European Journal of Pain 13 (2009) 3–10

Contents lists available at ScienceDirect

European Journal of Pain

journal homepage: www.EuropeanJournalPain.com

Review

Acupuncture and dry needling in the management of myofascial trigger point pain: A systematic review and meta-analysis of randomised controlled trials

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ARTICLE INFO

Article history:
Received 24 October 2007
Received in revised form 17 January 2008
Accepted 19 February 2008
Available online 18 April 2008

Keywords:
Acupuncture
Myofascial trigger point pain
Systematic review
Randomised controlled trials
Meta-analysis

ABSTRACT

Pain from myofascial trigger points is often treated by needling, with or without injection, although evidence is inconclusive on whether this is effective. We aimed to review the current evidence on needling without injection, by conducting a systematic literature review.

We searched electronic databases to identify relevant randomised controlled trials, and included studies where at least one group were treated by needling directly into the myofascial trigger points, and where the control was either no treatment, or usual care; indirect local dry needling or some form of placebo intervention. We extracted data on pain, using VAS scores as the standard.

Seven studies were included. One study concluded that direct dry needling was superior to no intervention. Two studies, comparing direct dry needling to needling elsewhere in the muscle, produced contradictory results. Four studies used a placebo control and were included in a meta-analysis. Combining these studies ($n = 134$), needling was not found to be significantly superior to placebo (standardised mean difference, 14.9 [95%CI, −5.81 to 33.99]), however marked statistical heterogeneity was present ($I^2 = 88\%$).

In conclusion, there is limited evidence deriving from one study that deep needling directly into myofascial trigger points has an overall treatment effect when compared with standardised care. Whilst the result of the meta-analysis of needling compared with placebo controls does not attain statistically significant, the overall direction could be compatible with a treatment effect of dry needling on myofascial trigger point pain. However, the limited sample size and poor quality of these studies highlights and supports the need for large scale, good quality placebo controlled trials in this area.

1. Introduction

Myofascial trigger points (MTrPs) have been described as a 'common cause of pain in clinical practice' Gerwin et al. (1997) and an 'extremely common, yet commonly overlooked' source of musculoskeletal pain (Simons, 2002). Epidemiological studies from the US have claimed that MTrPs were the primary source of pain in 30–85% of patients attending on account of pain in primary care or specialist pain clinic settings (Fricton et al., 1985; Fishbain et al., 1986; Skootsky et al., 1989). MTrP pain may therefore constitute a substantial burden for both individual patients and for society as a whole.

MTrPs have been defined as hyperirritable points located in taut bands of skeletal muscle or fascia which when compressed cause local tenderness and referred pain (Simons et al., 1999). MTrPs are thought to develop in muscles in any part of the body, in response to sudden injury or muscle overload. It has been hypothesised that the injured muscle fibres shorten (forming taut bands) either in response to excessive amounts of calcium ions being released from within the damaged fibres, or in response to the corresponding motor end plate releasing excessive amounts of acetylcholine (Simons et al., 1999). Local tenderness and referred pain ensues as muscle nociceptors are stimulated in response to reduced oxygen levels and increased inflammatory chemicals present at the site of injury (Simons et al., 1999).

Although the existence of MTrPs remains controversial, they do provide a basis for treatments and are an active topic for clinical research (Borg-Stein and Stein, 1996; Tunks and Crook, 1999; Borg-Stein and Simons, 2002). A recent systematic review identified 73 clinical intervention trials, of which the most common intervention examined was needling directly into the MTrP,

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1090-3801/$34.00
doi:10.1016/j.ejpain.2008.02.006

with or without injection of local anaesthetic, cortisone or botulinum toxin (Tough et al., 2007). Although the mechanism of effect is unknown, the practice of inserting needles into points of soft tissue tenderness to alleviate pain is long established, with clinicians commonly adopting either the orthodox approach of injection or the Western medical acupuncture approach of dry needling. Indeed, one of the first studies investigating trigger point dry needling, concluded that dry needling was effective at alleviating chronic myofascial pain (Lewit, 1979).

