

# MANUAL THERAPY IN THE TREATMENT OF PRIMARY HEADACHES

- a systematic review -

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## ABSTRACT

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**Introduction:** Headache is listed as one of the most prevalent pain conditions, with significant socioeconomic impact that affects the quality of life. Among these, we highlight the tension-type headache (TTH) and migraine. Treatment ranges from pharmacotherapy to physical therapy, emphasizing manual therapy. **Objective:** to highlight key findings and results of manual therapy techniques in the treatment of primary headaches. **Methods:** A systematic literature review was conducted through research and original studies published in journals indexed in electronic databases PLoS, MEDLINE via PubMed, PEDro, Lilacs and SciELO, which contained analyzes related to the purpose of the study in question. To evaluate the methodological quality and statistical description, as well as the risk of bias of the selected physical therapy studies, the PEDro scale as well as the PRISMA checklist. **Results:** 1,205 articles were found, of which nine were selected. These, despite the variety of techniques and duration of the intervention, indicated a decrease in the frequency, intensity and use of analgesic medication, and elevation in pain threshold, endurance of flexor muscles active cervical. A methodological analysis of trials was available for 55,5% of those and with scores  $\geq 5$  (PEDro scale). **Conclusions:** Manual therapy is show as an effective alternative in the treatment of primary headache.

**Keywords:** Tension-type headache; Migraine; Manual therapy.

**Introdução:** Cefaleia é listada uma das condições de dor mais prevalentes, com impacto socioeconômico significativo que afeta a qualidade de vida. Entre estes, destacam-se a cefaleia do tipo tensional (CTT) e enxaqueca. O tratamento varia de farmacoterapia para a fisioterapia, enfatizando a terapia manual. **Objetivo:** Destacar as principais conclusões e resultados de técnicas de terapia manual no tratamento de cefaleias primárias. **Métodos:** Uma revisão sistemática da literatura foi realizada por meio de pesquisas e estudos originais publicados em revistas indexadas na PLoS bases de dados electrónicas, MEDLINE via PubMed, Pedro, Lilacs e SciELO. Para avaliar a qualidade metodológica e descrição estatística, bem como o risco de viés dos estudos de fisioterapia selecionados, Pedro escala, bem como a lista PRISMA. **Resultados:** 1.205 artigos foram encontrados, dos quais foram selecionados nove. Estes, apesar da variedade de técnicas e duração da intervenção, indicaram uma diminuição na frequência, intensidade e uso de medicação analgésica, além de elevação no limiar de dor, resistência dos músculos flexores cervicais. Uma análise metodológica dos ensaios estava disponível para 55,5% das pessoas e com a pontuação  $\geq 5$  (escala PEDro). **Conclusões:** A terapia manual se mostra uma alternativa eficaz no tratamento de cefaleia primária.

**Palavras-chave:** Cefaleia do tipo tensional; Enxaqueca; Terapia manual.

## INTRODUCTION

Headache can be defined as any pain to the brain area and represents one of the most prevalent neurological complaints<sup>1-4</sup>. These facts associated with the high tendency to become chronic, results in significant individual and social consequences, affecting the Quality Of Life (QOL). Besides determining a considerable socioeconomic impact due to the direct and indirect expenses on health care costs, it may decrease efficiency at work or even on lost workdays<sup>5-14</sup>.

An International Classification of Headache Disorders (ICHDII, 2nd edition) divides headaches into two major categories: primary and secondary. Primary headaches are those that do not result from structural damage, toxic or metabolic alterations or underlying infections. Among these primary headaches, migraine and tension-type headache (TTH) appear as the most relevant according to epidemiological perspective<sup>15-17</sup>. The literature cites different therapies for the prevention and control of headache, since pharmacological treatments to alternative therapies such as diet modifications, recommendations for sleep, physical activity, stress reduction through biobehavioral interventions<sup>9,18-27</sup> and physiotherapy, using manual therapy

techniques<sup>28-30</sup>.

