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Integrative and complementary practices in dentistry: acupuncture in temporomandibular disorders

Práticas complementares e integrativas em odontologia: acupuntura em disfunções temporomandibulares

Prácticas integrativas y complementarias en odontologia: acupuntura en transtorno temporomandibular

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Abstract
The temporomandibular disorder (TMD) consists of the functional alteration of the orofacial muscles, the temporomandibular joints, or both. Among the therapeutic options available for treating TMD, acupuncture appears as a relevant therapy to relieve pain and reduce the symptoms of clicking and discomfort of the temporomandibular joint. This study investigated the use of acupuncture as an auxiliary therapy in pain management in patients with TMD. A narrative review of the literature was performed using PubMed, Scielo, Bireme, LILACS, the American Association of Pain and the descriptor acupuncture, temporomandibular joint disorders, quality of life, dentistry, limited to the Portuguese, Spanish and English covering the publication period of 2012 to 2022. The highest prevalence rate of TMD is among women (about 80%) and the dysfunction appears after the age of 30. The main causes of TMD are related to behavioral, psychosocial and hormonal factors. Studies evaluating acupuncture for TMD treatment are limited. In contrast, significant short-term pain improvement was expressed in 26% of the articles. Taking into account that the disorder is mainly characterized by pain (algia), the reduction of this condition is of paramount importance.
Keywords: Acupuncture; Temporomandibular disorders; Dentistry.

Resumo
A disfunção temporomandibular (DTM) consiste na alteração funcional dos músculos orofaciais, das articulações temporomandibulares ou de ambas. Dentre as opções terapêuticas disponíveis par ao tratamento da DTM, a acupuntura surge como terapêutica relevante para aliviar a dor e reduzir os sintomas de estalido e desconforto da articulação temporomandibular. Este estudo investigou o uso da acupuntura como terapia auxiliar no manejo da dor em pacientes com DTM. Foi realizada uma revisão narrativa da literatura utilizando PubMed, Scielo, Bireme, LILACS, American Association of Pain e os descritores acupuntura, distúrbios da articulação temporomandibular, qualidade de vida, odontologia, limitada ao português, espanhol e inglês abrangendo o período de publicação de 2012 a 2022. A maior taxa de prevalência de DTM é entre as mulheres (cerca de 80%) e a disfunção aparece após os 30 anos. As principais causas de DTM estão relacionadas a fatores comportamentais, psicossociais e hormonais. Os estudos sobre acupuntura para tratamento de DTM avaliados são limitados. Em contraste, a melhora significativa da dor em curto prazo foi expressa em 26% dos artigos. Levando-se em conta que o transtorno é caracterizado principalmente por dor (algia), a redução dessa condição é de suma importância.
Palavras-chave: Acupuntura; Disfunção temporomandibular; Dentista.

Resumen
El transtorno temporomandibular (TTM) consiste en la alteración funcional de los músculos orofaciales, de las articulaciones temporomandibulares o de ambos. Entre las opciones terapêuticas disponibles para el tratamiento de los

TTM, la acupuntura aparece como una terapia relevante para aliviar el dolor y reducir los síntomas de chasquidos y molestias de la articulación temporomandibular. Este estudio investigó el uso de la acupuntura como terapia auxiliar en el manejo del dolor en pacientes con TTM. Se realizó una revisión narrativa de la literatura utilizando PubMed, Scielo, Bireme, LILACS, American Association of Pain y los descriptores acupuntura, transtornos de la articulación temporomandibular, calidad de vida, odontología, limitada a portugués, español e inglés, abarcando el período de publicación de 2012 a 2022. La tasa de prevalencia más alta de TTM se encuentra entre las mujeres (alrededor del 80%) y la disfunción aparece después de los 30 años. Las principales causas de TTM están relacionadas con factores conductuales, psicosociales y hormonales. Los estudios sobre acupuntura para el tratamiento de TTM evaluados son limitados. Por el contrario, se expresó una mejoría significativa del dolor a corto plazo en el 26% de los artículos. Teniendo en cuenta que el transtorno se caracteriza principalmente por dolor (algia), la reducción de esta condición es de suma importancia.
Palabras clave: Acupuntura; Transtorno temporomandibular; Odontología.

1. Introduction

Integrative and Complementary Practices (PICs) integrate therapeutic activities based on the socio-environmental and behavioral aspects of the health-disease process (Habimorada, *et al.*, 2020; Medeiros, *et al.*, 2022).