Nonetheless, a previous systematic review of dry needling and injection therapy for MTrP pain found no evidence that injection of any substance elicited a superior response compared with the insertion of a needle alone (Cummings and White, 2001). Furthermore, the evidence at that time was inconclusive on whether or not needling is effective.

Our initial aim was to update the systematic review of Cummings and White (2001) and, in view of the large number of studies now available, and the clinical heterogeneity of the interventions (e.g. needling superficially over the site of MTrPs or needling traditional acupuncture points) we decided to report the evidence on different interventions separately. In this paper, we focus on examining whether or not direct dry needling of MTrPs that have been identified clinically, in the absence of any other potentially active treatment, is effective at reducing pain for patients with a diagnosis of MTrP pain.

2. Methods

We undertook a systematic review of the literature to identifying whether or not dry needling directly into MTrPs achieved superior pain reduction in patients with a diagnosis of MTrP pain when compared with either: no additional intervention; indirect local dry needling either superficially over the MTrP or elsewhere in the muscle; or a placebo control such as a non-penetrating sham needle or sham laser.

2.1. Search

In April 2007 we searched the following electronic databases sequentially: Pubmed (from 1966); a combined search of EMBASE (from 1974), AMED (from 1985) and MEDLINE (from 1950); Cochrane Central/Cochrane Reviews (from inception); PEDro (from 1929) and SCI-EXPANDED (from 1970). Searches were limited (where database facilities allowed) to randomised controlled trials (RCTs) or clinical trials, reviews and human studies. There was no language restriction. The search terms used were: 'myofascial pain' OR 'myofascial pain syndrome' OR 'trigger point' OR 'trigger points' and then in turn acup*, needl*, inject*, block*, *caine, tox* or percutaneous neuromodulation therapy.

Two authors (from ET, AW or MC) independently scrutinised the titles and abstracts (where available) of papers identified. Copies were obtained of any paper which appeared to meet our inclusion criteria of any prospective RCT or systematic review of at least one needle therapy for myofascial pain or MTrP pain.

We then hand searched any relevant journal to which we had access and which was not indexed on the searched electronic databases. These included publications held by the Chartered Society of Physiotherapy; all pre-indexed issues of Acupuncture in Medicine, and our own files (but excluding un-published studies).

Finally ET scrutinised the reference lists of all selected papers. A copy of the original report was obtained of any reference whose title indicated it could be eligible for review.

2.2. Study selection

Two authors (from ET, AW and MC) made a preliminary decision on which papers might be eligible. Studies were excluded if the 'active treatment' involved inserting needles: (i) superficially over the site of a MTrP; (ii) into traditional acupuncture points; (iii) into pre-specified MTrP locations, since our hypothesis concerned treating clinical identified MTrPs. We included RCTs where at least one intervention group were treated by direct insertion of a dry needle into the MTrPs after locating the patient's area of tenderness. After further scrutiny by all authors we excluded papers where the control intervention was considered to be an 'active' treatment, classified as: (i) oral medication (ii) an injected substance or (iii) traditional meridian acupuncture needling – in the light of laboratory and radiological evidence which shows a direct association between acupuncture and the stimulation of pain inhibitory mechanisms (Han and Terenius, 1982; Pariente et al., 2005).

2.3. Data extraction

Two authors (from ET, AW and MC) independently extracted data from each paper before data were entered onto a piloted electronic spread sheet. Discrepancies remaining in data extraction were resolved with discussion between the two reviewers and where necessary the third reviewer adjudicated.

We extracted data on pain outcomes which reported a visual analogue scale (VAS) or comparable pain score as the principle outcome measure. Where available, we extracted changes in mean scores and the associated standard deviations. Data in graphs were extracted by measuring with a ruler. Pressure pain threshold algometry readings were classified as a secondary outcome measure.

