

THE TEMPOROMANDIBULAR OPENING INDEX IN PATIENTS WITH TEMPOROMANDIBULAR DISORDERS UNDERGOING SURGICAL EXTRACTION OF MANDIBULAR THIRD MOLARS : A PILOT STUDY

ALT ÜÇÜNCÜ BÜYÜK AZI DIŞLERİNİN CERRAHİ ÇEKİMİ GEREKEN TEMPOROMANDİBULAR RAHATSIZLIĞI OLAN OLGULARDA TEMPOROMANDİBULAR AÇILMA İNDEKSİ: ÖN ÇALIŞMA

Ayşen NEKORA AZAK*, Gülümser EVLİOĞLU*, Melike ORDULU**, Tamer L. ERDEM***

ABSTRACT

Objective: The aim of this study was to examine the effect of surgical extraction of impacted mandibular on the Temporomandibular Opening Index (TOI) in patients with temporomandibular disorders (TMD).

Materials and methods: Ten patients (2 males, 8 females; age range 21 to 33 years) with TMD undergoing surgical extraction of the impacted third molars were recruited in this study. Before the surgical operation and three months after the surgical operation the clinical stomatognathic examinations were carried out by the same dentist, specialized in the stomatognathic physiology, who also determined TOI (in percents) according to the following formula:

$$TOI = \frac{\text{Passive opening (mm)} - \text{Maximum voluntary opening (mm)}}{\text{Passive opening (mm)} + \text{Maximum voluntary opening (mm)}} \times 100$$

Results: Three months after surgery, a marked improvement in signs and symptoms of TMD, as well as a statistically significant ($p < 0.01$) decrease in TOI was observed.

Conclusion: The TOI seemed to be a good assessment criterion of limitation in mandibular mobility.

Key words: Temporomandibular disorders, temporomandibular opening index, impacted mandibular third molar

ÖZET

Amaç: Bu çalışmanın amacı alt üçüncü büyük azı dişlerinin cerrahi çekiminin temporomandibular rahatsızlığı olan olgularda temporomandibular açılma indeksine etkisini araştırmaktır.

Gereç ve Yöntem: Alt üçüncü büyük azı dişlerinin cerrahi çekimi gereken temporomandibular rahatsızlığı olan 10 hasta (2 erkek, 8 kadın; 21 ile 33 yaşları arasında) bu çalışmaya alınmıştır. Cerrahi çekimden önce ve cerrahi çekimden 3 ay sonra bu hastaların stomatolojik muayeneleri ve temporomandibular açılma indeksleri aynı hekim tarafından yapılmıştır.

Temporomandibular açılma indeksi şu formülle tayin edilmiştir:

$$TOI = \frac{\text{Pasiv açıklık (mm)} - \text{Maksimum istekli açıklık (mm)}}{\text{Pasiv açıklık (mm)} + \text{Maksimum istekli açıklık (mm)}} \times 100$$

Bulgular: Cerrahi çekimden 3 ay sonra temporomandibular rahatsızlığın semptomlarında ve temporomandibular açıklık indeksinde anlamlı bir azalma görülmüştür.

Sonuç: Temporomandibular açılma indeksi mandibular hareketlerinin sınırlı olduğu durumlarda iyi bir değerlendirme kriteri olarak kullanılabilir.

Anahtar kelimeler: Temporomandibular rahatsızlıklar, temporomandibular açılma indeksi, gömük mandibular üçüncü molar

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* Istanbul University, Istanbul Faculty of Dentistry, Department of Maxillofacial Prosthodontics, Çapa, Istanbul (Correspondence to: aysenazak@bluewin.ch)

** Istanbul University, Istanbul Faculty of Dentistry, Department of Maxillofacial Surgery, Çapa, Istanbul

*** Istanbul University, Istanbul Faculty of Dentistry, Department of Oral Diagnosis and Radiology, Çapa, Istanbul

INTRODUCTION

Temporomandibular disorders (TMD) is a collective term that includes numerous clinical conditions of various aetiology, involving temporomandibular joints, masticatory muscles, and/or associated structures (3). It has been suggested empirically that impacted mandibular third molars can provoke or intensify signs and symptoms of TMD. The benefit of a prophylactic extraction of the asymptomatic impacted third molars in patients with TMD is controversial (5), though the risks of complications of surgical extraction of these molars increase with age (11).

Limitation of mandibular movement is one of the leading symptoms of TMD (6). The reliability of the measurements of maximum voluntary and/or passive mouth opening is influenced by factors such as age, gender (12), and ramus length (2). The Temporomandibular Opening Index (TOI), was developed in an attempt to reduce the effect of these variables (7). It has also been found to be useful to categorize myogenous group of patients, low TOI indicating the strong muscle sub-group and higher TOI the weak muscle sub-group (8).