In the late 1970s, the World Health Organization (WHO) created the Traditional Medicine Program, aimed at developing public policies in the area of PICs (Gonçalves, *et al.*, 2018). In this sense, in Brazil, the National Policy on Integrative and Complementary Practices (PNPIC) within the scope of the unified health system was approved in 2006 (Brasil, 2006) instituting the use of health practices and based on the need to guarantee the patient safety, quality and efficacy (Sousa, *et al.*, 2012).

From the on, the use of complementary therapies, such as Acupuncture, is a therapeutic option, especially in the pain clinics and with wide use in dentistry (Faria, *et al.*, 2021).

Note that the damage caused by oral diseases increases with age, compromises the quality of life and restricts the daily activities of individuals. In this way, any organic emotional imbalance can generate changes in all systems of the human body, thus impacting the oral health of patients (Santos, *et al.*, 2021).

The first use of Acupuncture in Dentistry, in France, in 1974 was Dr. Michel Bresset (Viana, *et al.*, 2015; Pereira, *et al.*, 2015; Lemos, *et al.*, 2021), and the use of this practice was approved by the International Dental Federation at the Vienna General Assembly in 2002 (Pereira *et al.*, 2015). In Brazil, the Federal Council of Dentistry (CFO, 2008), through resolution 82, recognized and regulated the use of integrative and complementary practices to oral health, including acupuncture (Pereira, *et al.*, 2015).

In Dentistry, acupuncture is an important tool for treating neurotrasmitters, such as in cases of Temporomandibular Disorders (TMD), teeth clenching or grinding, bruxism, constant biting of objects, head posture and even caused by the wrong bite or absence of teeth (Freire, *et al.*, 2018).

Temporomandibular disorder (TMD) is a functional alteration of the orofacial muscles, temporomandibular joints (TMJs) or both, with a higher prevalence in females and in the age group between 20 and 40 years. With a multifactorial etiology, psychological, structural and postural aspects, factors that unbalance the occlusion, masticatory muscles and temporomandibular joint are involved in the dysfunction. The most common symptoms are non-dental pain in the orofacial area, joint noises and irregular or limiting functions during mandibular movement. TMD therapy is done with therapie to relieve symptoms and improve patients quality of life (Abimorada, *et al.*, 2020; Brasil, 2006; Boscaine, *et al.*, 2019; Reis, *et al.*, Reis, *et al.*, 2021).

The use of acupuncture in Temporomandibular Disorders as a way to alleviate pain and reduce symptoms of popping and discomfort of the Temporomandibular joint (Pereira, *et al.*, 2015). As patients with TMD often present with pain, acupuncture has been widely chosen as an adjunctive therapy (Butts, *et al.*, 2017).

Seeking to investigate the use of acupuncture as an auxiliary therapy in pain management in patients with TMD, a

literature review was conducted out investigating acupuncture as an integrative and complementary practice in Dentistry, in the pain clinic, its mechanism of action and clinical reports.

2. Methodology

This integrative literature review served as a tool to obtain, identify, analyze, and synthesize publications related to the topic of interest. The PICO sequences (Population – participants or problem / clinical situation; Intervention; Comparison – example: control group or group treated with another intervention); "Outcomes" – outcomes / variables studied) were followed to elaborate the guiding question: "What studies show evidence of effectiveness of acupuncture use and its different approaches in the treatment of temporomandibular disorders?" With that, the searches in the databases were performed to define the types of studies that would be included in the review, for subsequent analysis, identification of the divergences and compatibilities of the studies, interpretation of the results and discussion, building the text of the review of the data found and synthesized (Patricio, *et al*., 2022).

This narrative review provides information on the subject that in scientific articles. The bibliographic survey was conducted out in PubMed; Scientific Eletronic Librarie Online (SCIELO), Regional Library of Medicine (BIREME), Latin American Literature in Health Sciences (LILACS), the American Association of Orofacial Pain, using the descriptor acupuncture, temporomandibular joint disorders, quality of life, dentistry, limited to the Portuguese, Spanish and English and published from 2012 to 2022.

It is an exploratory and reflective study that seeks to provide greater familiarity with the problem, to make it more explicit or build hypotheses, with the main objective of improving ideas or discovering intuitions.

