infections of the throat (e.g., tonsillitis) required internal applications of DMSO onto the inflamed area (rather than from the outside) and that cases with edema frequently had dramatic results (e.g., edema of the uvula often disappeared within hours).

•Significantly facial injuries (all of which had accompanying hematomas and included 2 traumatic hematotympanums and 2 hematomas of the nasal septum) had excellent responses (e.g., the hematomas and swelling distinctly improved on the first day, and the healing process as a whole was reduced to about half to a third of the average time and the 2 nasal septum hematomas did not require an incision or lead to colliquation).

•Three patients who had lost their smell were treated with DMSO. One had a striking response and immediately regained it; the other two had temporary improvements after each administration of DMSO.

•Many patients with stomatitis apthosa (iss) have a good response to DMSO. Unlike the other applications, 60% DMSO (applied as a spray) was used.

He then compiled all of his cases:

TABLE 2
SUMMARY OF CASES

Diagnosis	Mode of treatment	No. of patients treated	Complete remission of symptoms	Partial remission of symptoms	Unchanged
Furuncular otitis (and infected eczematous otitis)	DMSO	119	2	16	11
	DMSO + ANTIB.		26	53	11
Otitis media (40 acute, 27 chronic)	DMSO	67	1	–	3
	DMSO + ANTIB.		26	26	11
Furunculosis of the nose (and infected nasal eczema)	DMSO	35	4	3	1
	DMSO + ANTIB.		12	12	3
Tonsillitis and Pharingitis (acute) (acute and chronic)	DMSO	119	4	24	16
	DMSO + ANTIB.		16	48	11
Stomatitis aphthosa	DMSO	34	5	4	2
	DMSO + ANTIB.		8	15	–
Neuralgiform headache	DMSO	109	29	54	26
Temporomandibular arthropathy	DMSO	15	5	8	2
Injuries	DMSO + ANTIB.	13	9	4	–
Various disorders	DMSO	19	2	15	2
90% DMSO		530	149	282	99
Antibiotics were mainly terramycin and erythromycin			28.1%	53.2%	18.7%

Various disorders included: 4 acute facial paralyses (2 improved), 4 herpes simplex (3 improved), 2 chronic Herpes zoster otitis (both rapidly improved), 2 Parotitis (both improved), 2 phlegmons of the mylohyoid (both improved) and 3 anosmnias (all improved).

Note: most of the poor responses in otitis media were in chronic cases. Of the 27, 4 had a "very good" response, 13 had a "distinct improvement" (but generally relapsed in a short time), 10 had "no change" and 1 became worse.

A similar Russian study gave DMSO with success to 69 children (37 girls and 32 boys) with otitis media and 17 with maxillary sinusitis. In the otitis media cases, 30-50% DMSO (sometimes mixed with an antibiotic) was poured into a cleaned ear (under slight pressure) and typically passed through the eustachian tube into the nasopharynx (throat). In suppurative otitis media, there was a rapid cessation of pussy discharge from the ears, a return of hearing, and a

normalization of the blood. In purulent inflammation of the maxillary sinus, 30-50% DMSO was given by injection, and cures were achieved in 4-8 days in the majority of cases, with the treatments usually lasting long term.

Note: another Russian study used DMSO to treat suppurative otitis media and maxillary sinusitis in children.

Finally, one approach for treating middle ear infections is to puncture the ear drum with a needle and drain it. Since this is quite painful, this doctor decided to try swabbing a drop of DMSO mixed with tetracaine against the ear drum, as DMSO both potentiates local anesthetics and can allow them to pass through the eardrum without needing to puncture it (which would be immensely painful for any child). In turn, at the 1966 annual meeting of the American Academy of Ophthalmology and Otolaryngology, shared that had done this one 107 patients with serous otitis and 50 with purulent otitis media, of whom 80% had no pain, and 20% only had slight pain.

Puncturing a child's ear almost always requires putting them under anesthesia, which makes the procedure more costly and has its own set of complications, so having a way to perform the procedure while avoiding anesthesia would be of great benefit.

Sinusitis

DMSO has often been observed opening blocked nostrils within a few minutes due to its antibacterial and anti-inflammatory effects, which allow it to reduce swelling in the sinuses and promote the healing of inflamed tissue. In addition to the previously mentioned studies where it showed benefit for sinusitis:

•A large DMSO study included 7 female patients (aged 43-66) who had had sinusitis for 1 week to 9 months and received DMSO. Of them, 2 had a good response to it, and 5 had an excellent response. Likewise,

•In 1965, Merck sent out guidance to their investigators on what they had learned from treating approximately 4,000 patients for up to 18 months. In it,

they mentioned one of the conditions DMSO had shown efficacy for was sinusitis and that “A dilute solution to the nasal mucosa has resulted in the discharge of a great deal of infected material from the sinuses and relief of pain.”

•A 1992 Russian study found administering 10% DMSO to the sinuses followed by local oxygenation, within 2 years, 49 out of 52 children had a complete recovery (including all cases of maxillary sinusitis) whereas many controls receiving standard treatments did not.

DMSO in Dentistry

Many people find DMSO to be an excellent mouthwash or toothpaste, and when DMSO is used on the gums, they are much less likely to bleed. Additionally, DMSO can often relieve pain from a toothache until a dentist is seen, and pain in the oral cavity can be alleviated by swilling the mouth with a DMSO drink solution.

Likewise, some dentists in practice find DMSO (or DMSO combined with an antibiotic) very helpful for pain, infections, and swelling in the mouth, as well as for saving teeth that are starting to loosen from periodontitis. In turn, three authors have reported on dentists using DMSO in their practices:

•Stanley Jacob reported on a Portland dentist who specialized in restorative work and found that applying DMSO after a dental procedure consistently eliminates the pain (from intrapulpal inflammation) that some patients often experience after dental (even in those who have undergone a full day of restorative work.

•Another author reported other dentists use DMSO in a similar manner (e.g., for pain, infections, and swelling issues or after teeth extractions—where it is either applied to the gum or outside on the cheek or on the jaw next to the extraction site) and frequently combine it with other medications (e.g., antibiotics). Additionally, he cited a dentist in New York who applies DMSO to areas that

will be x-rayed to prevent the damage the x-ray could cause (as DMSO has been shown to do tal his).

•Another author reported that pioneering dentists are dropping DMSO into empty tooth sockets after extractions, especially those for wisdom teeth, as it stops post-extraction swelling.

A variety of papers have also been published on DMSO's value in dentistry:

• A 1969 Polish study followed, this evaluated 32 male and female patients (ages 18-45) with periodontal disease. In 13 of the patients, the disease only involved bleeding and swollen gums. In the other 19, the oozing and painful pockets of infection extended deep into the gum, sometimes involving the dental nerve, bone, and loose teeth. After cleaning and repairing the teeth as much as possible, the patients were treated with DMSO every other day for 7-10 treatments.

Compared to controls, this resulted in "remarkable improvements." Specifically, there was a total elimination of pain, decreased bleeding, and gum adherence to teeth in those patients with superficial disease. At the same time, those with deep infections reported less inflammation and disappearance of painful symptoms, but none of them had very loose teeth firm up.

Note: a preliminary version of this study can be found here.

Following this, many others were also written outside of America:

•The earliest one I know of was conducted in 1968 and showed DMSO improved the pulp of monkey's dental teeth. Three weeks later, that author then published a study that found DMSO improved 75% of pulpitis cases, while DMSO plus oxyphenylbutazone (a drug for gout) or chloramphenicol improved 85% of cases, while placebo only improved 50% of cases, and five months later published another paper on using a DMSO combination for pulpitis. *Note: this author conducted controlled studies on using DMSO for pulpitis for 10 years (e.g., he also published this, this, this, and this study).*

•A 1981 Russian study found DMSO mixed with azathioprine treats periodontosis.

•A 1981 Russian study mixed DMSO with oxacillin and ectericide was able to significantly accelerate the healing of a dry socket (an unhealed wound following a dental extraction).

•A 1983 Russian study of 222 people (176 had acute serous limited pulpitis and 46 — chronic fibrous pulpitis) found 70% DMSO placed into cavities was effective in 98.4% of acute cases and 89.3% of chronic cases, and that in most cases, this benefit persisted. Additionally, of 9 of the 16 cases with chronic fibrotic pulpitis benefitted from DMSO.

•A 1983 Bulgarian study found 15% DMSO mixed with a herbal extract treated periodontal disease.

•A 1986 Russian study found a DMSO containing paste treated deep caries.

•A 1987 Russian study showed how DMSO mixed with indomethacin can treat generalized periodontitis

•Another 1987 Russian study found DMSO helps deep caries and acute focal pulpitis

•A 1988 Russian study found of adolescent patients found DMSO plus procaine treated chronic parenchymatous parotitis (inflammation of the salivary glands).

•A 1993 Russian study found DMSO plus short-acting insulin and 5% calcium pantothenate (B5) safely treated 42 patients ages 23 to 62 with chronic parenchymatous parotitis.

•A 1998 Russian study found 50% DMSO with 2.5% orthophene stopped type I and type II autoimmune inflammation in the periodontium.

Applying DMSO to the Head

While applying DMSO to the body will often create positive effects on conditions in the head since DMSO spreads through the body, it is often necessary to apply DMSO directly to the area where the issue occurs so a higher concentration of DMSO can reach the area. In turn, many of the principles for using DMSO I've highlighted throughout this series hold true for the local applications to the head, but there are also a variety of unique considerations.

For example, people often will have things on their faces they do not want to transmit in the body such as:

•Contacts
•Metallic residues from the nose pads of glasses.
•Make-up
•Dyes or chemical cleaning products in the hair.

Because of this, things like contacts must be taken off before using DMSO and you should ensure the area it is applied to has been cleaned beforehand if any chemical residue may have been left there.

Note: it's also important that each thing you use to dilute DMSO is also chemical free (so don't pour it with plastic spoons, don't use plastic droppers, and be sure to use purified water to dilute it).

Likewise, the face is one of the most sensitive parts of the body to DMSO, so typically topical applications need to be started at a low concentration and gradually increased rather than a high concentration of DMSO immediately used on the face (especially stronger gels), as otherwise the skin may get irritated and make the user not want to use DMSO.

The Remarkable History and Safety of DMSO

Dimethyl sulfoxide (DMSO) is a simple chemical that is remarkably effective for treating a wide variety of health conditions (e.g., chronic pain, injuries, arthritis, strokes, spinal cord injuries, and a variety of autoimmune conditions). Because of this, once it was discovered, it quickly spread through America like wildfire with incredible (and almost impossible to believe) data behind it. Likewise, after I created a renewed interest in DMSO through this series, I received hundreds of almost unbelievable testimonials which were virtually identical to what people reported 60 years ago.

Note: this testimonials can be found in the comments at the bottom of this article. If you have a story you would like to share, please add it there as well.

This in turn raises a fairly straightforward question. If something that effective had been discovered, and both the medical community and the public got behind it, why hasn't anyone heard of it? Briefly, for a variety of political reasons (which I detailed here#), the FDA realized the agency would greatly benefit from DMSO being outlawed. In turn, the FDA was willing to go to war against America (e.g., the agency fought Congressional subpoenas and hearings for more than a decade) to keep away from us. To justify this, the FDA continually argued that DMSO was incredibly dangerous, when in reality, the data showed it was one of the safest substances in existence.

Since a renewed interest in DMSO is now forming, the purpose of this article will be to present all the the toxicity data on DMSO (so individuals can be more informed on the potential risks of the therapy) and to provide a place to collect all the testimonials readers have shared about their experiences with DMSO.

Introduction

My time in the medical field has led me to accept many medical practices are adopted because of politics or economics rather than because existing evidence shows they work. Nonetheless, certain instances of this happening still astound me to this day, particularly the blacklisting of DMSO (dimethyl sulfoxide) as:

•This simple chemical is incredibly safe and effective and treats a wide range of challenging medical conditions that impact millions that still lack an effective therapy (outside of DMSO).

•Because of its efficacy, once discovered, it took the country by storm, resulting in millions using it, the scientific community getting behind it and publishing thousands of studies on DMSO, **numerous pharmaceutical companies making large investments to bring it market**, professional athletes promoting it, numerous governors, congressional representatives and senators (on behalf of both themselves and their constituents) pressuring the FDA to give it a fair chance for decades and state legislatures independently legalizing it because the federal government would not.

•Many approved pharmaceutical products take advantage of DMSO's properties to work (e.g., in those products, DMSO is often classified as an inert "vehicle"). Similarly, DMSO is FDA approved for one condition (interstitial cystitis) and is approved for a wide variety of veterinary uses (e.g., the same conditions it treats in humans).

•Over the past 40 years, more than 10,000 articles on the biological implications and 30,000 articles on the chemistry of DMSO have appeared in the scientific literature—much of which, as I've shown here is remarkably compelling and paradigm shifting in healthcare.

•Yet, despite all of that, DMSO was effectively erased from history. It is now widely seen as an unproven and dangerous therapy, and even within the natural health field, most people do not know it exists.

Because of all that, I've felt a responsibility to use this platform to get the knowledge on DMSO out, which I began by presenting the strong case that

DMSO is an incredible therapy for:

•Circulatory disorders like Reynaud's and varicose veins.
•A wide range of neurological disorders, including ischemic and hemorrhagic strokes, and spinal cord injuries leading to paralysis or dementia.
•Allowing patients who've had decades of chronic pain (from a variety of different causes) to get their lives back.
•Healing a wide range of injuries (e.g., sports injuries, traumatic impacts) and chronic musculoskeletal problems (e.g., spine and shoulder issues) and wounds (e.g., burns or surgical incisions).
•Chronic rheumatic conditions (e.g., arthritis).
•Complex protein disorders (e.g., amyloidosis).
•Down Syndrome.

In turn, I've received numerous reports from readers (I've been gradually sharing here) from readers who've experienced rapid life-changing benefits from DMSO, very similar to the data I provided, which showed DMSO had an 80-90% success rate in treating.

Yet, despite all of this, I've still only touched the tip of the iceberg of what can be done with DMSO (e.g., in upcoming articles I will also review how DMSO is also quite helpful for a variety of eye, ear, dental, gastrointestinal, and autoimmune conditions such as tinnitus and macular degeneration, along with also having remarkable utility in treating cancer, challenging infections and debilitating collagen disorders). As a result, I've also received numerous queries from readers who inadvertently discovered many of those benefits when they used DMSO for a chronic pain condition.

For example, some of the more recent reports I've received include:

After AMDs articles, I used DMSO on an acute bruise and it completely took the pain away AND resolved the swelling that was developing. 😳😳😳😳. It's hardly even tender today. Incredible

Dear MWD, you are so right on learning to doctor yourself. I don't travel without DMSO, ivermectin and aspirin. Two nights ago at bedtime I developed chest pains that radiated between my shoulder blades. Being in New Mexico (Oh, Lord, don't let me die in New Mexico) I put DMSO along my carotids on my neck and took 2 aspirin. In an hour the pain was gone and I slept soundly. Scared the hell out of my poor husband.

After reading this I got a tub of 70/30 gel and applied it to my sons feet three times per day. He was riding his skateboard barefoot and crunched his toes under his feet. No broken bones.

Within three days he said he felt no pain or discomfort at all. For the sort of injury it was it seemed like the sort of thing which would take weeks to stop hurting and for all discomfort to end for a sixteen year old!

Excellent research - I've given DMSO to my mom and it has helped her arthritis immensely.

I am an 81 year old woman who was injured by the first of a series of 2 Shingrix shots in 2019. I never took the second shot. Eight days after receiving that shot I developed excruciating pain in my arms, hands, legs and feet. Although being told by two doctors that the vaccine did not cause the pain, the neurology team at a major medical institution diagnosed my condition as acute inflammatory demyelinating polyneuropathy(AIDP), on the spectrum of Guillame Barre. They treated me with gabapentin which relieved the pain. However, I was left with neuropathy in my feet which caused severe and painful spasms in my feet along with numbness on the bottom of my feet. After several weeks seeing a neurologist, I asked her what could be done to help this situation. She said there was nothing. After this article I started using DMSO on the bottom of my feet and over the tops of my toes when I went to bed. The first time I used it, I had no spasms which always happened at night when I was trying to go to sleep. I've now used it for 3 days and still no spasms. It's like a miracle. I'll continue using it to see if it helps resolve the numbness in my feet. God bless you, AMD. I never would have tried this without your articles and would have suffered

needlessly forever. I owe you a great debt. Thank you. I'm telling everyone about DMSO and sending your articles as well. Your contributions are, without doubt, some of the most important I have read.

Likewise, a grateful reader reported their wife (a retired nurse) had a fall that injured her back and left her in severe pain and unable to walk which chiropractic did not help, and then a few days later, the ER could not help either. However, rather than accept an admission to the hospital, she took DMSO, her back worked itself out, and she was spared months of recovery with the standard of care.

Note: I've also received reports on a variety of other conditions (e.g., one subscriber shared a DMSO mixture shrunk their hemorrhoid), and another shared DMSO has gradually been shrinking their cataract.

If we take a step back, it should be clear that DMSO should be in widespread use, but instead something very wrong happened with DMSO which resulted in it getting blacklisted. This was due to the FDA continually doubling-down on an unshakable ideological crusade against DMSO that I believe ultimately resulted from the FDA not wanting to lose its grip over the practice of medicine in the United States (as the therapeutic potential of DMSO greatly threatened the FDA's ability to control how medicine was practiced).

In turn, I believe what happened is a critical story to be told because:

•The entire story of DMSO is a remarkable example of thousands of dedicated scientists and doctors giving everything they could to bring this critical innovation to the public and thus highlight the incredible potential our scientific apparatus has to address the problems that plague humanity. In contrast, because of the decades of rigid suppression of independent science, we've become habituated to science being unable to solve our basic problems—something that urgently needs to change.

•The FDA's gross misconduct with DMSO set the stage for what the agency continues to do to this day, and helps to explain why so many remarkable

treatments have been withheld from the public while dangerous and ineffective ones are continually pushed upon the public (e.g., consider what happened throughout COVID-19).

Is DMSO Safe?

Throughout the FDA's war against DMSO, the FDA has always cited two reasons to justify its conduct.

•That no evidence existed DMSO worked, which as I showed in the first and secondpart of this series, was an absurd claim as data from thousands upon thousands of patients showed DMSO worked dramatically better than the existing therapeutic options.

•That DMSO was an incredibly dangerous drug that it was critically important to protect the public from—something I've argued was a patent lie.

Note: these lies now extend far beyond America. For example, this posting by Health Canada, beyond characterizing DMSO as a dangerous solvent, makes numerous demonstrably false claims about DMSO and declares no evidence exists for DMSO's efficacy—which is extraordinary given how many of clinical trials have proven DMSO works and how easy many of those studies are to locate.

Furthermore, beyond the above points being absurd, the existing standards within the FDA are that if unmet medical needs exist or there is no viable cure for a serious illness, those standards can be loosened (hence why the COVID vaccines were approved, or more recently, why an incredibly unsafe and ineffective Alzheimer's drug was approved despite the FDA's outside panel vetoing it and resigning in protest once the FDA overrode them. In the case of DMSO, this is particularly relevant as many of the diseases DMSO was proven to treat (e.g., Down Syndrome, Spinal Cord Injuries, Scleroderma) are severe illnesses that have remained incurable for decades.

All of this thus raises the question. How safe is DMSO? Since that data is relevant to both understanding the FDA's crusade against it and likewise for anyone considering using it, I have done my best to compile all of that data here..

The Safety of DMSO

No drug is completely safe. However, I consider DMSO to be one of the safest drugs I know of for a few key reasons.

1. It was subject to intensive scrutiny and a wide range of toxicology studies (as the FDA was desperate to find a reason to justify their prohibition on it). Nonetheless, nothing was found.

2. Rather than be toxic to cells, cells can tolerate very high concentrations of DMSOand in many cases, DMSO can protect cells from dying or rescue ones that were in the process of dying. All of this is extraordinarily unusual.

3. A large number of animal studies (in at least 11 different species—including fish) have shown a lack of toxicity for DMSO.

