

Effectiveness of Physical Therapy in Patients with Tension-type Headache: Literature Review

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ABSTRACT. Background: Tension-type headache (TTH) is a disease with a great incidence on quality of life and with a significant socioeconomic impact. **Objectives:** The aim of this review is to determine the effectiveness of physical therapy by using manual therapy (MT) for the relief of TTH. **Data sources:** A review was done identifying randomized controlled trials through searches in MEDLINE, PEDro, Cochrane and CINAHL (January 2002 - April 2012). **Study selection:** English-language studies, with adult patients and number of subjects not under 11, diagnosed with episodic tension-type headache (ETTH) and chronic tension-type headache (CTTH) were included. **Data extraction:** Initial search was undertaken with the words Effectiveness, Tension-type headache, and Manual therapy (39 studies). In addition, a search which included terms related to treatments such as physiotherapy, physical therapy, spinal manipulation was performed (25 studies). **Results:** From the two searches 9 studies met the inclusion criteria and were analysed finding statistically significant results: 1) myofascial release, cervical traction, neck muscles trigger points in cervical thoracic muscles and stretching; 2) Superficial heat and massage, connective tissue manipulation and vertebral Cyriax mobilization; 3) cervical or thoracic spinal manipulation and cervical chin-occipital manual traction; 4) massage, progressive relaxation and gentle stretching, program of active exercises of shoulder, neck and pericranial muscles; 5) massage, passive rhythmic mobilization techniques, cervical, thoracic and lumbopelvic postural correction and cranio-cervical exercises; 6) progressive muscular relaxation combined with joint mobilization, functional, muscle energy, and strain/counterstrain techniques, and cranial osteopathic treatment; 7) massage focused on relieving myofascial trigger point activity; 8) pressure release and muscle energy in suboccipital muscles; 9) combination of mobilizations of the cervical and thoracic spine, exercises and postural correction. **All studies used a combination of different techniques and none analyzed treatments separately, also all the studies have assessed aspects related to TTH beyond frequency and intensity of pain. Conclusions:** The findings from these studies showed evidence that physiotherapy with articular MT, combined with cervical muscle stretching and massage are effective for this disease in different aspects related with TTH. No evidence was found of the effectiveness of the techniques applied separately.

Key words: Physical therapy, Manual therapy, Tension-type headache, Effectiveness

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The types and characteristics of tension-type headaches (TTH) were included in primary headaches by the Inter-

national Headache Society (IHS) in 2004¹. The most common tension type headaches are episodic tension headaches (ETTH), which frequency is less than 15 days per month, and chronic tension-type headaches (CTTH), which frequency is more than 15 days per month. This last type also is characterised for its episodes of pain ranging from 30 minutes to 7 days. To be considered chronic, the headache

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should meet 2 or more of the following characteristics: bilateral location, non-pulsatile pressure, mild or moderate pain and does not increase with physical activity.

TTH also constitute an important area of primary care visits. Due to the effectiveness obtained from symptomatic medication, both migraines and tension headaches are often self-treated by patients who suffer from them²⁾. Both frequency and intensity of pain can produce serious disturbances on the patient. Moreover, when it becomes chronic, it turns into an important problem for both the doctor and the patient. Diagnosis of this disease is exclusively done on the clinical data and there are no other complementary diagnostic tests to confirm TTH, so it is often done by exclusion of other diseases. Prevalence rates range from 22.65% to 30% of the population, and it has repercussions on work, social fields, daily living activities and quality of life³⁾. Both human and socio-economic impact are considerable due to lost workdays or days with reduced work efficiency. TTH may as well affect quality of life, impairing relationships with family, friends and colleagues. It can even result in the cancellation of family and social activities⁴⁾. In recent studies conducted in Spain, it was shown that 31% of people who suffered headaches were disabling during the episode, whereas 53% reduced the efficiency of their daily life activities. For Lenssink *et al.*, 2004, from all types of headaches, TTH is the most common form, constituting a major health problem with great socioeconomic impact⁴⁾.

Primary headaches have a high incidence and prevalence in general population. Migraine and TTH are the leading types of primary headaches. Not only have social and health transcendence but also have an important repercussion in the public health system. Due to them, a high average of appointments are made to different health professionals and lead to a large number of medical prescriptions which cause high costs⁵⁾.