Although there are multiple drugs used in the acute treatment and prophylaxis of primary headaches, still there is a large number of patients who remain without satisfactory results, be it for the ineffectiveness of drugs or due to intolerance to their adverse effects. Given this reality, there are important studies that contribute to the progress of knowledge on the treatment of primary headaches, as well as presenting alternative ways for the treatment, possibly resulting in minimization of the impact of this condition<sup>31-33</sup>. In this context, this study aims to highlight the main findings and results of manual therapy techniques in the treatment of primary headaches, migraine and CTT.

## MATERIALS AND METHODS

A systematic literature review was conducted through research and original studies published in journals indexed in electronic databases PLoS, MEDLINE via PubMed, PEDro, Lilacs and SciELO, which contained analyzes related to the purpose of the study in question. The descriptors used in the

electronic survey were defined after consultation of the Medical Subject Heading (MeSH), the portal of the NLM, and Health Sciences Descriptors (MeSH), through the portal of the Virtual Health Library (VHL). Therefore, the following descriptors were used: tension-type headache; migraine; physical therapy modalities and manual therapy, conjugate or not, in the period of 2004-2016. For contextualization and discussion of the topic, articles with a wider period of search were used, from 1975 to 2016. To ensure the quality of systematic revision was applied PRISMA checklist.

The criteria for inclusion of articles were: sample of individuals with CTT and / or migraine, with diagnosis performed in accordance with the criteria of the International Headache Society (IHS); intervention group with the submission of individuals to any form of manual therapy as treatment of this particular clinical condition; outcome procedures in order to measure the effect of the therapy used on headache-related variables. To evaluate the methodological quality and statistical description, as well as the risk of bias of the selected physical therapy studies, the PEDro scale<sup>34-36</sup> was consulted.

All stages (electronic search in the databases, selection and evaluation of potential articles, data extraction and quality analysis of the studies) were performed by two independent researchers. The results of each stage were compared by a third reviewer to check the correlation between the pairs. In case of disagreement, a third investigator was responsible for the final analysis.

## RESULTS

In the search using the descriptors above, 1097 original articles were identified in the PLoS database, 77 in MEDLINE / PubMed, 19 in PEDro, 11 in LILACS and 1 in SciELO, totaling 1205 original articles. Of these, 1184 were excluded for one or more of the following reasons: repeated; review articles; issues not related, observed through analysis of the titles; language other than English; not available in full text. After that, the summaries of the 21 remaining articles were reviewed by two independent examiners. From this analysis 6 studies were excluded because they were found to be inadequate to the inclusion criteria of this review. Of the 15 remaining studies, analyzed in full, six were excluded for not presenting the issues related to the objective of the present study(see flow chart in figure 1). Thus, it was evident that most of the articles on this theme was identified in the MEDLINE/ PubMed database. The general characteristics of the nine studies selected for this systematic review are summarized in table 1.