4. Clinical trials consistently show a lack of toxicity from DMSO.

5. DMSO does not accumulate in the body, so it has no cumulative toxicity.

6. Millions of people have used DMSO, many of whom have used it for years if not decades (e.g., taking it daily for over 50 years). Still, despite this (outside of a few easily preventable mishaps which will be discussed below), no serious issues have emerged.

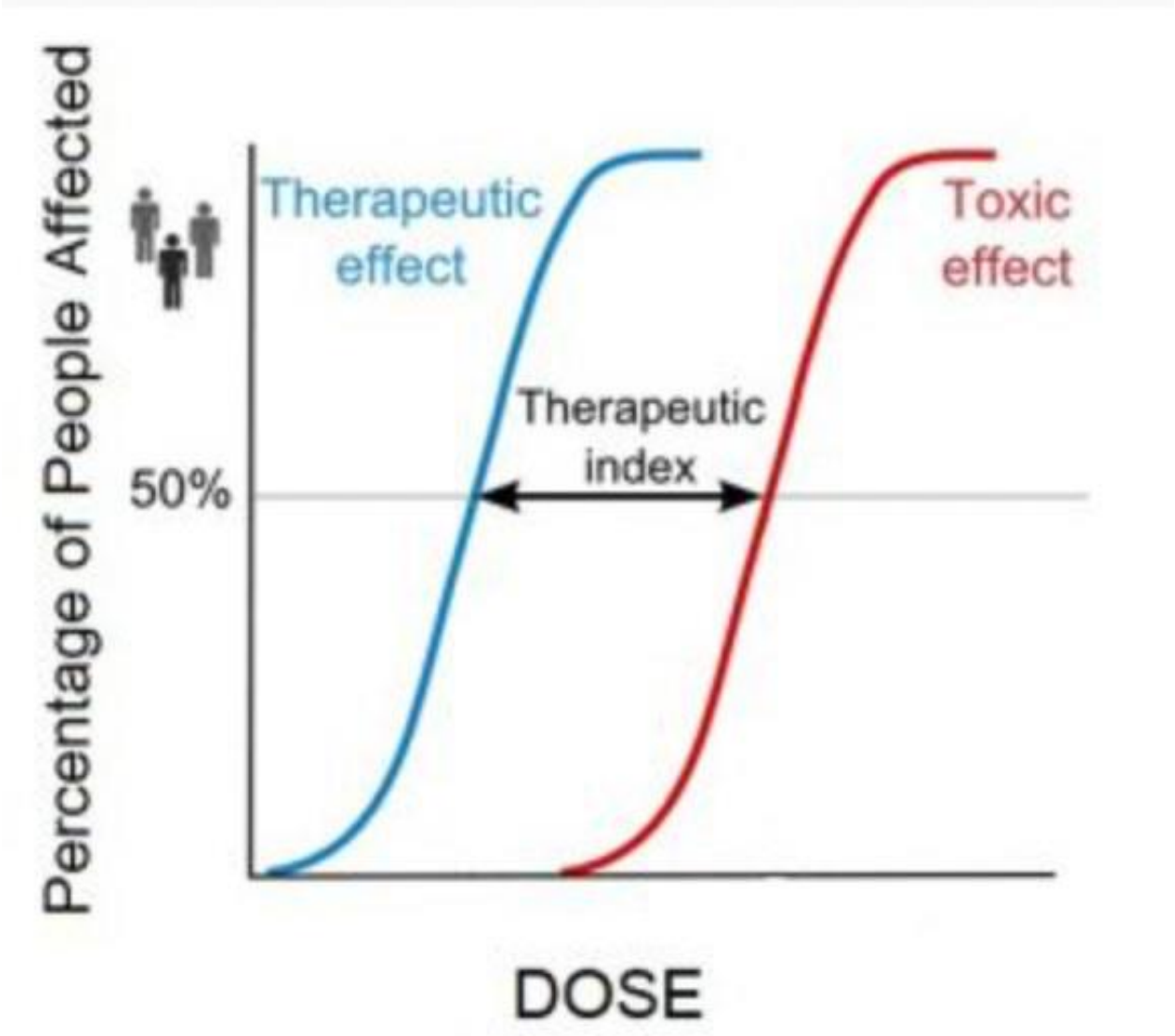
For context, DMSO has a safety profile that is orders of magnitude greater than drugs that are routinely taken without a thought being given to their safety.

I will now attempt to summarize **all** the pertinent data I've found on DMSO's safety. Some of this may sound concerning, but it needs to be seen in the context that it was found by using very high doses of it, as an immense amount of research was devoted to finding any possible way DMSO could be toxic (something rarely done for most drugs) and as a result, much of this is not applicable to how most of you will use DMSO.

Note: while this is a bit lengthy, I felt it was important to share all the toxicology data I could locate so that I did not inadvertently filter any potentially useful information and create a biased or misleading reference.

Median Lethal Dose (LD50)

One of the most commonly used methods to determine a substance's toxicity is to see how high a dose of it needs to be given to kill 50% of the exposed animals (which leads to countless tragic and, in my eyes unnecessary animal deaths each year). Part of why this value is needed is because each drug has both a toxic dose and an effective dose, and the goal is to find something in between those two that can be prescribed to people



In turn, when the therapeutic index is narrower, the drug is harder to use without side effects and often is given in more controlled settings (e.g., at an IV infusion center) so it is less likely someone will accidentally get a toxic dose. Conversely, drugs with a wide therapeutic index require less oversight in their administration.

Note: one of the major problems with how medicine is practiced now is that (in order to make drugs easily marketable products) standardized doses are always used. This in turn results in many patients receiving inappropriate doses (e.g., ones that are too high), and both I and my colleagues thus believe one of the

most critically important forgotten arts of medicine is knowing how to chose an appropriate dose (a subject which I discussed in further detail here).

Since there was so much controversy around DMSO, an immense amount of LD50 data was obtained that showed DMSO is far less toxic than a variety of commonly used substances.

Note: as toxic doses approaching the DMSO's LD50 were used in animals, tissue injury would also occur (e.g., vein irritation, vasoconstriction and necrosis after intravenous application, hemorrhagic gelatinous and edematous lesion at the site of muscular or subcutaneous injections, or liver damage)—much of which was thought to be due to osmotic injuries to the tissues created by the high concentrations of DMSO. However, if the animals survived, this damage typically went away within a week.

LD_{50} for Various Animal Species in g/kg Using Different Routes of Administration

LD_{50} of DMSO in Animals

Species	Route of Administration	g/kg
Mouse	SQ	13.9–20.5
Mouse	IV	3.8–10.7
Mouse	PO	15–22
Mouse	IP	20.0
Rat	IV	5.2–5.3
Rat	PO	16.0–28.3
Rat	IP	6.5–13.6
Dog	IV	2.5
Guinea pig	IP	6.5
Chicken	PO	12.5

Note: SQ, subcutaneous; IV, intravenous; PO, oral; IP, intraperitoneal.

Note: similar data has been found in many other species (e.g., monkeys have a IV LD50 of 4 g/kg). The one exception are rabbits, which have a lower LD50 with DMSO, something that was theorized to be due to the antimicrobial effects of DMSO altering their gut flora. Additionally, when dogs were given 3g/kg of DMSO topically (rather than IV) the only side effect observed was the classic DMSO odor.

In short, to reach the LD50 of DMSO, you would need to **drink roughly two quarts of it within an hour**, which is more DMSO **than daily DMSO users ingest over two months.**

For comparison, many commonly used substances are 10-100 times as toxic as DMSO**:**

Oral (PO) LD-50 of Common Substances (g/kg)

Ibuprofen: 0.495-0.740
Tylenol: 0.150
Ivermectin: 0.025-0.050
Metformin: 0.150-1.770
Aspirin: 1.9
Omeprazole: 2.210-4.000
Penicillin: 8.900
Prozac: 0.045-0.467

Alcohol: 3.450-7.060
Fructose: 4.0
Glucose: 25.8
Vitamin C: 11.9
Table Salt: 3.0

Note: LD50s are typically written in mg/kg rather than g/kg due to their higher toxicity. Additionally, some variation exists in the LD50s for the substances listed above (hence why I attempted to present an approximate range).

Additionally, none of the previously cited LD50 studies assessed topical applications of DMSO. This is because a limit gets reached as to how much DMSO can be absorbed through the skin, and that amount is far below the LD50 (e.g., in a previous article I cited cases of people who were going to lose a limb or finger which was then soaked in DMSO and the only side effect they experienced was the tissue fully recovering).

In mice, the LD50 of topical DMSO was estimated to be 50g/kg, as mice survived being dipped (immersed) up to their necks in up to 60% DMSO, while rats survived being dipped in up to 80% DMSO, or up to 60% DMSO three times per week for 26 weeks—with the dipping sessions often lasting 24 hours.

Note: the main changes observed in the repeatedly dipped rats were ulcerous dots on the belly and back, eye changes (lens clouding and near-sightedness)

and slight changes in the blood and liver—all of which were reversible. Conversely, when 100% DMSO was painted over their entire body each day, no adverse effects occurred (which again demonstrates that the toxic dose was quite high).

In humans, it is not practical (or ethical) to dip them in vats of DMSO all day long, but the closest approximation of that was attempted (subjects were repeatedly fully covered with DMSO gel so they could receive 1g/kg a day of DMSO—a dose 3-30 times higher than what is typically used by patients) and then monitored for 90 days. Despite this extraordinarily high dose being received each day, no toxicity was observed (whereas with virtually any other drug on the market, serious issues would emerge from repeatedly receiving that high of a dose)

Note: in monkeys, the LD50 of topical DMSO was established to be over 11g/kg, while the oral LD50 was established to be over 4g/kg.

In addition to the LD50 studies, a variety of other safety studies were also done on animals which likewise found (through an extensive battery of tests) that DMSO had negligible toxicity. For both length considerations, and because I don't believe many of you want to hear about all the other grotesque animal studies that were done to appease the FDA, I am not listing and summarizing them here. However, for those researchers who are interested, the two best resources I've found on DMSO's toxicology are this textbook on the pharmacology of DMSO (which has a lengthy discussion about the existing toxicology data and can be read on the internet archive here) and this well-referenced 2019 book that was written by two of the leading pioneers of DMSO.

Since I have read through approximately 100 studies that stated a similar side effect profile (DMSO was safe and typically caused the same reactions at comparable rates), rather than list each of them, I will just share the most pertinent information.

Note: one of the most detailed summaries of DMSO's animal toxicology data can be found here.

Common Side Effects

Two side effects are frequently seen with DMSO usage that often decrease with successive applications of DMSO:

•A temporary (and sometimes uncomfortable) irritation of the skin when DMSO is administered topically that typically disappears in 10 minutes (and at most 20) and varies widely in how it feels (e.g., some find it pleasant, others find it extremely unpleasant). Typically this irritation can be alleviated by immediately washing it off with water, and it is generally advised to avoid further irritating the skin by scratching the irritated area.

Studies find this irritation affects 50-85% of users (particularly blonde or red haired and fair skinned individuals or those already prone to skin reactions), and is more common at higher concentrations or when gels (rather than liquid DMSO) are used. Because of this, it is typically advised to not use more than 70% DMSO topically (outside of emergencies like a stroke) although many (e.g., readers here) tolerate 100% DMSO without issue. In roughly 15% of patients this reaction is "marked," in 3.5% it is enough that the patients stop using DMSO (with those reactions clearing within 10 days of stopping DMSO and the clearing being accelerated with topical hydrocortisone), and in 0.1% of patients the reaction is severe enough that it requires suspending the treatment. Additionally, in some patients, repeated applications to the same area can cause drying and scaling of that skin (which will heal in time but also responds to aloe vera). Finally, when DMSO is ingested orally, a much lower concentration needs to be used to avoid irritating the GI tract.
Note: while some people are fine with the taste of oral DMSO, most find prefer to mix it with something else to mask its flavor.

•When DMSO is metabolized, if the body is unable to fully oxidize it (e.g., due to reductive stress) some of it instead is reduced to dimethyl sulfide, which in

turn is excreted through the skin and lungs (and hence the breath), leading to a significant number of DMSO users (but not all of them) developing a characteristic garlic or clam like odor that typically lasts for a few hours but in some cases can last for up to 72 hours. Because of this side effect, DMSO users who experience it typically structure their social life and when they take DMSO so that the odor will not occur at inconvenient times (e.g., when they wish to have physical intimacy with their spouse).
Note: this odor increases with greater doses of DMSO.

In turn, with the exception of one headache, every negative response to DMSO a reader here has reported here was either this odor or skin irritation.

Severe Side Effects

The most significant danger of DMSO is having an allergic reaction to it (e.g., generalized body rashes). Compared to most drugs, this effect is fairly rare (estimates range from 1 in 1000 patients to 1 in 2000 patients), and fortunately has not been documented to lead to severe allergic reactions that can be fatal (e.g., in a sample of 2000 patients, 2 patients experienced minor difficulties with breathing that quickly reversed with treatment). Nonetheless, it is generally advised to check for an allergic reaction to DMSO (the process for which is described here) before beginning significant topical use of DMSO or internal use of it. Additionally, individuals who shown signs of an allergy to DMSO (from a positive patch test) often also have pre-existing allergies to other substances (e.g., eggs), which is some cases common tests do not detect.

Note: DMSO has not been shown to create allergic tendencies (e.g., it didn't create sensitivities to pollens in the environment)—which for instance is one of the major issues with certain childhood vaccines.

The other significant effect of DMSO is that ***prior to it drying***, it will drag chemicals (but not bacteria) which are on the skin where it is applied to the body. Incidents of this nature are extremely rare, and typically, it occurs when someone was in the vicinity of a pesticide (which was on their skin and resulted

in them getting ill), but I have also heard of a few more severe cases like this one:

My Dad told us of an adverse event related to DMSO use during his working career: lab technicians liberally used DMSO's excellent solvent characteristics to clean glassware. One technician was a heavy smoker and immersed a hand in DMSO. Almost immediately he had a severe reaction and was rushed to the hospital where he almost died. He was found to have severe nicotine poisoning … the DMSO transmitted the nicotine stains from his fingers directly into his bloodstream.

Note: I have read a few reports of individuals who typically didn't react to DMSO having significant reactions to DMSO when it was applied to parts of the body (e.g., the hair) where other compounds were present. For this reason, it is generally a good idea to always clean an area before applying DMSO to it, wait until DMSO dries (which takes about 20 minutes) before letting anything (e.g., synthetic clothing) contact the skin and to use clean (e.g., purified) water when diluting DMSO.

That all said, deaths from DMSO are incredibly rare, and despite millions of people using it, only three deaths have ever been ***associated*** with it.

The first (in 1965) involved an Irish woman who had been on a course of antibiotics and an anti-anxiety medication who continued to use DMSO despite having an allergic reaction to it, and then died of what was reported to be an anaphylactic reaction. It was never determined if DMSO was the responsible agent for her death.

The second case came from oral DMSO and was reported at this conference (but I could not find any additional information on this "overdose" beyond what was listed in FAERS report 13555640).

The final case is a still unsolved medical mystery where a woman with end-stage cervical cancer (who was also taking DMSO), presented the the ER, died shortly after (from cervical cancer) but simultaneously sickened many of the

workers around her (e.g., 3 fainted around her, 5 required hospitalization, with 1 being in the ICU for 2 weeks). One theory put forward was that the medical oxygen and electrical shocks she received caused the DMSO in her to be converted to dimethyl sulfate, a theory many chemists then disagreed with (hence making it an unsolved mystery). I personally believe this theory is impossible as she was tachycardic at the start (whereas a DMSO overdose slows the heart rate) and because the metabolite of DMSO that is exhaled (dimethyl sulfide) and hence what would have been in contact with the medical oxygen, unlike DMSO, cannot react to become dimethyl sulfate. Rather, if DMSO was at fault, I believe it is much more likely a contaminant was present in the DMSO she got from the hardware store.

In comparison, far more deaths can be conclusively linked to almost every other pharmaceutical on the market.

Moderate Side Effects

DMSO often reduces the toxicity of another pharmaceutical (e.g., it makes chemotherapy less damaging to the rest of the body), but in some cases it can instead enhance the toxicity or strength of the pharmaceutical. At the time when this was researched, it was shown to occur with alcohol and barbiturates due to altering their metabolism and DMSO's parasympathetic enhancing effects, but it likely occurs with other drugs as well (e.g., benzodiazepines). However, to the best of my knowledge, no other potentiating effects have been observed.

Additionally, a study evaluating the effect of DMSO on the Shwartzman phenomenon(tissue necrosis which occurs following the repeated introduction of a toxin to the body) injected a bacterial toxin (LPS) under the skin and then followed it with an IV injection of LPS. If DMSO was applied topically after the first injection, the reaction at the injection sites was enhanced following the second LPS injection, while if DMSO was applied topically after the second injection (when the severe Shwartzman phenomenon would occur) DMSO prevented the reaction, but if IV DMSO was given after the first injection, no change occurred, but when IV DMSO was given after IV LPS, **all 6 rabbits**

died within 2 hours.

This is one of the only examples I have come across of DMSO making something become significantly more dangerous (with the others being that if carbon tetrachloride was fed to rats with a feeding tube, injecting DMSO into the abdomen made it more toxic and if DMSO was given topically in conjunction with mustard gas, mustard gas became more toxic to the skin), but given how many drugs DMSO could interact with, it's quite possible other interactions exist (e.g., DMSO makes both antibiotics and chemotherapy more effective and simultaneously makes chemotherapy less toxic).

In turn, I've received numerous questions on if a harmful interaction exists between DMSO and anticoagulants like Eloquis (leading to excess bleeding) or metal prostheses (leading to their components being leached into the body). I can see numerous reasons arguing for why DMSO might be harmful, beneficial or inconsequential in each case and to the best of my knowledge, no harmful interactions have been reported in any of these cases—but unfortunately, since neither issue has been extensively studied (except when DMSO is mixed with stem cells), I can't actually state with confidence there isn't an interaction.

Note: while DMSO has strong anti-platelet activity (detailed here), I have come across a few papers that mentioned that while DMSO prevented dangerous clots, it did not affect the blood coagulability of subjects. The most detailed paper I found assessing this question found DMSO had the typical U-shaped curve of a zeta potential restoring agent, which meant at very low doses it caused blood to gel together, at most doses it dispersed it, and at high doses (which would not be found during medical DMSO therapy) it clumped blood together, along with also having a U-shaped curve of the recalcification time—all of which led the authors to conclude DMSO probably has an inconsequential effect on blood clotting, except possibly when it reached low levels as it was being eliminated from the body (where in practice it has not actually been shown to cause clotting). Simultaneously, another researcher found that at under 1% concentration, DMSO accelerates blood clotting, whereas above 5%

it slowed it, which suggests it would not cause excessive bleeding with anticoagulant therapy.

Simultaneously, in the places I would have expected to see the other drug reactions be listed, they weren't. For example, this was part of a memo Merck sent out to their clinical investigators on September 8, 1965, summarizing their experiences with approximately 4,000 patients who had received DMSO anywhere from once to daily for 18 months in a list that is fairly representative of the side effects seen now:

Approximately 85 percent of patients experience a typical histamine-type reaction at the site of application, usually transient mild itching and burning and some erythema. This is not considered to be a true adverse reaction to the drug but a typical side effect. A fine vesiculation, occasionally at the site of application, is also usually transient. After prolonged administration, drying, mild wrinkling and occasionally some scaling of the skin is not uncommon. This is no worse than after a mild sunburn.

A few cases of generalized dermatitis have occurred. This is usually a wheal and erythema reaction of a histamine type occurring at sites distant from the area of application. Rarely may this generalized dermatitis be so severe. The drug should be discontinued if a generalized dermatitis develops.

Rarely, serious or potentially serious hypersensitivity reactions may occur. One fatal reaction has been reported in a patient who continued to receive the drug after signs of extreme sensitivity developed.

There has also been a report of laryngeal edema of a mild degree in one patient.

Other unusual reactions have included hypotension in a few patients.

A few cases of mild paresthesias have been noted. Re-evaluation of most of these cases has shown that these were in patients with a strong emotional overlay. Elimination of this type of patient from the clinical studies has greatly reduced this type of reaction.

