

MEDICAL MASSAGE THERAPY

*Evidence-Based Treatment for Pain Management
without Opioids or Surgery*

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ABSTRACT

Over **100 million** Americans suffer from **chronic** and **acute pain**, with emotional pain and musculoskeletal (MSK) pain coincident 70% of the time. **Military personnel are at increased risk** for acute and chronic pain along with tightly associated challenges including depression, anxiety, post-traumatic stress disorder (PTSD), suicidal ideation, sleep disruption, disability, and movement impairment.

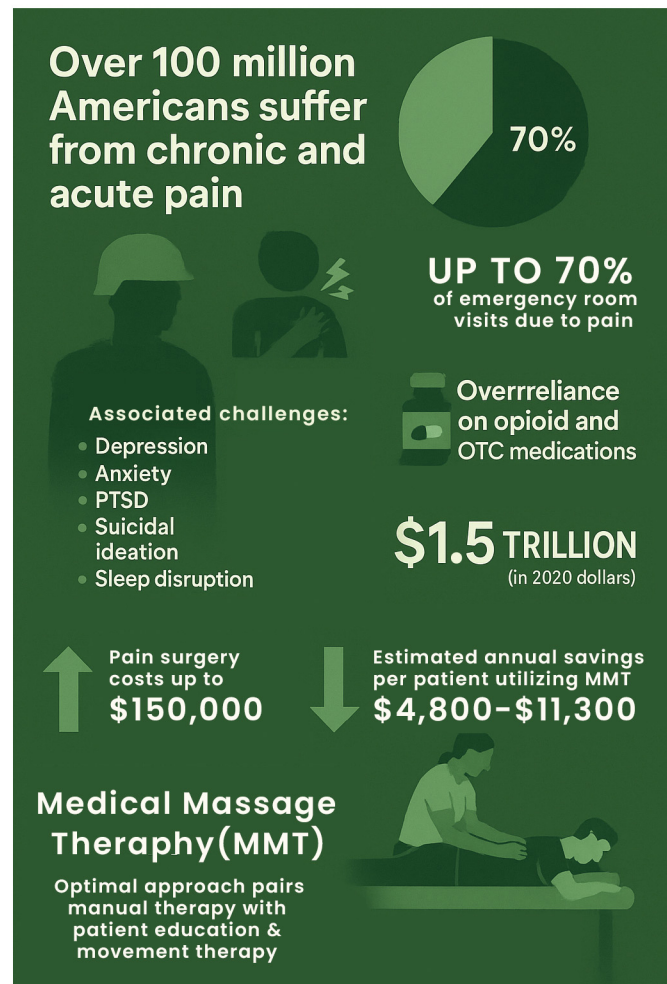
Research demonstrates that not only are traditionally prescribed approaches typically ineffective; they are also highly cost-prohibitive, making them unsustainable.

The overreliance on opioid and over the counter (OTC) medications for pain and associated disorders contributes to disability, fails to provide a pathway to health and recovery, and adds to an estimated **\$1.5 trillion** (in 2020 dollars) to our country's financial burden, not to mention the social, emotional, and physical burden for those suffering and in pain.

Use of emergency department (ED) data indicates that up to **70% of visits are due to acute or chronic pain** which is often better treated in the physician/medical office setting at **1/5th the cost**. Moreover, acute pain sufferers using opioids are 7.3% more likely to go to the ED and chronic pain opioid users are 18% more likely to visit an ED than non-opioid users.

Pain interventions that employ surgery continue to be cost excessive (**up to \$150,000** depending upon the specific procedures) and only marginally effective. Of a number of alternative treatments to consider, **medical massage therapy (MMT)** is associated with positive outcomes in effectively treating pain with little to no side effects.

An optimal approach, Zeel Health's MMT protocol, which pairs massage or manual therapy with patient education and movement therapy, provides not only pain relief, but better mood, movement, sleep, and functionality. In essence, the Zeel protocol effectively provides patients with a path to restoring and maintaining health at a fraction of the cost of traditional medical interventions (conservatively estimated at **per patient annual cost savings of \$4,800 to \$11,300**).





