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REVIEW ARTICLE

# Safety in Dry Needling: The Role and Contributions of the International Dry Needling Education & Training Advisory Group (IDNETAG)

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**Abstract**

**Dry needling is an intervention that physical therapists and other healthcare providers use to address various neuromusculoskeletal pain syndromes through a variety of approaches, such as targeting trigger points (TrPs) in muscle tissue or adhesions associated with scar tissue, among others. This technique involves inserting thin filiform needles into specific areas to relieve pain and improve movement. Despite its therapeutic potential, concerns regarding adverse events (AEs) necessitate stringent safety protocols and guidelines. In response, the International Dry Needling Education & Training Advisory Group (IDNETAG) was established in 2023 with members from diverse professions across eight countries. IDNETAG's mission is to enhance global standards of practice, focusing on safety, education, and consistency in treatment protocols. Research indicates that while mild AEs, such as bruising and localised pain, are common, significant AEs are infrequent. Studies have shown minimal risk of serious adverse events when trained practitioners perform dry needling. This review outlines the efforts of IDNETAG in developing initial safety guidelines, addressing challenges in research on dry needling, and fostering a collaborative framework to improve practice standards. Ultimately, IDNETAG aims to ensure patient safety and promote best practices in dry needling therapy across the globe.**

*Keywords:* Dry needling, Myofascial trigger points, Adverse events, Safety guidelines, IDNETAG

## 1. Introduction

Dry needling is used to treat muscles, ligaments, tendons, subcutaneous fascia, and scar tissue.[1] The American Physical Therapy Association (APTA) defines dry needling as a skilled intervention performed by physical therapists. The technique involves inserting filiform needles into specific areas of the body to relieve pain and improve movement impairments.[2]

Dry needling is used across a broad range of pain presentations, but it is often closely associated with Myofascial Pain Syndrome (MPS) because of the central role of trigger points. MPS is characterised by the presence of trigger points (TrPs), which are widely recognised as a primary source of

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regional and referred pain, as well as muscle dysfunction.[3]

Trigger points are described as hard, discrete, palpable nodules located within taut bands of skeletal muscle. These nodules may produce spontaneous pain (i.e., active) or pain only upon compression (i.e., latent).[4] As the use of dry needling continues to expand in clinical practice, so does the importance of implementing stringent safety protocols to mitigate the potential risks of this invasive procedure. Dry needling has been reported to assist patients with lateral epicondylalgia, trochanteric bursitis, chronic low back pain, plantar fasciitis, neck pain and tension-type headaches, rotator cuff tendinopathy, knee osteoarthritis, and other musculoskeletal conditions.[5–12] Although dry needling provides numerous therapeutic benefits, the potential for adverse events highlights the essential need for evidence-based guidelines that create a global standardised framework for safe practice.

In 2023, the International Dry Needling Education & Training Advisory Group (IDNETAG)[13] was formed in direct response to this pressing need. This review outlines the IDNETAG member team, current challenges in research on dry needling safety, and inconsistencies in dry needling education, training, treatment protocols, and techniques. It also reports on IDNETAG's initial dry needling safety guidelines, ongoing initiatives, and future goals.

## 2. IDNETAG members

IDNETAG comprises eleven members from eight countries: Australia, Belgium, the Islamic Republic of Iran, the Netherlands, Spain, Taiwan, the United Kingdom, and the United States. IDNETAG members come from various professions, including medicine, physical therapy, osteopathy, and acupuncture. They have united with a common goal: to enhance the standards of dry needling practices worldwide. This unique collaboration aims to support dry needling therapists, professional associations in manual therapy, regulators, and professional indemnity insurers. The ultimate objective is to ensure patient safety.

Before joining IDNETAG, team members had published over 600 peer-reviewed articles and authored 120 books or chapters on dry needling, myofascial pain, and dysfunction. All members are highly experienced dry needling therapists, some of whom have over forty years of clinical experience. They are also dry education providers and researchers and hold professorial positions at leading universities in physical therapy schools. Additionally, they are accomplished textbook authors and scientific journal reviewers.

## 3. Is dry needling safe?

Limited research exists on the incidence of dry needling adverse events (AEs). Much of the current understanding of these AEs has been inferred from acupuncture literature or physical therapists' self-reporting of AEs.

