

## RATIONALE OBJECTIVE DATA: The Basis for Effective Treatment

In the process of consultation, evaluation, examination and gathering evidence and data, there should be a consistent sequelae and flow to the rationale for recommended diagnostics which would lead toward a specific treatment protocol.

Without objective data gathering, misguided conclusions toward a particular mode of treatment, especially when dealing with the craniomandibular/ temporomandibular/cervical complex, will result in confusion and frustration to both the clinician and patient.

The sequence of fact-finding, verification and confirmation of what is observed and known should help lead the clinician toward understanding the problem as a whole. If certain pieces of evidence do not correspond and are not consistent with other findings, further study in that area of the unknown must be investigated before treatments is rendered.

Understanding the neuromuscular pathophysiology of this living system is a must for any treating clinician to effectively begin to consider treatment, especially In dealing with the complex.

Our investigative approach starting with a hands-on comprehensive examination should be a starting point to determine what abnormalities are present, if any. A supportive analysis should include: a review of static radiographs, joint sound analysis (Sonography) to determine and confirm joint pathologies. Based on this evidence, a dynamic three dimensional analysis of jaw movements and function are tested in relation to muscle activity/ posture of the head, neck, jaw and joints. This diagnostic study and evaluation allows the doctor to analyze and record the degree of dysfunction, thus giving further meaning and understanding to the static data.

The following is a brief summary of the sophisticate modalities weimplement to complete this study of dysfunction, pathology and suffering.

### Sonography

Sonography utilizes a Myotronic K6-I. measuring intracapsular TMJoint sounds against normalized data, duration of these sounds, exact location of the occurrence of these sounds during jaw opening) closing, or lateral excursions, and a spectral frequency analysis of the sound. Without this information, one could not restore function free of intracapsular interference. This is the first initial non-invasive diagnostic test to verify if there is joint pathology.

### Tomograms

Corrected Tomography of the TMJoint has proven to be the most reliable imagery in the diagnosis of patients suffering form Temporomandibular dysfunction and Craniofacial pain.

Tomography provides clinicians with layered views, cuts or slices of anatomical structures. These underlying tissues are usually obscured when using conventional, plain x-rays, because of the superimposition of more superficial tissues.

TMJoint tomography yields a tremendous amount of even subclinical information about the fossa/ condylar relationship and the integrity of the TMJoint mechanism.

### Coronal Tomographic Trauma Series

This series of six coronal tomograms was developed to ascertain changes in the density profile of the condylar head at each site of soft tissue attachment to the mandibular condyle, thus irrefutably referencing the presence or absence of trauma-Induced tissue damage.

### Computerized Electro-Diagnostic Instrumentation

This multi-dimensional means of observing typical signature patterns confirming injury incorporates several of our senses, exponentially enhancing our special visualization and conceptual grasp of the functioning or dysfunctioning of the body parts, organs, and neurovasomuscular systems, while utilizing to

the fullest the physical findings from clinical examination of the patient. SONO accurately measures and locates TMJoint sounds in function. EMG accurately measures the activity in muscles in microvolts. CMS accurately measures the motion and range of movement of the mandible In function in the frontal and sagittal planes as well as velocity of jaw movements. TENS relaxes the muscles of the face, including the muscles of mastication therefore allows us to determine the correct relation of the mandible to the cranium.

#### EMG

As a result of pain elicited in palpating muscles and areas of the craniomandibular complex, and in consideration of the patient s complaints, an electromyography (EMG) series is recommended to more specifically delineate and define hypertonic musculature in this compromised patient This series is necessary in order to differentially diagnose between intracapsular interference (mensical or otherwise) and extra-capsular interference (influence of the surrounding hypertonic muscular matrix) so as to determine the predominant dysfunctions. Defining the etiology of the patient s predominate neuromuscular dysfunctions will preclude misdirected palliative treatment regimens.

#### CMS

Computerized Mandibular Scanning is a more complex assessment of mandibular function using biomedical instrumentation which measures the rotational movement in the frontal and sagittal planes thus confirming a neuromuscular dysfunction. It Is a multi-dimensional assessment of torquing movements used to differentiate between contributing factors of a pathologic position to a non-pathologic position on opening and closing of the mandible. Used in conjunction with EMG recordings.

#### TENS

Transcutaneous electrical nerve stimulation is a specific therapy for the treatment and resolution of pain related to neurological and myofacial conditions. It does this by delivering a mild electronic impulse through the nerves that control the masticatory and facial muscles. The rythmic pulsing relaxes the muscles and therefore allows us to determine the correct relation of the mandible to the cranium. It also relieves pain and trismus of the muscles of the face caused by spasms and tension. In addition, it propels the mandible through space to a position which is most compatible with a relaxed musculature. This procedure involves the placement of electrodes bilaterally in the preauricular area anterior to the right and left ears, just lateral to the coronoid notch. The current emanating from the electrodes stimulate the motor divisions of the fifth and seventh cranial nerves. The TENS pulse rate is once every 1.5 seconds (low frequency). It mimics the natural pulsing action of the body somewhat like a massage. The effectiveness of the TENS therapy is documented by EMG recordings.

By gathering this data objectively one is able to effectively determine a resting physiologic position of the mandible In relation to the cranium. Resting modes of the musculature is clearly Identified and the parameters by which to record the optimal jaw to cranium relationship can be accomplished scientifically without subjective interference of bias and guessing.

#### ORTHOPEDIC APPLIANCE (ORTHOTIC)

Treatment, utilizing a neuromuscular orthotic, is directed toward orthopedic realignment of the mandible to the cranium, stabilizing the temporomandibular joints and restoring them to normal physiological function while concomitantly reducing contracted (spastic) craniofacial and cervical musculature and developing functional and resting modes within normal physiological parameters.

Tests are required for the placement of an orthotic that was designed and constructed using data derived from EMG recordings and range of motion data. The purpose of this orthopedic appliance is to align the mandible to the craniomaxillary complex optimally in three dimensions thereby relieving muscle, ligament, nerve and vascular impingement. It serves to maintain the stomatognathic musculature at the optimal resting length from origin to insertion thus decreasing pain and improving function.

The orthotic is a custom made removable acrylic appliance designed for the patient and placed over the mandibular teeth. To be worn 24 hours per day.

