

# Neuromuscular Dentistry- An Insight



## Medical Science

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### ABSTRACT

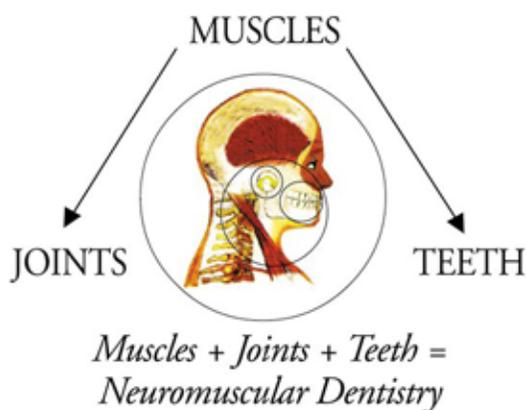
*Neuromuscular dentistry is an approach in which all the three components- teeth, masticatory muscles and temporomandibular joint are taken into consideration as an interdependent unit.*

*It recognizes the biophysiologic sciences relating dental pathophysiology and their relationship to masticatory muscle dysfunction and joint derangement problems through the neural pathways relating to the central nervous system. Neuromuscular occlusion considers the entire system that controls the positioning and function of the jaw and seeks a balanced relationship between them. This is done through various techniques and procedures which help to determine the rest position of the jaw and is used as a reference to establish the ideal mandibular position. Dental occlusion is then altered or adjusted to produce the new mandibular position. It can be achieved by surgery, occlusal splints or other means. This review aims to give an insight into neuromuscular dentistry.*

### Introduction

Neuromuscular dentistry is the science of dentistry that embodies accepted scientific principles of pathophysiology, anatomy, form and function. It objectively evaluates the complex relationship between teeth, temporomandibular joint (TMJ) and the masticatory muscles, in order to achieve an occlusion that is based on the optimal relationship between the mandible and the skull — a neuromuscular occlusion.

**Figure-1 Neuromuscular Dentistry**



As other fields of medicine are evolving, dentistry should also follow suite and treatment plan for each patient should be evidence based and must have passed the critical appraisal phase (Sackett DL et al, 1996 and Gianelly AA, 2000). While traditional dentistry focuses only on the teeth and gums, neuromuscular dentistry focuses on the harmonious relationship between the muscles, joints and nerves, the teeth, gums and bones. Neuromuscular dentistry is concerned with all the functions of the mouth including chewing, swallowing, speaking, biting, yawning and singing.

To put it simply, neuromuscular dentistry places the jaw into its optimal position, relieving the symptoms associated with TMJ. Neuromuscular dentists know that the hard and soft tissues have a complex relationship and work to make that relationship a harmonious one. They also understand the necessity for including the power source (muscles) and the controls (nerves) which create the movement, pressures, and function of the mouth.

When the jaw is not aligned properly, the hard and soft tissues get affected which can cause various physiological problems such as-

- Headache and migraine
- Jaw pain
- Neck ache
- Shoulder pain
- Ringing in the ears
- Clicking or popping sounds in the joints of the jaw
- Clenching and grinding of teeth
- Loose teeth
- Worn or cracked teeth and fillings

Often, these problems are the result of TMD (Temporomandibular Disorder) or MFP (Myo Facial Pain Syndrome).

What differentiates neuromuscular dentistry from other theories of occlusion that may guide dental treatment is its emphasis on gravity as determining the bite, as well as where the jaw muscles are most relaxed. Neuromuscular dentists can realign the bite and resolve the damage/ TMD symptoms. Hence the goal of neuromuscular dentistry is to relax the muscles controlling the jaw position, to establish a true physiological rest position upon which treatment considerations are based (Tabbara N, 2009).

### Historical background

Neuromuscular dentistry was introduced in the late 1960's early 1970 by Dr. Bernard Jenkelson, who examined the relationship of the upper and lower jaws. However, he did not limit his examination to the teeth, but also investigated the relationship between the muscles, nerves, bones and the two TMJ's.