INTRODUCTION TO ZEEL HEALTH

Zeel Health is a **wellness and rehabilitation platform** for our active duty and retired military, veterans, and their families as well as the civilian population. **Data directly support the efficacy of medical massage therapy (MMT)** in reducing opioid and other pain medicine use, relieving mental health challenges associated with PTSD and TBI (i.e., anxiety, depression, hypervigilance), alleviating acute and chronic pain (e.g., musculoskeletal and lower back pain), and improving mood and functionality (e.g., return to work, sleep, enabling activities of daily living, and enhancing and promoting self-care).

Although the initial referral to MMT is frequently for physical pain, Zeel Health's integrative approach holistically addresses each individual and helps establish his or her specific path to health over the course of **12 to 24 medical massage therapy sessions**. During the initial session, a thorough evaluation is conducted, incorporating validated clinical outcome measures. This assessment enables the provider to create a personalized plan of care based on measurable, functional goals.

Chronic pain (pain which is experienced on most or all days for three months or more) is a major health and economic burden for individuals, their families, and our country. **While 24% of the civilian population suffers from chronic pain**, the Rand Corporation estimates **31% to 44% of U.S. active-duty personnel experience chronic pain**. This pain is the primary cause of both disability and lack of preparedness for the military. The United States (US) Health and Human Services (HHS) Department reported in 2020 that **one-third of military veterans and one-fifth of the US adult population suffer from chronic pain** (National Interview Survey, 2019).

Pain is the main reason people seek health care and is the leading cause of long-term disability. The US Pain Foundation reported an annual cost associated with pain for the United States of approximately **\$635 billion (in 2010 dollars)**. This figure includes direct health care costs, disability pay, and lost productivity but is a conservative estimate as it only includes civilians, not the veteran population. Undoubtedly, the current cost is much greater.

Some of the consequences and co-morbidities associated with pain include **sleep disruption (50-88% of pain patients)** and an increased risk for suicide, with pain sufferers dying by suicide at double the rate of those not experiencing pain. The U.S. Department of Veterans Affairs (VA) noted that chronic pain is **highly associated with PTSD (66%)** and depression (estimated between 10% and 46%) for veterans and active-duty personnel. The VA points to a 2013 study that found veterans presenting with back, migraine, and psychogenic pain had an even higher risk of suicide. Chronic pain, PTSD, and mental health challenges significantly reduce individuals' quality of life and in the case of the military, their ability to do their jobs and/or reintegrate into civilian life.

In the two most recent decades, the primary solution for addressing chronic pain, particularly in veterans, is to **prescribe opioids** with dosages increasing over time as tolerance develops. Along with increased opioid usage, pain relief decreases and risk of suicide doubles. A recent *Wall Street Journal* article explores the incidence and drawbacks of the standard cocktail approach (polypharmacy; i.e., prescribing two or more central nervous system acting drugs) for treating combat personnel. The article explains that despite ample evidence that this flawed approach does not effectively treat soldiers (making them less functional and more depressed), it is still prevalent today with as many as 60% of veterans with PTSD prescribed two or more CNS drugs in 2019.

A different method to manage pain is needed – one that is effective, that promotes long-term health, and that does not include the significant physical, emotional, and psychosocial side effects of medications, especially opioids, as well as resolves acute pain before it becomes chronic. The central issue is that our traditional manner of treating our active duty and veteran soldiers when they experience the physical, mental, and psychological challenges of their service does not work and in many cases, causes harm. In contrast, **using MMT is essentially risk-free with no long-term negative side-effects**. Zeel's MMT utilizes a comprehensive therapeutic approach combining soft tissue mobilization with patient education and movement therapy (that continues in between massage sessions) and has proven to be effective.