#### UNDERSTANDING “TMJ”

What Is It?, the Controversy, and How to Treat  
The Controversy  
How to Treat TMJ  
WHAT IS "TMJ ?"

According to the National Institutes of Health, Temporomandibular Disorders refer to a collection of medical and dental conditions affecting the temporomandibular joint and/or the muscles of mastication (chewing muscles), as well as related tissue components.

The TMJs are the two joints in the front of the ears that attach the lower jaw (mandible) to the skull (fossa). Not only do the jaw joints rotate as other ball-and-socket joints, they translate (move down and forward). The disc (articular disc) is a thin piece of tissue acting as a buffer between the skull and the condyle (top of the mandible).

When intact, they are the only joints in the human body that work together as a unit. These joints, often taken for granted, allow us to perform functions as opening and closing the mouth, chewing, swallowing, breathing, kissing, talking, etc. Problems that can occur with the temporomandibular joint are arthritis, trauma, tumors, tearing or dislocation of the disc. The TMJs and the mandibular complex are able to function and move by means of innervated muscle, tissue, and ligaments that are the connecting components between the lower jaw (the mandible) and the skull (cranium). There often can be accompanying muscle spasms that effect temporomandibular diseases/disorders which often are diagnosed as Fibromyalgia or Myofascial Pain Dysfunction. You may experience joint problems, muscle problems or both.

#### Numerous Signs and Symptoms

TMJ as we know it presents with numerous signs and symptoms which include: a clicking or popping jaw and mild discomfort to complete jaw dysfunction and severe debilitating pain. Many can experience a varying combination of these symptoms with varying degrees of discomfort. Many discover that these symptoms may be transient and go away on there own with or without treatment. However, for many others, it can be the beginning of a long, agonizing and frustrating life where lives are disrupted, dreams shattered, families tom apart and people left bankrupt, desperate and without hope. If you have TMJ, you may have spent years of your life and thousands of dollars being referred from one doctor to another hoping for relief. Doctors may have told you that you are crazy or need to better handle your stress. They may have told you that you don t have pain. They may even have abandoned you, saying there is nothing more to be done for you...that is, after you have spent thousands or hundreds of thousands of dollars on treatments.

If this sounds familiar, you are not alone. You are not crazy and you are not to blame if you haven t gotten better. It is possible that you have received one or many of the over 49 treatments being recommended to TMJ patients in this country, most being sold on the basis of the doctor s preference, not scientific evidence of safety or effectiveness. The treatment may, in fact, be making you worse. You may feel caught in a quagmire. Your personal experience may be that there is a great deal of disagreement among professionals about most aspects of temporomandibular joint diseases/disorders.

#### Symptoms

The symptoms most commonly cited are as follows:

Facial pain

Jaw joint pain

Back, Neck, cervical pain

Postural problems (forward head posture)

Pain in the joint(s) or face when opening or closing the mouth, yawning, or chewing

Headaches (tension type)

Pain in the muscles surrounding the temporomandibular joints

Pain in the occipital (back), temporal (side), frontal (front), or Infraorbital (below the eyes) portions of the head

Pain behind the eyes

Swelling on the side of the face and/or mouth  
A bite that feels uncomfortable, “off,” or as if it is continually changing  
Clenching/ bruxing  
Tender sensitive teeth  
A limited opening or inability to open the mouth comfortably  
Deviation of the jaw to one side  
The jaw locking open or closed  
Ringing in the ears, ear pain, diminished hearing, and/ or hyperacusis  
Sinus like symptoms  
Dizziness or vertigo  
Visual Disturbances  
Tingling in fingers and hands  
Insomnia - difficulty sleeping

This list of subjective symptoms is by no means exhaustive, but does provide a good idea of the nature of the complaints that are often made by those suffering from TMD.

**Diagnostic Classification** The NIH Technology Assessment Conference Statement concludes, “there are significant problems with present diagnostic classifications of TMD, because these classifications appear to be based on signs and symptoms rather than on etiology.” They further state that, “...scientifically based guidelines for diagnosis ... are still unavailable.” “One of the most difficult and controversial diagnoses the practicing dentist must make is that of the temporomandibular joint dysfunction syndrome (MPD). Controversy still abounds in our literature and at professional meetings even though almost all involved therapists agree that head and neck muscles are affected in the syndromes. The champions of each concept of etiology tend to ignore or belittle the conflicting concepts as though there can be only one cause of TMJ-MPD problems.”

Parker E. Mahan, DDS, Phd, Professor and Chairman Department of Basic Dental Sciences, University of Florida, Gainesville, Florida

The dental community usually diagnoses TMJ based on several things, including range of motion tests, listening for sounds in the joints, examining the teeth, and palpation of the jaw joints as well as the muscles of the face, and head. Typically the dentist will ask for information about your pain and other symptoms, injuries, oral habits, and previous medical and dental treatment.

#### How Many People Have TMJ? Who Gets It?

According to the National Institutes of Health, over ten million Americans suffer from TMJ Diseases/Disorders. This is the most conservative estimate we have seen. Both males and females can get TMJ diseases/disorders. However, 90% of those seeking treatment for TMJ are women, most between puberty and menopause. Recent research has focused attention on the relationship between sex hormones and pain. A study conducted by Dr. Linda LeResche, University of Washington in Seattle, demonstrated that women on hormone replacement therapy were 77% more likely to seek treatment for jaw pain than those not undergoing such treatment. Also, women on oral contraceptive therapy were 19% more likely to seek treatment. Evidence is emerging in support of a biological explanation for why there are more women suffering from TMJ pain. A study done by Dr. Peter Waite, University of Alabama at Birmingham “demonstrates a high incidence of TMJ dysfunction among Mitral Valve Prolapse patients and leads to a suspicion of a common connective tissue disorder.” In an unrelated survey conducted by the Society for Mitral Valve Prolapse Syndrome, of 240 patients surveyed 51% had also been diagnosed with TMJ. A recent study conducted by Dr. J.C. Turp found that among a great percentage of TMJ patients the pain distribution was more widespread than commonly assumed. “Evidence suggests a significant overlap between temporomandibular disorder states and pain conditions in other parts of the body”.

#### Consult Your Medical Doctor

We recommend that you first consult with a medical doctor to rule out any disease that may be causing your symptoms and is treated by medical practitioners. If they are unable to find a reason for your problem, and you are referred to a dentist for a TMJ evaluation, we encourage you to then obtain multiple INDEPENDENT opinions on your condition.

