

BACKBONE OF NORMAL OCCLUSION, PEACEFUL NEUROMUSCULATURE IS STABLE COMFORTABLE TMJ

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ABSTRACT:

Dentist who ignore the TMJs can never be competent in smile design or in diagnosing or treating occlusions. Dentist who ignore occlusion can never be competent in diagnosing or treating problem of TMJs. Dentist who ignored occlusion can never be competent in diagnosing or treating problems of TMJs. Dentist who ignore the relationship of the occlusion to the position and condition of the TMJs can only guess at diagnosing a myriad of problem that are seen in every general practice. Understanding what it takes to keep masticatory system in harmony has positive consequences beyond achieving peaceful neuromusculature. This review is on the harmonious relation and interrelation of TMJs, occlusion and masticatory muscle.

Key words : Neuromusculature, TMJ, Occlusion.



INTRODUCTION:

The Temporomandibular joint is unique when compared to other synovial joints. Its unique characteristics are its complete articular disc, fibrous articular surfaces, two independent synovial cavities, and articular movements. Furthermore, one of its skeletal components, the mandible, carries teeth [1]. This review contain the relationship of the temporomandibular joints, the occlusion of the teeth, and Masticatory muscle to one another.

One of the most important rule to follow in dental practice is that if the TMJs cannot accept compressive loading

with complete comfort, always find out why before proceeding with irreversible occlusal treatment. The first requirement for successful occlusal treatment is stable, comfortable TMJs. We also cannot keep teeth in a stable position where muscle does not want them to be. Muscle is the dominant determinant of both the horizontal and verticle position of teeth [2]. The compressive force of jaw closing musculature has been measured at up to 975lbs [3].

MASTICATORY SYSTEM: "Dentist-masticatory system physician [2]"

OCCLUSION

Glossary of prosthodontic term defines occlusion as the actor process of closure or being closed or shut off or the static relationship between the incising or masticating surfaces of maxillary or mandibular teeth or tooth analogues [5].

Occlusal disease is deformation or disturbance of function of any structures within the masticatory system that are in disequilibrium with a harmonious interrelationship between the TMJs, the masticatory musculature, and the occluding surface of teeth.

- Determination of correct physiologic jaw relationship must always be determined before we can determine the correct alignment and occlusion relationship of teeth.
- The teeth must fit into the harmony of jaw relationship- not vice versa [4].

Primary requirement for successful occlusal therapy [4]

- Comfortable and stable TMJs
- Anterior teeth in harmony with the envelope of function
- Non-interfering posterior teeth

The reason we put so much emphasis on harmony between the TMJs, the anterior guidance, and the posterior teeth is because even the slightest disharmony can cause severe hyperactivity and incoordination of masticatory muscle function.

MASTICATORY MUSCLE

Muscle is the primary focus in verticle dimension, neutral zone, arch form, occlusal disease and even in smile design. If muscle is not a prime consideration in treatment planning for prosthodontics, implants predictability of treatment result will be reduced to guessing [6].

Research into how masticatory musculature function and dysfunction has clarified much of our clinical thinking [7-10]. Sophisticated EMG studies have expanded our knowledge from gross muscle activity all the way down to the function of single motor muscles [11,12].

The movement of mandible are controlled by muscle and a complex neurovascular network that allow not only mastication but proprioceptive control of the spatial position of jaws, breathing, speech, swallowing and other complex activity [13].

Masticatory muscle [14]

- 1) Masseter muscle
- 2) Temporalis muscle
- 3) Pterygoid muscle
- 4) Suprahyoid muscle
- 5) Head and cervical muscle

Depression is brought about mainly by lateral pterygoid. The digastric, geniohyoid and mylohyoid muscle help

when muscle help when mouth is opened wide or against resistance.

Elevation is brought about by masseter, the temporalis and medial pterygoid muscle of both side. These are antigravity muscles, Protrusion is done by lateral and medial pterygoid.

Retraction is produced by the posterior fiber of the temporalis. It may be resisted by middle and deep fiber of masseter, the digastric and geniohyoid muscles.