ABOUT MEDICAL MASSAGE THERAPY

Acute and chronic pain, PTSD, and mental health challenges affect millions of Americans, significantly reducing quality of life. For members of the military, these conditions can impair readiness for duty and hinder the transition back into civilian life. The overreliance on opioid-based pain management (as well as epidurals, nerve ablations, and surgery) has contributed to widespread addiction, overdose, and long-term health complications. As a result, there is an urgent need for safe, effective, non-pharmacological alternatives.

MMT is an evidence-based treatment that applies manual techniques to address specific medical conditions and functional impairments. A growing body of clinical research supports MMT as an effective intervention for:

- **Pain management** – alleviating acute and chronic pain symptoms.
- **Muscle recovery & improved activity levels** – enhancing mobility, circulation and tissue healing.
- **Stress and anxiety reduction** – decreasing cortisol levels and promoting relaxation.
- **Sleep and mood improvement** – supporting restorative rest and emotional well-being.
- **Reducing or eliminating opioid dependence** – providing safer, sustainable pain relief.
- **Ameliorating PTSD** – improving emotional regulation and resilience.

A national survey found that **44% of veterans who regularly use VA health services had received massage therapy; among those, pain reduction was cited as one of the primary reasons for use.** Individual case studies describe veterans with chronic or injury-related pain reporting substantial and sometimes lasting improvements after a course of massage therapy, including regaining mobility and reducing reliance on mobility aids or pain medication.

Zeel's MMT protocol is designed to develop and deliver solutions to **increase medical readiness, optimally treat injuries, and promote positive long-term outcomes, including lowering the incidence of chronic LBP, reducing or eliminating opioid usage, and improving mental health.**

It is distinct in that it contains three integrated components: **massage or manual therapy, patient education and self-care, and movement therapy.** Additionally, Zeel's protocol removes barriers to treatment by oftentimes deploying therapists to the veterans' home for treatment, leading to **compliance rates of 93%** (i.e., completing the entire course of treatment). Compare this compliance rate to compliance rates for other treatment modalities, which vary from current estimates of 25% nonadherence for preventative and health management activities to almost half of patients noncompliant with specific treatment completion and recommendations (Folkvord, F., Würth, A.R. van Houten, K. et.al, 2024).

When it comes to recommendations involving lifestyle change, typically only 30% of patients are compliant. Zeel's approach is unique in that the program develops patient specific goals and makes those patients active participants in their own recovery by providing them with education and tools for self-care which help to promote functional independence once treatment has been completed.

A VA-supported pilot study of nearly 1,000 veterans (2021–2023) demonstrated that Zeel's in-home medical massage therapy (MMT) is a highly effective, veteran-preferred solution. Veterans reported:

- **92% pain reduction** • **86% improved physical activity**
- **90% improved mood** • **89% reduced stress** • **84% better sleep**
- **52% reduced or eliminated opioid use** • **60% reduced or eliminated OTC pain meds** • **93% completion rate for prescribed 12-session treatment plans**—driven in part by saving 45 minutes per session via in-home care (note that overall, in-home visits by Zeel for VA MMT referrals are >75% of all visits).

This delivery model not only boosts access but also adherence, especially for veterans with mobility or mental health barriers. MMT is now structured as 60-minutes of manual therapy (CPT 97124), coupled with patient education and self-care (CPT 98960). This dual approach shifts massage from a passive to an active therapy—combining hands-on treatment with tailored self-care protocols between sessions. It improves long-term outcomes while reducing costs and dependency on medication.





