



Relationship between Headache and Myofascial Pain: Systematic Review

May Wathiq Alkhudhairy^{a*}, Ashwag Saleem Aldafiri^{b#},
Yara Hamed Alsayegh^{b#}, Wesam Saad Bin Saeed^{b#}
and Nadia Kamal Albather^{b#}

^a Department of Oral and Maxillofacial surgery and Diagnostic Science College of Dentistry, Riyadh Elm University, Riyadh, Saudi Arabia

^b College of Dentistry, Riyadh Elm University, Riyadh, Saudi Arabia.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i52B33596

Editor(s):

- (1) r. Syed A. A. Rizvi, Nova Southeastern University, USA.
- (2) Dr. Koteswara Mudigonda, Propharmex Company, India.

Reviewers:

- (1) Jorge Paredes Vieyra, Universidad Autonoma de Baja California, Mexico.
- (2) Wilson Roberto Malfará, University Center Barão de Mauá, Paulista University, Brazil.

Complete Peer review History, details of the editor(s), Reviewers and additional Reviewers are available here:
<https://www.sdiarticle5.com/review-history/77912>

Systematic Review Article

Received 13 September 2021

Accepted 27 November 2021

Published 30 November 2021

ABSTRACT

Aims: To systematically investigate the relationship between headache and myofascial.

Study design: Systematic Review.

Place and Duration of Study: Department of Oral and Maxillofacial surgery, Riyadh Elm University, Riyadh, Saudi Arabia. Between June 2020 and November 2021.

Methodology: A systematic search of the literature was conducted between 2006 and 2019 in seven electronic databases (Brain, Pub Med, ScienceDirect database, NCBI, Web of Science Core Collection, Google Scholar, Scopus, and Saudi digital library). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement was followed and the clinical question in PICO format was the relationship between headache and myofascial pain. The initial search resulted in 663 articles. Only 9 studies were selected for qualitative synthesis after fulfilling the eligibility criteria (three double blind Randomized Controlled Trials RCTs and one retrospective cohort study). The results showed that there is a consistent trend in the literature supporting the

Dental intern;

*Corresponding author: E-mail: may.alkhudhairy@riyadh.edu.sa;

relationship between headache and MFP.

Results: The first search showed 663 articles. A total of 110 duplicates were eliminated. After filtering by reading titles and abstracts and discarding any extraneous topics or goals that are not directly connected to this systematic review, the first phase comprised 49 publications. There were 14 papers that needed to be reviewed and evaluated for eligibility. Nine articles were chosen for the final evaluation after full text screening.

Conclusion: The findings point to a significant association between headache disability and musculoskeletal disorders of the head and neck. The absence of an agreement in Orofacial Pain research methodology, unified approaches, has an impact on the optimal collecting requirements for a systematic review.

Keywords: Headache; tension-type headache; myofascial pain; orofacial pain; active trigger point; passive trigger point.

1. INTRODUCTION

Orofacial pain, which involves very common conditions such as toothache and temporomandibular disorder as well as orofacial pain syndrome, is a very prevalent disease in the general population.

Many orofacial pain conditions have overlapping presentations, and diagnostic uncertainty is frequently encountered in clinical practice. As with headaches, these disorders, particularly as they become interrelated, pose a real health issue [1].

Myofascial pain is a common complaint, and in patients with TMD, headache is one of the most common symptoms. In the OFP population, the diagnosis of these headaches using standardized criteria has not been critically examined.

There are various etiological variables for TMD disorders such as: trauma, cognitive factor, stress, systemic factor, headache, chronic orofacial pain and myofascial pain [2,3]. Although there is controversy about their similarity and comorbidity, several studies have shown a correlation between masticatory myofascial pain (MMP) and headache [4].

Headache in the population is a common problem, which reduces the quality of life and makes it difficult to work every day [5]. A significant health issue is myofascial pain syndrome. It affects much of the general population, impairs mobility, induces discomfort, and decreases the general sense of well-being [6].

Some studies have shown that the treatment of different symptoms of TMD can greatly reduce

headaches, suggesting a close association between these two conditions. In patients with OFP, the effect of headache has not been widely studied. [1].

The shortage of research related studies and the absence of specific clinical recommendations for the evaluation of headache in patients with TMD have contributed to a lack of widely recognized clinical guidelines for the valuation of headache in these patients. [7].

Orofacial pain is frequently associated with many comorbid conditions, as reflected in TMD (Temporomandibular Disorders). One of the main comorbid conditions in TMD is headaches. Two recent findings have shown that some headaches are more prevalent in patient groups with orofacial pain. Since orofacial pain, TMDs, and headache all share a similar pathophysiology involving increased activity in the trigeminal system, this relationship is not unexpected. Orofacial pain often includes a complex category of disorders associated with the head, face, neck, and all intraoral systems of hard and soft tissues [6].

