TREATMENT OF MYOFASCIAL PAIN-DYSFUNCTION SYNDROME WITH OCCLUSAL EQUILIBRATION

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Treatment of myofascial pain-dysfunction syndrome with occlusal equilibration

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Fifty-three patients with a diagnosis of chronic myofascial pain-dysfunction syndrome were treated with occlusal equilibration to establish complete anterior guidance. In approximately 5 to 7 days after treatment, most myofascial pain dysfunction symptoms disappeared and complete symptom resolution was usually attained within 3 weeks. The common symptoms all patients had were (1) pain and fatigue in the masseter and temporal muscles, (2) nocturnal bruxism, (3) jaw tension on waking up, and (4) difficulty chewing some foods. All patients had an absence of true anterior guidance with molar interferences in all excursive movements. Many patients had previously undergone orthodontic therapy and had "ideal" vertical tooth relationships. Treatment consisted of occlusal equilibration to remove all posterior interferences and establish anterior guidance. Three appointments, 1 week apart, were allotted for treatment. Major symptom reduction occurred after the first appointment. Four-year follow-ups reveal no recurrence of chronic symptoms after treatment completion. (J PROSTHET DENT 1990;63:695-700.)

Causative factors of and treatment modalities for myofascial pain dysfunction syndrome (MPDS) have been studied extensively. The syndrome is characterized by chronic pain in the face, muscle tenderness, limited opening of the jaw and deviation upon opening, noises in the temporomandibular joint (TMJ), and pain in and around the area of the TMJ. Because the etiology of MPDS is unknown, proposed treatment modalities are numerous and largely symptomatic in nature and may not address the underlying causes of the syndrome.

Occlusal equilibration as a treatment modality has been described and claimed by numerous authors as a successful treatment option. However, other authors contend that MPDS is a stress-related disorder not brought on by occlusal factors.
This report describes the treatment of 53 chronic myofascial pain-dysfunction syndrome patients with occlusal equilibration to establish complete anterior guidance.

MATERIAL AND METHODS

Fifty-three patients were diagnosed as chronic MPD syndrome sufferers between 1983 and 1988. The patient group comprised 13 men in the age range of 24 to 43 years and 40 women in the age range of 15 to 51 years. Areas of chronic pain reported by our patients were (1) masseter-buccinator region, (2) the temporalis region, (3) the lower border of the mandible near the insertion of the masseter muscle, and (4) in the ear or TMJ region.

When questioned as to the nature and location of the pain, the patients verbally reported a total of 62 sites of chronic discomfort with some patients registering more than one site. The masseter-buccinator region was the most common region, registered 44 times (Table I).

Pain onset was described with two distinct patterns. Thirty-two patients reported pain on waking in the morning. All of the patients reported a dislike for their splints and were reluctant to wear them 24 hours a day to stop the onset of symptoms.

The other onset pattern was described by 21 patients as slight muscle tension in the morning with a gradual progression of pain as the day wore on. Eating would worsen the pain, resulting in chewing difficulty. Nine of these patients cited stress as a factor in their lives, and six of these nine wore acrylic resin splints. All of the patients were asked whether they felt that their lives were tense, stressful, and causing them excess worry or lack of sleep. Most reported low daily stress and that when they experienced periods of increased stress, their symptoms would worsen. However, pain was regularly present in many low-stress periods, for example vacations.

Thirty-seven of the patients reported that chewing gum or eating chewy foods would bring on fatigue or soreness after a short period of time. Many patients stated that they used to chew gum regularly, but since their jaw pain became noticeable, they have been unable to chew without discomfort.

Twenty-five patients had some form of painless unilateral or bilateral TMJ noises that were described as clicking and popping. Table II summarizes the distribution of symptoms.

Table I. Regions of patient-reported chronic pain

<table>
<thead>
<tr>
<th>Masseter buccinator</th>
<th>Temporalis</th>
<th>Lower border of mandible</th>
<th>TMJ region</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>44</td>
<td>70.9</td>
<td>10</td>
<td>16.1</td>
</tr>
<tr>
<td>5</td>
<td>8.2</td>
<td>3</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Reported sites = 62 (unilateral or bilateral).

The patients underwent a complete occlusal examination.

The patients all had some form of centric relation-centric occlusal (CR-CO) discrepancy ranging from approximately 0.25 mm to 2 mm in both horizontal and vertical directions.

