Is there an association between patients' symptoms in the masticatory system and orthognathic quality of life?

Short title: Effect of symptoms on quality of life

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Abstract

Objective The aim of this study was to investigate the impact of orthognathic patients' self-reported symptoms in the head and neck region on their orthognathic quality of life (OQOL) and satisfaction with occlusal function. **Material and methods** Participants included consecutive patients (n=50) referred to assessment of orthognathic treatment need and voluntary first-year university students (n=29). All participants filled in the Orthognathic Quality of Life Questionnaire (OQLQ) and a structured diary created by the authors. The mean values of OQOL sum score, satisfaction and number of awakenings were compared between patients and controls. Further, correlations between the mean values of the OQOL sum and subscores, satisfaction with occlusal function, and number of awakenings were analyzed. **Results** Patients reported more symptoms and woke up significantly more often than controls (p=0.029). Their OQOL sum scores were significantly higher (indicating a lower OQOL) (p=0.001), and they were significantly less satisfied with their occlusal function than controls (p=0.001). Those reporting symptoms had a statistically significant association between the number of awakenings and satisfaction with occlusal function (p=0.003 and p<0.001, respectively). Among the awakened and not-rested patients, the most commonly reported symptoms were pain in the head and/or neck region and fatigue and/or stiffness in the jaws. **Conclusions** Experiences of pain and discomfort have a significant impact on patients' OQOL, satisfaction with occlusal function, and their well-being.

Key words: Dentofacial deformity, orthognathic treatment, orthognathic quality of life

Introduction

In previous studies, 28–70% of patients with severe dentofacial deformities have pretreatment-reported symptoms in the head and neck region. These symptoms have included, e.g., pain, joint sounds and limitation in mouth opening [1-4]. It has also been found that temporomandibular dysfunction occurs more commonly in patients with dentofacial deformities than in their matched controls [5]; this finding could be related to the observation that a majority of orthognathic patients with pre- and postnormal occlusion use a unilateral chewing pattern [6,7]. However, self-reported symptoms are not directly associated with the severity of malocclusion [3].

In adults, severe dentofacial deformities often require combined orthodontic and surgical treatment [8]. In addition to social and appearance-related factors [9,10], these patients seek treatment for improvements in concrete functional problems, e.g., in eating and chewing and for pain relief [9,11]. In the literature, dentofacial deformities have also been suggested to cause severe consequences to patients' lives due to their impact on quality of life (QoL) [12-14]. Recent findings by Silvola et al. [15] have indeed indicated that QoL improves after treatment of severe malocclusion. The authors concluded that this improvement was due to the decrease in facial pain.

The aim of this prospective study was to investigate the impact of orthognathic patients' self-reported symptoms on their orthognathic quality of life (OQOL) and satisfaction with occlusal function.

Subjects and Methods

Study subjects comprised consecutive patients (n=50, 13 males, 37 females, age range 18–61 years) referred to two university clinics for assessment of orthognathic treatment need. Patients with cleft lip or palate, or syndromes affecting craniofacial anatomy, and those whose Finnish language skills did not allow them to complete the questionnaires were excluded from the study The control group consisted of first-year university students (n=29, 28 females, 1 male, age range 19–49 years), who participated in a dental examination at the Turku and Rauma unit of the Finnish Student Health Service.

All participants filled in the Orthognathic Quality of Life Questionnaire (OQLQ) consisting of 22 items [16]. These items form four subscales: occlusal function, facial aesthetics, awareness of facial aesthetics, and social aspects of dentofacial deformity. Higher scores indicate lower OQOL. The questionnaire was completed with a semi-structured diary filled in after waking up or at 8 a.m. [17].

Question 1 in the diary focuses on the respondent's satisfaction with occlusal function (scale 1–7, from extremely unsatisfied to extremely satisfied). If the patient selects alternatives 1–3 (indicating dissatisfaction), Question 2 further elucidates the reasons for dissatisfaction (response

alternatives: [A] I have pain in my head and/or neck region; [B] I have pain in the area of my jaw joint; [C] I hear sounds like clicking or crepitation from my jaw joint; [D] My jaws feel tired or stiff; [E] I have difficulties opening my mouth; [F] I suffer from teeth clenching and/ or grinding; [G] I have difficulties chewing; [H] Some other problem, please explain) [3].

In Question 3, the respondent is asked whether he/she had a good night's sleep, and in Question 4, whether he/she feels himself/herself rested in the morning.

The study protocol was approved by the Ethics Review Committee of the Hospital District of South-West Finland and the Joint Municipal Authority of the Pirkanmaa Hospital District. Before the study, all participants signed an informed consent form.