### Get an Independent

Opinion To be a truly independent opinion, the medical/dental professional can not be associated with or working with the medical/dental professional from whom you have already received an opinion. Many TMJ patients seek further opinions outside of their geographical area, without the referral of their original medical/dental professional.

### Educate Yourself and Others

With the increase of managed care (HMOs), where a primary care physician is your health care gatekeeper it is mandatory that you, the patient, become your own well-informed advocate. You will also need to educate your primary care physician and all others you encounter within the system about TMJ. As the Washington Post states in their Health News section on May 7, 1996, this is critical for "...medical science is so uncertain about how to treat jaw pain because the disorder has not been accurately diagnosed or described - and no one is sure whether it should be treated by doctors or dentists, or both." For additional information on treatment modalities and problems see our section on Treatments.

### THE CONTROVERSY

#### What to Call This Problem?

Currently, the health care and research community call this disease/ disorder TMD. The press and public are familiar with this disease/disorder under the name TMJ. Depending who is discussing this disease; it can be called any number of names. In fact, the confusion regarding what to call this is not just a reflection of the chaos in the field but also a contributing factor. A majority of patient advocates, have chosen to use TMJ as the abbreviation for these temporomandibular diseases/ disorders. This is what the patients and public relate to. Depending upon the view and perspective of the treating professional the following is a list of names that would identify and characterize this controversial disorder.

“TMJ”

Cranio-mandibular dysfunction (CMD)

Temporomandibular Joint dysfunction (TMD)

Myofacial pain

Cranio-facial dysfunction (CFD)

Musculoskeletal Dysfunction (MSD)

#### A More Clinical Term for TMJ

I prefer to characterize and identify TMJ as: Musculoskeletal Dysfunction (MSD) of the Head and Neck Resulting in Temporomandibular Joint (TMJ) Dysfunction. This is more characteristic of the more complex cases I see clinically, since muscular pain, imbalances and dysfunctions are exhibited in almost all cases. A More Academic Term for TMJ When contending with institutions, I will use the term “Cranio-mandibular/ neurovasomuscular/ cervical dysfunction” which again is more encompassing of all the various components of the human body that are effected by this elusive disorder. The term cranio-mandibular relates to the skull and lower jaw relationship. The nerves, the vascular blood supply, that are also needed to supply the muscles of the head, neck, and face must be considered in its entirety, since neither work independent of the other. Last but not least is the cervical or neck region that supports the cranium and jaw complex. As one begins to understand the human body, one will then realize the complexity as well as its fine order. The various components of the TM Joints, the muscles of the head and neck as well as the hard structures (the teeth) all desire to function harmoniously (non-antagonistically) with one another, thus functioning together as one entity. Understanding TMD is based on the proper knowledge of the functioning members of the body which include the muscles, discs, bones, vasculatures, nerves, teeth and ligaments as well as the psychological component.

### HOW TO TREAT?

Educated guesses, subjective feelings and speculation does not produce effective, reliable, lasting results. Treating the symptoms rather than addressing the source and cause will also prolong the inevitable search for a stable result. Only effective data gathering which will accurately direct treatment protocols will produce assured results. Without effectively measuring the physiologic parameters of the facial, head and neck muscles, understanding the true status, function and posturing of the jaw joints as it relates to the skull

and teeth, can one then unlock the key to this seemingly mysterious, ravaging, haunting disease! As Dr. Terrance O'Shaughnessy, an expert in the field of TMJ so wisely stated, "Objective Documentation is the simplest determining factor in arbitrating conflicting subjective opinions". Relating the objective data (clinical findings, recordings of muscles in function and physiologic rest) with detail, patience and accuracy will assure the treatment outcomes to be predictable, accurate and effective. BULLS EYE! "The effort then is to measure that which is measurable to relate unhealthy function to healthy function."

#### Objective Documentation

#### RAISING THE STANDARD OF CARE

#### THE NEED FOR OBJECTIVE DOCUMENTATION

Objectivity vs. Subjectivity Dr. Clayton A. Chan

#### EVIDENCE BASED TREATMENT AND CARE

In this age of evidence-based treatment and diagnosing It is imperative that objectivity is used by the treating clinician when addressing TMJ/ TMD. Due to the variety of symptoms and patient complaints it is imperative that objective gathering techniques be used rather than subjective, educated guesses when all else has failed. By implementing technology when appropriate in gathering measurable quantifiable data, as a part of a prudent protocol to verify objectively the true condition of the paining patient, one can begin to accurately diagnose, present a mode of treatment and treat effectively these types of problems reliably and consistently.

#### Radiographs of the Jaw Joints:

When treating the temporomandibular joint and its accompanying symptoms, it is imperative that radiographic imaging of the jaw joints be used to visualize and ascertain: the joint position (posture), bony surface anatomy and abnormalities of the surrounding structures. Diagnostic radiographa (Tomography) of the joints are the most accurate in most cases. Other modalities to visualize the jaw joints can be used to enhance further understanding, when needed. It is important to realize that radiographs are a "static" reproduction of three dimensional structures. Radiographs are helpful but should not be considered the only tool to access living, moving and functioning structures, especially when they are compromised and injured. To read about other radiographic modalities see DIAGNOSTIC MODALITIES.

#### Computerized Electro-diagnostic Instrumentation:

This type of diagnostic modality tests muscle function and stability of jaw movements in real time (dynamic). Computerized electro-diagnostics are able to record, measure and track jaw movements in three dimensions (horizontal, vertical and sagittal). Radiographic imaging techniques are not able to do this! The following are examples of two recordings (scans or tracings) that are implemented. There are ten different jaw recordings/ scans that can be used in diagnosing and treating TMJ disorders effectively. From the recorded data produced by the recording instruments, the doctor is able to distinguish between normal verses abnormal and pathologic verses physiologic movements of the jaw. Muscle activity is simultaneously recorded, thus enhancing the understanding of the dynamic living human anatomy (the mandible, the surrounding muscles, the jaw joints and posture of the head and neck).

#### Scientific Innovation Verses Tradition

In spite of the confused medical/ dental profession the suffering patient has to face the ravages of this harsh disease/ disorder. The merciless and often illogical criticism from those who would not or could not renounce their obsolete convictions regarding traditional notions about the Pathophysiology of head, neck and masticatory apparatus only promotes further confusion. Dr. Clayton Chan is well versed in the controversies of treatment methods and protocols. He is strongly aware of the varying views as well as the flawed research that many clinicians based their strong views, treatments and recommendations.