Some patients have noted a tranquilizing or sedative effect. In most cases this has not been severe enough to warrant concern.

Sedation may occur more in elderly patients with cerebral arteriosclerosis. In the younger individual it occurs more often before meals. It may occur after the first application and, if it is observed, the patient should be cautioned about driving or pursuits that may harm himself or others. Some patients have noted an apparent potentiation of sedatives like barbiturates or alcohol. These findings have not been observed in the laboratory.

Some patients have a garlic or oyster odor on their breath after topical administration of DMSO. There have been a few cases of mild nausea. All of these effects have disappeared when the drug was discontinued.

Blood chemistries have been followed on a large number of patients, and these have not shown significant changes.

Earlier studies included oral administration of the drug. This route of administration is not being investigated at the present time. (Oral and parenteral studies may be initiated at a later date.) These patients received 30 to 60 ml. per day orally for a period of two weeks, and weight loss from 5 to 10 pounds was noted in 50 percent of the patients. This may have been from loss of appetite

Note: aspirin, heparin, and warfarin were in use by 1965 but were not mentioned in this document. It's hard for me to assess if artificial joint replacements would have been evaluated since the technology had only been on the market for a few years, especially since on one hand patients with replacements would be more likely to enroll in these trials (due to complications from the surgeries) but simultaneously, may have been less attractive clinical trial investigators (since the technology was still moderately new).

In each of the studies I've looked at, the authors consistently noticed a lack of side effects, excluding irritation of the skin, a garlic odor, occasional nausea, and vomiting, and once a large enough sample size exists, the 1 in 1-2000 risk

of an allergy to DMSO. Additionally, when DMSO is given intravenously, there is often a temporary slowing of the heart rate, and in some cases, either an osmotic hemolysis of weaker (older) blood cells when DMSO is used at higher concentrations (30-40%) is infused intravenously (which often causes blood urine but does not affect kidney function), or significant urination and in some cases a fluid overload or hypernatremia when low concentrations (below 10%) are used.

Note: this concentration dependent effect of IV DMSO led to a variety of research to determine the optimal dose that is without either of these issues. When we use intravenous DMSO in practice, we use a fairly low concentration and have not run into the fluid overload or hypernatremia issue (which I believe is due to us using a much lower total dose of DMSO). Likewise, doctors who use higher concentrations of IV DMSO will evaluate a patient's blood count throughout the treatment to ensure they don't cause hemolytic anemia.

In the most extensive safety study conducted on DMSO (done in cooperation with the FDA from 1967 to 1968), from a pool of 400 volunteer prisoners, the healthiest volunteers (e.g., no pre-existing conditions) were selected to either be the 33 controls or to be the 78 who received 80% DMSO gel given at **3-30 times the normal dose** (done by stripping them and covering their entire body with DMSO) each day for either 14 or 90 days, all of whom were then monitored on a daily basis by a large team of doctors (e.g., many specialists). Alongside regular physical examinations, the subject's blood work, eyes, EEG, bone marrow, EKG, and cerebral spinal fluid were routinely assessed.

From this large volume of data, the only abnormality detected was an occasional transient blood work change, but except for a transient (likely histamine-induced) increase in eosinophils during the first few weeks (which occurred in 23 [51%] of the 45 DMSO treated subjects) and 8 (31%) of the controls, none of these changes appeared to be related to DMSO.

By far the most common side effects were skin irritation or a garlic-like odor.

Additionally, the following side effects were reported in the 65 subjects who used DMSO (**at an impossibly high dose**) for 90 days:

Sedation	52%	Influenza-like syndrome	5%	Dyspnea	2%
Headache*	42%	Diarrhea	5%	Dry throat	2%
Nausea	32%	Weight gain	5%	Sore throat	2%
Dizziness	18%	Weight loss	5%	Cough	2%
Burning or aching eyes	9%	Constipation	3%	Increased Frequency of Urination	2%
Vomiting	6%	Dry nasal passages	3%	Anorexia	2%
Xerostomia (Dry Mouth)	5%				

*Many of the reported headaches occurred following diagnostic lumbar punctures (which is common a side effect of this procedure—particularly given the large needles that were in use at the time). Additionally, I believe the sedation (drowsiness) was likely due to DMSO increasing parasympathetic activity.

Note: many of the prisoners in the study also self-reported an improvement of existing chronic pain conditions. Additionally, most of the subjects who left the study (which overall had a low dropout rate) did so because they were moved to another prison, they wanted to be paid more for participating, they did not like the odor, or they did not like the skin irritation (although many who experienced those symptoms continued).

One large meta-analysis tried to compute the risks of DMSO. While its results are generally in accordance with what I described (i.e., nausea is a common side effect of IV DMSO), many of the studies I reviewed were not included in it, and instead, while this review had some DMSO only studies, it was predominantly composed of studies where DMSO was used in conjunction with something else (most commonly stem cells, followed by topical diclofenac DMSO was used to bring into the system, followed by Onyx, a polymer that is used repair ruptured arteries under anesthesia and thus represents a much higher risk situation than when IV DMSO is typically used). Because of this, the risks that the review showed of adverse events, while low, **were significantly higher than what I**

observed in the individual DMSO studies I've looked at (e.g., this study, this study, this study and this study of IV DMSO all either reported there were "no side effects" or "no significant side effects" from the therapy). Likewise, I believe this mix of DMSO containing agents explains why the sample sizes varied for each symptom that was reported.

	Topical	Intravenous	Overall Incidence	Other
Halitosis or Garlic-like breath	10% (556/5333)	6% (14/239)	11% (607/5782)	Oral: 27% (4/15) Into Bladder: 20% (33/165)
Diarrhea	3% (12/363)	2% (15/744)	2% (27/1107)	
Nausea	5% (51/1039)	17% (199/1154)	12% (257/2214)	Multiple Routes: 33% (7/21)
Vomiting	1% (7/639)	11% (108/972)	7% (115/1611)	
Nausea and/or vomiting			13% (591/4529)	
Abdominal cramps stomach ache	4% (16/376)	6% (72/1253)	5% (88/1629)	

	Patients Experiencing Reaction	Range	Reactions Per Treatment	Range
Hypotension	4% (115/2752)	1-14%	3% (10/323)	2-14%
Hypertension	13% (385/2998)	2-95%	14% (60/425)	3-21%
Bradycardia (mild and severe)	11% (94/882)	0-49%	7% (4/54)	
Decrease in heart rate	79% (152/193)	11-94%	94% (30/32)	
Tachycardia	2% (13/565)	0-6%	7% (4/54)	
Ventricular Extrasystoles	50% (11/22)			
Cardiac Event (unspecified)	11% (18/165)	5-12%	3% (35/1269)	
Asystole	7% (3/45)	3-20%		
Left Cardiac Insuficiency	0.5% (1/194)			
Chest discomfort/tightness	2% (22/901)	1-10%	5% (83/1640)	0-6%
Unspecified respiratory symptoms	26% (43/165)	21-62%		
Dyspnea	1% (26/2748)	0-10%	1% (3/371)	0-2%
Cough	14% (52/373)	5-22%		
Lung Edema	1% (3/241)	1-2%		
Shortness of Breath			3% (40/1269)	

Note: the two cases of asystole (cardiac arrest) occurred when DMSO was to patch ruptured blood vessels. To quote the study: "bradycardia was observed in 4 cases, with a brief asystole in 2 of these patients during transarterial and transvenous Onyx delivery at cavernous sinus and orbital levels [which reversed with cessation of the injection and atropine—a drug that reverses

parasympathetic activity]. Based on our observation, hemodynamic instability was demonstrated during Onyx injection into the vessels that were in close proximity to the trigeminal nerve or its branches, especially in low-flow/low-volume compartment and may represent a direct effect of dimethyl sulfoxide/Onyx on the trigeminal nerve, resulting in vagal response from trigeminocardiac reflex."

Additionally, I have also found a few other reports of Onyx (or stem cells combined with DMSO) causing cardiac arrest—but I do not believe these instances are applicable to normal IV DMSO administration, except for a minor slowing of the heart (which likely results from DMSO increasing parasympathetic activity), nothing comparable to these incidences was ever reported with just IV DMSO alone.

Similarly, to quote another review paper which examined the effects of infusing DMSO preserved stem cells:

A retrospective review of the published literature identified several hundred adverse reactions (e.g. nausea, chills, cardiac arrhythmias, neurological symptoms and respiratory arrest) associated with the transplantation of stem cells cryopreserved with dimethyl sulfoxide. The occurrences of these are generally accepted as commonplace, as the majority of reactions are transient, whilst a few patients may require clinical treatment.

Note: this paper also found these reactions were proportional to what was infused, how fast it was infused and how much in total was infused (as did this one), while another review noted these reactions could be mitigated by mixing saline or albumin into the infusion and another trial found the nausea and vomiting could be relieved by sucking orange flavored lollypops. When IV DMSO (without the other additives) is given in practice, nausea is sometimes reported, and likewise, lowering the drip rate of stronger solutions can reduce discomfort, so the insights gained from using IV DMSO with stem cells may be useful for using IV DMSO alone.

FAERS

FAERS is used by the FDA to track adverse reactions to drugs, and like VAERS, only receives a small fraction of the reactions that occurred (estimates range from 1-10%) and typically thousands of reactions and deaths (if not tens of thousands) have been reported to it for many commonly used drugs. Since 1980, 214 reactions to dimethyl sulfioxide (including 21 deaths) were reported.

Of the reactions, 101 came from DMSO. In contrast, 113 came from DMSO with something else, which included eight cases of Onyx triggering the trigeminal cardiac reflex or asystole (with numerous published case reports being attached to the FAERS reports) along with a few cases of stem cell transplants causing significant issues and 3 allergic reactions which may have been linked to DMSO. Of the 101 where DMSO was attributed as the cause, 27 involved another drug which might or might not have been responsible for the reaction, and based on what happened in those 101 reactions, I suspect unlisted drugs played a role in other cases too.

In those where DMSO was the apparent culprit, 10 deaths occurred, but very little information was provided for each case. Of them, 1 also mentioned an anaphylactic reaction, 4 “hemolysis and hematuria,” 1 “ coronary artery occlusion,” 1 “injection site reaction,” 1 “hypernatraemia,” 1 “gangrene; sepsis” and 1 (which was also published at this conference) listed a variety of conditions.

The remaining 94 non-fatal cases included 19 skin reactions (including 4 characterized as “dermatitis bullous” and 1 as urticaria), 16 harmless product administration errors (e.g., given during pregnancy, drug ineffective, or an accidental exposure to the product), 12 gastrointestinal issues (e.g., vomiting), 8 eye issues that didn’t appear to be adverse reactions (4 lazy eyes, 3 cataracts and 1 “eye disorder”), 7 anaphylactic reactions, 7 “pain” (e.g., from DMSO being put into the bladder), 7 other cases where the bladder or vagina reacted to DMSO (e.g., pain or irritation), 6 fevers, 6 headaches, 5 cases of weakness or malaise, 4 changes in taste (e.g., loss of taste), 4 shortness of breath, 3 other eye

issues, 3 with facial edema, 3 with nausea, 3 that did not appear linkable to DMSO (e.g., an un-evaluable event, a variety of chronic conditions unrelated to DMSO or a suture rupture), 3 with dizziness, 2 with breath odors (and one that also had a change in smell), 2 with seizures, 2 with tachycardia, 1 with hematuria, 1 with TTP, 1 "non-serious" encephalitis, 1 "respiratory disorder," 1 chest discomfort, 1 pruritus with elevated bilirubin, 1 case of low blood pressure and 1 case of fainting, 1 with confusion, 1 with chills, 1 with flushing, and 1 with muscle pain.

Most of these effects were consistent with what's been attributed to DMSO, some of them were likely unrelated to DMSO, and overall, given how rare they were, they collectively suggest DMSO has a very low toxicity. Additionally, the pain and discomfort experienced when it is put into the bladder is to be expected as the primary approved condition it's used for is characterized by immense irritation and pain in the bladder (which is why in more severe cases of that disease DMSO is given orally rather than directly into the bladder).

Note: I did my best to accurately represent the FAERS data (since it is very time consuming to go through), but there may be minor errors (e.g., some of the above numbers above being off by 1 or 2).

Lens Toxicity

By far the most notorious side effect of DMSO was it allegedly changing the refractive index of the eyes (which is what glasses correct) by decreasing the normal relucency of the lens cortex, thereby causing the normal central zone of the lens to act as a biconvex lens.

This controversy arose because dogs were observed to develop this myopic change after receiving 5g/kg of DMSO (roughly fifty times the human dose) for 9 weeks, with the changes typically taking 5-10 weeks to emerge or longer when a lower dose was used. This dose dependent effect was then confirmed to also occur within 90 days in pigs receiving 2.7-4.5g/kg of 90% DMSO twice daily, in rabbits receiving 1g/kg of DMSO a day for 12 weeks (but not when

they received 0.1-0.5g/kg) and that rabbits and dogs were more sensitive to it than pigs. These changes progressively worsened over the course of 6 months of DMSO treatment, and gradually reversed once DMSO was discontinued (taking longer to reverse in dogs).

Note: these lens changes did not appear to affect the animals ability to perceive and navigate their environment and when the eyes were dissected, was attributed to the reduction of soluble proteins in the eyes.

When tested in monkeys, 3g/kg of a 40% DMSO solution for 9 days did not lead to any lens changes (or any other pathologic changes) over the next 120 days. Likewise, a dose of 11g/kg for 6 months did not produce any lens changes nor did a dermal dose of 11g/kg or an oral dose of 5g/kg given for 1 year, all of which suggested primates have a significantly greater resistance to this effect of DMSO.
Note: beyond not showing lens changes, those studies also showed a complete lack of toxicity from DMSO for the monkeys.

In humans, no lens changes have ever been observed (in contrast many patients, such as those with macular degeneration, report improved eyesight from DMSO). For example, in addition to the prison study (which was designed to definitively answer this question) Stanley Jacob had 32 patients who received an average of 30g of DMSO for 3-19 months receive regular eye exams. The only potential exception to this was a study of 44 patients with scleroderma (a condition which frequently causes changes to the eyes) who received DMSO a 3g/kg for as long as 23 days. Due to the challenges of regularly examining the eyes of these patients (both before and during the study) adequate testing was not performed that could have definitively proven the eye changes they had were a result of scleroderma rather than DMSO (although the eye changes that occurred differed from the refractive changes observed in dogs, pigs and rabbits).

Note: after the 1965 testing ban, many pharmaceutical companies continued to collect case reports on patients using DMSO (Merck collected approximately

17,000 cases, Syntex 7,000 cases, and E. R. Squibb and Sons 3,000). No toxicity was detected by any of these companies, including changes in the eyes when DMSO was given at 11 g/kg dermally and 5 g/kg orally per day for a year. Additionally, in 1971, a committee from the National Academy of Sciences submitted a report to the FDA that stated DMSO had a "relatively low toxicity level," apart from the unexplained eye effects in certain animals.

Teratogenicity and Genotoxicity

A key aspect of testing a new drug for safety is to assess if it can cause either cancer or birth defects (which the mRNA vaccines were exempted from and we in turn are now all suffering from as the spike protein is highly carcinogenic).

In the case of DMSO, it was determined that in certain animals, directly injecting high concentrations of DMSO into the vicinity of developing embryos could cause birth defects, but these effects were not observed at lower doses, or when DMSO was taken orally and not seen in all animal species. Specifically:

•A 1967 study injected chicken embryos (that were either 72 hours or 96 hours old) with toxic doses of DMSO and found that as the LD50 was approached, malformations would frequently occur in the chicks that survived (e.g., 25.9% of the surviving embryos which had a toxic dose of DMSO at 96 hours then developed defects).

Note: a 2021 study also found that injecting too high a concentration of DMSO could cause birth defects or kill chick embryos (whereas at lower doses no effects were noted).

Since previous experiments with lower doses of DMSO had not been observed to cause birth defects in mammals, mice, rats, and two species of rabbits were then given 50% DMSO (either orally or through abdominal injections into the animals) from the 6th to the 12th day of gestation and then dissected a few days before their scheduled delivery.

•In mice, no changes were observed in the rate of abortions, and no birth defects

resulted from oral DMSO, but when DMSO was injected into the abdomen, 7% of mice developed birth defects (compared to a typical rate of 0.226%)

•In rats, injecting DMSO was found to increase the rate of abortions, and reduced the birthweight of living rats by 15.4% (dosed at 8g/kg) to 28.5% (dosed at 10g/kg), and 1.5% developed birth defects (compared to 0.2% of controls).

•In rabbits however, no effects were observed from oral or injected DMSO.

•Another study found intraperitoneal injections of DMSO (at 5.5 g/kg) into pregnant hamsters could cause developmental malformations of their embryos. Likewise, another hamster study found injecting 0.5ml of DMSO intraperitoneally into hamsters on the eighth day of gestation caused varying degrees of exencephaly and an encephaly (brain changes).

•Additionally, Stanley Jacob reported:

In one study [*I could not locate*], eight cell embryos were soaked in DMSO and re-implanted. All developed normally. Indeed, DMSO is by any measure one of the least embryo-toxic substances in pharmacology.

It is routinely used as a solvent when scientists are studying the mutagenic effects of other drugs. DMSO's nonmutagenic effects have been confirmed by a scientist named Bruce Ames, whose test is the standard by which the FDA itself measures mutagenicity.

DMSO has also been successfully used to treat infertility without issue. For example, in this study, 47 women who were sterile (e.g., due to a tubal obstruction) received DMSO, with 27 (57.4%) then becoming pregnant. Of the 27, 12 had healthy full term babies, 7 were still continuing the pregnancy at the time the study was published, 4 elected to have voluntary abortions, while 3 had spontaneous abortions (and no other issues were reported). Given that these were high risk pregnancies, the fact only 1/9th of them ended up in spontaneous

abortions (lower than the expected rate) and that no other issues were reported, this argues for DMSO's safety in pregnancy.

Additionally, one study found DMSO **counteracted** the mutagenic effects (embryologic defects) caused by pyrimethamine and 6-mercaptopurine.

All of this in turn suggests that DMSO as typically used is not teratogenic (e.g., it's never injected into the belly), but since it was never formally tested the DMSO community always advised avoiding it during pregnancy since they could not guarantee the risk was 0. That said, within the scientific literature, no cases of any toxicity to the offspring of animals topic skin applications of DMSO have ever been reported.

Note: many commonly used pharmaceuticals can cause birth defects. For example, as I showed here, SSRI antidepressants (which are often pushed on mothers during pregnancy) double the risk of premature birth, increase the risk of a septal defect (which requires surgery to repair) from 0.5% to 0.9% (or to 2.1% if multiple SSRIs are taken), and increases the risk of persistent pulmonary hypertension (which occurs in 1-2 out of 1000 births) by 2.5 to 6.1 times (see this study, this study and this study). In contrast, I do not know of a single case where DMSO was shown to have caused a human birth defect.

Finally, as discussed in the first part of this series, rather than damage DNA, DMSO tends to protect it from damage (e.g., see this study, this study, and this study) additionally, as I will discuss later in this series, DMSO has also been shown to treat cancer by both causing cancerous cells to become normal cells or slowing their growth, and to significantly increase the ability of a variety of agents to kill cancerous cells (while simultaneously protecting normal cells from damage). Presently, I have not come across any studies showing DMSO causes DNA damage in normal cells.

Note: DMSO also has repeatedly been shown to have no cancer causing activity.

Additionally, many of DMSO's remarkable effects come from its ability to stabilize proteins (discussed further in the first part of this series) and dissolve abnormal ones (e.g., amyloids), which in turn likely accounts for why it can cure a variety of incurable illnesses (e.g., genetic ones). In turn, a variety of studies with newer technology have been conducted which show it subtly alters the function and configuration of proteins within cells (e.g., see this study, and this study). This in turn, has led the authors of this newer research to state the longstanding assumption that DMSO is "inert" may not be correct, and to assume there is the potential some of the changes DMSO creates may be problematic or destabilize proteins—an assumption which I believe arose from the fact those authors were unaware of the literature showing that DMSO instead stabilizes proteins.

