



Effect of Instrumental Chiropractic Manipulation on The Neck: A Systematic Review

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Abstract

Neck pain is a multifactorial disease and is a major problem in modern society. There is no definitive treatment for neck pain. However, different pharmacological and non-pharmacological treatments have been recommended, including instrumental chiropractic manipulation. Objective: This study will evaluate the efficacy and safety of chiropractic manipulation techniques instrumental for the treatment of neck pain. Method: Four databases were searched between October 20 and November 17, 2022: PubMed, Embase, VHL REGIONAL / LILAC, and Scopus with the keywords: "Chiropractic Manipulation", "Instrumental Chiropractic Manipulation", "neck pain", "Chiropractic". Two people independently examined the records for article inclusion. Results: 369 published articles were found, and three randomized studies were selected for this systematic review. Conclusion: There is moderate-quality evidence that instrumental chiropractic manipulation reduces pain and restores cervical function without adverse effects and with complete patient safety.

Introduction

Chronic non-specific neck pain is a common alteration nowadays and of great psychosocial impact [1,2], which does not present characteristic signs and symptoms. This disorder is characterized as chronic when it exceeds twelve weeks with low-grade symptoms or recurrences more than one year after treatment [3]. It was the second most referred pain by patients for the use of complementary and integrative medicine (CIM), preceded only by low back pain [4]. The mechanisms that lead to this condition may be associated with changes in the neck muscles that play an important role in the cervical joint [5]. Other factors, such as genetic and psychosocial factors, also influence the persistence of pain [6].

The patient's history and physical examination are the first step to defining the type of neck pain [7]. Some imaging tests such as x-ray, magnetic resonance imaging (MRI), or computed tomography (CT) of the cervical spine can help define a diagnosis. In the X-ray, we can usually visualize the loss of the lordotic curvature of the cervical [8]. With the MRI images, we verified the alterations of the soft tissues and in the computed tomography (CT) we analyzed the bone status [9].

Most chronic neck pain responds well to conservative treatments, even though

the best therapeutic choice is still not unanimous. Conventional treatments such as acupuncture, massage, or myofascial release and pharmacological treatments (anti-inflammatories, analgesics, and muscle relaxants) can be effective in reducing pain in the short term and recovering joint function [10]. In the search for non-pharmacological treatment, with quick, effective, and safe results, chiropractic instrumental manipulation has been widely used with success in cases of non-specific neck pain.

Instrumental manipulation is a technique that uses an instrument that produces a smooth impulse (vibration or micro impulse) that sends information to the nervous system triggering a rebalancing process, restoring normal and painless amplitude of the joints and, consequently, relaxing all the associated muscles. [11]. Thus, specific adjustments promote the activation of micro-movements and unblocking of the joints through small impacts on specific points [12]. It is a therapy indicated for the treatment of biomechanical restrictions, postural disorders, and acute and chronic pain [10,11].

This technique is based on Leg Check (leg length verification) to identify misfits [11]. This method uses three tests in its protocol to find the region that is out of adjustment: pressure test, stress test, and isolation test.

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Keywords

"Chiropractic Manipulation", "Instrumental Chiropractic Manipulation", "Neck Pain", "Chiropractic".

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It is a therapy indicated for the treatment of biomechanical restrictions, postural disorders, and acute and chronic pain [9,11]. Instrumental manipulation is intended for everyone, from pediatrics to geriatrics, not forgetting sports pathologies [13].

This review aims to analyze the response of this chiropractic manipulation therapy in patients with chronic neck pain.

Methodology

Search strategy

Two researchers searched computerized bibliographic databases, in English only, searching for "Chiropractic Manipulation", "Instrumental Chiropractic", "neck pain", and "Chiropractic Technique". The following databases were searched from the beginning of October 20 and November 17, 2022: PubMed, Embase, VHL REGIONAL / LILAC, and Scopus. Subject headings (MeSH) and keywords include anatomical, disorder or syndrome, treatment, and methodological terms. Mesh terms: (((((chiropractic instrumental therapy) OR (mechanical manipulation)) OR (chiropractic manipulation)) OR (chiropractic technique)) OR (neck pain)) OR (English).

Eligibility criteria

The studies included in this review must: (i) use instrumental manipulation chiropractic), (ii) written in English, and (iii) that speak of the cervical spine. Excluded articles that were duplicates, comments, letters, abstracts of congresses, books, book chapters, systematic reviews, and meta-analyses or narrative reviews and that do not use instrumental manipulation chiropractic. Also besides, articles that do not address pain in the cervical spine.