We classified an outcome measure as 'long-term' if it was applied 1–6 months after the final reported treatment (taking the measure assessed closest to 3 months) and 'short-term' if applied 24 h to 30 days after the final reported treatment (but a minimum of 72 h after the first treatment because of the potential for post treatment soreness) taking the measure assessed closest to 7 days.

For cross-over studies we analysed the results of the first arm only unless we agreed the data showed no carry-over effect. In RCTs that tested multiple interventions, we included only the treatment groups which met our criteria for inclusion.

Additional data were extracted on study design and setting, inclusion/exclusion criteria, the condition being treated, including duration of symptoms and criteria used for diagnosis, and the results as reported. We also extracted details of each intervention including treatment dose and number and frequency of treatment.

2.4. Quality assessment

We assessed a study's internal validity using a scoring system modified from Jadad et al. (1996). We awarded a maximum of four points, with one point allocated for each of the following criterion: (i) appropriate randomisation; (ii) allocation concealment; (iii) blinding and (iv) withdrawals and dropouts. We modified the latter criterion so that a point was awarded only if withdrawal and drop outs did not exceed 30% for a long-term outcome measure with no evidence of differential loss to follow-up (i.e. similar number in each group) and not exceeding 20% for a short-term outcome measure.

2.5. Data synthesis

We combined results initially in tabular and narrative formats. For purpose of analysis we categorised the studies according to the type of control group used including: Group 1 'usual care'; Group 2 'local needling' and Group 3 'sham'. We defined 'usual care' as a standard therapy which may or may not have accompanied the needling intervention, 'local needling' as needling superficially over the site of a MTrP or needling elsewhere in the muscle but not in acupuncture meridian points, and 'sham' as a non-penetrating needle or other intervention which was clearly intended to be a credible placebo control (White et al., 2001).

We planned to perform a meta-analysis if all reviewers agreed sufficient clinical homogeneity was found between studies, and if the outcomes were adequately reported (e.g. mean and SD available and/or data that allowed conversion). We used Review Manager (Rev.Man) 4.2.10 software, adopting the more conservative random-effects model to take into account expected clinical heterogeneity (DerSimonian and Laird, 1986). We used a chi-squared test (I^2) to evaluate statistical heterogeneity.

3. Results

From 1517 studies identified as potentially eligible for inclusion, 26 met our inclusion criteria (Fig. 1).

From the pool of confirmed RCTs which examined acupuncture or dry needling therapies ($n = 26$), we excluded 19 studies: seven needled non-MTrPs (Johansson et al., 1991; Kisiel and Lindh, 1996; Birch and Jamison, 1998; Karst et al., 2000; Ceccherelli et al., 2001; Goddard et al., 2002; Smith et al., 2007) six used an active intervention as a control group (Garvey et al., 1989; Hesse et al., 1994; Hong, 1994; McMillan et al., 1997; Kamanli et al., 2003; Wang and Bakhai, 2006) three combined MTrP needling with meridian acupuncture which confounded the interpretation of the results (Irnich et al., 2001; Ceccherelli et al., 2002, 2006); one did not locate tender points in each patient (Karakurum et al., 2001); one used only superficial needling (Edwards and Knowles, 2003) and one assessed outcomes too soon after the intervention to discount the impact of post treatment soreness (Irnich et al., 2002).

Seven RCTs were included in the systematic review (Chu, 1997; Ilbuldu et al., 2004; DiLorenzo et al., 2004; Huguenin et al., 2005; Itoh et al., 2004, 2006, 2007).