The term myofascial pain, denoting pain coming from myofascial (muscle) TrPs, was popularized by Travell and Simons. They emphasized the concept of pain arising from specific small, hardened, tender regions in muscle identifiable by palpation. They called these hardened and tender spots trigger points [8].

Chronic orofacial pain (OFP) is a hallmark feature of a variety of psychiatric conditions that are difficult to diagnose and treat, such as temporomandibular joint dysfunction (TMD), burning mouth syndrome, atypical odontalgia, and atypical facial pain [9].

Because primary headaches constitute a major health problem, there has been an increasing interest in the pathogenic mechanisms of these disorders.

Migraine and tension type headaches (TTH) are the most common type of headache in the developmental age group. Tension type headache (TTH) is a frequent pain condition with a global prevalence of 42 percent in the general population. This pathogenesis of tension type headache is not well known. Previous studies have shown that patients with tension type headache showed a rise in tension type headache [10].

In the central nervous system, tension-type headache (TTH) sensitization of neurons triggered by many physical, physiological or emotional causes such as depression, anxiety, or sleep disorders [11]. The word chronic regular headache (CDH) refers to a heterogeneous group of disorders with 15 days per month of headaches [12]. We designed this study to systematically investigate the relationship between headache and myofascial.

2. MATERIALS AND METHODS

2.1 Search Strategy

An extensive literature search will be performed to create a comprehensive narrative in the relationship between MFP and Headache. We selected studies published in the English-language between 2006 and 2019. We searched in the following data bases (Brain, Pub Med, Scopus, Web of Science, Saudi digital library and Science Direct database, NCBI, using the mentioned search strategies: (1) "myofascial pain"; (2) "headache"; and (3) "myofascial pain AND headache". Studies were select on the basis of the title and abstracts and methods obtained in the electronic searches, full texts. After identifying the articles meeting our inclusion criteria, we will use the PRISMA (Preferred Reporting items for Systematic Review) guidelines to assess the level of evidence, Relevant studies with stronger levels of evidence were compiled and summarized [13].

2.2 Eligibility Criteria

The PICO process (Population, Intervention/ Incidence, Comparison, Outcomes) is used to

Formulate the focused question in this Systematic Review, in which: P) population with Myofascial Pain (MFP); I) Presence of Headache); C) Non-Headache controls; and O) Association between Myofascial Pain and Headache. Odds Risk of getting Headache if the person has MFP (Table 3).

2.3 Inclusion and Exclusion Criteria

Inclusion: studies meeting the following criteria: randomised clinical trials (RCT) only the presence of an orofacial pain complaint, headache, episodic tension headache, chronic tension headache, patients diagnose with headache or MFP under valid & reliable tools.

Exclusion: psychological factor, occlusal risk factors for TMD, chief complaint of temporomandibular joint pain, TMD or headache management perform in the last 3 months, a history of head trauma or other intracranial disorders, vascular disorders, medication overuse headache and other major causes of headache -listed in the ICHD 2 (other than TMD), other causes of orofacial pain (such as caries, periodontal disease, or atypical odontalgia, and fibromyalgia).

2.4 Study Selection and Data Extraction

By using the endnote reference manager software. we were able to remove the duplicated article. After reading the abstract and title of each relevant article, the full text for the possible articles were also screened and assessed by two reviewers. Two reviewers independently and blindly extracted outcome and research characteristics utilizing the customized data extraction from.

2.5 Assessment of Risk Bias in the Included Studies

All case control studies have been evaluated especially for risk of bias using Newcastle-Ottawa scale for case-control studies. Individual study that was involved was analysed and categorized as the following protocol as showing on table 1. The Cohen kappa statistic was used to measure the level of the agreement between the two reviewers with the possible disagreements solved by a third reviewer.

Table 1. Study quality assessment using Newcastle-Ottawa scale for case-control studies before the excluded article

Selection						Comparability of	Outcome		
No	First author, year (reference)	adequate case definition	Representativeness of the cases	Selection of Controls	Definition of Controls	cohorts	Ascertainment of exposure	Same method of ascertainment	Non-Response rate
1	Ewa Wozniak et al. 2018	*	*	*	*				*
2	Yuri Costa et al. 2015	*	*			*	*		
3	Kazuhiko Hara's et al. 2016	*	*	*	*		*	*	
4	Michael Costigan et al. 2014					*		*	*
5	Vishal R. Aggarwal et al. 2019	*	*	*	*				
6	Bartosz Dalewski et al. 2019	*	*	*	*				
7	Wojciech Florjanski et al;2019	*	*			*	*	*	*
8	Ewa Emich-Widera et al. 2012	*	*	*	*				
9	Mieszko Wieckiewicz 2019	*	*	*	*	*	*	*	
10	V Ballegaard 2008	*	*	*	*	*	*	*	
11	Carlo Di Paolo 2017	*	*	*	*	*	*	*	*
12	Carlo Di Paolo et al. 2017	*	*	*	*	*		*	*
13	V Ballegaard et al. 2008	*	*	*	*			*	
14	MieszkoWieckiewicz et al. 2019	*	*	*	*	*		*	*