Other Potential Issues

I would like to conclude this section by disclosing all the other potential issues with DMSO I have come across over the years:

•Three of DMSO's characteristic effects (a rapid improvement of a patient's symptoms, the garlic like odor, and the frequent irritation of the skin) make it immensely challenging to conduct blinded trials where patients are unsure if they did or did not receive DMSO. **This ultimately was what created the biggest problem for DMSO**.

•Sensitive patients or those with liver congestion can experience a Herxheimer reaction to DMSO (e.g., fatigue or headaches) which at most lasts for 12-24 hours due to DMSO accelerating the detoxification process (e.g., one sensitive reader shared that8-12 hours after using DMSO they would get a moderate headache)—a process which I suspect is partially mediated through a release of histamine. Within the DMSO community, it's thought that these reactions can be mitigated by using a lower DMSO dose or aiding the detoxification process (e.g., with rest, fasting and drinking reverse osmosis water) and that it will often decrease in time as the body has detoxified itself.

Note: individuals who react to other sulfur compounds typically do not react to DMSO or MSM.

•Clinically, umbilical cord blood stem cells or exosomes that are frozen without DMSO perform tend to perform better than ones that were frozen with DMSO (although DMSO preserved ones still work).

•While DMSO is typically non-toxic and most surfaces of the body can tolerate appropriate concentrations of it (e.g., the eyes and the ears), a study found that rabbits who inhaled 25-50 ml/hr of DMSO for an hour each day for 8 weeks developed pathologic changes in the liver and lungs. While this was a high dose, nebulizing DMSO has nonetheless been advised against and very little information exists on if it can be done safely.
Note: this is somewhat analogous to how ozone can be injurious to the lungs, so while many different routes of administration exist for medical ozone therapy, inhalation is never done.

•DMSO is flammable and can cause explosive decomposition reactions when mixed with certain chemicals. This is unlikely to come up in home use (especially if you do not expose it to an open flame) but has caused numerous industrial and laboratory accidents.

•When giving DMSO intravenously (especially at higher concentrations) it can partially dissolve plastics that are not DMSO resistant. For this reason, it is important the correct materials come into the contact with it.

•One forgotten cancer cure the AMA wiped off the earth were the Koch Catalysts. I was advised by the people who gave them to me, that low doses of solvents could inactivate them (e.g., a patient on them should never pump gasoline), and that DMSO could also do inactivate them. Given how difficult the catalysts were to obtain and how limited my supply was, I hence always made sure anyone who used them did not also use DMSO.

•DMSO can be manufactured from either wood pulp or a petroleum source. I have seen some evidence suggesting people have a different therapeutic

response depending on which source they use, but not enough to be certain one is preferable to the other. For this reason, if any of you have the opportunity to try more than one of the brands I recommended and you notice different effects from the same concentrations, please share them with me.

•While I have not come across any major issues arising in people taking non-medical grade DMSO (e.g., DMSO from the hardware store) there are a lot of theoretical reasons why this is a bad idea to do. For this reason, I strongly recommend getting one of the widely available high-purity brands people have used for years without issue.

Conclusion

One of the particularly unfortunate aspects of human society is that humans typically cannot take a broad view which takes into consideration all the pertinent data and instead will hyper focus on what they have been primed to care about. This for example is how the medical industry was able to not only sell but mandate the COVID vaccines to the public (which did not work and were far more dangerous than COVID-19) as all the marketing around the vaccines:

•Greatly exaggerated the risk of COVID-19.

•Disclosed the benefits of the COVID vaccines as relative benefits (which obscured the fact a serious complication of COVID-19 was so rare it was highly unlikely you could ever benefit from a vaccine preventing it).

•Kept moving the goal posts on the COVID-19 vaccines each time they failed to deliver what had been promised.

•Continually covered up the immense damage the COVID vaccines did to society.

As a result, while many believers in the orthodoxy eventually were red-pilled, we still have many scientific "experts" who have now gotten 6 or more COVID-19 vaccines.

That same issue sadly exists with many other drugs. For instance, beyond DMSO being far more effective than NSAIDS (which are routinely used for many of the musculoskeletal and chronic pain conditions DMSO treats), it is so much safer than them the risks can't even be compared (e.g., while DMSO has not been linked to a single death, NSAIDS kill tens of thousands of Americans each year and seriously injure far more). Yet despite this, NSAIDs are given a pass, and many sincerely believe DMSO is a deadly poison (not unlike what happened with ivermectin—something the FDA also successfully rebranded as snake oil that only worked in horses but not humans).

Note: one of the things I consider to be particularly tragic with DMSO is how much cruel and completely unnecessary animal testing was done to refute the FDA's unwavering belief DMSO was dangerous. For example to quote Stanley Jacob: "DMSO has been responsible for the unnecessary death of more laboratory animals than any other drug in the history of medicine." Yet despite all those deaths (which resulted from massive doses orders of magnitude greater than what any human would ever take), since they demonstrated DMSO's incredible safety and thus didn't show what the FDA wanted, they were ignored—a situation not that different from how both the FDA and CDC have adamantly refused to consider the tsunami of evidence the COVID vaccines are incredibly dangerous and meet every possible criteria for an emergency withdrawal from the market.

DMSO is a Miraculous Therapy for Chronic Pain and Musculoskeletal Injuries

The decades of evidence DMSO revolutionizes the practice of medicine

•The standard approach for treating pain and musculoskeletal injuries typically involves giving NSAIDs (e.g., ibuprofen), and in more severe cases, opioids. Unfortunately, these drugs are extremely dangerous (e.g., each one kills tens of thousands of people each year), but nonetheless have remained the standard of care for decades.

•DMSO is a remarkably effective pain-killing agent, in many cases allowing individuals who'd been disabled for years by their pain (e.g., a failed spine surgery or severe arthritis—DMSO's most popular use) to get their lives back. Furthermore, it can treat many types of pain other therapies do not work on (e.g., complex regional pain syndrome).

•DMSO is a highly effective therapy for healing wounds and creating healthy scars, making it particularly helpful for recovering from surgery.

•DMSO is incredibly effective for healing a wide range of acute and chronic musculoskeletal injuries (e.g., arthritis, headaches, neck and back strains, restless leg syndrome, sprained ankles, trigeminal neuralgia and numerous traumatic injuries). It typically has an 80-90% success rate and often has an instant and dramatic effect. This use was particularly popular with professional athletes, as it allowed many of them to quickly return to the field rather than be out for the rest of the season.

•In this article, I will review the scientific literature that explains how DMSO provides pain relief and healing, the vast body of evidence (comprising of thousands of patients) showing it indeed does, and our preferred DMSO home treatment protocols for pain, arthritis, and musculoskeletal injury (along with the best sources for procuring DMSO).

One of the curious facets of Western Medicine is that while money is always spent on "research," whenever the occasional miracle drug comes out that works **too well** with a wide range of applications, it is inevitably consigned to the dustbin of history regardless of the data put forward for it.

In the first part of this series (which provides important context for this article), I listed the decades of evidence that demonstrates the simple (naturally occurring) chemical Dimethyl Sulfoxide (DMSO) is a remarkably safe drug that completely transforms the care of many challenging and insurmountable illnesses (e.g., strokes, severe head trauma, spinal cord injuries, amyloidosis, Down's Syndrome and dementia).
Note: after publishing the first article, I received many correspondences from readers who said DMSO was life saving when they had a stroke, many more testimonials on Twitter, and a few stories where it was used to treat a pet's stroke (e.g., this reader's dog).

However, while each of these applications, particularly DMSO's utility in strokes, would completely change medicine and how those lifelong illnesses affect our society (and were what drove many doctors to spend decades researching DMSO), none of that accounts for why DMSO took America by storm and campaigns were launched (that members of Congress eventually joined) to overturn the FDA's embargo on DMSO.

Rather, it was because DMSO solved three of the most common problems in medicine:

•It quickly heals a wide variety of musculoskeletal injuries (e.g., those routinely experienced by professional athletes or a chronic back injury leading to partial disability).

•It effectively treats a variety of joint disorders (e.g., rheumatoid arthritis).

•It's an extremely effective and very safe painkiller.

Because of this, it was miraculous for many with chronic pain and disability (e.g., from osteoarthritis or a failed spinal surgery), particularly since all other pain-killing medications have significant (and frequently lethal) side effects and worse still—often don't even work.

Note: a key theme to consider throughout this article is the immense difference in toxicity between DMSO and its conventional alternatives (such as corticosteroids and gabapentin). For example, NSAIDS and opioids each kill tens of thousands of Americans each year, whereas in over 60 years of use by millions of people, DMSO has not been linked to a single death. Likewise, NSAIDS are the leading cause of drug induced hospital admissions (because they are toxic to the heart and small intestine and particularly toxic to kidneys and stomach), whereas a systematic review of all published DMSO studies found the side effects associated with DMSO (e.g., typically skin irritation or a garlic-like odor and occasionally nausea, vomiting or diarrhea) were minor and transient. Likewise, it's very easy to overdose on an NSAID or Opioid, whereas a meticulous human study found taking 90 days of DMSO at 3-30 times the standard dosage did not cause any toxicity and was well tolerated by the research subjects (whereas almost any other drug would be extremely dangerous at doses that high).

This program about DMSO on 60 Minutes, for example, provides a context to how impactful it was for many Americans:

Additionally, shortly after this segment aired, a March 24, 1980, congressional hearing was held on the merits of DMSO, which grilled the FDA on its decades of stonewalling DMSO (leading to the FDA promising to treat DMSO fairly at the hearing).

1980 DMSO Hearing Transcript
21.9MB · PDF file
Download

Sadly, despite the incredibly compelling testimony presented at the hearing, a subsequent Senate subcommittee hearing being held over the drug's status with the FDA on July 31, 1980, the former governor of Alabama being treated with it and a champion of DMSO becoming the Secretary of Health and Human Services in 1985, the FDA never relented, and DMSO remains a forgotten side of medicine,

Note: the transcript of the Congressional hearing will be cited throughout this article.

In short, if DMSO were to become the standard of care due to its remarkably high success rate in treating a variety of common conditions, it would completely change the practice of medicine in the United States and likely knock many existing approaches out of business.

To illustrate, after I published the first article in this series, I received many emails like this:

Thank you for your email on DMSO. I had severe pain in my piriformis for over 2 months and couldn't walk, and tried everything without success. I work in orthopedics, and have tried multiple injections, etc. When I read your article, I remembered using DMSO in the past for athletic injuries. I found an old bottle of DMSO 99% pure that I bought at a "Feed and Seed" store, for horses, about 25 years ago, but never threw it out. I immediately applied it to the painful areas, and it really worked! — Harriet

Likewise, to show how versatile and frequent the uses for DMSO are, since publishing the first article, in addition to treating a few cases of knee osteoarthritis (an area where DMSO excels), I had a relative in another state recently deliver a child at home who 12 hours later was in significant pain and could barely go to the bathroom (even with assistance). I told her to take DMSO (which she had at home since I encourage all my relatives to keep it on hand in case someone has a stroke). Within minutes, she had regained her mobility, her painful abdomen began normalizing, and she was able to quickly get through what would have otherwise been (knowing her medical history) a challenging

recovery. Furthermore, I also had a friend in another state contact me about complications from a hernia surgery a few days before (which DMSO also addressed).

Note: unless you've birthed a child, it's quite difficult to truly appreciate just how challenging both childbirth and the recovery process can be. After I started working with chronic pain patients, I realized many of them were in an analogous situation as many of the people they interacted with simply did not have the context to grasp how just difficult every moment of their life was.

It is understandably a bit hard to believe that DMSO can actually do that, so I have put a lot of work into presenting the evidence that it indeed does (which is essentially why I have been publishing less new content recently).

Note: one of the most important precautions with DMSO is to not havee a toxic chemical on the skin (e.g., a pesticide, nicotine or mercury) which it can draw into the body once DMSO is applied there (hence why it's generally advised to wash the skin beforehand). Additionally, there are some unresolved questions about using DMSO while pregnant that will be discussed in an upcoming article.

How DMSO Works

In the first part of this series, I provided a wealth of evidence that demonstrates a few key properties of DMSO, such as:

•It rapidly spreading throughout the body once it contacts the skin (or is ingested), and if mixed with anything, brings that into the body as well.

•It protecting cells from a variety of otherwise lethal stressors (e.g., burns, being frozen, losing their blood supply, radiation, and sonic shockwaves). This amongst other things allows it to be a miraculous therapeutic for otherwise crippling injuries of the central nervous system (e.g., strokes and spinal cord injuries).

•It is incredibly safe (with the primary side effects being a temporary concentration dependent irritation when it's applied to the skin and in certain individuals, an unpleasant garlic like odor that lasts for a few hours, while the primary severe side effect is a 1/2000 chance of an allergic reaction.).

•It significantly increases blood circulation throughout the body and simultaneously removes edema and excess fluid from where it does not belong. This is particularly important for the joints, as their structure predisposes them to having a limited blood supply (especially when they are damaged and need that blood to heal).

These help explain how DMSO is almost universally applicable to a wide range of conditions—but simultaneously are only some of its remarkable properties. For instance, I believe its ability to rapidly heal injuries and eliminate pain results from being highly anti-inflammatory, restoring critical blood flow, being an effective muscle relaxant, protecting cells from death, and blocking the conduction of problematic pain signals.

If you take a step back for a moment, it's extraordinary a single substance can do all of that at the same time—particularly since the drugs we have that only do one or two of those (e.g., NSAIDs, steroids, or opioids) are often quite dangerous.

Note: in addition to these mechanisms, I believe that DMSO's other properties may also explain its analgesic effects. For example, pain is often due to a tight muscle or injured tissue, and since DMSO treats each of these, it can eliminate the "root cause" of pain.

However, I believe DMSO's least appreciated effect arises from its ability to eliminate blood stasis in the body, as in many cases, chronic pain is due to insufficient blood reaching an area (e.g., DMSO has been recognized to address the pain associated with blood clots). This builds on an observation from Chinese Medicine that blood stasis can cause severe pain throughout the body (e.g., sharp piercing pains are often associated with blood stasis) and my observation that blood stasis is a key disease of the modern age (in large part due to vaccines altering the electrical dispersion within the body and creating micro clots throughout it).

How DMSO Treats Pain

Note: I harbor strong ethical issues with animal experimentation (discussed further here) but am nonetheless citing animal studies because it is important for this information to be known.

A few mechanisms have been identified to explain how DMSO treats pain (many of which also likely account for DMSO's remarkable ability to heal musculoskeletal injuries).

Conduction Blocking

Many different nerves exist in the body. One group, known as the "small fibers" are responsible for transmitting specific sensations and (particularly the C fibers) are frequently linked to debilitating chronic pain syndromes (e.g., small fiber neuropathy, is characterized by sensations of pins-and-needles, pricks, tingling, and numbness alongside burning pain and electrical shocks).
*Note: the five most common symptoms of COVID vaccine injuries, in order, are fatigue, post-exertional malaise, brain fog (discussed further here), **small fiber neuropathy**, and dysautonomia.*

DMSO selectively blocks the conductions of these smaller fibers, thereby stopping the pain without causing significant damage to the rest of the body or

the body developing a tolerance to it (rather DMSO typically becomes more effective with time).

Note: alpha-delta (Aδ) fibers are responsible for sensing shallow, quick and sharp pain, whereas C fibers (especially when repeatedly triggered) mediate stronger somatic signals involving temperature, sensual touch, and muscle and joint pain—in essence comprising many common facets of chronic pain.

This is supported by the following data:

•One study evaluated sural nerves within cats and found that 5% DMSO slowed the conduction and decreased the amplitude of nerve impulses within the C fibers, while higher doses (9%) blocked it (with the block being instantaneous at 15%), and that these effects disappeared once DMSO was washed off. Another study of cat radial nervesfound that at lower concentrations, DMSO blocked the conduction of small nerve fibers (first C and then Aδ), while at high concentrations, it blocked the conduction of larger fibers (alpha-beta [Aβ] and alpha-gamma [Aγ])

Note: this blockade is thought to be in part due to DMSO decreasing the resting membrane potential by changing its permeability to chloride and potassium (e.g., by blocking the leak channels).

•Another study found 5-10% DMSO blocked the afterdischarges of C-fibers (a process associated with painful stimuli).

•DMSO has been observed to suppress NMDA and AMPA induced ion fluxes in neurons, each of which are receptors linked to chronic pain (e.g., NMDA is linked to central pain sensitization).
Note: I believe this property may in part account for why DMSO treats complex regional pain syndrome. Likewise it has been proposed to explain its utility in treating cancer pain.

•DMSO has also been observed to block sodium and calcium ions' entry into cells (likewise, many local anesthetics work by blocking sodium ion entry). This

effect has also been proposed to explain how DMSO can help cancer pain. *Note: DMSO has also been reported to significantly enhance the potency of local anesthetics (which in turn has been demonstrated in this study and this study).*

•In a human study, 50% DMSO was found to produce partial anesthesia (numbness) to pinpricking sensation, while a questionable reduction occurred with 20%, and no effect was observed with 10% DMSO.

•Isolated frog sciatic nerves immersed in 6% DMSO for 30 to 120 minutes developed a 40% decrease in conduction velocity. Normal conduction velocity returned after the nerves were washed for one hour in Ringer's solution.

Superficial radial nerves were isolated from adult cats and immersed in 75% DMSO for 60 minutes. Nerve conduction was totally abolished in the smaller nerve fibers (thought to be important in pain perception), but was reversible if the DMSO was washed off immediately once nerve conduction disruption began. Another author found that immersion in 5% to 10% DMSO completely blocked conduction in small peripheral nerve fibers from cats.

Note: DMSO temporarily blocking neurologic transmission may also treat pain by resetting pain circuits (as other methods that do this are highly effective for many of the challenging conditions DMSO also treats).

Finally, DMSO has been shown to induce total anesthesia in animals when injected directly into the cerebrospinal fluid and to do so without causing any adverse reactions.

Choline Esterase Inhibition

The body has a variety of regulatory processes which in tandem allow it to maintain a steady internal state despite being exposed to numerous external stressors. One of them is to eliminate the neurotransmitters it produces so they do not excessively stimulate nerves. In turn, certain drugs (e.g., SSRI

antidepressants) work by preventing this elimination, thereby raising the levels of a target neurotransmitter.

One of the key neurotransmitters in the body is acetylcholine, which serves a variety of functions such as being the primary neurotransmitter of the parasympathetic (rest and relax) branch of the autonomic nervous system. Acetylcholinesterase inhibitors raise acetylcholine within the body by preventing its breakdown enzyme from eliminating it. These drugs in turn have a variety of functions, such as increasing parasympathetic activity or improving memory, but likewise if used excessively can cause a dangerous overdose known as "cholinergic syndrome."

Note: years ago I tried numerous memory aids for studying and found the most effective one was a natural acetylcholine esterase inhibitor (which also had the side effect of creating vivid and lucid dreams).

Decades of research (e.g., this 1966 study, this 1966 study, this 1975 study, this 1983 study, this 1991 study, and this recent 2017 study) have shown that DMSO is an acetylcholine esterase inhibitor (and that it increases the pre-synaptic release of acetylcholine). That property in turn is believed to account for DMSO lowering the threshold for the vagal nerve to fire and DMSO's powerful ability to increase parasympathetic function in the body (e.g., DMSO increases the response of the smooth muscle of the stomach to both muscle and nerve stimulation) and also to help with improved memory and concentration (although that could also simply be from improved cerebral circulation).

However, unlike other acetylcholine esterase inhibitors, at high doses it hasn't been observed to cause a cholinergic syndrome (which may be because while under 1% DMSO is an acetylcholine esterase inhibitor, over 10% blocks cholinergic transmission, or because it is a competitive rather than irreversible inhibitor, or as the previously cited studies show, because its inhibition is significantly weaker than the pharmaceutical drugs used as acetylcholine esterase inhibitors).

Note: one of the few adverse effects of IV DMSO is certain individuals experiencing a partial reduction of the heart rate, which is likely due to DMSO's effects on the autonomic nervous system.

