

The consistency of reporting adverse events associated with dry needling: a narrative review

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Dry needling interventions are associated with disabling and potentially life-threatening events. Presently, undesired treatment effects are not reported consistently across the literature and as such, the degree of risk to and impact on patients cannot be clearly articulated.

To systematically summarise available literature and capture trends in the reporting of undesired treatment effects occurring during and after dry needling, we searched Scopus, PubMed, Cochrane, CINAHL, Sports Medicine and Education Index and Web of Science.

In total, 130 adverse events were reported synthesized into 31 general categories. Synthesis and risk categorisation identified “pneumothorax (bilateral)” as the only potentially life-threatening adverse event, while “acute spinal epidural haematoma”, “dysautonomia”, “nerve injury”, “pneumothorax” and “pneumothorax (self-limiting)” were reported as severe.

Uniformité du signalement des événements indésirables associés à la puncture physiothérapique avec aiguilles sèches: une revue narrative

Les interventions de puncture physiothérapique avec aiguilles sèches sont associées à des événements invalidants susceptibles de mettre en jeu le pronostic vital. À l'heure actuelle, les effets indésirables du traitement ne sont pas signalés de façon uniforme dans la littérature; il est donc impossible de caractériser clairement le niveau de risque auquel les patients sont exposés et les répercussions de ces effets sur ceux-ci.

Afin de résumer systématiquement les publications disponibles et de dégager les tendances en matière de signalement des effets indésirables survenant pendant ou après une intervention de puncture physiothérapique avec aiguilles sèches, nous avons effectué des recherches dans Scopus, PubMed, Cochrane, CINAHL, Sports Medicine & Education Index et Web of Science.

Au total, 130 événements indésirables ont été recensés et regroupés en 31 catégories générales. La synthèse des

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Adverse events resulting in more than mild, transient symptoms during or after dry needling are rare. However, the occurrence of pneumothorax and peripheral nerve injury remain of greatest concern as they are, at least in part, ascribable to clinician error.

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KEY WORDS: myofascial pain syndrome, myofascial trigger points, dry needling, data reporting, narrative review, adverse events.

Introduction

Informed patient consent forms a cornerstone of ethical standards in modern health care¹ and a clear articulation of intervention risk and benefits is integral to this process². And whilst sufficient and appropriate information is essential³, such information requires delivery in a nuanced manner, so as not to cause undue patient distress. Therefore, clarity and distinction between transient (and expected) versus serious (and unexpected) intervention complications are helpful in negotiating management plans in provider-patient partnerships.⁴

Dry needling (DN), the insertion of monofilament needles into irritable soft tissue structures, is widely utilized across manual medicine practice.⁵ The intervention is supported by a substantial body of literature, including multiple systematic reviews, indicating clinical effectiveness for pain relief, improved function and general quality-of-life outcomes.^{6,7}

DN is considered as minimally invasive⁸ with undesired treatment effects mostly limited to mild and tran-

données et la classification des risques ont permis de déterminer que le « pneumothorax (bilatéral) » était le seul événement susceptible de mettre en jeu le pronostic vital, tandis que l'« hématome épidural rachidien aigu », la « dysautonomie », la « lésion nerveuse », le « pneumothorax » et le « pneumothorax (spontanément résolutif) » étaient classés comme des événements graves.

Les événements indésirables entraînant des symptômes autres que légers et transitoires pendant ou après une intervention de puncture physiothérapique avec aiguilles sèches sont rares. Toutefois, le pneumothorax et les lésions des nerfs périphériques demeurent les principales sources de préoccupation, puisqu'ils sont, du moins en partie, imputables à une erreur du clinicien.

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MOTS CLÉS: syndrome douloureux myofascial, points gâchettes myofasciaux, puncture physiothérapique avec aiguilles sèches, présentation des données, revue narrative, événements indésirables

sient bruising, bleeding and pain⁹. However, rare disabling and potentially life-threatening events such as nerve injury and pneumothorax do occur.^{10,11}

Recently, the quality of reporting of DN interventions has come under scrutiny with investigators highlighting inconsistency as an issue that undermines intervention fidelity and transparency.^{7,12,13} This issue, appears to extend to the reporting of undesired treatment effects with current levels of reporting making it difficult to appraise relative risk and patient impact across different events.

At present, a shared common framework for presenting deleterious DN effects does not exist and one point of departure to address this issue, is through the use of standardised terminology. A preliminary scoping of available literature indicates that undesired treatment effects of DN appear to be described through a number of terms such as 'negative effects,' 'complications', 'adverse events' and 'adverse reactions'. Similarly, the level of impact of undesired treatment effects appear inconsistently categorised.^{7,9,14}

Our aim in this investigation was to summarise available literature describing undesired effects associated with DN, in order to identify common parlance. We furthermore attempted to categorise the types and severity of phenomena encountered. Additionally, we explored touchpoints for consistent clinical communication and future avenues of enquiry.

Methods

Search strategy

Our narrative review was constructed in accordance with the PRISMA checklist and explanation for scoping reviews.^{15, 16} Four keywords and their synonyms were identified from the research question to create the search query; *unintended, non-therapeutic, effect* and *dry needling*. Based on these a search strategy was created with the assistance of an expert librarian and searches performed in six search engines, namely: Scopus, Cochrane, CINAHL, Sports Medicine & Education Index, Web of Science and PubMed. The search was performed during October 2023 and updated in January 2026.

Eligibility criteria

Based on manageability and project scope considerations, we included contemporary literature published between 2013 and 2025 reporting undesired treatment effects or debates within DN. As such we included human Randomised Trials, cohort studies, clinical trials, case reports, case series, book chapters, surveys, and interview designs.

Data management and extraction

EndNote 20.6 was used for managing retrieved reports and screening titles and abstracts. Included studies were subsequently moved to Covidence for full text screening and inclusion.¹⁷ Two reviewers (MSP and JF) independently screened titles and abstracts according to standardised decision rules (see figure 1). In case of disagreement, a third screener (CM) stood as referee.

Due to delays in publication review process, we updated our search to include relevant studies in the period 2023-2025. This search was performed in January 2026. In this regard, CM and EV screened search results manually after which papers were included through consensus. From the included reports, we extracted details regarding the undesired treatment effects. These included the

term(s) used to describe the event, the symptoms/signs experienced.

Data analysis and synthesis

By adapting the Rheumatology Common Toxicity Criteria to our context, we attempted a classification of undesired treatment effects.¹⁸ To be considered mild, the patient must be asymptomatic or produce transient symptoms. Additionally, the effect must last less than a week, not alter the person's lifestyle and/or only require over-the-counter medication to resolve. Moderate undesired treatment effects are symptomatic, they last 1-2 weeks, only occasionally alter lifestyle and/or relieved by medication. Severe undesired treatment effects trigger prolonged reversible symptoms, result in major functional impairment and/or hospitalisation for less than 24 hours. Lastly, potentially life-threatening undesired treatment effects place the patient at risk of death and result substantial and/or potentially permanent disability or hospitalised for more than 24 hours. For the categorisation of undesired effects, we included only those studies reporting sufficient clinical data.

Results

The search resulted in including 87 articles for consideration and analysis from the 8909 articles that were screened: 3381 from Scopus, 1215 from Cochrane, 370 from CINAHL, 799 from Sports Medicine and Education Index, 2636 from Web of Science and 508 from PubMed. The PRISMA flow diagram of the search strategy is presented in Figure 1.

Terms used to describe unique undesired treatment effects

Adverse event (AE) was the most common term used to describe undesired treatment effects, although *adverse effects* and *adverse events* appear to have been used interchangeably. In addition, terms such as *side effects*, *complications* and *adverse reactions* were also reported (see Table 1). Finally, 11 studies omitted reporting any term. A descriptive table of included studies including details on the design, purpose, descriptive terms, recorded undesired treatment effects and intervention target can be found in Appendix 1.

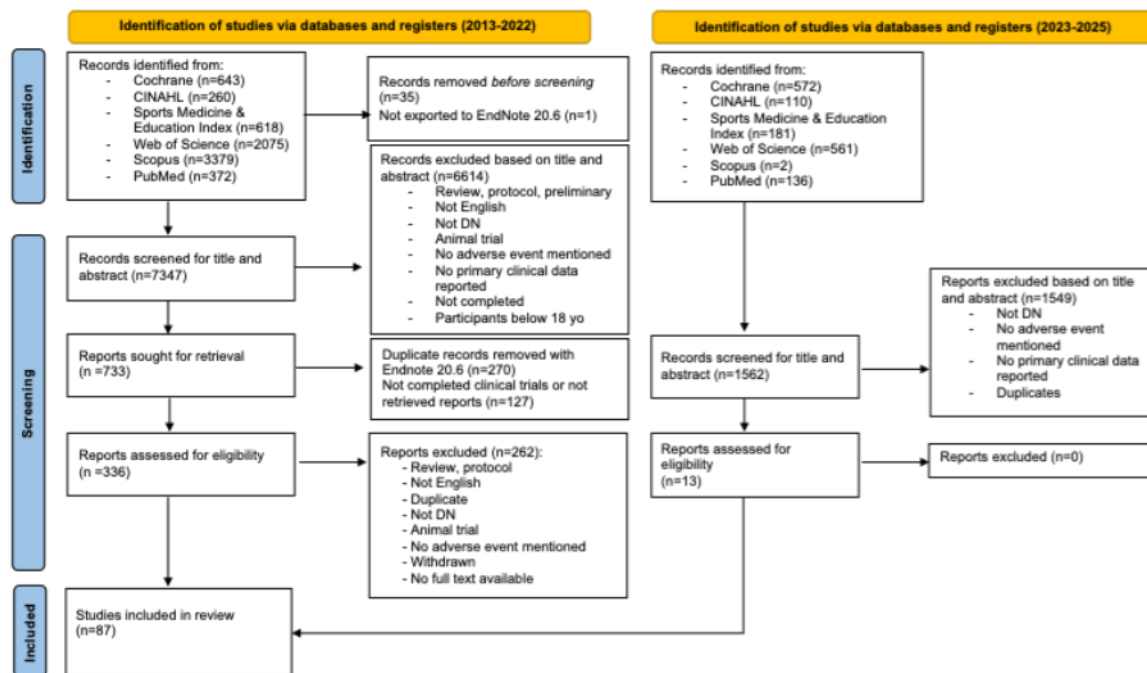


Figure 1.