3. Results and Discussion

3.1 Integrative and Complementary Practices in Dentistry

Integrative and complementary practices (PIC) encompass the practices of Traditional Chinese Medicine, acupuncture, homeopathy, herbal medicine, thermalism/crenotherapy and anthroposophy (Gonçalves, *et al.*, 2018; Brasil, 2006; Silva, *et al.*, 2021), meditation, art therapy, music therapy, naturopathic treatment, osteopathic treatment, chiropratic and reiki treatment, circular dance/biodancing, yoga, massage/self-massage workshop, auricolotherapy, massage therapy, thermal/crenotherapy treatment and aromatherapy, apitherapy, bioenergetics, family constellation were recently added, chromotherapy, geotherapy, hypnotherapy, laying on of hands, ozone therapy and floral therapy (Habimorada, *et al*., 2020; Brasil, 2018).

Complementary and alternative medicine (CAM) practitioners that help conventional a holistic dentists include chiropractors, pharmacist, acupuncturists, acupressurists, therapists and nutritionists (Liu, *et al.*, 2021).

In dentistry, the most used practice in Brazil is Phytotherapy (Brasil, 2006) mainly to treat and prevent microbial infecctions, anxiety, pain relief and sedation (Meccati, *et al.*, 2022).

A dental example of a complementary medicine procedure is using aromatherapy before, during or after dental procedures (Pasupuleti & Hassan, 2022). An example of an alternative medicine procedure is using hypnosis instead of drugs or medication for pain/anxiety control (Machado, *et al*., 2021; Pasupuleti & Hassan, 2022).

A study in Germany verified whether dentists offer or recommend complementary and alternative medicine (CAM) remedies in their clinical routine, and how effective these are rated by proponents and opponents. The results indicate that herbal medicine is highly prescribed (*Arnica montana* – 64%, *Chamomille* – 64%, clove – 63%, *Salvia officinalis* – 54%) accompanied by relaxation therapies (62%), homeopathy (57%), osteopathic medicine (50%) and dietetics (50%). It is important to note than CAM remedies are highly effective, namely ear acupuncture, osteopathic medicine and clove (Baatsch,

et al., 2017).

Dentists are among the health professionals that can prescribe medications, in accordance with Australian legislation. Popular CAM interventions include vitamins and nutraceuticals, herbalism and homeopathy, wich can also be applied in dentistry. Common dental indications include the relief of symptoms (more commoly gingival inflammation, toothache, jaw pain) experienced in acute oral conditions. Approximately, 10% of dental patients use topical herbal products (such as tea tree and cloves oils) for pain, as well as mind-body techniques to control anxiety (Park, *et al.*, 2020).

Floral therapy, as an integrative practice, focuses on emotional disorders, becoming a resource option in dental practice. However, it is important to emphasize the low number of qualified dentists who work with this complementary therapy. This result is attributed to the fact that it is a recent therapy (created in 1930) and the lack of specialization courses (Alves, *et al.*, 2020; Fernandes Neto, *et al.*, 2020; Santos, *et al.*, 2021).

In a study with Bach Flowers to treat herpetic gingivostomatitis, this therapy reduced pain in 50% of patients in the first 72h, and in the first week, 100% of the research participants reported no longer feeling pain in the lesions (Peña-Sisto, *et al.*, 2019).

In a study conducted in Peru, with children, the use of floral remedies acted on anxiety, promoting a decrease in heart rate, being effective to improving the behavior of children during dental treatment during procedures (operative 80%, extraction 70% and pulp treatment 75%) (Flores, 2019).

Arnica montana is recommended (Spezzia, 2022; Morais, *et al.*, 2021), *Belladonna* is useful for toothache, early dental abscess, and bruxism as well as in cases of postextraction, for example, dry socket. *Natrum muriaticum* drug is used in cases that occur due to cold sores and fever blisters, lips and corners of mouth dry and cracked lips. *Antimonium crudum*, *Aconitum napellus*, *Aranea diadema*, *Calcarea carbonica* and *Chamomilla* ae useful for a toothache. *Arsenicum album* is useful for unhealthy, bleeding gums, for diseases involving the pulp and periapical region. *Aconite* can be used for panic, fright, and general mental and physical restlesseness or sudden violent attacks, trigeminal neuralgia. *Calcarea phosphorica* is useful when the mouth cannot be opened without pain. *Phosphorus* is the drug of choice for conditions related to salivation as to control the postsurgical bleeding. For aphthous ulcers, candidiasis and oral lichen planus, *Borax* can be administered. *Calcarea carbonica* was used for a delayed eruption. *Kreosotum* is used for the decay of milk teeth (Newadkar, *et al.*, 2016).

