OPTUM®

Utilization Management Policy

Dry Needling

Table of Contents

Related Policies

Experimental and Investigational Services and Devices

Policy Number	**489**
Original Effective Date:	4/2020
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Category:	Determination

Policy Statement

Optum* by OptumHealth Care Solutions, LLC considers dry needling therapy to be unproven and not medically necessary for the treatment of neuromusculoskeletal disorders due to insufficient scientific evidence of effectiveness as either a single intervention or when combined with other treatment.

Purpose

This policy has been developed as the clinical criterion that describes the position of Optum regarding the effectiveness and safety associated with the use of dry needling therapy.

Key Policy Question

Is there sufficient research evidence of a beneficial impact on health outcomes (efficacy and safety) of dry needling, either as a single or combined therapy, for the sustained reduction of pain and disability to conclude this intervention is an appropriate therapeutic approach for a specific patient population?

Scope

The application of this policy is limited to those services and supplies best described as dry needling. Traditional acupuncture methods are excluded from the scope of this policy. This policy is not applicable to dry needling services when performed by auxiliary personnel acting under the direct supervision of a physician. This policy applies to all other in and out of network programs involving all provider types, where utilization review determinations about dry needling are rendered.

Description

Dry needling (DN) is an invasive procedure that encompasses the superficial or deep insertion of needles without injectate into, alongside, or around nerves, muscles, or connective tissue for the management of pain and dysfunction in neuromusculoskeletal conditions; and does not follow the principles of the Traditional Chinese Medicine.[1,2]

Background

Dry needling (DN), also known as trigger point DN or intramuscular stimulation, is a skilled intervention performed by physical therapists, physicians, and chiropractors to treat musculoskeletal pain related to myofascial trigger points (MTrPs). In this technique a fine sterile needle is utilized to penetrate the skin, subcutaneous tissues, fascia, and muscle, with the goal of deactivating TrPs without the use of an anesthetic. DN can be performed either superficially (to a depth of 5–10 mm) or in depth, with penetration of the involved muscle belly. In most deep DN procedures, the needle is then incrementally manipulated within the tissue in order to elicit a localized twitch response (LTR) and removed once the MTrP has been released (inactivated). Various treatment effects are being credited to DN, such as: decreased pain and muscle tension, improved range of motion, muscle strength and coordination.[3]

There is some emerging DN research, but the exact mechanisms of action of direct needling in the deactivation of trigger points are not yet unraveled.[3] DN may cause a reduction in spontaneous electrical activity associated with trigger points that results in reducing the tension of the muscle fibers and modulates pain via stimulation of mechanoreceptors. DN may increase muscle blood flow and oxygenation by causing the release of a vasoactive substance. Pain may be mediated via the neurophysiological effects of DN on peripheral and central sensitization, and/or through the release of pain-inhibitory neurotransmitters. DN may also produce significant placebo analgesia due to the fact that patient expectancy of a beneficial effect and needling stimulate similar regions of the brain involved in pain perception.

DN is one of several different interventions used to treat MTrPs. In comparing different nonpharmacologic techniques, Charles, et al (2019) concluded the evidence for DN is not greater than placebo, while there is moderate evidence for manual therapy in myofascial pain treatment.[4] The authors identified a number of limitations in the body of evidence regarding DN including: small sample sizes, unclear methodologies, poor blinding, and lack of control groups.

Literature Review

EFFECTIVENESS

Information Sources and Eligibility Criteria:

An updated literature search was conducted using guidance provided by the Cochrane Handbook for Systematic Reviews of Interventions.[5] Information sources included MEDLINE, CENTRAL, CINAHL, PEDro, LILIACS, and MANTIS. Search results eligible for inclusion in the appraisal of effectiveness were limited to: 1) systematic reviews and/or meta-analyses of randomized controlled trials (RCTs) and non-randomized studies of interventions (NRSI), network meta-analyses, and scoping reviews published within the preceding 24-months (to obtain the most current evidence); 2) dry needling (DN) was described for use with individuals having a neuromusculoskeletal disorder or symptoms attributable to myofascial trigger points (MTrPs); 3) DN was compared to sham, no treatment control, or to another active intervention; and 4) the effect on at least one patient-important outcome (pain, function, quality of life) was reported. Additionally, studies were excluded if they utilized traditional acupuncture methods or did not allow for the independent effects of DN to be assessed.

Study Selection and Appraisal:

A total of 19 reviews, were included in this literature appraisal [Table 1]. These studies evaluated the efficacy of DN for various conditions and complaints including general musculoskeletal disorders, headache, neurological disorders, orofacial pain and temporomandibular joint dysfunction, regional neck pain, upper extremity pain, headache, thoraco-lumbo-pelvic pain, sciatica, hip, knee, and heel pain. Systematic reviews with or without meta-analysis were critically appraised using the AMSTAR 2 (A MeaSurement Tool to Assess systematic Reviews) tool.[6] Network meta-analyses and scoping reviews were qualitatively summarized.

Dry Needling for General Musculoskeletal Disorders:

The application of DN for general musculoskeletal disorders or myofascial pain syndromes (MPS) was investigated in three systematic reviews. None of these studies was adequately supportive of DN as proven and medically necessary for the conditions evaluated.

Sánchez-Infante, et al. (2021) sought to determine the short-, medium-, and long-term effectiveness of DN to myofascial trigger points for the treatment of MSK pain.[7] Forty-two RCTs (N=3642) were included in the analysis. Sixty-two percent of studies related to neck (16), shoulder (5) and knee (5) disorders. This meta-analysis found low-quality evidence of a large effect with pain favoring DN compared to no treatment, sham and other therapies immediate to 72-hours post treatment, at 4- to 12-weeks and at 13- to 24-weeks follow up. There was moderate-quality evidence of a moderate effect on pain at 1- to 3-weeks favoring DN compared to inert and active controls. The conclusions drawn from this systematic review should be interpreted with caution. The quality of the review was rated as critically low [Table 2]. Most all the effect sizes had confidence intervals that included trivial to small effects. The findings comparing DN to placebo and to other interventions for long-term outcomes were each based on data from a single study. The overall quality of evidence most likely should be rated as very-low quality due to study limitations, imprecision and inconsistences. The clinical relevance of the results was uncertain.

