

# Complex Treatment of Internal TMJ Disorders in Patients with Different Bit Types

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## Abstract

**Objective:** To assess the impact of physiological and pathological types of occlusions on the effectiveness of the treatment of patients with internal disorders of the TMJ.

**Material and Methods:** A comprehensive examination and treatment of 139 patients with internal TMJ disorders with subluxation and chronic dislocation of the articular disc was carried out. The patients were divided into three groups. All groups included patients with both physiological and pathological occlusion. The first group included 28 (20.1%) patients who were treated only with occlusal splint therapy; the second group included 95 (68.3%) patients who were treated with a combination of occlusal splint therapy and the use of arthrocentesis; in the third group (16 people (11.5%), along with splint therapy and arthrocentesis, TMJ arthroscopy was performed. The examination included a survey and examination of patients, a study of diagnostic models of the jaws to determine the types of occlusion and occlusal contacts, magnetic resonance imaging (MRI) and ultrasound examination (ultrasound) of the TMJ. Patients underwent a phased treatment, including occlusive splint therapy (stage I); with insufficient effectiveness - occlusive splint therapy and arthrocentesis (stage II); occlusive splint therapy and arthrocentesis in combination with arthroscopy (stage III of treatment).

**Results:** As a result of the study, it turned out that the groups of patients differed significantly in the complexity and duration of the treatment. Thus, in patients with internal TMJ disorders and pathological type of occlusion, in 82.6% of cases, additional use of arthrocentesis was required and in 34.8% - arthroscopy (95 patients out of 139), while patients with physiological types of occlusions (orthognathic, prognathic, biprognathic and direct) needed these treatments in 80.2% and 7.8% of cases, respectively

In the groups of patients, the duration of therapy, as well as the number of arthrocentesis performed in patients at the second and third stages of treatment, significantly differed. In the first group, the duration of treatment was 6.2 months for patients with normal occlusion and 8.7 (p<0.01) months for patients with pathological occlusion; additional methods of treatment (arthrocentesis and arthroscopy) were not used. In the second and third groups of patients, the duration of treatment for patients with occlusion pathology was also longer: in the second group 4.9 and 6.8 (p<0.01) months for patients with physiological and pathological types of occlusions, respectively, in the third group with the use of splint therapy, arthrocentesis and arthroscopy in patients with normal occlusion was 13.1 (p<0.05) months, and in patients with occlusion pathology 14.5 months

**Conclusion:** Patients with internal TMJ disorders need a comprehensive examination for the timely detection of occlusion pathologies. The relationship between internal TMJ disorders and the type of occlusion must always be taken into account in the choice of further treatment tactics and therapy planning in order to achieve the best result.

**Key words:** internal temporomandibular joint disorders; occlusive dysfunction; bite type; occlusive splint therapy; arthrocentesis; arthroscopy

## Introduction

Pathology of the temporomandibular joint (TMJ) is an important problem in dentistry due to its wide prevalence and significant impact on the quality of life of patients [1-3]. In more than 70% of cases, according to recent studies, TMJ diseases are combined with impaired occlusion [4]. Due to this frequency of occurrence of a combination of these pathologies, many authors believe that occlusion disorders can play an important role in the etiopathogenesis of TMJ diseases [5,6]. One of the possible mechanisms was described by Savajani et al. [7].

According to these authors, the occurrence of occlusion disorders leads to compensatory asymmetry of muscle contraction and displacement of the mandibular heads. Because of this, the nerve endings of the joint capsule, posterior zones are subsequently injured, as well as a violation of the blood supply to the tissues, changes in the width of the joint space and the position of the articular disc. In addition, there is evidence that the violation of occlusion significantly complicates the course of TMJ disease [8,9].

On the other hand, the results of studies have been published in which no correlation was found between the incidence of TMJ pathologies and the number of occlusal disorders [10]. Despite the fact that the etiology of internal disorders of the TMJ is multifactorial, ignoring the role of occlusion is incorrect in the treatment of patients with internal disorders of the TMJ [11-14].