3.2 Acupuncture in Dentistry

Acupuncture can be used, in addition to pain management, as a short-term adjunctive therapy for masticatory muscle pain, acute dental pain, idiopathic headaches, migraines, tension headaches and chronic daily headaches (Alves, *et al.*, 2020).

Acupuncture techniques are increasingly being used in the dental environment mainly for its effectiveness and safety and because it is usually related to pain relief, acupuncture is well accepted by patients mainly because it does not have contraindications and because it does not have the side effects of medications allopathic (Tecchio, *et al.*, 2021).

The use of acupuncture helps reduce bleeding during the third molar extraction procedure, which in turn improves the vision of the operative field and reduces pre and postoperative damage, reducing anxiety, bleeding, pain and edema (Lemos, *et al.*, 2021).

Acupuncture is highly effective in the dental field, and can be used in all clinical procedures, especially in dental surgeries, both preoperatively, intraoperatively and postoperatively, providing comfort and safety for both the professional, as for the patient (Lemos, *et al.*, 2021).

The use of acupuncture is highly effective in Dentistry in cases of bruxism, in odontophobic patients, patients with exacerbated regurgitation reflex, potentiates the anesthetic effect, homeostasis of the circulatory system, assists in the

control of bleeding (hemostasis) is ideal for hypertensive patients with cardiac, ideal for patients with hypersensitivity to drugs, postoperative surgical in adjunctive therapy in the control of postoperative pain, reducing the administration of analgesics and anti-inflamatories, in xerostomia, in trigeminalgia for treating trismus and facial paralysis (Pereira, *et al.*, 2015).

3.3 Acupuncture in TMD

For treating patients with TMD, acupuncture is an individualized therapy, which aims at the remission and control of local symptoms and the balance of emotional factors. It is a safe therapy with successful outcomes, as shown by the data from the analyzed studies.

Twenty-three studies addressing the use of acupuncture as an auxiliary therapy in pain management in patients with TMD were analyzed and the parameters analyzed in the reviewed studies are show in Table 1.

Table 1 - Analysis of the studies and its parameters.

Paper	Objective	Methodology	Results
Acupuntura como alternativa para el tratamiento de la disfunción temporomandibular (Gil, *et al.*, 2017)	To evaluate the effect of acupuncture in patients with temporomandibular disorders, pain, reduced laterality and mouth opening movements, and with signs of anxiety.	Clinical case report. There were 6 acupuncture sessions (wrists and hands, right side of the head and back of the neck) in 5 weekly sessions and onde auriculotherapy session (with mustard seed), evaluating the parameters described in the objective. n*=1	There was a 40% reduction in pain and muscle relaxation and consequent improvement in the well-being of the patient.
Acupuncture Effect on Pain, Mouth Opening Limitation and on the Energy Meridians in Patients with Temporomandibular Dysfunction: A Randomized Controlled Trial (Zotelli, *et al.*, 2017)	To verify the effectiveness of acupuncture treatment in patients with TMD, for treating pain.	Two groups: treated and control patients Double-blind clinical trial, in adults with TMD of muscular or mixed origin, with ou without the mouth opening limitation, treated with 4 acupuncture sessions at points (meridians) at predetermined times. n=40	There was no decrease in pain and no increase in the limit of oral opening in the treated group compared with the control. There was a decrease in Yang energy levels in all sessions, however, only real acupuncture was effective in maintaining Yin energy throughout the four sessions.
Acupuncture therapy in the management of the clinical outcomes for temporomandibular disorders: A PRISMA-compilant meta-analysis (Wu, *et al.*, 2017)	This studyevaluated the use of acupuncture in TMD therapy in adult patients.	A review article made from 9 articles.	Acupuncture treatment was more effective than sham acupuncture or sham laser in relieving pain.
Muscular diagnostics and the feasibility of microsystem acupuncture as a potential adjunct in the treatment of painful temporomadibular disorders: results of a retrospective cohort study (Simma, *et al.*, 2018)	To investigate the effect of microsystemic acupuncture on temporomandibular disorders (TMD).	Mycorsystemic acupuncture was applied to the mouth, scalp, or fingers with a focus on oral acupuncture, evaluating the effect of application on pain. n= 407 patients in 887 treatments.	Mycrosystemic acupuncture was effective in reducing TMD pain intensity in the short term. In the pain scale, the pterygoid muscles were the most painful during palpation. The strongest sensitivity (moderate or severe pain) after treatment was in the oral retromolar points of the upper jaw.
Acupuncture in the treatment of temporomandibular muscle dysfunction (Boscaine, *et al.*, 2019)	To evaluate acupuncture as a treatment for temporomandibular disorders.	2 groups: G1 was treated with occlusal splint, massage, thermotherapy and self-care guidelines. G2 was treated with 6 acupuncture sessions lasting 30 min. Pain was evaluated in both groups using a visual analog scale, muscle tension in the temporal and masseter muscles, and the limitation of mouth opening. n= 34	In both groups, mouth opening, visual analog scale and muscle tension threshold scores were similar to improvement in the parameters evaluated after 6 weeks of treatment and remained constant until the end of treatment (4 months), validating the effectiveness of short treatments.