LITERATURE REVIEW & EVIDENTIARY BASIS

While the impetus to realistically consider alternative treatment approaches for pain management/cessation in Western medicine is relatively recent and may be traced, in part, to the reduced efficacy and negative side effects of opioid and OTC pain medications, medical massage therapy (i.e., direct manipulation of the physical body) is a centuries old approach to individuals' care and management of pain. In the last two decades, serious consideration backed by research studies exploring medical massage therapy as an adjuvant or primary treatment for pain, anxiety, depression, stress, TBI, PTSD, and some mental health disorders has discovered, anew, that medical massage is effective. Not only can it help these issues, but medical massage, like osteopathic medicine in general, helps individuals recover their functionality, often without pain medicine and/or ongoing medical intervention. The outcomes that are realized are significant. Research demonstrates that when an individual can engage in his or her activities of daily living, return to work, and again engage in socializing, his or her sense of well-being is also recovered. Such individuals can become active participants in their recovery and with the appropriate tools, can manage their pain, or may even become pain-free. The obvious benefit for the individual is that he or she feels better and feels or is actually happier. The benefit is even greater in that the individual becomes empowered to take control of his or her pain/health and will not require constant or on-going care with medications or other interventional therapies, productively contributing to society, both socially and occupationally.

A review of the current research from 2005 to 2025 establishes the efficacy of the use of medical massage for multiple disabling conditions, including: pain (acute and chronic), mental health (affective symptoms and disorders), sleep disturbance, movement, and functional disorders. Studies also demonstrate that direct patient education focusing on pain management enhances the practical utility of therapeutic approaches. Reported here is a very brief review of some of the many research studies that address each of these ailments and their amenability to massage therapy as well as a brief look at the impact of patient education on coping with pain.



ACUTE PAIN

With respect to acute pain, Simão, S., Höring, A. C., Lima, B. D. O., et.al. (2021) investigated the impact of massage on the perception of neck and shoulder muscle tension and pain in college professors. They found that the professors who were randomly assigned to the massage treatment group reported significantly less pain and muscle tension. In another study, immediate stress relief and decreased cortisol levels were reported by a group of nursing professionals in response to the application of massage therapy (Souza, T. P. B., Souza-Talarico, J. N. de, Kuba, G., & Turrini, R. N. T., 2019). These are only two of a number of research reports that identify a direct link between quick massage and immediate positive impacts for acute ailments.



MENTAL HEALTH: AFFECTIVE SYMPTOMS & DISORDERS

Medical massage can also decrease long-term pain and positively impact clients' affective symptoms as reported by Collings, W., Kahn, J., and Soltysik, R. (2012). Participants in their study were comprised of military veterans and their families. Participants reported their mental health as well as physical complaints at baseline (day 1 and day 30) and again post-treatment intervention with medical massage at four and eight weeks.

Participants received guided exercise instructions via audio CD and printed materials. Researchers termed this aspect of the intervention mind/body practices as they entailed meditative, contemplative, and relaxation exercises. Researchers tracked participants' compliance with massage and guided exercise interventions. They found that compared to baseline, participants reported significant decreases in physical pain and tension, anxiety/worry, depression, and irritability. Additional measures of PTSD symptoms, depression, and self-compassion were also improved over baseline for veterans and their partners along with decreased stress reported by partners.

A salient feature of this study is that the positive outcomes were stable at four and eight weeks and beyond. The intervention itself lasted for only eight weeks. The combination of massage therapy and patient education demonstrated in this study is linked to robust and stable participant improvements. In another study exploring the efficacy of massage in reducing stress, Mahdizadeh, M., Jaber, A. A., & Bonabi, T. N. (2019) found that 4 weeks of twice weekly Swedish massage sessions of 25 minutes were associated with a significant decrease in stress for emergency medical technicians (EMTs) compared with no intervention for the EMT peer control group. Although it is unknown whether the positive benefits of massage intervention persisted after the study concluded, the discovery of significant reductions in stress in only 200 minutes of intervention of four weeks is remarkable.