Realizing the short comings of the present medical and dental profession it is even the more necessary to take a scientific, methodical approach and lay aside biased views and old paradigms. As Dr. Bernard Jankelson, the Father of Neuromuscular Dentistry, so intuitively stated, "If It has been measured, It Is a fact; If It has not been measured, It is an opinion." This concept corresponds amazingly well to one of the basic postulates of Galileo Galilei, the father of modern scientific philosophy.

See the editorial comments of Dr. Clayton Chan in: A Gnathological Approach versus the Neuromuscular Approach to Dental Diagnosis and Treatment.

#### Automobile Victims and Chronic Pain Patients

It is highly appropriate to use objective diagnostic procedures and therapeutic modalities on patients that fall victims to auto accidents, chronic pain patients in distress that have often sought help and treatment from numerous clinicians that have already implemented their subjective evaluations and treatments with limited help. For this reason it is imperative to stop this cycle of subjective treatment and rising costs due to lack of proper implementation of objective diagnostic procedures and protocols that would contain the costs and decrease treatment times of those victims.

The use of objective quantifiable diagnostic procedures especially those with automobile accidents should be implemented to quantify and qualify a patient's dysfunction. This certainly adds essential accurate information in the effective diagnostic and treatment process especially with patients with trauma episodes to the head/ neck and cervical regions. Subjective feelings and educated guesses when treating the mandible, masticatory muscles of the head and neck, and the temporomandibular joints will not produce cost effective results and treatment times.

More on the Chronic Pain Patient in Distress.

#### CONFIRMING AND SUPPORTIVE EVIDENCE

for the use of Computerized Electro-diagnostic Instrumentation  
(Myotronics/ Normed, Inc. Tukwila, Washington)

Although there are some opponents that say that there is inadequate evidence to support the use and effectiveness of such diagnostic instrumentation, it is clear that they are misinformed and misguided as to their understanding of how computerized electro-diagnostic instrumentation can be used and implemented to aid in the diagnosis and treatment of TMJ.

There is more than adequate confirming evidence to support the effectiveness of such diagnostic instrumentation as verified and confirmed by the American Dental Association (ADA) and the Food and Drug Administration (FDA).

The American Dental Association (ADA) Council on Scientific Affairs:

The American Dental Association's Council on Scientific Affairs has awarded surface electromyography (SEMG), Computer Mandibular Scanning (CMS), and Sonography its "Seal of Acceptance", as diagnostic aids in the management of temporomandibular disorders.

(Report on Acceptance of TMD Devices, ADA Council on Scientific Affairs, JADA, Vol. 127, November 1996)

U.S. Food and Drug Administration (FDA):

The U.S. Food and Drug Administration has granted 510k status to each of these mentioned devices for use in the diagnosis and management of TMD in my practice.

This reflects that the U.S. Government and the dental profession acknowledges the safety and efficacy of the devices as recording and measuring devices used in the diagnosis and management of TMD and orofacial pain.

#### LITERATURE REVIEW SUPPORTS

the use of Computerized Electro-diagnostic Instrumentation:  
(Myotronics/ Normed, Inc. Tukwila, Washington)

Efficacy of Mandibular Tracking in the Diagnosis and Treatment of TMJ/ MSD

Over 22 controlled studies that further support the rationale for mandibular jaw tracking. 25 supporting referenced studies. Numerous other studies that document the clinical efficacy and validity.

#### Efficacy of Surface Electromyography In Dentistry

There is a broad body of literature that supports the physiologic basis for using surface EMG as an aid in assessment of muscle function/ dysfunction. (38 + studies support this ending with Lynn et al, 1992). There is substantial evidence based upon controlled studies that confirm that surface EMG is reliable and reproducible. (18 studies ending with Dean et al., 1992). 87 studies verifying the use, safety, and efficacy of EMG to monitor masticatory muscle function/dysfunction.

#### Efficacy of Low Frequency TENS in the Diagnosis and Treatment of TMJ/ MSD

The literature is clear and unequivocal - low frequency TENS (.05 Hz -10 Hz) is both safe and efficacious for muscle relaxation and pain control. It is clear that low frequency TENS has a high degree of specificity when utilized for craniofacial pain. (Over 44 studies internationally).

#### Efficacy of Sonography (Spectral Analysis) in the Diagnosis and Treatment of TMJ/ MSD

There is a broad body of literature that supports the use and efficacy of sonography in the diagnosis of temporomandibular joint disorders. (Over 30 studies ending with Bracco, et al In 1997).

More about what diagnostic Instrumentation can do for you. Diagnostic Instrumentation.

#### SUFFERER S IN DISTRESS

##### CHRONIC HEAD PAIN: The Ultimate Stress

“Pain: The..Psychological Effect On The Patient”- by Dr. Loren Pilling M.D.

Albert Schweizer said: “We must all die. But that I can save [a person] from days of pain, that Is what I feel is my new or even great privilege. Pain is a greater lord over mankind than even death itself.”

The following was written by Dr. Terrence O Shaughnessy a Board Certified Orthodontist and an expert in pain management. He is considered one of the leading authorities in the field of Objective Documentation and Expert Analysis of Unresolved Trauma Induced Injury to Craniomandibular/ Temporomandibular/ Cervical Complex. He personally Is a chronic paining patient and understands that pain is no laughing matter. He describes beautifully what happens emotionally when patients suffer chronic physical pain.

#### THE CHRONIC PAIN PATIENT IN DISTRESS

by Dr. Terrence O Shaughnessy

There is more than ample evidence to find that a person has been suffering, and now continues to suffer, from the debilitating effects of “Chronic Pain Patient Syndrome”.

Informational Note: Today Chronic Pain is recognized as an entity unto itself.

Interfacing with the Chronic Pain Patient visage is not a pleasant experience. Victims suffering from chronic pain are not likable people; not only relatives, friends, acquaintances and strangers, but even clinicians are “turned off” by the whining complaint. Clinicians with limited time schedules are very much inclined to quickly write a prescription to avoid having to listen to their woes again and again and again.

