Occlusion, Parafunction, and Restorative Dentistry

Restorative dentistry is doomed to failure if the patient bruxes, this is particularly apparent with cervical restorations, here just a couple of literature references.


Correlations

According to evidence based dentistry, there are no statistically valid correlations between occlusion and any kind of symptoms. Scientifically, occlusal therapy (restorative or equilibration) is not indicated for treatment of CMD.


Naturally, this “science” contradicts the clinical experience of nearly every dentist in the world. Probably no other area in dentistry is so screwed up by bad science and misconceptions.

Wear facets are frequently used as the primary diagnostic indicator of bruxism, which is complete nonsense. There is a strong inverse correlation of wear facets with symptoms.


Naturally, you cannot find correlations if you begin with incorrect assumptions and improper patient selection.

Diagnosis

Correct diagnosis depends on the presence of specific signs and symptoms and their interrelation. The signs and symptoms, together with the position of the mandible and an analysis of the centric and eccentric occlusal contacts determine if occlusal adjustment or splint therapy is indicated and how treatment will proceed. We need to put pieces of the puzzle together.
Signs and Symptoms

**Signs**: angular Class 5 lesions, masseter hypertrophy, scalloped lateral border of the tongue, lingual mandibular tori, short clinical crown length of posterior teeth, isolated anterior wear facets, IID < 30 mm. We could also add asymmetrical mandibular movement and unilateral function, particularly if this correlates with the sleep position. **Symptoms**: pain on opening, neck and shoulder pain, headaches, cervical sensitivity to temperature, and naturally TMJ and/or masticatory muscle pain.

Cervical lesions are one of the main diagnostic criteria for bruxism, the lesion morphology and the distribution provide important information for understanding “how” the patient parafunctions.


**Cervical lesions**

Class 5 lesions cannot be caused by a toothbrush and toothpaste alone, despite claims to the contrary. Erosion lesions are caused by the combination of an acid (dietary or bacterial) together with the toothbrush.


Angular cervical lesions are caused by the combination of acid and the toothbrush and parafunction. The location of the occlusal contacts determines lesion morphology. The correlation of the occlusal contact location with the signs and symptoms determines whether the occlusion should be altered. Mobile teeth do not have angular lesions as a rule.

Allow me one pedantic point. The true elasticity modulus of dentin is NOT the commonly cited 18 GPa, which was determined with dry dentin at room temperature. The modulus varies with the position of loading, and is approximately 14 GPa in the mesio-distal direction but only 8 GPa if the teeth are bent orally or vestibularly. Additionally, a thin layer of dentin at the DEJ has a modulus of approximately 4 GPa. (The modulus of maple wood is approximately 14 GPa., teeth are much more flexible than most types of wood.)

- Zaslansky P, Currey JD, Friesem AA, Weiner S. Phase shifting speckle interferometry for determination of strain and Young's modulus of nimeralized
FEA with anatomically correct modelling under consideration of the anisotropy of enamel and dentin correlates extremely well with the clinical incidence of angular Class 5 lesions. Two dimensional or simulated 3-D FEA studies are misleading. Interferometry studies which utilize natural teeth confirm a stress localization corresponding to both position and incidence of clinical lesions.


Here again, I believe everyone is aware of the contributions of Lee and Eakle, McCoy, and Grippo, so I need not cite them separately.

Parafunction can characterized with three components: intensity, duration, and frequency, with high contraction intensity being the predominate cause of symptoms. High intensity precludes mandibular movement, and no movement means no wear facets. Cervical lesions (and CMD) correlate with the force of occlusal contact.


The position of the teeth determines which symptoms the patient will get. “Correcting” the occlusion does not eliminate parafunction in the majority of cases, the elimination of one symptom may only exacerbate others. Some problems can be solved with occlusal therapy, some cannot, the challenge is to know when and where.

**Stress**

The primary cause of parafunction is psychological stress, there is a strong correlation of anxiety or depression with CMD. The muscles of mastication and a few neck muscles have sympathetic motor inervation.

- There are also multiple references in the bible concerning psychological stress and bruxism. (Matthew 8, 22, 25. Job 16. Lucas 13)

Relaxation techniques, biofeedback and physical therapy have demonstrated success rates equal to or exceeding dental splint therapy for treatment of CMD. The placebo effect may be responsible for >50% of treatment success. Basically, an interdisciplinary approach is required.

- Medlicott MS, Harris SR. A systematic review of exercise, manuel therapy, electrotherapy, relaxation training, and biofeedback in the management of temporomandibular disorder. Phys Ther 2006;86:955-73