PATIENT PAIN EDUCATION

Educating clients/patients about their health, current condition(s), and potential paths to better health is not new. Indeed, most individuals prefer medical personnel who listen to them, answer their questions, and communicate what is going on in terms they understand. Thus, it is not surprising that deliberately providing information about pain and its management to those seeking relief from acute or chronic pain demonstrates positive outcomes. Pain is better tolerated and managed when we understand and can prepare ourselves for it. This understanding is supported by research exploring the impact of patient education on pain management for those suffering from pain associated with multiple health conditions, including cancer (Lovell, M., Lockett, T. et al, 2014), neck pain (Yu, H., Cote, P, et al, 2014), and chronic low back pain (Sidiq, M., Muzaffar, T., Janakiraman, et al, 2024; Zahari, Z., Ishak, A., Justine, M., 2020). The approach used by Lovell, M., Lockett, T. et al (2014) describes personalized patient-centered education including self-management and coaching. Results of their study indicated improved pain management and self-care. They concluded that patient education should be included as standard care for those suffering pain (in this study caused by cancer) and that the best therapeutic approach is individually tailored and integral to the patient-healthcare provider relationship.

In the journal Spine, Yu, H., Cote, P, et al. (2014) report a study which compared health and recovery outcomes for patients recovering from procedures addressing neck pain. While results suggested that patient structured education alone had a positive impact, the effect size was small. Patient education was more effective when paired with physiotherapy or massage. Patients receiving the structured pain patient education intervention realized more positive outcomes (i.e., improved pain, functional recovery, and clinical outcomes), at least in the short term. Yu, H., Cote, P, et al. (2014) recommended treatment which includes patient education along with other alternative/conservative type treatment such as advice, massage, and physiotherapy to enhance positive clinical outcomes for patients.

With respect to chronic low back pain, both Sidiq, M., Muzaffar, T., Janakiraman, et al. (2024) and Zahari, Z., Ishak, A., Justine, M. (2020) discovered that patients reported enhanced feelings of wellness and quality of life as a result of the inclusion of patient education in their therapeutic treatment. In Sidiq, M., Muzaffar, T., Janakiraman, et al. (2024), study participants with chronic low back pain were randomly assigned to the control condition (standard care) or experimental condition (standard care with patient education). All patients received standard physiotherapy. Patient pain education intervention was only included for the experimental group. The results at six weeks indicated that individuals in the pain education experimental group experienced significant decreases in disability and pain intensity and significantly higher well-being in comparison to the control group members who did not receive pain education intervention. In a similar vein, Zahari, Z., Ishak, A., Justine, M. (2020) concluded in their review of research articles investigating the impact of patient pain education for older adults with low back pain that older adults experience less disability and greater sense of wellness and quality of life when they receive targeted patient pain education.



Patient Pain Education

Educating clients/patients about their health, current condition(s), and potential paths to better health





SLEEP DISRUPTION

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A symptom commonly reported by those experiencing pain, anxiety, depression, PTSD, and associated negative mental health challenges is sleep disruption. Medical massage research reports consistently indicate improvement and/or alleviation of disrupted sleep for study participants. Disruption of sleep is a significant health issue. Individuals presenting with inadequate sleep experience affective impacts including irritability, anger, depression, and increased suicidality. In the long-term, lack of adequate quality sleep can lead to weight gain through hypothalamic reordering in which hormones, metabolism, and the brain's response to food are affected. Gene expression can be disrupted by failure to correct errors leading to greater potential for heart disease and negative health outcomes (Myers, D.G. & DeWall, C.N., 2022). Improving sleep quality and length is vitally important for overall health and a frequently identified benefit of massage therapy. In one study, Cheraghbeigi, N., Modarrest, M., Resaei, M. & Khatony, A. (2019) found that massage alone as well as a combination of massage and aroma therapy improved sleep quality for cardiac patients. Cardiac patients getting massage therapy self-reported improved sleep quality compared to controls post-intervention. Another investigation (Jong, M., Ljadas, K., Englund, E., et. al., 2016) looked at the impact of tactile massage (TM) for treatment of women diagnosed with primary insomnia. Conditions included patient counseling, care as usual, and TM. Results indicated that only the TM group self-reported better quality of sleep post-intervention.