Thus, due to the lack of complete clarity on this issue, we conducted a study whose purpose was to assess the impact of physiological and pathological types of occlusions on the effectiveness of the treatment of patients with internal disorders of the TMJ.

## Material and Methods

A comprehensive examination and treatment of 139 patients with internal TMJ disorders with subluxation and chronic dislocation of the articular disc was carried out. The patients were divided into three groups. All groups included patients with both physiological and pathological occlusion. The first group included 28 (20.1%) patients who were treated

only with occlusal splint therapy; the second group included 95 (68.3%) patients who were treated with a combination of occlusal splint therapy and the use of arthrocentesis; in the third group (16 people (11.5%), along with splint therapy and arthrocentesis, TMJ arthroscopy was performed.

The groups of patients were comparable in gender and age. The exclusion criteria were patients who had previously undergone orthodontic and orthognathic treatment.

The examination included a survey and examination of patients, a study of diagnostic models of the jaws to determine the types of occlusion and occlusal contacts, magnetic resonance imaging (MRI) and ultrasound examination of the TMJ. Patients underwent a phased treatment, including occlusive splint therapy (stage I of treatment); with insufficient effectiveness - occlusive splint therapy and arthrocentesis (stage II of treatment); occlusive splint therapy and arthrocentesis in combination with arthroscopy (stage III of treatment).

After treatment with internal TMJ disorders, all patients underwent repeated MRI of the TMJ and ultrasound of the TMJ to assess the state of the joint. All patients with occlusion pathology underwent orthodontic or orthopedic treatment simultaneously with the treatment of internal TMJ disorders or after its completion.

Statistical processing of the obtained results was carried out using the software Statistica 8.0, the criterion for differences in the group was Student's t-test. Differences were considered significant at \* - p<0.05, \*\* - p<0.01.

## Results

As a result of the study, it turned out that the groups of patients differed significantly in the complexity and duration of the treatment. Thus, in patients with internal TMJ disorders and pathological type of occlusion, in 82.6% of cases, additional use of arthrocentesis was required and in 34.8% - arthroscopy (95 patients out of 139), while patients with physiological types of occlusions (orthognathic, progenic, biprogenic and direct) needed these treatments in 80.2% and 7.8% of cases, respectively (table 1).

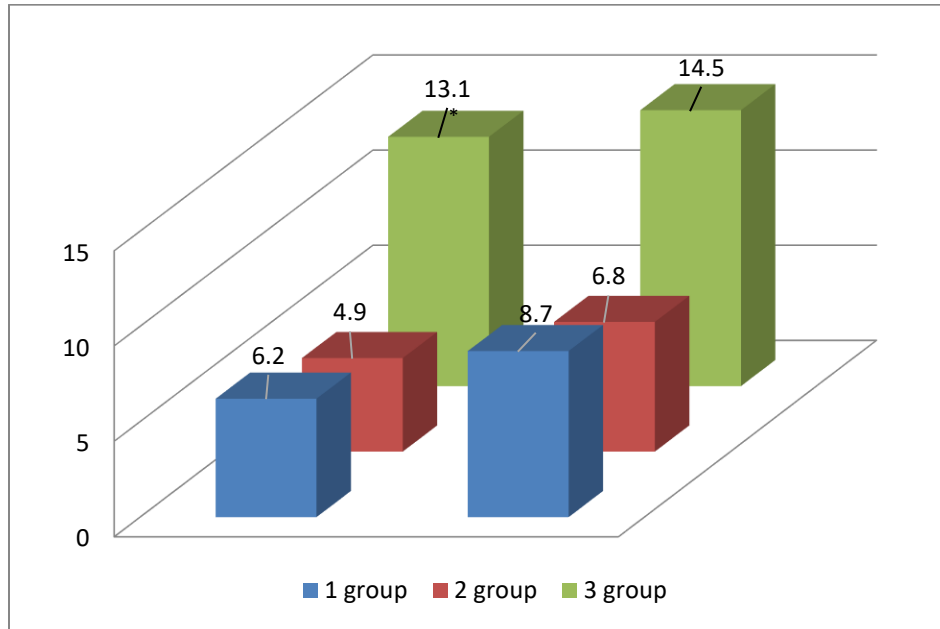
Physiological types of bite	Pathological types of bite				Pathological types of bite		
	I stage of treatment	II stage of treatment	III stage of treatment		I stage of treatment	II stage of treatment	III stage of treatment
Orthognathic	61	53	-	Deep	6	6	2
Progenic	39	28	5	Open	5	4	2
Biprogenic	11	7	-	Distal	3	2	2
Straight	5	5	4	Mesial	7	5	1
				Cross	2	2	1
Number of patients in % who required the use of arthropuncture and arthroscopy	80,2%	7,8%				82,6%	34,8%