Furthermore, in addition to enhancing parasympathetic function, DMSO also blocks the inhibitory effects of the sympathetic nervous system, both of which counteract the sympathetic symptomatology commonly seen in autonomic disorders.

Note: this property may also contribute to DMSO's pain-relieving effects as existing research shows acetylcholine esterase inhibitors reduce chronic pain.

Anti-inflammatory:

Many of my colleagues who used DMSO in practice primarily used it for inflammation. It was incredibly effective in this regard, and unlike the other dangerous options (e.g., steroids or NSAIDs), DMSO is very safe. Since inflammation is a key component of both pain and musculoskeletal injury (e.g., "chronic inflammatory pain" is well recognized), this property likely is key to DMSO's utility in those conditions.

In the first part of this series, to help illustrate how DMSO can protect injured tissue from death (and allow non-healing brain or spinal cord tissue to heal), I provided the evidence (like this study) showing DMSO:

•Reduces pathologic inflammatory responses to tissue injury
•Reduces inflammatory cytokines.
•Reduces the production of inflammatory prostaglandins and increases the production of anti-inflammatory prostaglandins.
•Neutralizes (scavenges) free radicals, which are both a cause and result of chronic inflammation and a common cause of tissue injury, degenerative illness, and chronic pain.

In turn, numerous animal studies have shown shown DMSO prevents inflammatory stimuli from creating inflammation and tissue damage:

•In guinea pigs, locally applied DMSO was effective in inhibiting both the development of DNCB (an irritating chemical) induced contact dermatitis and local swelling.

•In rats, pressure necrosis was prevented by pretreatment of the skin with 70% DMSO, Carrageenin induced edema in their paws was reduced by topical but not oral administration of DMSO (as was zymosan-induced edema), DMSO preventedadjuvant-induced arthritis (and in another study attenuated adjuvant induced arthritis), topical DMSO inhibited traumatic edema induced by intrapedal injection of autologous blood in the leg of a rat, and DMSO prevented the formation of granuloma-pouches. DMSO (70%) also prevented contact dermatitis, allergic eczema, and calcification of the skin.

•In rabbits, DMSO counteracted the Shwartzman phenomenon by suppressing inflammation if administered prior to injecting an inflammatory bacterial lipopolysaccharide and reduced inflammation when injected into joints with croton oil induced arthritis.

•In horses, topical DMSO prevented the severe inflammatory reaction they typically experience from small doses of purified human gamma globulin they have been sensitized to (which leads to areas becoming so inflamed and edematous that the horses will not move their necks and frequently become necrotic).

Six horses with LPS induced synovitis in their mid-carpal joints received topical (90%) DMSO gel, and compared to controls were found to have a decrease in joint inflammation (e.g., less neutrophils present). Additionally, DMSO was found within both the joints and serum.

A rabbit study found that in rabbits with fractured hind legs, the daily application of DMSO reduced the eventual stiffness in their ankles by 41%.

Additionally, as shown later in this article, numerous studies show DMSO prevents tissue injury from chemotherapy drugs, which is likely due to its anti-inflammatory properties. Likewise, as I will also show later in the article, DMSO is highly effective at healing naturally occurring injuries in animals with an inflammatory component.

Note: a study which evaluated ultraviolet light's ability to produce an inflammatory response that killed melanocytes in the skin found that DMSO caused an increased density of melanocytes, which again suggests DMSO facilitates a better recovery of the inflammatory response.

Muscle Relaxation

DMSO tends to relax skeletal muscle while simultaneously enhancing the contraction of other muscles (e.g., 3-6% DMSO enhanced the contraction of the heart and stomach).

DMSO applied topically to the skin of patients produces electromyographic evidence of muscle relaxation 1 hour after application, while another study found 50% DMSO prevented the contraction of frog skeletal muscles.

A 1966 study found that (as shown by electromyography) muscles in spasm will relax within 60 minutes of topical application. It also found that this relaxation could be used to treat headaches associated with cervical disease and complex regional pain syndrome.

As muscle tension is a frequent cause of pain and musculoskeletal disorders, this property likely accounts for some of its efficacy for those conditions.

Treating Pain with DMSO

As opioids are seen as the gold standard for pain control, there is very little awareness research has shown a comparable analgesic exists. To illustrate:

•A 1983 study using a common research metric (how mice respond to heat and tail flicks) found that DMSO produced an analgesic effect comparable in strength to morphine. However, this effect was assessed to be due to a different mechanism as an opioid receptor blocker (naloxone) did not affect DMSO's ability to eliminate pain, DMSO did not produce any of the side effects seen with opioids, and DMSO's effect lasted far longer (4-6 hours and in some cases over 24 hours—whereas in contrast morphine typically lasted less than 2 hours). *Note: another mouse study using similar tests also found that DMSO blocks pain.*

However, unlike other analgesics (pain killers), DMSO has a variety of unique properties. These include:

•It treats a very wide range of pain conditions, including ones other analgesics can't address. For example, case reports exist of DMSO treating phantom pain (pain outside the body where an amputated limb had previously existed).

•Rather than the body developing a resistance to it (which is what commonly happens with opioids), DMSO often becomes more effective at eliminating pain with subsequent doses, and in many cases, is needed less and less frequently (or not at all because the condition is resolved). Because of this, while acute pain rapidly responds to DMSO, chronic pain conditions often take 4-7 days of applications for DMSO to begin taking effect and 6-8 weeks for lasting relief to occur (e.g., to quote one patient "after **twenty-four** DMSO injections, I was completely pain-free").

•In many cases, as is seen with other applications of DMSO, the effect is systemic (e.g., one study found 65% of patients experienced pain relief if DMSO was applied at the site of pain, whereas 61.5% experienced comparable relief when DMSO was applied somewhere further away in the body).

Additionally:

•DMSO (especially topical DMSO) tends to be more effective in treating pain above the waist, and is less likely to help the larger joints (e.g., the hips have the

smallest response to DMSO). In turn, the pioneer of DMSO would typically use injections rather than topical applications for the hips and knees (although we've found the knees frequently respond to topical DMSO).

•In acute cases (e.g., an ankle sprain), DMSO is often applied every 2-3 hours, and in many cases, the broader an area that is covered with DMSO (and the more DMSO is used), the more effectively DMSO relieves pain.

•In chronic pain patients who do not respond to topical DMSO, a lower concentration of injectable DMSO often helps.

•Shingles (which will be discussed in a later part of this series) consistently has an excellent response to DMSO.

Cancer Pain

Many cancer patients experience severe pain (which increases as the cancer becomes terminal), and in 10-20% of cases, it does not respond to standard opioid management. In many cases however, it does to DMSO. For example:

•A study gave two older patients with cancer pain DMSO, one of whom had an excellent response to treatment and one who had a good response.

•Another study found that of 7 patients with metastatic cancer pain, DMSO gave 2 a full remission and 2 a partial remission.

•One of the most well known examples was Otis Bowen MD (a popular second term Indiana governor) who "illegally" used topical DMSO to treat his wife's pain from terminal multiple myeloma and then publicly denounced the FDA's absurd embargo on it at the AMA's 1981 national meeting. Remarkably, a few years later, Bowen became Reagan's Secretary of Health and Human Services, but even then, with this highly ethical doctor at the helm of the HSS, DMSO was unable to overcome the FDA's prohibition of it.

Headaches

Tension headaches (e.g., those caused by muscular tension of the neck) and sinus headaches tend to respond to DMSO (with relief typically lasting 4-6 hours), whereas migraine and cluster headaches are less responsive to DMSO. For example, in addition to the previously mentioned study where DMSO was found to both relax the cervical musculature and alleviate tension headaches, these results were reported by two doctors:

TABLE 1
HEADACHE, NECK PAIN AND CRANIAL NEURALGIA

Diagnosis	No. of Patients Treated		Ages	Duration	Results			Side Effects	
	Male	Female			Poor	Good	Excellent	Mild	Severe
Vascular									
Migraine	4	26	19-68	1 wk-8 mo	22	5	3	20	3
Cluster	4	1	37-59	2wks-4 mo	4	1	0	1	2
Nonspecific vascular	7	15	22-74	2wks-5 mo	11	7	4	14	2
Atypical face pain	0	3	36-62	1 wk-4 mo	2	1	0	1	0
Temporal arteritis	0	1	61	4 mo	0	1	0	0	0
Tension									
Anxiety & psychological	8	8	18-74	1 wk-7 mo	3	7	6	4	2
Muscle contraction	5	5	42-67	1 wk-3 mo	1	4	5	5	0
Post-traumatic									
Acute	2	7	17-73	1 wk-8 mo	0	7	2	3	1
Chronic	2	22	19-70	2days-9mo	5	18	1	16	5

Note: many headaches are incorrectly categorized as migraine headaches. Additionally, migraine headaches typically only respond to DMSO if it's applied during the early stages of the headache.

Many other headaches also respond to DMSO. For example, Stanley Jacob reported on59 patients with headaches from a variety of causes, of whom over 75% responded to DMSO. This included 13 out of 17 patient with years of chronic neck pain from cervical arthritis that triggered headaches, (who then required a gradually decreasing DMSO dose), 4 out of 5 patients with sinus headaches improved from DMSO, 2 out of 2 patients with temporal arteritis

(causing severe head pain) who fully recovered after DMSO and 26 out of 35 patients who'd had trigeminal neuralgia for more than a year with numerous failed treatments (13 of whom then had a full recovery).

Likewise, another study of 10 patients with headaches (from a variety of causes—the majority being frontal) found DMSO significantly helped all 10 (including in those who had had a headache for more than a day).

Finally, a study of 15 patients with tinnitus (another condition which responds to DMSO) included 11 who had concurrent headaches. For those 11, DMSO resulted in 7 having a complete recovery, 1 having less intense headaches, 2 only having occasional headaches and 1 having no response.

Note: there are numerous testimonials of individuals with years of headaches who experienced life-changing results from DMSO.

Fibromyalgia

Over the years, I have heard of quite a few cases of individuals with fibromyalgia having a massive improvement in their quality of life from DMSO (e.g., one can be found here) but simultaneously, I've also seen quite a few cases where it needed to done slowly for a sensitive patient (as otherwise the initial detoxification response was too much for the individual).

Note: this principle is also important to keep in mind when working with other "sensitive" patients (which is discussed further here).

While no formal literature has been published in this area, the leading pioneer of DMSO therapy (who I consider to be extremely honest) attested:

Over the last few years, we have been treating patients with fibromyalgia. Seventy percent of the patients have experienced benefit. No serious side effects have been encountered.

The properties of our regime contributing to benefit included free-radical scavenging, analgesia, anti-inflammation, softening of scar tissue, reduction of muscle spasm, and stimulation of healing.

Spinal Pain:

Many of the most profound benefits from DMSO are found in patients with spinal issues (e.g., spinal stenosis, a failed back surgery, surgical scars, severe arthritis, previous spinal cord injuries, or bulging discs), and numerous testimonies (e.g., many can be found in the Congressional hearing) exist of individuals who had been in years of crippling pain suddenly getting their lives back because of how effectively DMSO treated their pain and restored their mobility.

However, while I frequently read case reports of this, I have only located one which specifically evaluated this. In that 1968 study, 38 patients with lumbar and cervical disc problems received conventional (non-surgical) treatments and half also received DMSO—which was found to halve the treatment time they required.

Note: topically applied DMSO is often extremely helpful for herniated discs (and much safer than systemic steroids). Additionally, a few people found injecting DMSO mixed with lidocaine into the vertebral musculature was quite helpful for spinal pain.

Since studies are lacking in this area, I will instead share a few testimonies (most of which can be found within the previously mentioned Congressional Hearing).

Point blank, I myself am one of the individuals who I treated with DMSO for a slipped disc, and I can tell you point blank that it works better than anything else I have ever tried before or since DMSO therapy.

At 46, I was a deformed arthritic mass of pain from a childhood injury which shortened my left leg by healing with a short bend. Physicians thought I had

been born with one leg shorter than the other; and this caused a severe curvature of the spine and, with age, arthritis.

Two hours after my first DMSO treatment, I felt a buzzing in my knee and my leg straightened—after 34 years. I then had treatments on my back. My spine is still curved, but nothing like it was. I am straight, my hips and shoulders lateral, not forward with an enlarged hip, and the lump of muscle doesn't show. I no longer have osteoarthritis in my knee and, at 51, I can drive a car long distances and teach a class in college. Before DMSO, I couldn't walk a block or ride 10 minutes in a car.

I, myself, have realized almost complete freedom from pain since being injected with DMSO by Dr. Stanley Jacob. My pain was due to scar tissue formed around the sciatic nerve as a result of two lumbar disc surgeries and would drop me by surprise to the ground—thus causing a constant need for pain medication and the use of a cane, for walking. After two (2) shots of DMSO I was able to quit using the cane, and after about six (6) shots of DMSO by Dr. Jacob I was able to stop using the pain medication. I now feel better than I have since before I got hurt, and owe it all to Dr. Jacob and DMSO.

Would you please use your influence to legalize DMSO? Our daughter broke her neck in an auto accident and for the first time in years pain free because of using DMSO.

I am writing regarding DMSO. I am 75 years old, veteran and an R.N. I have a service connected back, 5 operations, plus 2 after my discharge on my back. I feel that after my spinal fusion in 1950, that I had excellent results, but in the last few years have had arthritis through my entire spine.

My doctor finally told me that there was just nothing left for him to do, to try DMSO. He did not tell me how or where I could get it. Tried veterinarians but had no dog, yes, I had no dog, so I couldn’t get it. Finally found a kind gentleman who told me where I could get it.

Thanks to the Foundation in Portland, I was able to get it, and needless to say, I'm thankful. I won't say that it has cured any of my aching joints, but I've been able to stay on my feet, instead of in a wheelchair.

Note: I suspect a key reason DMSO is so effective for spinal pain is that spinal joints are relatively small, and DMSO has the most positive effects on smaller joints (e.g., the fingers).

Additionally, there are also many stories of quadriplegics who initially took DMSO to alleviate their chronic pain and then gradually regained motor function as a "side effect" of DMSO. In turn, there are many cases (listed here) of individuals overcoming lifelong paraplegia (including "hopeless" cases where their "miraculous" improvement could be traced to DMSO as it stopped once DMSO was withdrawn). This for example was a testimony of a mother whose child was saved from a lifetime of paralysis by DMSO:

During the last six months, have spent many hours in Dr. Jacob's clinic with his beautiful and caring staff, watching miracle after miracle happen right in front of my eyes. I have seen people who have been totally paralyzed for twenty years or more being treated and starting to move. The wonder in their eyes indeed a sight to behold.

Complex Regional Pain Syndrome

Complex regional pain syndrome (CRPS), is a chronic pain condition that is characterized by also having autonomic and inflammatory involvement. Other than it frequently following a trauma (e.g., a surgery) and being linked to small fiber neuropathy, the causes of CRPS are still not well understood and management of this challenging condition typically consists of a plethora of pharmaceutical drugs targeting each symptom.

This is a shame as there are few unorthodox therapies which effectively treat CRPS, one of which is DMSO (which as mentioned before blocks pain from the small fibers). Sadly however (like the other CRPS treatment options) there is very little knowledge of DMSO's unique applicability to the condition.

Note: complex regional pain syndrome was an adverse event associated with the HPV vaccine.

The supporting evidence is as follows:

•A 1985 study demonstrated that 50% DMSO reduced the inflammation associated with CRPS and improved symptoms associated with the condition.

•A 1994 study treated 13 CRPS patients (within 3 months of diagnosis) with 50% DMSO and found they had a significantly better recovery than the comparative treatment.

•A 1996 study of 32 patients with acute CRPS (e.g., heat, redness, pain, swelling, reduced range of motion) gave them 50% DMSO or placebo for 2 months, and a significant improvement was seen in the DMSO group.

•A 2003 study randomized 64 patients with CRPS to receive topical 50% DMSO and 67 patients to receive n-acetyl-cysteine (NAC) for 17 weeks to a year. This study found that DMSO was a cost effective therapy that produced good to excellent results for the patients, especially when their CRPS was associated with inflammatory symptoms and when it was done earlier in the illness.

•Another 2003 study of 146 patients also comparing 50% DMSO to NAC (over 24 months) found DMSO was effective, particularly for hot (inflammatory) CRPS.

•A 2012 study gave 29 patients (who had had CRPS for less than a year) 50% topical DMSO and found DMSO significantly reduced their pain (with results approaching a complete absence of pain), brought back the functionality of the affected limb and improved their quality of life.

•A 2012 study used a combination of treatments including 50% DMSO for CRPS and found this combination was effective for treating the condition.

•Finally, a 2005 review of the existing therapies for CRPS concluded 50% DMSO had evidence of efficacy and compared to the other treatment options, was the least likely to cause harm.

Additionally, to highlight that these benefits extend to neuropathic conditions besides CRPS, another study found that of 9 patients with peripheral neuritis segmental neuralgia, DMSO gave 6 a full remission and 2 a partial remission.

Surgical Pain

Since DMSO both accelerates wound healing and reduces pain, it is uniquely suited to post operative pain. Numerous studies support this. For example:

•A rat study found administering DMSO into a wound before closing it significantly reduced the subsequent pain and guarding the rats had, suggesting this approach could address a common complication of surgery.

•A 1967 study found that DMSO applied to the incision sites of thoracotomy (open chest surgery) patients in concentrations of 60% to 80% resulted in significant pain relief, and reduction of the opioids needed (which in turn led to fewer gastrointestinal complications). These patients as a group were able to cough more effectively, move more easily both in and out of bed, resume early motion of the arm and shoulder, and in general enjoy a more rapid and less complicated postoperative course.

•Another study gave 90% DMSO to 64 postpartum women with episiotomy pain and found that over half had pain relief and a reduction in swelling and that there was a significant improvement in mobility (with some patients who had left the hospital then requesting to resume DMSO to alleviate subsequent pain). The investigators ultimately concluded the risks (e.g., a burning sensation from the DMSO) did not outweigh the benefits of the therapy—something I suspect may in part have been due to them using too high a concentration of DMSO on a sensitive region of the body.

•Another study treated 37 post-surgical patients with chronic intractable pain syndromes and noted excellent relief in 32 of them.

Wound Healing

Due to its properties, DMSO tends to accelerate wound healing, prevent wounds getting infected, eliminate pain, heal chronically non-healing wounds and prevent the formation of scar tissue or dissolve it once present (a property which may relate to its remarkable ability to eliminate amyloid aggregates throughout the body). Because of this, there are many accounts of individuals saying they've benefitted greatly from applying it immediately after wounds (typically around the wound rather than inside it).

Note: a reader who did his PhD in physical and organic chemistry shared that his research had shown DMSO could change the molecular bonding of atoms in its vicinity, which allows it to greatly accelerate biochemical reactions. Assuming this is true, it might help to explain why DMSO accelerates healing.

Ulcers

Note: as shown in the previous article (and for instance in this commenter's experience), varicose veins and ulcers have an excellent response to DMSO.

A large study of chronic skin wounds (which in many cases had remained untreatable for years or were infected) found 95.04% had a complete recovery (e.g., no burn scars) following DMSO that was often quite rapid. The conditions treated were as follows:

TYPES OF SKIN AFFECTIONS TREATED AND NUMBER OF CASES RECORDED

Condition	Number of Cases
Ulcerations of legs, feet, and/or upper extremities	401
Infected wounds of diverse localizations	747
Infected dermatomycosis on feet and/or hands	50
Second- or third-degree burns on hands, feet, and/or legs	173
Total number of cases treated	1371

Note: the investigators reported that certain patients with deep wounds experienced some pain at the time of DMSO application. However, this pain only lasted a short time and did not prevent DMSO treatment. Most patients received immediate relief after DMSO, and in some cases, the pain completely stopped after the first treatment.

A systematic review examined the efficacy of topical DMSO on wound healing and noted that decubitus ulcers were the most frequently studied condition. Overall, the review found that DMSO was beneficial for wound healing and analgesia (and had low toxicity).