Methodological quality

The methodological quality of the articles was assessed using the PEDro scale (Physiotherapy Evidence Database) which tests the effectiveness of therapy interventions. On this scale, there are 10 criteria established based on an "expert consensus" and not on empirical data. The score is awarded only when a criterion is satisfied. Publications with a score of seven or more on the PEDro scale are of 'high' methodological quality, those with a score of five to six would be of 'regular' quality, and a score of four or less is classified as "poor" quality [14].

Risk of bias

The risk of bias was assessed in the studies selected according to the Cochrane risk of bias assessment tool [15]. According to the instrument, for each work, different domains related to the risk of bias were assessed independently.

Results

A total of 339 studies were identified through a database search and, after the removal of duplicates, 181 studies were identified. During the screening process, 208 publications were excluded for not being related to the research question, and the full text of 27 studies was reviewed in detail. Finally, 3 randomized control studies were included in the systematic review. The selection process was schematized in Figure 1, and the characteristics of each article are shown in table 2. The included studies had a mean score of 6 when assessing the methodological quality with the PEDro scale (Figure 2), with a minimum of 5 points and a maximum of 7, evidencing moderate methodological quality. Detailed descriptions and results of the included studies are presented in Table 1. All studies [14,15,16] were designed as randomized controlled trials. The risk of bias in included studies was assessed with the Cochrane risk of bias tool (Figure 3).

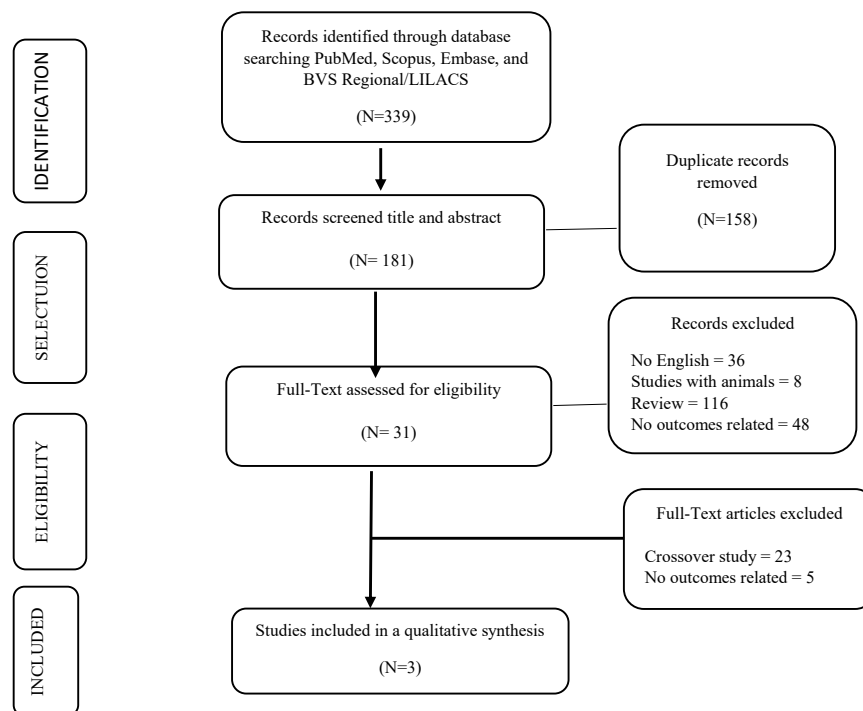


Figure 1. PRISMA flowchart with the different stages of the current systematic review

Table 1. Article data: Country, year, author, number of participants, age.

Articles	Country	Number of participants	Age	Trial design
Gemmell et al., 2010	UK	47	18≥	Randomized clinical trial
Gorrell et al., 2016	Austrália	65	18≥	Randomized clinical trial
Wood et al., 2001	South of Africa	30	18≥	Randomized clinical trial

Table 2. Article data: Assessment tools, follow-Up Period, objectives, and results of each publication selected for this review.

Articles	Assessment Tools	Follow-Up Period	Objectives	Results
Gemmell et al., 2010	PGIC/ NRS/ SF-36 (PCS/ MCS)/ BQ	10 Min	Examine the effects of ischemic compression manual X Activator on trigger points no adverse effects.	The Activator technique had a better long-term response, and
Gorrell et al., 2016	VAS/ NRS	1 Month	Compare a single cervical HLVA manipulation HLVA (MAM X IAM) with stretching	(either MAM OR IAM) can produce immediate benefits compared to stretching
Wood et al., 2001	NRS McGill/ NDI/ ROM Goniometer	1 Month	To compare the effects of IAM and MAM	The results indicate that both method had a positive effect on the clinical outcome

PGIC: Patient Global Impression of Change; NRS: Numerical Pain Rating Scale; SF-36: Short-Form Health (PCS: Physical component summary of the SF-36 and MCS: Mental Component Summary of the SF-36); BQ: Bournemouth Questionnaire; VAS: Visual Analogue Scale; McGill Questionnaire: McGill Short-Form Pain Questionnaire; NDI: Neck Disability Index; ROM Goniometer: Goniometer Cervical Range of Motion