**Table 1:** The number of patients with different types of occlusion at the stages of treatment

In the groups of patients, the duration of therapy, as well as the number of arthrocentesis performed in patients at the second and third stages of treatment, significantly differed. In the first group, the duration of treatment was 6.2 months for patients with normal occlusion and 8.7 (p<0.01) months for patients with pathological occlusion; additional

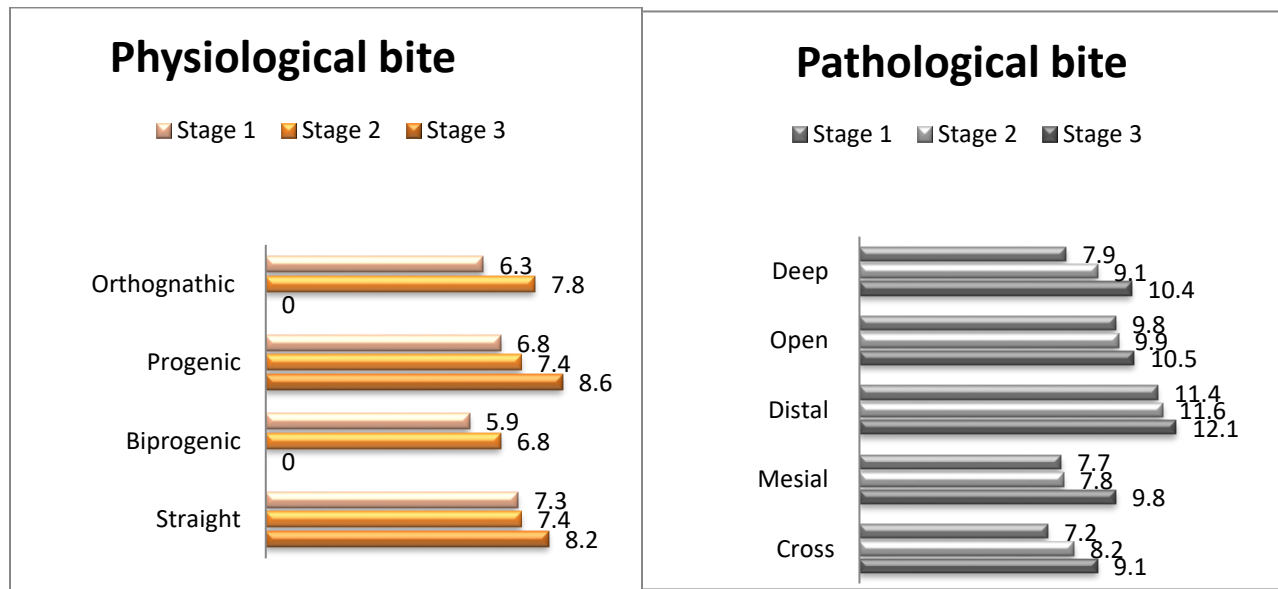
methods of treatment (arthrocentesis and arthroscopy) were not used. In the second and third groups of patients, the duration of treatment for patients with occlusion pathology was also longer: in the second group 4.9 and 6.8 (p<0.01) months for patients with physiological and pathological types of occlusions, respectively, in the third group with the

use of splint therapy, arthrocentesis and arthroscopy in patients with normal occlusion was 13.1 ( $p < 0.05$ ) months, and in patients with occlusion pathology 14.5 months (figure 1).