Table 2. Study quality assessment using Newcastle-Ottawa scale for case-control studies after the excluded article

Selection						Comparability of cohorts	Outcome		
N	First author, year (reference)	adequate case definition	Representativeness of the cases	Selection of Controls	Definition of Controls		Ascertainment of exposure	Same method of ascertainment	Non-Response rate
1	Ewa Wozniak et al. 2018	*	*	*	*				*
2	Yuri Costa et al. 2015	*	*			*	*		
3	Lívia Maria Sales Pinto et al. 2013	*	*	*	*		*	*	
4	Sanjay Prakash DM Et al. 2016	*	*	*	*	*		*	*
5	Somsak Mitirattanakul et al. 2006	*	*	*	*		*		*
6	William E Dando et al. 2006	*	*	*	*		*		*
7	MieszkoWieckiewicz et.al. 2019	*	*	*	*	*	*	*	
8	VBallegaard et. al. 2008	*	*	*	*	*	*	*	
9	CarloDiPaolo et al. 2017	*	*	*	*	*	*	*	*

Table 3. The primary research question defined as per the PICO framework

Population	Population with myofascial pain
Incidence	Presence of tension type headache
Comparison	MFP without TTHA
Outcome	Association between MFP & TTH

Table 4. Clinical studies that investigated the correlation after the excluded articles

Title	Authors (Year)	Country	Study design	Sample size and gender	Age	time	Myofascial pain and headache diagnosis	Result	Risk Of bias
1-Influence of Myofascial Pain on the Pressure Pain Threshold of Masticatory Muscles in Women With Migraine	Livia Maria Sales Pinto et.al,2013	Brazil	Clinical Trial	101 Women	18-60y	N/A	-All patients were evaluated using Research Diagnostic Criteria for Temporomandibular Disorders to determine the presence of myofascial pain and were divided into 2 groups: group I (n=56), comprising women with a migraine, and group II (n=45), comprising women with a migraine and myofascial pain. Two more groups (49 asymptomatic women and 50 women with myofascial pain). -The PPT values of masseter and temporalis (anterior, middle, and posterior regions) muscles were recorded bilaterally using a pressure algometry.	all groups had significantly lower PPT values compared with asymptomatic women, with lower values seen in group II (women with migraine and myofascial pain). Women with a migraine and myofascial pain showed significantly lower PPT values compared with women with a migraine only, and also when compared with women with myofascial pain only.	II
2-A Cross-Sectional Clinic-Based Study in Patients With SideLocked Unilateral Headache and Facial Pain	Sanjay Prakash DM et.al,2016	India	Cross-Sectional Clinic-Based Study	307 consecutive adult patients	Adult >18 years) (Range 18-80 y). (48% of patients were male)	N/A	-clinical interview and detailed neurological examination based on structured Questionnaire -All patients were subjected to MRI brain and other investigations to find out the different secondary causes. -The diagnosis was carried out by at least two headache specialists together. -All patients were classified according to the International Classification of Headache Disorder-third edition (ICHD-3β).	1-Migraine was the most common diagnosis (15%) 2-Cervicogenic headache was the secondary headache 3-Classical trigeminal neuralgias and persistent idiopathic facial pain were two most common diagnoses in the painful cranial neuropathies and other facial pain groups 4-(61%) chronic daily headaches, and hemicrania continua and cervicogenic headache. -large number of primary and secondary headaches and cranial neuropathies may present as side locked headache and facial pain syndrome.	II