3.1. Description of RCTs

Tables 1 and 2 show the key characteristics of the seven RCTs included in this systematic review. In all but two studies (Chu, 1997; DiLorenzo et al., 2004) MTrPs were identified using the palpation of 'tender spot in a taut band' and 'local twitch response (LTR)'. Three studies added 'patient pain recognition on tender spot palpation' as a confirmatory finding (Ilbuldu et al., 2004; Huguenin et al., 2005; Itoh et al., 2006). Four studies investigated patients with MTrP pain in the upper quadrant (cervical and shoulder girdle region) (Chu, 1997; Ilbuldu et al., 2004; DiLorenzo et al., 2004; Itoh et al., 2007) and three in the lower quadrant (lumbo-pelvic region)

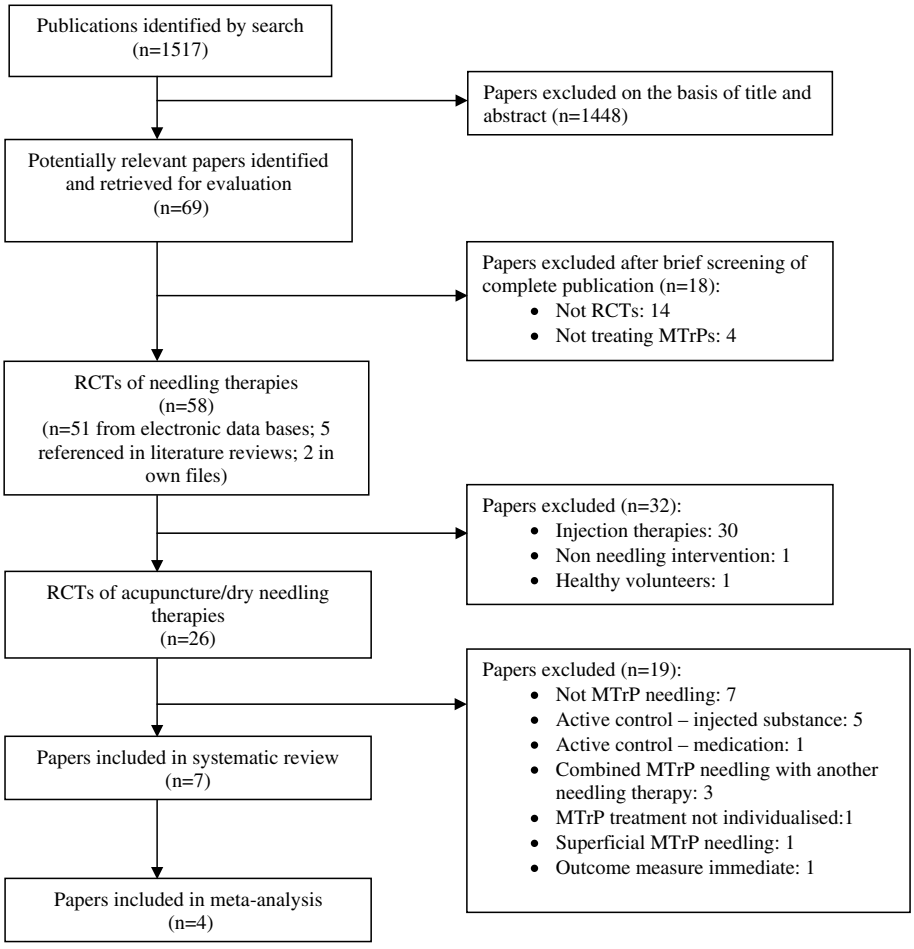

Fig. 1. Study flow diagram.