Additionally, muscle disorders play an important role in headaches. Even ETTH could become chronic because of these disorders. In fact, it has been proved that neck and head trigger points in TTH patients score higher in pain intensity and frequency than in healthy people⁶⁾. Buchgreitz *et al.*, 2008⁷⁾, believe that central sensitivity caused by long periods of suffering pain can make the process chronic.

Fernández *et al.*, 2006, evaluated pericranial and neck muscles trigger points (TrP) both in patients with CTTH and in healthy subjects. They studied bilateral TrP in trapezium, sternocleidomastoid and temporalis muscles. Subjects with TTH with active points showed a greater intensity and duration of headache compared with those who had latent points ($P < 0.05$)^{8,9)}.

Serrano *et al.*, 2007¹⁰⁾, published a study in which they showed that pericranial muscle contracture and stress played an important role in headache's physiopathology, which justifies the presence of pericranial pain hypersensitivity and decreased pain threshold.

Manual therapy is considered one of the main treatments for TTH. It is based on the treatment of neuro-musculoskeletal dysfunction through muscle and joint analytical manipulations based on their biomechanical study. There is a wide range of manual therapy treatments used in physiotherapy¹¹⁾. The characteristics of the headache have to be studied to achieve an accurate diagnosis before applying any of these manual treatments¹²⁾.

The reviews we have found so far show either the non-effectiveness of treatments⁴⁾, or always include spinal manipulation^{13,14)}. However, there are recent studies that include manual therapy techniques which were not studied in previous reviews. Therefore, it is necessary to collect recent studies in order to focus on those treatments with scientific quality, and incorporate and compare studies that include both manipulative and articular therapy.

The novelty of this systematic review in relation to other reviews, is that we want to find the effectiveness of treatments applied in patients with TTH, not only spinal manipulation but also other treatments which include manual therapy. Moreover, in our study we review which other aspects related to TTH have been assessed beyond frequency and intensity of pain which are the most common aspects.

Objective

The aim of this review is to determine the effectiveness of physical therapy by using manual therapy (MT), manipulative or not, in TTH treatment, as well as the assessed aspects.

Methods

From February to April 2012 systematic searches of scientific literature were undertaken on MEDLINE, PEDro, Cochrane and CINAHL, for randomized controlled studies published from January 2002 to April 2012. For this review the initial search terms were obtained from the MeSH and were: *effectiveness, tension-type headache, and manual therapy*. An additional search was done using the following keywords also obtained from MeSH: *treatment, physiotherapy, physical therapy, physiological and spinal manipulation*.

Study selection

Studies were included if they: 1) were in English language, 2) included adult patients, 3) the sample size was never below 10, 4) subjects were diagnosed with ETTH and CTTH according to the IHS criteria¹⁾ 5) included manual therapy techniques applied more than one session per treatment, 6) studies from 2002 until 2012 and 7) at least one of the following parameters were measured: pain intensity, pain frequency, other evaluations concerning headache.