3-Headache impact in patients with orofacial pain	SomsakMitri rattanakul et.al,2006	USA	cross-sectional study	337 university-based clinic patients with OFP 367 general dental (GD) patients, who controls	N/A	N/A	<p>-(MIDAS)questionnaire</p> <p>-They made primary and secondary diagnoses in patients with OFP according to standard diagnostic criteria.</p> <p>-The authors classified the patients into 3 categories: primary headache (PH), musculoskeletal disorders (MS) neuropathic pain (NP).</p> <p>-They categorized the MIDAS score into 4 severity grades .</p> <p>-The authors analyzed the data using χ^2, t test, one-way analysis of variance and logistic regression for calculated odds ratios.</p>	<p>-Patients with OFP had a greater prevalence of headache than did patients in the GD group (72.7 percent versus 31.9 percent, respectively; $P < .001$), with a higher total MIDAS score, number of headache days in the previous three months and headache severity ($P < .001$).</p> <p>-Within the OFP group, the diagnostic prevalence of PH, MS and NP was 7.1 percent, 79.8 percent and 13.1 percent, respectively ($P < .001$).</p> <p>- The authors categorized 56 percent of patients with OFP and headache into the high-impact headache group (MIDAS grades III and IV; $P < .001$).</p>	II
4-Headache Disability in Orofacial Pain Patients	William E Dando et. al,2006	Bethesda , USA	Cohort study	426 Orofacial pain	N/A	November 2003 - December 2004	<p>-(MIDAS) is administered to all patients as a part of the initial assessment at the Orofacial Pain Center.</p> <p>-its retrospective examine the reported history of and the disability caused by headaches in patients who presented for evaluation and treatment of orofacialpain.</p>	<p>-In the present study 261 (61.3%) patients reported a headache complaint and 100 (38%) fulfilled the criteria for migraine with or without aura.</p> <p>-MIDAS scores were reported by 55.3% of 426 patients with the mean score of 23.68. There were no significant differences in MIDAS scores in relation to the presence or absence of an intracapsular disorder.</p> <p>-Patients with masticatory and/or cervical myalgia demonstrated significantly higher MIDAS scores when compared to patients without myalgia.</p>	I

5 -Relation between Headache and Mastication Muscle Tone in Adolescents	Ewa Wozniak et. al, 2018	South Boston	cohort	106 individuals (27 men and 79 women)	106 individuals (27 men and 79 women)	NA	. Clinical evaluation y the same dental practitioner using the RDC/TMD dual-axis diagnostic system. . A Polish version of the personal questionnaire forming a part of the RDC/TMD diagnostic algorithm was completed by the project participants themselves.	-the contractile activity of both the masseter muscles and anterior temporal muscles was recorded bilaterally as the surface electromyographic activity (sEMG) at rest, during swallowing, and maximum clenching. II -Group I(healthy individuals),II (sick individuals): Masseter . -Group III (individuals with depression or nonspecific somatic symptoms): temporalis. -Pain severity is greater if the temporalismuscle is involved. -Masseter and temporalis both related to headache. -Temporalis is worsen headache cuase of pain
---	--------------------------	--------------	--------	---------------------------------------	--	----	--	--

6-Headache attributed to masticatory myofascial pain: clinical features and management outcomes	Yuri Costa et.al ,2015	Brazil	Random ized controlle d clinical trial (RCT).	(n = 60) of this randomize d controlled trial comprised patients with masticator y myofascial pain. The patients were divided into two groups	adults aged between n 18 and 50 years.	August 2011 to April 2013.	One professional examiner performed a careful clinical examination according to the RDC/TMD protocol. and a comprehensive interview in order to select subjects that fulfilled the above inclusive criteria. Headache information was recorded using a questionnaire based on the International Classification of Headache Disorders, 2nd edition (ICHD 2), and each volunteer's detailed medical history was examined. The initial sample (n = 60) of this randomized controlled trial comprised patients with masticatory myofascial pain according to the Research Diagnostic Criteria for TMD (RDC/TMD), and headache.	-The main clinical features of headache attributed to masticatory myofascial pain were the long duration (≥ 4 hours), frontotemporal bilateral location, and a pressing/tightening quality. - 41 subjects (group 1, 17 subjects; group 2, 24 subjects) were included in the final analysis. There was a reduction in headache intensity and frequency, with no significant differences between groups (P > .05). - The mean (± SD) baseline VAS was 7.6 (± 2.2) for group 1 and 6.5 (± 1.6) for group 2; final values were 3.1 (± 2.2) (P < .001) and 2.5 (± 2.3) (P < .001), respectively.	II
							The patients were divided into two groups: group 1 received only counseling for behavioral changes, and group 2 received counseling and an occlusal appliance. A 5-month followup period included three assessments. TMD-related headache characteristics, eg, headache intensity (scored on a visual analog scale [VAS]) and frequency were measured by a questionnaire. Two-way analysis of variance, chi-square, Friedman, and Mann-Whitney tests were used to test for differences considering a 5% significance level.	-The behavioural feedback help decrease the headache intensity and frequency, that mean there is a relationship between myofascial pain headache, there is no statistical significant myofascial pain and headache.	