Table 1
Settings and patients in the studies for systematic review

First author/ year	Setting/ country	Total *n* allocated	Age years mean (SD or range)	% Male	Region body (duration of symptoms)	Diagnostic criteria for MTrP identification	Exclusion criteria
Chu (1997)	University/ USA	296	Not reported	37	Neck & arm pain (acute & chronic)	Most tender point in a myofascial band	Peripheral neuropathy
DiLorenzo et al. (2004)	Secondary care/Italy	101	68 (9)	28	Shoulder pain post CVA (4–6 weeks)	Not stated	Hemiparesis not CVA related; pre-CVA shoulder pain; depression
Huguenin et al. (2005)	University/ Australia	59	'Young athletes'	100	Hamstring pain from gluteal MTrPs (not reported)	TS in TB; pain reproduction; LTR	Hamstring tear; low back injury in past 6/52 s; neurological deficit; nerve root pain; needle phobia; bleeding disorder; anticoagulation; previous experience of MTrP needling
Ilbuldu et al. (2004)	Not stated/ Turkey	40	(18–50)	0	Upper trapezius pain (>3 months)	TS in TB; pain reproduction; LTR; pain limited movement	Tumour; infectious disease; severe OA/bone disease; pregnancy; COPD
Itoh et al. (2004)	Secondary care/Japan	22	(65–81)	28	Low back pain (>6 months)	TS in TB; LTR	Major trauma; systemic disease; serious co-morbidity; conflicting treatment
Itoh et al. (2006)	Secondary care/Japan	26	(65–91)	35	Low back pain (>6 months)	TS in TB; LTR; pain reproduction	Major trauma or systemic disease; conflicting treatment
Itoh et al. (2007)	Secondary care/Japan	20	(47–80)	27	Neck pain (>6 months)	TS in TB; LTR	Major trauma; systemic disease; conflicting treatment

Key: TS in TB = tender spot in taut band; LTR = local twitch response; Pain reproduction = pain reproduction on tender spot palpation; CVA = cerebrovascular accident (stroke); COPD = chronic obstructive pulmonary disease; OA = osteoarthritis.

(Huguenin et al., 2005; Itoh et al., 2004, 2006). Two studies by Itoh et al. (2004, 2006) which appeared similar, involved different study populations.

Although the needling technique varied, four RCTs adopted 'sparrow pecking' whereby needles were manipulated in and out of each trigger point to elicit an LTR (Huguenin et al., 2005; Itoh et al., 2004, 2006, 2007). Treatment regimes were generally similar in so far as five RCTs offered a course of three or more treatments, given once a week (Ilbuldu et al., 2004; DiLorenzo et al., 2004; Itoh et al., 2004, 2006, 2007).

Two RCTs used a co-intervention in both groups: a rehabilitation programme of exercise for shoulder dysfunction following stroke (DiLorenzo et al., 2004); a home exercise programme of muscle stretching exercises (Ilbuldu et al., 2004).

Data from three control groups reported in the papers were not extracted for review. Helium neon laser (Ilbuldu et al., 2004) and meridian acupuncture (Itoh et al., 2007) control groups were excluded because we considered them to be potentially active interventions. The third excluded study used an inappropriate control group selected from patients without MTrP pain (Itoh et al., 2007). The remaining control groups in these studies were retained for analysis within the review.

All RCTs used a visual analogue scale to measure the intensity of pain within the pre-specified short-term outcome measurement period. Only one study took a long-term outcome measure at six months (Ilbuldu et al., 2004). None used pressure pain threshold algometry readings.

3.2. Internal validity

Table 2 presents the scores for internal validity of included study reports. Only one RCT described using allocation concealment, (Huguenin et al., 2005) and two recently published RCTs failed to score any points for internal validity (Ilbuldu et al., 2004; DiLorenzo et al., 2004). Both studies suggested that participants were randomly allocated to each intervention, and both implied, from the results tables, that there was no loss to follow-up. However, neither study fully described the randomisation process nor the management of withdrawals. Therefore, we could not be certain that these processes were either adequate or appropriate. Furthermore, the control intervention adopted by each study prohibited participant blinding.

3.3. Data synthesis

Only one RCT compared the effect of direct MTrP dry needling with usual care (DiLorenzo et al., 2004). That study reported a significant short-term reduction in post stroke shoulder pain in patients who received MTrP needling plus standard rehabilitation compared with those who received standard rehabilitation alone ($p < 0.001$). Patients used an 11 point visual analogue scale to report the severity of their pain before, during, and at the end of treatment (week 3). However, the timings of these measures differed between groups, which limit the value of the results.