Brady et al.[14] conducted one of the first studies investigating dry needling AEs. The study surveyed 39 physical therapists over nine months and recorded all of the mild and significant adverse events that occurred during that period. Examples of mild adverse events included bleeding, bruising, and pain at the needle insertion site, while significant adverse events involved pneumothorax or other serious responses to dry needling treatment. Brady et al.'s[14] study reported no significant AEs and gave an estimated upper-risk rate for significant AEs of less than or equal to 0.04 %. A more extensive and recent study[15] of 420 physical therapists reported that expected minor AEs, such as mild bleeding, bruising, and pain during trigger point dry needling (TDN), were common, and significant AEs were rare. The findings of this study showed that the overall risk of a significant adverse event during TDN was small.

Mabry et al.[16] conducted a large observational study examining the safety and utilisation of advanced practice physiotherapy procedures—such as spinal manipulation and dry needling – in a military healthcare setting compared to traditional primary care. A key finding related to dry needling was that 2910 dry needling procedures were carried out during the study period, with no reported safety events. This provided strong support for the safety of dry needling when performed by appropriately trained advanced practice physiotherapists within a structured clinical environment. The

study added to the growing body of literature indicating that dry needling is a safe and well-tolerated intervention, provided it is delivered within the professional scope and with appropriate clinical governance.

Gattie et al.[17] conducted a national survey exploring the practice patterns and safety of dry needling among American physiotherapists. The study aimed to gather data on how dry needling was used in clinical practice and the frequency and nature of any reported adverse events. The survey included responses from 1265 physiotherapists, revealing that dry needling is commonly used for treating musculoskeletal pain and dysfunction, particularly in outpatient orthopedic settings. Most practitioners reported receiving post-graduate training in dry needling and using it regularly as part of their treatment approach. Regarding safety, the study found that serious adverse events were extremely rare. The most frequently reported side effects were minor and self-limiting, such as bleeding, bruising, and post-needling soreness. Only a minimal number of more serious events, such as pneumothorax, were reported, indicating that dry needling is generally a safe intervention when performed by trained professionals. The authors concluded that while minor adverse effects were relatively common, the overall risk profile was low. This supported its safe use in clinical physiotherapy practice when performed competently and with proper precautions.

In a large-scale prospective observational study, Witt et al.[18] evaluated the safety of acupuncture across 229,230 patients who received an average of 10.2 treatments each, totalling over 2.2 million acupuncture sessions. The study found that 8.6 % of patients reported at least one adverse effect, with 2.2 % experiencing effects that required treatment. The most common adverse effects were minor bleeding or hematoma (6.1 %), pain (1.7 %), and vegetative symptoms (0.7 %). Notably, two cases of pneumothorax were reported; one required hospital treatment, while the other necessitated observation only. The longest reported duration of a side effect involving a nerve lesion in the lower limb was 180 days. Based on these findings, the authors concluded that acupuncture administered by physicians is relatively safe.

Although it is encouraging to read favourable conclusions about dry needling and acupuncture safety, these results must be interpreted cautiously, as underreporting adverse events in these studies may compromise their internal validity. In their large-scale observational study, Endres et al.[19] recognised the risk of underreporting serious adverse events (SAEs) in clinical research. To address this, they introduced an internal standard to assess the accuracy of the reporting process. This involved embedding a known, predefined SAE into the study by collaborating with selected centres. The aim was to see whether these events would be correctly reported through standard channels. Most of these test cases were accurately identified and documented, proving the reliability of the study's safety reporting mechanisms. This novel method strengthened the credibility of their conclusion—that acupuncture is associated with an extremely low risk of serious harm—and has since been cited as a best-practice model for safety monitoring in extensive clinical studies.

The studies by Brady et al. and Boyce et al.[14,15] are excellent contributions to the literature. However, researchers used self-reported surveys in both studies to retrieve data about AEs. Self-reporting is a valuable way of collecting data from patients. It is particularly important when collecting data about adverse events, as it provides direct, first-hand insights into patients' experiences, symptoms, and perceptions following medical interventions. Encouraging patients to report adverse events actively ensures that researchers capture a comprehensive picture of treatment safety. However, self-reporting also has significant confounders, including low response rates (the overall response rate in the Boyce et al.[15] study was only 3 %), selection and recall bias, and subjective variability.

Witt et al.'s[18] retrospective observational study, based on records from a national database, has strong statistical power. However, it is less convincing due to the techniques and therapeutic applications used by acupuncturists versus those used by dry needling therapists. One important factor that researchers have not fully

addressed is the underreporting of adverse events, particularly those that are moderate or serious. This limitation may lead to underestimating the actual risk profile associated with specific interventions.

