Usual and Unusual Orofacial Motor Activities Associated with Tooth Wear

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What Do We Know?

Definition

Usual orofacial motor activities include chewing, swallowing, breathing, and speaking. In dentistry, any unusual activity is called a parafunction, a general term describing nonfunctional oromandibular and lingual activities such as jaw clenching; bruxism (tooth grinding); tooth tapping; cheek, lip, or tongue biting; nail biting; tongue thrusting; lip licking; tongue protrusion; gum chewing; object biting (eg, cigarette, pipe, pencil, candy); hypersalivation/swallowing; and backward, forward, or lateral head or jaw posture (eg, phone on shoulder, computer work). A parafunction may occur while the individual is awake or asleep, or during both states. Parafunction may be voluntarily induced (eg, gum chewing), be repeated as a habit or tic (eg, clenching), or be involuntary (eg, sleep bruxism). It is not rare to observe several parafunctions in a patient.

Differential

Parafunctions must be distinguished from: (1) the usual orofacial activities of chewing, swallowing, breathing, and speaking; and (2) unusual (eg, too frequent, too intense/powerful, in unusual timing/sequence) activities such as "involuntary" chewing, oromandibular myoclonus (tooth tapping during sleep that could be associated with epilepsy or a familial condition), excessive swallowing, oral tardive or idiopathic dyskinesia (eg, tongue protrusion, air expiration, lip suckling), Parkinsonian tremor (chin, lip, tongue), Gilles de la Tourette syndrome, REM behavior disorders (muscle atonia/paralysis during this stage of sleep), snoring, or sleep apnea.

Causes

The parafunction could: (1) result from psychosocial factors (eg, stress or anxiety, a child mimicking parents' oral habits such as nail biting or clenching) or reactivity associated with anger or frustration; (2) be associated with a medical or drug-related condition (eg, oral tardive dyskinesia, Parkinson disease), sleep parasomnia (eg, bruxism/tooth grinding, REM behavior disorder, oromandibular myoclonus), or sleep disorders (eg, sleep apnea); or (3) be concomitant with intrao-

ral conditions (eg, pain; occlusion; xerostomia; hypersalivation; oral lesions; discomfort with restorations, dentures, or orthodontic or snoring-sleep apnea devices).

Consequences

If the parafunction is too loud (eg, air expiration, snoring), too apparent (eg, severe tooth loss, involuntary tongue protrusion while eating), or induces handicap (eg, interferes with speech or eating), it may cause social reclusion, anxiety, and poor self-esteem. Although there is some controversy in the literature concerning the effects of parafunctions, they can also result in oral mucosa or dental damage, restoration breakdown, occlusal discomfort (eg, fixed partial denture against implant rehabilitation), pain, jaw movement limitation, and temporomandibular joint sounds. In the most extreme cases, parafunctions may be risk factors for health, or even cause life-threatening conditions (eg, food aspiration in the airway of a Parkinsonian or oral tardive dyskinesia patient; hypertension and vehicle accident in a patient with sleep apnea).

What Research Strategies Are Needed?

Recognition of Problem and Consequence

A valid questionnaire needs to be developed to survey prevalence and psychosocial factors in relation to functional consequences in nonrehabilitated and rehabilitated populations (eg, denture, implants), in temporomandibular disorder (TMD) and non-TMD patients, and in those with and without bruxism; population-based study is needed. Reliable tools for quantifying usual and unusual parafunctions need to be validated with the use of ambulatory or laboratory tools. The observations collected using the above methodology need to be validated with regard to associations of cause and effect; experimental studies may be designed to further explore these connections.

Examples of research questions include:

 Is excessive tooth wear caused by the following factors: poor enamel quality (eg, enamel biopsy), lack of oral lubrication (eg, xerostomia), diet, habit (eg, smoking, alcohol), anxiety/lifestyle, aging, clenching or tooth grinding, occlusal discomfort, sleep arousal mechanism (eg, polysomnography), or medical condition (eg, cardiovascular hyper-responsiveness, medication, neurologic disorders, gastroesophageal reflux)?

- 2. Is the pattern of bruxism/tooth grinding related to types of jaw movements (eg, protrusive, lateral)? Is wear localized on one tooth, or is a group of teeth associated with the same type of parafunction?
- 3. Could xerostomia, lack of oral lubrication, or gastroesophageal reflux partially or completely explain patients' tooth wear, discomfort, or parafunction?
- 4. Is poor enamel quality associated with higher wear and tear in normal function, or is it an increased risk factor in the presence of parafunction?
- 5. Are concomitant sleep disorders (eg, bruxism/tooth grinding, apnea, REM behavior disorder) risk factors for parafunction? If concomitant, should they influence our treatment planning?
- 6. An examination of the influence of gender, ethnicity, and cultural factors on parafunction is needed.

Assessment of Management Strategies: Efficacy, Cost Benefit, Risk

- Splint therapy plus cognitive-behavioral strategies to reduce parafunction.
- Use of medication and/or physical therapy to manage crises (short-term or recurrent).
- Customizing oral splint design to conform to different types of parafunction and/or concomitant sleep apnea or bruxism or following implant rehabilitation.
- The relationship between occlusal comfort, adaptation, and extensive treatment planning concerning the selection of dental material to be used (eg, implants against fixed partial denture).

What Needs Highlighting in Educational Programs?

We must develop a better understanding of causes, pathophysiology, consequences, and management of parafunction and associated health conditions. Revision in the following areas of practical science and review of current research should be undertaken:

- Cognitive-behavioral factors in relation to management strategies
- Oral physiology in relation to pain (eg, nerve damage, arthritis), sleep, respiration, taste, salivation (oral lubrication), occlusion, and quality of life
- Oral diagnosis/medicine including pharmacology/differential diagnosis (including mood alteration/psychiatricpsychologic condition, sleep, and neurologic disorders)
- Global assessment of patient condition to improve treatment planning
- Learning how to reassess the validity of techniques used on a regular basis in daily practice; how to remain critical and up to date on evidence-based clinical sciences

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