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Fixed Partial Denture (FPD) Patients With Parafunctional Habits: Challenges And Clinical Strategies

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Abstract
The long-term success of Fixed Partial Dentures (FPDs) is significantly hampered by parafunctional behaviors including bruxism and clenching. These behaviors may result in temporomandibular joint issues, abutment tooth destruction, and prosthetic failure. To guarantee the longevity of prosthetics and patient comfort, patients with suchbehaviors must be effectively managed.
With an emphasis on prevention, diagnosis, and treatment concerns, this paper examines methods for effectively managing FPD patients who display parafunctional behaviour.
Keywords: *parafunctional habits, bruxism, fixed dental prosthesis*

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I. Introduction

Parafunctional behaviors, particularly bruxism, are frequently observed among patients who visit dental clinics on a daily basis, representing a significant dental concern for nearly all dentists. Numerous researchers have concentrated on the definition, pathophysiology, and management of these behaviors.

There are two ways the masticatory system can work: parafunctionally and functionally.While parafun ctional behaviors signify abnormal hyperactive functions carried out by the masticatory structures, such as the t ongue, teeth, oral muscles, etc., functional activity comprises meaningful labor like speaking, eating, or chewin g. (1)

Destructive lateral strains and overloading may arise from parafunctional behaviors such as clenching, bruxing, or engaging that transfer forces to the supporting bone.(2)

II. Clinical Significance Of Parafunctional Habits

Knowledge of the biomechanical principles governing the masticatory system is equally crucial. Treatment planning must take into consideration the distribution of occlusal forces, load transfer to supporting structures, and the impact of parafunctional habits.(3)

Acute or chronic discomfort, exhaustion, indications and symptoms of TMD, damage to the tooth struc ture, enlargement of certain masticatory muscles, and potential exacerbation of periodontal disease are some of t he significant effects of this behavior, whether it be diurnal or nocturnal.(4)

A prevalent parafunctional behavior that might happen while you're awake or asleep is bruxism. Though it rarely has major side effects, some patients may experience them. It has a complex etiology. No known remedy, not even prosthetics, can prevent bruxism. Although its exact contribution to tooth wear is unknown, bruxism is not thought to be a significant contributing factor.(5)

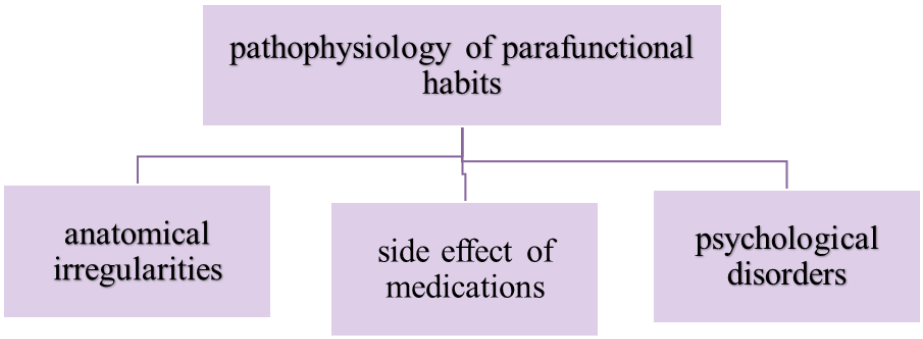
Then there was non-nutritive suckling, when patients would often nurse non-food objects, especially a child's pacifier or his thumb or any other digit. As people age, these behaviors gradually fade away. However, they might continue throughout adulthood, causing serious harm to the oromandibular and masticatory systems.(1)

Girls are more likely than boys to have oral parafunctional behaviors, which range in frequency from 7% to 15.1%. Higher levels of stress, worry, and sadness have been observed in patients with parafunctional behaviors. (6)

III. Pathophysiology Of Parafunctional Habits:

The neurotransmitters that are frequently implicated are dopamine, serotonin, and noradrenaline. They also looked at genetic causes . According to recent research, central regulatory processes cause parafunctional behaviors to arise, while peripheral influences have no role in the pathophysiology.

Numerous factors have been proposed to be linked to the occurrence of bruxism. These include anatomical irregularities, psychological influences, sleep disorders, and side effects from medications. Research has indicated that structural irregularities within the oromandibular and stomatognathic systems may play a significant role in the onset of bruxism. Such irregularities can disrupt normal function and lead to the grinding of teeth, which is characteristic of this condition.(1)



IV. Impact Of Parafunctional Habits On Fixed Prosthesis

Clenching is not the same as grinding. While grinding is an eccentric bruxism, clenching is a centric one. When the mandible and maxilla are forcefully closed, a static process known as clenching occurs, causing the opposing teeth to contact eccentrically. However, grinding creates a dynamic state where the mandibular arch shifts in various ways, causing the dentition to slide over one another .