In a moderate quality systematic review of six (N=384) RCTs, Sousa-Filho, et al. (2021) compared the effects on pain and disability of corticosteroid injection and dry needling for MSK conditions at short-, medium-, and long-term follow-up periods.[8] At short- and medium-term, corticosteroid injection seemed to be superior to dry needling for reducing pain and disability in musculoskeletal conditions. At long-term, dry needling seemed to be more effective than corticosteroid injection. However, the quality of evidence behind these findings was judged to be very low. Most included studies were at high risk of bias, which likely affected the strength of the results. Most studies presented with small sample sizes. Blinding of participants and personnel and allocation concealment were the main sources of bias. The overall quality of the evidence was rated by the authors as very-low for all outcomes and follow periods. Although both interventions presented effects for pain at short-, medium-, and long-term follow-up in the assessed MSK conditions, these findings were supported by insufficient evidence. The reviewers suggested that corticosteroid injections and dry needling should be used with caution in the clinical settings.

Jayaseelan, et al. (2021) conducted a systematic review of 5 RCTs, 2 case series and 3 case reports investigating the application of DN for the treatment of individuals with tendinopathies affecting the upper and lower extremities i.e., rotator cuff, bicipital, lateral epicondylitis, hamstring, and Achilles.[9] The authors found DN was associated with improved pain, function, muscle performance and perceived improvement in each study evaluating the relevant outcome. However, conflicting results were found in comparative studies evaluating DN. DN may be a useful adjunctive treatment in the conservative management of tendinopathy, although its discrete effect is unclear. Very low-quality evidence and methodological limitations suggest further investigation is warranted. The authors noted significant limitations affecting confidence in the results including the small number of studies and low total number of participants; methodological flaws and variances were noted within the studies and reporting was poor; heterogeneity in methods and outcomes made meta-analysis impractical; the inclusion of study designs without comparator groups increased the potential of bias; and limitations with identifying the discrete effect and clinical relevance of DN.

Headache and Neurological Disorders:

A single systematic review and meta-analysis of RCTs evaluated the effectiveness of DN on headaches, and three systematic reviews investigated the effect of DN on muscle spasticity following stroke or in association with brain tumor. None of these studies was sufficiently supportive of DN as proven and medically necessary for the conditions evaluated.

Pourahmadi, et al. (2021) included eleven RCTs (N=685) in a systematic review and meta-analysis of the effectiveness of DN for the treatment of individuals diagnosed with tension-type, cervicogenic, and migraine headache.[10] In this high-quality review [Table 3], the authors found very low-quality evidence suggesting that DN is not statistically better for decreasing headache pain intensity, but it is significantly more effective for improving related disability than other interventions in the short-term in patients with headaches. The authors noted the results of the review were inconclusive and should be interpreted with caution. Specifically, the results of the selected studies may be compromised by selection bias and overestimation of the treatment effect magnitude induced by inappropriate random-sequence generation and allocation concealment.

Núñez-Cortés, et al. (2020) performed a systematic review of 6 RCTs (N=221) to determine the effectiveness of DN in the treatment of spasticity for individuals with stroke.[11] In this moderate quality study [Table 3], the reviewers determined the data was insufficient for drawing conclusions on the effects

of DN. Although a significant decrease in spasticity was observed in most of the muscles evaluated, the certainty of the evidence was low. The effects were only evaluated in the short-term in all included studies and the sample size was small. These results should be taken with caution because the included studies were few in number and had different comparators. Additionally, the effects of DN were difficult to isolate in some of the studies and clinical relevance was uncertain. More RCTs are needed to cover aspects of biases found in the literature, in particular the blinding of participants and personnel.

Carusotto, et al. (2021) systematically reviewed the effect of DN on spasticity in adults with neurological disorders (9 studies involved cerebrovascular accident; and 1 case report described a patient with a brain tumor).[12] The findings revealed low to moderate evidence in support of using DN to decrease spasticity in adults with neurological disorders, particularly in those with a history of stroke. Limitations included small sample sizes. Few trials included large samples, as five of the ten articles were case studies, which limits generalizability to the larger population of individuals with stroke. In addition, further research is required to analyze the long-term effects of DN on reducing spasticity. Overall, this review was judged to be of critically low quality i.e., the review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies [Table 3]. In addition to including 6 of 10 very low-quality study designs (5 case reports and a small n=6 case series), 3 small RCTs and a quasi-experimental pre-/post-test design were also part of the review. The authors did not assess for risk of bias; instead, study quality was determined by the design. The "Results" section did not include any narrative or quantified information or analysis about the findings, including clinical relevance, of the studies.

Valencia-Chulián, et al. (2020), included 7 RCTs and 9 nonrandomized studies of DN in a moderate quality systematic review [Table 3] summarizing the available evidence about the effectiveness of DN on spasticity, pain-related outcomes, and range-of-motion (ROM) in adults after stroke.[13] The results showed the current evidence suggests a positive, but inconclusive effect of DN. Overall, a significant improvement of spasticity, pain-related outcomes, and ROM were demonstrated in the immediate and short-term after DN alone or combined with exercise training, electrical stimulation, or conventional physical therapy. The long-term effect of needling therapies on spasticity remains uncertain. Confident conclusions cannot be made due to lack of high-quality trials, the inclusion of low-quality studies (case reports and case series), the absence of measurable outcomes, inconsistent results, and uncertainty about the long-term efficacy of DN.

Orofacial Pain/Temporomandibular Joint Dysfunction (TMD):

Al-Moraissi, et al. (2020) compared different needling techniques for the treatment of myofascial pain affecting the masticatory muscles in a network meta-analysis (NMA) derived from 10 RCTs with low-quality evidence.[14] This NMA showed dry and sham needling produced comparable pain reduction that was clinically insignificant in the short-term (1-20 days). In longer-term follow-up, DN could not show any difference in post-treatment pain intensity compared to passive or active placebo. The effectiveness of DN analyzed in the NMA was not compared to other treatments such as occlusal splint therapy, manual therapy or counselling therapy; thus, no conclusions could be drawn regarding any possible superiority of DN therapy over other treatments of TMD-M. Taken together, this NMA did not provide enough support for DN for the management of myogenous TMD.

