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SYSTEMATIC REVIEW WITH META-ANALYSIS

The effect of dry needling for myofascial trigger points in the neck and shoulders: A systematic review and meta-analysis

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KEYWORDS
Dry needling;
Lidocaine;
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Randomised controlled trial

Summary *Background:* and purpose: The aim of this systematic review with meta-analysis is to determine the effect of dry needling in the treatment of MTrPs.
Methods: Searches were performed using the electronic databases AMED, EBM reviews, Embase, and Ovid MEDLINE (all from database inception-February 2012).
Study selection: Randomized controlled trials (RCTs) were included if they compared dry needling with another form of treatment or placebo and included pain intensity as an outcome.
Data extraction: Two blinded reviewers independently screened the articles, scored their methodological quality and extracted data.
Quality assessment: Physiotherapy Evidence Database (PEDro) quality scale and the Cochrane risk of bias tool were used.
Results: Four RCTs compared dry needling to lidocaine and one RCT compared dry needling to placebo. Meta-analyses of dry needling revealed no significant difference between dry needling and lidocaine immediately after treatment standardized mean difference (SMD) 0.41 (95%CI −0.15 to 0.97), at one month (SMD −1.46; 95% CI −2.04 to 4.96) and three to six months (SMD −0.28; 95% CI −0.63 to 0.07).
Discussion: Although not significant in the meta-analyses, there were interesting patterns favoring lidocaine immediately after treatment and dry needling at three to six months.

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Introduction

MTrPs are defined as: hyperirritable spots in the muscle that are associated with hypersensitive palpable nodules in taut bands; are painful on compression and can give rise to referred pain felt in a distant region and which is non-dermatomal; are tender; cause weakness and a restriction in range of motion of a muscle and can give rise to autonomic dysfunction (Lucas et al., 2009; Travell and Simons, 1998). MTrPs found in the neck and shoulders are commonly located in the upper trapezius muscle (Bron et al., 2011; Trinh et al., 2006) It is currently recommended that the term MTrPs be used to identify myofascial pain syndrome caused specifically by trigger points (Mense and Simons, 2001).

Dry needling of MTrPs, acupuncture needling of classical acupuncture points, and injections are common treatment techniques for myofascial pain (Cummings and White, 2001; Harris and Clauw, 2002). Dry needling is the insertion of a fine filament acupuncture needle into the region of a trigger point. The needle is manipulated and "fanned" at multiple locations with the goal of trying to deactivate the trigger point (Huguenin, 2004).

A systematic review with meta-analysis found a large difference (1.67 cm pain intensity VAS) between various types of acupuncture (including classical acupuncture and dry needling) compared to placebo for various painful conditions (Tough and White, 2011). A Cochrane systematic review found a moderate difference between various types of acupuncture and placebo immediately after treatment in the treatment of neck disorders (Trinh et al., 2006). Although the Cochrane review was most recently published in 2010, the latest search was completed in 2006. To the authors' knowledge, there are not any recent systematic reviews investigating the effects of dry needling compared to placebo or usual care treatments for the neck and shoulder region.

The primary objective of this systematic review is to determine the evidence base for the effect of dry needling compared to placebo or other usual care treatments in the management of MTrPs, specifically in the neck and shoulders for pain intensity and activity outcomes.

Methods

A protocol for this systematic review with meta-analysis was not published prior to the completion of this review.

Inclusion criteria

Randomized controlled trials (RCTs) investigating dry needling for MTrPs in the neck, or both neck and shoulders; compared to usual care, placebo or transcutaneous electrical nerve stimulation (TENS); using a validated outcome measure for pain intensity or activity (such as the VAS for pain, and the Nottingham Health Profile (NHP) for activity); reported in English were included.

Exclusion criteria

Studies were excluded when: MTrPs were only investigated in the shoulder; MTrPs were not defined according to the criteria of Travell and Simons (Travell and Simons, 1998); when needling types other than dry needling (e.g., bee venom) were investigated; when the effects of dry needling could not be distinguished from other treatments; when different types of needling were compared to each other; they were reported in any language other than English.