Given the nature of these AE types, it would be reasonable to assume that patients experiencing such an event would present with initial and ongoing signs and symptoms that prompt them to seek medical attention at a hospital Emergency Department (ED). Had these patients been treated in an ED setting, important clinical details such as the dry needling technique used, needle depth, precise location of insertion, and direction of the needle that could help establish a temporal relationship between the procedure and the adverse event would likely not have been systematically documented or reported. This omission of data is critical as it hinders our ability to accurately quantify the actual AE rate associated with dry needling. Without this comprehensive data, it is challenging to establish a reliable baseline for AE rates and to identify potential risk factors or areas for improvement in dry needling procedures.

To address this data gap, we propose a comprehensive checklist of key information categories that should be systematically collected and reported following any adverse event (AE) associated with dry needling. Table 1 outlines recommended data across patient history, practitioner background, procedural and technical details, symptom onset, medical investigations, interventions, outcomes, and reflective practice. Consistent documentation of these variables is essential for improving the accuracy of AE reporting, identifying risk patterns, and enhancing the overall safety of dry needling practices.

*Table 1. Recommended information checklist.*

| Category | Data to Collect |
|---|---|
| Patient Details | • Age, sex<br>• Relevant medical history (e.g. respiratory conditions, bleeding disorders)<br>• Medication use (e.g. anticoagulants)<br>• Previous dry needling or acupuncture experience |
| Practitioner Details | • Professional background and qualifications<br>• Years of experience with dry needling<br>• Training completed in dry needling (hours, certification body) |
| Procedure Details | • Area of the body/muscle needled<br>• Needle brand<br>• Depth of insertion/Technique<br>• Needle diameter and length<br>• Duration of needling<br>• Whether manual or electrical stimulation was applied |
| Technique Details | • Patient position during needling<br>• Needle insertion direction and angle<br>• Palpation method used to identify the target tissue<br>• Was anatomical landmarking or imaging guidance used? |
| Onset of Symptoms | • Time from needling to onset of symptoms<br>• Symptoms (pain at site of insertion, dyspnoea or cough)<br>• Severity and duration of symptoms<br>• Were symptoms immediate, delayed, or progressive? |
| Diagnosis/Investigation | • Diagnostic imaging performed (e.g. X-ray, CT, ultrasound)<br>• Medical diagnosis |
| Medical Intervention | • Was urgent medical care sought?<br>• What treatment was required (e.g. chest drain, observation)?<br>• Duration of hospital admission (if any) |
| Outcome & Follow Up | • Was full recovery achieved?<br>• Any ongoing symptoms?<br>• Time taken to return to normal function or work<br>• Patient-reported outcomes or satisfaction |
| Reporting & Reflection | • Was the event reported to a regulator or professional body?<br>• Has the clinician modified their technique or understanding?<br>• Have any contributing factors been identified (e.g., fatigue, rushed session, poor surface anatomy knowledge or training)? |

## 4. Dry needling education & training standards

There is currently no international consensus on sufficient training or standardised dry needling techniques for manual therapists. However, professional associations, regulatory bodies, and insurance providers that underwrite dry needling therapists have attempted to regulate the training courses that they attend. The regulations that have been previously recommended typically cover duration, content, eligibility, and delivery methods. Despite the understandable concerns that regulators of dry needling education and training have about the incidence of dry needling AEs, they often lack the necessary resources or experience to apply evidence-based training guidelines.

In 2006, the Australian Society of Acupuncture Physiotherapists recommended two minimum voluntary training standards: 150 h for those learning traditional acupuncture and a 2-day course for those using acupuncture needles to perform 'Dry Needling or Western Acupuncture'.[20] Seven years later, the same organisation reduced its recommended number of training hours for traditional acupuncture by almost half to 80 h. However, its stipulated guideline for 'western acupuncture' or 'dry needling' based on 'clinical reasoning' underpinned by 'anatomical and neurophysiological knowledge' remained constant at 16 h.[20]

Contrary to the common belief that longer training hours inherently lead to safer healthcare practices, studies suggest that the quality and structure of training may be more critical than the sheer number of hours.[21]

Salas et al.[22] argued that training effectiveness was not determined by duration alone, but rather by how well the training is structured and delivered. They highlight that programmes designed using evidence-based instructional strategies—such as clearly defined learning objectives, opportunities for feedback, and alignment with real-world tasks—are more effective in improving performance and safety outcomes. The authors concluded that increasing training hours without ensuring high-quality content and delivery may offer limited benefits, particularly in high-stakes environments such as healthcare. This research directly challenged the assumption that "more is better" in training and instead promoted the view that thoughtfully designed, context-specific training is far more impactful. These findings suggested that focusing on efficient, high-quality training approaches may be more beneficial for patient safety than simply increasing the number of training hours.

