

Dry Needling and its Use in Health Care – A Treatment Modality and Adjunct for Pain Management

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Abstract

Dry needling is used by medical professionals throughout the United States to treat pain and to help patients improve quality of life. There are noninvasive mechanisms that are used to treat pain such as heat and cold application, other thermal or electrical modalities, stretching to soft tissue, or manual therapy. Dry needling is a mechanism that is used to treat muscle trigger points that refer pain to areas within the body. Trigger points can cause irritation to skeletal muscle or fascia and affect function. Dry needling is used to reduce pain by achieving a local twitch response to release muscle tension, normalize electrical dysfunction of the motor end plates, and assist with return to activities or rehabilitation. There are many modalities available for pain management and dry needling is one of many used to target soft tissue and manage pain. Using a multimodal approach is an effective method of treatment to consider for many musculoskeletal or neuromuscular conditions.

Introduction

Numerous treatments for pain have been proposed, such as trigger point infiltration, dry needling, acupuncture, manual therapy, stretching of soft tissue, acupressure, and medications. Trigger point dry needling, or intramuscular needling, has become more prevalent and is used by medical professionals throughout the United States. Muscle trigger points (MTrPs) are found to be involved in the pain process whether the pain is in the trunk, neck, arm, or leg. Monofilament needles are used with dry needling and are inserted into MTrPs by touching, tapping or pricking the tip of the needle into the skin. MTrPs are defined as taut bands that are hypersensitive areas in the body and are painful upon palpation.[1] MTrPs are classified as either active or latent. When palpated, active MTrPs could elicit referred pain, reproducing the patient's symptoms; whereas, latent MTrPs do not cause a pain that will reproduce the patient's symptoms but could be responsible for tightness of the muscle.[2,3] Dry needling is used for myofascial pain, lower and upper extremity pain, neck pain, back pain, headaches, jaw pain, and migraines, among other conditions. The effects of dry needling in the treatment of knee osteoarthritis has been well documented.[4-6] Dry needling is not used as in traditional Oriental or Chinese medical practice, or to inject solutions into MTrPs. Dry needling is used as an adjunct for the management of pain and dysfunction in numerous neuromusculoskeletal conditions.

Effects of dry needling

Many schools of thought and approaches to dry needling have been presented as effective ways to treat pain. Various philosophies, theories, rationales, and duration of training programs have been proposed, within health care, addressing the use of dry needling to treat pain and soft tissue irritability. Needling provides a hyperstimulation with an analgesic effect that is similar to heat and cold compress causing changes of the physiological responses within skin.[7] Pain signals are reduced with direct stimulation to the ischemic tight muscle segment allowing it to relax when using needling.[1] Opioids and pain gating have been implicated in pain control. When using imaging, it has been found that changes are noted within the brain after needle treatment.[8,9] Using dry needling under infrared thermovision causes a temperature increase and short-term vasodilatation response that is similar to the pain distribution pattern of the subject.[10] Needle insertion into the MTrPs elicits a localized twitch response that could interrupt the motor end-plate causing analgesia to the area.[11,12] Dry needling disrupts the sensory input to the spinal cord through the mechanical irritation of the needle being inserted into the sensitive loci within the MTrPs,

which in turn causes a local twitch response.[13] It has been proposed that with needle insertion there is a disruption of nociceptors which will elicit a local twitch response within the MTrPs causing a disruption of the pain cycle with notable pain relief.[14,15] Pain perceptions and reductions in pain could be due to the number of physiologic mechanisms that contribute to subjective improvements. Some patients may not feel the insertion of the needle while others might note a little electrical impulse in the local tissue. The health care provider should consider these implications when providing dry needling to MTrPs.

Dry needling as an intervention

Using dry needling in combination with various manual therapy techniques is considered when treating both MTrPs and non-trigger point conditions.[16] Soft tissue interventions such as stretching, manual therapy, and exercises to the deep neck flexors are considered an effective approach to manage neck pain. Dry needling is also used to treat neck pain. Treating neck pain with dry needling to the upper trapezius has had positive results in reducing the pain.[17] Using a single session of dry needling to the specific MTrPs of the upper trapezius, resulted in a decrease of neck pain intensity.[17,18] Treating the effects of whiplash with dry needling and exercise has been shown to produce positive outcomes with significant reduction in pain, pain catastrophizing, and cold hyperalgesia at 6 and 12 months follow-up.[19] The temporomandibular joint has associated myofascial pain dysfunction and is another area that has had successful outcomes with use of dry needling.[20] Treating myofascial pain with dry needling has been shown to be an effective way to manage pain, improve mobility, reduce sensitivity of MTrPs, and improve the quality of life.[21] Being point specific with dry needling seems to produce more effective results than non-point-specific dry needling. Using dry needling on MTrPs of the hamstrings and gluteal muscles did not show significant