Reference	1	2	3	4	5	6	7	8	9	10	11	SCORE
Gemmell et al., 2010 UK												8/ 11
Gorrell et al., 2016 Australia												10/ 11
Wood et al., 2001 South Africa												9/ 11

Figure 2. Methodological quality assessment of the included studies with the PEDro scale. (2) Subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received); (3) allocation was concealed; (4) the groups were similar at baseline regarding the most important prognostic indicators; (5) there was blinding of all subjects; (6) there was blinding of all therapists who administered the therapy; (7) there was blinding of all assessors who measured at least one key outcome; (8) measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups; (9) all subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analyzed by “intention to treat”; (10) the results of between-group statistical comparisons are reported for at least one key outcome; (11) the study provides both point measures and measures of variability for at least one key outcome.

	Gemml	Gorrell	Wood	
	Green	Green	Green	Random sequence generation (selection bias)
	Green	Green	Green	Allocation concealment (selection bias)
	Red	Green	Red	Blinding of participants and personnel (performance bias)
	Red	Red	Red	Blinding of outcome data (detection bias)
	Green	Green	Green	Incomplete outcome data (attrition bias)
	Green	Green	Green	Selective reporting (reporting bias)
	Green	Green	Green	Other bias

Figure 3. Risk of bias summary: authors' assessment for each risk of bias criterion

The results suggest that instrumental manipulation chiropractic is a safe and effective intervention. All 3 randomized trials had a total of 196 participants aged 18 years or over. The methodological quality of the included studies was high. Regarding blinding, only Gemml et al. [17] did not meet these criteria; Wood et al. [18] blinded only patients, and Gorrell et al [16]. blinded participants and evaluators. As for the risk of bias, none of the articles presented a high risk.

All studies compared instrumental manipulation with manual manipulation. The results confirmed the effectiveness of this therapy without causing any adverse effects. The evaluation used in the articles was done by questionnaires before and after the intervention. The most used questionnaire was the visual analog scale (VAS). Gemml et al. used in addition to the VAS, the short form 36 (SF-36); Gorrell et al. evaluated with VAS and the Numerical Pain Rating Scale (NRS); Wood et al. used VAS and McGill short-form pain. The treatment period ranged from 10 minutes in Gemml et al. to 1 month in the other studies.

Discussion

The main objective of this systematic review was to evaluate the efficiency of instrumental manipulation chiropractic in pain in the cervical. After analyzing the included studies and considering their limitations, the results suggest that TIQ is a safe and effective intervention in this intervention.

Harrison et al., 2003 [19], obtained significant results in the treatment of neck pain with ICT. Polkinghorn et al., 2001 [20], in their systematic review, observed that adjustments made by the instrument can provide benefits in cases where manual manipulation could cause an exacerbation of symptoms due to the position of the maneuver. Hurwitz et al. 1996 [21] demonstrated that a single cervical manipulation can produce immediate and short-term benefits for mechanical neck pain. Todd et al. 2016 [22] and Lopes et al. 2016 [23], carried out their studies with children and the results of the research confirmed that instrumental manipulation chiropractic can be applied from pediatrics to geriatrics. Russell et al, 2016 [24], not only confirmed the benefits of TIQ but also showed an increase in the quality of life of these patients. Positive results were observed

in the articles cited above for the use of TIQ. However, the findings still need to be better and more widespread to better use this therapy in spinal treatments.

Conclusion

This systematic review of 3 clinical trials involving the use of the TIQ instrument found reported benefits for patients with cervical spine pain. Given the wide use and clinical utility of TIQ, it is regrettable that most clinical trials investigating its effectiveness are only pilot studies involving between 30 and 65 patients and generally involve only one or two follow-up treating physicians. That said, there are case studies, case series, clinical trials, and now this systematic review, which suggests that patients experience positive, safe, and clinically significant benefits when treated for neck pain with TIQ. Further studies should include a larger number of patients using a placebo or sham group and an untreated group, better-blinded randomization protocols, and long-term post-intervention follow-up for a more definitive assessment of the benefits of TIQ treatment.

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

Data sharing does not apply to this article as no datasets were generated or analyzed during the current study.

Competing interests

The authors declare that they have no competing interests in this section.

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Authors' contributions

Melo-Oliveira, MES: Conceptualization, and Original Writing-draft; project management

Baumgarth, Henrique: Software and visualization; Formal analysis

Tosi, ML: Methodology; writing-proofreading and editing.

Edgar Idogava: Supervision, research, and writing-revision

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Not applicable

Limitation

Study limitations include small sample size, lack of a control group, and in addition, health care records may not contain all relevant data.

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