Statistical Analyses

Comparison of symptoms between patients and controls was done using the Chi square test. Differences between patients and controls according to the number of awakenings per night, the mean values of OQOL sum and subscores, and satisfaction with occlusal function were evaluated using the independent samples Mann-Whitney U test. It was also applied in comparisons between those with and without reported symptoms (number of awakenings, the mean value of OQOL sum score and satisfaction with occlusal function); between those awakening and not awakening; and between those feeling rested and not-rested (the mean values of OQOL sum and subscores, and satisfaction with occlusal function). P-values of less than

0.05 were interpreted as statistically significant. Associations between satisfaction with occlusal function, number of awakenings per night, and OQOL sum and subscores were evaluated using Spearman's correlation coefficients, separately among patients and controls. Values r of less than 0.3 were interpreted as weak, 0.3–0.5 as moderate, and r over 0.5 as strong correlations between the variables. All analyses were conducted using SPSS 23.0 (IBM SPSS Statistics, V22.0, Armonk, NY).

Results

Patients' orthognathic quality of life was lower than that of controls; the difference was statistically significant in all other subscales except in social aspects of dentofacial deformity. Patients woke up more frequently and were less satisfied with their occlusal function than controls (Table 1).

Of patients, 48% and of controls, 24% reported various symptoms ($p=0.020$). Those with symptoms reported more awakenings, had lower OQOL, and were less satisfied with occlusal function than those without symptoms (Table 2).

A total of 48 participants (64% of all patients and 55% of all controls) reported awakening during the night. Those who reported awakenings tended to report statistically significantly lower OQOL function subscore than those who did not report awakenings. Among the awakened, satisfaction with occlusal function was statistically poorer than that of the not-awakened (Table 3).

Thirty-eight respondents (48% of both patients and controls) reported that they did not feel rested in the morning. Those who reported feeling rested did not wake up as many times per night as those who felt not-rested in the morning. Rested participants were more satisfied with occlusal function and had lower OQOL function subscores than the not-rested subjects (Table 4).

The most frequently reported symptoms among the ‘awakened and not-awakened’ and ‘rested and not-rested’ were pain in the head and/or neck region, jaws feeling tired or stiff, difficulties chewing, and pain in the area of the jaw joint (Table 5).

Among patients, there were strong correlations between satisfaction with occlusal function and OQOL sum, OQOL function and OQOL facial aesthetics subscores (Table 6).

Among controls, the correlation between OQOL function subscore and number of awakenings was strong (Table 7).

Discussion

In this study, prospective orthognathic patients with dentofacial deformities reported more symptoms from the head and neck region than controls, were less satisfied with their occlusal function, and had a significantly poorer orthognathic quality of life than controls. These results confirm earlier findings that orthognathic patients have a lower QoL than asymptomatic controls with a normal occlusion [13,14,18]. According to several studies, this inferiority can be improved through orthognathic

treatment, possibly by reducing signs and symptoms of temporomandibular disorders [14,15,17-20].

The current results indicate that patients woke up much more frequently than controls and did not feel as rested in the morning as controls. Similar symptoms have been reported in patients diagnosed with obstructive sleep apnea syndrome (OSAS) and mandibular retrognathia [21]. Since orthognathic surgery has been recommended as one of the treatment options for OSAS, it is more than likely that some of the patients in the current study had been referred for assessment of orthognathic treatment need because of OSAS. However, it is worth noting that more than half of controls also reported awakening during the night. Interestingly, their share was eightfold in comparison with the results of a national survey among university students [22]. In this survey, only 5% of males and 7% of females reported nocturnal wake-ups and difficulties falling asleep.

Although, among both patients and controls, awakenings were significantly associated with pain and other self-reported symptoms, it is obvious that there were also other reasons. For example, results by Exelmans and Van der Bulck [23] indicated that 38–52% of adults receive text messages or phone calls in the night-time. Recent results by Levenson et al. [24] also revealed that frequent and long-lasting use of social media is strongly associated with increase in sleep disturbances. In their study, the researchers used the PROMIS® Sleep Disturbance assessment consisting of 27 statements, e.g., ‘I had a problem with my sleep’; ‘I had difficulty falling asleep’ and ‘I had trouble staying asleep’ [25].

The OQLQ is a valid, condition-specific questionnaire that has been used widely in analyses of orthognathic patients' QoL [26]. It can also be assumed that data considering various symptoms were reliable, because the diary was filled in immediately after awakening in the morning. However, as in other studies [27,28], the majority of respondents were females, which limits the generalizability of the results. Further studies are needed to elucidate the situation in larger samples that include both genders.

To conclude: In light of current results, experiences of pain and discomfort have a significant impact on patients' OQOL, satisfaction with occlusal function and well-being.

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