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changes in straight leg raise or hip internal rotation; yet, there were subjective improvements reported in pain and tightness of the muscles following dry needling or sham needling.[3] Using dry needling with a multimodal approach for postoperative repair to a humeral fracture or rotator cuff repair may have assisted with a faster increase in function.[22] The addition of dry needling of the multifidus muscle of the low back in the treatment of low back pain has been shown to increase multifidus muscle contraction and decrease sensitivity to pain in patients who responded to treatment.[23] The use of dry needling has been postulated to be a mechanism for the attainment of early pain relief in order to facilitate a manual therapy technique and a quicker return to function. [24]

Other modalities used as an intervention for pain relief

Dry needling and other modalities are available to aide in the delivery of pain management. (Figure 1) Thermal modalities change responses in tissue temperature and circulation, altering cell membrane permeability [25], modulate pain via the gate control theory and effect the endogenous opioid system [26]. Modalities are often used in conjunction with or in sequence to one another. Moist heat or cryotherapy are often used with electrical stimulation or inferential current for pain management. For thermal ultrasound, preheating the skin with moist heat prior to an ultrasound treatment is thought to decrease the time necessary to reach moderate to vigorous heating.[25] High volt electrical stimulation with a positive polarity for motor nerve depolarization could be used in combination with thermal ultrasound for localized trigger point release.[25,27] For managing chronic pain, an electrical current is used to depolarize efferent motor nerve fibers through high current amplitude, low pulse frequency, and a long pulse duration.[25,27] Modality selection depends upon the surface area of tissue involvement, the depth of penetration desired and stage of injury healing. Dosing parameters unique to each modality must be carefully considered, in order to foster the best patient outcome.

Conclusion

In review, it is hypothesized that dry needling is an adjunct to facilitate a quick response to significantly minimize pain so a person could return to function.[24] Practice guidelines have been proposed that provide a rationale to deliver the optimal frequency, intensity, duration and points of insertion when using dry needling for neuromusculoskeletal conditions.[28] Standardization has been explored when treating MTrPs in people who have myofascial pain.

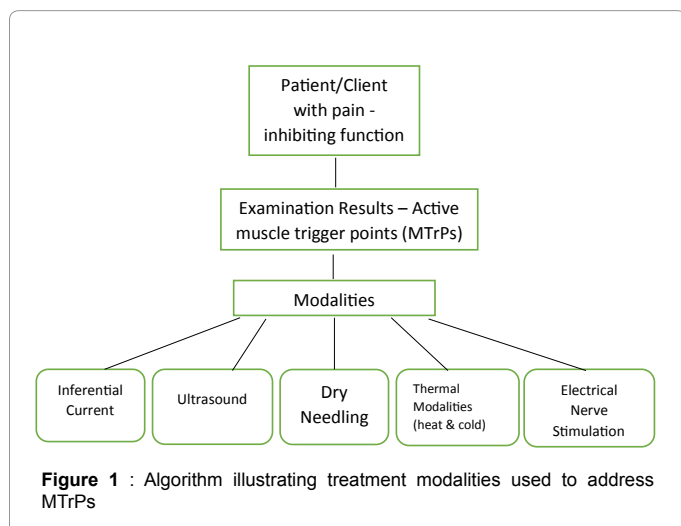


Figure 1 : Algorithm illustrating treatment modalities used to address MTrPs

[29] There might be a global reduction in pain perception due to the physiological responses to pain mechanisms as proposed when using other modalities for pain relief. In clinical practice, using dry needling as an isolated intervention is atypical. Dry needling combined with conventional therapies such as exercises and other modalities should be considered, especially if long term effects are desired.[19] Dry needling minimizes the pain so that the person is able to focus on performing the exercises, or other interventions, that will help restore movement. When deciding upon the use of dry needling for pain, a multimodal approach should be considered.

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