

Oral parafunctions and positive clinical examination findings

Giedre Kobs, Olaf Bernhardt, Thomas Kocher, Georg Meyer

SUMMARY

Statement of problem. Oral parafunctional activity can be fatigued and painful masticatory muscles and/or pain in the temporomandibular joints. There is controversial discussion in the literature as to what role parafunctional activity plays in the multi-causal pathologic process.

Purpose. The purpose of this study was to determine any association between the level of parafunctional habits versus the level of mandibular dysfunction and to test the hypothesis that TMD/bruxer patients have significantly increased musculature tension and joint pain.

Material and methods. There were 307 subjects (140 males and 167 females) selected for this investigation. 299 subjects were examined regarding any relationships between clenching and the incidence of muscle sensitivity. The age of subjects ranged from 20 to 54 years old, with a mean age of 35. 4. 114 subjects had at least one sign of temporomandibular disorders (tenderness/pain on palpation of the joints or muscles, TMJ sounds, pain or deviation during maximum mouth opening (active/passive).

Results. 81 subjects admitted to clenching, while 218 said they did not. Among the "non-clenchers", 68.8% had no sensitive muscles, 31.2% indicated sensitive masticatory muscles. Those who clenched their teeth were distributed as follows: 53.1% were diagnosed with bilateral masticatory muscle sensitivity, 46.9% showed no such indications. The two groups were not homogeneously divided, with regard to pain/discomfort ($p = 0.001$; Fisher's precision test).

Conclusion. This study found a statistically solid relationship between the incidence of "clenching" and muscle palpation findings, as well as between sensitivity in the mandibular joints from lateral and to cranial and dorsal with positive muscle palpation findings. The agreement between sensitivity of the masticatory musculature and the mandibular joint demonstrates that intensive clenching can predominantly lead to pathologic phenomena in the muscles or joints.

Key words: temporomandibular disorders; temporomandibular joint dysfunction; internal derangement; clinical examination; oral parafunctions

INTRODUCTION

Temporomandibular disorders (TMD) is a collective term encompassing a number of clinical signs and symptoms of some disorders that involve the masticatory muscles, temporomandibular joints (TMJs), and other adjacent structures of the stomatognathic system. Common signs and symptoms of the TMD include pain in the masticatory muscles and/or TMJs during jaw movements, tenderness to palpation, joint

sounds, impaired jaw movements and headache (1). Bruxism is the habit of grinding, clenching, gnashing, tapping, and chewing the teeth, which is not related to any of the physiologic activities of the masticatory system (2). This habit being diurnal or nocturnal has some important consequences for the sufferer including damage to the tooth structure, hypertrophy of some masticatory muscles, acute or chronic pain, fatigue signs and symptoms of TMD, and possible aggravation of periodontal disease (3).

The etiology of bruxism is to great extent unknown and controversial, and many theories have been discussed ranging from local mechanism ones to other theories associated with the central and autonomic nervous system. The literature separates into four main causes for this problem (4): 1. malocclusion; 2. oral habits; 3. TMD; and 4. altered emotional states such as anxiety. Since muscular activity is decisive for the functioning of the masticatory organ (5), the recording of muscle palpation findings is a significant factor in clinical functional analysis. Positive palpation findings indicate tension in the masticatory musculature, which can manifest itself in myogelosis or hypertonicity in the muscles. According to Bergholz (6), only distinctly painful reactions from the patient should be taken into consideration in evaluating positive muscle findings, to make for good reproducibility of the examination results.

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MATERIAL AND METHODS

Subjects

From a population representative cross-sectional study - "Study of Health in Pomerania" (SHIP) there were 307 subjects (140 males and 167 females) selected for this investigation. The age of subjects ranged from 20 to 54 years old, with a mean age of 35, 4.