Lateral and side to side movement like turning the chin to left side is produced by left lateral pterygoid and right medial pterygoid [15].

It has become apparent that condyle and disk discordination does not occur without the involvement of muscle. one must determine wheather incoordination of muscle is the cause of the disk misalignment and , if so, the chain of muscle responses must be traced back until the originating stimuli for the muscle disharmony is determined. If the intercuspatation of teeth is not in harmony with the joint-ligament-muscle balance, a stressful and tiresome protective role is forced onto the muscles [16].

THE TEMPOROMANDIBULAR JOINT

“All occlusal analysis starts at Temporomandibular joint”

The TMJs is formed by the mandibular condyle fitting into the mandibular fossa

of the temporal bone. Separating these two bones from direct articulation is the articular disc. The TMJs is classified as a compound joint. The articular disc is composed of dense fibrous connective tissue, for the most part devoid of any blood vessels or nerve fibers. The extreme periphery of the disc, however, is slightly innervated. 1,2 In the sagittal plane it can be divided into three regions according to thickness (Fig. 1-12). The central area is the thinnest and is called the intermediate zone. The disc becomes considerably thicker both anterior and posterior to the intermediate zone. The posterior border is generally slightly thicker than the anterior border. In the normal joint the articular surface of the condyle is located on the intermediate zone of the disc, bordered by the thicker anterior and posterior regions [17].

Ligaments of joint:

- Capsular ligament
- Temporomandibular ligament
- Sphenomandibular ligament
- Stylomandibular ligament

ARTICULATION

Compression upon the TMJ intracapsular components is not well tolerated. This erroneous depiction of TMJs represents one of the most prevalent causes for confusion. Everything about the design of TMJs points to the capacity to accept

compressive loading as the fulcrum for the mandibular lever [18].

Sicher described the character of these tissue as anatomic and histologic evidence that TMJs were made to be load bearing [19]. Extensive studies by hylander have proven conclusively that loading forces are directed through the condylar fulcrum during all functional jaw movements [20].

A quote from the literature expresses this view point:

“ the natural condyle foss relationship has 2.0 to 4.0 mm of superior joint space. Under the force of masseters, temporalis and medial pterygoids this space can be over-powered and compressed.” This view point leads to attempts to protect the TMJs from loading forces by putting the forces on teeth in order to stop upward compression of joints [18].

This concept fails the test of clinical accuracy in two ways:

1. It fails to recognize that the stopping surface for upward movement of the condyle-disk assembly is hard bone, not a spongy soft tissue. The disk that is interposed between the Condyle and bone stop is dense, strong fibrous tissue with no blood vessels in its bearing surface, and no clinically observable compressibility. When the condyle are seated (centric relation), the inferior lateral pterygoid muscle is completely released and is inactive [18].

Mahan has described this relationship as unyielding to upward movement when the condyles are in centric relation [21].

It is this precise end point for the condyle disk assemblies that enables us to record centric relation with needle point accuracy [22]. It is for this reason that correctly mounted cast on an articulator are an absolutely reliable duplication of patients correct jaw-to-jaw relationship.

2. The effect of putting the teeth in interference with completely seated joints, requiring the condyle to displace down and forward from their seated position every time teeth come together. This is potential activator of incoordinated hyperactivity of masticatory muscles and a prime causative factor in occluso-muscle pain [22].

“ If TMJs are not stable, the occlusion will not be stable, so it is a risky proposition to undertake occlusal changes without knowing the condition of the TMJs”

FIVE REQUIREMENTS FOR EQUILIBRIUM OF THE MASTICATORY SYSTEM:

- Stable, comfortable TMJs (even when loaded)
- Anterior guidance in harmony with functional movements of mandible
- Non-interference of posterior teeth
 - a. Equal intensity contacts in centric relation
 - b. Posterior disclusion when the condyle leaves centric relation

- all teeth in vertical harmony with the repetitive contracted length of the closing muscles
- all teeth in horizontal harmony with neutral zone

CONCLUSION:

Dentist have never been better equipped to serve their patients with highest level of quality and predictability. If that ultimate level of master quality dentistry is to be

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