7- Prevalence and Overlaps of Headaches and Pain-Related Temporomandibular Disorders Among the Polish Urban Population	MieszkoWie ckiewiczet al ;2019	Poland	Cross-sectiona l study	213 individuals were examined (149 women and 64 men).	The mean age of the particip ants was 37 ± 15.82 years.	Betwe en Febru ary and Nove mber 2017.	The examination consisted of two parts: a clinical examination of TMD using the Diagnostic Criteria for TMD Examination Form and the Head-HUNT Study questionnaire filled in by the participants to determine the occurrence and type of headaches. An experienced and qualified clinician trained all the examiners in the clinical examination protocol.	The diagnosis for 55.9% of the participants was pain-related TMD, including myalgia (47.4%), myofascial pain (14.1%), arthralgia (21.1%), or headache attributed to TMD (10.3%). In the study population, 48.8% were diagnosed with temporomandibular joint disorders, most frequently disc displacement with reduction (47.9%). A total of 73% of the individuals had experienced headaches in the previous 12 months. The majority of the participants described the headache episodes as occurring less than 7 days/month and lasting less than 4 hours. Among people with painful TMD, the frequency of headaches was almost twice as high as that in nondisordered individuals (48.35% and 25.35%, respectively; P < .0001). The logistic regression model confirmed a significant overlap between headache and painful TMD (OR = 4.77, 95% CI 2.44-9.32, P = .0000). For the entire studied population, no statistically significant connections were established between the occurrence of identified TMJ disorders and headache reports or diagnoses (P > .05).	II
--	--------------------------------	--------	------------------------	---	---	--	--	---	----

8- Are headache and temporomandibular disorders related? A blinded study	V Ballegaard et al ;2008	Uk	cohort study	The prevalence of TMD to be from 8% to 15% for women and from 3% to 10% for men .	Mean age of 44.8 years (range 18–88 years) participated.	N/A	Patient diagnosed according to Research Diagnostic Criteria for TMD (RDC/TMD) and classified in headache groups according to the International Classification of Headache Disorders, second edition for headache diagnoses in a blinded designs	<p>-The prevalence of TMD in the headache population was 56.1%. -Psychosocial dysfunction caused by TMD pain was observed in 40.4%.</p> <p>- No significant differences in TMD prevalence were revealed between headache groups, although TMD prevalence tended to be higher in patients with combined migraine and tension-type headache.</p> <p>- Moderate to severe depression was experienced by 54.5% of patients. Patients with coexistent TMD had a significantly higher prevalence of depression most markedly in patients with combined migraine and tension-type headache.</p> <p>- studies indicate that a high proportion of headache patients have significant disability because of ongoing chronic TMD pain. The trend to a higher prevalence of TMD in patients with combined migraine and tension-type headache suggests that this could be a risk factor for TMD development.</p>	II
--	--------------------------	----	--------------	---	--	-----	---	---	----

9- Temporomandibular Disorders and Headache: A Retrospective Analysis of 1198 Patients	CarloDi Paolo et el; 2017	Italy	cohort study	A total sample of 1198 consecutive TMD patients was selected.	was evaluated through a qualitative scale with the following subdivisions: 0–15 childhood, 16–25 adolescents/young adults, 26–40 adults, 41–50 middle-aged adults, 51–60 mature /older adults, 61–70 seniors, and 71+ elders.	January 2011 – December 2013	First, 1198 TMD patients was selected. Presence of headache was analyzed using both clinical parameters recorded on patient's medical charts and answers given by patient on the DC/TMD Symptom _Questionnaires (Headache was found in 894 (75%) patients while in 304 (25%) was excluded.) In order to differentiate headache and perform a correct diagnosis to exclude false positives, all patients positive for headache were invited to undergo a neurological visit with a neurologist specialized in the diagnosis of primary headache according to the latest edition of the International Classification of Headache Disorders (ICDH-III). After the neurological visit, in accord with ICHD-III, a diagnosis of headache was performed in 625 patients.Two hundred and sixty-nine patients were excluded from the study: in particular, 191 subjects did not undergo the neurological examination and 78 were found to be affected from other neurological diseases, such as atypical facial pain and cranial neuralgia. subjects. Patients were divided into two groups based on presence/absence of headache: Group with Headache (GwH) and Group without Headache (GwoH). Descriptive statistics and Chi-square index were performed.	-In the TMD sample, headache prevalence was found to be 67.3%. --In GwH, pain score was VNS and 78% of patients showed VNS values higher than 50. -The higher values in GwH, while absence of pain was more frequent in GwoH .	II
--	---------------------------	-------	--------------	---	---	------------------------------	---	--	----

3. RESULTS AND DISCUSSION

The flow chart of the search strategy is presented in (Fig. 1). The initial search retrieved 663. 110 duplicates were excluded. First phase included 49 articles, after screening by reading titles and abstracts and excluding any irrelevant titles and aims that are not directly related to this systematic review 14 articles remained for further reviewing and assessment for eligibility. After full text screening 9 articles were considered for the final review. [Fig. 1]

3.1 Discussion

This systematic review aimed to select all clinical trial studies with or without control groups, in

addition to cross sectional, retrospective, and observational studies to assess the correlation between headache and myofascial pain. Nine studies were retrieved. After scientific assessment and study quality assessment using Newcastle-Ottawa scale, eight of them were categorized as moderately low risk and one of them low risk. Thus, influencing the import and reliability of their relative results. The first study included [14] which found that all groups had significantly lower PPT values compared with asymptomatic women, with lower values seen in group II (women with migraine and myofascial pain). [15] Study which done in women with myofascial pain and TMD symptom-free women showed also, revealed a significantly lower PPT for all muscles in the symptomatic group.