From the abbreviated SHIP functional analysis, 114 subjects showed indications of functional disorder in the stomatognathic system (sensitivity in the joint region, joint-noise, positive muscle findings (pain), pain during maximal opening (active/passive), deviations in the opening movement), while 193 subjects showed no such symptoms.

Collected data were compared by contingency tables and analysed with chi-square (χ^2) test. Better visualisation of results was done by graphics.

Clinical functional analysis was carried out with the aid of the examination form. The form was comprised of a questionnaire and the clinical examination. This work was especially concerned with the clinical examination of the mandibular joint and the masticatory musculature. The following data was recorded: sensitivity in the joint region, muscle findings, palpable movement disorders, joint noise, mandibular mobility, progress of the opening movement, and dorsal sensitivity. The examination was carried out on a relaxed subject, sitting upright.

1. Sensitivity in the joint region

1.1 Lateral sensitivity

During the examination for sensitivity, the mandible was in rest position. The examiner localized the condyles by probing with the fore- and middle fingers on both sides. The subject was asked about any feelings during moderate palpation of the right and left sides:

- indolent: "0" in the corresponding field
- malaise (discomfort): "1" in the corresponding field
- pain: "2" in the corresponding field
- not determinable: "n" in the corresponding field

1.2 Sensitivity to cranial and dorsal

Here, the subject was instructed to perform light opening and closing movements. The examiner lightly guided the mandible at the chin from the rest position and moved it to dorsal and cranial. The subject was questioned about any feelings for the right and left sides and the answers were recorded in the appropriate fields, as described in "lateral sensitivity".

2. Muscle findings

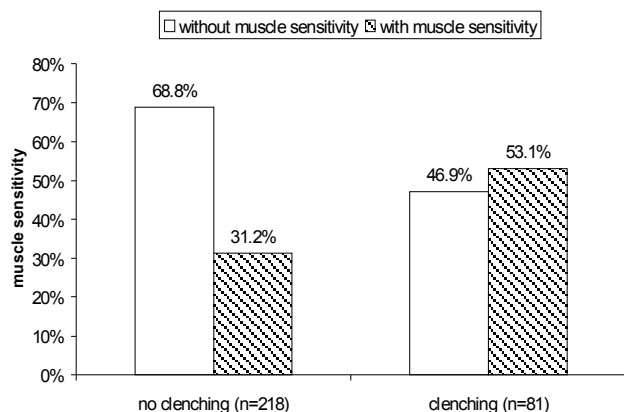


Fig. 1. Relationships between the subject groups with the data "clenching/no clenching" and muscle sensitivity.

The musculature were palpated extra-orally from caudal to cranial, on the left- and right sides. Muscle palpation was done both in the rest position and under muscular contraction (m. temporalis and m. masseter). The subject's feelings were recorded as above, for each muscle palpated, after being asked whether the sensation in the muscle was unnoticeable (usual), or if there was discomfort and/or pain. The appropriate coding was noted. The m. suboccipitalis was palpated above the m. trapezius on both sides, from caudal and cranial.

Only the reaction of the lateral pterogoid was checked in an isometric muscle test:

- the lower jaw was in rest position
- the examiner placed the base of the hand on the side of the lower jaw
- the subject exerted pressure for 30 seconds against the examiner's hand

Discomfort or pain could occur in the joint region of the opposite side, and was duly recorded. The test was carried out for both sides, in succession, and the findings were noted in the appropriate fields. The subject was asked about discomfort, unease or pain on the contralateral side. The procedure was repeated, in cases where the subject gave unclear signals.

RESULTS

In the analysis of significant relationships between the clinical examination results, only the two following combinations could be established:

1. Relationship between "clenching" and muscle sensitivity.

299 subjects were examined regarding any relationships between clenching and the incidence of muscle sensitivity (Figure 1). From these, 81 subjects admitted to clenching, while 218 said they did not. Those who clenched their teeth were distributed as follows: 53.1% (n = 43) were diagnosed with bilateral masticatory muscle sensitivity, 46.9% (n = 38) showed no such indications. Among the "non-clenchers", 68.8% (n = 150) had no sensitive muscles, 31.2% (n = 68) indicated sensitive masticatory muscles. The two groups were not homogeneously divided, with regard to pain/discomfort (p = 0.001; Fisher's precision test).