With the assistance of his son, Dr. Bob Jenkelson, he developed equipment to locate the ideal position of the lower jaw, which was determined to be where the jaw muscles are most comfortable. According to Dr. Jenkelson and neuromuscular theory, when the teeth, jaw muscles and TMJs are not aligned, TMD symptoms occur.

### Neuromuscular dentistry diagnosis

Diagnosis should be the initial step in any interaction with the patient and should start from a neutral and relaxed physiologically optimal position. In addition to x-rays or digital radiographs that reveal the position and condition of the jaw joints, neuromuscular dentists use several diagnostic technologies in order to determine the ideal position of the jaw to relieve TMD

symptoms. Several computerized instruments are used to measure the jaw movements and jaw muscle activity to determine the extent of the problem and to establish a physiologic rest position for the jaw. Some of the measurement techniques and procedures used are-

Sonography and/or Joint Vibration Analysis – used to record jaw joint sounds to detect any abnormalities. It measures vibrations from the joint when the mouth is opened and closed to identify joint derangements.

Ultrasound- has been used since many years for the treatment of neuromuscular and musculoskeletal ailments (Bains VK, Mohan R and Bains R, 2008).

Transcutaneous Electrical Neural Stimulation (TENS) – involves ultra-low frequency electrical stimulation of the muscles to relieve muscle spasms and pain and help establish a “physiologic” jaw position. This treatment involves placing electrodes on the jaw, neck and shoulder areas that transmit mild electrical stimulation to repeatedly contract the jaw muscles in order to relax them.

Once the rest position of the jaw is determined, the patient undergoes extensive restorative dental procedures or orthodontics to maintain this new position

Electromyography (EMG) – It is an efficient and effective way to measure the jaw's muscle function in both its stressed and relaxed positions, and will also measure the jaw-to-skull relationship to see if there is a structural imbalance. It involves placing surface electrodes over the jaw muscles that pick up electrical impulses and sending them to the recording instrument. It is used to measure the activity in the muscles during various movements

Jaw Tracking (Electrognathograph, Kinesiography) – analyzes mandibular movements three dimensionally. A headset is placed on the patient and a magnet is attached to the lower front teeth. Recording of the lower jaw movement is then made.

### Neuromuscular dentistry treatment

If the jaw is not properly aligned, neuromuscular dentistry may help to address the precise cause of the problem- whether jaw joint, muscle or tooth position. Treatment plans developed by neuromuscular dentists are designed to correct bite abnormalities by allowing the jaws to go to their optimal positions for the long term. Typically treatment will follow three steps:

#### 1. Relieve muscle spasm and pain

The best way to provide relief for the symptoms is by using a technology called ULF-TENS (Ultra Low Frequency Transcutaneous Electrical Neural Stimulation) which is a way to relax the jaw with a gentle massage of the muscles. The rhythmic pulsing relaxes the muscles by increasing blood flow and releasing waste products trapped by the area being constricted.

#### 2. Stabilize the bite

Adjustments of a person's bite can be accomplished using an oral appliance- such as a splint or mouth guard- until the bite has been permanently stabilised.

#### 3. Long-term management

Orthodontic work may be required to ensure proper alignment, in addition to dental restorations such as crowns, or tooth recontouring (equilibration).

### Conclusion

Neuromuscular science is a broad and all-encompassing approach to finding the stable physiologic neutral zone. The neu-

romuscular approach recognizes that establishing homeostasis of the masticatory, joint and cervical system is a foundational principle that goes hand in hand with biophysiological health. Historically occlusal theories focussed on the hard tissue structures in the system but lacked comprehensive perspective to be able to create predictable outcomes. With the inclusion of the soft tissue analysis along with the hard tissue science, an objective and complete analysis of the entire system can be arrived at, including musculature and bone and teeth to create a stable result from multiple perspectives, including posture of the head, neck, body and jaws. In addition, muscular balance will create better occlusal stability and long term restorative or orthodontic/orthopaedic stability as well as enhanced esthetics for the patient.

Hence, patients of neuromuscular dentistry experience a range of benefits from decreased or eliminated pain and discomfort to better overall health and longer-lasting dental restorations.

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