

Dry Needling and Management of Trigger Points with Low Back Pain: An Evidence to Practice Review

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ABSTRACT

Low back pain is a common health concern. The development of myofascial trigger points due to low back pain can cause debilitating pain and loss of functional movement in patients. Dry needling is a minimally invasive procedure that has shown to be useful in the treatment of myofascial trigger points when used with other forms of treatment. However, the literature surrounding dry needling and myofascial trigger points in patients with low back pain is lacking. The guiding systematic review and meta-analysis sought to analyze the effectiveness of dry needling for patients with low back pain. The review utilized eight databases for randomized controlled trials and selected 11 of 784 articles for analysis based on inclusion and exclusion criteria. A 6-subgroup meta-analysis was conducted on these studies, and 6 of the 11 studies were found to have high risk of bias. The included studies used both pain measurements and functional measurements including the visual analogue scale (VAS), Oswestry Disability Index (ODI), and the Roland-Morris Disability Questionnaire (RDQ). The studies did not include objective functional measurements. Overall researchers found a clinically meaningful decrease in outcome scores in the short-term, but there were no significant differences in pain or functional outcomes through long-term follow-up. This seems to correlate with the current literature on dry needling and its inflammatory effects on the body, suggesting that dry needling alone does not provide any long-term effect on myofascial trigger points in patients with low back pain. Dry needling should be combined with other treatments and high-quality rehabilitation to provide longer-lasting results and better treatment outcomes for patients with low back pain.

Key Phrases

Functional testing, manual therapies, patient-reported outcomes

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ORIGINAL REFERENCE

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SUMMARY

CLINICAL PROBLEM AND QUESTION

Low back pain (LBP) is a common healthcare concern worldwide for both the patient and the healthcare system itself. This has subsequent burden, both socially and economically, to the patient and the healthcare system.¹ In many cases, the development of myofascial trigger points (MTrPs) due to chronic LBP can cause debilitating pain and loss of function in patients. MTrPs are defined by Simons et al. as a hyperirritable nodule within a taut band of muscular fibers, and these are typically painful to palpation.² Dry needling (DN) is a minimally invasive therapy that uses small monofilament needles to produce physiological changes in the patient, most often targeted at muscle tissue.³ It is widely accepted that the needle causes microtrauma in the tissue, resulting in a cascade of physiologic events that produce changes in the body. These changes include pain modulation (via gate-control and descending pain control theories), increased blood flow, and reduction in taut band activity in the muscle.^{4,5} Current physiological theory states that taut bands of muscle and MTrPs cause ischemic conditions within the muscle leading to the increase in acetylcholine left in the interstitial tissue. This causes sensitization of peripheral pain receptors,

and it is hypothesized that long-term peripheral sensitization can cause central nervous system sensitization in the spinal cord leading to chronic pain.^{6,7}

Previous literature suggests that DN treatment improves the outcomes in patients with MTrPs when combined with other treatments.⁸ However, current literature on utilizing DN treatments on MTrPs in patients with LBP is lacking. Further, the quality of evidence is low due to low sample sizes. The guiding systematic review and meta-analysis sought to provide a quantitative analysis on the effectiveness of DN for patients with MTrPs when compared to other treatments individually and in combination with other treatments.

SUMMARY OF LITERATURE

The guiding review used eight databases and searched for randomized controlled trials that included patients with diagnosed LBP and MTrPs, DN used as a treatment alone, and pain and or functional movement used as an outcome measure. While this review evaluated studies that compared DN to other treatments, these studies must have studied DN alone as well. This review did not include studies that compared different types of dry needling to each other, randomized control trials had no data, full text could not be obtained, or did not define MTrPs by the criteria set by Simons et al.² Two blind reviewers evaluated the validity of studies based on the methodologic quality criteria list. Of the original 784 articles identified by the original search, 11 randomized control trials were selected for analysis. A 6-subgroup meta-analysis was conducted on the selected randomized control trials that evaluated pain outcomes and functional disability outcomes at post-intervention and follow-up. Of the 11 studies included, 6 presented with high risk of bias due to lack of blinding of practitioners and patients, low trial numbers, or low patient recruitment. There is also limited information on objective measurement of

functional scores or pain due to lack of integration in the studies reviewed.