MOVEMENT & FUNCTIONALITY

With regard to the primary problems of reduced movement and functionality associated with chronic pain, recent research provides evidence of improvement using medical massage. Crawford, C., Boyd, C., Paat, C.F., et. al. (2016) completed a meta-analysis of randomized controlled trials of massage therapy intervention in patients experiencing pain. Their study, reported in the journal *Pain Medicine*, provides robust evidence that massage is a viable treatment for pain management as well as for improving patient mood and health related quality of life. Using a repeated measures design, Elder, W. G., Munk, N., Love, M. M., et. al. (2017) provide strong support for the efficacy of massage therapy to treat chronic low-back pain. In this study, a cohort of patients experiencing low back pain received 10 massage therapy sessions and were followed over time at 12 weeks and again at 24 weeks, post-intervention. Highlights of findings from their study include improvements in indices of Physical and Bodily Pain Domain and reduced disability. They found that group means improved for all participants and for those with improved disability at week 12, **75% remained clinically improved at 24 weeks**. Many participants also reported **clinically improved mental health scores at 12 weeks (43.4%) and at 24 weeks (30.3%)**. An interesting finding was that persistent reduction in pain and disability was more prevalent for adults older than 49 years than for younger adults. The clear messages emerging from the studies reviewed here are that using **massage therapy** and **patient education** (i.e., empowering patients with effective self-care practices) in a relatively short span of time (4-24 weeks), without invasive medical procedures or addictive pain medications, can and **does provide effective pain management**, decreased disability, and increased mood and functioning for many individuals. It also makes a case for approaching each patient/client as an individual, with **personalized treatment plans** the most efficacious.



ZEEL PHILOSOPHY & PROCESS

Zeel's foundational philosophy is that healthcare interventions are most effective when they are designed not only to appropriately treat patients, but also to provide a path for healing by extending to patients the knowledge and tools needed to manage their pain.

Zeel therapists employ MMT, performing soft tissue mobilization/massage to initiate movement and increase function. The MMT is further paired with patient education and advice in remedial/basic exercise and movement therapy which is specifically customized to the individual patient and his or her diagnosis and needs. The combination of these three components: MMT, education and self-care, and basic exercise/movement therapy, administered over 12 to 24 sessions during a one-year period, are what Zeel believes leads to positive patient outcomes.

Similar to the research findings reported here, Zeel's own data indicate that veterans served do indeed experience increased movement and functionality, reduced/cessation of pain medications (both OTC and opioid or other prescribed medications), improved sleep, and improved mood. Many in this population have recovered the ability and motivation to perform Activities of Daily Living (ADLs) as well as return to work/school/parenting. Zeel continues to collect outcomes data in the short and long-term to help identify the most effective practices for empowering and guiding patients to a fully functional status that does not require ongoing medical intervention.





COST EFFECTIVENESS

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The question of the cost effectiveness of medical massage to address pain and related affective symptoms has only recently been explored. Not surprisingly, the results of the handful of published studies indicate that recovery of health through medical massage and integrative therapies is superior to pain management through opioid usage and/or surgery. To more fully appreciate the issue, some background context focusing on opioid usage is provided here.

Some of the most salient problematic issues associated with opioid treatment for chronic pain are identified in the June 2, 2021 Congressional Research Service report "Consumption of Prescription Opioids for Pain: A Comparison of Opioid Use in the United States and Other Countries." First and foremost is the obvious drawback that treating chronic pain using opioids contributes to chronic opioid use, an outcome that inhibits patient functionality and increases patient disability. The negative impact on functionality and disability incurs a significant cost. An analysis by Avalere Health (2025) estimates that the national cost (excluding the cost to the patients themselves) of **opioid use disorder for 2024 was \$934 billion**. Included in the total are **\$438 billion in lost productivity** for employers, **\$248 billion in employee productivity loss** (i.e., taxes not collected), and an estimated **\$73 billion in lost household productivity** (Avalere Health, The Cost of Opioid OUD Addiction in the United States, 2025). Estimates of costs associated with the opioid crisis reported in the June 2nd, 2021 Congressional report put the **national cost at \$504 billion in 2015** and up to **\$1.5 trillion in 2020**. Put into context, estimated healthcare costs in the United States in the same year for heart disease and stroke were \$254 billion and \$168 billion, respectively, for lost productivity.