Paper	Objective	Methodology	Results
Uso de la acupuntura en el tratamiento de la disfunción temporomandibular (Almeida, *et al.*, 2018)	To evaluate the effectiveness of acupuncture treatment in a patient with TMD, headache and tinnitus, joint pain and energy level.	Clinical case report. The patient received 6 acupuncture sessions, with expressive points according to the ascending liver Yang. n=1	After the acupuncture sessions, the patient reported no headache, tinnitus and pain in the temporomandibular joint, with an improvement in sleep quality and disposition.
Effectiveness of acupuncture, ozonio therapy and low-intensity laser in the treatment of temporomandibular dysfunction of muscle origin: a randomized controlled trial (Tortelli, *et al.*, 2019)	To compare the effectiveness of acupuncture, ozone therapy and laser therapy for treating patients with TMD.	A Clinical trial, randomized with 3 groups where: G1: Lasertherapy (6 sessions, 72h apart). G2: acupuncture (6 sessions, once a week), and G3: ozone therapy (six sessions, twice a week). In all groups, pain intensity, maximum mouth opening and quality of life were evaluated. n=12	Acupuncture, lasertherapy and ozone therapy treatments could decrease pain and improve the capacity of maximal mouth opening related to muscle TMD, impacting the quality of life.
Effects of low-power laser auriculotherapy on the physical and emotional aspects in patients with temporomandibular disorders: A blind, randomized, controlled clinical trial (Rodrigues, *et al.*, 2019)	To evaluate the effects of low-level laser auriculotherapy (AL) on the physical and emotional symptoms of patients with temporomandibular disorders (TMDs) compared with occlusal splints (SO).	A clinical trial, double-blind, randomized, with 2 groups: G1 – SO- control group and G2 – AL – experimental group, treated for 8 weeks. n=21	SO treatment improved five physical symptoms of TMD and seven emotional symptoms, while AL improved six physical symptoms and five emotional symptoms, thus, AL improved physical and emotional symptoms of TMD as SO.
Use of acupuncture in the treatment of temporomandibular dysfunction (Rossi Júnior, *et al.*, 2019)	To evaluate the effectiveness of acupuncture on anatomical, occlusal, muscular and psychological factors in patients with TMD.	A clinical trial, double-blind, randomized, with 4 groups: G1- patients with moderate TMD treated with acupuncture, G2- patients with moderate TMD treated with sham acupuncture (control group), G3- patients with severe TMD treated with acupuncture and G4- patients with severe TMD treated with sham acupuncture. All groups were treated once a week with 10 acupuncture sessions, at local and distant points of the temporomandibular joint. n=20	Acupuncture was effective in the control and remission of signs of temporomandibular disorders, and all volunteers at the end of treatment were considered non-temporomandibular patients.
A randomized clinical trial comparing the efficacy of low-level laser therapy (LLLT) and laser acupuncture therapy (LAT) in patients with temporomandibular disorders (Madani, *et al.*, 2021)	To compare the effectiveness of low-level laser therapy (LLLT) versus acupuncture laser therapy (LAT) in patients with temporomandibular disorders (TMD).	Double-blind clinical trial, with 3 groups: G1 (LLLT) with the application of GaAIAs laser in the masticatory muscles and temporomandibular joint, G2 (LAT) the laser was emitted bilaterally under the same conditions as T1 and Placebo Group treated with sham laser. The mandibular range of motion and pain intensity in the masticatory system were evaluated at predetermined time intervals. n=45 patients	Pain intensity and degree of pain in masticatory muscles and TMJs were lower in both treatments, which were also effective in reducing pain and increasing excursive and protrusive mandibular movement in TMD patients. The LAT can be a suitable alternative to the LLLT, because of the results obtained in a short time.
Comparasion of acupuncture on specific and non-specific points for the treatment of painful temporomandibular disorders (Sen, *et al.*, 2020)	To investigate the effectiveness of specific acupuncture by comparing specific and non-specific acupuncture points patients with chronic and painful TMDs.	Double-blind clinical trial, with randomized blocks where group A (n=18): treated with acupuncture, in seven specific points and auriculotherapy on each side of the body and group B (n=21) non-specific acupuncture, in 3 non-specific points on each side of the body. Acupuncture session were repeated once a week for four consecutive weeks (T1-T4). One week after the fourth acupuncture session, pain intensity, mouth opening, treatment expectation, pain development were evaluated; depression and oral health-related quality of life. n=39	Acupuncture at specific and non-specific points reduces non-dysfunctional pain in patients with TMD. The effect of acupuncture on painful TMD cannot be attributed to the specific point selection.