Regional Neck Pain:

Four systematic reviews of RCTs with meta-analyses reported on the effects of DN for the treatment of myofascial trigger points (TrPs) related to neck and upper back pain. The quality of these reviews ranged from moderate to low [Table 4]. Taken in aggregate the evidence did not support DN for regional neck pain as proven or medically necessary.

Navarro-Santana, et al. (2020) evaluated 28 RCTs in assessing the effect of DN alone as compared to sham needling, no intervention, or other physical interventions applied over TrPs related with neck pain symptoms.[15] DN reduced pain immediately after (MD -1.53, 95% CI -2.29 to -0.76) and at short-term (MD -2.31, 95% CI -3.64 to -0.99) when compared with sham/placebo/waiting list/other form of dry needling and, also, at short-term (MD -0.51, 95% CI -0.95 to 0.06) compared with manual therapy. No differences in comparison with other physical therapy interventions were observed. An effect on pain-related disability at the short-term was found when comparing DN with sham/placebo/waiting list/other forms of DN (SMD -0.87, 95% CI -1.60 to -0.14) but not with manual therapy or other interventions. No between-treatment effect was observed in any outcome at mid-term. Low to moderate evidence suggests that DN can be effective for improving pain intensity and pain-related disability in individuals with neck pain symptoms associated with TrPs at the short-term. An appraisal of these findings found that in the short-term, compared to inert interventions and other forms of DN, TrP DN reduced pain; however, the effects ranged from small to trivial. For all other comparators, outcomes and timing to follow up, DN demonstrated no clinically relevant differences. The authors judged all trials to be at a low risk of bias (RoB); however, 16 of 28 (57%) of the RCTs were judged to be unclear concerning allocation concealment and should be regarded as having a high RoB. This would likely reduce the confidence in the estimates of effect.

Navarro-Santana, et al. (2021, in press) examined the effects of DN against TrP injections (wet needling) applied to TrPs associated with neck pain.[16] A total of 7 RCTs (6 in the meta-analysis) were included in this moderate quality review. The authors found low-quality evidence suggesting a superior effect of TrP injection (wet needling) for decreasing pain of cervical muscle TrPs at short-term as compared to DN. No significant effects on other outcomes (very low-quality evidence) were observed.

Lew, et al. (2021) compared the effectiveness of DN and manual therapy for reducing pain and pressure pain threshold (PPT) scores and improving function over the short to medium term (1-28 days) in patients with neck and upper back myofascial pain syndrome (MPS).[17] This moderate quality review included 6 RCTs (N=241). The effect size of difference between DN and manual therapy was non-significant for VAS [d = 0.41 (−0.18, 0.99)], for PPT [d = 0.64 (−0.19, 1.47)], and for NDI [d = −0.66 (−1.33, 0.02)]. Both DN and manual therapy improve pain and function in the short to medium term. Neither is more superior than the other.

Fernández-De-Las-Peñas, et al. (2021) evaluated the effects of combining DN with other physical therapy interventions versus the application of the other interventions or DN alone applied over TrPs associated with neck pain.[18] DN combined with other physical therapy interventions did not exhibit a significant effect on pain immediately after treatment, compared to other physical therapies or DN-alone. Low-to-moderate evidence suggests a positive effect with the combination of DN with other interventions for improving pain intensity, pain-related disability, pressure pain thresholds, and cervical range of motion in people with neck pain associated with TrPs at short-term. The effects were not, however, clinically significant. These results were based on 5 of the 8 studies that did not provide adequate information of the assessment of allocation

concealment. These studies should be viewed as having concerns about a high RoB. No mid- or long-term effects were observed. The heterogeneity and imprecision of the results of the trials were serious; therefore, current results should be taken with caution.

Upper Extremity Disorders:

Two systematic reviews and meta-analyses of RCTs involving upper extremity disorders reported positive effects. Both reviews were rated as low quality primarily due to critical flaws associated with the assessment of RoB in the included studies and the impact on the interpretation of the results [Table 5]. Taking these limitations into consideration, neither of these studies was adequately supportive of DN as proven and medically necessary for the conditions evaluated.

Navarro-Santana, et al. (2021) included 6 RCTs (N=381) to evaluate the effects of TrP DN alone or as an adjunct to other interventions on pain intensity and related disability in nontraumatic shoulder pain (subacromial pain syndrome, rotator cuff disorder, subacromial impingement syndrome, or nonspecific shoulder pain).[19] The authors reported, moderate- to low-quality evidence is suggestive of positive effects of TrP DN for pain intensity (small effect) and pain-related disability (large effect), mostly at short term. DN had no statistical effect on pain in the mid- and long-terms. DN showed statistically significant effects on pain-related disability in the short- and long-terms; however, there was very serious heterogeneity ($I^2 >$ 90%) between studies. Future clinical trials investigating long-term effects are needed. A critical appraisal of the study found 2 of 6 trials had a high RoB regarding allocation concealment. The overall RoB should be rated high for these studies. This would likely reduce confidence in the interpretation of the review and meta-analysis. Point estimates for disability outcomes in the short- and long-terms approximated a minimal clinically important effect (small effect); however, the CIs showed effects ranging from small to trivial.

Navarro-Santana, et al. (2020) investigated the effect of DN alone or combined with other treatment interventions on pain, related-disability, pressure pain sensitivity, and strength in people with lateral epicondylalgia of musculoskeletal origin.[20] Seven RCTs (N=320) were included in the analysis. Low to moderate evidence suggests a positive effect of dry needling for pain, pain-related disability, pressure pain sensitivity and strength at short-term in patients with lateral epicondylalgia of musculoskeletal origin. The clinical relevance of these results is uncertain. These conclusions should be taken with caution due to the low-quality of the evidence (imprecision, heterogeneity) and that most studies investigated just short-term effects, with only one study investigating long-term (6-months) effects.