Two RCTs compared MTrP needling with 'local needling' (Chu, 1997; Itoh et al., 2004). Chu (1997) compared electromyography (EMG) needling of MTrPs with needling of non-MTrPs in the same muscles. The design of the study makes it very difficult to interpret as it was neither blinded nor appropriately randomised and the dropout rate was 48%, though the authors conclude that direct MTrP needling was superior to non-MTrP needling in reducing pain. The only data appropriate for review are presented in Table 3. Itoh et al. (2004) compared direct MTrP needling with superficial (subcutaneous) needling over the site of the MTrPs. No statistically significant difference was observed between the two groups at the end of two phases of treatment.

Table 2
Study design and markers of internal validity

First author (year)	RCT design	Intervention (*n* of sessions; times/week)		Internal validity				
		Active treatment (direct dry needling into MTrPs)	Control [categorisation]	Appropriate randomisation	Allocation concealment	Participant blinding	† Withdrawal	Total score/4
Chu (1997)	Parallel	EMG needle (1)	EMG needle into non-MTrP (1) [Group 2]	U	N	N	N	0
DiLorenzo et al. (2004)	Parallel	Acupuncture needle (diameter 0.40 mm) inserted for 5 min, needle manipulated to produce de qi response; plus standard rehabilitation (4; 1)	Standard rehabilitation of physical therapy and ongoing daily medication (dosage unchanged) (4; 1) [Group 1]	U	U	N	U	0
Huguenin et al. (2005)	Parallel	Acupuncture needle (diameter 0.30 mm) 'sparrow pecking' technique until LTR and pain eliminated; application approx 1 minute (1)	Blunt end needle applied via guide tube over site of MTrP; needle manipulated to mimic real needling; application approx. 10 s (1) [Group 3]	Y	Y	Y	Y	4
Ilbuldu et al. (2004)	Parallel	Acupuncture needling (diameter 0.25 mm) plus home exercise programme of upper & middle trapezius & pectoral muscles stretches (4; 1)	Inactive laser over site of MTrPs (12; 3) [Group 3]	U	U	N	U	0
Itoh et al. (2004)	Parallel	Acupuncture needle (diameter 0.2 mm) 'sparrow pecking' technique eliciting LTR; needle left in situ for 10 min (3; 1 then 3 weeks no treatment then 3; 1)	Superficial insertion of needle into skin over site of MTrP; needle left in situ for 10 min (3; 1 then 3 weeks no treatment then 3; 1) [Group 2]	Y	N	Y	Y	3
Itoh et al. (2006)	Cross-over	Acupuncture needle (diameter 0.2 mm) 'sparrow pecking' technique eliciting LTR; needle left in situ for 10 min (3; 1 then 3 weeks no treatment then 3; 1)	Blunt end needle applied over site of MTrP; needle manipulated to mimic sparrow pecking; mimic removal after 10 min (3; 1 then 3 weeks no treatment then 3; 1) [Group 3]	Y	N	Y	Y	3
Itoh et al. (2007)	Parallel	Acupuncture needle (diameter 0.2 mm) 'sparrow pecking' technique eliciting LTR; needle left in situ for 10 min (3; 1 then 3 weeks no treatment then 3; 1)	Blunt end needle applied over site of MTrP; needle manipulated to mimic 'sparrow pecking'; mimic removal after 10 min (3; 1 then 3 weeks no treatment then 3; 1) [Group 3]	Y	N	Y	N	2

Key: †withdrawal <20% at short-term outcome measure and/or <30% at long-term outcome measure; Y = yes; N = no; U = unclear if criteria achieved; 'sparrow pecking technique' = needle moved in and out of the muscle in a pecking motion.