Information sources

Electronic searches were completed on the following databases: AMED, Cochrane Central Register of Controlled Trials, EMBASE, and Ovid MEDLINE (all from database inception to February 2012).

Search strategy

Table 1 details the OVID Medline search strategy used to locate RCTs. This search was adapted for use in the other databases.

Table 1 Search strategy for myofascial pain syndrome and trigger point studies.

Phase 1	Phase 2	Phase 3
1. Electric stimulation therapy.mp	12. Myofascial pain.mp	15. Randomised controlled trial$.mp
2. TENS.mp	13. Trigger points.mp	16. Random allocation.mp
3. TNS.mp	14. OR 12—13	17. Double-blind method.mp
4. ENS.mp		18. Single-blind method.mp
5. Transcutaneous electric$ nerve stimulation or transcutaneous nerve stimulation.mp		19. Exp clinical trial/
		20. Clin* near trial*.m_titl.
6. Electric$ nerve stimulation or electrostimulation therap$ or electro-stimulation therap$.mp		21. Limit 20 to abstracts
		22. (singl* or doubl* or tripl* nearblind* or mask*).m.titl
7. Electric$ nerve therap$ or electroanalgesi$.mp		23. placebo*.m_titl.
8. Dry needling.mp		24. Random*.m_titl.
9. Acupuncture.mp		25. OR 15—24
10. Acupuncture therap$.mp		26. 11 AND 14 AND 25
11. OR 1—10		

Study selection and data collection process

Two independent reviewers applied the selection criteria to the abstracts retrieved following the electronic search. The full text was retrieved for all abstracts that met the search criteria. For abstracts that did not have sufficient information, the full text was also retrieved to determine eligibility. Disagreements were resolved by consensus by the reviewers. A data extraction sheet was formulated and two reviewers independently extracted the data.

Data items

The following data items were extracted from the RCTs. Population: sample size of the population, the number of males and females, and the location of MTrPs. Intervention: the length and diameter/gauge of the needle, the depth of needling, number of needles used, and number of treatments. Control or usual care treatments included: the number of treatments and the use of additional treatments such as stretching exercises. The outcome measures used in the trials were also recorded. The results of the study as regards pain intensity and activity were extracted in the form of mean and standard deviation data.

Risk of bias in individual studies

The Risk of Bias (RoB) scale was developed by The Cochrane Collaboration to assess the validity of studies to determine the risk of overestimating or underestimating the true intervention effect (Higgins and Altman, 2008). For a particular procedure the RoB is rated as being low risk, unclear, or high risk depending on the methods used.

The PEDro scale is a rating of the quality of the RCTs evaluating therapeutic interventions based on the presence or absence of key methodological components (de Morton, 2009). Studies scoring $\geq$6/10 were considered to be high quality, while studies of $\leq$5/10 were considered to be lower quality evidence (Maher et al., 2003).

Two reviewers rated the studies independently using the RoB and PEDro scale. Any disagreements were resolved by consensus by the reviewers.

Summary measures

Mean and standard deviation data were extracted for the outcomes of pain intensity and activity where reported.

Synthesis of results

Data were combined where possible using Review Manager (RevMan 5) software. For outcomes on the same scale (e.g., the VAS) the data was combined using mean differences. Where the data were homogenous (as indicated by the Chi^2 and I^2 tests) a fixed-effect model was used; otherwise a random-effects model was used. Data were combined in meta-analyses at three time points: immediately after treatment, at short-term follow-up (1—4 weeks after treatment) and longer-term follow-up (3—6 months after treatment). Where data were not available to combine, a best evidence synthesis was used to rank the level of evidence for each treatment option (van Tulder et al., 2003)

