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Signs of Dental Compression Syndrome in Patients with Temporomandibular Disorders

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Abstract: ***Aims & Objectives:*** *The aim of this study was to investigate the clinical manifestations of Dental Compression Syndrome (DCS) in patients with temporomandibular disorders (TMD). We especially concentrated on the common signs of DCS observed in teeth, and investigated the relationship between DCS and temporomandibular disorders.* ***Materials & Methods:*** *The study involved 30 patients with TMD ranging from 38 to 59 years of age (averaging 45.6 years) and control group from 30* **healthy subjects without signs** *or* **symptoms** *of TMD and oral parafunctional habits. Were investigated five symptoms of the Dental Compression Syndrome – tooth wear, abfraction (noncarious lesions – NCLs), micro-fractures, bone exostoses (tori) and periodontal lesions.* ***Results:*** *Data analysis showed that there was a statistically significant difference ($p<0.05$) in the frequency of signs of Dental Compression Syndrome in the two groups. Conclusions: The signs of the Dental Compression Syndrome may be useful in diagnostic process for temporomandibular disorders.*

Keywords: Temporomandibular disorders, Dental Compression Syndrome, Tooth wear, Abfraction, Bone exostoses

1. Introduction

Temporomandibular disorders (TMD) is a term denoting various a group of different clinical conditions affecting the muscles of mastication, temporomandibular joints (TMJ) and the related structures or both (23).

The impact of occlusion, as an etiology factor for temporomandibular disorders (TMD) has been a widely discussed issue for many years and it is still a source of controversies. Occlusion, as an etiologic factor for TMD consists of increased occlusion pressure hence leading to increased pressure on the periodontium, muscles and the temporomandibular joints.

In 1984, Lee and Eakle [16, 17] describe lateral forces resulting from occlusive disturbances as the reason for disrupting hard dental structures. Their illustrations are perhaps the first and the best representation of the effect of tensile pressure.

In 1991, Grippo [8, 9] introduces the term abfraction in order to describe the pathologic loss of enamel and dentin caused by biochemical pressure forces. According to him, these forces can be satic as the ones in swallowing and clenching, or dynamic – generated during mastication or bruxism.

Numerous authors [1, 2, 20, 24, 26, 27, 28] support the theory that irregularly directed mechanic forces can generate local, concentrated stress in the distant regions of the teeth (most often in the cervical region) and initiate disruption of hydroxipatite crystals there.

A number of research [12, 13, 14, 8] assert that such a loss of email and dentine is due to bending and chemichal fatigue as a result of increased and unfavourably directed occlusal forces. These forces are acknowledged factor in the development of noncarious cervical lesions.

Some scientific publications review the static and dynamic contact of teeth during functioning. Other authors review inter-teeth relations during non-functional activities and call the 'parafunctional activities'. For years, various terms were used to denote the increase of functional and nonfunctional stress on the masticating system, some of them being 'bruxism' derived from the Greek word „βρυγμός", which means excessive grinding of teeth, 'bruxomania' [18], 'traumatogenetic occlusion' [3], 'parafunctions' [6, 7].

A significant part of these publications consider compression and grinding of teeth (which only stand for part of the non-functional forces) as a direct etiologic factor for TMD. In 1993, McCoy [20] considers the problem from another angle by uniting functional and non-functional dental stress and introduces the term 'dental compression syndrome'. According to some authors, in DCS there are deformities in the hard dental formations denoted by „noncarious cervical lesions", changes in the periodontium such as vertical bone loss, jaw bones as exostosis, in the masticating muscles and TMJ.

The purpose of this study is to establish the frequency of the manifestations described by McCoy [20] of dental compressive syndrome affecting hard dental tissues and perodontium in patients with TMD as compared to the frequency in healthy patients.

2. Materials and Methods

In order to establish the symptoms of dental compression syndrome, 60 patients were studied hwere 30 were diagnosed with TMD of miogenic or arthrogenic etiology and 30 healthy patients with no symptoms of TMD and no parafunctions. An intraoral examination was held to include study of the condition of hard dental tissues (HDT) and periodontium to establish the following symptoms of DCS:

a. Pathological wear (attrition dentis) of HDT (Figure 1). The numner and localization of worn out teeth were analysed.