Table 3
Results from studies included in the systematic review

First author/year	*n* allocated *I*, *C* (*n* analysed)	Results	Short-term outcomes for pain (unless stated otherwise) measured using a visual analogue scale (VAS)	
		I = Intervention MTrP needling versus *C* = Control		
		Between group mean difference	Within group mean difference	
Group 1				
DiLorenzo et al. (2004)	54,47 (54,47)	*I* superior to *C* ($p < 0.001$);	Significant reduction in pain in both groups (both $p < 0.05$) (VAS 0–10) *I* 60% reduction; mean change 4.18	*C* 38% reduction; mean change 3.06
Group 2				
Chu (1997)	296 or 154[a]	"*I* induces more relief than C" Not tested formally	No statistical comparison *I* 82 (67%) patients had 'pain relief'	*C* 23(55%) patients had 'pain relief'
Itoh et al. (2004)	10,12 (9,9)	No between group difference (p = NS)	Significant reduction in pain in group A ($p < 0.01$) but not in group C (p = NS) *I* 50% reduction; mean change 32.5	*C* 27% reduction; mean change 17.4
Group 3				
Huguenin et al. (2005)	29,30 (29,30)	No between group difference (p = NS)	Significant reduction in pain in both groups (both $p < 0.001$) *I* 60% improved; median change 18	*C* 60% improved median change 18
Ilbuldu et al. (2004)	20,20 (20,20)	No statistical comparison long-term outcome at 6 months – no difference between interventions	No statistical comparison *I* 27% reduced; mean change 36.15	*C* 36% reduced; mean change 28.26
Itoh et al. (2006)	13,13 (10,9)	*I* superior to *C* ($p < 0.001$) No lasting effect beyond 3 weeks	Significant reduction in pain in group A ($p < 0.01$) but not in group C (p = NS) *I* 58% improved; mean change 37.7	*C* 1% worse; mean change −0.8
Itoh et al. (2007)	10,10 (9,8)	Not reported	Significant reduction in pain in group A ($p < 0.01$) but not in group C (p = NS) *I* 72% reduction; mean change 48.4	*C* 34% reduction; mean change 23.6

Key: Group 1: MTrP needling versus usual care; Group 2: MTrP needling versus local needling not into MTrP; Group 3: MTrP needling versus sham intervention.
[a] Unsure from report which patients were included in the analysis. Of 296 approached to take part, no break down given on number available at follow-up.

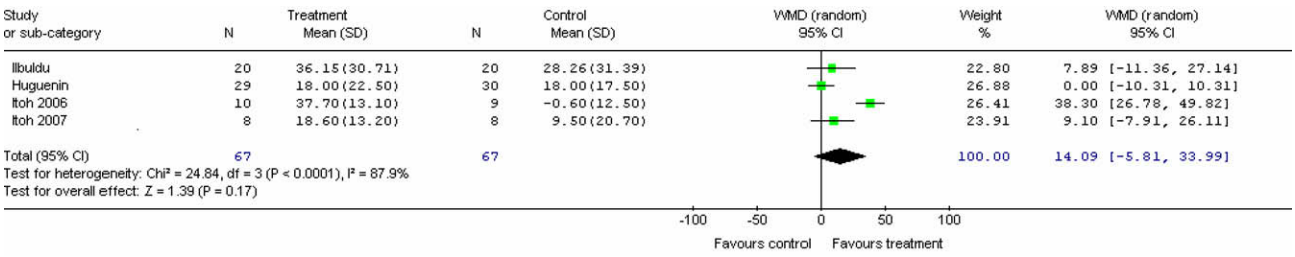

Fig. 2. Meta-analysis of MTrP dry needling versus sham.

Finally four RCTs compared MTrP needling with a sham intervention. These were considered sufficiently homogeneous to undertake a meta-analysis. Fig. 2 shows that the short-term effectiveness of MTrP needling on pain was not statistically significantly superior to sham control (standardised mean difference = 14.09 [95% CI, −5.81 to 33.99]) although marked heterogeneity was observed in this model (I^2 = 88%).