The title, abstract and keywords of each article were

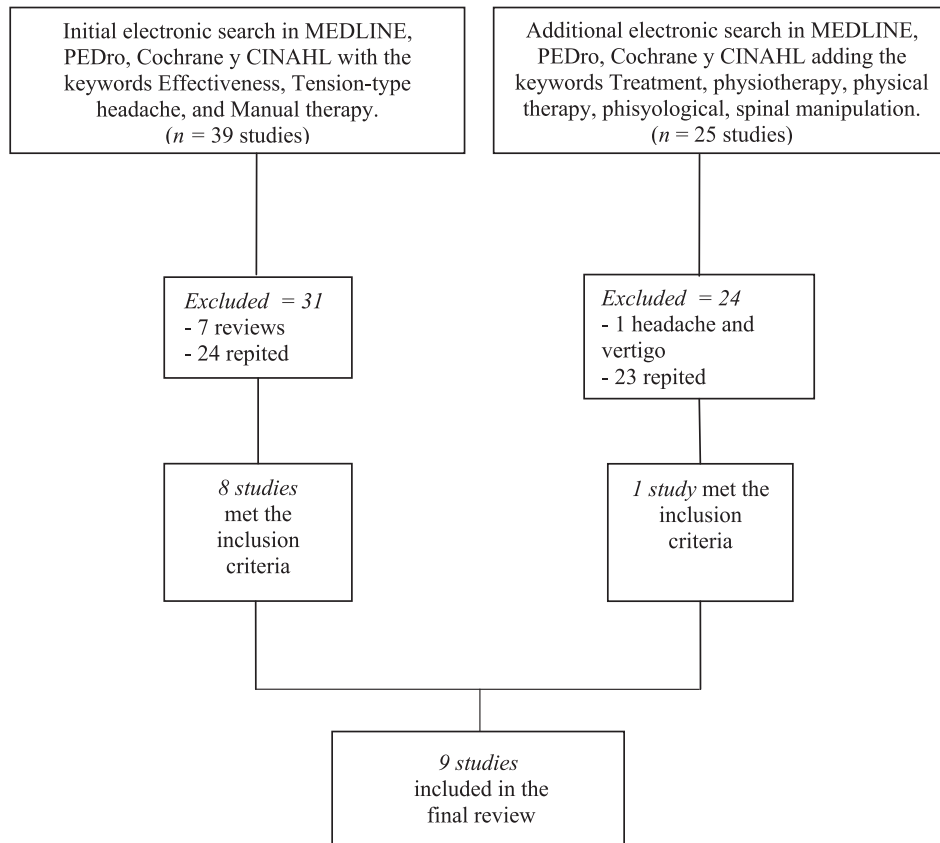


Fig. 1. Flow diagram of study selection procedure

assessed to determine if it fulfilled the inclusion criteria outlined above. Studies which met inclusion criteria were included for full-text review.

Data extraction

The selection of studies and data extraction was carried by two reviewers. Initial search was undertaken on randomized controlled trials with adult patients diagnosed with TTH (IHS criteria), using the words effectiveness, tension-type headache, and manual therapy. This way 39 studies were obtained and reviewed. Reviews were excluded for not being the subject of study, but they were considered for the discussion.

Additionally, the following MeSH terms were added in the search: *treatment, physiotherapy, physical therapy, physiological and spinal manipulation*. Therefore, 25 more studies were obtained and reviewed. One of them was excluded since it included headache with symptoms of vertigo. Finally, the studies meeting the inclusion criteria were reviewed and analyzed.

Results

Study selection

From the search strategy, 64 potentially relevant studies were found, from which 7 reviews were excluded, as

well as one study which examined both headache and vertigo. Also repeated studies were excluded. The 9 remaining studies met the inclusion criteria and were analyzed. Fig. 1 shows the procedure used in study selection.

Interventions

The treatments that each of the 9 studies included for TTH were: 1) massage, myofascial release, traction, trigger point therapy, stretching and relaxation¹⁵; 2) superficial heat, massage, connective tissue manipulation and spinal mobilization¹⁶; 3) chiropractic manipulation¹⁷; 4) initial gentle massage, progressive relaxation and gentle stretching, adding a daily home program of active exercises for shoulder, neck and pericranial muscles¹⁸; 5) friction massage, rhythmic passive mobilization techniques based on the Maitland method and cervical, thoracic and lumbopelvic postural correction, as well as cranio-cervical exercises¹⁹; 6) progressive muscular relaxation, joint mobilization, functional, muscle energy, and strain/counterstrain techniques, and cranial osteopathic treatment²⁰; 7) massage focusing on myofascial trigger point activity²¹; 8) pressure release and muscle energy in suboccipital muscles²²; 9) cervical and thoracic spine mobilization and postural correction²³.

Description of included studies

The characteristics, results and main conclusions of the 9 analyzed studies are as follows and are presented summarized in Table 1.

1. Quinn and Chandler, 2002¹⁵⁾ performed a headache treatment recruiting 25 patients between 18 and 55 years old. The treatment was done for 4 weeks, 2 times per week, 30 minutes each session with the following 6 phase sequence: 3 minutes of preparatory tissue warm-up, 5 minutes of myofascial release, 2 minutes of cervical traction, 5 minutes of TrP in trapezius, sternocleidomastoid, suboccipital, splenius capitis and elevator scapulae muscles, 5 minutes of stretching and 3 to 5 minutes of relaxation. After 4 weeks relevant outcomes were extracted for frequency ($P = 0.009$), duration of pain ($P = 0.58$), and pain intensity ($P = 0.19$). Therefore there was an improvement of the three measures after the manual

therapy treatment.

