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PATHOLOGIES OF THE TEMPOROMANDIBULAR JOINT OCCLUSION SPLINTS: THEIR TYPES AND ROLE IN TREATMENT AND COMPLEX THERAPY

Axmedova Malika Qilichovna

Asia International University

Bukhara, Uzbekistan

Email : malikaaxmedova855@gmail.com.

Annotation: Current understanding of the etiology of temporomandibular joint disorders suggests the complexity of diagnosis and treatment. Among the many approaches and methods for treating musculoskeletal disorders, occlusal splints, which have been used for decades, are among the simplest and most versatile. The authors provide modern classifications of splints, defining their mechanism of action and indications for use. The article also briefly describes the main materials used to manufacture splints and the rules for selecting the jaw for which a splint should be manufactured.

Keywords:occlusal splint, bite splint, stabilizing splint, bruxism, centric relation, splint therapy, temporomandibular complex diseases.

Temporomandibular joint (TMJ) pathology is one of the most challenging conditions in dental practice, both in terms of timely and accurate diagnosis and the development of an effective treatment plan. Patients with joint disorders often remain unaware of qualified care for years, being referred from one specialist to another. This is largely due to the multifactorial nature and complexity of TMJ treatment. For a long time, the prevailing belief in dentistry was that the primary cause of TMJ disorders was malocclusion. However, clinical research increasingly supports the concept that TMJ pathology is multifactorial, with a predominantly psychosocial component.

Occlusal splints, or splint therapy, are used to treat a variety of conditions, including bruxism and other parafunctions, fatigue and increased tone of the masticatory muscles, headaches, toothache, tooth wear, malocclusion, and temporomandibular joint (TMJ) disorders. Despite the long-standing use of occlusal splints by dentists worldwide, determining their effectiveness in the comprehensive treatment of temporomandibular joint (TMJ) disorders remains controversial. Many specialists point to an exacerbation of the psychoemotional component in the development of TMJ disorders when splints are used without appropriate preliminary comprehensive therapy. Furthermore, in some clinical cases, it is difficult to distinguish the actual effect of splint treatment from the placebo effect. Consequently, practitioners face difficulties in clearly defining the indications and contraindications for the use of various types of splints in specific clinical situations.

Occlusal splints address a wide range of issues by targeting the three main components of the masticatory system: the dentition, the muscles, and the temporomandibular joint itself. The choice of splint type depends on the nature of the pathology, which is determined only after a thorough diagnosis using standard methods. It is important to determine the level of the changes: whether they are at the level of the dentition and masticatory muscles, or whether the

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temporomandibular joint itself is involved. Occlusal splints are most effective for occlusal muscle dysfunction. The presence of systemic pathology (such as rheumatoid arthritis) significantly reduces the effectiveness of splint therapy. In addition to their immediate therapeutic effect, occlusal splints can also provide diagnostic information. Using a splint allows for a more precise diagnosis and, depending on the degree of improvement, a more accurate diagnosis and tailored treatment.

Occlusal splints protect the teeth, soft tissues, and joints of patients with parafunctional disorders, particularly bruxism. Bruxism is defined as excessive clenching and grinding of the teeth unrelated to chewing. Bruxism is classified as nocturnal (during sleep) and diurnal (during wakefulness). These forms differ not only in timing but also, according to some data, have different natures and clinical presentations. Stress is one of the primary etiological factors causing bruxism, so occlusal splints are merely an adjunct to comprehensive therapy, preventing the development of negative consequences of clenching and grinding. These consequences include abnormal tooth wear, wedge-shaped defects, fractures of teeth, restorations, and dentures, tooth mobility, headaches, joint pain, tension in the masticatory muscles, and more. A splint reduces the force of clenching and grinding. Wearing a splint for bruxism helps patients develop healthy behavior and awareness of their condition, which over time helps them manage stressful situations and avoid clenching their teeth.

Types of occlusal splints: The literature describes a large number of different occlusal splint designs, but they can generally be divided into several groups. In the post-Soviet space, V.A. Khvatova and S.O. Chikunov provided the most comprehensive descriptions of occlusal splints, identifying four types of designs based on the function they perform and the design of the occlusal surface:

- disengaging (used for bruxism and decreased interalveolar height to protect teeth and soft tissues);
– relaxation (reduces muscle tone by placing the joint heads in a centric position);
– stabilizing (stabilizes the position of the lower jaw after normalization of muscle tone);
– repositioning (sets the articular heads of the lower jaw in the correct position).