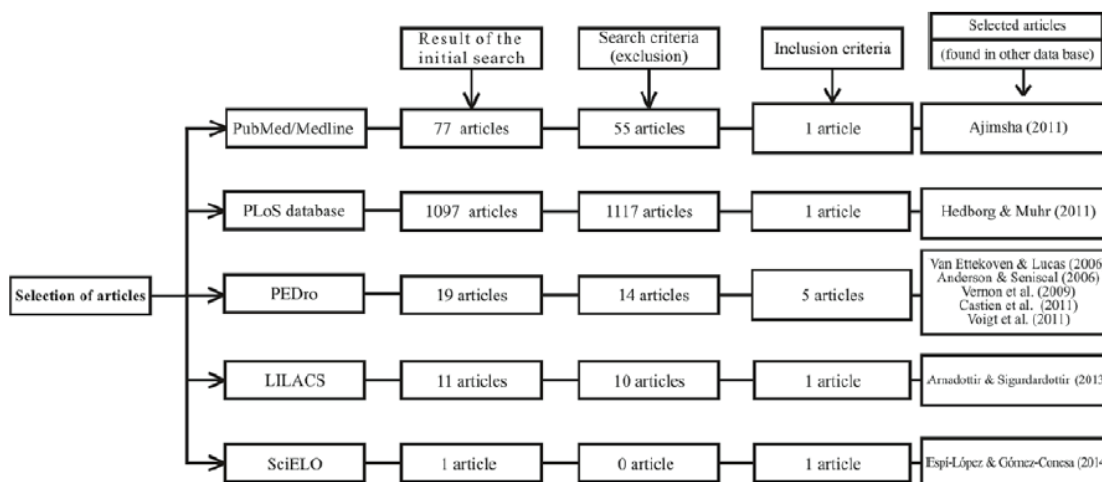


Figure 1 - Search flowchart in different databases

Table 1 - General characteristics of the studies analyzed

Author (year)	Sample	Type of Headache	Groups	Interventions	Variables analyzed	PEDro Scale
Van Eteekoven & Lucas <sup>30</sup> (2006)	80	CTTH and ETTH	Control Group (CG) Cranio-cervical Training Group (CTG)	CG: standard physiotherapy *. CTG: standard physiotherapy + cranio-cervical training.	Frequency; - Pain intensity Use of medication; - Quality of life.	07
Anderson & Seniscal <sup>31</sup> (2006)	26	CTTH and ETTH	Control Group (CG) Experimental Group (EG)	CG: relaxation exercises performed at home. EG: osteopathic manual techniques + relaxation exercises performed at home.	- Frequency and Pain intensity (combined analysis); - Headache Index (HI)**; - Free headache days / week.	05
Vernon et al <sup>32</sup> (2009)	20	CTTH	Group 1 Group 2 Group 3 Group 4	1: amitriptyline + chiropractic 2: amitriptyline placebo + chiropractic 3: amitriptyline + placebo chiropractic 4: amitriptyline placebo + placebo chiropractic		06
Hedborg & Muhr <sup>33</sup> (2011)	83	Migraine	Group A Group B Group C (control)	A: manual massage + MBT*** + CD with relaxation techniques. B: MBT + CD with relaxation techniques.. C: CD with relaxation techniques.	Frequency; - Use of medication; - Depression symptoms; - Quality of life.	NR
Castien et al. <sup>34</sup> (2011)	73	CTTH	Manual Therapy Group (MT) Usual Care Group (UC)	MT: combination of mobilization of the cervical and thoracic columns, cervical exercises and postural correction. UC: Guidelines on the headache and benefits in the change of lifestyle.	- Frequency; - Use of medication; - Pain intensity; - Inability; - Impact on AVD; - Cervical active RM; - Algometry;- Resistance of cervical flexor muscles; - Overall Improvement Perceived; - Occupational impact.	08

Table 1 - General characteristics of the studies analyzed

(continuation)

Author (year)	Sample	Type of Headache	Groups	Interventions	Variables analyzed	PEDro Scale
Voigt et al. <sup>35</sup> (2011)	42	Migrane	Intervention Group (IG) Control Group (CG)	IG: Osteopathy. CG: Osteopathy placebo or conventional physical therapy.	Osteopathy placebo or conventional physical therapy. - Pain intensity + occupational disturbance by migraine. - Headache impact; - Quality of life.	06
Ajimsha <sup>36</sup> (2011)	56	CTTH e ETTH	Direct Myofascial Release Group (D-MRG) Direct Myofascial Release Group (ID-MRG) Control Group (CG)	D-MRG: Direct myofascial release techniques (higher pressure and shorter duration). ID-MRG: techniques of indirect myofascial release (lower pressure and longer duration). CG: massage therapy.	- Frequency.	NR
Arnadottir & Sigurdardottir <sup>37</sup> (2013)	20	Migraine	Group A Group B	Both groups received the same treatment (Upledger craniosacral therapy), but at different times.	- Headache Impact;	NR
Espí-López & Gómez-Conesa <sup>38</sup> (2014)	84	CTTH e ETTH	Group 1 Group 2 Group 3 Group 4 (control)	Group 1: Manual Therapy Group 2: Manipulative treatment Group 3: Combination of manual therapy and manipulative treatment Group 4 (control): no treatment	- Pain perception; - RM - Frequency; - Pain intensity. McGill Pain Questionnaire	NR

\* Standard therapy: conventional Massage Therapy, oscillation techniques (Maitland) and postural correction instructions.