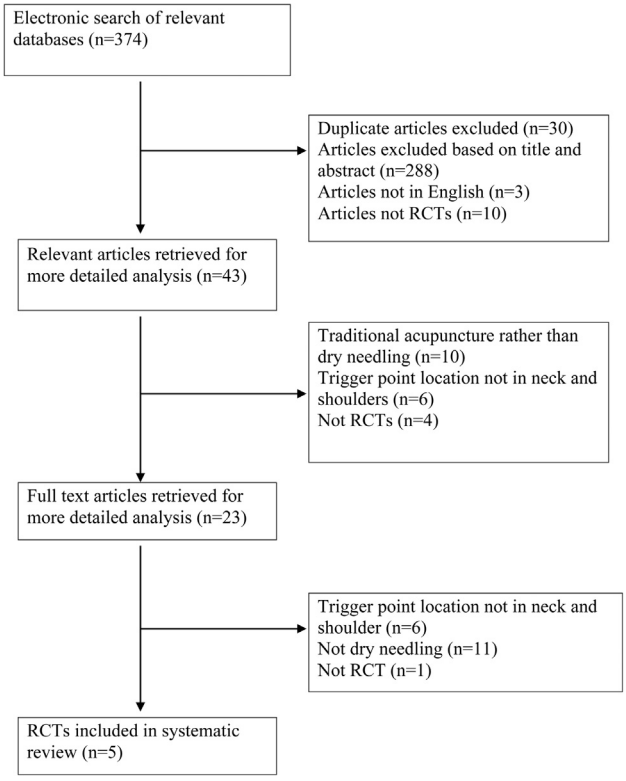

Figure 1 Search strategy.

Strong evidence: consistent finding among multiple higher quality RCTs;
Moderate evidence: consistent findings among multiple lower quality RCTs and/or one higher quality RCT;
Limited evidence: one lower quality RCT;
Conflicting evidence: inconsistent findings among multiple RCTs;
No evidence: no RCTs

Results

Study selection

The study selection process is detailed in Fig. 1. The initial search resulted in 378 hits. After applying the inclusion and exclusion criteria five RCTs were eligible and were included in the review.

Study characteristics

The characteristics of each RCT are provided in Table 2. In all of the RCTs the MTrPs were located in the upper trapezius muscle. Four of the five RCTs investigated dry needling versus lidocaine (Ay et al., 2010; Ga et al., 2007; Hong, 1994; Kamanli et al., 2005) one RCT investigated dry needling versus placebo laser (Ilbuldu et al., 2004). Two RCTs took outcome measures immediately after treatment (Ilbuldu et al., 2004; Hong, 1994). All RCTs took outcome measures

Table 2 Results of individual studies included in this systematic review.