4. Discussion

Evidence from one study suggests that direct MTrP needling was effective in reducing pain compared with no intervention. Two studies provided contradictory results when comparing needling MTrPs directly versus needling elsewhere in muscle; and the evidence of four studies combined failed to show that needling directly into MTrP is superior to various non-penetrating sham interventions.

We used extensive searches and rigorous methods for this review, but drawing meaningful conclusions from these results is difficult because, in addition to the generally low internal validity revealed in Table 2, there were four areas of significant limitation in the design of many of the original studies.

Firstly, though MTrPs appear to have been identified carefully in most studies, it is not clear that they were the sole cause of pain. For example, three studies recruited elderly patients with chronic neck or low back pain (Itoh et al., 2004, 2006, 2007). Observations by experts in clinical practice suggest that patients with a history of injury, for example whiplash, or sustained postural strain (e.g. during computer work) may be more suitable cases for this treatment approach (Fricton, 1993; Simons et al., 1999; Treaster et al., 2006). Secondly, sample sizes were generally small which raises the possibility of type II error, where the likelihood of a study producing a false negative result is increased (Sim and Wright, 2000). Although this should have been overcome in the meta-analysis by the inclusion of 134 patients, given the statistical heterogeneity observed, care must be taken in interpretation. Thirdly, treatment interventions varied considerably in location of needle placement, the depth of insertion, individual treatment times and overall number of treatment sessions. Until evidence is available on the possible mechanism of action of needling, or until different interventions have been compared directly, there is no logical basis for choosing the optimal intervention. Another limitation in the design of one study was the different number of intervention sessions in experimental and control groups (Ilbuldu et al., 2004). Finally, outcome measures were applied at different times in various studies and, in one case (DiLorenzo et al., 2004) in different arms of the study adding to difficulties in interpretation.

The result of the meta-analysis of four studies is itself difficult to interpret due to the small sample size available. The results are consistent with both a lack of any treatment effect and a positive trend that might become significant with a larger sample size (narrower confidence interval). It is noteworthy that the control group in the single significantly positive study by Itoh et al. (2006) used blunt needles, which may have less physiological effect than subcutaneous needling; yet another study using the same control showed no significant difference between groups (Itoh et al., 2007). Only further research can provide a definitive answer on whether or not direct needling of MTrPs has an effect superior to placebo.

In making recommendations for research, other than the obvious corrections of the limitations listed above, we note that a number of studies excluded from this review combined direct MTrP needling with needling of other areas, and in particular using classic acupuncture points (Irnich et al., 2001; Ceccherelli et al., 2002, 2006). It is not clear if this intervention is based on the hypothesis that direct MTrP needling is only effective, or more effective, when used in combination with needling meridian points. Unfortunately, since needling of classical points may have an independent effect, this design cannot contribute to answering the question of the effectiveness of direct MTrP needling.

The choice of controls in acupuncture studies of deep needling is a perennial problem. Any intervention that seems similar to deep needling (blunt needle, superficial needle) probably has some biological effect, necessitating very large sample sizes to show small differences. Sham treatments that do not involve needles (such as sham laser or sham TENS) are not likely to have the same psychological impact as needling, and therefore do not control for all the non-specific effects of needling.

5. Conclusion

There is limited evidence, deriving from one study that deep needling directly into myofascial trigger points has an overall treatment effect when compared with standardised care. Whilst the result of the meta-analysis of needling compared with placebo controls does not attain statistically significant, the overall direction could be compatible with a treatment effect of dry needling on myofascial trigger point pain. However, the limited sample size and poor quality of these studies highlights and supports the need for large scale, good quality placebo controlled trials in this area.

Acknowledgements

Andrea Peace, Library and Information Services Manager. The Chartered Society of Physiotherapy.

EA Tough and AR White are supported by the National Institute for Health Research (NIHR).

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