Thoraco-Lumbo-Pelvic Disorders:

Funk, et al (2020) conducted a scoping review to determine the current state of the literature regarding DN for patients with spine related disorders. Twenty-two studies (45.5% RCTs) were identified describing the application of DN in the thoraco-lumbo-pelvic region for nonspecific or myofascial diagnoses.[21] Although scoping reviews do not critically appraise the quality of the literature, it appears most of the studies concluded that DN contributes to improved outcomes. Favorable outcomes were demonstrated regardless of diagnosis, number of treatments or patient population. Future studies that look at strict diagnostic and inclusion criteria, detailed treatment methods and most applicable outcome measures would be helpful in filling the gaps in the literature as it relates to the effectiveness of DN for thoracolumbar-pelvic MSK pain.

Lower Extremity Disorders:

Three systematic reviews and meta-analyses of RCTs and a single network meta-analysis described the effects of DN for painful disorders of the hip, knee and foot.

Gazendam, et al. (2021) performed a NMA to compare the efficacy of the various nonoperative treatments for greater trochanteric pain syndrome.[22] For pain and function scores at 1 to 3 months follow-up dry needling demonstrated no significant reductions compared with no treatment.

Rahou-El-Bachiri, et al. (2021) systematically reviewed and meta-analyzed the evidence to evaluate the effect of trigger point DN alone or as an adjunct with other interventions on pain and related disability in people with knee pain (patellofemoral pain syndrome, osteoarthritis, post-surgical pain).[23] The authors found low to moderate evidence suggesting a positive effect (ranging from trivial to large) of trigger point DN on pain and related disability in patellofemoral pain, but not knee osteoarthritis or post-surgery knee pain, at short-term. No significant effects were observed at mid- or long-term follow-ups. The risk of bias was generally low, but the heterogenicity and the imprecision of the results downgraded the level of evidence. The results of the current meta-analysis should be considered with caution. For pain outcomes at short-term, the overall mean difference was -0.85 (95% CI -1.35 to -0.34) points on a 0–10 numerical pain rate scale. This difference was not clinically significant. Four of the 10 studies should be rated as having a high RoB due to uncertainty about randomization sequencing and allocation concealment. Critical appraisal determined this review to be of low quality; it may not provide an accurate and comprehensive summary of the available studies [Table 6].

In a critically low-quality review, Ughreja, et al. (2021) appraised the evidence available on the effectiveness of different DN techniques in knee OA and analyze the short-term and long-term implications of these techniques on pain and function.[24] The reviewers found moderate-quality evidence on the short-term effect of periosteal stimulation technique on pain and function in knee osteoarthritis. Future studies comparing the effects of various techniques of dry needling with different dosages and long-term follow up need to be conducted. This review was judged to be of critically low quality due to multiple critical and non-critical flaws [Table 6]. The overall quality of the evidence for each outcome and follow-up period was not described. Domains critical to making qualitative judgments (consistency, directness, and precision) were omitted from the review. The inspection of the Cochrane RoB assessment showed that at least 4 of the 9 studies should likely be judged as having a high RoB due to uncertainties about allocation concealment and the blinding of outcome assessors. The clinical relevance of the results was not well-described.

Llurda-Almuzara, et al. (2021) systematically reviewed and quantitatively analyzed 6 RCTs (N=395) in evaluating the effects of DN over TrPs associated with plantar heel pain on pain intensity and related disability or function.[25] The authors reported that moderate- to low-quality evidence suggests a positive effect of TrP DN for improving pain intensity and pain-related disability in the short term and long term, respectively, in patients with plantar heel pain of MSK origin. The RoB of the trials was generally low, but the heterogeneity of the results downgraded the level of evidence. The present results should be considered with caution because of the small number of trials. Critical appraisal showed this to be judged a low-quality systematic review [Table 6]. The overall quality of evidence was likely overstated. None of the studies was rated as having a high risk of bias, despite four of six studies not reporting appropriate allocation

concealment. The between group differences for all outcomes and follow-up periods did not demonstrate clinically relevant results.

SAFETY

Although DN techniques seem to be safe when properly applied, it cannot be implied that there is no risk of potentially serious complications. DN is an invasive technique with potential for adverse events (AEs) including pain, infection, epidural hematoma and organ puncture.[26] Common AEs (1-10/100) included bruising, bleeding, and pain (during and following treatment). The incidence rate of mild AE associated with DN was found to be almost 20%, based on a prospective, self-reported survey of physical therapists.[27] This AE rate for DN is significantly greater than the 8.6% incidence that has been reported for AE with traditional acupuncture.[28]The reported incidence of AEs in practitioner surveys may be subject to reporting bias that underestimates the true rate of complications.

At least two RCTs have recorded data on the occurrence of AE during the course of the trial. The incidence rates are significantly greater than survey data. Arias-Buría, et al (2015) reported that 60% of patients assigned to the DN + physical therapy experienced muscle soreness after treatment but experienced no increase in their symptoms.[29] Post-treatment soreness resolved spontaneously within 24 to 36 hours with no intervention. Cotchett et al, (2014) estimated that for every three patients treated with DN, one person will experience an immediate mild, transient AE related to needle site pain.[30] This compared with immediate AEs occurring in 1% of those receiving sham DN.

Case reports and cadaveric studies provide low level evidence of the risk for more serious AE due to DN. Cummings, et al (2014) described the occurrence of pneumothorax following DN to thoracic trigger points.[31] At least two case reports have described acute spinal epidural hematoma as a complication of DN.[32,33] A case of infection of a hip prosthesis after DN has been reported.[34] Two cadaveric studies have described the caution warranted with needle placement technique to minimize the risk of sciatic nerve and kidney puncture.[35,36]

SUMMARY

The evidence concerning the effectiveness and safety of DN was systematically reviewed for generalized and specific neuromusculoskeletal disorders and complaints. The use of dry needling is supported by some positive published data regarding effectiveness for neuromusculoskeletal disorders/complaints, but a beneficial impact on health outcomes has not been proven for the following reasons:

- The direction of effectiveness studies is mixed in comparison to placebo/sham/no treatment and generally no more or less effective than other more established interventions with less inherent risk (eg, manual therapy techniques).
- Clinically relevant benefits from the application of dry needling across the range of neuromusculoskeletal disorders evaluated have not been demonstrated.
- The overall quality of the evidence is low to very low.
- The evidence is sparse and imprecise due to the limited number of small studies for most disorders.