As a result, this disease entity was relegated to the same disposal heap as some forms of mental illness (also not pleasant to encounter) and other entities which did not conveniently fit Into the schedules of doctors, attorneys and friends or relatives. Little resource was assigned to the study of this disease entity, and these victims were shoved under the rug of society.

Today, with gratitude to a handful of people who have devoted their careers to the study of this disease, we are now privy to the ravages and ramifications it has upon these victims. Furthermore, when given its proper priority in treatment planning, these victims can often be reclaimed so as to resume their role in society which had been so unfairly taken from them.

A victim suffering from pain as a result of unresolved soft tissue injury is a chronic pain patient. If this pain is not resolved quickly (i.e., days or weeks), but drags on for six months or more, this patient becomes a chronic pain patient in distress with the following problems as recognized and documented in both medical and dental literature:

the longer the injuries are left unresolved, the more difficult diagnosis and treatment become; the patient experiences a deduction in pain tolerance; the patient experiences a vicious self-feeding cycle of frustration, despondency and anxiety, often leading to clinical depression requiring supportive therapy; symptoms and patient complaints will increase exponentially and “hop-scotch” around on good days and bad days; the patient will gradually withdraw from friends and acquaintances, family and spouse, hobbies, and even from the workplace, concentrating solely on tolerating their mum-tiered levels of pain; consortium with a spouse or companion is always affected, as even routine tasks such as eating and sleeping are made more awkward and difficult to pursue.

The face is the mirror of our very existence; it reflects all inner feelings, whether they be restful or in turmoil, as we interface with others in every daily endeavor. Smiling, talking, laughing, frowning, worrying, whatever our inner feelings happen to be is ultimately displayed for all to share for good or bad. Our mouths are used to speak, eat, love, and to communicate with the nuances of expression every feeling imaginable.

Both the face and the mouth are at the mercy of the function or dysfunction of the TMJoint; the TMJoint is the primary joint used to sustain life, and when functioning properly, it provides for the enjoyment of life more than any other joint. When dysfunction of this TMJoint is accompanied by constant pain or discomfort, everything is affected. There are no time-outs; our very existence becomes totally focused on this terrible template overriding all else in our lives:

The work place is affected; The caliber of our work deteriorates as does our relationships with co-workers; constant preoccupation with this problem precludes normal interfacing with co-workers, family and friends; even during leisure time there is no relief from this intrusion; there are no pleasurable or restful interludes with friends or family; the natural sequelae is seclusion and withdrawal unto ourselves, and yet that very withdrawal serves to compound the depression and frustration of this vicious, self-feeding cycle of despair.

Acute pain that diminishes in the course of the natural healing process is generally manageable psychologically. However, recurrent or persistent pain, which evolves into chronic pain the patient believes is untreatable, and hence threatening to future function and well-being, leads to progressive disability.

Of particular note is the fact that muscles, tendons, ligaments and fascia when so compromised results in pain symptoms (sometimes for decades) whenever tension or stress is a factor during their function.

Also please read a paper written by Dr. Loren Pilling M.D., who founded the first pain clinic at the Mayo Clinic who shares the emotional and behavioral aspects of a paining sufferer in distress. “Pain: The Psychological Effect On The Patient”

Neuromuscular Occlusion

BALANCE, FORM AND FUNCTION

Clayton A. Chan, D.D.S., F.I.C.C.M.O., DipI. C.F.O. /

Cranio-mandibular Orthopedics . Gnathology . Neuromuscular Dentistry

CASE STUDIES

ARE YOUR JOINTS HEALTHY?

The temporomandibular joints (the TMJ s) are two joints that are a part of the chew and swallowing functions. They are important in supporting the mandible to the skull by means of many muscles. Without two jaw joints our ability to open and close the mouth and move the jaw from side to side will be greatly diminished.

The TMJoints are often overlooked and not seriously considered, since on routine examinations the joints are hidden behind tissue. The oral cavity, the gums and teeth, are mostly seen since those are the parts that we see the easiest. Routine x-rays are taken of the teeth to check for cavities. Pocket probing measurements around the teeth and gums are recorded regularly to check for gum disease. But the jaw joints are rarely considered as important. Most dentist, physicians, chiropractors, osteopathic physicians, etc. are consider

these two joints in their overall evaluation since most of the health professionals have had very little training in this area.

### JAW JOINTS ARE JUST AS IMPORTANT AS TEETH AND GUMS!

The following tomographs show unstable joints that have given these patients a list of problems. Jaw joints need to be checked! Dentists use x-rays to check our teeth for cavities and evaluate the underlying bone for pathology around our teeth routinely.

### THE TEMPOROMANDIBULAR JOINTS ARE NO LESS AS IMPORTANT!

#### CASE 1

This patient presents with constant headaches and jaw joint dysfunction. The left jaw joint has very little pathology. The right joint shows abnormal joint surfaces (osteodegeneration-beaking).

Do you think that the teeth will be stable and be easy to fix when dental work is done? Notice the right tomogram shows the joint in an up and back position near the ear hole. Yes, this patient experiences “fullness in the ear” feelings. By the way, his teeth bite together evenly and appears to have good occlusion (In a habitual bite). They even appear straight.

What does one do for this problem? Ignore the joints? At one end of the mandible (jaw bone) are teeth. At the other end of the same bone are the joints (TMJ s). If the teeth are in the wrong position don t you think that they will also effect the joint in a wrong way as well?

#### CASE 2

These joints belong to an 18 year old female. She experiences constant head and neck pain for the past three (3) years.

Tomograms reveal severe joint pathology. Notice the thin/ narrow shape of these condyles. The neck of the condyles are bent. Notice the sclerotic (white) bone in the upper portion of the joint. The left tomogram - teeth are biting together. Right tomogram - mouth wide open. Patient has constricted mouth opening. Patient can bite her teeth together, but the joints are In a strained position causing muscular pain and numerous TMJ symptoms.

### SHOULD WE DENTIST CONTINUE TO IGNORE THE JOINTS? AND JUST CONTINUE DOING OUR “TOOTH DENTISTRY”?

The condition of the temporomandibular joints must certainly be considered especially when any form of dentistry is being considered!

If any restorative work is being considered such as fillings, crowns, bridges and implants, the health of the joints should seriously be considered. Most jaw joints do not give the patient pain directly, but many symptoms that are indirectly related will effect the occlusion (the bite), the comfort of the teeth and the overall comfort of the supporting muscles.