Reference	Population	Intervention (1)	Control (2)	Outcome	Results
Ay et al. (2010)	80 patients (28 males, 52 females) between 19 and 58 years with MTrPS located in the upper trapezius	$n = 40$ 1) dry needling on trigger points using a 22-guage 1.25 inch needle. MTrP were identified by obtaining a local twitch response or contraction with pain. Number of MTrP not reported, nor the frequency or length of treatment. Patients also completed a home-based exercise programme (isometric and isotonic neck exercises and back extensor stretching exercise) daily for 12 weeks.	$n = 40$. Injections with 2 ml of 1% lidocaine. 22-guage 1.25 inch needle. MTrP were identified as per the dry needling condition. A maximum of two trp were injected. The same doctor completed all injections. Patients also completed a home-based exercise programme (isometric and isotonic neck exercises and back extensor stretching exercise) daily for 12 weeks.	Pain (VAS) 0 no pain and 10 worst pain Active cervical ROM (goniometry, all active movements) Depression — BDI All outcomes were taken at baseline, at 1 month and 3 months after treatment	VAS Baseline 1) 5.82 ± 1.25 2) 5.55 ± 1.33 1 month after treatment 1) 2.27 ± 0.98 2) 3.82 ± 0.47 3 months after treatment 1) 0.97 ± 0.83 2) 1.25 ± 0.83
Ga et al. (2007)	39 patients (3 males, 36 females) above 60 years old with MTrPs found in the upper trapezius	Acupuncture dry needling. Stainless steel needle (diameter 0.30 mm, length 60 mm) needling depth 30 —35 mm. Patients were treated three times at day 0, 7 and 14. All MTrPs found bilaterally were treated. Patients carried out self-stretching exercises for the upper trapezius three times a day until the next treatment	Needling with 5 ml syringes and 25 gauge, 40 mm long needles, pre-filled with 0.5% lidocaine. Each trigger point was injected with 0.2 ml of 0.5% lidocaine. Patients carried out self-stretching exercises for the upper trapezius three times a day until the next treatment	Pain (VAS) 0 — 10 And FACES0 — 5 Pressure Pain Intensity-0 — 3 Passive cervical ROM (All passive movements) Depression GDS-SF Pain, PPT and ROM taking during treatment at baseline, 1 and 2 weeks and at 1 month. GDS-SF taken at baseline and 1 month.	VAS Baseline 1) 6.98 ± 1.32 2) 6.43 ± 2.08 1 week 1) 5.76 ± 1.79 2) 5.87 ± 2.37 2 weeks 1) 4.69 ± 2.05 2) 3.90 ± 2.12 1 month 1) 3.82 ± 2.47 2) 3.46 ± 2.47
Hong (1994)	58 patients (16 males, 42 females) with MTrPS in the upper trapezius	At least one active MTrP was treated per participant. 27 gauge needle, 1.25 inch longmuscle fibers of taut band explored with multiple insertions. After injection, injected area was compressed firmly for at least 2 min for hemostasis. Trapezius muscle was lengthened using spray and stretch	27 Gauge needle, 1.25 inch long Muscle fibers of taut band explored with multiple insertions 0.5% lidocaine was injected each time needle was inserted into taut band After injection, injected area was compressed firmly for at least 2 min for hemostasis. Trapezius muscle was lengthened using spray and stretch	Pain (VAS) 0 no pain 10 the most severe pain PPT over MTrP Active cervical ROM (goniometry, lateral bending) All outcomes were taken before and immediately after treatment.	VAS Baseline 1 7.8 ± 0.83 1a 7.63 ± 0.99 2 7.88 ± 0.93 2a 7.67 ± 0.67 Immediately after treatment 1 1.00 ± 1.46 1a 7.13±0.93 2 0.42 ± 0.49 2a 5.44 ± 0.83 At 2 weeks 1 4.93 ± 1.44 2 0.96 ± 0.90

(*continued on next page*)

Table 2 (*continued*)

Reference	Population	Intervention (1)	Control (2)	Outcome	Results
Ilbuldu et al. (2004)	60 female patients, 18 −50 years old, with MTrPS in the upper trapezius	Dry needling with a 0.25 × 25 size acupuncture needle once a week for 4 weeks. Laser at 632.8-nm was applied to the 3 MTrPs bilaterally 3 times a week at 2 J for 12 sessions.	Placebo laser applied on the trigger point 3 times a week. The probe was applied with the machine turned on and set, but no beam was applied	Pain (VAS) 0 − 10. Cervical ROM (goniometer) Functional status-NHP All outcomes taken at baseline, immediately after treatment and at 6 months follow up	VAS Baseline 1) 5.1 ± 1.97 2) 5.7 ± 1.81 Immediately after treatment 1) 3.71±2.33 2) 3.65 ± 2.03 6 months follow up 1) 2.59 ± 2.18 2) 2.89 ± 2.63
Kamanli et al. (2005)	29 Patients (23 females, 6 males) with MTrPS in the cervical and/or periscapular regions	25 Gauge needles 1.25 inch long, empty syringe needle was inserted into a average of 3 MTsPs per participant. Needle moved forward and backward 8 −10 times	25 Gauge needles 1.25 inch long Needle was inserted until TP was reached Needle moved forward and backwards 8−10 times after 1 ml of 0.5% lidocaine was injected	Pain (VAS) 0 − 10 Work (VAS) 0 − 10 Fatigue (VAS) 0 − 10 Cervical ROM (goniometry) PPT on MTrP and on contralateral (healthy) side Pain score over MTrP 0 − 3 Functional status-NHP Anxiety and Depression- HADI All outcomes taken at baseline and one month after treatment.	VAS Baseline 1) 7.03 ± 2.68 2) 6.9 ± 1.43 One month after treatment 1) 5.12 ± 2.94 2) 1.95 ± 1.67 NHP Baseline 1)16.2 ± 6.91 2)18.5 ± 6.59 One month after treatment 1) 14.2±7.00 2) 6.4±4.83