Table 1. Summary of included studies

Condition/Complaint	Author	Year	Study Design
General MSK Disorders	Sánchez-Infante Sousa Filho Jayaseelan	2021 2021 2021	SR/MA of RCTs SR of RCTs SR of RCTs/NRSI
Headache	Pourahmadi	2021	SR/MA of RCTs
Neurological Disorders	Núñez-Cortés Carusotto Valencia-Chulián	2020 2021 2020	SR of RCTs SR of RCTs/NRSI SR of RCTs/NRSI
Orofacial Pain/TMD	Al-Moraissi	2020	Network Meta-Analysis
Neck Pain	Navarro-Santana Navarro-Santana Lew Fernández-De-Las-Peñas	2020 2021(IP) 2021 2021	SR/MA of RCTs SR/MA of RCTs SR/MA of RCTs SR/MA of RCTs .
Shoulder Pain	Navarro-Santana	2021	SR/MA of RCTs
Elbow Pain	Navarro-Santana	2020	SR of RCTs/NRSI
Thoraco-Lumbo-Pelvic	Funk	2020	Scoping review
Hip Pain	Gazendam	2021	Network Meta-Analysis
Knee Pain	Rahou-El-Bachiri Ughreja	2021 2021	SR/MA of RCTs SR/MA of RCTs
Plantar Heel Pain	Llurda-Almuzara	2021	SR/MA of RCTs

IP: in press; LBP: low back pain; MA: meta-analysis; MSK: musculoskeletal; NRSI: non-randomized studies of an intervention; RCT: randomized controlled trial; SR: systematic review; TMD: temporomandibular joint dysfunction

Table 2: Quality Appraisal of Systematic Reviews for General Musculoskeletal Disorders (AMSTAR 2*)

Quality Assessment Item	Sánchez-Infante (2021)	Sousa-Filho (2021)	Jayaseelan (2021)
Did the research questions and inclusion criteria for the review include the components of PICO?	Yes	Yes	Yes
Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	Partial Yes[1]	Partial Yes	Yes
Did the review authors explain their selection of the study designs for inclusion in the review?	No	No	Yes
Did the review authors use a comprehensive literature search strategy?	No[2]	Partial Yes	No[2]
Did the review authors perform study selection in duplicate?	Yes	Yes	Yes
Did the review authors perform data extraction in duplicate?	Yes	Yes	Yes
Did the review authors provide a list of excluded studies and justify the exclusions?	No[3]	No[3]	No[3]
Did the review authors describe the included studies in adequate detail?	Partial Yes	Partial Yes	Partial Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual RCTs that were included in the review?	No[4]	Yes	Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual NRSI that were included in the review?	N/A	N/A	N/A[7]
Did the review authors report on the sources of funding for the studies included in the review?	No[5]	No[5]	No[5]
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for RCTs?	No[6]	N/A	N/A
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for NRSI?	N/A	N/A	N/A
If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	N/A	N/A	N/A
Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	Yes	Yes	Yes
Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Yes	Yes	Yes
If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	Yes	N/A	N/A
Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Yes	Yes	Yes
Rating overall confidence in the results of the review	**Critically Low**	**Moderate**	**Moderate**

* Source: Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017 Sep 21;358:j4008.
Legend: PICO = population, intervention, comparator, outcome; MD = mean difference; N/A = not applicable; NRSI = nonrandomized studies of an intervention; RCT = randomized controlled trial; RoB = risk of bias; SMD = standardized mean difference

Rating overall confidence in the results of the review

High	Zero or one non-critical weakness: The systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest.
Moderate	More than one non-critical weakness: The systematic review has more than one weakness, but no critical flaws. It may provide an accurate summary of the results of the available studies that were included in the review.
Low	One critical flaw with or without non-critical weaknesses: The review has a critical flaw and may not provide an accurate and

	comprehensive summary of the available studies that address the question of interest.
Critically low	More than one critical flaw with or without non-critical weaknesses: The review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies.

Note: Multiple non-critical weaknesses may diminish confidence in the review and it may be appropriate to move the overall appraisal down from moderate to low confidence

Rationale:

1. The protocol called for RoB to be assess by the Cochrane tool; instead, the PEDro checklist was used to determine RoB
2. The literature search did not include an explanation for limiting study selection to English language (non-critical flaw)
3. No list of excluded studies (non-critical flaw)
4. Both PEDro and Cochrane tools were used in the study but only PEDro, where all studies were judged to have a low RoB, was applied to the interpretation of RoB. Had the Cochrane RoB 2.0 tool been applied 32 of 42 studies should have been judged to have a high or unclear RoB, which would have markedly downgraded confidence in the estimates of effect (critical flaw)
5. Funding sources for included studies were not reported (non-critical flaw)
6. The authors did not justify meta-analysis when only a single study was included. SMD was used without transforming the results into natural units, making judgments about clinical relevance uncertain (critical flaw)
7. NRSI = case reports and case series

Table 3: Quality Appraisal of Systematic Reviews for Headache & Neurological Disorders (AMSTAR 2*)

Quality Assessment Item	Pourahmadi (2021)	Núñez-Cortés (2020)	Carusotto (2021)	Valencia-Chulián (2020)
Did the research questions and inclusion criteria for the review include the components of PICO?	Yes	Yes	Yes	Yes
Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	Yes	Partial Yes	No[4]	Partial Yes
Did the review authors explain their selection of the study designs for inclusion in the review?	Yes	Yes	No	Yes
Did the review authors use a comprehensive literature search strategy?	No[1]	Partial Yes	No[5]	No[1]
Did the review authors perform study selection in duplicate?	Yes	Yes	No[6]	Yes
Did the review authors perform data extraction in duplicate?	Yes	Yes	No[7]	Yes
Did the review authors provide a list of excluded studies and justify the exclusions?	Yes	No[2]	No[2]	No[2]
Did the review authors describe the included studies in adequate detail?	Yes	Yes	Partial Yes	Partial Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual RCTs that were included in the review?	Yes	Yes	No[8]	Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual NRSI that were included in the review?	N/A	N/A	No[8]	Yes
Did the review authors report on the sources of funding for the studies included in the review?	Yes	No[3]	No[3]	No[3]
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for RCTs?	Yes	N/A	N/A	N/A
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for NRSI?	N/A	N/A	N/A	N/A
If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	Yes	N/A	N/A	N/A
Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	Yes	Yes	No[9]	Yes
Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Yes	Yes	No[10]	Yes
If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	Yes	N/A	N/A	N/A
Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Yes	Yes	Yes	Yes
Rating overall confidence in the results of the review	**High**	**Moderate**	**Critically Low**	**Moderate**

* Source: Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017 Sep 21;358:j4008.