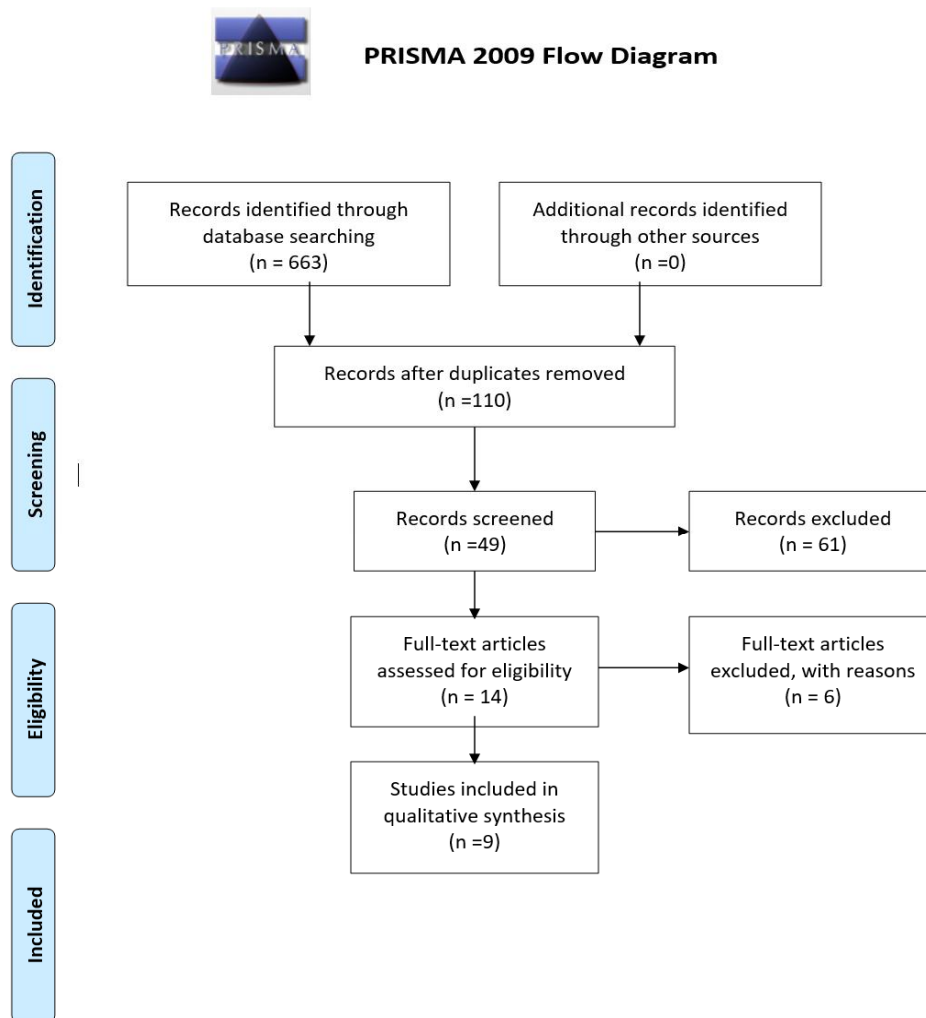


Fig. 1. PRISMA flow chart of the search strategy

The second study [16] that showed Migraine was the most common diagnosis, Cervicogenic headache was the secondary headache, Classical trigeminal neuralgias and persistent idiopathic facial pain were two most common diagnoses in the painful cranial neuropathies and other facial pain groups, chronic daily headaches, and hemicrania continua and cervicogenic headache. So, it shows a large number of primary and secondary headaches and cranial neuropathies may present as side locked headache and facial pain syndrome. Also, [17] showed " The occurrence of side-locked unilateral pain was more frequent in migraine (17%) than tension headache (4%). Of the 1169 patients, 181 (15%) had side-locked unilateral pain: 70% of the 181 had migraine, 25% were not-well-defined head pain cases and 5% were tension-type headache cases.

According to [1] showed Patients with OFP had a greater prevalence of headache than did patients in the other patient. also, the authors categorized 56 percent of patients with OFP and headache into the high-impact headache group (MIDAS grades III and IV; $P < .001$). Its supported by [18] reports show that "there should be no dividing line between the knowledge of both orofacial pain specialists and headache physicians. On the contrary, these 2 specialists should share their work regarding the management of patients with TMD and headache, whether or not the 2 conditions are associated".