PRISMA flow diagram illustrating the search strategy, including the initial and the updated searches.

Frequency of undesired treatment effects

A total of 130 undesired intervention effects were reported with “post-needling pain and soreness” (n:44), “bleeding or bruising” (n:18), and “pain during treatment” (n:14) constituting the most frequent ones (see Figure 2). We attempted to group similar AE types together, where possible, in order to limit redundancy. For example, events like “haematoma”, “slight bruising”, “local hematoma”, or “minimal localised bruising” were grouped under the umbrella term “Bleeding or bruising”. This process resulted in 31 distinct AEs.

Categorisation of undesired treatment effects identified across available literature

Inspired by the Rheumatology Common Toxicity Criteria,

16 AEs met the criteria of “Mild to moderate”, five AEs were categorised as “Severe” and only one AE was identified as “Potentially life-threatening”, with eight AEs having insufficient details reported thus not categorized by severity. “Pneumothorax (self-limiting)”, “Pneumothorax”, “Dysautonomia”, “Nerve injury”, and “Acute spinal epidural haematoma” were reported as severe AEs, while the only potentially life-threatening AE reported was “Pneumothorax (bilateral)”. The details of the categorisation are presented in Figure 2.

In eight instances no data on the effects were reported, and in four instances the severity of the effects reported could not be completed due to missing data (see also Appendix 1).

Table 1.
Adverse events by frequency of recording

Term used	Adverse event	Adverse effect	Side effect	Complication	Adverse reaction	Adverse symptom	Negative effect	Treatment reaction
Frequency	48	22	9	5	2	1	1	1

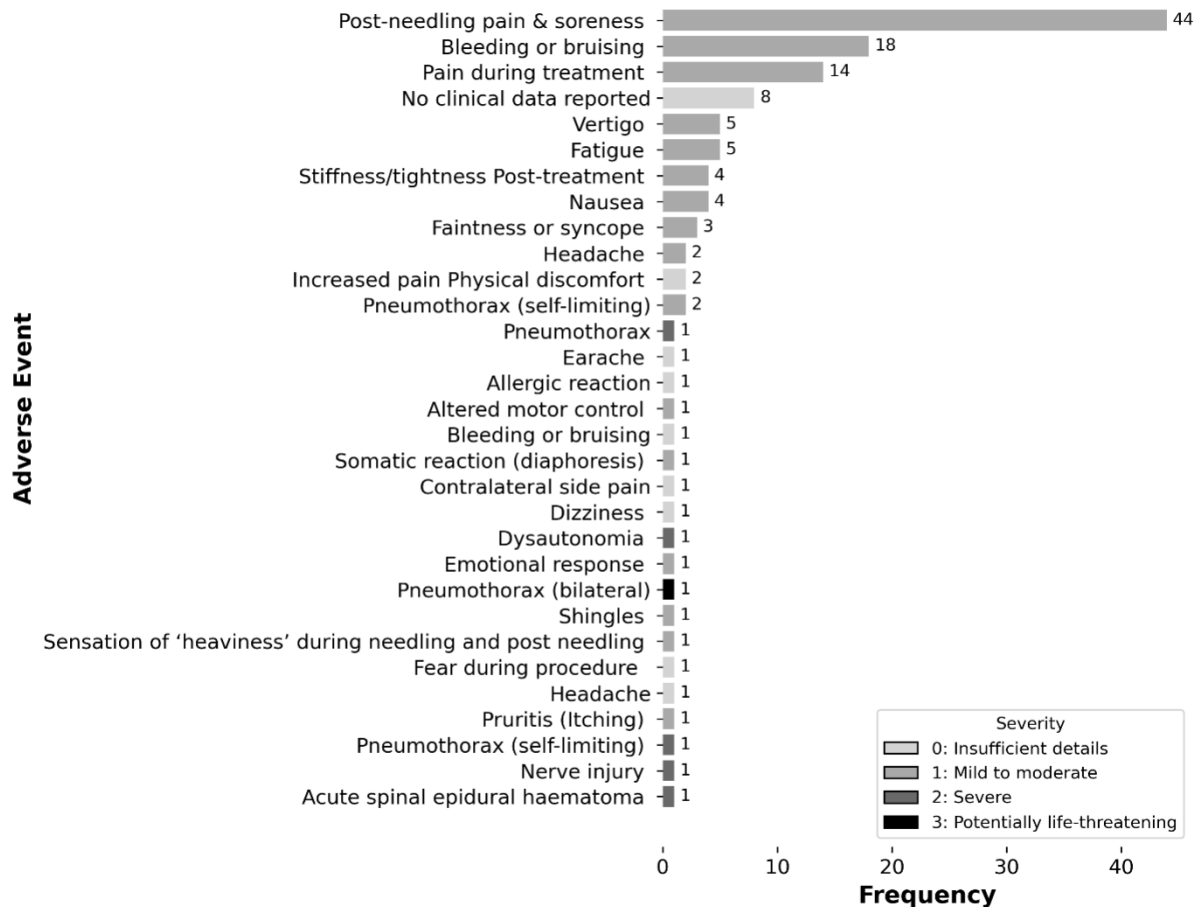


Figure 2.
Frequency and severity of AEs reported in RCTs.

Discussion

Our study supports current literature highlighting common AEs and their substantive under reporting in randomised controlled trials using DN^{12, 14, 19}. Additionally, though, our investigation provides novel insights relevant to the development of a common framework for reporting AEs. In this regard, we offer selected examples from our observed data for consideration.

Pneumothorax-Variable term, variable impact

It has previously been argued that, in order to be of use in clinical management, reporting of untoward treatment effects should not only elucidate both potential risk and severity, but also actual impact on the patient.^{20, 21}

In our study, the occurrence of a pneumothorax was categorised as a severe adverse event¹⁰, a potentially life-threatening adverse effect^{22, 23}, and a mild to moderate complication^{22, 24}. These results highlight the variable impact of a pneumothorax, despite the seriousness of its occurrence. However, it additionally highlights that the descriptive terms themselves do not carry equivalence in the literature. For example, in the case of adverse event versus effect, the former infers no causality between the DN intervention and observed phenomenon, whereas the latter does.²⁵

Peripheral nerve injury- impact and operator error

Current reporting offers little insight into the likelihood

of clinician error in relation to observed harmful effects.²⁶ This is an important consideration as severe and life-threatening harmful effects appear, at least in part, associated with operator error. A case in point is the issue of peripheral nerve injury. We identified only a single instance of nerve injury-related AE.²⁷ However, it resulted in permanent disability and occurred immediately post needle insertion. The position of vulnerable peripheral nerves, in this instance the radial nerve, can be predicted via the use of anatomical landmarks, however, this requires a high level of clinical anatomical competency and as such increases procedure risk.²⁸

Post-needle soreness- AE or not?

Post-needle pain and soreness represents almost 34% of all AEs recorded in the literature and is uniformly observed as 'mild'. However, an important question remains unresolved with respect to this phenomenon. In brief, the conventional view espoused is that post-needle soreness results as a result of a micro-injury inflammatory response induced by DN insertion.⁵ This view is essentially grounded in observations of a positive correlation between needle insertion frequency and patient reported soreness. However, a key clinical sign of a clinically effective DN intervention is the appearance of the so-called local twitch response (LTR), which is interpreted as the stimulation of hyperexcitable, dysfunctional skeletal muscle motor endplates. The removal of which, by means of repeated DN insertion, sets in motion normalisation of the muscle excitation-contraction apparatus, resulting in pain reduction and eventual function.²⁹ Although, beyond the scope of this investigation resolve, it would be prudent to pose the question whether low level post-needle soreness meets the definition of an AE, as it can reasonably be argued to be an injection site reaction occurring as part of a pre-planned procedure.³⁰

Future research

By resolving the concerns regarding internal validity in research protocols utilizing DN and satisfying patient safety standards, two significant stumbling blocks for greater inclusion of DN in treatment guidelines can be removed. It is therefore imperative that the state-of-the-art is moved forward through further conceptual clarification followed by consensus processes such as Delphi protocols.^{13,31} Areas of focus might include:

- An extension of the CONSORT guidelines governing the reporting of dry needling interventions,³²
- terminology used to describe AEs and,
- standardisation of AE reporting, for example the adopting of severity grading scales³³.

For the clinician

An acupuncture qualification may allow a practitioner to offer DN as part of their scope of practice. However, procedurally speaking DN and acupuncture are clearly distinct. As such, we would not encourage practitioners to rely on competency overlap, but rather to undergo specific DN instruction. In this way practitioners can better satisfy scrutiny regarding psychomotor skills and clinical competencies required to minimize risk, whilst optimising clinically effectiveness. With regards to psychomotor skills, applied anatomy plays a key role and we would therefore encourage visualisation of procedures through, for example, the use of diagnostic ultrasound.^{33, 34} With regards to clinical competency, focus on patient risk assessment and seeking informed consent are encouraged. Risk assessment should be integrated as a standard component of patient journals where DN is considered as a treatment option. Moreover, it should minimally include patient-related factors (e.g. medication, allergies, needle anxiety), procedure-related factors (e.g. number and location of trigger points) and potential impact (e.g. work, leisure/sport). With respect to informed consent, rare but severe AEs should be disclosed when relevant.

In the interim, and as a means of assisting clinicians and researchers, we offer a common sense guideline of the AE landscape in the following infographic (see Figure 3, below):

Strengths

This investigation used a novel methodology to systematically describe and appraise AEs using a number of search engines and therefore including a variety of source data. This approach made it possible to descriptively report on current data, but also to specifically highlight areas where reporting can be improved.

Limitations

We adapted a rheumatology guideline for the reporting of AEs. As this tool has a focus on DN-related AEs and its sequela, an argument can be made that the instrument was

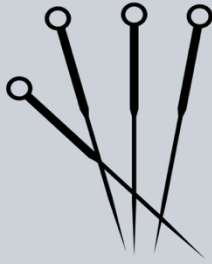
Future research	For the Clinician
	
• Consort Guidelines Extension- Standardised reporting of DN interventions • AE Terminology- Unified language for describing adverse events across studies • AE severity Grading Scales- Adoption of standardised adverse event reporting and classification	• Psychomotor skills training- Dry needle specific • Risk Assessment- Patient-related, Procedure-related, Post-intervention impact

Figure 3.
A common sense guideline of the AE landscape.

not a perfect fit for a manual intervention setting. However, as previously argued the instrument's function was to highlight variances in reporting, which did not require a customized tool. Our paper aimed to capture trends in the reporting of undesired treatment effects, rather than an exhaustive synthesis of AE reporting presenting precise incidences of reported incidences.

