ANATOMO-FUNCTIONAL STRUCTURE OF THE MANDIBULAR JOINT

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Abstract. *The temporomandibular joint (TMJ) is one of the most complex joints in the human body, located between the mandible and temporal bone. This joint has a symmetrical structure, moves bilaterally and functionally plays an important role in chewing, speaking, breathing, and facial expression. The normal functioning of the TMJ is of great importance in the fields of orthodontics, dentistry, neurology, and orthopedics.*

Keywords: *Temporomandibular joint, mandible, temporal bone, articular disc, ligaments, muscles.*

АНАТОМО-ФУНКЦИОНАЛЬНАЯ СТРУКТУРА НИЖНЕЧЕЛЮСТНОГО СУСТАВА

Аннотация. *Височно-нижнечелюстной сустав (ВНЧС) является одним из самых сложных суставов в организме человека, расположен между нижней челюстью и височной костью. Этот сустав имеет симметричное строение, движется двусторонне и функционально играет важную роль в жевании, речи, дыхании и выражении лица. Нормальное функционирование ВНЧС имеет большое значение в областях ортодонтии, стоматологии, неврологии и ортопедии.*

Ключевые слова: *Височно-нижнечелюстной сустав, нижняя челюсть, височная кость, суставной диск, связки, мышцы.*

I. Anatomical structure of the TMJ

Anatomically, the TMJ consists of the following main elements:

1. Skeletal structures

The TMJ includes the following bone elements:

• Mandible (Mandibula) – is the mobile part of the TMJ. Its condyles articulate with the articular fossa.

• Temporal bone (Os temporale) – This bone is the immobile part of the joint, in which the articular fossa (Fossa mandibularis) and the articular tubercle (Tuberculum articulare) are located.

2. Articular disc (Discus articularis)

The articular disc consists of fibrous connective tissue and divides the TMJ into two parts:

1. Upper cavity (cavitas articularis superior) – is located between the articular bone and the articular disc.

2. The lower cavity (cavitas articularis inferior) is located between the articular disc and the condyles of the lower jaw. The articular disc serves to cushion the movement of the lower jaw and evenly distribute the load. Its elasticity is important for absorbing shock during movement and protecting the articular surfaces.

Joint capsule and synovial fluid

• The joint capsule is a structure made of connective tissue that surrounds the TMJ.

• Synovial fluid is a substance that acts as a lubricant, reduces friction between the joint surfaces, and nourishes the tissues.

4. Ligaments

Several ligaments are involved in controlling the movements of the TMJ:

• Temporomandibular ligament (Ligamentum temporomandibulare) - limits the lower jaw bones posteriorly.

• Sphenomandibular ligament (Ligamentum sphenomandibulare) - helps to stabilize the lower jaw.

• Stylomandibular ligament (Ligamentum stylomandibulare) - limits the retraction of the lower jaw.

5. Muscles associated with the pterygoid process

The main muscles that provide movement of the pterygoid process:

Musculi masticatorii

1. Masseter muscle (Musculus masseter) - lifts the lower jaw up and secures it with strong soft attachments.

2. Temporal muscle (Musculus temporalis) - moves the lower jaw up and back.

3. Medial pterygoid muscle (Musculus pterygoideus medialis) - moves the lower jaw up and in the medial direction.

4. Lateral pterygoid muscle (Musculus pterygoideus lateralis) - moves the lower jaw forward and to the side.

II. Functional structure of the TMJ.

The TMJ is a multi-movement joint and performs the following main movements:

1.Depression and elevation (opening and closing the mouth)

• Opening the mouth is the activity of the lateral pterygoid muscle.

• Closing the mouth is performed by the masseter, temporal and medial pterygoid muscles.

2. Protrusion and retrusion (pushing the lower jaw forward and backward)

• Protrusion - as a result of the bilateral activity of the lateral pterygoid muscle, the lower jaw moves forward.

• Retrusion - the posterior part of the temporal muscle pulls the lower jaw backward.

3. Lateral movements (moving the lower jaw to the side)

• Unilateral lateral movement is provided by the unilateral activity of the lateral pterygoid muscle.

III. TMJ dysfunctions and pathologies.

There are various pathological conditions in the TMJ, including:

1.Temporomandibular dysfunction (TMD) - pain, noise and limited movement are observed in the joint.

2.Articular disc displacement - pain and limited movement occur as a result of the displacement of the articular disc from its normal position.

3.Osteoarthritis and arthrosis - occur as a result of degenerative changes in the joint.

4.Arthritis - can develop as a result of infection or autoimmune processes.

Conclusion

The temporomandibular joint (TMJ) is one of the most important and complex joints in the human body, capable of performing multifunctional movements. Its normal functioning is important for speech, chewing and facial expression. A thorough study of the anatomical and functional structure of the cranial nerves is of great importance for the effective treatment of pathologies in dentistry, orthopedics, and neurology.

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