In foreign literature, there is a classification of tires that distinguishes two main types:

Permissive splints and repositioning splints. The former allow teeth to contact and glide freely along the flat surface of the splint. Their main function is to correctly position the condyles of the mandible by eliminating negative occlusal contacts and relaxing the masticatory muscles. Within this group of splints, two types are distinguished depending on the number of teeth in contact: splints that contact only the anterior teeth (anterior bite splints) and splints that contact the entire arch (stabilizing splints).

Front bite splints. Anterior bite splints (anterior bite planes, anterior midpoint contact splints) are made of rigid plastic and placed on the maxillary or mandibular incisors in such a way that all teeth except the incisors are disengaged. This eliminates occlusal obstacles to the correct positioning of the condyles during mouth closure, and also relaxes the lateral pterygoid muscle and the anterior cervical muscles. The absence of posterior tooth contacts significantly reduces harmful sensory feedback from inflamed temporal muscles, which can cause intracranial sympathetic vascular changes. A special splint, the NTI (nociceptive trigeminal inhibition splint), operates on this principle. This group of splints also includes the Lucia template, anterior deprogrammer, and others, which are used to find and fix the centric relation of the jaws after 2-

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4 days of wear. Anterior bite splints are contraindicated in cases of intra-articular disorders, as they can lead to even greater stress on the joint components.

Stabilizing tires. Permissive splints are the most commonly used and versatile design of all-arch splints. They create simultaneous contacts on all teeth when the condyles are correctly positioned. It is crucial that the positioning of the condyles in centric relation coincides with uniform tooth contacts on the splint. Stabilizing splints evenly distribute the load during parafunctions, reduce muscle tone, and position the condyles in centric relation, creating a free centric occlusion. The most well-known is the Michigan splint (Ramfjord, Ash) for the upper jaw. Fabrication of stabilizing splints requires an articulator with preliminary fixation of centric relation. During eccentric movements, only the anterior teeth should contact, with immediate disengagement of the lateral teeth. This is achieved by thickening the splint on the palatal surface of the upper canine, creating lateral canine guidance. The occlusal surface of the splint is designed to be flat, with slight indentations sometimes allowed for the cusps of the teeth on the opposite jaw. The duration of use of stabilizing splints for muscle relaxation and joint head alignment is determined by the doctor depending on the clinical situation and typically lasts several months. For patients with severe bruxism, night splints may be used for several years.

Guides, or repositioning, Anterior guide splints shift the condyles of the mandible forward from their centric position to eliminate pain. While resolving splints eliminate occlusal obstacles, allowing the condyles to settle into a superoanterior position when the masticatory muscles contract, guide splints, conversely, prevent the condyles from settling into centric relation, directing the mandible anteriorly when the mouth closes. This is achieved by the presence of special inclined planes on the occlusal surface in the premolar region. Anterior guide splints are primarily used in two situations: to relieve pressure on the tissues behind the condyles following acute trauma (a fall, a blow to the chin from front to back) and for anterior reducible dislocation of the articular disc with pain. A characteristic symptom of anterior reducible disc dislocation is a double click in the joint when opening and closing the mouth. Typically, the anterior displacement of the mandible from the centric occlusion position is 2–3 mm, which is sufficient to position the condyles precisely against the discs. Unlike resolving splints, guidance splints should be worn at all times, even while eating. An example of a guidance splint is the Gelb mandibular splint.

Materials for making a tire. The primary material for occlusal splints is currently hot- or cold-curing plastic. Its main advantages are relative affordability, ease of use, and dimensional stability. Plastic splints are also easily adjusted for occlusion using abrasive instruments and can be built up directly in the mouth with self-hardening plastic. The use of metal in splints is currently limited to the manufacture of clasps in cases of insufficient retention. All-metal splints are of historical interest only. Splints are often made of soft acrylic plastics or elastic materials with similar properties. Such splints can be fabricated relatively quickly and are indicated for short periods of time, primarily in cases of severe pain or dysfunctional symptoms caused by muscle hyperactivity or acute trauma. Splints made of soft materials can also be used in children and adolescents with bruxism, as hard acrylic splints can interfere with jaw growth. The use of soft splints in adults, on the contrary, can increase hyperactivity of the masticatory muscles, as well as grinding and clenching of the teeth due to the elasticity of the material. Such tires are less polished and ground and require frequent reworking due to the wear and tear of the material.

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Thus, occlusal splints are a simple and versatile treatment for musculoskeletal disorders. However, their use can only be effective when combined with other therapies (psychotherapy, myogymnastics, medications, etc.). Patients using splints should be under constant supervision by a dentist, and at the first sign of worsening symptoms, either the splint should be replaced or splint therapy should be discontinued completely.

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