Conclusion

We observed a substantial variance in the parlance used to describe undesired treatment effects associated with DN across a variety of current literature. The term 'adverse event' is most commonly used across existing literature, but other terms such as 'adverse effect', 'side effect' and 'complication' also appear frequently. These terms appear to be used interchangeably. More nuanced reporting is required in order to clarify potential risk and actual impact of any particular adverse event. Additionally, terms denoting potential clinical error require consideration. Consistently adopting the term AE would be a helpful first step to address the status quo, however, consensus-gen-

erating investigations are urgently required to standardise reporting of AEs in intervention studies, enhance patient safety and to support shared decision-making practices. The occurrence of pneumothorax and peripheral nerve injury are the AEs of greatest concern in DN, with the latter perhaps being the most difficult to avoid.

CRedit authorship contribution statement

CM: Conception and design of the work, interpretation of data for the work, drafting the work and revising it critically for important intellectual content.

MSP: Conception and design of the work, data acquisition, drafting the work and revising it critically for important intellectual content.

JF: Conception and design of the work, data acquisition.

EV: Conception and design of the work, revising the work critically for important intellectual content.

All authors approved the final manuscript. CM is study guarantor.

References

1. Ng IK. Informed consent in clinical practice: Old problems, new challenges. *Journal of the Royal College of Physicians of Edinburgh*. 2024;54(2):153–8.
2. Barstow C, Shahan B, Roberts M. Evaluating medical decision-making capacity in practice. *American family physician*. 2018;98(1):40–6.
3. Coulter A, Entwistle V, Gilbert D. Sharing decisions with patients: is the information good enough? *BMJ (Clinical research ed)*. 1999;318(7179):318–22.
4. Towle A, Godolphin W, Grams G, Lamarre A. Putting informed and shared decision making into practice. *Health Expectations*. 2006;9(4):321–32.
5. Martín-Pintado-Zugasti A, Mayoral del Moral O, Gerwin R, Fernández-Carnero J. Post-needling soreness after myofascial trigger point dry needling: Current status and future research. *Journal of bodywork and movement therapies*. 2018;22(4):941–6.
6. Dunning J, Butts R, Mourad F, Young I, Flannagan S, Perreault T. Dry needling: a literature review with implications for clinical practice guidelines. *Phys Ther Rev*. 2014;19(4):252–65.
7. Myburgh C, Kildsgaard K, Damsgaard T, Corfixen K, Boyle E. Consistency of Dry-Needling Interventions Across High-Quality Randomized Trials: A Critical Systematic Exploration of Intervention Reporting and Fidelity. *Journal of Manipulative and Physiological Therapeutics*. 2021;44(7):546–57.
8. Al-Boloushi Z, Lopez-Royo MP, Arian M, Gomez-Trullen EM, Herrero P. Minimally invasive non-surgical management of plantar fasciitis: A systematic review. *Journal of bodywork and movement therapies*. 2019;23(1):122–37.
9. Brady S, McEvoy J, Dommerholt J, Doody C. Adverse events following trigger point dry needling: a prospective survey of chartered physiotherapists. *Journal of Manual & Manipulative Therapy*. 2014;22(3):134–40.
10. Cummings M, Ross-Marrs R, Gerwin R. Pneumothorax complication of deep dry needling demonstration. *Acupuncture in Medicine*. 2014;32(6):517–9.
11. Diciolla NS, Pérez-Clemente C, Cámara-Caballero M, Matienzo-Barreto A, Real-Rodríguez A, Torres-Lacomba M. Efficacy of exercise on postneedling soreness: a randomized controlled trial. *Journal of Clinical Medicine*. 2021;10(23):5527.
12. Kearns GA, Brismée J-M, Riley SP, Wang-Price S, Denninger T, Vugrin M. Lack of standardization in dry needling dosage and adverse event documentation limits outcome and safety reports: a scoping review of randomized clinical trials. *Journal of Manual & Manipulative Therapy*. 2023;31(2):72–83.
13. Ickert EC, Griswold D, Learman K, Cook C. Identifying which adverse events associated with dry needling should be included for informed consent: A modified e-Delphi study. *Physiotherapy theory and practice*. 2024;40(8):1724–36.
14. Boyce D, Wempe H, Campbell C, Fuehne S, Zylstra E, Smith G, et al. Adverse events associated with therapeutic dry needling. *International journal of sports physical therapy*. 2020;15(1):103.
15. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ (Clinical research ed)*. 2021:n71.
16. Turnbull D, Chugh R, Luck J. Systematic-narrative hybrid literature review: A strategy for integrating a concise methodology into a manuscript. *Social Sciences & Humanities Open*. 2023;7(1):100381.
17. Covidence 2023 [Available from: www.covidence.org.
18. Woodworth T, Furst DE, Alten R, Bingham C, Yocum D, Sloan V, et al. Standardizing assessment and reporting of adverse effects in rheumatology clinical trials II: the Rheumatology Common Toxicity Criteria v. 2.0. *The Journal of Rheumatology*. 2007;34(6):1401–14.
19. Halle JS, Halle RJ. PERTINENT DRY NEEDLING CONSIDERATIONS FOR MINIMIZING ADVERSE EFFECTS – PART TWO. *International journal of sports physical therapy*. 2016;11(5):810–9.
20. Carnes D, Mars TS, Mullinger B, Froud R, Underwood M. Adverse events and manual therapy: A systematic review. *Manual therapy*. 2010;15(4):355–63.
21. Carnes D, Mullinger B, Underwood M. Defining adverse events in manual therapies: A modified delphi consensus study. *International Journal of Osteopathic Medicine*. 2010;13(3):94–8.
22. Patel N, Patel M, Poustinchian B. Dry needling–induced pneumothorax. *Journal of Osteopathic Medicine*. 2019;119(1):59–62.
23. Dalton B, Swarbrigg C, Raman V, Sheehy M, Glynn S. Acupuncture-D-bilateral pneumothoraces following dry needling. *Ir Med J*. 2022;115(2):P546.
24. Uzar T, Turkmen I, Menekse EB, Dirican A, Ekaterina P, Ozkaya S. A case with iatrogenic pneumothorax due to deep dry needling. *Radiology case reports*. 2018;13(6):1246–8.
25. Aronson JK. When I use a word . . . Medical definitions: adverse events, effects, and reactions. *BMJ (Clinical research ed)*. 2023;381:p917.
26. Oyeboode F. Clinical Errors and Medical Negligence. *Medical Principles and Practice*. 2013;22(4):323–33.
27. McManus R, Cleary M. Radial nerve injury following dry needling. *Case Reports*. 2018;2018:bcr-2017-221302.
28. Cox CL, Riherd D, Tubbs RS, Bradley E, Lee DH. Predicting radial nerve location using palpable landmarks. *Clinical Anatomy*. 2010;23(4):420–6.
29. Fernández-de-Las-Peñas C, Plaza-Manzano G, Sanchez-Infante J, Gómez-Chiguano GF, Cleland JA, Arias-

- Buria JL, et al. The importance of the local twitch response during needling interventions in spinal pain associated with myofascial trigger points: a systematic review and meta-analysis. *Acupuncture in Medicine*. 2022;40(4):299–311.
30. Franklin A, Kalenderian E, Hebballi N, Delattre V, Etoule J, White J, et al. Building consensus for a shared definition of adverse events: a case study in the profession of dentistry. *Journal of patient safety*. 2022;18(5):470–4.
 31. Hasson F, Keeney S, McKenna H. Research guidelines for the Delphi survey technique. *J Adv Nurs*. 2000;32(4):1008–15.
 32. MacPherson H, Altman DG, Hammerschlag R, Youping L, Taixiang W, White A, et al. Revised STAndards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA): Extending the CONSORT Statement. *Journal of evidence-based medicine*. 2010;3(3):140–55.
 33. Valera-Calero JA, Plaza-Manzano G, Rabanal-Rodríguez G, Díaz-Arribas MJ, Kobylarz MD, Buffet-García J, et al. Current state of dry needling practices: a comprehensive analysis on use, training, and safety. *Medicina*. 2024;60(11):1869.
 34. Bagcier F, Yurdakul OV. A safer way of dry needling therapy for gastrocnemius muscles: ultrasound guidance. *Medical Ultrasonography*. 2020;22(4):495–6.
 35. Adams Z, Stewart R, Taylor A, Scifers JR. Dry needling. *Athletic Training & Sports Health Care*. 2020;12(2):53–5.
 36. Albin S, Koppenhaver S, MacDonald C, Capoccia S, Ngo D, Phippen S, et al. The effect of dry needling on gastrocnemius muscle stiffness and strength in participants with latent trigger points. *Journal of Electromyography and Kinesiology*. 2020;55:102479.
 37. Al-Boloushi Z, Gómez-Trullén EM, Arian M, Fernández D, Herrero P, Bellósta-López P. Comparing two dry needling interventions for plantar heel pain: a randomised controlled trial. *BMJ open*. 2020;10(8):e038033.
 38. Alfaddagh TZ, Al-Natour S, Al-Natour SH. Multidermatomal Shingles Occurrence Post-therapeutic Dry Needling (TDN) in a Saudi Woman. *Cureus*. 2022;14(5).
 39. Almushahhim M, Nuhmani S, Joseph R, Muslem WHA, Abualait T. Short-term effects of dry needling with a standard exercise program on pain and quality of life in patients with chronic mechanical neck pain. *Journal of Clinical Medicine*. 2022;11(20):6167.
 40. Anandkumar S, Manivasagam M. Effect of fascia dry needling on non-specific thoracic pain—a proposed dry needling grading system. *Physiotherapy theory and practice*. 2017;33(5):420–8.
 41. Arias-Burúa JL, Franco-Hidalgo-Chacón MM, Cleland JA, Palacios-Ceña M, Fuensalida-Novo S, Fernández-de-Las-Peñas C. Effects of kinesio taping on post-needling induced pain after dry needling of active trigger point in individuals with mechanical neck pain. *Journal of Manipulative and Physiological Therapeutics*. 2020;43(1):32–42.
 42. Arias-Burúa JL, Monroy-Acevedo Á, Fernández-de-Las-Peñas C, Gallego-Sendarrubias GM, Ortega-Santiago R, Plaza-Manzano G. Effects of dry needling of active trigger points in the scalene muscles in individuals with mechanical neck pain: a randomized clinical trial. *Acupuncture in Medicine*. 2020;38(6):380–7.
 43. Arias-Burúa JL, Valero-Alcaide R, Cleland JA, Salom-Moreno J, Ortega-Santiago R, Atín-Arratibel MA, et al. Inclusion of trigger point dry needling in a multimodal physical therapy program for postoperative shoulder pain: a randomized clinical trial. *Journal of manipulative and physiological therapeutics*. 2015;38(3):179–87.
 44. Baraja-Vegas L, Martín-Rodríguez S, Piqueras-Sanchiz F, Faundez-Aguilera J, Bautista IJ, Barrios C, et al. Localization of muscle edema and changes on muscle contractility after dry needling of latent trigger points in the gastrocnemius muscle. *Pain medicine*. 2019;20(7):1387–94.
 45. Benito-de-Pedro M, Becerro-de-Bengoa-Vallejo R, Elena Losa-Iglesias M, Rodríguez-Sanz D, López-López D, Palomo-López P, et al. Effectiveness of deep dry needling vs ischemic compression in the latent myofascial trigger points of the shortened triceps surae from triathletes on ankle dorsiflexion, dynamic, and static plantar pressure distribution: A clinical trial. *Pain Medicine*. 2020;21(2):e172–e81.
 46. Berrigan WA, Whitehair CL, Zorowitz RD. Acute spinal epidural hematoma as a complication of dry needling: a case report. *Pm&r*. 2019;11(3):313–6.
 47. Brennan K, Elifritz KM, Comire MM, Jupiter DC. Rate and maintenance of improvement of myofascial pain with dry needling alone vs. dry needling with intramuscular electrical stimulation: a randomized controlled trial. *Journal of Manual & Manipulative Therapy*. 2021;29(4):216–26.
 48. Brewster BD, Snyder Valier AR, Falsone S. A systematic dry-needling treatment to support recovery posttraining for division I ice hockey athletes: an exploration case series. *Journal of athletic training*. 2022;57(8):788–94.
 49. Calvo-Lobo C, Pacheco-da-Costa S, Martínez-Martínez J, Rodríguez-Sanz D, Cuesta-Álvaro P, López-López D. Dry needling on the infraspinatus latent and active myofascial trigger points in older adults with nonspecific shoulder pain: a randomized clinical trial. *Journal of geriatric physical therapy*. 2018;41(1):1–13.
 50. Casanueva B, Rivas P, Roderio B, Quintial C, Llorca J, González-Gay MA. Short-term improvement following dry needle stimulation of tender points in fibromyalgia. *Rheumatology international*. 2014;34:861–6.
 51. Clark NG, Hill CJ, Koppenhaver SL, Massie T, Cleland