Legend: BDI = Beck Depression Inventory; GDS-SF = Geriatric Depression Scale (Short Form) HADI = Hospital Anxiety and Depression Scale MTrP = Myofascial Trigger Point; *n* = number; NHP = Nottingham Health Profile; PPT = Pressure Pain Threshold; ROM = Range of Motion; VAS = Visual Analogue Scale.

Table 3 Pedro scores for each of the included studies.

Item													
Study	1	2	3	4	5	6	7	8	9	10	11	Total	Quality
Ga et al., 2007	Y	Y	N	Y	Y	Y	N	Y	N	Y	Y	7/10	
Ay et al., 2010	Y	Y	N	Y	N	N	N	Y	Y	Y	Y	6/10	
Ilbuldu et al., 2004	N	Y	N	Y	Y	N	Y	N	Y	Y	Y	7/10	
Kamanli et al., 2005	Y	Y	N	Y	N	N	N	N	N	Y	Y	4/10	
Hong 1994	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	8/10	

Abbreviations: Y, yes; N, no.
Items: 1. Eligibility criteria specified; 2. Random allocation; 3. Concealed allocation; 4. Baseline comparability; 5. Blind assessors; 6. Blind subjects; 7. Blind therapists; 8. Follow up measures; 9. Intention to treat analysis; 10. Between group comparisons; 11. Point measures and measures of variability for key outcome.

Table 4 Risk of bias across studies.

Authors	Sequence generation	Allocation concealment	Blinding of participants, personnel and outcome assessors	Outcome assessment	Incomplete outcome data	Selective outcome reporting	Other sources of bias
Ga et al., 2007	Low	Unclear	Low	Low	Low	Unclear	Low
Ay et al., 2010	Unclear	Unclear	Unclear	Low	Low	Unclear	Low
Ilbuldu et al., 2004	Unclear	Unclear	Unclear	Low	Low	Unclear	Low
Kamanli et al., 2005	Unclear	Unclear	Unclear	Low	Unclear	Unclear	Low
Hong 1994	Unclear	Unclear	Unclear	Low	Low	Unclear	Low

at follow-up time points of either two weeks to one month (Ay et al., 2010; Ga et al., 2007; Hong, 1994; Kamanli et al., 2005) or three months to six months (Ay et al., 2010; Ilbuldu et al., 2004). Pain intensity measured on a VAS was used in all RCTs, whilst two RCTs (Ilbuldu et al., 2004; Kamanli et al., 2005) measured pain-related activity using the NHP. Whilst other outcome measures such as pressure pain threshold were taken by some RCTs data were not extracted as this was not the purpose of this review. The dry needling interventions varied considerably between the studies; Hong (1994) needled at least one MTrP for a single session, whereas (Ga et al., 2007) needled all MTrPs that were found bilaterally once a week for three weeks.

Risk of bias within studies

PEDro scores of the included RCTs are presented in Table 3. Four out of five RCTs were rated as high quality (≥6/10); only one RCT rated as low quality evidence (≤5/10). RCTs commonly did not score points for concealed random allocation and blinding of therapists.