\*\*HI: It's calculated adding the 28 classifications of headache activities in one week (4 records / day) and divided by 7, to obtain an indication of the daily average severity of headache.

\*\*\* Multimodal Behavioral Therapy (MBT): is a web tool for daily migraine, consisting of a material with 53 pages of text, addressing the following topics: stress physiology, physical activity, diet, thought patterns, handling emotions and attitudes about oneself.

(CTTH: Chronic Tensional Type Headache; ETTH: Episodic Tensional Type Headache; CD: Compact Disc; NR: Not rated; DLA: Daily Life Activities; ROM: Range of Motion).

## CHARACTERISTICS OF STUDIES

All nine studies analyzed used manual therapy techniques as treatment for primary headaches, combined or not with other interventions. The headache types investigated included CTT (chronic and / or episodic) and migraine, as the first being the most frequent in the included studies ( $n = 6$ ). As for the sample used, it can be found variability, considering between low to moderate in all studies (20-84 individuals included). The variables involved: frequency of headache; intensity of pain; medication for headache; headache-free days; index of headache; impact of headache on daily life; occupational impact of headache; pressure pain threshold (algometry); strength of the cervical flexor muscles; cervical range of motion (AM); quality of life; depressive symptoms; pain perception; and noticed overall improvement (see details in table 1).

## QUALITY ASSESSMENT OF STUDIES (PEDRO SCALE)

The analysis of the methodological quality of the articles selected for this review, performed by consulting the PEDro scale, found that 55.5% ( $n = 5$ ) were analyzed. Of the evaluated studies, all presented scores  $\geq 5$ , thus being considered moderate to high the methodological quality, which suggests a high level of scientific evidence<sup>46</sup>.

## DISCUSSION

The present study aims to highlight the key findings and results of manual therapy techniques in the treatment of primary headaches, migraine and CTT. Despite the variety of therapeutic approaches, generally speaking, it can be observed that the results were similar, showing a positive clinical evolution of participants subjected to manual therapy techniques. Studies of Castien<sup>41</sup>, Voigt<sup>42</sup> Ajimsha<sup>43</sup>, Arnadottir&Sigurdardottir<sup>44</sup> e Espí-López & Gómez-Conesa<sup>45</sup> used as intervention, isolated

therapies (manual therapy) and the control groups (if there were any) received or not other kind of therapy (orientations, conventional physiotherapy, massage therapy and placebo therapy). In these studies, clinical improvement was observed, which could be related to the intervention. The remaining studies<sup>37-40</sup> applied combined therapies, in other words, besides manual therapy, the intervention groups were subjected to other techniques (standard physiotherapy, relaxation exercises, medication and multimodal behavioral therapy). As well as the studies with isolated therapy, positive patient clinical evolution was also observed. However, this therapy does not show which component of the therapeutic treatment was specific for the results obtained or if they are only observed due to their combination.

Frequency of episodes and intensity of pain are aspects usually investigated by researchers who seek to evaluate treatments for headaches. In this review, it was observed that seven<sup>37-41,43,45</sup> and five<sup>37,38,41,42,45</sup> studies, respectively, measured these variables. With regard to frequency, 85.7% ( $n = 6$ ) of the articles found statistically significant reduction of complaints after the intervention phase. As for intensity, 100% of analyzes showed improvement with statistical significance. To measure these variables, it has been reported frequently in the literature the use of "pain diaries" as a tool for tracking issues related to headache<sup>18,47-51</sup>, as well as its subjective intensity on the analogue visual scale (AVS)<sup>38</sup> or by the McGill pain questionnaire<sup>45,52-53</sup>. Primary headaches were also evaluated objectively using different physical variables (AM, algometry, resistance of deep cervical flexor muscles), showing improvement after the application of craniocervical manual therapy techniques<sup>41,45</sup>.