- JA. The effects of dry needling to the thoracolumbar junction multifidi on measures of regional and remote flexibility and pain sensitivity: A randomized controlled trial. *Musculoskeletal Science and Practice*. 2021;53:102366.
52. Cotchett MP, Munteanu SE, Landorf KB. Effectiveness of trigger point dry needling for plantar heel pain: a randomized controlled trial. *Physical therapy*. 2014;94(8):1083–94.
53. Cuenca Zaldivar JN, Calvo S, Bravo-Esteban E, Oliva Ruiz P, Santi-Cano MJ, Herrero P. Effectiveness of dry needling for upper extremity spasticity, quality of life and function in subacute phase stroke patients. *Acupuncture in Medicine*. 2021;39(4):299–308.
54. Dunning J, Butts R, Bliton P, Vathrakokoilis K, Smith G, Lineberger C, et al. Dry needling and upper cervical spinal manipulation in patients with temporomandibular disorder: A multi-center randomized clinical trial. *CRANIO®*. 2024;42(6):809–22.
55. Espí-López GV, Serra-Añó P, Vicent-Ferrando J, Sánchez-Moreno-Giner M, Arias-Buría JL, Cleland J, et al. Effectiveness of inclusion of dry needling in a multimodal therapy program for patellofemoral pain: A randomized parallel-group trial. *Journal of orthopaedic & sports physical therapy*. 2017;47(6):392–401.
56. Farley J, Taylor-Swanson L, Koppenhaver S, Thackeray A, Magel J, Fritz JM. The Effect of Combining Spinal Manipulation and Dry Needling in Individuals With Nonspecific Low Back Pain. *The Journal of Pain*. 2024;25(8):104506.
57. Gallego-Sendarrubias GM, Voogt L, Arias-Buría JL, Braithwaite FA, Fernández-de-Las-Peñas C. Effects of previous experience with dry needling therapy on blinding effectiveness and pain outcomes in people with neck pain: A preliminary sham-controlled study. *Musculoskeletal Science and Practice*. 2022;58:102515.
58. Gascon-Garcia J, López-Marne S, Dominguez-Rubio R, de Aragón AM, Girabent-Farrés M, Bagur-Calafat C. Efficacy of dry needling with the fascial winding technique in reducing the percentage of surgery in carpal tunnel syndrome: A randomized clinical trial. *Journal of bodywork and movement therapies*. 2025;42:408–16.
59. Gattie E, Cleland JA, Snodgrass S. A survey of American physical therapists' current practice of dry needling: Practice patterns and adverse events. *Musculoskeletal Science and Practice*. 2020;50:102255.
60. Gaubeca-Gilarranz A, Fernández-De-Las-Peñas C, Medina-Torres JR, Seoane-Ruiz JM, Company-Palónés A, Cleland JA, et al. Effectiveness of dry needling of rectus abdominis trigger points for the treatment of primary dysmenorrhoea: a randomised parallel-group trial. *Acupuncture in Medicine*. 2018;36(5):302–10.
61. Gildir S, Tüzün EH, Eroğlu G, Eker L. A randomized trial of trigger point dry needling versus sham needling for chronic tension-type headache. *Medicine*. 2019;98(8):e14520.
62. Hasuo H, Ishiki H, Matsuda Y, Matsuoka H, Kosugi K, Xing M, et al. Trigger point injections for myofascial pain in terminal cancer: a randomized trial. *Pain Medicine*. 2025;26(1):14–21.
63. Jenkins LC, Summers SJ, Nasser A, Verhagen A. Dry needling perceptions and experiences: A survey of Australian physiotherapists. *Musculoskeletal Science and Practice*. 2024;69:102895.
64. Jiménez-Sánchez C, Gómez-Soriano J, Bravo-Esteban E, Mayoral-del Moral O, Herrero-Gállego P, Serrano-Muñoz D, et al. Effects of dry needling on biomechanical properties of the myofascial trigger points measured by myotonometry: a randomized controlled trial. *Journal of Manipulative and Physiological Therapeutics*. 2021;44(6):467–74.
65. Khanittanuphong P, Saesim A. Comparison of the effectiveness between dry needling with and without needle retention in myofascial trigger points in upper trapezius muscle: A randomized comparative trial. *Journal of back and musculoskeletal rehabilitation*. 2022;35(6):1247–55.
66. Koppenhaver SL, Walker MJ, Smith RW, Booker JM, Walkup ID, Su J, et al. Baseline examination factors associated with clinical improvement after dry needling in individuals with low back pain. *Journal of orthopaedic & sports physical therapy*. 2015;45(8):604–12.
67. Koppenhaver SL, Weaver AM, Randall TL, Hollins RJ, Young BA, Hebert JJ, et al. Effect of dry needling on lumbar muscle stiffness in patients with low back pain: A double blind, randomized controlled trial using shear wave elastography. *Journal of Manual & Manipulative Therapy*. 2022;30(3):154–64.
68. Korkmaz MD, Ceylan CM. Effect of dry-needling and exercise treatment on myofascial trigger point: A single-blind randomized controlled trial. *Complementary therapies in clinical practice*. 2022;47:101571.
69. Kuźdżał A, Clemente FM, Kawczyński A, Ryszkiewicz I, Trybalski R. Comparing the effects of compression contrast therapy and dry needling on muscle functionality, pressure pain threshold, and perfusion after isometric fatigue in forearm muscles of combat sports athletes: A Single-Blind randomized controlled trial. *Journal of Sports Science & Medicine*. 2024;23(3):548.
70. Llamas-Ramos R, Pecos-Martín D, Gallego-Izquierdo T, Llamas-Ramos I, Plaza-Manzano G, Ortega-Santiago R, et al. Comparison of the short-term outcomes between trigger point dry needling and trigger point manual therapy for the management of chronic mechanical neck pain: a randomized clinical trial. *Journal of orthopaedic & sports physical therapy*. 2014;44(11):852–61.
71. Martín-Pintado-Zugasti A, Fernández-Carnero J, León-Hernández JV, Calvo-Lobo C, Beltran-Alacreu