It is only obvious that if the joints are not stable and have compensations in the opening and closing paths of mouth movements, it will later impact the stability of the teeth and any dental work that is performed!

For the “Occlusion” (the bite) to be stable, the jaw joints must be stable and healthy.

Let us not forget that the TMJoints are connected to the same jaw bone (mandible) at one end and at the other end of the jaw are our teeth. They do effect one another! Muscles are the driving force to move them to gether.

Joint pathology does play a major role in phase II restorative treatment.

Do most dentist realize this? Do they realize that vertical dimension, posture and unstrained muscles at a physiologic rest position plays a major role in treatment outcomes? Or do they ignore these Important body parts (oblivious to the facts of muscle physiology, joint pathology and teeth). They function together as a unit and are not independant one from the other (TEETH AND JOINTS).

#### ADVANCES IN SCIENCE AND TECHNOLOGY EXISTS TODAY

to assist any clinician In the diagnosis and treatment of TMJI Occiusall Jaw Orthopedic problems  
TOOTHACHES & TREATMENT OPTIONS TRAUMA IN THE BITE?

Clayton A. Chan, D.D.S., F.I.C.C.M.O., Dipl. C.F.O.  
General Dentistry . Jaw Orthopedics. Gnathology . Neuromuscular Dentistry

#### Neuromuscular Occlusion

##### A Personal Observation

Over the number of years that I have been practicing the art and science of dentistry with my patients, I have found that there are various reasons and factors that cause toothaches and pains. Toothaches and pains can range from mild symptoms such as cold and sweet sensitivity to extreme and severe symptoms where patients find themselves in unbearable pain.

Patients with toothaches can exhibit symptoms such as: sensitivities due to cold, hot, sweet foods and drinks, pressure, biting sensitivity, spontaneous throbbing aches, dull aches and soreness, sensitivity when brushing and flossing, touch sensitivity, and sharp shooting sporadic pain to list a few. Patients have on occasion reported that their aches and pains can come and go with no real obvious reasons.

In my dental practice, I have been faced with these various symptoms from the young patients to the older patients. Sometimes when we go through these challenging times we wished we did not have our teeth or I have heard "I hate my teeth!" due to the agony they give us. Yet, nature has designed human beings with teeth to eat, chew, and digest food for long-term comfort and also to enjoy a healthy life if our teeth are property functioning and fitting together.

Toothaches and dental pain can come from three regions: 1) the tooth itself, 2) the surrounding gum tissue (the gingiva), 3) the bone in which the tooth or teeth are attached and supported, or 4) surrounding facial-muscles of mastication.

In order to properly treat and resolve these pains and aches it is best to identify what region or area the pain is coming from. What circumstances and situations stimulates these pains? How long have you been experiencing this pain

#### IS YOUR TOOTHACHE FROM "TRAUMA IN THE BITE"?

Often times when patients call our office for an appointment regarding a toothache, many patients will naturally think, "I must have a cavity" or perhaps there is fear that a nerve problem is involved, thus visions of painful "root canal" treatments will be needed. "It appears to exhibit symptoms of a fractured tooth", says the doctor. Let me tell you and relieve you of your anxiety. Most of the dental pains and aches that I see here in our office come from "tooth trauma in the bite". Yes, if decay penetrates into the dentin layer of the tooth or there is an infection at the root tip when seen with an x-ray, then perhaps root canal treatment may be an option, but this is rarely the case in my dental practice. It is "rare", from my clinical perspective that decay as active as it maybe can cause such extreme toothaches.

Many patients have never been offered nor have ever been presented with the option of "removing the trauma" in the bite which could possibly resolve the toothache they thought was due to a cavity or some serious problem in the nerve of the tooth. Many of my patients have elected to try the simple things first, such as "correcting the bite" or recontouring the filling or crown which was rubbing high, the source of their toothache! To their surprise their pain was resolved with minimal harm to them.

Many dentists remove tooth pain by recommending new fillings, crowns, and root canal treatments. They may all be justifiable. Yet, if the bite in those fillings, crowns, or root canal treatments are not corresponding properly to the accurate bite and fit of all the teeth and surrounding muscles and temporomandibular joints, then sooner or later the pain will come back to haunt that region. Those treatments may give temporary relief, but the real question is, “Is that treatment taking care of the “source” of the pain or just treating the “symptoms”?”

#### TREATMENT CHOICES FOR YOUR TOOTHACHE

If you are experiencing severe tooth pain, the following are some treatment options and choices that are available for your consideration and planning.

1. Limited Tooth Adjustment - The most conservative approach, causing the least harm and trauma to the dental environment. Recommended if there is no obvious dental infection at the root apex when examined by x-ray. The tooth may exhibit slight to severe mobility, cold sensitivity and sweet sensitivity. Biting/pressure sensitivity may be present with difficulty to chewing certain foods. Likely source of pain: an existing high filling or crown, change in tooth position, and/or biting interferences in grinding movements of the jaw. Limited to one or two teeth.

2. Filling Treatment -- Recommended if there is a preexisting filling that is deteriorated, the margins of the filling are leaking, there is a fractured filling present, the preexisting filling is “high in the bite” causing tooth trauma, and/or the biting interferences are present when the teeth are grinding and contacting one another. There may be decay present, seen upon visual examination and/or on radiographic evaluation.

3. Crown/Tooth Restorative Treatment -- Recommended if there are symptoms of sharp shooting pain sporadically. A fractured cusp exposing dentin, the presence of fractures on the marginal ridges and surfaces of the tooth, there is minimal natural tooth remaining in addition to the presence of caries, a large pre-existing filling that is compromising adequate structural support, an existing crown margin shows deterioration and wear are other possible reasons to crown a tooth. A pre-existing crown that has biting interferences and is traumatically rubbing and grinding another tooth can also cause severe pain and may need to be retreated.

4. Root Canal Treatment -- Recommended only if there is obvious infection at the root tips (periodontal ligament space is widening and broken). A dental abscess is present. Swelling, fever, and malaise may be present. Decay has infringed close to the pulp chamber. If the nerve or tooth pulp has become necrotic (Chronic dull ache symptoms). Inadequate tooth remaining for restorative procedures. Crown/ restorative treatment is recommended after root canal therapy for long term support of the tooth structure.

