



# Osteopathy treatment of temporomandibular joint dysfunction in young teens

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## Abstract

**Introduction and Objective.** Pain symptoms of the temporomandibular joint constitute a challenge for clinicians as well as patients having to cope with this issue. Presently, there are no clear cut factors that could cause TMD in children and youths. The differentiation of the diagnostic significance of symptoms of TMD constitutes an ever greater challenge in dental and orthodontic treatment. The manual procedure used in the treatment of diseases of the musculoskeletal systems, as well as in temporomandibular diseases (TMD), seems to be promising, although at present there is no high-quality proof that would indicate the efficacy of this therapy.

**Materials and Methods.** 30 young teens transferred to osteopathic specialists due to pain diseases of the TMJ, and subjected to treatment using osteopathic therapy. Assessment of symptoms related to the TMJ was by the TMJ Symptom intensity scale (SIS) and the TMJ Symptom Frequency Scale (SFS), constituting modifications of the Steigerwald/ Maher questionnaire.

**Results.** Statistically significant improvement was found in the most severe cases ( $p=0.0032$ ) and usual ( $p=0.0007$ ) jaw pain. Improvements were also found for painful jaw clicking (most severe  $p=0.0076$  and usual  $p=0.0220$ ). The intensity of the jaw-locking symptom on a daily basis was the same, but the greatest intensity of locking decreased ( $p=0.0077$ ). A beneficial effect was found for osteopathic intervention on jaw pain ( $p=0.0207$ ), painful jaw clicking ( $p=0.0011$ ) and headaches ( $p=0.0122$ ).

**Conclusions.** 1) Osteopathic therapy positively influences the reduction of pain in the TMJ in children aged 12–14 years. 2) Osteopathic techniques positively influence the reduction of occurring pain symptoms of the head in TMD.

## Key words

osteopathy, temporomandibular disorder, young teens

## INTRODUCTION

The temporomandibular joint is one of the most complex joints in the human body, and is related to the unique connection of the motion of sliding and rolling during its proper functioning. The articular disc found in the joint plays a very important function within it. The proper position of the disc is necessary for keeping the correct function of the joint under various circumstances and positions. The maintenance of the proper location of the disc within the joint is necessary to maintain its correct shape and the proper functions of the mouth. The articular disc is composed of an intracellular matrix which may change its shape due to chronic erroneous position, as well as other factors. Improper proportions of type I and type III collagen may also lead to excess motility and additionally influence the shape of the disc itself [1]

Dysfunctions of the temporomandibular joint require individually selected therapy for a given person; hence, treatment should be based on the establishment of complete human development, with habits and experiences being significant when treating the TMJ. In connection with the area of the mandible, the examination should be based on functions of breathing, motion or posture apparatus,

circulatory system, hormonal and digestive systems, together with the nervous system which however, should also include psychological and mental relations as well as psychosomatic phenomena [2, 3].

Many adults report pain symptoms of the lip and facial area during dental appointments. Pain was often observed among children aged 13–15, which was limited to some extent by performing preventive jaw exercises [4]. In certain trials, the amount of pain was almost 60% [5]. The most common ailments were related to musculo-ligamental and alveolar pain [6]. Such clinical symptoms concerning dysfunctions of the TMJ were found in one-in-six children and youths. In 23% of preschoolers a feeling of pain was recorded during mastication as well as acoustic phenomena in the joint [7]

Functional dysfunctions of temporomandibular joints are most likely the most common symptom due to the high prevalence of the symptoms. The most frequently occurring symptom is pain, usually localised in the preauricular area and/or the mastication muscles. Additionally, patients usually experienced a reduced range of motion of the mandible, with sounds in the temporomandibular joint frequently being described as ‘cracking’, ‘clicking’, or ‘grinding’. General complaints of the patients cover pain in the ear, headaches, and pain of the mandible and the face. Related problems may be a painless overgrowth of the mastication muscles and improper occlusion wear related to the parafunctions of the mouth (teeth grinding and jaw clenching).

The aim of the study is an assessment of the influence of osteopathic treatment on the prevalence of pain symptoms

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of the temporomandibular joints among children aged 12–14 years. In order to discuss the topic as best as possible, various databases were used, such as the Polish Medical Datgabase, PubMed and Cochrane.

