

# The effect of temporomandibular disorders on condition-specific quality of life in patients with dentofacial deformities

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**Objective.** This study investigated the effect of temporomandibular disorders on quality of life (QOL) of patients with dentofacial deformities.

**Study Design.** A case-control study was performed involving 3 age- and gender-matched groups: 38 preoperative participants, 38 postoperative participants, and 39 control participants. Temporomandibular joints were assessed using the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD axis I), and QOL was assessed using the Orthognathic Quality of Life Questionnaire (OQLQ) and the Short-Form Health Survey (SF-36).

**Results.** Significantly lower OQLQ scores were found in postoperative patients with one or more RDC/TMD findings; the domains in which these occurred were mental health, dentofacial esthetics, and awareness of dentofacial esthetics for patients with myofascial pain; social aspects and awareness of dentofacial esthetics for patients with disk displacement with reduction; and all domains for patients with arthritis (all  $P < .05$ ).

**Conclusions.** Despite the variable effect of orthognathic treatment on TMDs, the presence of TMDs in patients after treatment can have a negative effect on their QOL. (Oral Surg Oral Med Oral Pathol Oral Radiol 2014;117:293-301)

Temporomandibular disorders (TMDs) can be associated with a variety of symptoms and signs related to the temporomandibular joint (TMJ) and its related structures,<sup>1</sup> which include pain in the TMJ region, pain and tenderness in the masticatory muscles and TMJ upon palpation, joint sounds, and limitations or disturbances in the mandibular movement. The most common subtypes of TMDs are myofascial pain, disk displacement with reduction, and arthralgia.<sup>2,3</sup> TMDs are believed to be multifactorial, and potential etiologic factors include trauma and pathophysiologic factors.<sup>4,5</sup> Psychosocial function such as life stress, depression, and the presence of multiple symptoms have also been found to be risk factors for TMD pain.<sup>6-8</sup> Moreover, TMDs were found to have a substantial effect on the oral health-related quality of life (QOL), with a more pronounced effect of pain in patients with TMDs.<sup>9,10</sup>

Severe mandibular retrognathism and a hyperdivergent skeletal pattern have been suggested to be risk factors for developing TMDs.<sup>11-13</sup> In addition, a significantly higher prevalence of TMD signs and symptoms has been found in persons with certain malocclusions (including Angle's Class II, anterior open bite, deep bite, posterior cross bite, and extreme maxillary overjet).<sup>14</sup> However, the importance of the occlusion and its role as a factor that can contribute to TMDs is still debatable.<sup>15,16</sup>

Orthognathic surgery has been found to have a positive effect on the QOL of patients with dentofacial deformities<sup>17,18</sup>; however, the presence of temporomandibular dysfunction symptoms in these patients can be correlated with lower patient satisfaction after treatment.<sup>19,20</sup> Interestingly, the effect of TMDs on the QOL of patients with dentofacial deformities has not been investigated.

In this case-control study, we aimed to investigate whether TMDs diagnosed according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD axis I) in patients with dentofacial deformities would affect their condition-specific QOL before and after orthognathic treatment compared with normal individuals.

## METHODS

The study included 116 Jordanian patients from the Department of Oral and Maxillofacial Surgery, Jordan University Hospital, Amman, Jordan. The patient assessment procedure involved a comprehensive clinical examination by a maxillofacial surgeon and an orthodontist, study models, radiographic examination

## Statement of Clinical Relevance

Orthognathic surgery positively affects quality of life of patients with dentofacial deformities; however, despite its variable effect on temporomandibular disorders, our findings suggest that the presence of these disorders after orthognathic treatment can negatively affect patients' condition-specific quality of life levels.

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(panoramic radiograph and lateral cephalogram), and an explanation of what orthognathic surgery involved. The study involved 3 experimental groups (Table I). Group 1, the postoperative group, comprised patients who had orthognathic intervention during the years 2008 to 2011, with an average follow-up period of 21 months after completion of treatment and a minimum follow-up period of 6 months. Group 2, the preoperative group, comprised patients who were referred by orthodontists for orthognathic surgery from October 2010 to October 2012. Group 3, the control group, was formed by patients attending outpatient dental clinics of Jordan University Hospital (during the same period as group 1) for routine oral health care, with no congenital deformities, physical disabilities, or previous jaw surgery, and with good maxillomandibular relations and normal occlusion. However, the presence of TMDs or TMD signs and symptoms in this group of patients was not considered as an excluding factor, so that an assessment of the relationship between TMDs and the oral health-related QOL could be performed in this sample of the healthy population.