2. Demirturk *et al.*, 2002¹⁶⁾ conducted a comparative study on the efficacy of two different manual treatment methods in patients with TTH. The study included 35 patients with a mean age of 38.27 years old, who were randomly allocated into two groups. Only 30 patients completed the treatment programs. Superficial heat and massage were applied to both groups, as well as connective tissue manipulation to group 1 ($n = 15$) and vertebral Cyriax mobilization to group 2 ($n = 15$). The treatment program consisted of 20 sessions over 4 weeks plus 1 month of follow-up. For comparing the effectiveness of the methods the following parameters were evaluated before and after treatment and in a month follow-up: headache pain intensity, cervical active movement range, and pain threshold to pressure. The study results indicated that all parameters had significant improvements in both

Table 1. Characteristics of studies with MT and their efficacy (1)

Author	n	Treatment duration	Type of study	Treatment	Effect
Quinn and Chandler 2002 ¹³⁾	25	4 weeks	Trial without control group	Massage, myofascial inhibition, traction, trigger point therapy, stretching and relaxation	Frequency $P=0.00$ Pain Duration $P=0.58$ Intensity $P=0.19$
Demirturk <i>et al.</i> , 2002 ¹⁴⁾	35	4 weeks	Comparative trial	G1: Superficial heat and massage + connective tissue manipulation G2: Superficial heat and massage + spinal Cyriax mobilization	Pain index, intensity and movement range $P>0.05$ in both groups.
Donkin <i>et al.</i> 2002 ¹⁵⁾	30	4 weeks	Comparative pilot study	G1: Thoracic spinal manipulation G2: chiropractic manipulation and cervical occipital manual traction	Perception of pain, disability, CROM, frequency, intensity and duration $p<0.05$ in , both groups, but better results for manipulation without traction
Torelli <i>et al.</i> , 2004 ¹⁶⁾	50	G1: 8 weeks treatment + 12 weeks observación G2: 8 weeks observación + 8 weeks treatment + 12 obsevación	Comparative trial	G1: Treatment (gentle massage, progressive relaxation gentle stretching, and active exercises) + observation G2: Observation+ Treatment as G1	G1 and G2: Frequency reduced $P<0.001$ Compared G1 and G2 results in the CTTH compared with ETTH $P<0.002$ Intensity, duration, and consumption of medication no significatn results in any group no results
van Etteken and Lucas, 2006 ¹⁷⁾	81	6 weeks	Randomized controlled trial	G1: friction massage, passive rhythmic mobilization techniques based on Maitland method, cervical, thoracic and lumbopelvic postural correction and cranio-cervical exercises G2: Control group treatment was the same except that cranio-cervical exercises were not applied	G1: Frequency $P=0.0001$; Intensity $P=0.001$; Duration $P=0.01$; Quality of life $P <0.001$ G2: All parameters $p>0.05$

Table 1. Characteristics of studies with MT and their efficacy (2)

Author	n	Treatment duration	Type of study	Treatment	Effect
Anderson and Seniscal, 2006 ¹⁸⁾	26	3 weeks	Randomized controlled trial	G1: progressive muscular relaxation + treatment (3 session with + joint mobilization, muscle energy and strain/counterstrain techniques, osteopathy). G2: progressive muscular relaxation	G1: Frequency P=0.016 Intensity, degree of pain no results positive; degree of pain improved on 57,5%. G2: Degree of pain only improved on 15,6%.
Moraska and Chandler, 2008 ¹⁹⁾	18	6 weeks	Pilot study one group	Massage focused on relieving myofascial trigger point activity	Frequency P<0.001 Intensity P<0.01 Duration P<0.05 Disability P<0.001
Toro-Velasco <i>et al.</i> , 2009 ²⁰⁾	11	2 sessions	Pilot study	G1: Pressure release and muscle energy in suboccipital muscles G2: placebo treatment with ultrasound therapy	G1: Index of HRV P=0.01 Anxiety P=0.03 Hostility, anger P=0.04 Intensity P<0.05 G2: Parameters p>0.05
Castien <i>et al.</i> , 2011 ²¹⁾	82	8 weeks	Randomized controlled trial	G1: Mobilization of cervical and thoracic spine, postural correction exercises. G2: usual care by general practitioner	G1: Impact P<0.001 Disability P=0.001 Movement P=0.023 Algometry P=0.001 Strength P=0.011 G2: Parameters p>0.05

groups ($P > 0.05$). Thus, both treatments improved the measures.