A multitude of research studies have demonstrated a strong correlation between bruxism and the long-term failure of fixed dental prostheses . The presence of bruxism, along with other parafunctional activities, has been shown to cause early deterioration and a decrease in the lifespan of dental prostheses. As a result, clinicians often prefer to use gold and ceramic materials instead of resins when treating patients who exhibit bruxism, since these materials provide superior resistance to wear and material loss.(1)

The most commonly reported technical failures involve material fracture and retention loss. It is widely acknowledged that these failures tend to occur more frequently in patients with bruxing habits. For instance, when offering prosthetic restoration for a worn dentition, often defined by shortened clinical crowns, it may be difficult to attain adequate mechanical retention and resistance forms for restorations cemented conventionally. Additionally, the elevated stress on restorations from bruxism, powerful chewing forces, or unfavorable loading angles between teeth requires a meticulous design of the restoration to reduce the possibility of mechanical failure.

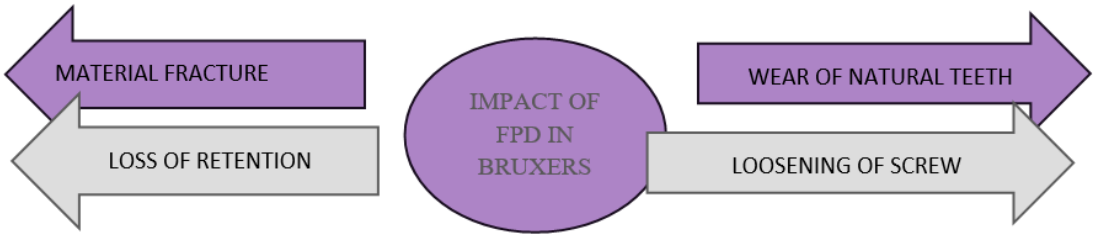
In addition to the potential for mechanical failures and the risk of retention loss when subjected to excessive loads, biological failures present an even greater likelihood, such as caries, marginal degradation, and endodontic complications. Therefore, in the context of conventional fixed prosthodontics, it is advisable to construct single crowns whenever feasible, while fixed dental prostheses (FDPs) should be kept to a minimal extension. A practical approach to enhance the retention of conventionally retained crowns on short, worn abutments involves incorporating boxes and grooves, or parallel pins, into the preparation, followed by addressing caries and other biological issues.occurrences can be challenging to ascertain, and it is possible that loss of retention happens initially, subsequently leading to caries and other biological issues.(7)

A more complicated challenge is the bite forces that arise from clenching or bruxing. A review conducted by Manfredini21 indicates that 30% of the adult population experiences daytime parafunction, with 15% affected at night. Most dentists have witnessed the fractures resulting from oblique or off-axis loading on tooth cusps, as well as the wear on both natural teeth and those that have been conventionally restored due to parafunctional habits. (7)

Since the advent of implant dentistry, implant-supported prostheses have been established as a highly dependable treatment for patients who are completely or partially edentulous. However, complications that can affect osseointegrated dental implants may occur in particular scenarios, and the clinician must be aware of the limitations of the treatment and take care to avoid precarious situations that could result in the failure of implant-supported prostheses due to biomechanical complications. These complications can include the loosening or fracture of the prosthetic screw, the loosening or fracture of the abutment screw, and also the fracture of the implant.(8)

The connection between occlusal forces and osseointegration loss has not been established . Bruxism is acknowledged as a risk factor associated with more mechanical and technical complications, but it does not impact implant survival. Nonetheless, research shows that bruxism patients experience higher complication rates with superstructures of fixed and removable implant-supported restorations.(7)

According to Misch, bruxism should not be viewed as an absolute contraindication for implants; nonetheless, it has a substantial effect on treatment planning. The authors argue that the excessive forces exerted by bruxism on implants and their suprastructures lead to a heightened risk of biological and biomechanical complications compared to those associated with normal masticatory processes. This necessitates a thorough evaluation of treatment strategies in light of these potential complications.In cases of bruxism, many authors suggest placing a greater number of implants than would typically be required without this movement disorder. Specifically, to prevent free-ending situations, it is advised to place one implant for every missing element.(8)