Note: this analysis included a 1985 study where 20 older diabetic patients with chronic (treatment resistant) perforating ulcers received DMSO and 14 had a complete recovery in 4-15 weeks of treatment (whereas in contrast only 2 of the 20 controls who received conventional treatment did), a double blind trial where DMSO was used as an adjunctive therapy for refractory duodenal ulcers and was found to increase the cure rate from 60% to 100%, and an unpublished trial where 39 elderly patients with first stage pressure ulcers received 5% DMSO for 36 months and had a very positive response to the treatment.

Additionally, since chemotherapy drugs are cytotoxic, a variety of common injuries occur with them, with one of the most common (an extravasation injury) occurring when the drug leaks out of blood vessels and injures the surrounding tissue (and skin). Extravasation injuries affect approximately 1% of

chemotherapy patients (estimates range from 0.1%-6.0%), and create significant issues for patients. DMSO in turn, has successfully treated a variety of common chemotherapy injuries, particularly extravasations and ulcers (e.g., see this rat study, this rat study, this rat and pig study, this pig study, and this guinea pig study).

In humans, case reports exist of DMSO treating these injuries (e.g., see this report, this report of two cases, this report and this report), alongside larger datasets (e.g., here 4 out of 4 chemotherapy injuries responded to DMSO, here 8 out of 8 did, and here 74 out of 75 did). Finally, prospective clinical trials have also corroborated this (e.g., in this study 20 out of 20 patients responded to DMSO, while in this study 16 out of 20 did).

Finally, when used on open wounds in horses, DMSO was found to rapidly stimulate healthy granulation tissue, decrease excessive granulation tissue, and both eliminate existing infections in the wounds and prevent new infections.

Tissue Regeneration

DMSO has the unique property of accelerating the speed at which newts regenerate lost limbs by approximately 2-3 days (see this paper and this dissertation).
Note: newts are one of the only advanced organisms which can regenerate a lost limb.

Additionally, authors of a 1998 Russian paper stated that they are routinely applying DMSO into surgical wounds as it accelerates healing and provides general infection control. This in turn is congruent with the pain studies mentioned earlier in this article that show DMSO improves the healing of surgical wounds.

Scar Tissue and Adhesions

DMSO is often used to treat scars. This may be in part due to DMSO being observed to disrupt the links between collagen fibers

Note: Matrix metalloproteinases degrade the proteins that surround cells. While their function is essential, when excessive, they (especially MMP-9) are linked to a variety of disease states (e.g., organ fibrosis, cardiovascular disease, cancer, and rheumatoid arthritis) due to the healing process becoming disordered. DMSO in turn has been shown to attenuate excessive MMP-9 activity.

In rats, DMSO decreased experimentally induced intestinal adhesions (a common complication of abdominal surgeries) by 80%. Additionally, another study foundDMSO inhibits fibroblastic proliferation in vitro.

Note: it has been observed that DMSO is much more likely to prevent adhesions if administered prior to surgery rather than after it.

In rabbits, when 70% DMSO was administered next to a wound incision (but not the incision site itself), 70% DMSO appeared to increase the development of wound tensile strength—which is important since a major issue in surgery is the incision sites dehiscing (ripping open) and because an early improvement of a scar's tensile strength suggests the scar that ultimately forms will be stronger and healthier.

Another rabbit study applied DMSO immediately after surgically wounding their backs and found that after 7 days, their scar tissue was significantly stronger than that of untreated controls. Finally, a third rabbit study administered DMSO 4 weeks after an injury to their ears and found that DMSO prevented hypertrophic (excessive) scar formation.

Note: surgical scars take about 6 weeks to develop, and in most cases are around 80% as strong as the original tissue that preceded them. This again suggests that using DMSO would significantly improve longterm surgical outcomes.

Finally, DMSO is also sometimes used to repair keloid scars. For example, in one studyof ten people with keloids, applying 50-80% DMSO a couple of times a day induced scar flattening with loosening of the collagen surrounding the fibrous bundles. Similarly, another study found DMSO eliminated subcutaneous fibrosis induced by radiation (through a gradual softening and reduction of it). A third study discussed using DMSO for the treatment radiation pneumonitis in lung cancer patients, and a fourth found DMSO could prevent radiation reactions in the skin while a fifthexplored DMSO's use in the overall treatment of local radiation complications.

Note: this author also found DMSO had a concentration dependent effect on the wound healing process.

Skin Flaps and Grafts

Surgically created skin flaps are at an increased risk of dying due to poor blood perfusion. Numerous studies (e.g., this one, this one, this one, this one, this one, this one, this one, this one, this one, and this one) have shown DMSO protects vulnerable skin flaps (including in a rat model of smokers), which makes it a shame its not used in fields that could greatly benefit from this innovation (e.g., plastic surgery).

Likewise, skin grafts, even from the same person, often fail. Fortunately, DMSO happens to address the common causes of skin graft failures. To illustrate, a Ukrainian plastic surgeon documented that in over 500 transplants that dressings moistened with 30% DMSO solution for 3-5 days enabled grafts to take and survive in badly burned patients and victims of elephantiasis (e.g., there was no skin necrosis, no inflammatory changes, no keloids, and no hypertrophic scars). Similarly, a study of 120 rabbitsdemonstrated the DMSO significantly improved the viability of a skin or cartilage graft.

Note: in rabbits, DMSO was shown to reduce tissue carbon dioxide levels, and when mixed with hydrogen peroxide, increase oxygen levels, but this effect was not seen in rats or pigs.

DMSO and Musculoskeletal Injuries

While DMSO is a remarkably effective painkiller and wound healing agent, by far its number one use was the treatment of musculoskeletal conditions, particularly those which created a functional immobility. In turn, many of the early adopters of DMSO went from skeptics to believers because of the rapid and dramatic improvements they saw from it (e.g., as they had patients with a debilitating bursitis in the shoulder recovering within minutes of receiving DMSO).

Due to its safety and dramatically better performance than the existing treatment options, DMSO rapidly took off around the country. Numerous pharmaceutical companies clamored for it (and invested millions in bringing it to market), and before long, many doctors were using it on thousands of patients with unbelievable results—results that were particularly unbelievable given how poorly the existing therapies worked.

Sadly however, as both the public and professional interest in DMSO was skyrocketing, the FDA decided it was unacceptable a drug they could not control was taking off around the country, and on November 10, 1965, issued a global research ban on it, causing almost every doctor who had been using it to stop out of fear of prosecution. This immediately created an underground market for DMSO, a flurry of complaints to and by elected officials over it (which eventually resulted in Congressional hearings) and an end to almost all DMSO research.

Note: the reason for the ban was completely unjustified as the existing evidence showed the FDA's safety concern did not exist, and later was conclusively disproven by a large human toxicology study.

As a result, very little knowledge now exists of DMSO's use in human musculoskeletal injuries other than it existing in a few products where it was combined with another agent (e.g., there are numerous FDA approved topical DMSO-Diclofenac [an NSAID] preparations), and it having the sole approval

for treating interstitial cystitis (which will be discussed later in this series). Remarkably however, it is fully permitted in veterinary medicine (which led to a lot of Americans using DMSO that was “meant for horses”) where it is acknowledged to create the same benefits that were observed in humans.

Being fully aware something like that ban was being considered by the FDA, DMSO’s advocates decided a research symposium under the auspices of a prestigious organization needed to be held to head it off and throughout 1965, despite immense pressure from the FDA not to host it, the scientific community rallied behind them. The program gradually came together (in a manner far different from our modern scientific community):

The March 14, 15, and 16, 1966, symposium under the auspices of the New York Academy of Sciences was held in a large hall of New York's Waldorf Astoria Hotel. More than a thousand researchers came from all parts of the United States and from overseas. After the FDA had cracked down on DMSO, Jacob had written to every person who had submitted an abstract, he said that now that DMSO had been branded toxic and dangerous by the FDA the paper could be withdrawn. No one canceled.

Note: 82 papers were presented at this meeting which was attended by over 1000 researchers from across the world.

This timeline in turn explains how a wealth of compelling data emerged over a very brief period of time—and then just as suddenly stopped. Likewise, much of the research at this time was in the initial stages (e.g., it was produced by doctors who had switched to reviewing all of their charts from when DMSO had been used since they could no longer give it to patients) most of these studies were comprised of a wide range of musculoskeletal issues (those that their patients presented with) rather than being restricted to a single complaint. For this reason, I felt it was best to present most of them by sharing the key data tables of each study. Doing so in turn makes it clear DMSO consistently had an 80-90% success rate in treating thousands of musculoskeletal issues—

something dramatically better than any of the options which existed then or that exist now…..60 years later.

Note: what I am alleging here is understandably difficult to believe. That was why I began this series by providing the wealth of evidence DMSO effectively treats "untreatable" brain and spinal cord injuries (e.g., strokes) and justifying the contention that millions could have been spared a lifetime of disability or paralysis if the FDA had not suppressed it (along with making a similar case for other incurable conditions DMSO treats like Down Syndrome and amyloidosis). Likewise, there are many other important facets to the DMSO story (e.g., exactly why the FDA did this or how DMSO treats other challenging disorders like tinnitus, macular degeneration, and scleroderma) I felt should not be presented until a clear and unambiguous case was made to how unconscionable the FDA's conduct was in these first two articles

Human Musculoskeletal DMSO Studies

One of the first studies was published in 1965 and conducted by the researcher who courageously pioneered the adoption of DMSO throughout the United States:

Diagnosis	Patients		Usual Daily Dosage of DMSO (Ml)	Maximum Period of Treatment
	No. Treated	No. Improved		
Acute musculo-skeletal injuries	210	195	30	7 days
Bursitis				
subacromial acute	25	22	30	7 days
subacromial chronic	40	32	30	3 months
Arthritis				
osteoarthritis	110	88	30	10 months
rheumatoid				
grades 1, 2	80	60	30	10 months
grades 3, 4	70	30	30	10 months
gouty	5	3	30	3 days
Scleroderma	5	4	30	3 months
Dupuytren's contracture	3	3	30	3 months
Total	**548**	**437**		

Diagnosis	Results and Comments
Acute musculo-skeletal injuries	Relief of pain and muscle spasm within 30 min; duration of benefit 2-12 hr
Bursitis	
subacromial acute	Rapid increase in range of motion and diminution of rest pain within 30 min
subacromial chronic	Continued treatment for 3 months required before patient symptom free; reduction of calcium by x-ray in 25% of patients exhibiting initial calcification
Arthritis	
osteoarthritis	Diminished pain, lessened muscular spasm; increased range of motion
rheumatoid	
grades 1, 2	Diminished pain, lessened muscular spasm; increased range of motion
grades 3, 4	Objective evidence of diminution of swelling; subjective relief of pain. Six of 10 patients followed for 8-10 months are improved
gouty	Diminution of swelling and redness, relief of rest pain in 30 min; some discomfort persists on walking
Scleroderma	Improved range of motion at joint with softening of skin
Dupuytren's contracture	Reduction of plaque size in palmar fascia with increased range of finger motion
Total	

This in turn was followed by numerous 1967 studies. The largest of which found:

	No. of Cases	Partial Remission of Symptoms	Complete Remission of Symptoms	Failures
Acute disorders	1025	279 = 27.2%	609 = 59.4%	137 = 13.4%
Chronic disorders	3155	1088 = 34.5%	1572 = 49.8%	495 = 15.7%
Total	4180			

Some of those disorders included:

TABLE 3
CLINICAL EFFECT OF DMSO: TRAUMATIC INJURIES (732 CASES)

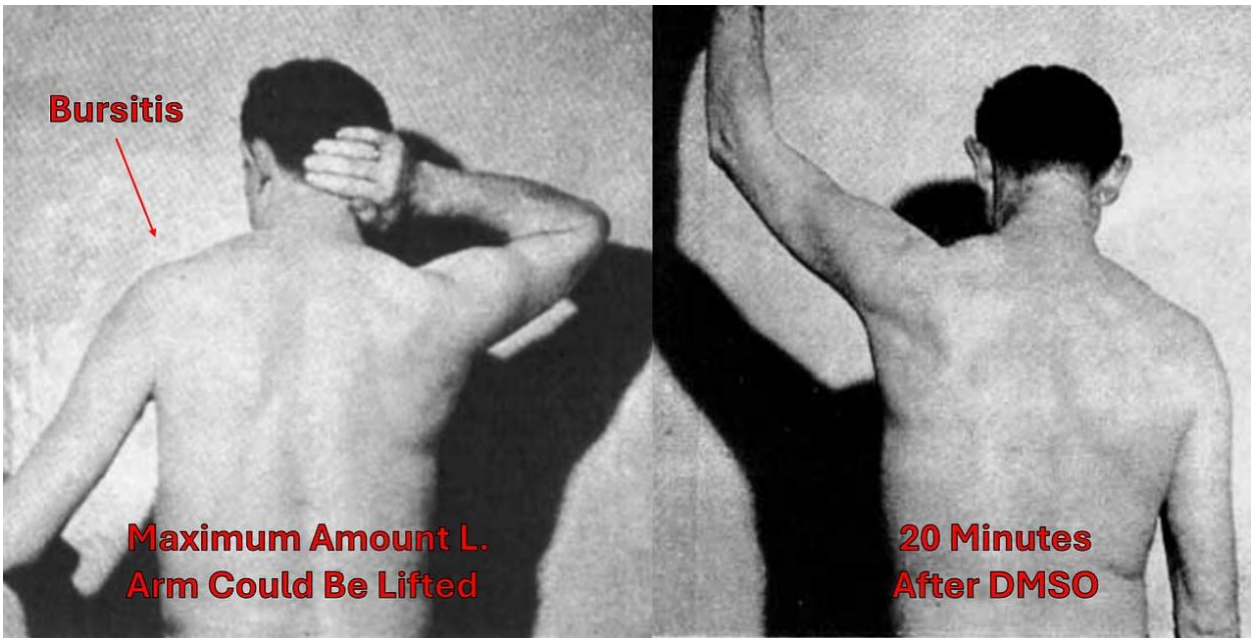
Type of Injury	No. of Cases	Partial Remission of Symptoms	Complete Remission of Symptoms	Failures
Sprains, strains, contusions	479	95	325	59
Fractures (postoperative treatment)	147	39	88	20
Meniscus injuries	39	10	21	8
Burns (grades 1,2)	4	—	3	1
Posttraumatic and post-operative pain	63	14	36	13
		21.6%	64.6%	13.8%

TABLE 4
CLINICAL EFFECT OF DMSO: ACUTE AND CHRONIC MUSCULOSKELETAL DISORDERS (3321 CASES)

	No. of Cases	Maximum Period of Treatment (Months)	Partial Remission of Symptoms	Complete Remission of Symptoms	Failures
1. Bursitis, periarthritis (1075)					
a) acute	293	1	121	136	36
b) chronic	782	3	321	345	116
2. Periostitis, epicondylitis Tendinitis	409	2	111	238	60
3. Osteoarthritis (1641)					
a) spine	896	2	253	539	104
b) hip	104	6	52	28	24
c) knee	497	6	202	215	80
d) small joints	144	3	46	69	29
4. Rheumatoid arthritis (grades 1, 2)	177	6	68	74	35
5. Gouty arthritis	19	2	3	16	—
			35.4%	50.0%	14.6%

Note: this study also included x-ray images of painful calcifications at the trochanteric bursa, supraspinatus attachment and greater tuberosity disappearing from DMSO. However, while DMSO has often been observed to eliminate calcifications, other therapies (e.g., neural therapy) are sometimes also required to accomplish this.

In that study, many of the results were immediate and dramatic. For example, this was one bursitis patient:



Rapid improvement of subacromial bursitis is frequently reported after DMSO.

Note: in another 1964 study, 22 out of 25 patients with subacromial bursitis experienced a rapid improvement within 30 minutes of DMSO, while in chronic cases 32 of 40 patients improved, but in many cases 3 months of treatment were required for improvement. Additionally, in some patients, a reduction in calcium deposits was also noted.

Another 1967 study found:

Condition	Total Number of Patients	Excellent	Good	No Benefit	Delayed Action
1. Acute Injuries					
a) Athletes	23	16	6	1	4
b) Nonathletes	19	14	4	1	0
2. Osteoarthritis of peripheral joints (excluding shoulder)	21	5	9	7	6
3. Rheumatoid Arthritis	3	3	0	0	3
4. Inflammatory Shoulder Disease					
a) Acute	55	2	2	1	1
b) Chronic	18	12	5	1	8
5. Gout:					
a) Acute, first attack	4	4	0	0	0
b) Recurrent acute	2	0	2	0	0
6. Degenerative lumbar disc disease					
a) First attack	13	10	2	1	4
b) Recurrent	12	6	3	3	3
7. Degenerative Cervical Disc Disease (including one acute whiplash injury)	16	6	4	6	7
8. Varicose Veins	22	13	8	1	7
9. Sinusitis					
a) Acute	7	6	1	0	0
b) Chronic	5	1	2	2	0
10. Thrombophlebitis					
a) Acute	3	3	0	0	0
b) Chronic	1	0	1	0	1
11. Miscellaneous	6	0	3	3	2
Total	180	101	52	27	46
Percentages	-	56.1%	28.3%	15%	25.6%

Note: a key point these researchers emphasized was 25.6% of their patients, particularly the chronic ones, had a delayed response to DMSO (which is important to recognize as in chronic conditions DMSO can initially appear to not be doing anything). These researchers hypothesized this may have been due to them giving DMSO 1-2 times a week rather than 1-2 times a day.