## MATERIALS AND METHOD

The study included 30 young teens with an average age of 13 years, who were transferred to the osteopathic practice by an orthodontist on the basis of the symptom of jumping in the joints and pain symptoms of the TMJ. Each patient was examined by a physician to assess the sound in the joint on opening the mouth (clicking, crepitation), with the side of the emerging pain symptoms also being described. Those transferred to therapy had no dysfunctions of the bite and had not experienced dislocations of the TMJ. The study was conducted during the six month period June – December 2023.

In the course of the osteopathic treatment, a range of techniques was used to influence the balancing of muscle and ligament inequalities. Analysis of excessive muscle tension was based on a manual assessment, treated by inhibition techniques.

The treatment applied to all muscles of mastication is presented and described in *Cranial Osteopathy: Principles and Practice*, volume 2, ‘The temporomandibular joint’ [8]. The techniques used for muscle treatment are muscular inhibition for the following mastication muscles: temporalis, masseter, lateral pterygoid, and medial pterygoid muscle. Treatment for the ligaments: joint capsule and lateral ligament, sphenomandibular and stylomandibular ligament.

Increased muscle tension of specific structures and the presence of pain symptoms during manual touching were an indication favouring the implementation of inhibition techniques of specific structures during therapy. After completion of the treatment, each patient received a set of self-treatment techniques for the tense structures. Self-therapy was carried out twice a day in three rows, until the subsequent visit to a osteopathy specialist.

Osteopathic therapy was conducted during three visits, at monthly intervals. During therapy, manual techniques were used on all muscle structures, with relevant inhibitions performed to improve muscle and ligament balance. Treatments in inhibition were carried out by a specialist in osteopathy dealing with dental issues for seven years. The treatment was carried out at a private practice in Gdańsk, Poland.

Before the commencement of therapy, each patient had their muscle and fascia balance of the upper section of the neck equalised by position relaxation techniques. During the three months of therapy, all patients desisted from chewing gum, and noted the symmetrical process of biting during eating.

The assessment of symptoms related to the TMJ used the TMJ Symptom intensity scale (SIS) and the TMJ Symptom Frequency Scale (SFS), a modification of the Steigerwald/Maher questionnaire [9] with a data section. The data section included basic anthropometric information (height, age), the date of birth and the gender.

The SIS assesses the level of the experienced symptom intensity from the TMJ, with the SFS assessing the frequency

of their emergence. Both scales are designed in such a way that the patient may obtain a maximum score of 70 points, with the minimum value being zero in the case of no symptoms. For each affliction, the patient provides a score, between zero – no symptoms, and ten – strongest symptoms. During completion of the questionnaire, the patient, describes the intensity and frequency for seven symptoms: jaw pain, painful jaw clicking, jaw locking, headaches, neck and/or upper shoulder muscle pain, dizziness, or ringing in the ears. In the SIS, the intensity of ailments is additionally divided into the level most frequently experienced, and the momentary strongest yet to be experienced. The questionnaire was completed before the start of therapy and a month after the conclusion of the last visit at the osteopathy practice. The results were subjected to statistical analysis, with the Student’s t-test for dependent samples.

## RESULTS

The implemented techniques for specific muscles (Fig. 1) and tendons (Fig. 2) show in percent the frequency of presence of pain under application of manual techniques while the techniques used during the osteopathic visits. The technique most frequently used for the muscles were those for lateral and medial pterygoid muscles, followed by the masseter muscle and the temporalis. In terms of pain symptoms of the ligaments, most symptoms involved the area of the stylomandibular ligament, followed by the lateral ligament, and the technique used least was that for the sphenomandibular ligament.