In the preoperative group, 14 patients were followed up 1 year postoperatively to assess changes in the TMD status and its effect on their oral health-related QOL.

All participants in the first 2 groups were diagnosed to have moderate to severe malocclusion or dentofacial deformities. Exclusion criteria were as follows: Those with facial deformities due to trauma or clefts, congenital malformation, craniofacial syndromes, systemic arthritis, or muscular disease were not included in the study.

Participants in the treatment group underwent pre- and postoperative orthodontic treatment with fixed orthodontic appliances in both arches. Three specialists carried out the orthodontic treatment; orthognathic surgery was undertaken by one oral maxillofacial surgeon (Dr Al-Ahmad). Participants from all groups were categorized as American Society of Anesthesiologists (ASA) class 1 (healthy patient) or ASA class 2 (patient with mild systemic disease).<sup>21</sup> They were all asked to participate in the study and provided a written consent before the investigation. The study was approved by the Clinical Research Ethics Committee of the University of Jordan (Amman, Jordan) and followed the guidelines of the Helsinki II Declaration.

### Questionnaire and clinical examination

All individuals in the patient and control groups were assessed for signs and symptoms of TMDs. They underwent a clinical TMD examination and evaluation of the occlusion and completed a questionnaire according to the RDC/TMD, axis I.<sup>22</sup> The RDC/TMD are based on a series of protocolized clinical procedures and on

**Table I.** Characteristics of the 3 experimental groups

Variable	Preoperative group n = 38		Postoperative group n = 39		Control group n = 39	
	n	(%)	n	(%)	n	(%)
Gender						
Male	14	(36.8%)	12	(30.8%)	21	(53.8%)
Female	24	(63.2%)	17	(69.2%)	18	(46.2%)
Age (y), range [mean]	15-30 [21]		17-47 [23.8]		17-34 [23]	
Diagnosis						
Mandibular prognathism	24	(57.9%)	24	(61.5%)		
Mandibular retrognathism	4	(10.5%)	6	(15.4%)		
Anterior open bite	3	(7.9%)	1	(2.6%)		
Laterognathism	1	(2.6%)	2	(5.1%)		
Vertical maxillary excess	8	(21.1%)	6	(15.4%)		

strict diagnostic criteria applied to the most common types of TMD. Two diagnostic axes are contemplated: axis I establishes a diagnosis based on clinical variables, whereas axis II establishes a diagnosis based on psychological variables.

Participants in the postoperative group had their evaluation after completion of surgery during the years 2008 to 2011, with an average follow-up period of 21 months after completion of treatment and a minimum follow-up period of 6 months; participants in the control group had their evaluation during the same period.

Evaluation of patients in the preoperative group was completed after their referral for surgery by orthodontists from October 2010 to October 2012; 14 patients from this group were followed up at 1 year after their orthognathic intervention.

The clinical examinations were conducted at the Department of Oral and Maxillofacial Surgery, Jordan University Hospital, by 1 of 2 residents. The examination included measurement of maximum mandibular opening capacity, occlusal evaluation, registration of TMJ sounds (clicking and crepitation), and tenderness in the TMJs and related muscles. To improve the reliability of clinical registrations, calibration of the examination techniques of the 2 examiners was completed.<sup>18</sup> Thus, before the study, 8 persons not included in the study were examined, and the examiners were not informed which group their patients belonged to.<sup>23,24</sup>

Subdiagnoses for TMDs followed the RDC/TMD (see Table I).<sup>2,3,22,23</sup> The diagnoses were divided into 3 groups, as follows:

1. Muscle disorders: (a) myofascial pain, (b) myofascial pain with limited opening
2. Disk displacements: (a) disk displacement with reduction; (b) disk displacement without reduction,

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