RoB scores of the included RCTs are presented in Table 4. Components that were scored as a low risk of bias were outcome assessment, incomplete outcome data, and other sources of bias. Components that were scored as unclear included random sequence generation, allocation concealment, blinding of participants, personnel, and assessors, and selective outcome reporting.

Results of individual studies

Pain intensity (VAS)

Dry needling versus lidocaine

Two RCTs did not find any significant reduction in pain VAS scores at four weeks and 12 weeks after treatment (Ay et al., 2010; Ga et al., 2007). In contrast, Kamanli et al. (2005) found a significant difference in VAS scores favoring lidocaine at four weeks follow-up and Hong (1994)

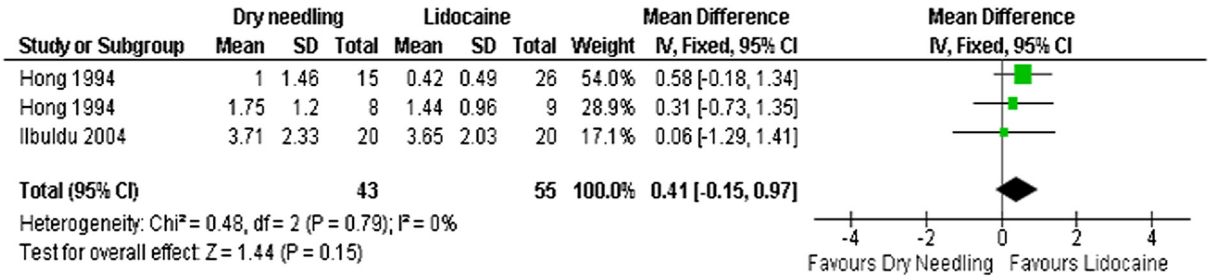

Figure 2 Dry needling versus Lidocaine of MTrPs in the neck immediately after treatment.

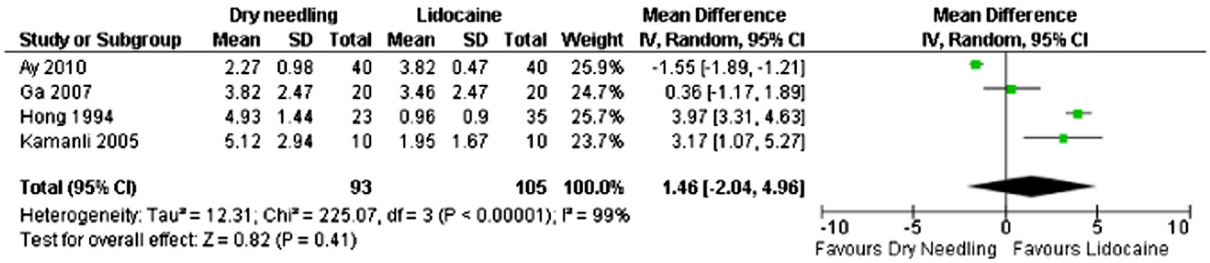

Figure 3 Dry needling versus lidocaine of MTrPs in the neck 1—4 weeks after treatment.

reported a significant difference of VAS scores favoring lidocaine at two weeks follow-up.

Dry needling versus placebo

Ilbuldu et al. (2004) did not observe any significant difference between dry needling compared to placebo both immediately post-treatment and at six month follow-up.

Activity

Two RCTs measured activity using the Nottingham Health Profile (Kamanli et al., 2005; Ilbuldu et al., 2004). As each RCT compared dry needling to a different control group meta-analysis was not appropriate. Applying the best evidence synthesis there is limited evidence of no significant difference between dry needling and placebo immediately after treatment and at the 6 month follow up (Ilbuldu et al., 2004) and limited evidence of no significant difference between dry needling and lidocaine immediately after treatment at 1 month follow up (Kamanli et al., 2005).