3. Donkin *et al.*, 2002¹⁷⁾ performed a study with 30 patients between 20 and 62 years old divided into two groups with 15 subjects each. The treatment was undertaken in 9 sessions over 4 weeks. The first group received cervical or thoracic spinal manipulation and the second received chiropractic manipulation and cervical chin-occipital manual traction 20 times (10 seconds of traction followed by 10 seconds of pause). Perception of pain was assessed by the McGill questionnaire, disability by the Neck Disability Index, intensity by the Numerical Pain Rating Scale 101, and also cervical range of motion (CROM) and a daily register of pain frequency, intensity and duration were evaluated. The first group improved as well in all parameters of daily pain. Moreover, compared with the second group the first group improved in pain intensity ($P = 0.042$), pain perception ($P = 0.082$) and its daily pain improved in intensity ($P = 0.005$) and in frequency ($P = 0.018$), while the rest of parameters remained unchanged. The study concludes that manipulation without traction is the most effective technique.

4. Torelli *et al.*, 2004¹⁸⁾ evaluated results of physiotherapy for TTH in 50 patients, aged between 18 and 70: 26 diagnosed with ETTH and 24 with CTTH. Patients received physiotherapy treatment for 8 weeks: group 1

was treated with initial gentle massage, progressive relaxation and gentle stretching, adding daily home program of active exercises of shoulder, neck and pericranial muscles, plus 12 weeks of follow-up. Group 2 had 8 weeks of observation, then 8 weeks of identical physiotherapy treatment as Group 1, followed by 12 weeks of follow-up. Comparing headache frequency before and after the treatment a significant and equal decrease was shown in both groups ($P < 0.001$). These results were significant for CTTH compared with ETTH ($P < 0.002$). The intensity, duration and medication, did not change throughout the study and showed no variations between chronic tension headache or between episodic tension-type headache. The study was limited by the lack of double-blind design.

5. van Ettehoven and Lucas, 2006¹⁹⁾ conducted a multi-center, randomized controlled trial with a treatment period of 6 weeks, immediate evaluation after them and a 6 months follow-up. The objective was to determine the effectiveness of a cranio-cervical exercise program combined with other physiotherapy treatments in patients with TTH. The study recruited 81 participants with TTH and a mean age of 48.3 years (SD 18.39) who were randomly allocated into two groups. One group was treated with friction massage, passive rhythmic mobilization techniques based on Maitland method, cervical, thoracic

and lumbopelvic postural correction and cranio-cervical exercises with a latex band (150 cm). The control group treatment was the same except that cranio-cervical exercises were not applied. Frequency, intensity and duration of pain, were evaluated, as well as quality of life with the SF-36, and the multidimensional aspect with the Multidimensional Health Locus of Control scale (MHLC). The cranio-cervical exercise group showed significant reduction in most of the parameters. This trial showed that cranio-cervical physiotherapy including an exercise program is effective for a long period of time in TTH.

6. Anderson and Seniscal, 2006²⁰⁾ conducted a study to compare the effects of a treatment based only on progressive muscle relaxation, with a treatment based on progressive muscular relaxation combined with joint mobilization, functional, muscle energy, and strain/counterstrain techniques, and cranial osteopathic treatment. It was a single-blind, randomized, clinical trial undertaken with 26 patients with TTH (12 in the control group and 14 in the experimental group). Both groups practiced relaxation exercises for 20 minutes at home, while the experimental group also received 3 osteopathic treatments (1 per week) that focused on the pelvis, cranium, cervical and upper thoracic spine, clavicles, and upper ribs. Pain frequency was registered and it decreased significantly in the experimental group ($P = 0.016$), but the level of improvement in pain and headache intensity was not statistically significant. The pain rate also improved 57.5% in the experimental group, while in the control group it improved 15.6%. Therefore, progressive muscle relaxation combined with osteopathic treatment was more effective than only progressive muscle relaxation.

7. Moraska and Chandler, 2008²¹⁾ performed a study to evaluate the short-term changes in patients with TTH. The physiotherapy program was based on massage focused on relieving myofascial trigger point activity. The study recruited 18 participants with a mean age of 43.8 years, who received the treatment 2 times per week, in 45 minute massage sessions, which began after a three week base-line period. Disability evaluation was done using the Headache Disability Inventory (HDI) and with a record of frequency, intensity and duration of pain. The headaches were registered during base-line period, 6 week treatment period and 3 week follow-up. Pain frequency decreased from 4.7 (SD 0.7) episodes per week to 3.7 (SD 0.9) during treatment period and to 3.2 (SD 1.0) during the follow-up. The headache intensity was reduced by 30% and headache duration decreased from 4.0 (SD 1.3) to 2.8 (SD 0.5) hours. Disability index also showed significant improvement. This results show that massage combined with myofascial trigger point treatment is effective.