Research published in BMC Health Services Research[23] examined factors influencing the effectiveness of management training programs in healthcare settings. The study concluded that program design, relevance to participants' roles, and the inclusion of practical components were more influential on training outcomes than the total number of training hours. This underscored the significance of quality and applicability in training curricula. Another important aspect of dry needling training that leads to safer patient outcomes is skills testing. Assessing practical technique skills in healthcare is crucial for ensuring safe application and enhancing patient safety.

Assessment is essential to competency-based education and should be used for feedback and summative examination.[24] The authors highlighted that assessing healthcare professionals' competencies is vital for maintaining and improving patient safety standards. To improve patient safety, dry needling education requires standardised guidelines developed through expert consensus and collaboration among key stakeholders, including educators, clinicians, tertiary institutions, professional indemnity insurers, professional associations, and regulatory bodies.

### *4.1. Dry needling course checklist recommendations*

The following checklist outlines essential course quality, assessment, and practitioner eligibility elements to promote safer, more effective dry needling practice. It emphasises consistency, safety, and clinical relevance.

### *4.2. Course structure & delivery*

- Theory is evidence-based, well-structured, and aligned with clinical practice
- Clear learning objectives are defined and linked to real-world applications

- Course design reflects current best practices in adult education
- Learning is progressive, building from foundational concepts to clinical application

*4.3. Instruction & supervision*

- Experienced clinicians with recognised expertise lead practical sessions
- Instructors provide real-time feedback and guidance during skills training
- Learners are supported in integrating theory with hands-on techniques

*4.4. Knowledge & skills assessment*

- Theory includes quizzes and checkpoints to reinforce learning
- A formal, summative test is required to pass the theory component before progressing to the practical course
- Multiple-choice questions (MCQs) are used to assess understanding of anatomy, safety, and clinical reasoning
- Practical skills are assessed using clear, objective criteria
- Safety, anatomical precision, and clinical reasoning are central to all assessments
- Reassessment pathways are available for those who do not meet standards

*4.5. Eligibility & competency focus*

- Course is only available to regulated healthcare professionals with an appropriate scope
- Entry criteria ensure a baseline understanding of anatomy and patient safety
- Competency, not course hours, is the standard for successful completion

*4.6. Patient safety & reflection*

- Risk management and adverse event prevention are thoroughly addressed

## 5. The importance of safety guidelines in dry needling

Although generally considered safe when performed by a skilled practitioner, the dry needling procedure carries inherent risks such as pneumothorax, spinal cord injuries, and infections. These risks are particularly elevated when practitioners lack adequate training or employ unsafe techniques.

A paper by Gattie et al.[17] surveyed over 21,000 physical therapists in the United States and reported significant variability in dry needling techniques among U.S. physical therapists. The paper emphasised differences in clinical practice patterns, such as treatment frequency, duration, number of sessions per patient, and specific needling methods. Furthermore, therapists exhibited diverse levels of training, ranging widely in both hours of instruction and clinical experience, contributing to inconsistent application of dry needling techniques across different practitioners. This variability in technique underscored the need for standardisation and consistency in training to ensure patient safety and optimal therapeutic outcomes. The observed differences suggested that detailed guidelines or consensus on best-practice techniques could help minimise potential risks and enhance clinical effectiveness. They also highlighted the importance of structured education and standardised competency assessment for dry needling practitioners.

In their 2023 scoping review, Kearns et al.[25] examined randomised clinical trials involving DN to assess the standardisation of DN dosage and the documentation of adverse events AEs. The study revealed significant variability in DN application, including differences in needle length, insertion depth, and treatment duration. Moreover, the documentation of AEs was inconsistent across studies, with many failing to report AEs systematically. This lack of standardisation and inconsistent AE reporting hindered the ability to accurately evaluate the safety and efficacy of DN interventions.

In a recent study by Puentedura et al.,[26] the authors explored current dry needling practices across the United States. They identified widespread adoption and evolving methodologies, particularly the growing integration of electrostimulation and multimodal treatment approaches. While the findings reflect the increasing sophistication of dry needling in clinical settings, the study also revealed significant inconsistencies in treatment parameters, such as needle placement, duration, and adjunctive techniques. These variations

highlight the urgent need for standardised protocols to improve clinical effectiveness, support practitioner consistency, and strengthen the validity of future research in the field.