Meta-analyses

Meta analyses were performed for the pain intensity (VAS) outcome at three time points: immediately after treatment, one to four weeks after treatment, and three to six months after treatment.

Two of the RCTs (Hong, 1994; Ilbuldu et al., 2004) comparing dry needling versus lidocaine of MTrPs in the neck reported results immediately after treatment. Data available from two pooled trials (Fig. 2; two groups were from one trial (Hong, 1994)) did not show a significant difference between dry needling and lidocaine (SMD: 0.41; 95% CI -0.15 to 0.97; $P = 0.15$).

Four of the RCTs (Ay et al., 2010; Ga et al., 2007; Hong, 1994; Kamanli et al., 2005) investigated dry needling and Lidocaine of MTrPs in the neck made comparisons at one month follow-up. Data available from four pooled trials (Fig. 3) mostly favored lidocaine, however this difference was not significant (SMD: −1.46; 95% CI −2.04 to 4.96; $P = 0.41$).

Two RCTs (Ay et al., 2010; Ilbuldu et al., 2004) also made comparisons between dry needling and lidocaine at three to six months after treatment. Data available from two pooled trials (Fig. 4) favored dry needling compared to lidocaine however this difference was not significant (SMD: −0.28; 95% CI −0.63 to 0.07; $P = 0.12$).

Discussion

Summary of evidence

The primary objective of this systematic review was to determine the evidence basis for the effectiveness of dry needling compared to placebo or other treatments in the treatment of MTrPs, specifically in the neck and shoulders. Four of the five included RCTs compared dry needling to lidocaine. Results from the RCTs were contradictory as to the effectiveness of dry needling compared to lidocaine on pain intensity VAS scores immediately after treatment and up to four weeks follow up. Meta-analyses at these time points (Figs. 2 and 3) revealed no significant differences between these interventions. At 1—4 weeks follow-up (Fig. 3) there is significant heterogeneity between RCTs (therefore a random effects model has been used) with the overall effect favoring lidocaine, although not significantly, with a difference of about 1.5 cm (15 mm) on the VAS. A major trauma study reported that the minimum clinical important difference in VAS pain scores is 12 mm regardless of pain severity at baseline (Kelly, 2001). This effect may therefore be worth exploring with a larger scale RCT. At 3—6 months follow up (Fig. 4) the overall effect favors dry needling, although not significantly, and the difference of about 0.3 cm on the VAS which is much smaller in magnitude. Previous meta-analyses included RCTs using both classical acupuncture and dry needling found large effects compared to placebo for various painful conditions (Tough and White, 2011) and moderate effects compared to placebo for the neck (Trinh et al., 2006). None of the RCTs included in Trinh et al. (2006) were included in the current review because they investigated traditional acupuncture or ah shi points or electroacupuncture and this review focused on dry needling. In the current review, one RCT investigated the effects of dry needling compared to placebo for the neck and found no difference between groups (Ilbuldu et al., 2004).

Outcome measures

The main outcome measure that was common across all studies was pain intensity. Pain intensity using the VAS is a common subjective outcome measure used in clinical practice and is recommended by the Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT) group (Dworkin et al., 2008) for inclusion in

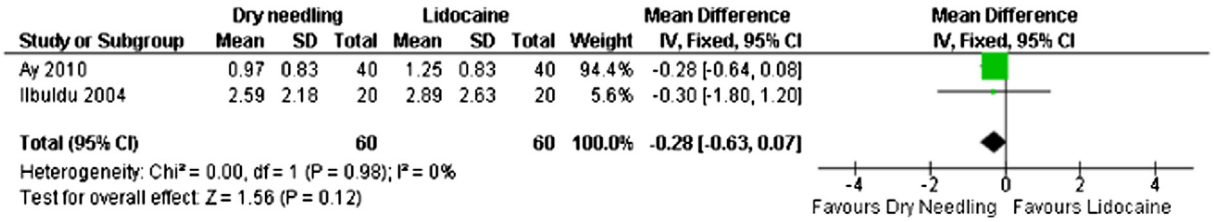

Figure 4 Dry needling versus lidocaine of MTrPs in the neck at 3—6 months after treatment.