SUMMARY OF OUTCOMES

The outcomes used within the included studies were pain intensity scores either by visual analogue scale (VAS) or an alternate Likert scale, and functional disability with either the Oswestry Disability Index (ODI) or the Roland-Morris Disability Questionnaire (RDQ). One study utilized a custom Likert scale model for pain intensity and functional disability. Both ranged from 0-3, with 0 being no pain or restriction, respectively, and 3 being severe pain or restriction, respectively.⁹ Overall, 10 studies utilized the VAS,¹⁰⁻¹⁹ 3 studies utilized the ODI,^{16, 17, 19} and 7 studies utilized the RDQ.^{10-15, 19} In the original studies, researchers identified clinically meaningful improvements in the outcome scores in all recorded outcome measures after the use of DN intervention. However, the differences ranged between studies, where some studies only found moderate changes and others showed large improvements. One study did not assess functional disability, focusing only on VAS scores.¹⁸

FINDINGS AND CLINICAL IMPLICATIONS

At post-intervention, DN alone saw significant improvements in pain and functional disability outcomes compared to other treatments.²⁰ However, at follow-up evaluation there were no significant differences in pain and functional disability outcomes between the two groups. Only two of the studies compared DN alone with DN used in combination with other treatments. These studies found significant improvements in pain scale scores in the short term for DN used in combination with other treatments when compared to using DN alone. This evidence illustrates the usefulness in DN as a treatment in the short-term improvement of pain and functional disability, which could provide an opportunity for patients to see greater improvements during therapeutic exercise sessions.

The results from treatment are mostly local physiological responses, similar to an acute laceration in the tissue. While there is no current literature on the healing response to dry needling specifically, it seems to reason that because DN has an acute inflammatory mechanism in the body, in terms of direct tissue disruption, the effects would only last for a short time. Thus, without further treatment such as therapeutic exercise to solidify tissue changes due to this disruption during the subsequent healing phases, the relief gained from dry needling would only be short lived, and this is reflected by the results in both clinical trials and meta-analytical research both physiologically and functionally.^{5, 21}

Interestingly, current literature also shows that DN has been effective in eliciting higher passive peak torque, muscle compliance, and stretch tolerance in target tissues at immediate follow-up and at 15 minutes post-intervention compared to static stretching, and this may account for the improvement in functional disability scales immediately after treatment but not during long-term follow-up.²² This seems to be a distinct effect of DN separate from the local tissue disruption and inflammatory response, however other research suggests that DN has the same moderate to long-term effects on peak torque, muscle compliance, and stretch tolerance as static stretching.²³ Therefore, it seems that the DN response would not continue past the short-term without further stimulation such as follow-up therapeutic exercise. These factors shed light onto the short-term effects seen by studies investigating DN alone. Furthermore, low back pain is often a multifactorial pathology. The multiple mechanisms of treatment that occur from DN may explain why there are beneficial effects for patients with LBP within the short-term window as shown by the guiding review.²⁰

A majority of studies in this review had a high risk of bias due to lack of blinding of patients or practitioners. However, it is nearly impossible in

clinical outcomes research, specifically with manual therapy, to blind study participants to the treatment. In addition, the clinicians must know what treatment they are performing to actually perform the treatment. While single-blind randomized controlled trials could be performed, there is still a necessary unblinding required for this type of research.

CLINICAL BOTTOM LINE

Dry needling, while useful alone in the short-term to decrease pain and dysfunction, should be combined with other treatments and rehabilitation to provide longer-lasting results and better treatment outcomes in both the short-term and long-term treatment of LBP. While the risk of bias within manual therapy research is high, future research should endeavor to continue with highly rigorous research with focus on the physiological effects of dry needling.

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