5. Neuromuscular Evaluation -- Recommended if numerous teeth, crowns and fillings are not allowing the teeth to come together evenly and balanced. Unusual pain and discomfort for no apparent reason, causing bite interferences, sensitivity and trauma. The presence of bone loss may be present on x-ray evaluation with previous root canals on teeth within the adjacent areas. Facial muscles and temporomandibular joints (TMJs) may be tender. Severe neckaches, temporal pains, clicking and popping in the joints, bruxism and grinding, headaches (chronic), excessive tooth wear, previous periodontal treatments not resolving the tooth mobility and existing periodontal pockets, are some of the many problems that must be evaluated in determining tooth discomfort and pain.

6. Orthodontic Treatment and Evaluation -- Recommended if arch shape widths are narrow, crowding teeth, maligned teeth, missing teeth due to under-development or previous extractions compromising proper occlusion, stability, and function. One may have the previously stated symptoms as well.

Sonographic Analysis can help determine jaw joint health and condition as a significant contributing factor to toothaches and facial pains. Having no discomfort in the jaw joints does not always mean there is no problem or pathology! An evaluation and assessment of the jaw joints usually will help determine the need and level of care in regards to any paining tooth and facial muscle pain.

The above list of treatment choices are only a Partial list and considerations. Treatment choices do not include bony or periodontal conditions that may be a contributing factor to tooth discomfort.

LETTER TO THE NEW JERSEY, DEPARTMENT OF LAW AND PUBLIC SAFETY

Division of Consumer

Affairs, NJ State Board of Dentistry November 15, 1998

Agnes M. Clarke, Executive Director

State of New Jersey,

Department of Law and Public Safety

Division of Consumer Affairs

NJ State Board of Dentistry

P.O. Box 45005

New, New Jersey 07101

Re: N.J.A.C. 13 30-8.22., Proposal Number: PRN 1998-498 "Validity of diagnostic tests for traumatically induced temporomandibular joint dysfunctions"

Dear Gentlemen:

My name is Dr. Clayton A. Chan. I have been in dental practice for over ten years, with my practice emphasis on Temporomandibular/ Neurovasomuscular/ Cervical dysfunction disorders and related professional fields. I treat in my practice patients afflicted with craniomandibular dysfunction, craniofacial pain, and associated cervical dysfunctions that effects the temporomandibular joint and craniomandibular regions of the head and neck. Patients that come to my practice for care include those that have been injured in motor vehicle accidents as well as those that have been hoping from care giver to care giver still in pain and suffering from their accident trauma episode.

I certainly applaud the State of New Jersey s efforts to trim unnecessary costs thereby reducing auto insurance premiums. The attempt to contain costs of medical care must be conducted with great care to avoid eliminating certain procedures, which can improve the accuracy of diagnostic and therapeutic efforts. These efforts of cost containment at the same time should not further the injured victims rights to complete diagnosis and timely treatment.

Based on well documented research, professional literature, my professional experience, the American Dental Associations and the U.S. Food and Drug Administration, protocols, professional standards and practices commonly accepted and recognized by national standard-setting organizations, it is my professional opinion that the New Jersey State Board of Dentistry has published Regulations that involve several diagnostic procedures for which I believe have been inappropriately stated and flawed.

Strict reliance on history or physical examination plus either a Panoramic or Transcranial Radiograph, and possible MRI of the TM Joint beginning six to eight (6-8) weeks later is overly simplistic and is not consistent with the current standard of practice. This is likely to result in incomplete and improper treatment, ultimately resulting in far greater expense than would result if proper diagnosis was achieved early on.

I question the doctors experience and qualifications that are on the committee that have recommended to the State of New Jersey - Department of Law and Public Safety the protocol for the caring of TM Joint injured patients, that have been involved in any type motor vehicle accident.

Do they actually diagnose and treat these kind of cases on a regular basis with this type of protocol in their practices? If they do they would certainly understand that what they have recommended is neither in the best interest for the patient nor the parties at hand in controlling costs. What kind of results and resolutions if any do they get with these kind of cases under this manner of treatment and protocol?

Improper diagnosis would certainly increase costs that would impact the medical! dental community abroad, leaving the victim in a state of chronic pain unresolved.

A panoramic film is used as a screening film, but in no way would be adequate to identify underlying tissues that are pertinent to proper identification and diagnosis of a soft tissue type injury to the TM Joint area. Without proper diagnosis and clear cut identification of injury site, how can any treating doctors that is experienced in these matters truly accurately treat and get reliable results? Only obscure data and documentation will result in obscure and unpredictable results! Using conventional, plain x-rays, i.e. panorex, because of the superimposition of more superficial tissues will result in generalized treatment which will not adequately address the cause of the symptoms. I am in total agreement of conservative treatment and / or no surgery. To limit proper and needful data gathering is certainly going to result in inaccuracies of treatment, diagnosis, increased treatment time, frustration and greater costs.

Taking tomography one year after the accident is certainly a gross error and major negligence of ignoring present status and condition of the injured joint and soft tissue attachment. The advantage of a "corrected cut"(tomogram) is the accuracy of the subject anatomy, without artifacts, and its reproducibility before, during and after treatment.

TMJoint Tomography yields a tremendous amount of even subclinical information about the fossa! condylar relationship and the integrity of the TMJoint mechanism which a panorex fails to do. It has been well documented and established in the literature that tomography provides superior accuracy in identifying pathologies than a panorex plain film. Yes, I agree that a panorex film is a good initial diagnostic film. But when needing to identify pathologies to confirm objective findings that would impact treatment protocols outcomes, tomography has been shown to be more accurate in yielding data of sufficient value in the development of an appropriate plan of treatment for injuries sustained in motor vehicle accidents and should be included in coverage. It would be a grave mistake to base a complete treatment protocol of a motor vehicle accident victim on an initial diagnostic panorex film. From this objective data and evidence medical certainty can be established. It is medically appropriate, relevant and necessary.

How can any qualified treating clinician (when treating TM Joint degeneration) be limited to diagnosing a joint disease condition from only a panoramic x-ray, which is a surveying plain film and not specific for the TM Joints? How can a clinician even determine if there is joint degeneration without clear, and appropriate diagnostics without tomography? To wait one year later would certainly be placing the State of New Jersey and the Dental Board up to severe legal scrutiny and question regarding the ethics and dental standards of care of the traumatically induced temporomandibular joint dysfunction/ accident victim. To be purposefully negligent because the rules and regulations stated to wait one year, does not remove the possibility of existing joint degenerative joint disease that should be identified and treated with an appropriate treatment protocol conservatively and in a timely manner.