- H, Alguacil-Diego I, et al. Postneedling soreness and tenderness after different dosages of dry needling of an active myofascial trigger point in patients with neck pain: A randomized controlled trial. *Pm&r*. 2018;10(12):1311–20.
72. Martín-Pintado-Zugasti A, Pecos-Martin D, Rodríguez-Fernández ÁL, Alguacil-Diego IM, Portillo-Aceituno A, Gallego-Izquierdo T, et al. Ischemic compression after dry needling of a latent myofascial trigger point reduces postneedling soreness intensity and duration. *PM&R*. 2015;7(10):1026–34.
 73. Martín-Pintado-Zugasti A, Rodríguez-Fernández ÁL, Fernandez-Carnero J. Postneedling soreness after deep dry needling of a latent myofascial trigger point in the upper trapezius muscle: Characteristics, sex differences and associated factors. *Journal of back and musculoskeletal rehabilitation*. 2016;29(2):301–8.
 74. Zugasti AM-P, Rodríguez-Fernández ÁL, García-Muro F, López-López A, Mayoral O, Mesa-Jiménez J, et al. Effects of spray and stretch on postneedling soreness and sensitivity after dry needling of a latent myofascial trigger point. *Archives of physical medicine and rehabilitation*. 2014;95(10):1925–32. e1.
 75. Martín-Rodríguez A, Sáez-Olmo E, Pecos-Martín D, Calvo-Lobo C. Effects of dry needling in the sternocleidomastoid muscle on cervical motor control in patients with neck pain: a randomised clinical trial. *Acupuncture in Medicine*. 2019;37(3):151–63.
 76. McDowell JM, Kohut SH, Johnson GM. Trigger point acupuncture (dry needling) and associated fecal incontinence in multiple sclerosis: a case report. *Med Acupunct*. 2015;27(4):283–7.
 77. Mejuto-Vázquez MJ, Salom-Moreno J, Ortega-Santiago R, Truyols-Domínguez S, Fernández-De-Las-peñas C. Short-term changes in neck pain, widespread pressure pain sensitivity, and cervical range of motion after the application of trigger point dry needling in patients with acute mechanical neck pain: a randomized clinical trial. *Journal of Orthopaedic & Sports Physical Therapy*. 2014;44(4):252–60.
 78. Mendigutía-Gómez A, Quintana-García MT, Martín-Sevilla M, de Lorenzo-Barrientos D, Rodríguez-Jiménez J, Fernández-de-Las-Peñas C, et al. Post-needling soreness and trigger point dry needling for hemiplegic shoulder pain following stroke. *Acupuncture in Medicine*. 2020;38(3):150–7.
 79. Mengi A, Bulut GT. The effect of combining physiotherapy with dry needling in patients with cervical spondylosis: A randomized controlled trial. *Journal of back and musculoskeletal rehabilitation*. 2024;37(5):1213–21.
 80. Mintken PE, Denman B, Dommerholt J. Pneumothorax After Dry Needling of Intrascapular Muscles Using a Rib Bracketing Technique: Insights from the Clinician, Patient, and Clinical Expert. *Physical therapy*. 2025:pzaf078.
 81. Morgan BC, Deyle GD, Petersen EJ, Allen CS, Koppenhaver SL. Dry needling in the management of patients meeting clinical diagnostic criteria for subacromial pain syndrome: a case series. *International journal of sports physical therapy*. 2019;14(4):637.
 82. Mousavi-Khatir SR, Fernandez-de-Las-Penas C, Saadat P, Javanshir K, Zohrevand A. The effect of adding dry needling to physical therapy in the treatment of cervicogenic headache: a randomized controlled trial. *Pain Medicine*. 2022;23(3):579–89.
 83. Naseri F, Dadgoo M, Pourahmadi M, Amroodi MN, Azizi S, Shamsi A. Dry needling as an adjunct treatment to multimodal rehabilitation protocol following rotator cuff repair surgery: a preliminary, randomized sham-controlled trial. *Chiropractic & manual therapies*. 2024;32(1):39.
 84. Onat SS, Polat CS, Bicer S, Sahin Z, Tasoglu O. Effect of dry needling injection and kinesiotaping on pain and quality of life in patients with mechanical neck pain. *Pain physician*. 2019;22(6):583.
 85. Pai MYB, Toma JT, Kaziyama HHS, Listik C, Galhardoni R, Yeng LT, et al. Dry needling has lasting analgesic effect in shoulder pain: a double-blind, sham-controlled trial. *Pain reports*. 2021;6(2):e939.
 86. Raeissadat SA, Rayegani SM, Sadeghi F, Rahimi-Dehghan S. Comparison of ozone and lidocaine injection efficacy vs dry needling in myofascial pain syndrome patients. *J Pain Res*. 2018:1273–9.
 87. Rahbar M, Kargar A, Eslamian F, Dolatkha N. Comparing the efficacy of dry needling and extracorporeal shock wave therapy in treatment of plantar fasciitis. *Journal of Mazandaran University of Medical Sciences*. 2018;28(164):53–62.
 88. Rajkannan P, Vijayaraghavan R. Dry needling in chronic abdominal wall pain of uncertain origin. *Journal of bodywork and movement therapies*. 2019;23(1):94–8.
 89. Şahin SS, Şişman AÇ, Atar E, Kilaç H, Sultanoğlu EG. Comparison of the effectiveness of botulinum toxin, dry needling, pharmacological treatment, and manual therapy for bruxism-induced myalgia: a prospective randomized study. *Journal of Oral & Facial Pain and Headache*. 2024;38(4):101.
 90. Salom-Moreno J, Ayuso-Casado B, Tamaral-Costa B, Sánchez-Milá Z, Fernández-de-Las-Peñas C, Albuquerque-Sendín F. Trigger point dry needling and proprioceptive exercises for the management of chronic ankle instability: a randomized clinical trial. *Evidence-Based Complementary and Alternative Medicine*. 2015;2015(1):790209.
 91. Salom-Moreno J, Jiménez-Gómez L, Gómez-Ahufinger V, Palacios-Ceña M, Arias-Buría JL, Koppenhaver SL, et al. Effects of low-load exercise on postneedling-

- induced pain after dry needling of active trigger point in individuals with subacromial pain syndrome. *PM&R*. 2017;9(12):1208–16.
92. Sánchez Romero EA, Fernández-Carnero J, Calvo-Lobo C, Ochoa Saez V, Burgos Caballero V, Pecos-Martín D. Is a combination of exercise and dry needling effective for knee OA? *Pain Medicine*. 2020;21(2):349–63.
93. Sánchez Romero EA, Lim T, Villafañe JH, Boutin G, Riquelme Aguado V, Martín Pintado-Zugasti A, et al. The influence of verbal suggestion on post-needling soreness and pain processing after dry needling treatment: an experimental study. *International Journal of Environmental Research and Public Health*. 2021;18(8):4206.
94. Settergren R. Treatment of supraspinatus tendinopathy with ultrasound guided dry needling. *J Chiropr Med*. 2013;12(1):26–9.
95. Shanmugam S, Mathias L, Thakur A. Effect of Dry-Needling Induced Muscle Soreness (DIMS) on the Severity of Pain Post Deep Trigger Point Needling. *Journal of Clinical & Diagnostic Research*. 2018;12(7).
96. Sharma G, Patil A, Kaur P, Rajesh S, Drakonaki E, Botchu R. Comparison of efficacy of ultrasound-guided platelet rich plasma injection versus dry needling in lateral epicondylitis—a randomised controlled trial. *Journal of Ultrasound*. 2024;27(2):315–21.
97. Solomons L, Lee JJ, Bruce M, White LD, Scott A. Intramuscular stimulation vs sham needling for the treatment of chronic midportion Achilles tendinopathy: a randomized controlled clinical trial. *PloS one*. 2020;15(9):e0238579.
98. Sterling M, Vicenzino B, Souvlis T, Connelly LB. Dry-needling and exercise for chronic whiplash-associated disorders: a randomized single-blind placebo-controlled trial. *Pain*. 2015;156(4):635–43.
99. Stieven FF, Ferreira GE, Wiebusch M, de Araújo FX, da Rosa LHT, Silva MF. Dry needling combined with guideline-based physical therapy provides no added benefit in the management of chronic neck pain: a randomized controlled trial. *Journal of Orthopaedic & Sports Physical Therapy*. 2020;50(8):447–54.
100. Tabatabaiee A, Takamjani IE, Sarrafzadeh J, Salehi R, Ahmadi M. Ultrasound-guided dry needling decreases pain in patients with piriformis syndrome. *Muscle & nerve*. 2019;60(5):558–65.
101. Taşoğlu Ö, Şahin Onat Ş, Bölük H, Taşoğlu İ, Özgirgin N. Comparison of two different dry-needling techniques in the treatment of myofascial pain syndrome. *Agri*. 2017;29(1):9–16.
102. Thompson R, Prosell M, Timpka T. Elite athletes' experiences of musculoskeletal pain management using neuroanatomical dry needling: A qualitative study in Swedish track and field. *Journal of Science and Medicine in Sport*. 2021;24(1):46–51.
103. Toprak CS, Unubol TO. Effectiveness of dry needling in the treatment of neck pain and disability associated with myofascial trigger points. *Marmara Medical Journal*. 2021;34(1):40–4.
104. Uygur E, Aktaş B, Özkut A, Erinc S, Yilmazoglu EG. Dry needling in lateral epicondylitis: a prospective controlled study. *International orthopaedics*. 2017;41:2321–5.
105. Valiente-Castrillo P, Martín-Pintado-Zugasti A, Calvo-Lobo C, Beltran-Alacreu H, Fernández-Carnero J. Effects of pain neuroscience education and dry needling for the management of patients with chronic myofascial neck pain: a randomized clinical trial. *Acupuncture in Medicine*. 2021;39(2):91–105.
106. Velázquez-Saornil J, Ruíz-Ruiz B, Rodríguez-Sanz D, Romero-Morales C, López-López D, Calvo-Lobo C. Efficacy of quadriceps vastus medialis dry needling in a rehabilitation protocol after surgical reconstruction of complete anterior cruciate ligament rupture. *Medicine*. 2017;96(17):e6726.
107. Wang-Price S, Zafereo J, Couch Z, Brizzolara K, Heins T, Smith L. Short-term effects of two deep dry needling techniques on pressure pain thresholds and electromyographic amplitude of the lumbosacral multifidus in patients with low back pain—a randomized clinical trial. *Journal of Manual & Manipulative Therapy*. 2020;28(5):254–65.
108. Wilging S, Mansfield C, Rethman K, Boucher L, Oñate J, Briggs M. A pilot study examining the feasibility and effects of dry needling on pain during strength testing for individuals with bilateral patellofemoral pain and high kinesiophobia. *Journal of bodywork and movement therapies*. 2025;42:1128–34.
109. Yargic M, Kurklu G. Reflex anoxic seizures (RAS) during dry needling. *Hippokratia*. 2019;23(1):45.
110. Yılmaz N, Erdal A, Demir O. A comparison of dry needling and kinesiotaping therapies in myofascial pain syndrome: A randomized clinical study. *Turkish journal of physical medicine and rehabilitation*. 2020;66(3):351.
111. Zheng Y, Shi D, Wu X, Gu M, Ai Z, Tang K, et al. Ultrasound-guided miniscapel-needle release versus dry needling for chronic neck pain: a randomized controlled trial. *Evidence-Based Complementary and Alternative Medicine*. 2014;2014(1):235817.

Appendix 1.

Descriptive table of included studies by design, purpose, descriptive terms, recorded undesired treatment effects and intervention target.