•Another 1967 study also had similar results:

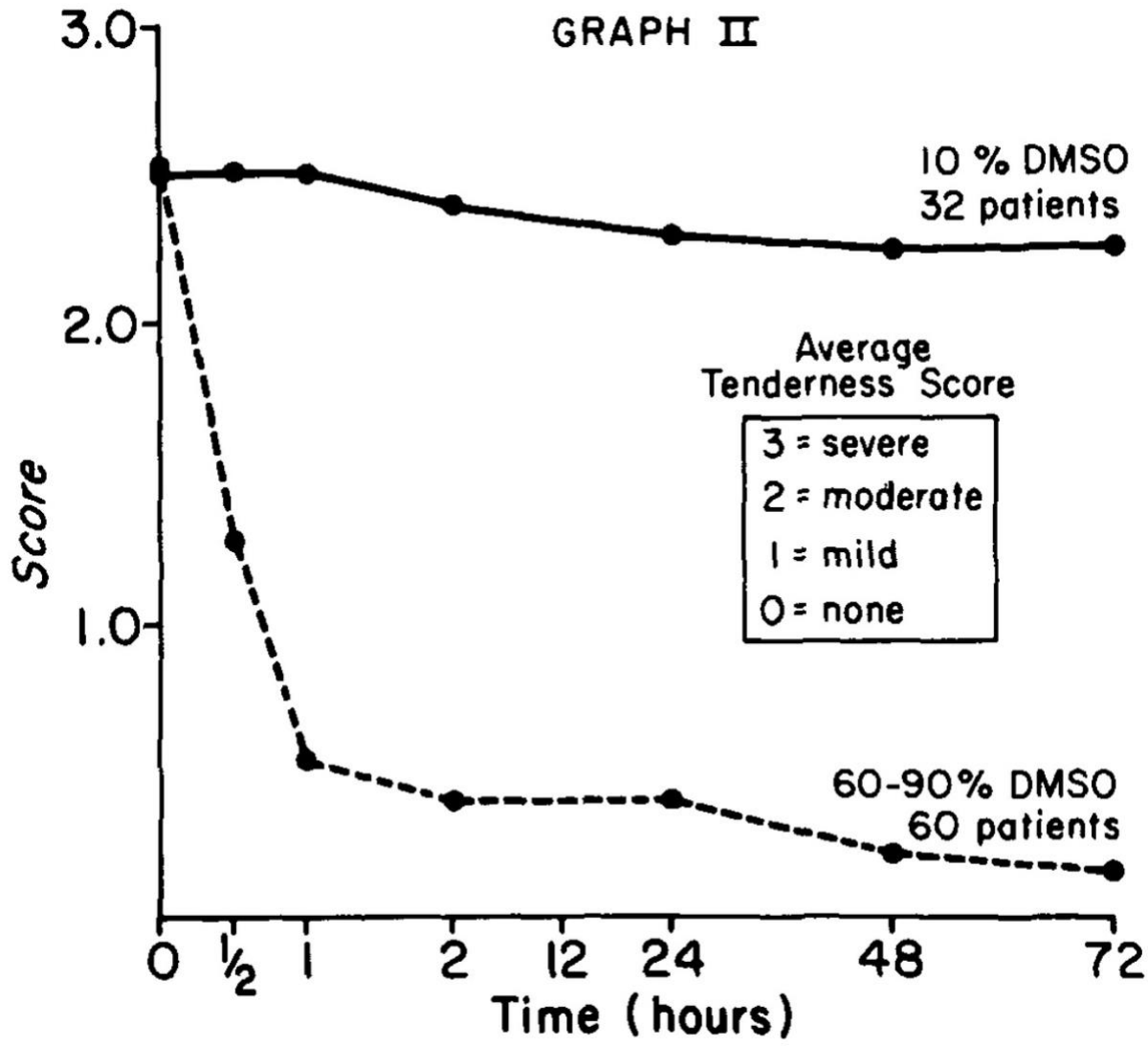
TABLE 2
MUSCULOSKELETAL DISORDERS

Diagnosis	No. of Patients Treated		Ages	Duration	Results			Side Effects	
	Male	Female			Poor	Good	Excellent	Mild	Severe
A. Chronic back pain	6	11	37-73	2days-8mo	4	9	4	3	5
B. Acute musculoskeletal injuries and pains	15	14	17-89	2days-8mo	6	11	12	5	8
C. Fractures	2	5	40-85	5days-1mo	0	3	4	2	0
D. Joint disorders									
Shoulder—acute	5	9	43-72	2days-2mo	2	1	11	1	3
Shoulder—chronic	5	8	37-68	2days-7mo	8	5	0	4	3
Elbow	7	3	35-58	2days-2mo	5	3	2	4	1
Knee, ankle, foot, hand	11	13	22-78	3days-8mo	4	10	10	9	2
Gout	3	2	47-62	1 wk-3 mo	1	2	2	1	0
Dupuytrens	3	0	46-75	2 mo-4 mo	2	1	0	2	0
Total	57	65			32	45	45	31	22

•A 1967 blinded study for acute musculoskeletal disorders, using 10% DMSO gel as a "placebo" found:

Strength	No. Cases	Results								DiC'd Side Effects	
		Excellent		Good		Fair		None			
		No.	%	No.	%	No.	%	No.	%	No.	%
90% gel	9	7	78	1	11	0	0	1	11	1	11
70% gel	60	48	80	5	8	2	3	5	8	3	5
70% sol'n	118	86	73	14	12	2	2	16	13	8	7

Strength	No. Cases	Results								DiC'd Side Effects	
		Excellent		Good		Fair		None			
		No.	%	No.	%	No.	%	No.	%	No.	%
90% sol'n	12	7	59	3	25	0	0	2	16	4	33
80% sol'n	18	14	80	1	5	3	15	0	0	0	0
70% sol'n	12	9	75	0	0	0	0	3	25	1	8
60% sol'n	18	15	83	2	11	0	0	1	6	0	0
10% sol'n	32	0	0	0	0	6	19	26	81	0	0



In that study, its author (a former president of the Aerospace Medical Association) remarked:

I am convinced that topical application of DMSO in the treatment of acute musculoskeletal conditions is a striking and significant therapeutic contribution. During the period of time I conducted clinical investigation with this medication, I practically discarded physical therapy as treatment for musculoskeletal problems because the rehabilitation of my patients was so prompt with DMSO. There was little or no necessity to prescribe narcotics and

tranquilizers since pain was promptly mitigated following topical application of DMSO.

He then conducted a follow-up double-blind study (using either 80% or 10% DMSO gel) on patients with sprains, strains, bursitis, or tendinitis. The study found that the active treatment had significantly better results than the placebo and significantly reduced the time patients lost from work.

Note: a 1969 study treated rheumatoid arthritis with 10% DMSO and found no benefit from that dose.

•Another 1967 study found:

Diagnosis	Favorable Response	Failure	Total Cases	% Responding favorably
Acute injury	43	10	53	81.1
Osteoarthritis	128	24	152	84.1
Rheum. Arthritis	28	8	36	77.7
Tendonitis Peritendonitis	47	3	50	94.0
Acute neuritis	30	4	34	88.2
Synovitis and Tenosynovitis	22	3	25	88.0
Discogenic Disease	9	9	18	50.0
Miscellaneous	98	34	132	74.2
Total	405	95	500	79.0%

Note: to save space, I listed the miscellaneous conditions treated in this study by DMSO (e.g., 19 cases of sciatica, 6 cases of coccydynia, and 2 cases of lupus) here.

•Another 1967 study found:

Condition	Total	Improved
Degenerative arthritis (osteoarthritis)	41	34 (lasted several days)
Rheumatoid arthritis	27	23 (temporary)
Periarthritis (frozen shoulder)	7	7 (temporary)
Acute supraspinatis bursitis	6	6 ("spectacular")
Psychosomatic pain	5	0 (cause of pain indeterminate)
Acute trauma (Buffalo Bills Football Team Athletes)	8	8 (halved recovery time)
Epicondylitis	4	3 (one stopped DMSO)
Diabetic neuritis	1	?
Postsurgical pain following removal palmar fascia (for Dupuytren contracture)	1	1 (no other treatment worked)
Tendinitis of palm	1	?
DeQuervains syndrome	1	?
Peripheral vascular disease	1	?
	103	

The "?" were not described in the study

Note: another study gave PT and 70% DMSO to 7 people with frozen shoulders, 4 of whom had excellent pain relief and improved motion. Other investigators also found that frozen shoulders respond to DMSO but can require anywhere from 5 to 24 applications (and sometimes more).

•A 1994 blinded study gave 157 patients with acute tendinopathies (e.g., tennis elbow) 10% DMSO gel or a placebo ointment three times a day for 14 days within 3 days of symptoms starting. Pain of movement under loading and the mobility of the joints were significantly improved after, respectively, 3 and 7 days of treatment with DMSO, as compared with placebo. After 14 days on DMSO, a further improvement was observed, and 44% of the patients were pain-free (placebo 9%).

Note: DMSO has also been found to be effective for carpal tunnel syndrome (and other hand issues like trigger fingers), but while I know many people who've observed this (such as this author) to my knowledge no formal studies have been conducted on this application. For those struggling with carpal tunnel syndrome, I discussed our approaches to the disorder here.

•Finally, a 1967 analysis of 76 studies using topically applied (90%) DMSO for musculoskeletal conditions found 72% improved. Specifically:

TABLE 4
INVESTIGATOR'S EVALUATION OF OVERALL THERAPEUTIC RESULT

Therapeutic Result	Percent of Total Patients	
	Acute	Chronic
Excellent	46.4	24.2
Good	26.0	27.6
Fair	12.2	16.0
Poor	14.9	31.7
Blank*	0.5	0.5
Total	100.0	100.0
Total Patients	1,068	848

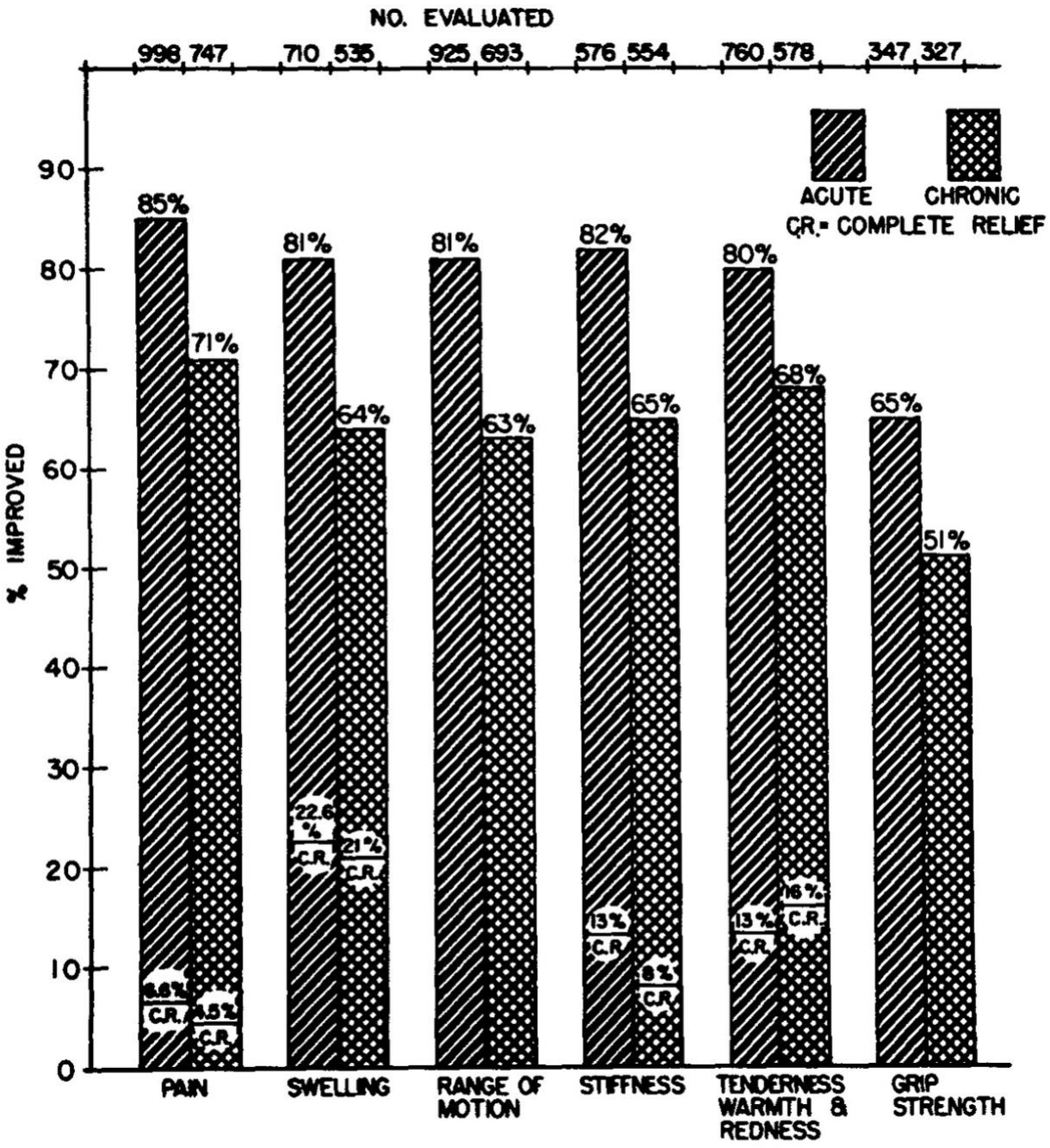

NO. EVALUATED
998 747
710 535
925 693
576 554
760 578
347 327
ACUTE
CHRONIC
C.R.= COMPLETE RELIEF
% IMPROVED
0
10
20
30
40
50
60
70
80
90
85%
71%
81%
64%
81%
63%
82%
65%
80%
68%
65%
51%
6.6% C.R.
6.5% C.R.
22.6% C.R.
21% C.R.
13% C.R.
8% C.R.
13% C.R.
16% C.R.
PAIN
SWELLING
RANGE OF MOTION
STIFFNESS
TENDERNESS WARMTH & REDNESS
GRIP STRENGTH

TABLE 5
THERAPEUTIC RESULTS IN SPECIFIC DISORDERS

Condition	Number of Patients	Response			
		Excellent	Good	Fair	Poor
Bursitis					
acute	183	48%	25%	12%	15%
chronic	141	31	26	20	23
Sprain	223	53	30	9	8
Strain	145	39	28	14	19
Myositis	99	45	28	12	15
Rheumatoid arthritis	76	20	30	16	34

The review also included 102 Traumas (contusion, fracture, etc.), 29 Tenosynovitis, 27 of Neuritis, 20 of Muscle spasms, 20 unspecified types of arthritis, and 220 miscellaneous issues (e.g., fibrositis, epicondylitis, synovitis, calcific tendinitis).

To quote the authors:

It is difficult to declare that a drug has efficacy on the basis of uncontrolled studies in a heterogeneous group of diseases. However, from these data and from discussions with many of our investigators, we feel that DMSO is a unique and effective agent for the treatment of many acute musculoskeletal disorders. Beneficial results are unpredictable, but they occur frequently and are sometimes dramatic, particularly in acute conditions, which require low doses and short treatment periods. In chronic conditions, improvement occurs at a lower rate and is less dramatic. The usual dose was only **0.1-0.2** ml/ kg/day.

Finally, at a symposium on DMSO, data on 9,521 patients were presented which showed DMSO was effective therapy in a wide variety of acute traumatic conditions, in acute and chronic subacromial bursitis, ostecarthritis, gouty arthritis, and in some patients with rheumatoid arthritis (along with other conditions such as early Dupuytren’s contracture).

Note: in addition to two of the previously mentioned studies showing the majority of patients with gout responded to DMSO, a later 1981 study also found DMSO was superior to indomethacin in the treatment of gout.

Rheumatoid Arthritis Studies

In the above results, one of the conditions which consistently improved was rheumatoid arthritis (RA). Since RA remains a common but challenging condition and a significant area of research, studies were conducted that focused on RA, all of which found significant benefit from DMSO. They are as follows:

•A 1983 study of 70 adults with RA and 35 children with juvenile arthritis:

Treatment	Pain		Joint Index		Change in the Circumference of Interphalangeal Joints*	Grip Strength†	
	Before	After	Before	After		Before	After
Applications of DMSO + heparin ($N = 17$)	1.7 (0.19)	0.81 (0.2)	9.37 (1.04)	6.75 (0.83)	3.40 (0.50)	116.50 (21.90)	171.80 (20.10)
	‡$p < 0.01$		N.S.		‡$p < 0.05$	N.S.	
DMSO applications only ($N = 17$)	1.67 (0.22)	1.17 (0.22)	8.56 (1.0)	7.17 (0.91)	1.50 (0.8)	100.90 (19.80)	134.30 (19.30)
	‡$p < 0.05$		N.S.		N.S.	N.S.	
DMSO ointment + ultrasonics (0.4 Wt/cm^2) ($N = 10$)	1.75 (0.25)	0.75 (0.25)	6.0 (0.65)	4.75 (0.7)	2.66 (1.0)	117.4 (21.6)	149.2 (24.9)
	$p < 0.01$		N.S.		N.S.	N.S.	
DMSO ointment + ultrasonics (zero capacitance) ($N = 10$)	1.50 (0.26)	0.87 (0.22)	6.20 (0.74)	5.50 (0.70)	1.77 (0.74)	122.30 (26.20)	124.60 (27.90)
	N.S.		N.S.		N.S.	N.S.	

	Pain		Joint Index		Reduction of Circumference of Proximal Interphalangeal Joints	
	Before	After	Before	After		
DMSO: butadion gel $N = 20$	1.11 (0.19)	0.39 (0.14)	10.75 (1.44)	6.87 (1.20)	42.36 (8.33)	5.44 (0.80)
	$p < 0.01$		$p < 0.05$		$p < 0.05$	

30-40% DMSO + Heparin given to 35 children aged 5-13 with chronic arthritis

Criteria of Efficacy Evaluation	Basic Group	
	Before	After
Pain in joints (0–5) scale)	5.0 (2.1)	1.2 (0.8)
	$p < 0.1$	
Changes in circumference of joints (cm)	30.5 (2.0)	25.6 (4.3)
	$p > 0.5$	
Range of articular motion (degrees)	86.0 (7.2)	133.0 (4.8)
	$p < 0.01$	
Articular index (points)	7.8 (0.6)	3.1 (0.2)
	$p < 0.01$	

Additionally, 20 patients with flexion contractures received topical DMSO mixed with hydrocortisone, and after 5-6 applications, the range of joint motion increased by 15-20 degrees, and after 10-12, 95% had it increased by 20-30 degrees (with no relapses a month later).

•A 1965 study of 150 patients with RA treated for 10 months several times daily with 60% to 90% DMSO found diminished pain and increased range of motion were noted in 75% of milder cases and 44% of more severe cases.

•A 1967 study of 318 patients with RA who received 90% topical DMSO, 50% topical DMSO, or placebo found that DMSO had a much greater benefit that placebo. Depending on the dose, the following occurred in the 248 who were available for analysis:

	Total	Slightly Improved	Significantly Improved or Complete Recovery	No Improvement
Men (all severities)	55	28.6-37.5%	37.5-61.9%	9.5-25%
Women (Stage I or II)	117	39.0-41.0%	43.6-48.8%	12.2-15.4%
Women (Stage III or IV)	102	56.8-60.0%	15.9-22.9%	17.1-27.3%

With the following specific improvements being observed:

	Improved	Unchanged	Aggravated
Spontaneous Pain	63.9-91.9%	0-24.6%	8.1-11.5%
Tenderness to Pressure	76.9-81.8%	18.2-23.1%	0%
Range of Elbow and Wrist Flexion or Extension	61.9-67.2%	13.4%-16.7%	19.4-21.4%
Range of Elbow and Wrist Pronation or Supination	25.0-65.7%	22.9-62.5%	11.4-12.5%

Note: grip strength was found to have a 13.60—14.72mmHg improvement.

•A 1967 study which included 177 patients with early RA found DMSO caused a complete remission in 74, a partial remission in 68, and 35 did not respond to treatment.

•A 1968 study gave 85% DMSO alone or in combination with hydrocortisone, procaine, or “edan” to 76 patients with rheumatic diseases, inflammation of the nerve roots or spinal disc problems (whereas controls received 1% DMSO). DMSO was observed to improve symptoms as early as an hour after treatment (with the greatest improvement happening after 3 hours) and in some cases the pain disappeared completely. In all cases, DMSO was superior to conventional therapy and was more efficacious when combined with the other therapies.

Finally, within 1 week of treatment, improvement was seen in 5 out of 8 rheumatoid patients, 17 of 20 patients with inflamed nerve roots and 8 out of 10 with disc pain.

•A 1979 study treated 343 arthritic patients (320 with RA and 23 with deforming arthritis). Of them, 145 received 50-70% DMSO (applied topically to site of joint inflammation), 85 received DMSO plus an unspecified "analgin" (pain killer), 50 received DMSO plus heparin, and 25 received DMSO plus sodium salicylate (a compound similar to aspirin), and additionally, some of the more challenging cases also received cortisone injections. In the DMSO only group, 64% had significant improvement, 19% had insignificant improvement, 15% had no benefit and 2% worsened. When DMSO was used in combination with the other therapies, it enhanced their efficacy and lowered their required dose. No issues arose from combining it with the other therapies and only 3.2% of the 343 patients had adverse effects (which were primarily skin irritation).

•A 1988 study treated 75 RA patients with a variety of therapies, and found that DMSO significantly improved a variety of parameters of the condition.

•A 1989 study injected 20% DMSO plus hydrocortisone into the knees of 25 children (aged 4-15 years) with juvenile rheumatoid arthritis and found all signs of inflammation subsided, the joint function was restored and there were no untoward reactions.

•A 1991 study found DMSO in conjunction with copper ions (generated by electrical currents) was a safe and effective treatment for RA.
Note: another Russian study found that DMSO combined with Dopan (a form of dopamine) was an effective RA treatment (which has some basis as dopamine agonists have shown promise for treating RA).

•Finally, this book discussed a Brazilian study (I could not locate) where 15 RA patients and 15 OA patients received an IVs of DMSO (5ml), a B-complex, vitamin C and magnesium sulfate 2 times a week for 5 weeks and then once a month for 18 months. This caused an immediate 66% decrease in free radical production (and a longterm 52% reduction), and created a lasting clinical

improvement in over 85% of the patients with OA and 77% of the patients with rheumatoid arthritis.
Note: DMSO has also been used in combination with decimeter-wave and mud therapy to treat OA.