clinical trials on pain, thus was chosen as the primary outcome measure. Pressure pain threshold (PPT), has been defined as the amount of pressure needed to elicit a sensation of pain, distinct from pressure or discomfort (Fischer, 1987) and has been recommended as a way of quantitatively assessing MTrPs. PPT induced by pressure algometry has been described as an experimental parallel to palpation in clinical practice (Graven-Nielsen et al., 2001). Current recommendations for the diagnosis of MTrPs include a hyperirritable/tender spot in muscle, deactivation of this MTrP may therefore increase the amount of pressure applied before the PPT is reached (i.e. increase PPT). The primary outcome measure for this review was pain intensity, three RCTs also measured PPT (Ga et al., 2007; Kamanli et al., 2005; Hong, 1994). It is possible that dry needling has an effect on this outcome and is an area for further exploration.

It is worth noting that activity was reported by two RCTs; one comparing dry needling to placebo (Ilbuldu et al., 2004) and the other comparing dry needling to lidocaine (Kamanli et al., 2005). It is recommended by IMMPACT (Dworkin et al., 2008) that outcomes in activity, quality of life, and emotion domains in addition to pain intensity are recorded by chronic pain clinical trials.

Limitations

Although four out of five RCTs were high quality evidence as shown on the PEDro scale, the risk of bias on all the RCTs were generally unclear. There was no clear explanation of how the sequence generation or allocation concealment was done. Moreover, the blinding of participants, personnel and assessors was not stated clearly. This would have an impact on the true reporting of those studies. In addition, on the PEDro scale, a scoring point was of the blinding of therapists. However, this would not have been possible, as the therapist administering the treatment would have the knowledge of the type of treatment being performed. This would mean that the PEDro score is systematically underscored for these studies. The meta-analyses comparing dry needling and lidocaine were based on several pooled RCTs however the number of participants per group remained relatively small The meta-analysis immediately after treatment was based on $\sim n = 50$ per group, the meta-analysis 1—4 weeks after treatment was $n = 100$ per group, and the meta-analysis at 3—6 months was $n = 60$ per group. It is also worth noting that two studies which compared injections of lidocaine with dry needling (Hong, 1994; Kamanli et al., 2005) used a syringe needle for the dry needling procedure (rather than a finer acupuncture needle). These studies reported results which favored lidocaine and the results need to be considered with this important difference in mind. In addition, the dry needling intervention varied considerably amongst the studies included in this review. For example, one study (Hong, 1994) needled at least one active MTrP which may not be representative of current clinical practice. Researchers have reached agreement on what should be reported in acupuncture research trials and it is recommended that future trials should follow this guidance (MacPherson et al., 2010). A limitation of this review is a possible language bias as language was restricted to English. It is possible that further RCTs would have been included if a language restriction was not imposed.

Conclusion

The main conclusion of this systematic review with meta-analysis is there is no significant difference between dry needling and lidocaine in the management of MTrPs in the neck and shoulder region. However, it should be acknowledged that these analyses are based on a relatively small number of participants ($n = 50$—100 per group). Further conclusions of this review is that there is limited evidence of no significant difference between dry needling and placebo for pain intensity and activity outcomes immediately after treatment and at 6 month follow-up. There is also limited evidence of no significant difference between dry needling and lidocaine on activity levels immediately after treatment and at 1 month. As dry needling is as effective as lidocaine injection, dry needling may be more favorable and more feasible in the physiotherapy clinical setting due to it being minimally invasive, lower cost, and has less adverse effects than a local anesthetic injection.

There is a need for statistically powered RCTs investigating the effect of dry needling and placebo or usual care treatments. Outcome measures should include those recommended by IMMPACT (Dworkin et al., 2008) and should be recorded for at least one year follow-up.

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