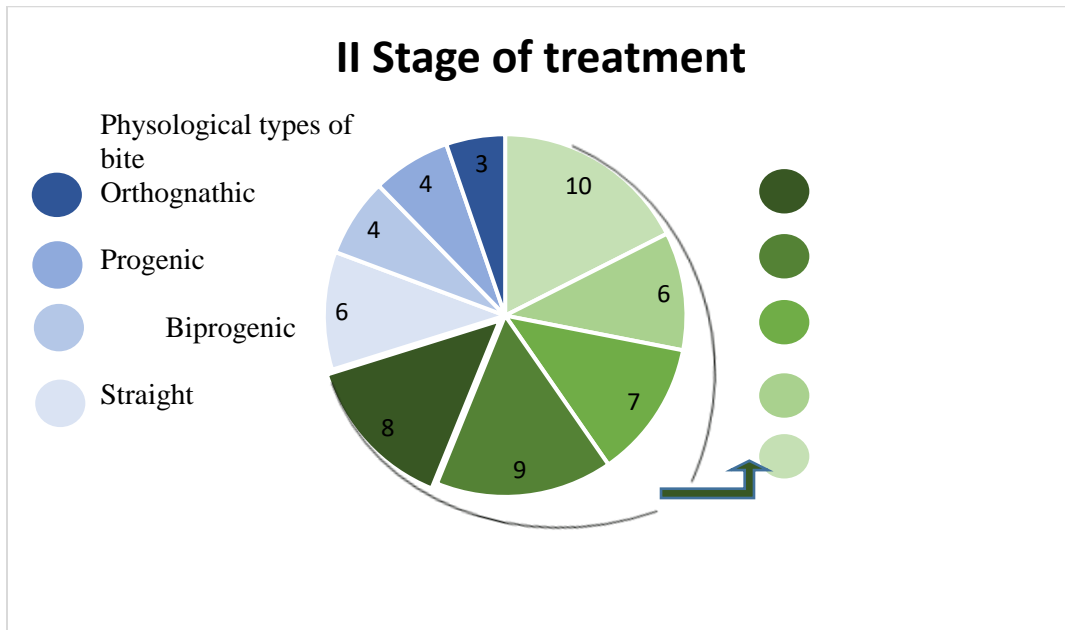
**Figure 1:** Terms of treatment of patients in all three groups with physiological types of bite pathological types of bite (in months)

The terms of treatment also depend on the type of physiological or pathological bite. On (figure 2) shows the treatment time for patients with various types of physiological and pathological occlusion.