Part of the opioid problem has to do with access to and availability of alternative pain treatments. As outlined in the June 2nd, 2021 Congressional report, research as well as experts indicate that prescription opioid treatment is favored by our healthcare and insurance payment structures while limiting the coverage for alternative pain management treatments, thereby contributing to the overall overuse of opioids for chronic pain (Schatman, M., 2011). While not all individuals prescribed opioids will develop opioid use disorder, the cost to the individuals, their families, and our society is significant.

When physicians have effective non-pharmacological treatments that are covered by insurance at their disposal, we can greatly reduce the number of chronic opioid users and the associated costs. On an annual basis, the **cost of medical massage therapy range from \$1,500 - \$3,600** while one year of opioid based treatment for individuals suffering high-impact chronic spinal pain according to Herman, P.M., Broten, N., Lavelle, T.A., et al. is estimated at \$14,661 and for low-impact chronic spinal pain at \$6,371 (2019). In addition, the morphine equivalent daily dose (MEDD) increases significantly across years for this population (Herman, P.M., Broten, N., Lavelle, T.A., et al., 2019). These data suggest cost **savings of \$4,800 to over \$11,300** per year from the use of MMT over conventional and invasive pain treatments.



An obvious long-term benefit to holistically treating the individual using massage therapy and patient education/empowerment is the provision of a path to and support for healthy living. This result is not an outcome associated with long-term opioid usage but, as outlined earlier in this paper, is an outcome associated with 30%-60% of patients engaging in massage therapy and educational programs. In addition, while opioid use is associated with depression and negative mental health, studies of massage therapy consistently report that participants experience an increased sense of well-being as well as reduced depression, anxiety, and stress. Feeling better, feeling healthy, and being physically and mentally able to work and socialize represent the most positive outcomes for those enduring pain. Although we could not locate direct comparative analyses of MMT (ie, massage therapy/education treatment) to traditional opioid-based treatment for pain, the research identified repeatedly demonstrates that the healthy outcomes associated with massage therapy provide for considerable cost savings over the short and long term for the individual and our society in juxtaposition to the high price of opioid use and addiction.



CONCLUSION

Over 100 million Americans experience physical pain and 70% of the time, it manifests alongside emotional pain. Service to one's country brings increased risks and challenges to physical, psychological, and mental well-being. For both civilians and our military personnel, the cost of these challenges, if left untreated or ineffectively treated, astronomically increases our burden in terms of dollars, performance, and well-being for each individual. Despite good intentions, **standard treatments** (i.e. pharmacological and surgical intervention) are **costly** and **ineffective**. **Zeel Health has developed an alternative, viable solution** to this vexing problem – **medical massage therapy, or MMT**. Zeel combines soft tissue mobilization with patient education and movement therapy (that continues in between massage sessions) and promotes functional independence once treatment has been completed. By employing a **real-time digital platform for scheduling** in-home and in-office appointments, Zeel directly overcomes accessibility to treatment issues which are a major barrier for patients experiencing pain, disability, and depression. As such, **compliance rates for Zeel's protocol** are consistently **above 90%** while other treatment approaches struggle to reach even 50% compliance for acute and chronic pain as well as the frequently associated mental health challenges (e.g., PTSD, depression, anxiety, suicidal ideation) and sleep disturbance.

Zeel's MMT protocol is comprehensive and essentially risk-free. In short, Zeel's MMT protocol costs less than the standard treatment paradigms and leads to better and safer outcomes.



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