8. Toro-Velasco *et al.*, 2009²²⁾ studied the immediate effects of head and neck massage on heart rate variability

(HRV), mood states and pressure pain thresholds (PPT) in patients with CTTH. The sample had 11 patients with a mean age of 51 years (SD 15). Group 1 received the experimental treatment (pressure release and muscle energy in suboccipital muscles for 40 minutes) and group 2 had placebo treatment with ultrasound therapy. Evaluation was performed by holter, electrocardiogram, and PPT on temporalis, suboccipital, upper trapezius, splenius capitis, sternocleidomastoid, levator scapulae, and semispinalis capitis. The mood profile was evaluated with the Profile of Mood States questionnaire (POMS). The data were obtained before intervention, immediately after it and 24 hours later. Paired comparisons after the intervention showed that the group treated with MT had an increased rate of HRV ($P = 0.01$), whereas no changes were found after intervention in placebo group ($P = 0.7$). There were also differences for tension-anxiety ($F = 5.3$, $P = 0.03$), and for hostility and anger ($F = 4.6$, $P = 0.04$). Paired comparisons showed that pain intensity was reduced 24 hours after the MT ($P < 0.05$) but not after placebo intervention ($P = 0.9$). Therefore, the application of a single session of MT produces an immediate increase in heart rate variability index and a decrease in tension, in anger state and perceived pain in patients with CTTH.

9. The study performed by Castien *et al.*, 2011²³⁾ evaluated the effectiveness of MT in the CTTH with 82 subjects that were randomly allocated: 41 received MT treatment and 41 received usual care by general practitioner. The MT treatment consisted of a combination of mobilizations of the cervical and thoracic spine, exercises and postural correction for 8 weeks, with a maximum of 9 sessions of 30 minutes each. Evaluation included pain frequency, use of medication, headache severity, impact and disability produced by headache evaluated with the Headache Impact Test-6 (HIT-6), algometry, strength of cervical flexors and cervical range of motion. Evaluation was done at the end of the 8 week treatment and had a follow-up of 26 weeks. Significant differences were found for the MT group in frequency (-6.4 days, 95% CI -8.3 to -4.6), duration of headache (-5.3 hours, 95% CI -9.5 to -1.2) and headache intensity (-1.8, 95% CI -3.1 to -0.7). After 8 weeks pain frequency was reduced to 50% in 87.5% of participants in MT group and in 27.5% in the usual care group (Table 1). At 26 weeks follow-up the differences between groups were statistically significant in headache frequency (-4.9 days, 95% CI -6.95 to -2.98) pain intensity (-1.4, 95% CI -2.7 to -0.2) and impact of pain ($P = 0.012$) in favour of the MT group. Therefore, MT was proved to be more effective than usual care.

All the analyzed studies combine different techniques and no study applies manual therapy separately and evaluates its effectiveness, making it difficult to know which of the techniques is most effective. 4 of them include massage,

Table 2. Summary of other systematic reviews of effectiveness of MT in CTTH

Author	Type of treatment	n	Results
Espí and Gómez, 2010 ¹¹⁾	Drugs, manual therapy	15 studies	Joint therapy, functional techniques, with muscle relaxation have good results.
Astin and Ernst, 2002 ²²⁾	Vertebral manipulation	8 studies	Only 3 treated TTH and do not show conclusive results referring to effectiveness.
Fernández <i>et al.</i> , 2006 ²³⁾	Vertebral manipulation, massage, vertebral mobilization, manual traction, cranium therapy	6 studies	Studies using spinal manipulation showed evidence of effectiveness (level 4), while soft tissue techniques showed limited evidence (level 3).
Lenzsinck <i>et al.</i> , 2004 ⁴⁾	Physiotherapy and spinal manipulation	8 studies	Insufficient evidence to support or refute the efficacy of physiotherapy and spinal manipulation in patients with TTH

2 include suboccipital inhibition and 2 spinal manipulation in a different region.

Common techniques to most of the studies are postural correction exercises or similar and myofascial techniques.

The 3 higher methodological quality studies are RCTs, but they combine a greater number of manual therapy techniques and none of them focuses on the treatment of suboccipital or craniocervical region.

Discussion

This review found that manual therapy can be an alternative for treatments and therapies used for TTH which do not have complete effectiveness.