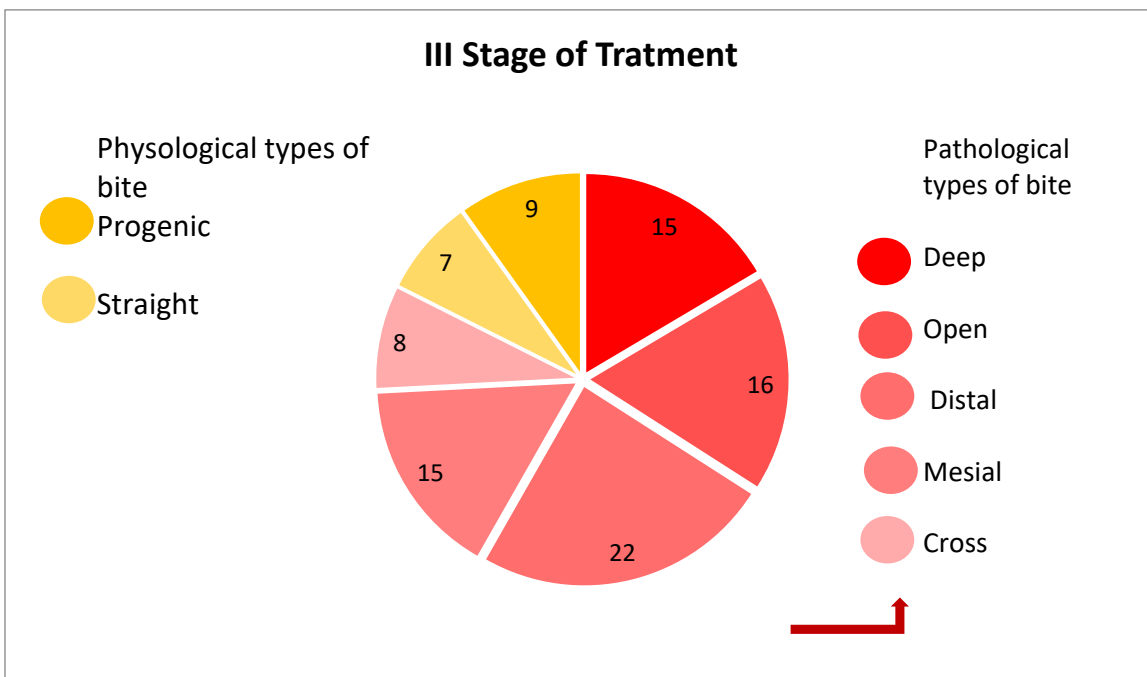


**Figure 2:** Terms of treatment of patients with internal TMJ disorders depending on the type of occlusion.

At the first stage of treatment, only an occlusal splint was used. At the second and third stages of treatment, the number of necessary atrocentesis was required in patients with occlusion pathology significantly more than in patients with physiological occlusion (figures 3 and 4).