Legend: PICO = population, intervention, comparator, outcome; MD = mean difference; N/A = not applicable; NRSI = nonrandomized studies of an intervention; RCT = randomized controlled trial; RoB = risk of bias; SMD = standardized mean difference

Rating overall confidence in the results of the review

High	Zero or one non-critical weakness: The systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest.
Moderate	More than one non-critical weakness: The systematic review has more than one weakness, but no critical flaws. It may

	provide an accurate summary of the results of the available studies that were included in the review.
Low	One critical flaw with or without non-critical weaknesses: The review has a critical flaw and may not provide an accurate and comprehensive summary of the available studies that address the question of interest.
Critically low	More than one critical flaw with or without non-critical weaknesses: The review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies.

Note: Multiple non-critical weaknesses may diminish confidence in the review and it may be appropriate to move the overall appraisal down from moderate to low confidence

Rationale:

1. The literature search did not include an explanation for limiting study selection to English and Spanish languages (non-critical flaw)
2. The review authors did not provide a list of excluded studies and justify the exclusions (non-critical flaw)
3. Funding sources for included studies were not reported (non-critical flaw)
4. Item 2 – The review methods did not include a RoB assessment (critical flaw)
5. Item 4 – The literature search did not include an explanation for limiting study selection to the English language and peer-reviewed journals. (non-critical flaw)
6. The review authors did not perform study selection in duplicate (non-critical flaw)
7. The review authors did not perform data extraction in duplicate (non-critical flaw)
8. The review authors did not assess for the risk of bias (RoB) in individual studies that were included in the review (critical flaw)
9. The review authors did not account for RoB in individual studies when interpreting/ discussing the results of the review (critical flaw)
10. The impact of heterogeneity on the results of the review was not explicitly discussed. (non-critical flaw)

Table 4: Quality Appraisal of Systematic Reviews for Neck Pain Disorders (AMSTAR 2*)

Quality Assessment Item	Navarro-Santana (2020)	Navarro-Santana (2021)	Lew (2021)	Fernández-De-Las-Peñas (2021)
Did the research questions and inclusion criteria for the review include the components of PICO?	Yes	Yes	Yes	Yes
Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	Yes	Yes	Partial Yes	Yes
Did the review authors explain their selection of the study designs for inclusion in the review?	No	No	No	No
Did the review authors use a comprehensive literature search strategy?	No[1]	No[1]	No[6]	No[1]
Did the review authors perform study selection in duplicate?	Yes	Yes	Yes	Yes
Did the review authors perform data extraction in duplicate?	Yes	Yes	Yes	Yes
Did the review authors provide a list of excluded studies and justify the exclusions?	Yes	Yes	No[7]	Yes
Did the review authors describe the included studies in adequate detail?	Partial Yes	Yes	Partial Yes	Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual RCTs that were included in the review?	Yes	Yes	Yes	Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual NRSI that were included in the review?	N/A	N/A	N/A	N/A
Did the review authors report on the sources of funding for the studies included in the review?	No[2]	No[2]	No[2]	No[2]
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for RCTs?	No[3]	No[3]	Yes	No[3]
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for NRSI?	N/A	N/A	N/A	N/A
If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	Yes	Yes	Yes	Yes
Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	No[4]	No[5]	Yes	No[8]
Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Yes	Yes	Yes	Yes
If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	Yes	Yes	No	Yes
Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Yes	Yes	Yes	Yes
Rating overall confidence in the results of the review	**Low**	**Low**	**Moderate**	**Low**

* Source: Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017 Sep 21;358:j4008.

Legend: PICO = population, intervention, comparator, outcome; MD = mean difference; N/A = not applicable; NRSI = nonrandomized studies of an intervention; RCT = randomized controlled trial; RoB = risk of bias; SMD = standardized mean difference

Rating overall confidence in the results of the review

High	Zero or one non-critical weakness: The systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest.
Moderate	More than one non-critical weakness: The systematic review has more than one weakness, but no critical flaws. It may provide an accurate summary of the results of the available studies that were included in the review.
Low	One critical flaw with or without non-critical weaknesses: The review has a critical flaw and may not provide an accurate and comprehensive summary of the available studies that address the question of interest.
Critically low	More than one critical flaw with or without non-critical weaknesses: The review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies.

Note: Multiple non-critical weaknesses may diminish confidence in the review and it may be appropriate to move the overall appraisal down from moderate to low confidence

Rationale:

1. The literature search did not include information about any restrictions e.g., language (non-critical flaw)
2. Funding sources for included studies were not reported (non-critical flaw)
3. The causes of heterogeneity were not investigated (non-critical flaw)
4. None of the studies was rated as having a high risk of bias, despite 16 of 28 studies (57%) not reporting appropriate allocation concealment. The authors did not discuss the potential impact on the estimate of effects (critical flaw)
5. None of the studies was rated as having a high risk of bias, despite all trials subjected to meta-analysis did not report appropriate allocation concealment and/or blinding of outcome assessors. The authors did not discuss the potential impact on the estimate of effects (critical flaw)
6. The literature search did not include an explanation for limiting study selection to the English language (non-critical flaw)
7. Excluded studies not listed (non-critical flaw)
8. None of the studies was rated as having a high or unclear risk of bias, despite 5 of 8 studies not reporting appropriate allocation concealment. The authors did not discuss the potential impact on the estimate of effects (critical flaw)