The studies found in this review show that massage combined with: cervical exercises, myofascial techniques, postural techniques, cervical relaxation exercises, cervical mobilization, gentle and progressive stretching or TrP treatment are effective in reducing pain frequency, intensity and duration, as well as increasing range of motion. Relaxation exercises combined with cervical exercises were only effective in reducing pain frequency in CTTH, and were not in ETTH. The reviewed studies that apply only manipulation showed positive results, however, they did not have control group or their methodological quality was low and systematic reviews show no conclusive results of its effectiveness. However this therapy appears to be effective when it is combined with massage.

Other authors¹³⁾ conducted a review which evaluated the effectiveness of manipulation in headache. It included 8 randomized studies and the Jadad scale was used for assessing the validity of the scientific article. 6 trials were included in the study and only 3 treated TTH. No conclusive results referring to the effectiveness of spinal manipulation were obtained since the studies were limited for not having control group or only single-blind control.

Along the same lines, Fernández de las Peñas *et al.*¹⁴⁾ performed a review of the effectiveness of manual therapy

for reducing pain in TTH based on the methodology scale of PEDro. Only 6 studies had used manual therapy. According to PEDro scale evidence changed from 2 to 8 (mean 5.8 SD = 2.1). Quality and results analysis of all trials did not provide evidence that manual therapy had a positive effect in reducing TTH: spinal manipulation showed evidence of effectiveness (level 4), while soft tissue techniques showed limited evidence (level 3).

Lenzsinck *et al.*, 2004⁴⁾ performed a systematic review of randomized controlled trials (RCTs) to determine the effectiveness of physiotherapy and spinal manipulation in patients with TTH. A total of 8 RCTs that used physiotherapy or spinal manipulation in the treatment of TTH in adults were selected. These studies showed a variety of interventions such as spinal chiropractic manipulation, connective tissue manipulation or physiotherapy. Only two studies were considered of high quality, but showed opposite results. Due to clinical heterogeneity and low methodological quality of many of the studies, it did not seem possible to show valid conclusions. Therefore, there is insufficient evidence to support or refute the efficacy of physiotherapy and spinal manipulation in patients with TTH according to this review. Table 2 shows different reviews that study the effectiveness of MT in TTH.

As shown in this review, massage combined with other physiotherapy techniques is usually effective, but we still do not know if other physiotherapy techniques are effective separately. Likewise, so are MT techniques. However, few studies have implemented specific physiotherapy techniques based on MT for the treatment of headache, probably this is due to the effectiveness for relieving pain of pharmacological measures¹¹⁾. Therefore, greater number of evidence-based studies is needed to determine the effectiveness of physiotherapy for patients with TTH. In addition, due to the application of treatments that combine several techniques, it is not possible to distinguish whether the same results would be shown for each treatment on its own.

The highlight of this review was to determine other physiotherapy techniques which include manipulative manual therapy or not and the assessments which are important in different spheres such as quality of life, disability, impact of pain and pain perception, and not just pain frequency and intensity of pain during crisis which decreases in most of the treatments. The main limitation of this study is that the results are not taken into account the risk of bias and reporting bias.

Conclusion

Cervical exercises, relaxation, massage, postural exercises, cranio-cervical techniques, thermotherapy, vertebral mobilization and stretching are effective in reducing TTH symptoms such as pain frequency and intensity. In the studies that have applied joint mobilization, cervical range of motion has improved. Other parameters such as quality of life, impact and pain disability and psychological aspects have improved with MT. Therefore it would be advisable to use it both to improve the quality of life of patients and to reduce the socioeconomic cost of the disease. However, it is noteworthy that all studies reviewed, as well as other previous reviews include more than two techniques so it becomes difficult to know which one of them is most effective. Therefore, it would be desirable to implement studies that showed the effectiveness of techniques on their own.
Conflict of interest: None declared