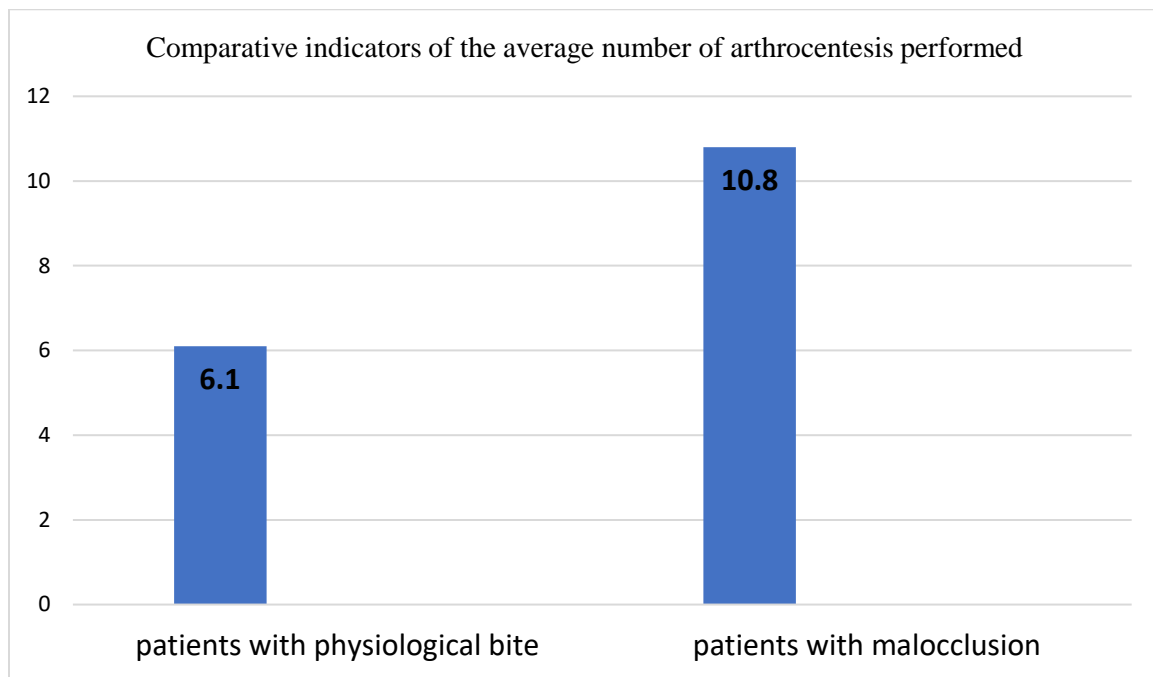


**Figure 3:** Number of arthrocentesis II stages of treatment in patients with different types of occlusions.



**Figure 4:** Number of arthrocentesis III stages of treatment in patients with different types of occlusions

On (figure 5) shows the average number of required arthropunctures in patients with normal and pathological occlusion. In patients with pathological occlusion, an average of 14.95 more arthrocentesis was required to normalize the position of the articular disc.



**Figure 5:** The average number of arthrocentesis performed in patients with physiological and pathological types of bite

## Discussion

Internal disorders of the temporomandibular joint (TMJ) in most cases are combined with the presence of occlusion disorders in patients, TMJ diseases, or only occlusive disorders [15,16]. However, it is known that the violation of occlusion can significantly complicate the course of TMJ disease, and incorrect treatment tactics lead to instability of the formed occlusion and relapse of the disease [17,18]. Since the diagnosis and treatment of TMJ remains a challenge, there is still no consensus on many aspects. An important part of the diagnosis of TMJ is the differential diagnosis from those clinically significant but unusual conditions that require urgent treatment. Depending on the type of TMJ, a variety of conservative treatment options and surgical interventions are offered. It has been shown that the use of an occlusal splint reduces the intensity of pain and has a positive effect [19].

In the case of an internal disorder, restoring the position of the disc is not the main goal of treatment, since it may not lead to clinical improvement [20,21]. Nevertheless, the available literature does not show how strongly occlusive disorders influence the complexity of treatment of TMJ pathology and its duration. The effectiveness of arthroscopy in the management of internal derangement of the temporomandibular has been reported in many studies [22,23].

Arthrocentesis has been proposed which involves two puncture needles into the superior joint space guided by landmarks in relations to adjacent structures, followed by lavage with an irrigation solution [24-27].

At the moment, based on the data available in the scientific literature, it is impossible to unambiguously conclude which of the pathologies is primary and which is secondary, however, most authors support the idea that the pathological types of occlusions existing in the patient to greater or lesser extent affect the occurrence of internal TMJ disorders. Many cases of TMD are due to multiple etiologies, which requires a multimodal approach, and it is also necessary to evaluate the clinical improvement of the proposed methods.

In this work, we assessed several parameters: the total duration of treatment, the number of arthrocentesis and arthroscopy operations performed in patients with TMJ with pathological occlusion and in

patients with physiological occlusion. It was revealed that patients with pathological occlusion require more complex and often longer therapy than patients with physiological occlusion. This must be taken into account when determining the treatment tactics and planning therapy to achieve the best result.

The type of occlusion is an important aspect in the treatment of internal TMJ disorders. The results of this study clearly demonstrate that pathological types of occlusions significantly increase the duration of treatment for patients with internal TMJ disorders and often require the use of arthrocentesis and arthroscopy along with occlusal splint therapy.

## Conclusion

Patients with internal TMJ disorders need a comprehensive examination for the timely detection of occlusion pathologies. The relationship between internal TMJ disorders and the type of occlusion must always be taken into account in the choice of further treatment tactics and therapy planning in order to achieve the best result.

## Conflict of interest and financial disclosure

The author declares that he has no conflict of interest and there was no external source of funding for the present study. None of the authors have any relevant financial relationship(s) with a commercial interest.

## Funding

The work was not funded.

## Ethical approval

The study was reviewed and approved by the local Ethics (protocol N16, 5.10.17) and in accordance with those of the World Medical Association and the Helsinki Declaration.

## Consent Statement

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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