The pain medication has been widely used clinically as a prophylactic treatment for episodes of frequent or disabling headache<sup>39</sup>. However, excessive use of stimulant substances (caffeine, tobacco and alcohol)<sup>54-60</sup>, as well as excessive use of drugs may be risk factors for chronic headaches<sup>17,41</sup>. Non pharmacological therapies have shown good results in reducing drug use for the control of pain in these conditions<sup>37,40</sup>. In the study of Castien<sup>41</sup>, this variable did not significantly decrease in neither of the groups, which was probably due to the high number of patients not taking medication at the beginning of treatment (baseline condition).

The clinical condition of headache may be associated with considerable limitations in psychosocial ambit

<sup>61-64</sup>. Thus, questionnaires about the impact or the inability due to headache are used to monitor progress in clinical and research environments<sup>41,65-67</sup>. Among the instruments used in the included studies, HIT-6, HDI and MIDAS<sup>68</sup> are available, which considers different aspects related to the quality of life of patients with headache, including the psychosocial component<sup>69,70</sup>. All the studies reviewed, had a positive result in different aspects of life quality after the application of manual therapy techniques when comparing the pre- and post-treatment moments<sup>37,40,42</sup>.

In the context of modern, online programs for different types of health care have been used, since many patients have difficulty in accessing specialized medical care, as in migraine<sup>71-75</sup>. In this sense, the study of Hedborg & Muhr<sup>40</sup> used multimodal behavioral therapy applied online in two treatment groups, one of them being combined with massage therapy sessions. The authors observed a significant improvement in both groups compared to pretreated moment (baseline) and control. However, the group combined with the massage therapy showed no significant effects. The authors correlated that this may have occurred due to the low frequency of sessions of manual therapy used after the beginning of treatment via internet.

Of the eight studies included in this review, five<sup>37-39,41,42</sup> were analyzed using the PEDro scale and classified as moderate to high the methodological quality. It is important to highlight, however, that some criteria of this scale are not always able to be fulfilled by certain studies, which can be applied in the articles included in this review, since any of them had maximum score. This probably occurred because the criteria that refer to the masking of therapists and participants were not followed by four articles<sup>37,38,41,42</sup>, due to the difficulty of masking in implementing technical manual therapy by a properly trained therapist. Finally, the studies investigated presented different limitations that should be considered such as: (1) the short time for intervention and period of treatment; (2) the sample size<sup>38-42,44</sup>; (3) the inability to blind the applied techniques and (4) the no use of placebo<sup>42</sup> and control<sup>44</sup> may influence the results.

Although cranial therapy technique manual<sup>76</sup> and strengthening exercises of the cervical muscles (stabilization of the region) have presented evidence consideráveis<sup>77</sup>. Recently (2016)<sup>78</sup>, have be shown a low level of evidence/quality in work involving

exercises nurses with primary headache. The authors suggest studies with methodologies and rigorous designs can provide helpful evidence strategies to treat primary headache<sup>78</sup>.

## FINAL CONSIDERATIONS

Despite the heterogeneity of the techniques used in the different studies reviewed (combined manual therapy technique or not), we observed a positive relationship between manual therapy and improvement in clinical and social aspects of primary headache. In this context, manual therapy presents itself as an important adjunct in clinical treatment of primary headache, since excessive use of drugs can also cause headaches and adverse effects. However, more research is needed to investigate the specific components of manual therapy acting on the algic condition of origin of primary headaches as well as the precise time of application for a safe recovery without relapse.

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