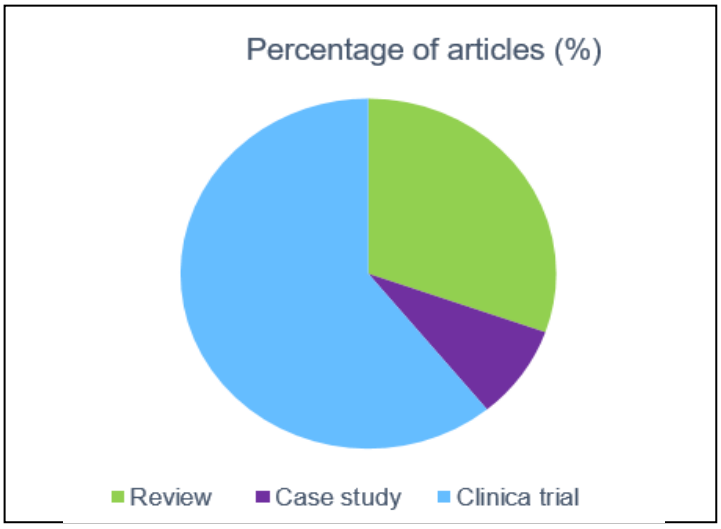
Paper	Objective	Methodology	Results
Effect of auricular acupuncture on the reduction of symptoms related to sleep disorders, anxiety and Temporomandibular Disorder (TMD) (Reis, *et al.*, 2021)	To evaluate the effectiveness of Auricular Acupuncture (AA) in reducing the symptoms of sleep disorders, anxiety and TMDs.	Non-randomized clinical trial. Ear acupuncture was performed using mustard seeds in the ear, once a week for 8 weeks. The reduction of symptoms of sleep disorders, anxiety, and the degree of chronic TMD pain was evaluated using specific questionnaires. n=20	AA was effective in reducing sleep disorder symptoms and was suggestive of relieving TMD anxiety and pain symptoms.
Intervenciones complementarias para el tratamiento de dolor en pacientes con alteraciones temporomandibulares: una revisión sistemática (Ávila-Curriel, *et al.*, 2020)	Conduct a systematic review to determine the levvel of evidence of the effectiveness of complementary treatments in controlling TMD pain.	Systematic review article of 8 articles that included acupuncture, ozone therapy, platelet-rich plasma, or phonophoresis.	Eight articles from randomized clinical trials reported positive results for pain control in TMJ. However, there is not enough evidence for recommend the use of these therapies.
Comparasion of the effectiveness of three different acupuncture methods for TMD-Related Pain: a randomized clinical study (Serritella, *et al.*, 2020)	To compare the effectiveness of three acupuncture methods for pain related to temporomandibular disorders (TMDs).	3 treatments groups: G1 – BA received body acupuncture, G2 – EA received electroacupuncture and G3 – CA received acupuncture + cupping therapy. The groups were compared as a function of pain sensitivity and impressions of treatment efficacy as a function of treatment time. n=60	The acupuncture methods used were effective in improving pain-related interference in the patient's commom activities and quality of life. EA was more effective than BA and CA in improving pain interference with patients' mood and sleep quality.
Temporomandibular disorders and the use of traditional and laser acupuncture: a systematic review (Peixoto, *et al.*, 2021)	To compare the effectiveness of traditional and laser acupuncture in reducing the signs and symptoms of temporomandibular disorders (TMD).	A review article based on 6 studies.	Traditional acupuncture appears to alleviate the signs and symptoms of TMD, as does laser acupuncture when combined with an occlusal splint. However, more rigorous, high-quality clinical trials are needed.
Acupuncture applied at local or distal acupoints reduces pain related to temporomandibular disorders in female patients (Katewaka, *et al.*, 2021)	To evaluate two protocols of local and distal acupuncture for pain relief in patients with temporomandibular disorders (TMD)	Clinical trial. With 3 groups: G1 - Control (n=48); G2 - local acupuncture (head, neck, n=32) and G3 – distal points (n=22) and pain intensity were recorded before and after the acupuncture session (6 to 10 weeks). The treatment was applied once per week for 10 sessions. n=102	Acupuncture treatment reduces chronic pain in TMD patients, and application of needle stimulation to local or distal acupuncture points had similar effects.
Effects of Warm Needle Acupuncture on temporomandibular Joint Disorders: A Systematic Review and Meta-Analysis of Randomized Controlled Trials (Liu, *et al.*, 2021)	Use the method of systematic review and meta-analysis to understand the effectiveness of WNA (Warm Needle Acupuncture) for treating TMD.	A review article made from 10 articles.	Data from this review showed that WNA is superior to treatments such as acupuncture alone, acupuncture therapy combined with TDP, drug therapy, and ultrasonic therapy.
Short-Term Effect of Scalp Acupuncture on Pain, Sleep Disorders, and Quality of Life in Patients with Temporomandibular Disorders: A Randomized Clinical Trial (Peixoto, *et al.*, 2021)	To evaluate the effects of Chinese scalp acupuncutre in patients diagnosed with temporomandibular disorders (TMD) on pain, sleep and quality of life (QoL), and compare the results with traditional therapies.	Clinical trial, randomized 4 groups: G1 – control (n=15), G2 – occlusal splint (OS, n=15), G3 – scalp acupuncture (SA, n=15), and G4 – manual therapy (MT, n=15). The time of 1 month, evaluating sleep disorders, pain, sleep quality and life. n=60	Scalp acupuncture, occlusal splint and manual therapy treatments were effective in improving the pain. Manual therapy and occlusal splint improve sleep, manual therapy improve quality of life and occlusal splint in the psychological domain. Scalp acupuncture is an alternative for pain relief in patients with TMD, with positive short-term results and is not effective in improving quality of life and sleep.