Table 5: Quality Appraisal of Systematic Reviews for Neck Pain Disorders (AMSTAR 2*)

Quality Assessment Item	Navarro-Santana (2020)	Navarro-Santana (2021)	Lew (2021)	Fernández-De-Las-Peñas (2021)
Did the research questions and inclusion criteria for the review include the components of PICO?	Yes	Yes	Yes	Yes
Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	Yes	Yes	Partial Yes	Yes
Did the review authors explain their selection of the study designs for inclusion in the review?	No	No	No	No
Did the review authors use a comprehensive literature search strategy?	No[1]	No[1]	No[6]	No[1]
Did the review authors perform study selection in duplicate?	Yes	Yes	Yes	Yes
Did the review authors perform data extraction in duplicate?	Yes	Yes	Yes	Yes
Did the review authors provide a list of excluded studies and justify the exclusions?	Yes	Yes	No[7]	Yes
Did the review authors describe the included studies in adequate detail?	Partial Yes	Yes	Partial Yes	Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual RCTs that were included in the review?	Yes	Yes	Yes	Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual NRSI that were included in the review?	N/A	N/A	N/A	N/A
Did the review authors report on the sources of funding for the studies included in the review?	No[2]	No[2]	No[2]	No[2]
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for RCTs?	No[3]	No[3]	Yes	No[3]
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for NRSI?	N/A	N/A	N/A	N/A
If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	Yes	Yes	Yes	Yes
Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	No[4]	No[5]	Yes	No[8]
Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Yes	Yes	Yes	Yes
If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	Yes	Yes	No	Yes
Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Yes	Yes	Yes	Yes
Rating overall confidence in the results of the review	**Low**	**Low**	**Moderate**	**Low**

* Source: Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017 Sep 21;358:j4008.

Legend: PICO = population, intervention, comparator, outcome; MD = mean difference; N/A = not applicable; NRSI = nonrandomized studies of an intervention; RCT = randomized controlled trial; RoB = risk of bias; SMD = standardized mean difference

Rating overall confidence in the results of the review

High	Zero or one non-critical weakness: The systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest.
Moderate	More than one non-critical weakness: The systematic review has more than one weakness, but no critical flaws. It may provide an accurate summary of the results of the available studies that were included in the review.
Low	One critical flaw with or without non-critical weaknesses: The review has a critical flaw and may not provide an accurate and comprehensive summary of the available studies that address the question of interest.
Critically low	More than one critical flaw with or without non-critical weaknesses: The review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies.

Note: Multiple non-critical weaknesses may diminish confidence in the review and it may be appropriate to move the overall appraisal down from moderate to low confidence

Rationale:

1. The literature search did not include information about any restrictions e.g., language (non-critical flaw)
2. Funding sources for included studies were not reported (non-critical flaw)
3. The causes of heterogeneity were not investigated (non-critical flaw)
4. None of the studies was rated as having a high risk of bias, despite 16 of 28 studies (57%) not reporting appropriate allocation concealment. The authors did not discuss the potential impact on the estimate of effects (critical flaw)
5. None of the studies was rated as having a high risk of bias, despite all trials subjected to meta-analysis did not report appropriate allocation concealment and/or blinding of outcome assessors. The authors did not discuss the potential impact on the estimate of effects (critical flaw)
6. The literature search did not include an explanation for limiting study selection to the English language (non-critical flaw)
7. Excluded studies not listed (non-critical flaw)
8. None of the studies was rated as having a high or unclear risk of bias, despite 5 of 8 studies not reporting appropriate allocation concealment. The authors did not discuss the potential impact on the estimate of effects (critical flaw)

Table 6: Quality Appraisal of Systematic Reviews for Upper and Lower Extremity Disorders (AMSTAR 2*)

Quality Assessment Item	Navarro-Santana (2021)	Navarro-Santana (2020)	Rahou-El-Bachiri (2021)	Ughreja (2021)	Llurda-Almuzara (2021)
Did the research questions and inclusion criteria for the review include the components of PICO?	Yes	Yes	Yes	Yes	Yes
Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	Yes	Yes	Yes	Partial Yes	Partial Yes
Did the review authors explain their selection of the study designs for inclusion in the review?	No	No	No	No	No
Did the review authors use a comprehensive literature search strategy?	No[1]	No[1]	No[5]	No[8]	No[5]
Did the review authors perform study selection in duplicate?	Yes	Yes	Yes	Yes	Yes
Did the review authors perform data extraction in duplicate?	Yes	Yes	Yes	Yes	Yes
Did the review authors provide a list of excluded studies and justify the exclusions?	Yes	Yes	No	Yes	No
Did the review authors describe the included studies in adequate detail?	Yes	Yes	Yes	Yes	Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual RCTs that were included in the review?	Yes	Yes	Yes	Yes	Yes
Did the review authors use a satisfactory technique for assessing the RoB in individual NRSI that were included in the review?	N/A	N/A	N/A	N/A	N/A
Did the review authors report on the sources of funding for the studies included in the review?	No[2]	No[2]	No[2]	No[2]	No[2]
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for RCTs?	Yes	Yes	Yes	No[9]	No[13]
If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results for NRSI?	N/A	N/A	N/A	N/A	N/A
If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	Yes	Yes	Yes	Yes	Yes
Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	No[3]	No[4]	No[6]	No[10]	No[14]
Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Yes	Yes	Yes	No[11]	Yes
If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	Yes	Yes	No[7]	No[12]	Yes
Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Yes	Yes	Yes	Yes	Yes
Rating overall confidence in the results of the review	**Low**	**Low**	**Low**	**Low**	**Low**

* Source: Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017 Sep 21;358:j4008.

Legend: PICO = population, intervention, comparator, outcome; MD = mean difference; N/A = not applicable; NRSI = nonrandomized studies of an intervention; RCT = randomized controlled trial; RoB = risk of bias; SMD = standardized mean difference

Rating overall confidence in the results of the review

High	Zero or one non-critical weakness: The systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest.
Moderate	More than one non-critical weakness: The systematic review has more than one weakness, but no critical flaws. It may provide an accurate summary of the results of the available studies that were included in the review.
Low	One critical flaw with or without non-critical weaknesses: The review has a critical flaw and may not provide an accurate and comprehensive summary of the available studies that address the question of interest.
Critically low	More than one critical flaw with or without non-critical weaknesses: The review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies.