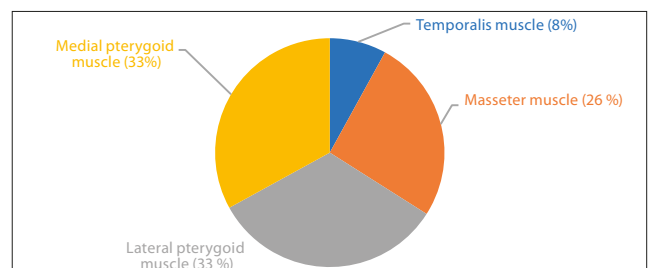


Diagram 1. Distribution of pain symptoms caused in muscles by manual techniques

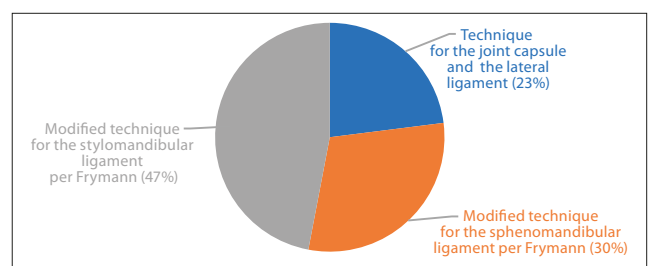


Diagram 2. Distribution of pain symptoms caused in ligaments by manual techniques

Statistical analysis was performed of the results collected with the TMJ SIS (Tab. 2). The conducted tests revealed a statistically significant improvement in most severe ( $p=0.032$ ) and usual ( $p=0.0007$ ) jaw pain. Improvements were also found for painful jaw clicking (most severe  $p=0.0076$  and usual  $p=0.0220$ ). The intensity of the jaw-locking symptom on a daily basis was the same, but the greatest intensity of locking decreased ( $p=0.0077$ ). No statistically significant

**Table 1.** Fundamental anthropometric data of the study group

Research group n=30	
Age [yrs]	12.3 ± 0.7
Height [m]	1.5 ± 0.1
Weight [kg]	52.3 ± 6.8
BMI [%]	
Normal range	32.7%
Overweight	47%
Obese ( Class I)	15.7%
Obese (Class II)	26%

**Table 2.** Statistical analysis for the TMJ Symptom Intensity Scale (SIS)

Symptom		$\bar{X}$	SD	$\bar{X}$	SD	p
		before		after		
Jaw pain	usual	6.1	2.0	3.1	3.9	0.007
	Most severe	9.6	2.9	5.5	3.5	0.032
Painful jaw clicking	usual	7.4	2.2	2.8	2.8	0.022
	Most severe	8.6	2.2	3.3	1.9	0.076
Jaw locking	usual	4.5	4.2	8.9	3.2	0.077
	Most severe	7.4	4.8	7.1	6.0	0.482
Headaches	usual	6.7	4.9	3.5	4.4	0.044
	Most severe	6.5	4.2	6.4	4.9	0.336
Neck and/ or upper shoulder muscle pain	usual	5.9	5.5	5.4	2.0	0.795
	Most severe	6.5	5.5	6.5	3.7	1.000
Dizziness	usual	2.3	5.0	1.6	1.3	0.523
	Most severe	2.6	5.6	2.1	2.2	0.736
Ringing in the ears	usual	5.9	5.5	1.4	5.0	0.795
	Most severe	6.5	5.5	1.5	5.7	1.000

**Table 3.** Statistical analysis for the TMJ Symptom Frequency Scale (SFS)

Symptom	$\bar{X}$	SD	$\bar{X}$	SD	p
	before		after		
Jaw pain	7.71	2.01	4.34	2.35	0.0207
Painful jaw clicking	8.04	4.09	6.64	2.74	0.0011
Headaches	6.68	0.69	3.71	3.23	0.0122
Neck and/ or upper shoulder muscle pain	5.04	4.09	5.64	2.74	0.7245
Dizziness	2.68	0.69	2.71	2.63	0.3874
Ringing in the ears	5.04	4.09	26.64	4.74	0.5211

relations were found for ringing in ears, dizziness, neck and/ or upper shoulder muscle pain.

Statistical analysis was also performed on the TMJ SFS (Tab. 3). A beneficial effect was found for osteopathic intervention on jaw pain ( $p=0.0207$ ), painful jaw clicking ( $p=0.0011$ ) and headaches ( $p=0.0122$ ). No significant change was found in terms of ringing in the ears, dizziness, neck and/ or upper shoulder muscle pain.

On the basis of the performed statistical analysis and the results, the zero hypothesis is rejected and the alternative hypothesis confirmed, indicating that osteopathic treatment reduces the subjective perception of pain in the temporomandibular joint in children aged 12–14 years.