Consequently, establishing and adhering to standardised, evidence-based safety guidelines is paramount for safeguarding patients and practitioners. Professional associations representing various healthcare disciplines, including physiotherapy, osteopathy, chiropractic, massage therapy, podiatry, and medicine, universally emphasise the importance of adhering to stringent safety protocols. The authors emphasised the need to develop standardised guidelines for DN application and AE documentation to improve the quality of research and clinical practice. They advocated for the comprehensive reporting of DN parameters and the systematic documentation of AEs in future studies to enhance the understanding of DN's safety profile and therapeutic outcomes.

## 6. Process of developing IDNETAG safe dry needling guidelines

Dry needling safety guidelines exist from several worldwide organisations, including Australia, the United States, Canada, Ireland, the United Kingdom, the Netherlands, and Switzerland. However, regional and national guidelines differ. These variations can lead to confusion and potential risks for practitioners and patients, underscoring the urgent need for uniform international standards.

The IDNETAG team evaluated all of the existing guidelines in February 2023. This initial work aimed to establish consensus and identify the key recommendations that had been previously outlined. We used this information to create a framework to develop new guidelines that addressed areas where the existing guidelines could be improved or further developed. IDNETAG's safe practice guidelines were developed through a comprehensive review of the existing body of literature. This meticulous process involved in-depth reviews of textbooks, journal articles, and existing guidelines. This initial phase proved indispensable for understanding the current state of knowledge, identifying gaps and areas requiring further research, and evaluating the strengths and weaknesses inherent in existing frameworks.

The culmination of this systematic literature review was a detailed, crafted working paper that served as a pivotal reference document for subsequent meetings with IDNETAG members. Extensive discussions, debates, and video analyses of proposed techniques characterised the iterative refinement process. This collaborative and critical scrutiny played a pivotal role in evaluating the safety and efficacy of various needling techniques, identifying potential risks and hazards, and proposing necessary adjustments and modifications.

## 7. Current work and achievements of IDNETAG

The IDNETAG safe dry needling guidelines offer comprehensive, evidence-informed recommendations for safe dry needling practices. These guidelines are specifically tailored to address critical anatomical regions, including the scapular stabilisers, deep spinal musculature, and upper trapezius, which have been identified as high-risk areas for potential AEs.

A notable achievement of IDNETAG has been initiating an extensive Delphi study into the safe dry needling of the paraspinal muscles based on the guidelines developed by IDNETAG members. The Mass General Brigham Human Research Protection Program (HRPP) has just approved the Delphi study. Delphi studies engage global panels of experts in a systematic review, debate, and consensus-building process regarding safety protocols, core competencies, and best practice standards. Using a Delphi study ensures a broad, international validation of the guidelines by experts, enhancing their robustness and acceptability.[27]

Furthermore, IDNETAG aims to support accrediting bodies by providing detailed resources and guidance based on expert knowledge and experience supported by global agreements. Accreditation ensures that therapists receive training aligned with expert consensus and ongoing professional development standards. IDNETAG also offers expert witness support. The group's authoritative reports and professional opinions will contribute significantly to upholding integrity and accountability

in dry needling practice and provide invaluable clarity in legal or ethical scenarios.

## 8. Future plans and aspirations

IDNETAG has ambitious plans to refine and expand its guidelines further. Future initiatives include additional Delphi studies, safe dry needling technique guidelines, advice regarding dry needling contraindications, and expert responses to emerging research and commentary. This work will continue to utilise international expert collaboration to ensure currency, relevance, and consistency with emerging evidence and evolving best practices.

IDNETAG also aims to cultivate stronger partnerships with international professional associations and insurance underwriters to promote wider adoption of its guidelines. A global collaborative effort will ensure the safe and effective integration of dry needling practices into mainstream therapeutic approaches.

## 9. Conclusion

As the popularity of dry needling continues to surge, not just among manual therapists but also patients, ensuring the safety of both patients and practitioners through rigorous, evidence-based guidelines is of paramount importance.[28] IDNETAG aspires to be pivotal in addressing this critical need. Through meticulous review, collaborative expert consensus, and ongoing educational and accreditation endeavours, IDNETAG is making significant strides in raising global standards in dry needling practice. The group's ongoing initiatives and future directions promise continued advancements in patient safety, professional integrity, and therapeutic efficacy. Ultimately, dry needling will be positioned as a safe and effective intervention in managing myofascial pain and dysfunction.

## Consent to participate

Not applicable.

## Ethics approval

Not applicable.

## Consent for publication

All authors have read and agreed to the published version of the manuscript.

## Author contributions

*Mahmoud, W.*: Conceptualisation, reference acquisition, interpretation, and manuscript drafting. *Dommerholt, J.*: Contributed to the critical manuscript revision through feedback and review. All authors read and approved the final manuscript.

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## Conflict of interest

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