Figure 1: Pathological wear

b. Noncarious cervical lesions (NCLs), (Figure 2). The number and localisation of all along the cervical dental surface were analised as per the McCoy criteria [20].

Figure 2: Noncarious cervical lesions – McCoy

c. Vertical periodontal bone defects – The number and localisation of vertical bone pockets was established via periodontal probe and section X-rays (Fig. 3).

Figure 3: Vertical periodontal bone loss

d. Microfractures (Figure. 4 b) – Considered were only the number and localisations of all visible microfractures. The results so not include trauma fractures.
e. Bone exostoses – number and localosation (Figure 4 a)

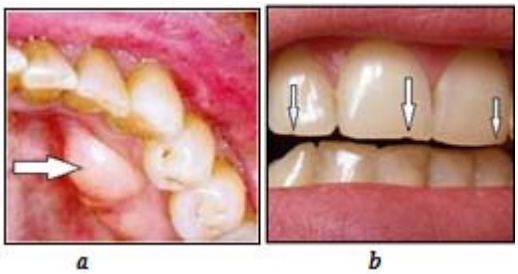

Figure 4: a) oral bone exostosis – tori; b) microfractures

3. Results

The results from the clinical study of HDT and periodontium of all subjects and the distribution of different DCS symptoms' are shown on Table 1. Non-physiological wear (abrasio) of various degree was established in 22 of the 30 patients with TMD, corresponding to 73.3% of all studied patients. The frequency of this symptom was significantly lower in the control group – 23.3%.

Table 1: Results from the distribution of DCS symptoms in the two groups of patients

Signs	Subject with TMD	Control group	
	n=30 %	n=30 %	p
tooth wear	22 73.3	7 23.3	0.017
noncarious cervical lesions	11 36.7	2 6.67	0.010
bone exostosis	4 13.3	1 3.33	0.353
periodontal bone defects	13 43.3	5 16.7	0.047
microfractures	21 70.0	10 33.3	0.009

*- the total of symptoms and percentages is above 100 since some patients exhibited more than one symptom

Noncarious cervical lesions were established in 11 (36.7%) patients of the total number of TMD patients (n=30), which is significantly higher than the numer in the healthy patients group – 6.67%.

Bone exostoses were established in 4 (13.3 %) of the TMD patients. No statistically significant difference was established in the frequency of this symptom in the two studied groups.

Vertical bone pockets were established in 13 (43.3%) TMD patients (n=30) and in 5 (16.7%) patients from the control group. Microfractures were established in 21 (70.0%) of the TMD patients and in 10 (33.3%) of the control group patients. This symptom's frequency difference is considered significant.

4. Discussion

The results analysis of the study of HDT and periodontium in all the 30 studied patients showed the highest frequency of deterioration symptoms of HDT in microfractures – 77,1% (n=37). This high microfracture frequency is probably due to the increased muscle activity and abrasion in patients with TMD, which, according to Rodriges-Bigatoh et al. (25) can be found there.

According to Cohen et al. [5], in 1/2 the patients with vertical fractures there is also bruxism established. Non-physiologic wearing in the 95 patients studied had a mean frequency of 33.7% (n=32), while there was no statistically significant difference (p>0.05) in the frequency in women (28.8%) and men (39.5%). The higher frequency of patologic wearing in men, according to Yadav [30], is probably due ro the bigger muscle mass and strength they have.

The frequency of cervical lesions we established in patients with TMD is significantly higher than the one in healthy patients and according to Telles et al. [29] it approximates 11.5%. The results of the study affirmed neither the relations found by Clifford et. al. [4] between bone exostoses and TMD, nor the ones found by other authors [21, 31]. The significantly higher percentage of vertical periodontium lesions confirms the opinion of other authers [10, 11, 15] zon the role of occlusal trauma in the etiology of periodontium damage.

5. Conclusion

The analysis of the results leads to the conclusion that some clinical symptoms of the dental compression syndrome (tooth wear, noncarious cervical lesions and microfractures) are of significantly higher frequency in patients with TMD. These symptoms can be helpful in the diagnosing TMD.

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