Note: Multiple non-critical weaknesses may diminish confidence in the review and it may be appropriate to move the overall appraisal down from moderate to low confidence

Rationale:

1. The literature search did not include information about any restrictions e.g., language (non-critical flaw)
2. Funding sources for included studies were not reported (non-critical flaw)
3. All individual studies were assessed as having a low RoB. Two studies were judged to have a high RoB concerning allocation concealment, which should have downgraded to overall RoB and quality of evidence. The interpretation of the results of the review would likely have been more cautious. (critical flaw)
4. All individual studies were assessed as having a low RoB. All included studies appear to have a high RoB. Six of seven studies did not report on appropriate allocation concealment. Five studies did not blind outcome assessors, which should have downgraded to overall RoB and quality of evidence. The interpretation of the results of the review would likely have been more cautious. (critical flaw)
5. The literature search did not include an explanation for limiting study selection to the English and Spanish languages (non-critical flaw)
6. Four of the ten studies were "uncertain" concerning randomization sequencing and allocation concealment. The authors did not account for RoB in individual studies when interpreting/discussing the results of the review (critical flaw)
7. The authors did not discuss the potential impact of publication bias (small study bias) on the results of the review. Note sample sizes ranged from 25-70 participants. (non-critical flaw)
8. The literature search did not include an explanation for limiting study selection to the English language. (non-critical flaw)
9. Three of the five meta-analyses reported high heterogeneity. The causes of heterogeneity were not formally investigated. (non-critical flaw)
10. Four of the nine studies were "uncertain" concerning allocation concealment and/or assessor blinding. The authors did not account for RoB in individual studies when interpreting/discussing the results of the review (critical flaw)
11. The impact of heterogeneity on the results of the review was not explicitly discussed. (non-critical flaw)
12. The authors did not discuss the potential impact of publication bias (small study bias) on the results of the review. Note sample sizes ranged from 20-242 participants, with seven of nine trials having sample sizes of <100. (non-critical flaw)
13. The causes of heterogeneity were not investigated (non-critical flaw)
14. None of the studies was rated as having a high risk of bias, despite four of six studies not reporting appropriate allocation concealment. The authors did not account for RoB in individual studies when interpreting/discussing the results of the review (critical flaw)

Coding Information

Note: The Current Procedural Terminology (CPT) codes listed in this policy may not be all inclusive and are for reference purposes only. The listing of a service code in this policy does not imply that the service described by the code is a covered or non-covered health service. Coverage is determined by the member's benefit document.

Code	Description
20560	Needle insertion(s) without injection(s), 1 or 2 muscle(s)
20561	Needle insertion(s) without injection(s), 3 or more muscle(s)

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Policy History/Revision Information

Date	Action/Description
4/23/2020	Original effective date
4/22/2021	Annual review and approval completed
5/03/2022	Annual review and approval completed; Literature review updated
6/29/2022	Updated legal entity name "OptumHealth Care Solutions, LLC." to *Optum™ Physical Health ("Optum") includes OptumHealth Care Solutions, LLC; ACN Group IPA of New York, Inc.; ACN Group IPA of California, Inc. d/b/a OptumHealth Physical Health of California; Managed Physical Network, Inc.; and OrthoNet Holdings, Inc. which includes OrthoNet New York IPA, Inc., OrthoNet West, Inc., OrthoNet, LLC, OrthoNet of the South, Inc.
4/27/23	Annual review and approval completed; no significant changes made to the document. Updated contact email from policy.inquiry@optumhealth.com to phpolicy_inquiry@optum.com.

Contact Information

Please forward any commentary or feedback on Optum utilization management policies to: phpolicy_inquiry@optum.com with the word "Policy" in the subject line.

If there is a difference between any policy and the member's SPD or COC, the member's SPD or COC will govern.

PLAIN LANGUAGE SUMMARY

Dry Needling

Utilization Management Policy # 489

Plain Language Summaries are a service provided by *Optum* by OptumHealth Care Solutions, LLC* to help patients better understand the complicated and often mystifying language of modern healthcare.

Plain Language Summaries are presented to supplement the associated clinical policy or guideline. These summaries are not a substitute for advice from your own healthcare provider.

What is dry needling and what is known about it so far?

Dry needling is a technique similar to acupuncture, where a needle is inserted through the skin into trigger (tender) points to alleviate pain associated with various musculoskeletal and neurological conditions.

Dry needling is one of several different ways to treat trigger points. Other commonly used manual therapies appear to be as effective as or more effective than dry needling. While dry needling is generally safe when performed by trained professionals, the potential for serious complications is greater than commonly used manual therapies.

How was dry needling evaluated?

A work group of clinicians was assigned to review the available research. The internet was searched for articles about dry needling. The work group independently examined the selected research studies. A broadly accepted evaluation approach was used. Decisions were based on judgments about the clinical effectiveness of dry needling compared to no treatment, placebo, and/or other treatments.

Before the policy was approved, it was presented to a series of committees that included independent health care practitioners.

What did the work group find?

The evidence about the effectiveness of dry needling for the treatment of neurological and musculoskeletal disorders is limited mainly to small studies. The overall research quality was rated as *low*. Larger and better quality studies are needed.

It was not possible to make a determination that dry needling provided more benefit than no treatment or placebo treatment. Generally accepted and safe treatments including traditional manual therapy techniques appear to be at least as effect with less risk than dry needling.

What were the limitations of the information?

A number of studies involved small numbers of participants. So, it is unclear if the results apply to other people. In most cases, the effectiveness of dry needling was not assessed over longer periods of time. Only a few studies described clinically important reductions in pain and improvements in function. There were significant differences in how dry needling was performed in the different studies. So, it is not clear how to best apply dry needling in clinical practice.

What are the conclusions?

Dry needling is viewed as *unproven and not medically necessary*. Further research is needed before its use can be considered an established treatment option for any musculoskeletal or neurological condition.