V. Clinical Assessment And Diagnosis

Clinical assessment and diagnosis involves a comprehensive evaluation of the patient, which includes gathering a detailed history of their medical background and conducting a thorough behavioral assessment to understand their symptoms and concerns. This initial step is crucial for forming a baseline understanding of the patient's condition.(8)

The next phase of the assessment focuses on identifying clinical signs that may indicate underlying issues. This includes examining the patient for wear facets on teeth, any fractures present, and assessing the mobility of teeth, which can provide valuable insights into their dental health and potential problems.These patients may experience general worn dentition and alveolar bone resorption . In these situations, utilizing an occlusal device is recommended to alleviate the stress on the teeth, which primarily occurs involuntarily during sleep . Severe tooth wear can result in pulp irritation. Moreover, the effects of bruxism can include headaches and facial pain, tooth sensitivity, and aesthetic issues with the smile.(9)

Tooth wear can result in a reduction of the occlusal vertical dimension (OVD), which decreases the space between the dental arches. This condition keeps the muscles under strain, leading to an imbalance in the distribution of occlusal forces and exacerbating the wear on the teeth.(10)

Radiographic examination is an essential component of the diagnostic process. This involves taking X-rays or other imaging studies to visualize the internal structures of the teeth and jaw, allowing for the identification of issues that may not be visible during a physical examination.

Finally, the use of diagnostic tools such as T-scan technology and occlusal analysis plays a significant role in the assessment process. These tools help in evaluating the occlusion and bite dynamics, providing further information that aids in accurate diagnosis and treatment planning.(9)

VI. Protective And Adjunctive Therapies

Until recently, addressing parafunctional forces has been a challenge. Conventional methods, including intra-oral orthotic appliances, provide very limited control in cases that are completely implant restored. In patients with natural dentition, orthotics like night guards, regardless of their design, manage to reduce or eliminate parafunction in roughly 50% of cases. The remaining 50% of patients either remain unchanged or experience heightened parafunction (referred to as the 'chew toy' phenomenon). The reasons for this occurrence have not been thoroughly clarified, but it seems to involve both positive and negative feedback from sensory receptors located in the periodontal ligaments, jaw joints, and muscles.(8)

VII. Treatment Planning Considerations

Although numerous approaches, including prosthetic treatment, have been tried over the years, there is currently no single treatment that can stop sleep bruxism.

However, a number of behavior-based therapies, including biofeedback massed therapy, habit awareness, habit reversal therapy, and relaxation techniques, have been proposed as potential cures for awake bruxism.

When prosthetic treatment is necessary for a patient with bruxism, it is crucial to reduce the effects of significant occlusal forces on all components that uphold the structural stability of the prosthetic. Since there is currently no confirmed treatment for bruxism, methods to lessen the damaging effects have been developed. Various forms of interocclusal equipment, such as nightguards and occlusal splints, are the most popular way to stop the negative consequences of bruxism. (7)

Parafunctional conditions such as clenching and bruxism respond favorably to the relaxing effects of Botulinum toxins. Injecting a moderate amount of Botox, into the major clenching muscles, specifically the Masseter and Temporalis, will help reduce the frequency, intensity, and duration of clenching without significantly impacting a patient's chewing capability. The clinical effects of the toxin are dose-dependent, and the duration of a single treatment in the masticatory muscles lasts approximately two to three months. The drug is well tolerated, with contraindications generally restricted to pregnancy, lactation, and associated muscle wasting diseases.

Occlusal splints are frequently utilized to avert tooth abrasion resulting from bruxism and/or excessive loading. A survey conducted among general dental practitioners in Sweden revealed that they regarded the primary purpose of hard interocclusal appliances as safeguarding the dentition from wear, with the secondary purpose being the management of TMD issues.(7)

VIII. Conclusion

Parafunctional habits, including bruxism and clenching, present considerable challenges in fixed prosthodontics by undermining the durability, functionality, and integrity of restorations. Understanding the

causes and effects of these habits is crucial for effective treatment planning and the selection of suitable materials and designs. Implementing preventive measures—such as occlusal splints, stress management techniques, and regular follow-ups—can assist in alleviating the harmful consequences. A comprehensive approach that incorporates behavioral, prosthodontic, and, when necessary, psychological interventions is essential for achieving enduring prosthetic success and ensuring patient satisfaction.

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