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
1.	³⁵ <i>Dry needling.</i>	Clinical round table	Gain insight in how clinicians use dry needling.	Negative effect	No clinical data reported
2.	³⁶ <i>The effect of dry needling on gastrocnemius muscle stiffness and strength in participants with latent trigger points.</i>	RCT	The study assessed the short-term effect of two sessions of dry needling on muscle stiffness in individuals with latent myofascial trigger points in the gastrocnemius muscle.	Adverse event	Bleeding or bruising (Mild) Post needling pain & soreness (Mild)
3.	³⁷ <i>Comparing two dry needling interventions for plantar heel pain: a randomised controlled trial</i>	RCT	To compare the effectiveness of dry needling versus percutaneous needle electrolysis for improving the level of pain, function, and quality of life of patients suffering from plantar heel pain caused by myofascial trigger points.	Adverse event and adverse effect	Bleeding or bruising (Mild) Pain during treatment (Mild)
4.	³⁸ <i>Multidermatomal Shingles Occurrence Post-therapeutic Dry Needling (TDN) in a Saudi Woman</i>	Case report	We present a case of shingles following TDN.	No term reported	Pain during treatment (Mild) Bleeding or bruising (Mild) Shingles (Moderate)
5.	³⁹ <i>Short-Term Effects of Dry Needling with a Standard Exercise Program on Pain and Quality of Life in Patients with Chronic Mechanical Neck Pain</i>	RCT	To determine the short-term effects of dry needling with a standardised exercise program on pain and quality of life in patients with chronic mechanical neck pain.	Significant adverse event and mild adverse effect	Bleeding or bruising (Mild) Post needling pain & soreness (Mild)
6.	⁴⁰ <i>Effect of fascia dry needling on non-specific thoracic pain – A proposed dry needling grading system</i>	Case report	This case report describes the physical therapy management of a patient with fascia restriction using DN, posture education, and exercise therapy.	No term reported	Sensation of ‘heaviness’ during needling and post needling (Mild)
7.	⁴¹ <i>Effects of Kinesio Taping on Post-Needling Induced Pain After Dry Needling of Active Trigger Point in Individuals With Mechanical Neck Pain</i>	RCT	To determine the effectiveness of the application of kinesio taping on reducing induced pain after dry needling of active trigger points in the upper trapezius muscle in individuals with mechanical neck pain.	Adverse event	Post needling pain & soreness (Mild)
8.	⁴² <i>Effects of dry needling of active trigger points in the scalene muscles in individuals with mechanical neck pain: a randomized clinical trial</i>	RCT	To compare the effects of dry needling versus pressure release over scalene muscle trigger points on pain, related disability, and inspiratory vital capacity in individuals with neck pain.	Adverse event Adverse effect	Post needling pain & soreness (Mild)
9.	⁴³ <i>Inclusion of trigger point dry needling in a multimodal physical therapy program for postoperative shoulder pain: A randomized clinical trial</i>	RCT	The purpose of this study was to evaluate the effects of including one session of trigger point dry needling into a multimodal physiotherapy treatment on pain and function in postoperative shoulder pain.	Adverse event Adverse effect	Post needling pain & soreness (Mild)

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
10.	⁴⁴ <i>Localization of Muscle Edema and Changes on Muscle Contractility after Dry Needling of Latent Trigger Points in the Gastrocnemius Muscle.</i>	Between-group design	To identify the presence of muscle edema after the application of dry needling and to investigate if the identified muscle edema was associated with changes in muscle contractile properties and soreness.	No term reported	Post needling pain & soreness (Mild)
11.	⁴⁵ <i>Effectiveness of deep dry needling vs ischemic compression in the latent myofascial trigger points of the shortened triceps surae from triathletes on ankle dorsiflexion, dynamic, and static plantar pressure distribution: a clinical trial.</i>	RCT	To determine the immediate efficacy of a single session of deep dry needling versus ischemic compression in a latent myofascial trigger point of the shortened triceps surae from triathletes for ankle dorsiflexion and redistribution of plantar pressures and stability.	Adverse effect	Bleeding or bruising (Mild)
12.	⁴⁶ <i>Acute spinal epidural hematoma as a complication of dry needling: A case report</i>	Case report	Describes the complication of epidural hematoma induced by dry needling.	Adverse event	Acute spinal epidural haematoma (Severe)
13.	¹⁴ <i>Adverse events associated with therapeutic dry needling.</i>	Prospective questionnaire design.	Survey to determine the adverse effects in DN	Major and minor adverse event	No clinical data reported
14.	⁹ <i>Adverse events following trigger point dry needling: A prospective survey of chartered physiotherapists</i>	Prospective questionnaire design	To determine the incidence of adverse events associated with the use of trigger point dry needling as practiced by a sample of physiotherapists with David G Simons Academy training in Ireland.	Common and uncommon adverse event	No clinical data reported
15.	⁴⁷ <i>Rate and maintenance of improvement of myofascial pain with dry needling alone vs. dry needling with intramuscular electrical stimulation: a randomized controlled trial.</i>	RCT	To determine the difference in rate and maintenance of improvement of pain and disability for dry needling compared to dry needling with intramuscular electrical stimulation in myofascial pain syndrome.	Adverse event	Faintness or syncope (Mild)
16.	⁴⁸ <i>A Systematic Dry-Needling Treatment to Support Recovery Post training for Division Ice Hockey Athletes: An Exploration Case Series.</i>	Case series	To explore the use of a systematic dry needling lower extremity protocol in healthy collegiate ice hockey athletes to promote recovery post-exercise	Adverse reaction	Pain during treatment (Mild)
17.	⁴⁹ <i>Dry Needling on the Infraspinatus Latent and Active Myofascial Trigger Points in Older Adults with Nonspecific Shoulder Pain: A Randomized Clinical Trial.</i>	RCT	To demonstrate that only one intervention on one latent trigger point with dry needling of the infraspinatus can improve motor function and reduce the nociceptive input, in nonspecific shoulder pain and in the satellite trigger point located in the referred pain area in older adults, when added to the treatment of the key active trigger point.	Adverse effect	Bleeding or bruising (Mild)

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
18.	⁵⁰ <i>Short-term improvement following dry needle stimulation of tender points in fibromyalgia.</i>	RCT	To investigate the efficacy of dry needling as a complementary treatment of severely affected Fibromyalgia patients. To establish whether this procedure might still yield some clinical improvement 6 weeks post-intervention.	Adverse effect	Increased pain Physical discomfort Insufficient details reported
19.	⁵¹ <i>The effects of dry needling to the thoracolumbar junction multifidi on measures of regional and remote flexibility and pain sensitivity: A randomized controlled trial.</i>	RCT	To describe the effects of dry needling applied to the T12 and L1 multifidi on regional and remote flexibility.	Adverse event	Post needling pain & soreness (Mild)
20.	⁵² <i>Effectiveness of trigger point dry needling for plantar heel pain: A randomized controlled trial.</i>	RCT	To evaluate the effectiveness of trigger point dry needling for treatment of plantar heel pain	Adverse event	Post needling pain & soreness (Mild) Bleeding or bruising (Mild)
21.	⁵³ <i>Effectiveness of dry needling for upper extremity spasticity, quality of life and function in subacute phase stroke patients.</i>	Non randomized single-centre study	To evaluate the effectiveness of deep dry needling on affected arm functionality throughout 8 weeks of treatment in patients with stroke in the subacute phase.	Adverse effect Adverse event	Bleeding or bruising (Mild)
22.	¹⁰ <i>Pneumothorax complication of deep dry needling demonstration.</i>	Case report	Reports a case of a 55-year-old female experiencing a pneumothorax after deep dry needling of the Iliocostalis muscle.	Adverse event	Pneumothorax (self-limiting) (Severe)
23.	²³ <i>“Acupuncture-D” – Bilateral Pneumothoraces Following Dry Needling.</i>	Case report	Reports a case of a 24-year-old female presenting with bilateral pneumothoraces following dry needling.	Adverse effect	Pneumothorax (bilateral) (Life threatening)
24.	¹¹ <i>Efficacy of exercise on postneedling soreness: a randomized controlled trial.</i>	RCT	To investigate the efficacy of concentric, eccentric, and isometric exercise protocols on the post-needling soreness after the dry needling of latent myofascial trigger points in the medial gastrocnemius muscle.	Adverse effect	Post needling pain & soreness (Mild)
25.	⁵⁴ <i>Dry needling and upper cervical spinal manipulation in patients with temporomandibular disorder: A multi-center randomized clinical trial.</i>	RCT	To compare the effects of dry needling and upper cervical spinal manipulation with interocclusal splint therapy, diclofenac, and temporomandibular joint mobilization in patients with temporomandibular disorder.	Adverse event	Post needling pain & soreness (Mild) Bleeding or bruising (Mild) Fatigue (Mild) Headache (Mild) Nausea (Mild)
26.	⁵⁵ <i>Effectiveness of Inclusion of Dry Needling in a Multimodal Therapy Program for Patellofemoral Pain: A Randomized Parallel-Group Trial.</i>	RCT	To compare the effects of adding trigger point dry needling to a manual therapy and exercise program on pain, function, and disability in individuals with patellofemoral pain.	Adverse event	Post-needling pain & soreness (Mild)