## DISCUSSION

TMJ diseases are considered difficult to treat, hence their treatment is not indifferent to the body and must be interdisciplinary. The methods used to relieve pain – pharmacotherapy, acupuncture, physical therapy and OMT – improve the motor functions of the mandible and the quality of life of the patient. Analyses of the feeding habits of the patients were also significant. It was found that a diet rich in omega-3 acids and vitamins E and C can prevent TMD, due to anti-inflammatory and anti-oxidative properties [10]. Persons with a vitamin D<sub>3</sub> level below 30 nmol/l may expect advantages in TMD if they commence supplementation [11]. Pharmacological treatment presently [12] does not provide answers as to the first choice of medication in terms of mouth and face pain symptoms. Attempts are being made to treat TMD by changing diet, habits and manual treatment. TMD manual therapy seems to be the best solution due to the most common problem being related to muscles and ligaments [6].

Research has shown that several techniques for the treatment of TMD have been described previously, although little research has been devoted to the treatment of the additional ligaments of the TMJ. Certain relations were also found concerning improvements in the self-esteem in patients treated manually in TMD [10]. The pathogenesis of TMD remains little studied and unclear, but nevertheless seeks the causes of pain symptoms in trauma, muscle contractions, bruxism, chronic dysfunctions of the bite, insufficient vitamin levels, as well as such physiological problems as stress or depression. It is therefore necessary to attempt non-invasive therapy before starting orthodontic or surgical treatment, e. g. manual therapies, acupuncture or properly applied kinesiotherapy exercises [13].

A response to the above is an attempt at assessing the treatment of pain symptoms of the TMJ using manual techniques that thus far have not shown significant side-effects following the application of treatment. The efficacy of treatment of illnesses in children, however, has advantageous yet inconclusive indications, with unwanted events during the application of manual therapy being transient, gentle to moderate [14]. Further research is necessary in terms of manual TMD in order to allow parents, as well as medical professionals, to make more informed choices in terms of the treatment of diseases in children.

Due to the limited side-effects of manual techniques among children [14], more frequent prevalence of myofascial problems in course of TMD and suggestions in terms of methods that indicate an analysis of tension and balancing by osteopathic or orthodontic treatment [15], techniques were used aimed at relaxing the muscles and ligaments [8]. A significant aspect in terms of commencement of therapy is the proper preparation of the cervical spine for the analysis and assessment of TMD. The cervical spine is described by some authors as a component that is inseparably tied to dysfunctions of muscles and fascia, specifically dysfunctions of temporomandibular joints [16]. It has additionally been confirmed that greater dysfunctions of the cervical spine may contribute to a lesser therapeutic effect and dissatisfaction of patients in course of physical therapy treatment of TMD [17].

Statistical analysis of the results presented in the current study shows a statistical improvement following osteopathic treatment of pain symptoms in the area of the temporomandibular joints, and in terms of the frequency of

their emergence in young teens. Further research has also confirmed that manual treatment carried out among patients aged 5–30 years has resulted in a significant improvement in terms of pain symptoms, as well as opening of the mouth [18]. The results obtained by Fariña R. are of limited clinical value because they are based on a small number of only 15 patients involving a long-term treatment process that lasted several years. There is no reliable research proving the efficiency of TMD treatment, especially in children, hence the need for clinical trials in this regard. Recent years have influenced the development of manual techniques, as well as a registered, decidedly lower volume of unwanted effects compared to other interventions [14]. Other recent studies also show improvement after the use of physical intervention, with particular improvement noted in the reduction of pain and improvement of jaw function [19, 20]. Osteopathic therapy aimed at equalising the muscle-ligament balance in children suffering from pain symptoms of the TMJ seems promising, but requires further study in this area [21].

The conducted clinical trial was designed and performed on the basis of long years of practice with children suffering from TMD. From the practical perspective, the techniques used in the treatment of children seem to be most advantageous. Long-term observation of patients with TMD suggest a significant influence of muscles and ligaments on pain symptoms, in particular among children. Patients particularly at this age respond well to treatment, as shown by the present analysis.

Ever more frequent issues of hyperactivity correlated with ever increasing problems with TMD [22], theoretically indicate that there are also problems related to the children's diet, although the most recent research has failed to show such a correlation [23].

## CONCLUSIONS

1. Osteopathic therapy positively influences the reduction of pain in the TMJ in children aged 12–14 years.
2. Osteopathic techniques positively influence the reduction of occurring pain symptoms of the head in TMD.

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