Paper	Objective	Methodology	Results
Auricular acupuncture in TMD – A sham-controlled, randomized, clinical trial (Aroca, *et al.*, 2022)	To evaluate the effect of auricular acupuncture (AA) on the physical (PA) and emotional (EA) aspects of patients with temporomandibular disorders (TMDs) and to compare the effect of AA with those of Sham and occlusal splints (OS).	Randomized clinical trial with three groups: OS (n=13), Sham (n=13) and AA (n=13), treated for 8 weeks. n=39	In the Sham group, there was no improvement in the emotional aspects and there was an improvement for 5 variables of the emotional aspects. In the auricular acupuncture group, there was improvement in 2 variables in the emotional aspect and 9 in the physical characteristics. In the occlusal splint (OS) group, 8 improvements were observed for both aspects.
Benefits of acupuncture in the treatment of temporomandibular disorders (Fortaleza, *et al.*, 2022)	To analyze the results of the use of acupuncture for treating temporomandibular disorders.	Narrative literature review of 20 articles, with a qualitative approach and descriptive character.	The consulted studies state that acupuncture is effective for treating TMDs and in the analgesia of their associated pain. Dry needling therapy had positive responses.
The benefits of acupuncture in the treatment Temporomandibular Joint Dysfunction (TMD): a literature review (Teles, *et al.*, 2022)	To analyze from the literature review the importance of acupuncture for treating Temporomandibular Disorders.	Literature review, qualitative and descriptive of 11 articles.	The authors affirm the effectiveness of acupuncture in TMD and that this technique can be combined with other dental procedures. They also state that for better use, further studies should be conducted.
Electroacupuntura en pacientes con dolor miofacial asociado a disfunción de las articulaciones temporomandibulares (Hernandéz, *et al.*, 2022)	To evaluate the efficacy of electroacupuncture in patients with myofascial pain syndrome associated with TMD.	Clinical study 2 treatment groups: G1 – electroacupuncture (n=21), G2 – control with conventional medication (n=19), applied in 10 sessions (one daily) and evaluated on the 3rd, 5th, 7th and 10th days of the experimental according to the pain intensity. n=40	Three days after the start of the therapeutic intervention, the evolution was 45.0% for G1 and 32.5% for G2; on the fifith day, it increased to 60% in G1. At the end of the intervention, myofascial pain relief had been achieved in 97.5% of G1 and of 90.0% in controls. Electroacupuncture was clinically more effective in relieving myofascial TMD pain, with a good therapeutic response in a shorter time.
The effectiveness of low power laser and occlusal plate in the treatment of temporomandibular dysfunctions: a literature review (Freire, *et al.*, 2022)	To clarify the effectiveness of low power laser associated or not with occlusal splint for treating temporomandibular disorders.	Literature review of 16 articles.	The literature indicates therapeutic efficacy both in associated and/or isolated treatments of TMDs, however, there are controversies about the indication of the two non-invasive therapeutic methods. They report that there is a scarcity of clinical studies and great heterogeneity of the protocols addressed, making it difficult to parameterize the effectiveness of therapies.