On the other hand,[7] showed MIDAS scores were reported by 55.3% of 426 patients with the mean score of 23.68. There were no significant differences in MIDAS scores in relation to the presence or absence of an intracapsular disorder. Patients with masticatory and/or cervical myalgia demonstrated significantly higher MIDAS scores when compared to patients without myalgia. Also, A [14] study which show "In order to understand and manage TMD patients, it is necessary to understand temporomandibular disorders and their comorbidities. and for the dental profession, the implications of this information are serious, especially regarding chronic TMD conditions, in which modulation mechanisms of pain are reduced and comorbidities are present most of the time"

According to [5] study the contractile activity of both the masseter muscles and anterior temporal muscles was recorded bilaterally as the surface electromyographic activity (sEMG) at rest, during

swallowing, and maximum clenching. Group I (healthy individuals), II (sick individuals): Masseter. Group III (individuals with depression or nonspecific somatic symptoms): temporalis. They found pain severity is greater if the temporalis muscle is involved. Masseter and temporalis both related to headache. Temporalis is worsened headache cause of pain. Similar results were found with [19]. Among adolescent with moderate to severe TMD the higher Electromyographic activity in both masseter and temporal muscles. Another study published by [20] They found in CTTH patients, same pattern showed in the local and referred pain from active TrPs temporalis muscle and the headache pain. Also, headache duration and intensity were greater in CTTH patients who had active TrPs.

[21] they found the main clinical features of headache attributed to masticatory myofascial pain were the long duration (≥ 4 hours), frontotemporal bilateral location, and a pressing/tightening quality. 41 subjects (group 1, 17 subjects; group 2, 24 subjects) were included in the final analysis. There was a reduction in headache intensity and frequency, with no significant differences between groups ($P > .05$). It is supported by [22] "In the general adult population there is an association between headache and symptoms of TMD. A functional evaluation of the stomatognathic system should be therefore considered in subjects with unexplained headache, even if chronic conditions and mechanical symptoms of temporomandibular disorder are absent". Other study by [23] "The main findings of this study were that TMD patients with increased frequency of headache occurring in the temple(s) exhibited increased severity of TMD pain characteristics, spread of pain, as well as increased sensitivity in trigeminal and non – trigeminal sites. Together these findings suggest that these headaches may be TMD-related and suggests a role for both peripheral and central sensitization in TMD patients".

According to the [24] which found that 70.9% of patients who is complain TMD had moderate to severe depression. it is sported by [25] adults also found an association between elevated anxiety/depression scores and TMD pain. Other study by [26] patient with TMD is higher in GwH, while absence of pain was more frequent in GwoH, it is sported by [27] the TMD is higher in patients with GWH [28] there is relationship between TMD and headache, it is sported by [25] The headache is strongly and independently related to TMD pain.

4. CONCLUSION

Through the extensive literature analysis, it was found that Myofascial pain is a poorly understood disorder that may be important in understanding primary headache. Headache has very high incidence and impact in orofacial pain and TMD patients. Patients with OFP had a higher prevalence of headache with greater disability impact than did control subjects. The degree of disability was related strongly to the MS diagnosis. The result indicates the strong relationship of headache disability and musculoskeletal disorders of head and neck.