2. Relationships between sensitivity in the mandibular joint from lateral and to cranial and dorsal, with positive muscle palpation results (Figure 2).

The results were significantly different for sensitivity in the mandibular joint, both from lateral and to cranial and dorsal, as well as for the right and left sides, according to the Chi-squared-test, in comparison with the two groups with and without myopathy (right: p = 0.006; left: p = 0.002; Fisher's precision test).

DISCUSSION

There is controversial discussion in the literature as to what role parafunctional activity plays in the multi-causal pathologic process. Relationships between oral parafunctions and craniomandibular dysfunctions have been reported in various studies (7-18). According to statements from Rugh and Harlan (19), nocturnal bruxism leads to severe grinding facets, muscle pain and degenerative changes in the mandibular joint in approximately 5% of the population. Although studies from Solberg et al. (20), and Reding et al. (21), show that up to 90% of

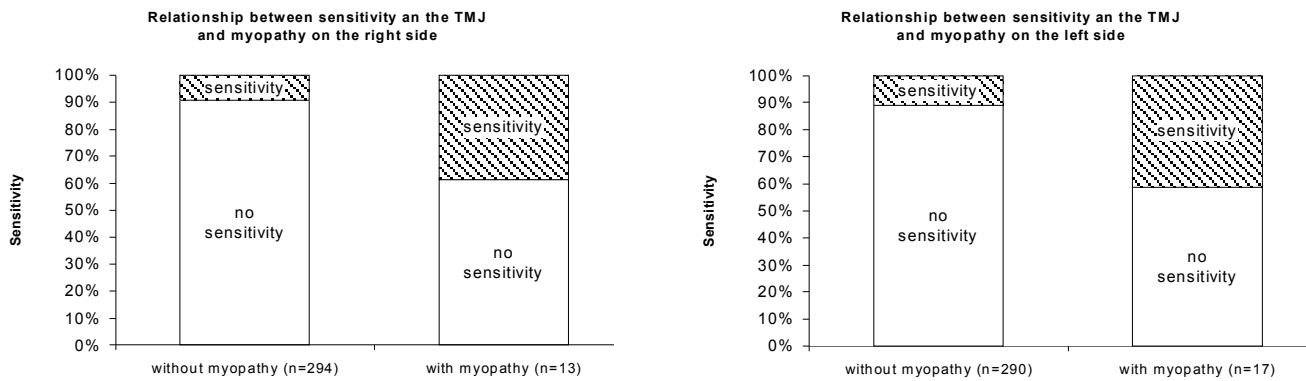


Fig. 2. Comparison of the findings for sensitivity in the mandibular joint from lateral and to cranial and dorsal, for the right and left sides between the subject groups, with and without myopathy

the overall population grind their teeth during the day or at night, other studies (22-23), show that only 6-20% are aware of clenching and/or grinding activity.

Christensen (24), estimates that a third of adults suffers from bruxism. According to some authors (25-27), the results of oral parafunctional activity can be fatigued and painful masticatory muscles and/or pain in the joints.

This study found a statistically solid relationship between the incidence of "clenching" and muscle palpation findings, as well as between sensitivity in the mandibular joints from lateral

and to cranial and dorsal with positive muscle palpation findings. The agreement between sensitivity of the masticatory musculature and the mandibular joint demonstrates that intensive clenching can predominantly lead to pathologic phenomena in the muscles or joints.

Egermark et al. (28) noted critically, that a relationship gives no information as to whether parafunctional activity is the cause or the result of pain and/or a dysfunction. Marbach et al. (29), also alluded to the weakness of proof for an etiological relationship.

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