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
27.	⁵⁶ <i>The Effect of Combining Spinal Manipulation and Dry Needling in Individuals With Nonspecific Low Back Pain.</i>	RCT	To evaluate physiologic and clinical outcomes, and exercise adherence in patients with LBP after receiving a combination of DN and SMT...	Side effect	Stiffness Post-treatment (Mild) Fatigue Post-treatment (Mild) Muscle tightness Post-treatment (Mild) Vertigo (Mild)
28.	⁵⁷ <i>Effects of previous experience with dry needling therapy on blinding effectiveness and pain outcomes in people with neck pain: A preliminary sham-controlled study.</i>	RCT	To explore whether previous experience of dry needling could influence blinding effectiveness and clinical outcomes, including pain and self-perceived improvement, in people with neck pain.	Adverse event	Post-needling pain & soreness (Mild)
29.	⁵⁸ <i>Efficacy of dry needling with the fascial winding technique in reducing the percentage of surgery in carpal tunnel syndrome: A randomized clinical trial.</i>	RCT	To determine the proportion of wrists with CTS in which the application of DN avoids surgery.	Adverse effect	Pain during treatment (Mild)
30.	⁵⁹ <i>A survey of American physical therapists' current practice of dry needling: Practice patterns and adverse events.</i>	Cross-sectional observational survey	To estimate the proportion of physical therapists currently performing dry needling and report current practices patterns. Secondary aims were to report the numbers of minor and major adverse events and determine if these adverse events were related to therapist characteristics.	Adverse event	No clinical data reported
31.	⁶⁰ <i>Effectiveness of dry needling of rectus abdominis trigger points for the treatment of primary dysmenorrhoea: A randomised parallel-group trial.</i>	RCT	To compare the effectiveness of trigger point dry needling versus placebo needling, relative to an untreated control group, on pain and quality of life in primary dysmenorrhoea.	Adverse event	Post-needling pain & soreness (Mild)
32.	⁶¹ <i>A randomized trial of trigger point dry needling versus sham needling for chronic tension-type headache.</i>	RCT	To explore the effectiveness of trigger point dry needling in patients with chronic tension-type headache in reducing headache frequency, intensity and duration, and improvement of health-related quality of life.	Adverse effect	Pain and fear during procedure Insufficient details reported
33.	⁶² <i>Trigger point injections for myofascial pain in terminal cancer: a randomized trial.</i>	RCT	The efficacy and safety of a single TPI of a local anesthetic in hospitalized patients with incurable cancer and MPS-related pain.	Adverse event	Nausea (Mild) Fatigue (Mild) Bleeding or bruising (Mild)
34.	¹³ <i>Identifying which adverse events associated with dry needling should be included for informed consent: A modified e-Delphi study</i>	Delphi	To identify which AEs should be included in a risk statement for IC.	Adverse event	No clinical data reported

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
35.	⁶³ <i>Dry needling in clinical practice: A survey of Australian Physiotherapists</i>	Survey	The primary aim was to enhance understanding of why Australian physiotherapists use dry needling in clinical practice. Secondary aim was to explore Australian physiotherapists experiences with adverse events caused by dry needling.	Adverse event	No clinical data reported
36.	⁶⁴ <i>Effects of Dry Needling on Biomechanical Properties of the Myofascial Trigger Points Measured by Myotonometry: A Randomized Controlled Trial.</i>	RCT	To examine the effect of dry needling on the biomechanical properties of a latent medial myofascial trigger point of the soleus muscle compared with an adjacent point within the taut band measured by myotonometry.	Adverse event Adverse effect	Post-needling pain & soreness (Mild)
37.	⁶⁵ <i>Comparison of the effectiveness between dry needling with and without needle retention in myofascial trigger points in upper trapezius muscle: A randomized comparative trial.</i>	RCT	To compare the effect between dry needling with and without needle retention in the treatment of myofascial trigger points in the upper trapezius muscle	Complication	Post-needling pain & soreness (Mild)
38.	⁶⁶ <i>Baseline examination factors associated with clinical improvement after dry needling in individuals with low back pain.</i>	Quasi-experiment	To explore for associations between demographic, patient history, and physical examination variables and short-term improvement in self-reported disability following dry needling therapy performed on individuals with low back pain.	Adverse event	Fatigue (Mild) Vertigo (Mild) Nausea (Mild)
39.	⁶⁷ <i>Effect of dry needling on lumbar muscle stiffness in patients with low back pain: A double blind, randomized controlled trial using shear wave elastography.</i>	RCT	To compare the effects of dry needling to sham dry needling on lumbar muscle stiffness in individuals with low back pain (LBP) using SWE	Adverse event and side effect	Pain during treatment (Mild) Vertigo (Mild) Emotional response (Mild)
40.	⁶⁸ <i>Effect of dry-needling and exercise treatment on myofascial trigger point: a single-blind randomized controlled trial.</i>	RCT	To investigate the effectiveness of dry needling together with exercise therapy on pain, ultrasonographic parameters of myofascial trigger points, and upper trapezius muscles, and neck disability in patients with myofascial pain syndrome.	No term reported	Allergic reaction Insufficient details reported
41.	⁶⁹ <i>Comparing The Effects of Compression Contrast Therapy and Dry Needling on Muscle Functionality, Pressure Pain Threshold, and Perfusion after Isometric Fatigue in Forearm Muscles of Combat Sports Athletes: ...</i>	RCT	The acute effects of CT and DN on muscle tension, muscle strength, pressure pain threshold, and perfusion after isometric fatigue of forearm muscles	Side effect	Pain during treatment (Mild)

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
42.	⁷⁰ Comparison of the short-term outcomes between trigger point dry needling and trigger point manual therapy for the management of chronic mechanical neck pain: A randomized clinical trial.	RCT	To compare the effects of trigger point dry needling and manual therapy on pain, function, pressure pain sensitivity, and cervical range of motion in subjects with chronic mechanical neck pain.	Adverse event	Post-needling pain & soreness (Mild)
43.	⁷¹ Postneedling soreness and tenderness after different dosages of dry needling of an active myofascial trigger point in patients with neck pain: A randomized controlled trial	RCT	To compare the prevalence, intensity, and duration of post-needling soreness and tenderness after different dosages of deep dry needling and analyze the influence on post-needling soreness of psychological factors and other factors involved in the deep dry needling process.	No term reported	Post-needling pain & soreness (Mild)
44.	⁷² Postneedling Soreness and Tenderness After Different Dosages of Dry Needling of an Active Myofascial Trigger Point in Patients With Neck Pain: A Randomized Controlled Trial	RCT	To investigate the effect of ischemic compression versus placebo and control on reducing post-needling soreness of one latent myofascial trigger point and on improving cervical range of motion in asymptomatic subjects.	Adverse effect	Post-needling pain & soreness (Mild)
45.	⁷³ Postneedling soreness after deep dry needling of a latent myofascial trigger point in the upper trapezius muscle: Characteristics, sex differences and associated factors.	RCT	To assess the intensity and duration of post-needling soreness and tenderness after deep dry needling of a trapezius latent myofascial trigger point, to evaluate the possible differences in post-needling soreness between sexes and to analyze the influence on post-needling soreness of factors involved in the dry needling process.	No term reported	Post-needling pain & soreness (Mild)
46.	⁷⁴ Effects of spray and stretch on postneedling soreness and sensitivity after dry needling of a latent myofascial trigger point.	RCT	To investigate the effect of spray and stretch versus control on reducing post needling soreness of one latent myofascial trigger point and whether higher levels of psychological distress are associated with increased post-needling pain intensity.	No term reported	Post-needling pain & soreness (Mild)
47.	⁷⁵ Effects of dry needling in the sternocleidomastoid muscle on cervical motor control in patients with neck pain: a randomised clinical trial.	RCT	To determine the changes produced by trigger point dry needling of sternocleidomastoid in patients with neck pain, and to observe how it might modify cervical motor control.	Adverse effect	Contralateral side pain Headache Dizziness Earache Haematoma Insufficient details reported on severity
48.	⁷⁶ Trigger point acupuncture (Dry Needling) and associated fecal incontinence in multiple sclerosis: A case report.	Case report	Reports a case of fecal incontinence in a patient with Multiple Sclerosis seeking dry needling (or trigger point acupuncture) treatment	Adverse reaction	Dysautonomia (Severe)

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
49.	²⁷ Radial nerve injury following dry needling.	Case report	Present a case of radial nerve injury following DN	Complication	Nerve injury (Severe)
50.	⁷⁷ Short- Term changes in neck pain, widespread pressure pain sensitivity, and cervical range of motion after the application of trigger point dry needling in patients with acute mechanical neck pain: A randomized clinical trial.	RCT	To determine the effects of trigger point dry needling on neck pain, widespread pressure pain sensitivity, and cervical range of motion in patients with acute mechanical neck pain and active trigger points in the upper trapezius muscle.	Adverse event	Post-needling pain & soreness (Mild)
51.	⁷⁸ Post-needling soreness and trigger point dry needling for hemiplegic shoulder pain following stroke.	RCT	To determine the presence of post-needling induced pain in subjects who had suffered a stroke and received trigger point dry needling, and to investigate the effects of including trigger point dry needling into a rehabilitation program for shoulder pain in this population.	No term reported	Post-needling pain & soreness (Mild)
52.	⁷⁹ The effect of combining physiotherapy with dry needling in patients with cervical spondylosis:...	RCT	The contribution of DN applied to concomitant active TPs in the upper trapezius muscle on the treatment outcomes of physiotherapy in CS.	Adverse event	No clinical data reported
53.	⁸⁰ Pneumothorax After Dry Needling of Intrascapular Muscles Using a Rib Bracketing Technique: ...	Case report	To describe the clinical presentation, progression, and outcome of a patient who developed a pneumothorax following DN.	Adverse event	Pneumothorax (Severe)
54.	⁸¹ Dry needling in the management of patients meeting clinical diagnostic criteria for subacromial pain syndrome: a case series.	Case series	To describe the use of dry needling, in conjunction with exercise, as a management strategy for patients meeting clinical diagnostic criteria of subacromial pain syndrome and to observe the short- and intermediate-term effects of dry needling with therapeutic exercise in this population.	Adverse event	Pain during treatment (Mild) Bleeding or bruising (Mild)
55.	⁸² The Effect of Adding Dry Needling to Physical Therapy in the Treatment of Cervicogenic Headache: A Randomized Controlled Trial.	RCT	To compare the long-term effect of adding real or sham dry needling with conventional physiotherapy in cervicogenic headache	Adverse event	Post-needling pain & soreness (Mild)
56.	⁸³ Dry needling as an adjunct treatment to multimodal rehabilitation protocol following rotator cuff repair surgery: ...	RCT	to determine the effects of MTrP-DN compared to S-DN in a MRh on postoperative shoulder pain for patients following RCR.	Adverse event	Bleeding or bruising (Mild) Pain during treatment (Mild) Post needling pain and/or soreness (Mild)
57.	⁸⁴ Effect of dry needling injection and kinesiotaping on pain and quality of life in patients with mechanical neck pain.	RCT	To evaluate the effect of KT on posterior cervical spine and DN into a posterior paracervical muscle of patients with MNP	Minor reversible adverse event	Post-needling pain & soreness (Mild)

