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Diagnosis Of Functional Disorders Of The Temporomandibular Joint In Distal Occlusion And Their Comprehensive Treatment

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Abstract

Distal occlusion is one of the most common dentofacial anomalies and is frequently associated with functional disorders of the temporomandibular joint (TMJ). Changes in mandibular position, imbalance of the masticatory muscles, and altered occlusal relationships may lead to pain, joint dysfunction, limited mandibular movement, and pathological joint sounds. Early diagnosis and comprehensive treatment are essential for restoring functional balance and preventing chronic complications. This article discusses modern diagnostic methods for TMJ disorders associated with distal occlusion and presents comprehensive therapeutic approaches, including orthodontic, orthopedic, physiotherapeutic, and occlusal rehabilitation methods. The study emphasizes the importance of an interdisciplinary approach in achieving stable functional and aesthetic outcomes.

Keywords: Distal occlusion, temporomandibular joint, TMJ dysfunction, orthodontic treatment, occlusal disorders, functional diagnostics, comprehensive therapy.

Introduction

Functional disorders of the temporomandibular joint represent a significant problem in modern dentistry due to their high prevalence and complex etiology. Distal occlusion, characterized by posterior positioning of the mandible relative to the maxilla, often contributes to biomechanical imbalance within the stomatognathic system. This imbalance affects the coordinated activity of the masticatory muscles, dental occlusion, and temporomandibular joint structures.

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Patients with distal occlusion frequently complain of joint pain, clicking sounds, headaches, muscle fatigue, and restricted mandibular movements. If left untreated, these disorders may progress into chronic temporomandibular dysfunction, negatively affecting both oral health and quality of life.

The relationship between occlusal anomalies and TMJ dysfunction remains an important topic in orthodontics and gnathology. Accurate diagnosis and comprehensive treatment planning are crucial for achieving long-term functional stability.

Aim of the Study

The purpose of this article is to analyze modern diagnostic approaches for functional TMJ disorders in patients with distal occlusion and to evaluate effective comprehensive treatment methods.

Materials and Methods

The study is based on the analysis of contemporary scientific literature, clinical observations, and diagnostic protocols used in orthodontic and gnathological practice.

The following diagnostic methods are commonly applied:

- ✓ Clinical examination;
- ✓ Functional occlusal analysis;
- ✓ Palpation of masticatory muscles and TMJ;
- ✓ Assessment of mandibular movements;
- ✓ Radiographic examination;
- ✓ Cone-beam computed tomography (CBCT);
- ✓ Magnetic resonance imaging (MRI);
- ✓ Electromyography (EMG);
- ✓ Articulator analysis.

Comprehensive examination allows accurate identification of structural and functional abnormalities in the temporomandibular joint.

Etiology and Pathogenesis

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Distal occlusion may develop due to hereditary, functional, or environmental factors. The most common etiological factors include:

- ✓ Genetic predisposition;
- ✓ Abnormal oral habits;
- ✓ Mouth breathing;
- ✓ Premature tooth loss;
- ✓ Disturbances in craniofacial growth;
- ✓ Muscular imbalance.

In distal occlusion, posterior displacement of the mandibular condyle may increase pressure on retrodiscal tissues and alter joint biomechanics. Continuous overload leads to muscular hyperactivity, internal derangement of the joint, and functional instability.

Muscle discoordination and occlusal interference contribute to the progression of TMJ dysfunction. Over time, adaptive changes may transform into pathological conditions involving cartilage degeneration and chronic pain syndrome.

Clinical Manifestations

Patients with TMJ dysfunction associated with distal occlusion may present with the following symptoms:

- ✓ Pain in the TMJ region;
- ✓ Clicking or crepitus during jaw movement;
- ✓ Limitation of mouth opening;
- ✓ Deviation of the mandible during function;
- ✓ Headaches and facial pain;
- ✓ Increased fatigue of masticatory muscles;
- ✓ Ear discomfort or tinnitus;
- ✓ Bruxism.

Clinical manifestations vary depending on the severity and duration of the disorder.

Diagnostic Approaches

Clinical Examination

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Clinical evaluation includes facial analysis, assessment of occlusal relationships, mandibular mobility, and muscle tenderness. Special attention is paid to joint sounds and symmetry of mandibular movements.

Instrumental Diagnostics

Cone-Beam Computed Tomography (CBCT)

CBCT provides detailed visualization of bony structures and condylar position within the glenoid fossa.

Magnetic Resonance Imaging (MRI)

MRI is considered the gold standard for evaluating soft tissues, including the articular disc and joint effusion.

Electromyography (EMG)

EMG assesses the functional activity of masticatory muscles and identifies muscular imbalance.

Articulator Analysis

Articulator systems help simulate mandibular movements and analyze occlusal interferences.

Comprehensive Treatment

Treatment of TMJ dysfunction in patients with distal occlusion should be individualized and multidisciplinary.

Orthodontic Treatment

Orthodontic correction aims to normalize occlusal relationships and improve mandibular positioning. Common methods include:

- ✓ Functional appliances;
- ✓ Fixed orthodontic systems;
- ✓ Clear aligners;
- ✓ Growth modification techniques.

Early orthodontic intervention may significantly reduce TMJ dysfunction symptoms.

Occlusal Therapy

Occlusal splints are widely used to reduce joint loading, relax masticatory muscles, and stabilize mandibular position.

Types of splints include:

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- ✓ Stabilization splints;
- ✓ Repositioning splints;
- ✓ Night guards.

Physiotherapy

Physiotherapeutic procedures improve blood circulation and reduce muscle tension. Common methods include:

- ✓ Ultrasound therapy;
- ✓ Laser therapy;
- ✓ Electrostimulation;
- ✓ Therapeutic exercises;
- ✓ Massage therapy.

Pharmacological Management

In acute conditions, medications may include:

- ✓ Nonsteroidal anti-inflammatory drugs (NSAIDs);
- ✓ Muscle relaxants;
- ✓ Sedatives;
- ✓ Vitamin therapy.

Surgical Treatment

Surgical intervention is indicated only in severe cases involving structural joint pathology and failure of conservative treatment.

Discussion

Modern studies demonstrate a strong association between distal occlusion and temporomandibular dysfunction. Functional imbalance caused by malocclusion may alter condylar position and increase stress on the joint complex.

Successful treatment requires not only elimination of symptoms but also correction of the underlying occlusal and functional disturbances. Interdisciplinary cooperation between orthodontists, prosthodontists, physiotherapists, and maxillofacial specialists significantly improves treatment outcomes.

Comprehensive diagnostics combined with individualized treatment planning ensures restoration of functional harmony and long-term stability.

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Conclusion

Functional disorders of the temporomandibular joint are frequently associated with distal occlusion and may significantly impair oral function and quality of life. Early diagnosis using modern clinical and instrumental methods is essential for accurate assessment of joint dysfunction.

Comprehensive treatment involving orthodontic correction, occlusal therapy, physiotherapy, and supportive management provides effective restoration of TMJ function and prevention of chronic complications. A multidisciplinary approach remains the most effective strategy for achieving stable clinical and functional results.

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