To put this into context, consider the story of Patricia McClenathan, a 39-year old New Yorker who had been receiving treatment for the last six years from rheumatologists for spondylitis (inflammation of the spinal joints) that left her with deep pain, a loss of mobility, and a variety of severe side effects from the drugs and procedures she had received that could only reduce her pain. As time went on, her condition continued to worsen (e.g., her discs ruptured) she become bed bound and fell into a deep depression. A relative then suggested DMSO (as DMSO had recently been legalized in Florida) and having no other options, she flew to Florida for daily IV DMSO sessions, and by the third day experienced a profound improvement (and a complete improvement on day 5).

Since taking DMSO, I am now a functioning person where previously I had not been, spending much of the time in bed accomplishing nothing. I can do most normal things now by relying on DMSO. At this time [January 7, 1981], I take no painkillers or muscle relaxants [both used quite heavily before] and find for this reason I can cope with everything very well. I am finally physically, mentally, and emotionally much better and attribute this to DMSO. I feel that the problems the DMSO has caused are by far outweighed by the new life it has given me—a life other than just surviving in constant pain. Again, I thank you.

Likewise, consider Ruth Lewis:

When I entered the doctor's office for DMSO treatment, I was unable to put both feet on the ground. After two-and-a-half weeks of IV DMSO treatment I walked out of that office without any help whatsoever—no cane—no support at all. I had not been able to close my right hand completely for over a year. It even kept me awake at night with severe pain. But after the IV, topical, and oral DMSO treatment, I can now close my hand tightly. The arthritis has not returned.

I cannot put into words what this drug has done for me. I highly recommend it. I saw many people come and go during my clinic stay; all walked out well.

Or this testimony sent to the Congressional Committee from a woman who shocked her Orthopedist after DMSO regenerated a “rotted” femur (which had previously caused the orthopedist to believe there was nothing that could be done for her as it made a hip replacement surgery impossible):

I was one of the people who was suffering needlessly and spending large sums of money on useless medical treatment when I was introduced to DMSO 16 years ago. I had severe bursitis in my right shoulder, painful arthritis in my right knee from an old injury, and a degenerative left hip joint. Sleep and rest were something I had not known for many weeks when a friend who had been an arthritic invalid, gave me about 2 tablespoons of DMSO. I applied this to my shoulder twice one evening and fell into a 12 hour restful sleep. I awakened cured!

Countless stories like this exist (which, due to length considerations I did not list), and in many cases encapsulate the “excellent” responses to DMSO many of the previous researchers listed (and discussed in their articles). That in short is why there was so much public and professional pushback against the FDA’s prohibition of DMSO.

I can actually swear and take an oath that relieved all my pains through my legs and has helped me maintain my job. am a waitress and all my work depends on my feet feeling good. This drug should be available. I can’t understand why people have to suffer, when we all can live and work a normal life with this drug available. It's not fair for parts of Europe and Greece, etc., to have it only. The average person can’t take the time or expense to travel where its legal to get DMSO. Please help get the FDA to legalize it.

Lastly, many patients find taking DMSO allows them to significantly lower the doses of their existing arthritis medicines (which is often quite helpful as their toxicity worsens with increasing doses).

Note: many patients with arthritis also experience positive results from MSM (DMSO's primary breakdown product in the body) or soaking in sulfur containing hot springs.

Sports Injuries

What I like about DMSO is that you don't have to interrupt your training every time you get a minor pull or sprain. It doesn't pump you up like certain pills. It's simply a very useful thing to use for simple athletic injuries. Some people have told me that you shouldn't use it because it might mask the pain of a serious injury, but a good athlete knows his body well. Even when I'm using DMSO, I know when I can push and when I can't. —Al Oerter, a discus thrower and the first American to win 4 consecutive Olympic gold medals.

One of the greatest challenges professional athletes face are sports injuries which prevent them from returning to the field, particularly since many sports injuries are a product of micro-injuries building up until a critical point is passed (e.g., from adhesions and scars in the soft tissue). In turn, since DMSO both heals micro-injuries and rapidly treats traumatic injury (returning them to full functionality), DMSO was rapidly adopted by professional athletes once they realized what it could do for their careers (and being off the field was often devastating to their careers). In turn, due to the voice their position afforded them, a few professional athletes (e.g., Atlanta Falcons Quarterback June Jones—who now is a coach) became some of the most impactful advocates for DMSO (e.g., Jones stated in Congressional testimony that "veterinary" DMSO was widely used but athletes were afraid of publicly discussing it).

Likewise, in 2013, a Dallas Cowboys Lineman stated:

You get it [from] the veterinarian and it goes right to the bloodstream. It's an ointment that's like anti-inflammatory. You put it on your skin and you put it on a muscle, and I guarantee you, in about 30 minutes you'd feel it. It wasn't on the list [of banned substances]…we used DMSO and people knew it. Everyone knew about it.

Furthermore, in his riveting testimony, Jones provided cases that left the Congressmen in disbelief, such as a teammate with a bone chip and a torn ligament (which would require months of recovery and hence end their season) taking DMSO immediately after the injury and 7 or 8 days later returning to the field (with the bone chip remaining but no longer causing issues).

Likewise, at that Congressional hearing, the former team physician for the Oakland Raiders testified that he'd used 70% topical DMSO on a careful and controlled basis for his players 20-30 times a year for 5 years. From this, he observed that DMSO was the most beneficial when given in the first 3 to 4 days of an acute injury where a muscle or joint had severe swelling, particularly of the extremities, especially the ankle, elbow, hands, or wrist. Overall, he stated that DMSO provided good to excellent results 70-80% of the time (e.g., through reduced pain and swelling) and the players felt they were able to return to play 50-75% faster than they had from similar injuries in the past. Conversely, they did not find DMSO was helpful for chronic injuries, but this may have been due to it not being used long enough for the effects to kick in.

Note: he also emphasized that DMSO would transform the field of occupational medicine. I fully agree with his assessment, especially given just how frequently Worker's Comp fails to help its patients.

Similarly, podiatrist Lowell Scott Weil (who was the physician for both the Chicago Bears and the United States Olympic gymnastics team) uses DMSO on a regular basis (particularly injured gymnasts). After 12 years of using it, he shared, he'd seen it rapidly heal injuries (e.g., he had a gymnast who suffered an ankle sprain expected to end her season, but instead her rapid recovery allowed her to make the US Olympic team, and a Football player who tore his hamstring but was able to rapidly return to the field). Overall, he had a 60% treatment success rate and saw the best response to DMSO for tendinitis, myositis, and post-injury situations such as muscle pulls, ankle sprains, strains, and tears of the soft tissue (and conversely the only side effects he had were skin irritation). Additionally, he also used it for arthritic patients (especially rheumatoid arthritis) with many having dramatic relief.

Many other compelling anecdotes exist. For example, this book discusses the experience of an Oregon State track coach and early adopter of DMSO who had many amazing stories of DMSO treating hamstring and achilles tendon injuries such as an athlete being able to return to the field at full capacity 3 days after a normally disqualifying hamstring injury and the story of a **blind** long distance runner who was able to run due to DMSO fixing musculoskeletal injuries and (according to the author) then played a pivotal role in opening the sport to women.

Note: a major problem in certain sports like football is repeated concussions (which are now recognized to put them at risk for cognitive impairment and dementia later in life). As discussed in the first part of this series, DMSO is immensely helpful for mitigating the effects of concussions.

In addition to these anecdotes and studies of DMSO's utility in other musculoskeletal injuries, research also directly corroborates its value in sports medicine.

•A 1965 study treated 47 injured athletes from a wide range of sports (e.g., tennis, diving, or wrestling) by applying 90% DMSO applied to the injured areas 3 times a day initially and then after 2 days, twice a day. The group was comprised of 30 acute injuries (e.g., sprains, strains, dislocations, serious cuts) 7 syndromes that follow long immobilization for broken bones, and 10 chronic conditions (e.g., tennis elbow) resulting from repetitive "microtraumas." The acute traumas were observed to rapidly resolve, sometimes "so spectacularly as to compel us to urge our patients to observe greatest caution in order to avoid further damage to a joint," while the chronic conditions and syndromes also responded rapidly and those athletes were often able to quickly return to the field. These results and the lack of observed adverse events led the investigators to argue DMSO urgently needed to become the standard of care in sports medicine.

•A 1967 paper discussed 8 players of the Buffalo Bills Football Team who were treated with DMSO for injuries during the 1964 season and in each case, the

player returned to full duty 50% sooner than he would with other forms of therapy. These injuries included severe muscular contraction of the adduction thigh muscles, acutely strained sternomastoid muscle, acute sprain of sternoclavicular joint and another with acute sprain of medial collateral ligaments of the knee.

•A study of 78 patients (mostly athletes) with overstrained tendons received Dolobene gel (15% DMSO, dexpanthenol and heparin) for 2-3 weeks, with over 50% having a significant improvement of symptoms and those improvements including a 94% improvement in pain, a 55% improvement of swelling, 95% improvement of redness and 92% improvement of warmth.

•A study gave Dolobene gel to 30 athletes with soft tissue injuries of the upper and lower extremities twice daily for 4 weeks. There were 4 athletes with contusion of the shoulder, 8 with distortion and contusion of the knee joint, 8 with muscle, tendon and ligament lesions, and 10 with distortion of the ankle joint. Following DMSO, 10 had an excellent response (improvement), 5 had a excellent to good response, 10 had a good response and 5 had a moderate response. Specifically, pain, inflammation, swelling, reabsorption of hematomas, tenderness and recovery time were assessed.

•A study gave Dolobene gel and ultrasound to 15 subjects who had received a blunt tissue trauma (without fracture) to the lower extremity within the last 24 hours. Compared to 15 placebos, the treatment resulted in a faster relief of pain, reduction of edema, and recovery of mobility.

•A 1966 study of 28 professional baseball players found that giving them DMSO after injuries caused their downtime be one third of what was observed by the treating physician in the previous year with 42 players.

Note: While not quite the same as getting tackled, I've also come across cases of individuals taking DMSO immediately after getting hit by a car while crossing the street (which caused injuries but no fractures) and immediately fully recovering.

Additionally, a veterinary practice using 90% DMSO reported that in 10 dogs with ruptures of the ACL (anterior cruciate ligament), after surgical repair, DMSO halved their recovery time with edema disappearing promptly and much less analgesia or sedation being required. Additionally, they cited the cases of:
•A large German shepherd that was run over by a truck (sustaining multiple fractures of the femur and tibia, with extensive tissue bruising), where DMSO facilitated a rapid post surgical recovery.
•Two cases where the swelling and sensitivity around prosthetic implants was markedly reduced by DMSO.
•A racing greyhound who sustained severe tendinitis above the tarsal joint (an injury where they are rarely are able to retain their former speed) who received DMSO after 60 days of non-recovery, rapidly improved, and after a few months won two races and before long established two new track records.

Horse Studies

As DMSO is widely used in veterinary medicine, a wealth of research shows it treats musculoskeletal conditions (and likewise it is approved to treat those conditions). As there are too many too list, in the spirit of the FDA's war against ivermectin, I wanted to share a few horse ones:

In horses, after over 50 cases of bursitis or synovitis were treated with DMSO, in almost 90% of cases, there was at least "some improvement" and often a "complete return to normal," in 65 cases of osteoarthritis and periostitis, 60% had a clinical improvement, in 20 cases of metacarpal periostitis ("bucked shin''), 90% had a "quick relief," and in 22 cases of tendinitis (bowed tendon), there was a therapeutic response superior to any existing therapy.

Likewise, another team of researchers found 90% of horses with bursitis or synovitis (totaling 50 horses) improved from DMSO (with many fully recovering), out of 65 horses with osteoarthritis and periostitis (involving the carpus and the fetlock joints), 60% improved with DMSO (many of whom had not responded to other treatments for months), including quick relief 90% of those with bucked shin (an otherwise challenging condition) that was sustained

if followed by a period of rest. Additionally, 22 cases of tendonitis (bowed tendon) improved with DMSO, and 14 traumatic injuries (involving subcutaneous edema and hemorrhage) had a remarkable response to treatment.

Thirteen horses had two of their tibiotarsal joints injected with LPS to induce inflammation in them and DMSO (unlike the other interventions tried) was found to reduce the inflammation in their joints.

Other Datasets

The following datasets also deserve mention:

1. On September 8, Merck Sharp & Dohme Laboratories sent out to all investigators under their auspices an advisory memorandum on the emerging role of DMSO in experimental medicine. It stated based on their data from 4000 patients (who had taken DMSO for up to a month) that DMSO was safe and had shown merit for many of ailments including many of the conditions discussed here. For those conditions listed here, it stated:

•Acute Inflammatory or Traumatic Situations—Some pain relief usually occurs within one hour. At 2 hours the pain is usually reduced by at least 50%. Continue for 3 to 7 days to assure that the condition does not recur.

•Chronic Conditions—Response has usually been slower and the pain relief from a single or a few applications may be transient. A significant response may not be obtained until after 4 to 12 weeks of daily administration.

•Acute bursitis—Merck's largest clinical trials were for this and in the majority of patients, decreased pain and increased range of motion was observed in about 30 to 60 minutes, lasts for lasts 2 to 6 hours, and typically is less severe once in returns.

•Acute low back strains—In the majority of patients decreased pain and increased range of motion has been observed in 30-60 minutes and in some cases a spectacular improvement in pain in observed.

•Acute injuries (e.g., strains, sprains, contusions, athletic injuries, industrial injuries and other traumatic situations)—These typically responded quite dramatically to DMSO. However, since DMSO has masked a few fractures, x-ray diagnosis was advised in most cases.

•Acute neck strains (whiplash)—Wide area of application has given good results.

•Osteoarthritis—DMSO applied to osteoarthritis of the knees has produced a favorable response after 4 to 6 weeks of daily administration. Transient relief may occur before this time. Increased mobility and general ability to walk and perform tasks without pain has been remarkable in some cases.

•Rheumatoid arthritis—DMSO seems less effective here than in certain other diseases. Grades 3 and 4 responded only partially after prolonged administration.

•Neuralgias and pain syndromes—A wide variety of pain syndromes have responded to DMSO. In tic douloureux or trigeminal neuralgia, some but not all patients have obtained benefit. Treatment must be long-term. The pain relief may not be permanent. Herpes Zoster has responded most favorably.

•Gout—There have been a few cases of dramatic relief of pain and general improvement.

•Surgery—After thoracotomies, cholecystectomies and hemorrhoidectomies, 5 to 15 cc. dose 3-4 times/day, results have been very good.

2. Podiatrist Morton Walker was selected as a clinical investigator for Merck and using an innovative technique to drive topically applied DMSO into the target treatment area (which to my knowledge no one else has utilized) and

found DMSO:

•Was highly effective for acute bunions (and the bursitis they caused) but not effective for the chronic bunions which followed the acute stage.

•Temporarily (typically few a few days) eliminated the pain from hammertoes, ingrown toenails, hard corns and soft corns.

•Eliminated the pain while followed the removal of many foot skin conditions (e.g., after a shaving).

•Is very helpful in the management of overgrown (club) toenails. For example, applying DMSO mixed with olive oil or castor oil makes it much easier to remove them and prevent them from regrowing.

Note: DMSO when combined in low doses with 5-fluorouracil has been found to be highly effective for treating psoriatic nails (onychodystrophy), which otherwise is a challenging condition to treat.

•Was excellent for arithritis of the foot and ankle, particularly the toes.

•Is often very helpful for Morton's neuromas, dancer's foot (sesamoiditis) and heel spurs.

•Could help in the treatment of flat feet (by removing inflammation and helping to heal damaged ligaments and muscles).

•When combined with an antifungal agent (which DMSO brings into the skin) is very helpful for fungal infections of the feet and toe nails.
Note: research has subsequently confirmed Walker's discovery. However it is important to remember that nails are one of the only tissues DMSO cannot effectively penetrate so DMSO must also be applied to the surrounding skin.

•Is very helpful for sprain ankles.
Note: this is one of the most common things DMSO is used for (as it works). Because of how rapidly it removes pain and inflammation, many worry the individual no longer guarding the ankle will predispose it to further injury (and hence strongly urge the patient to remain cautious with how they walk after the treatment), but in real life, a re-injury occurring is not reported to be an issue.

•Soaking in 50% DMSO effectively eliminates foot odor—however this is not always helpful since taking DMSO can cause its characteristic side effect (a garlicy odor).

Sadly however, after Morton Walker had tested DMSO on 124 people with excellent results, the FDA banned all research into DMSO and Merck immediately confiscated his records (which were subsequently never published).

Note: another author reported he finds 60-75% DMSO is very helpful for blisters and calluses, as it both softens the skin and dries the blisters out and 75% topical DMSO will gradually shrink Baker's cysts (which form in the knees).

3. Clinical studies done for Syntex Laboratories in the early 1960s by Dr. Arthur Steinberg showed that chronic arthritis patients given topical DMSO applications four times daily experienced pain relief in about 84 percent of cases, and also demonstrated increased mobility and decreased swelling in the inflamed joint. Steinberg found that when DMSO therapy was discontinued, the swelling returned. His study also showed that rheumatoid arthritis patients experienced subjective pain relief from DMSO about 77 percent of the time, and, like Drs. John and Laudahn, he reported that several patients got relief from a combination of DMSO with a reduced dosage of their normal medication.

4. Since the FDA had essentially ended DMSO research in the country with their 1965 ban, the 1980 House Select Committee decide to conduct more "research" by sending a survey to 250 randomly selected American

Veterinarian, another 250 Rheumatologists and 110 physicians of professional athletic teams.

Of the 134 veterinarians who responded (54% of those surveyed), 94 (70%) said they had used DMSO in practice and of them 85 (90%) believed it to be effective in reducing inflammation, pain or other arthritic symptoms in animals while 75 (80%) believed from their experience in animals that DMSO would be safe and effective for humans.

Some of the main uses for which the veterinarians used DMSO were: tendonitis, lameness, bruises, arthritic joints, acute inflammation and swelling, chronic inflammation in ear canal, edema, sprains, strains, mastitus, laminitus, splints and other leg injuries in horses, cattle and dogs, intravenously for head injuries in dogs, to relieve spinal pressure due to ruptured interverbral discs and as a carrier for other medications.

Of the rheumatologists, 169 (68%) responded and of them, the majority felt more carefully controlled studies of DMSO were warranted, 33 (20%) had used or prescribed DMSO in their practice and of those 33, 49% felt the drug was effective in reducing inflammation, pain or other arthritic symptoms (along with another 23 who felt the same but had no direct experience with the drug) and 12 (36%) felt the drug should be legalized.

Those who had used DMSO in their practices reported using it for the following conditions: arthritis (including osteoarthritis, rheumatoid arthritis and degenerative arthritis of the spine), bursitis, scleroderma, tendonitis, fibrositis, gout, sprains, skin ulcers, painful muscles, cervical syndrome and epicondylitis.

Of the 39 team physicians who responded, 7 had used DMSO (for conditions such as inflammation of joints, sprains, swelling, tendonitis, bursitis, muscle bruises and contusions, and gout), and 5 more (who did not use DMSO themselves) had seen it used in sports medicine. Of those 12, 10 found DMSO effective in reducing inflammation, pain or other arthritic symptoms. Additionally, most of the 39 believed further study on DMSO was warranted.

While I can’t list all of the correspondences they received, I did want to quote this one:

DEAR CONGRESSMAN PEPPER: I have had considerable clinical experience with DMSO utilized as an external liniment to various painful joints and other areas of the body. In the past, I have treated over two hundred patients with DMSO products made by Syntex Laboratories.

Most of these patients were benefitted. None of the patients experienced any serious injury to their health. One man did break out with a rash and some pus which resembled impetigo, but this cleared promptly when the liniment was stopped.

I would strongly recommend that this drug be made available to the medical profession, at least in liniment form, because of its effectiveness in relieving muscular and joint pains.

Sincerely yours,

ALBERT A. Wilson, M.D., P.A.

Dosing and Topically Applying DMSO

My hope is that this article and the previous one make a strong case for how miraculous DMSO is and how egregious it is that the FDA kept it from America for decades, and why I felt it was so important to bring awareness to this subject.

In the final part of this article, I will discuss the established protocols for applying topical DMSO for many of the conditions here (including our preferred methods), key precautions to be aware of, tricks we’ve found for using it, and our preferred sources for obtaining it.