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
58.	⁸⁵ <i>Dry needling has lasting analgesic effect in shoulder pain: a double-blind, sham-controlled trial</i>	RCT	We evaluated the pattern of analgesic efficacy and local sensory changes of a single session of dry needling for Myofascial pain syndrome in patients with chronic shoulder pain.	Major adverse event Minor side effect	Post-needling pain & soreness (Mild)
59.	²² <i>Dry needling-induced pneumothorax.</i>	Case report	Describe a case in which a pneumothorax developed after dry needling of the infraspinatus, supraspinatus, rhomboid, and paraspinal muscles.	Adverse effect	Pneumothorax (self-limiting) (Moderate)
60.	⁸⁶ <i>Comparison of ozone and lidocaine injection efficacy vs dry needling in myofascial pain syndrome patients.</i>	RCT	To evaluate efficacy of ozone injection in myofascial pain patients, compared with two currently used methods including lidocaine injection and dry needling.	Minor adverse event	Post-needling pain & soreness (local) (Mild)
61.	⁸⁷ <i>Comparing the efficacy of dry needling and extracorporeal shock wave therapy in treatment of plantar fasciitis.</i>	RCT	To compare the improvement of pain and function in patients with <i>plantar fasciitis</i> treated with extracorporeal shockwave and dry-needling therapy.	Side effect	Post-needling pain & soreness (Mild)
62.	⁸⁸ <i>Dry needling in chronic abdominal wall pain of uncertain origin.</i>	Case series	To report the effect of dry needling treatment for patients who suffer from chronic abdominal wall pain of uncertain etiology and in whom specific myofascial trigger points were identified	Side effect	Post-needling pain & soreness (Mild)
63.	⁸⁹ <i>Comparison of the effectiveness of botulinum toxin, dry needling, pharmacological treatment, and manual therapy for bruxism-induced myalgia: a prospective randomized study</i>	RCT	To evaluate and compare the effectiveness of BoNT-A, DN, PT and MT	Side effect	Pruritis (Itching) (Mild)
64.	⁹⁰ <i>Trigger point dry needling and proprioceptive exercises for the management of chronic ankle instability: A randomized clinical trial.</i>	RCT	To compare the effects of combined trigger point dry needling and proprioceptive and strengthening exercises to proprioceptive and strengthening exercises on ankle pain and function.	Adverse event	Post-needling pain & soreness (Mild)
65.	⁹¹ <i>Effects of Low-Load Exercise on Postneedling-Induced Pain After Dry Needling of Active Trigger Point in Individuals With Subacromial Pain Syndrome.</i>	RCT	To determine the effectiveness of low-load exercise on reducing post needling-induced pain after dry needling of active trigger points in the infraspinatus muscle.	Adverse event	Post-needling pain & soreness (Mild)
66.	⁹² <i>Is a Combination of Exercise and Dry Needling Effective for Knee OA?</i>	RCT	To assess the effectiveness of adding dry needling to an exercise program on pain intensity and disability in patients with knee osteoarthritis.	Adverse event and common side effect	Post-needling pain & soreness (Mild) Bleeding or bruising (Mild)

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
67.	⁹³ <i>The influence of verbal suggestion on post-needling soreness and pain processing after dry needling treatment: An experimental study.</i>	RCT	To examine the effect of verbal suggestion on post-needling soreness in healthy subjects after dry needling over trapezius muscle.	No term reported	Post-needling pain & soreness (Mild)
68.	⁹⁴ <i>Treatment of supraspinatus tendinopathy with ultrasound guided dry needling.</i>	Case report	To describe the treatment of a patient with tendinopathy using sonographically guided dry needling.	No term reported	Post-needling pain & soreness (Mild)
69.	⁹⁵ <i>Effect of Dry-Needling Induced Muscle Soreness (DIMS) on the Severity of Pain Post Deep Trigger Point Needling.</i>	RCT	To evaluate the correlation between the deep dry-needling induced muscle soreness and severity of shoulder pain in patients with myofascial pain.	Common adverse event	Post-needling pain & soreness (Mild)
70.	⁹⁶ <i>Comparison of efficacy of ultrasound-guided platelet rich plasma injection versus dry needling in lateral epicondylitis—a randomised controlled trial</i>	RCT	To compare the efficacy of USG-guided PRP injection versus USG-guided dry needling in treatment of LE.	Adverse event	Post-needling pain & soreness (Mild)
71.	⁹⁷ <i>Intramuscular stimulation vs sham needling for the treatment of chronic midportion Achilles tendinopathy: A randomized controlled clinical trial.</i>	RCT	Is intramuscular stimulation more effective than sham intramuscular stimulation/dry needling for the treatment of Achilles tendinopathy?	Adverse event Needling side effect	Post-needling pain & soreness (Mild) Pain during treatment (deep ache) (Mild) Bleeding or bruising (Mild)
72.	⁹⁸ <i>Dry-needling and exercise for chronic whiplash-Associated disorders: A randomized single-blind placebo-controlled trial.</i>	RCT	To investigate the effectiveness of dry-needling and exercise compared with sham dry-needling and exercise for people with chronic whiplash-associated disorders.	Serious adverse event Adverse effect	Post-needling pain & soreness (Mild)
73.	⁹⁹ <i>Dry needling combined with guideline- based physical therapy provides no added benefit in the management of chronic neck pain: A randomized controlled trial.</i>	RCT	To determine the added benefit of combining dry needling with a guideline-based physical therapy treatment program consisting of exercise and manual therapy on pain and disability in people with chronic neck pain.	Serious or significant adverse event Mild adverse effect	Post-needling pain & soreness (Mild) Headache (Mild)
74.	¹⁰⁰ <i>Ultrasound-guided dry needling decreases pain in patients with piriformis syndrome.</i>	RCT	To investigate the effect of dry needling on buttock pain intensity in patients with Piriformis syndrome.	Major adverse effect	Bleeding or bruising (Mild) Pain during treatment (Mild)
75.	¹⁰¹ <i>Comparison of two different dry-needling techniques in the treatment of myofascial pain syndrome.</i>	RCT	To compare the efficacy of two different dry needling techniques in myofascial pain syndrome.	Adverse event profile	Post-needling pain & soreness (Mild) Nausea (Mild) Vertigo (Mild) Pain during treatment (burning sensation) (Mild)

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
76.	¹⁰² <i>Elite athletes' experiences of musculoskeletal pain management using neuroanatomical dry needling: A qualitative study in Swedish track and field.</i>	Qualitative study	To investigate how elite track and field athletes with a history of musculoskeletal pain describe their perceptions of clinical treatments based on dry needling guided by a neurological map.	Severe treatment reaction	Post-needling pain & soreness (Mild) Muscle stiffness likened to cramping (Mild) Fatigue (Mild) Altered motor control (Mild)
77.	¹⁰³ <i>Effectiveness of dry needling in the treatment of neck pain and disability associated with myofascial trigger points.</i>	Retrospective cohort study	To evaluate the effectiveness of dry needling with fast-in and fast-out technique for myofascial trigger points in the upper trapezius muscle associated with neck pain.	Complication	Post-needling pain & soreness (Mild)
78.	¹⁰⁴ <i>Dry needling in lateral epicondylitis: a prospective controlled study.</i>	RCT	To compared the outcomes of first-line treatment and dry needling	Complication	Bleeding or bruising (Mild) Pain during treatment (Mild)
79.	²⁴ <i>A case with iatrogenic pneumothorax due to deep dry needling.</i>	Case report	Case presentation of iatrogenic pneumothorax due to deep dry needling over the thorax.	Complication	Pneumothorax (self-limiting) (Mild)
80.	¹⁰⁵ <i>Effects of pain neuroscience education and dry needling for the management of patients with chronic myofascial neck pain: a randomized clinical trial.</i>	RCT	To observe the medium-term effects on pain, disability, and psychological factors of a combination of myofascial trigger point dry needling with pain neuroscience education versus dry needling alone versus control care as usual in patients with chronic neck pain.	Adverse effect	Post-needling pain & soreness (Mild)
81.	³³ <i>Current State of Dry Needling Practices: A Comprehensive Analysis on Use, Training, and Safety</i>	Survey	To provide an overview of the current practice of DN...	Adverse event	No clinical data reported
82.	¹⁰⁶ <i>Efficacy of quadriceps vastus medialis dry needling in a rehabilitation protocol after surgical reconstruction of complete anterior cruciate ligament rupture.</i>	RCT	To determine the pain intensity, range of motion, stability, and functionality improvements by adding quadriceps vastus medialis TrP-DN to the rehabilitation protocol provided to subacute ACL reconstructed patients.	Adverse effect	Bleeding or bruising (Mild) (One participant discontinued the study with no further information reported)
83.	¹⁰⁷ <i>Short-term effects of two deep dry needling techniques on pressure pain thresholds and electromyographic amplitude of the lumbosacral multifidus in patients with low back pain – a randomized clinical trial.</i>	RCT	To compare the effects of deep dry needling with and without needle manipulation on pressure pain thresholds and electromyographic amplitude of the lumbosacral multifidus.	Common adverse symptoms Minor adverse effect	Vertigo (Mild) Bleeding or bruising (Mild) Post-needling pain & soreness (Mild)

	Source	Design	Stated aim/purpose/question	Descriptive term(s) utilised	Effects reported and Categorisation(s)
84.	¹⁰⁸ <i>A pilot study examining the feasibility and effects of dry needling on pain during strength testing for individuals with bilateral patellofemoral pain and high kinesiophobia</i>	Cohort study	To examine the feasibility and fidelity of examining the effects of dry needling in those with bilateral PFP and high kinesiophobia...	Adverse event	Pain during treatment (Mild) Bleeding or bruising (Mild) Post-needling stiffness/tightness (Mild)
85.	¹⁰⁹ <i>Reflex anoxic seizures (Ras) during dry needling.</i>	Case report	Case description of tonic-clonic seizure ensuing after multiple needle insertions	Adverse event	Faintness or syncope (lasting 30 sec.) (Mild)
86.	¹¹⁰ <i>A comparison of dry needling and kinesiotaping therapies in myofascial pain syndrome: a randomized clinical study.</i>	RCT	To compare the effectiveness of dry needling and kinesiotaping therapies on pain, quality of life, depression, and physical function in the treatment of myofascial pain syndrome.	No term reported	Faintness or syncope (Mild)
87.	¹¹¹ <i>Ultrasound-guided miniscalpel-needle release versus dry needling for chronic neck pain: A randomized controlled trial.</i>	RCT	To compare ultrasound-guided miniscalpel-needle release versus ultrasound-guided dry needling for chronic neck pain	Adverse events	Pain during treatment (Mild) Somatic reaction (diaphoresis) (Mild)

RCT: Randomised controlled trial