References

- 1) Headache Classification Subcommittee of the International Headache Society: The International Classification of Headache Disorders, 2nd edition, is published by International Headache Society in Cephalalgia 2004, 24 (suppl 1): 1–160. Available in: http://ihs-classification.org/_downloads/mixed/WatermarkedShortForm%20ICHD-II.pdf
- 2) Infante E, Pérez del Campo Y, Díaz MJ and Vergara O: Enfoque clínico-etiológico de las cefaleas. Rev Cub Med Gen Integr. 2001, 17(5): 483–489.
- 3) Felício AC, Bichuetti DB, Celso dos Santos WA, Godeiro CO, Marin LF and Carvalho DS: Epidemiology of primary and secondary headaches in a Brazilian tertiary-care center. Arq Neuro-Psiquiatr. 2006, 64: 41–46.
- 4) Lenssinck MLB, Damen L, Verhagen AP, Berber MY, Passchier J and Koes BW: The effectiveness of physiotherapy and manipulation in patients with tension-type headache: a systematic review. Pain. 2004, 112: 381–388.
- 5) Volcy-Gómez M: The impact of migraine and other primary headaches on the health system and in social and economic terms. Rev Neurol. 2006, 43(4): 228–235.
- 6) Coupe C, Torelli P, Fuglsang-Frederiksen A, Andersen K and Jensen R: Myofascial Trigger Points Are Very Prevalent in Patients With Chronic Tension-type Headache: A Double-blinded Controlled Study. Clin J Pain. 2007, 23(1): 23–27.
- 7) Buchgreitz L, Egsgaard LL, Jensen R, Arendt-Nielsen L and Bendtsen L: Abnormal pain processing in chronic tension-type headache: a high-density EEG brain mapping study. Brain. 2008, 131(12): 3232–3238.
- 8) Fernández-de-las-Peñas C, Alonso-Blanco C, Cuadrado ML, Gerwin RD and Pareja JA: Myofascial trigger points and their relationship to headache clinical parameters in chronic tension-type headache. Headache. 2006, 46: 1264–1272.
- 9) Fernández-de-las-Peñas C, Alonso-Blanco C, Cuadrado ML, Gerwin RD and Pareja JA: Trigger points in the suboccipital muscles and forward head posture in tension-type headache. Headache. 2006, 46: 454–460.
- 10) Serrano C, Andrés MT and Sánchez-Palomo MJ: Cefalea de tensión. Medicine. 2007, 9(70): 4473–4479.
- 11) Espí GV and Gómez A: Eficacia del tratamiento en la cefalea tensional. Revisión sistemática. Fisioterapia. 2010, 32(1): 33–40.
- 12) Niere KR: Pain descriptors used by headache patients presenting for physiotherapy. Physiotherapy. 2002, 88(7): 409–416.
- 13) Astin JA and Ernst E: The effectiveness of spinal manipulation for the treatment of headache disorders: a systematic review of randomized clinical trials. Cephalalgia. 2002, 22: 617–623.
- 14) Fernández de las-Peñas C, Alonso-Blanco C, Cuadrado ML, Miangolarra JC, Barriga FJ and Pareja JA: Are manual therapies effective in reducing pain from tension-type headache? Clin J Pain. 2006, 22(3): 278–285.
- 15) Quinn C, Chandler C and Moraska A: Massage Therapy and Frequency of Chronic Tension Headaches. Am J Public Health. 2002, 92(10): 1657–1661.
- 16) Demirturk F, Akarcali I, Akbayrak T, Citak I and Inan L: Results of two different manual therapy techniques in chronic tension-type headache. Pain Clinic. 2002, 14(2): 121–128.
- 17) Donkin RD, Tech M, Parkin-Smith GF, Tech M and Gomes AN: Possible effect of chiropractic manipulation and combined manual traction and manipulation on tension-type headache: A pilot study. J Neuromusculoskeletal Sys. 2002, 10(3): 89–97.
- 18) Torelli P, Jensen R and Olesen J: Physiotherapy for tension-type headache: a controlled study. Cephalalgia. 2004, 24(1): 29–36.
- 19) van Eettekoven H and Lucas C: Efficacy of physiotherapy including a craniocervical training programme for tension-type headache; a randomized clinical trial. Cephalalgia. 2006, 26: 983–991.
- 20) Anderson RE and Seniscal C: A comparison of selected osteopathic treatment and relaxation for tension-type headaches. Headache. 2006, 46(8): 1273–1280.
- 21) Moraska A and Chandler C: Pilot study of chronic tension type headache. J Man Manip Ther. 2008, 16(2): 106–112.
- 22) Toro-Velasco C, Arroyo-Morales M, Fernandez-de-las-Peñas C, Cleland JA and Barrero-Hernandez FJ: Short-term effects of manual therapy on heart rate variability, mood state, and pressure pain sensitivity in patients with chronic tension-type headache: a pilot study. J Manipulative Physiol Ther. 2009, 32(7): 527–535.
- 23) Castien RF, van der Windt DA, Grooten A and Dekker J: Effectiveness of manual therapy for chronic tension-type headache: a pragmatic, randomised, clinical trial. Cephalalgia. 2011, 31(2): 133–143.