The Angle classification breakdown was class I, 32; class II (both divisions), 9; and class III, 12.

Twenty-nine patients had previously undergone orthodontic treatment and had "ideal" vertical tooth relationships and six patients had an anterior open bite. Three of these patients had undergone orthodontic treatment. Two patients had posterior crossbites.

The patients all had an inability or limited ability to make right and/or left excursive movements with the anterior teeth in contact. This was due to both working and nonworking interferences in the molar region (Figs. 1 and 2). Some patients could move the mandible a small amount from habitual maximum intercuspation (ICP) whereas others could only move laterally if they first separated their teeth vertically. All of the patients could protrude the mandible; 11 patients had protrusive interference in the molar region.

The 11 patients who had acrylic resin splints were evaluated without the appliances in place. All of these patients were unable to make successful excursive movements from ICP because of working and nonworking interferences.

In all 53 patients, one or both maxillary canines were worn flat at the incisal edge (Fig. 3).

The common occlusal element in all of these patients with chronic muscle pain was the absence of multidirectional freedom of contact movement of the mandible as a result of lack of anterior guidance. No control patients were used in this subjective descriptive report.

Treatment consisted of freeing up mandibular excursive movements through occlusal equilibration using the principles outlined by Schuyler. However, no attempt was made to remove the CR-CO discrepancy or to modify the closure position to centric relation. The objective of the treatment was to remove nonworking and working interferences so as to develop anterior guidance.
The patients with an anterior open bite had guidance established on the canines and first premolars because it was impossible to achieve incisor guidance contact. The patients were monitored during recall appointments over a 4-year period. None of the patients were treated with lenses to “deprogram” the musculature before equilibration.

RESULTS OF TREATMENT

Immediately after completion of the first appointment, all patients reported new-found ease of jaw movement and many reported an immediate if incomplete reduction in masticatory stress. Forty-four patients reported a total reduction of their specific pain at the second appointment. The other nine patients reported incomplete symptom reduction. Further occlusal evaluation routinely showed remaining posterior interferences of some nature. Upon removal of these interferences, six of these patients reported complete relief at their next appointment.

Of the remaining three patients, two required five appointments to establish anterior guidance and subsequent reduction of muscle pain. Both of these patients had shallow guiding surfaces, resulting in minimal disclusion and difficulty in completely separating the posterior teeth. The third patient’s third molars continued to provide mandibular movement interferences and will likely have these teeth extracted. Although his symptoms have greatly improved since treatment was initiated, they are not totally absent.

Reduction of symptoms generally occurred 5 to 7 days after establishment of anterior guidance regardless of the duration of previous chronic pain. This agrees with previous work done by Riise and Sheikholeslam. All 53 patients reported no fatigue upon eating or gum chewing. The night bruxers who previously woke up with muscle pain and tightness reported relaxed musculature and no pain. Their spouses and mates reported a definitive decrease or complete absence of the bruxing habit. TMJ clicking and popping was reduced but persisted in most patients; however these symptoms decreased in frequency as time passed.

Patient recall has shown that after up to 4 years, no re-
occurrence of chronic muscle spasm or fatigue was noted in 46 patients. The other six patients reported minor episodes of muscle discomfort at times of personal stress such as examination periods or family tragedy. The level of intensity and duration of these episodes was markedly reduced compared with those present before the occlusal treatment.

The 11 patients who wore acrylic resin splints at night no longer required appliance therapy. Their symptoms were eliminated through occlusal treatment.

Some patients noted a “shrinking of the cheeks” as muscle relaxation progressed.

**DISCUSSION**

Glickman\(^\text{13}\) classified occlusal interferences as class I, II, and III (Fig. 4). In all of the patients, the largest number of interferences were class III followed by class II and class I. During the equilibration procedure, removal of class III interferences on the nonworking side would allow for the visualization and subsequent removal of class II and I interferences on the working side. The class III interference was the major impediment to an excursive movement. Subsequent removal of class II and I working interferences completed the removal of all faulty contacts and established anterior guidance with freedom of jaw movements.