The lack of a consensus in research in Orofacial Pain methodology, unified techniques, affects the ideal collection standards that one wants to collect for a systematic review. In a perfect world, importance would be shed on utilizing a standard form as the one provided by the DC-TMD questionnaire for Orofacial Pain patients suffering headaches.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Mitirattanakul S, Merrill RL. Headache impact in patients with orofacial pain. *J Am Dent Assoc.* 2006;137(9):1267–74.
2. Florjanski W, Malysa A, Orzeszek S, Smardz J, Olchowy A, Paradowska-Stolarz A, et al. Evaluation of biofeedback usefulness in masticatory muscle activity management—a systematic review. *J Clin Med.* 2019;8(6).
3. Dalewski B, Kamińska A, Szydłowski M, Kozak M, Sobolewska E. Comparison of early effectiveness of three different intervention methods in patients with chronic orofacial pain: A randomized, controlled clinical trial. *Pain Res Manag.* 2019;2019:9–11.
4. Hara K, Shinozaki T, Okada-ogawa A, Matsukawa Y, Dezawa K, Nakaya Y, et al. 58_15-0491. 2016;58(2):195–204.
5. Wozniak E, Loster JE, Wieczorek A. Relation between headache and mastication muscle tone in adolescents. *Pain Res Manag.* 2018;2018.
6. Jafri MS. Mechanisms of Myofascial Pain. *Int Sch Res Not.* 2014;2014:1–16.
7. Dando WE, Branch MA, Maye JP. Headache disability in orofacial pain patients. *Headache.* 2006;46(2):322–6.
8. Do TP, Heldarskard GF, Kolding LT, Hvedstrup J, Schytz HW. Myofascial trigger points in migraine and tension-type headache. *J Headache Pain.* 2018;19(1): 84.
9. Durham J, Exley C, Wassell R, Steele JG. “Management is a black art” - Professional ideologies with respect to temporomandibular disorders. *Br Dent J.* 2007;202(11).
10. Aaseth K, Grande RB, Lundqvist C, Russell MB. Pericranial tenderness in chronic tension-type headache: the Akershus population-based study of chronic headache. *J Headache Pain.* 2014; 15(1):1–7.
11. Fernández-De-Las-Peñas C, Caminero AB, Madeleine P, Guillem-Mesado A, Ge HY, Arendt-Nielsen L, et al. Multiple active myofascial trigger points and pressure pain sensitivity maps in the temporalis muscle are related in women with chronic tension type headache. *Clin J Pain.* 2009;25(6): 506–12.
12. Natoli JL, Manack A, Dean B, Butler Q, Turkel CC, Stovner L, et al. Global prevalence of chronic migraine: A systematic review. *Cephalalgia.* 2010; (5):599–609.
13. Silverwood V, Chew-Graham C, Shiers D. Improving the physical health of people with severe mental illness. *InnovAiT Educ Inspir Gen Pract.* 2019;12(4):203–10.
14. Conti PCR, Pinto-Fiamengui LMS, Cunha CO, Conti AC de CF. Orofacial pain and temporomandibular disorders - the impact on oral health and quality of life. *Braz Oral Res.* 2012;26(SPL. ISS.1):120–3.
15. Dos Santos Silva R, Conti PCR, Lauris JRP, Ferreira Da Silva RO, Pegoraro LF. Pressure pain threshold in the detection of masticatory myofascial pain: An algometer-based study. *J Orofac Pain.* 2005;19(4): 318–24.
16. Prakash S, Rathore C, Makwana P, Dave A. A Cross-Sectional Clinic-Based Study in Patients With Side-Locked Unilateral

- Headache and Facial Pain. *Headache*. 2016;56(7):1183–93.
17. D'Amico D, Leone M, Bussone G. Side-Locked Unilaterality and Pain Localization in Long-Lasting Headaches: Migraine, Tension-Type Headache, and Cervicogenic Headache. *Headache J Head Face Pain*. 1994;34(9):526–30.
 18. Speciali JG, Dach F. Temporomandibular dysfunction and headache disorder. *Headache*. 2015;55(S1):72–83.
 19. Lauriti L, Motta LJ, De Godoy CHL, Biasotto-Gonzalez DA, Politti F, Mesquita-Ferrari RA, et al. Influence of temporomandibular disorder on temporal and masseter muscles and occlusal contacts in adolescents: An electromyographic study. *BMC Musculoskelet Disord*. 2014;15(1).
 20. Fernández-de-las-Peñas C, Ge HY, Arendt-Nielsen L, Cuadrado ML, Pareja JA. The local and referred pain from myofascial trigger points in the temporalis muscle contributes to pain profile in chronic tension-type headache. *Clin J Pain*. 2007;23(9):786–92.
 21. Costa Y, Porporatti A, Stuginski-Barbosa J, Bonjardim L, Speciali J, Conti P. Headache Attributed to Masticatory Myofascial Pain: Clinical Features and Management Outcomes. *J Oral Facial Pain Headache*. 2015;29(4):323–30.
 22. Ciancaglini R, Radaelli G. The relationship between headache and symptoms of temporomandibular disorder in the general population. *J Dent*. 2001;29(2):93–8.
 23. Toosi K. 基因的改变 NIH Public Access. *Bone*. 2014;23(1):1–7.
 24. Ballegaard V, Thede-Schmidt-Hansen P, Svensson P, Jensen R. Are headache and temporomandibular disorders related? A blinded study. *Cephalalgia*. 2008;28(8):832–41.
 25. Nilsson IM, List T, Drangsholt M. Headache and co-morbid pains associated with TMD pain in adolescents. *J Dent Res*. 2013;92(9):802–7.
 26. Di Paolo C, D'Urso A, Papi P, Di Sabato F, Rosella D, Pompa G, et al. Temporomandibular disorders and headache: A retrospective analysis of 1198 patients. *Pain Res Manag*. 2017;2017.
 27. Mello CEB, Oliveira JLG, Jesus ACF, Maia ML de M, de Santana JCV, Andrade LSO, et al. Temporomandibular disorders in headache patients. *Med Oral Patol Oral Cir Bucal*. 2012;17(6):1042–6.
 28. Wieckiewicz M, Grychowska N, Nahajowski M, Hnitecka S, Kempiak K, Charemska K, et al. Prevalence and Overlaps of Headaches and Pain-Related Temporomandibular Disorders Among the Polish Urban Population. *J Oral Facial Pain Headache*. 2020;34(1):31–9.

© 2021 Alkudhairy et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/77912>