*n: number of patients. Source: Table elaborated by the authors.

Of the 23 selected articles, about 30% are review articles, 9% are clinical case studies and 61% are clinical trials (data shown in Figure 1). Note that there are fewer reports of clinical cases, which are of paramount importance to direct clinical trials and the appropriate methodology for developing clinical trials and data comparison.

Figure 1. Percentagem of articles consulted according to the methodology. Ouro Preto, 2022.



Source: Graphic elaborated by the authors.

In the consulted literature, acupuncture was indicated as a therapy for pain control in 96% of the articles. In clinical case reports, the authors report that there was an improvement n pain and, consequently, in the patient's quality of life, with a consequent improvement in the quality and time of sleep and mood. In clinical case trial articles, the number of patients is a decisive factor for data analysis and experimental precision. One of the limiting factors for conducting clinical trials, as specified by the authors, was adherence to and completion of treatment by the experimental groups.

TMD is more common in individuals aged between 20 and 45 years, and more prevalent in females. In the studies evaluated, most patients who participated in the studies were female, which is the group where the dysfunction is more prevalent. This group is the one with the highest adherence to treatment. In the studies evaluated, patients dropped out, especially young men. The highest prevalence rate of TMD among women (about 80%), the dysfunction appears from the age of 30, when women are in their best productive phase (Amarante, *et al.*, 2018).

The main causes of TMD in women are related to behavioral, psychosocial and hormonal factors [56]. Disorders of the temporomandibular joint and muscles (TMJ) may be related to emotional tensions, hormonal disorders, malocclusion, stress, masticatory muscle dysfunction, emotional tension, internal and external changes in the TMJ structure, hormonal variations, psychosocial and behavioral changes, muscle contraction, hyperactivity and trauma occurring in the region or the association of these factors (Jung, *et al.*, 2022).

The studies on acupuncture for treating TMD evaluated have limited n (n<100), this fact prevents recommending the use of acupuncture for treating TMD based on the reviewed studies. However, significant decrease in short-term pain was expressed in 26% of articles (between >n=407 and <n=34 patients), which for the patient adds to the quality of life and improves sleep. Taking into account that the disorder is mainly characterized by pain (algia), reducing this condition is of paramount.

4. Conclusion

In the consulted literature, acupuncture was indicated as a therapy for pain control in 96% of the articles, which were composed of 30% of review articles, 9% of clinical case studies and 61% of clinical trials. 26% of articles recommended the use of acupuncture in short-term treatments.

The lower number of clinical case reports is worrying as case reports are important to direct clinical trials and the

appropriate methodology for developing clinical trials and data comparison.

The small sample size in clinical trials, according to the authors themselves, makes it difficult to adopt a protocol for implementing acupuncture and suggests further studies.

It is necessary to encourage the publication of case reports with the use of acupuncture by therapists. The scientific literature needs records of patient care, which promotes the dissemination of evidence-based health, with the proposal to guide the design of large studies and achieve greater scientific impact for society.

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