Williamson and Lundquist\(^\text{14}\) described the relationship between posterior tooth contact in mandibular excursions and muscle activity. Their work suggested that the contraction process present in the closed position will continue if posterior teeth remain in contact in eccentric movement. If posterior teeth are out of eccentric contact, the muscle
contraction process ceases. In theory, patients who have eccentric posterior tooth contact are continuously initiating and perpetuating muscle activity without an adequate rest period for reduction of contractile by-products (lactic acid). Over a period of years of excessive muscle activity without adequate rest, muscle spasm may occur, which in turn may result in decreased muscular function, chronic fatigue, and pain. Ischemia occurs when spastic contraction tightens around the muscle blood supply while lactic acid takes up the remaining oxygen, and nerve endings are highly sensitive to lactic acid buildup and ischemia. A theoretical explanation for the benefits of establishing anterior guidance is that the excessive muscle activity is interrupted and a rest period takes place between closure contacts. This allows the musculature to recover from the contractions so that spasm and fatigue cannot occur. Most patients reported relief of spasm, fatigue, and pain in 5 to 7 days, despite the duration of the preexisting symptoms.

Traditional acrylic resin splint therapy may provide a barrier to posterior tooth contact because it keeps the inclines of opposing teeth from contacting, thereby interrupting the contraction process. The 8- to 12-hour use at night seems to provide enough rest period for the musculature to relax. If the night guard is not worn continuously, symptoms return because the occlusion has not been altered. Splints have been shown by Solberg et al. to reduce bruxism. A splint does this by separating the interfering inclines thereby stopping the muscular contraction process.

It is generally accepted that splint therapy should precede occlusal equilibration so as to “deprogram” the musculature and to aid in the diagnosis of an occlusal problem. Through adequate occlusal examination to evaluate excursive interferences and a thorough history of location and duration of muscle pain, it is possible to successfully diagnose and treat patients who have MPD syndrome without splints. This reduces the cost of treatment and provides a permanent treatment solution.

A study by Helsing evaluated the relief of the dysfunction syndrome after equilibration of 20 patients from ICP to retruded contact position (RCP). Symptom relief was obtained in eight patients despite repeated refinements of the retruded contact position. This suggests that equilibrating to the retruded position may have some benefit in treating MPD, but is not necessarily the major factor.

Because 52 of 53 patients experienced symptom reduction without equilibration to the CR position, it appears that a balanced, comfortable, closure position enables the neuromuscular mechanism to function properly.

The bruxing habits of 32 patients appeared to be altered by the removal of the posterior interfering inclines in lateral excursions. This might suggest that it was not the CR-CO prematurities but the lateral interferences that initiated these patients’ bruxing.

Before treatment, all 32 patients woke up with a sensation of tight musculature and pain caused by nocturnal grinding. After treatment the grinding appeared to stop or was greatly reduced, and the pain and muscle tightness were absent.

Stress is probably a cofactor in causing nocturnal bruxism. Schaerer et al. reported that occlusal contact relations are causal factors in mandibular dysfunction and its sequelae, while emotional factors may play an aggravating role. The nine patients who reported stress as a prominent factor in their lives achieved muscular comfort and disappearance of pain and bruxing habits, and they no longer needed acrylic resin splint therapy.

Regardless of the Angle classification or anterior open bite present, anterior guidance was established. In class I patients, canines and incisors were the guiding teeth; in class II patients, canines and first premolars; and in the one class III patient, incisors and canines. Posterior inclines were adjusted to be shallow so that anterior teeth could disclude them. In the cross-bite occlusion, the interferences were reversed to buccal cusps of the maxillary teeth and lingual cusps of the mandibular teeth (Fig. 5). This did not affect the establishment of anterior guidance or the resolution of muscle spasm.

A large percentage (55%) of patients had MPD many years after orthodontic treatment. It appears that establishing ideal vertical tooth relationships does not mean that excursive movements will be functional and neuromuscularly healthy. The result of not establishing free excursions when orthodontics is completed in the adolescent years may lead to muscle dysfunction in later years. Equilibration to establish proper functional movements should probably be done as soon as all of the teeth assume a stable position on completion of orthodontics.

The development of complete anterior guidance requires repeated examinations and identification of the interfering inclines until absolutely no contact exists as the jaw is moving laterally. As long as some contact remains, a risk of developing symptoms may occur.

CONCLUSION

Treatment of 53 patients with chronic myofascial pain-dysfunction syndrome with occlusal equilibration to es-
Establish anterior guided occlusal schemes brought relief from the symptoms within a short time after treatment was initiated. Further study needs to be done in this area to understand the relationship between tooth contact, muscular contraction, and neuromuscular health.

REFERENCES


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