The aim of this study was to examine the effect of surgical extraction of impacted mandibular on the Temporomandibular Opening Index (TOI) in patients with TMD.

MATERIALS and METHODS

Ten patients (2 males, 8 females; age range 21 to 33 years) with TMD undergoing surgical extraction of the impacted third molars were included in this open, non-comparative study. Before the surgical operation and three months after the surgical operation, the clinical stomatognathic examinations were carried out by the same dentist, specialized in the stomatognathic physiology, who also determined TOI (in percents) according to the following formula:

$$TOI = \frac{\text{Passive opening (mm)} - \text{Maximum voluntary opening (mm)}}{\text{Passive opening (mm)} + \text{Maximum voluntary opening (mm)}} \times 100$$

Passive mouth opening, determined as described by Hansson et al. (4), and maximum voluntary mouth opening were measured in millimetres with a Boley gauge. At both examinations, headache, neck pain, muscle and/or temporomandibular joint pain, and joint sounds were assessed using a 4-point rating scale (0 = none, 1 = slight, 2 = moderate, 3 = severe). Recorded was the total score of these signs and symptoms.

Altogether, 20 operative extractions of mandibular third molars were performed by the same oral surgeon. All patients were otherwise healthy persons, receiving no regular medication. Anti-inflammatory-analgesic medication was administered before the effect of anaesthesia was worn off and thereafter depending on the intensity of pain. All patients received chlorhexidine 0.2% for the mouth rinsing twice daily during the first preoperative week .

Statistical analysis was performed using the paired t-test.

RESULTS

The mean TOI was 3.78% (± 1.40%) before the surgical operation, and 2.40% (± 0.77 %) three months after the surgical operation. The mean cumulative score of signs and symptoms decreased from 11.9 (± 2.84) to 3.5 (± 3.30). The decrease in both the TOI and the cumulative score of signs and symptoms were statistically significant (p<0.01, and p<0.001, respectively). In 7 of 10 patients, the TOI decreased by 30% or more, in 2 of these 7 by 50 % or more. At the last examination, 4 of 10 patients were symptom-free (Table 1).

DISCUSSION

In this study, it was found that the TOI may have a greater diagnostic value than linear mouth opening for the patients with TMD undergoing surgical extraction of impacted mandibular third molars.

However, many patients with TMD and impacted third molars, who are experiencing moderate to severe pain, are unable to localize their pain. In the present study, a marked impro-

Table 1. Symptom severity scores (SSS) and Temporomandibular Opening Index (TOI) in patients with temporomandibular disorders before and three months after surgical intervention

Number	Age	Sex	SSS		TOI	
			Before	3 months after	Before	3months after
1	25	Female	15	8	2.70	1.26
2	21	Female	12	8	5.49	2.91
3	28	Female	12	5	1.81	1.75
4	33	Female	18	4	3.70	3.29
5	26	Female	10	0	4.08	1.88
6	29	Male	12	6	2.63	2.50
7	23	Female	10	0	5.61	3.09
8	27	Male	10	0	3.03	1.92
9	31	Female	8	4	5.76	3.57
10	25	Female	12	0	3.03	1.92

vement in signs and symptoms of TMD, as compared with the patients' baseline ratings, and a statistically significant ($p<0.01$) decrease in TOI were observed three months after the operation. The decrease in TOI was in the order of magnitude of one SD before the treatment, while the SD at the last examination was far smaller than the SD of the cumulative score of signs and symptoms. The range of both the maximum voluntary mouth opening, and the passive mouth opening increased, while the difference between these two measures decreased, in consequence of the relief of pain, and the subsided inflammatory swelling. At the last examination, four of 10 patients were symptom-free.

The TOI index was developed in an attempt to reduce the inter-individual variability in the measurements of maximum voluntary and/or passive mouth opening, due to patients' demographic and anatomic characteristics. The formula used accentuates also the importance of the difference between the maximum passive and the maximum voluntary mouth opening. The idea is simple, but efficient. Miller et al (9). showed that the TOI is a useful index, both for categorizing patients and independent of age, gender, ramus length, and gonial angle unlike the commonly used linear mouth opening with its dependence on these factors. In addition to this, it is simple and less costly than other proposed alternatives to linear mouth opening measurements, such as cephalometrics (10,13), angle of mouth measurements (2), and instruments such as the mandibular excursiometer (1). In the study under discussion, the TOI seem to have proved to be a great assessment criterion of limitation in mandibular mobility. It can be recommended for following treatment outcome both in the individual patients and in the therapeutic studies.

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