It has been noted and previously brought to your attention by a letter I previously wrote to you on August 29, 1998, that the use of objective quantifiable diagnostic procedures especially those with automobile accidents should be implemented to quantify and qualify a patient's dysfunction. This certainly adds essential accurate information in the effective diagnostic and treatment process especially with patients with trauma episodes to the head/ neck and cervical regions. Subjective feelings and educated guesses when treating the mandible, masticatory muscles of the head and neck, and the temporomandibular joints will not produce cost effective results and treatment times!

Not allowing dentist to charge at all for such diagnostic procedures such as EMG, Sonography, and Mandibular Tracking for those patients that have had injuries to the hard and soft tissues of the head and neck also would be a major act of negligence and disregard for present day technology and information that is essential to the diagnosing and treatment protocol that is imperative to stabilizing strained muscles, torn tissues, torn and ripped ligaments and tendons not mentioning the damaged temporomandibular joint complex and all the accompanying structures.

How can anyone properly treat these soft tissues and muscles if one is not able to measure and identify what is abnormal from normal ranges of mandibular movement and function without objective measuring and documentation? I hope the State of New Jersey Department of Law and Public Safety and the New Jersey State Board of Dentistry does not take the stand to play ignorant in spite of its flawed

recommendation and regulations. It should not be finalized as it states! There is no other alternative means in this present day to properly diagnose and treat auto accident victims effectively when the cranio-mandibular, neurovasomuscular, cervical complex is injured, accept with well documented reproducible, and quantifiable results.

Mandibular Tracking is by far more precise than any doctor s eyes and millimeter ruler used to measure jaw movement and function. This eliminates guess work and costly trial and error treatments.

Mandibular tracking therefore is appropriate when used in this manner, yielding objective and sufficient data to develop a treatment plan for those patients that have sustained motor vehicle accident injuries. From this objective data and evidence medical certainty can be established. It is medically appropriate, relevant and necessary and should not be excluded from coverage, when the treating clinician is honestly and fairly doing everything possible to render appropriate care to these injured victims in a cost contained manner (with reliable and repeated results - that can be proved with objective evidence, consistently). Not leaving these victims to the demise of a ruined life and chronic pain that is so called untreatable often due to the lack of knowledge and understanding of many clinicians.

(Thus the regulations that have been proposed are based on those unfounded, unreliable, undocumented, random treatment protocols that that school of philosophy, mindset and inexperience would try to implement as a standard of care!)

If you were ever an accident victim who has already been seen by numerous medical care givers and dentist and still in the pain predicament as many in this country due to the typical standard protocol and regulations that you are planing and proposing, you will certainly be added to that number of victims in distress! It would only take one personal experience of such for you to realize what a grave mistake the New Jersey Regulations on this subject are. I don t thik any of us would want to wait one whole year in pain and suffering for the doctors to take the appropriate tomography films to eventually realize that the joints show degenerative changes and a complete treatment regimen and protocol has to be changed. What a waste of time and cost! I wouldn t want to be that patient!

Stethoscopic auscultation is known to be inaccurate and is dependant upon hearing accuity of the examiner. Electronic recording (Sonography) is by far more accurate and precise in determining an appropriate treatment plan to those victims that have sustained motor vehicle injuries. From this objective data and evidence medical certainty can be established. It is medically appropriate, relevant and necessary.

Electromyography (EMG) accurately measures the TMD muscles objectively. The clinician must solely rely on his subjective evaluation of the patients reported pain on palpation and complaints of chewing inabilities. These subjective criteria have been demonstrated to be inaccurate. Without objective measurements and data to verify the patients complaints of pain, results of treatment will be unpredictable, time consuming and frustrating to the patient/victim and the health care profession.

Definitely driving the costs of treatment higher, leaving the patient to be a chronic pain complainer to society and the profession.

1. I have outlined four diagnostic procedures that I use in my practice. The importance of a clinicians role and use of theses diagnostic procedures for his patients involved with motor vehicle accident injuries and TMD pathologies caused by automobile accidents must certainly be used prudently and individualized based on the patients requirements.

2. Objective evidence must be gathered and measured to determine the injured patients diagnosis and treatment protocol to accurately treat and decrease the rising costs of subjective treatment protocols and methods.

3. The Dental Board should recognize and protect the dental profession s role in diagnosing and treating TMD including motor vehicle accident caused trauma injuries.

4. The American Dental Association's Council on Scientific Affairs has awarded SEMG, Mandibular Tracking, and Sonography its "Seal of Acceptance". As diagnostic aids in the management of temporomandibular disorders. The U.S. Food and Drug Administration has granted 510k status to each of these devices for use in the diagnosis and management of TMD. This reflects that the U.S. Government and the dental profession acknowledges the safety and efficacy of the devices as recording and measuring devices used in the diagnosis and management of TMD and orofacial pain.

5. Adopting and accepting these Regulations concerning these diagnostic procedures as reported by the Dental Board would be a rejection of the ADA's position as well as a rejection of the U.S. FDA's position and would place hundreds of clinicians that are successful in treating and caring for patients with TMD injuries and pain in legal jeopardy.

6. I respectfully request that the State of New Jersey - Department of Law and Public Safety and the New Jersey Dental Board of Dentistry reject the stated Regulations for mandibular tracking and Stimulation devices, Sonography, Surface EMG (SEMG), Tomography for TMJ/D. Establishing these regulations would be a cause a denial of benefits as well as result in an inappropriate evaluating protocol as established by your committee for patients who have TM Joint injuries as a result of any type of accident.

7. I would urge the Board not to recommend and finalize the proposed regulations regarding:

a. A dentist only being able to take a panoramic x-ray or a transcranial x-ray, but not both.

b. No other x-rays will be allowed, except for tomography at least one year later after the accident, and only those with joint degenerative disease.

c. Dentists would not be allowed to charge at all for EMG, sonography, and mandibular tracking.

To deny these modalities and regulate the timing when the diagnostic could be performed (i.e. tomography, sonography, EMG, mandibular tracking) would deny accident victims the diagnostic aids that are needed to objectively evaluate their treatment rather than using the old empirical subjective evaluating methods that often leads to unpredictable treatment outcomes and increased cost and frustration to the victim, insurance companies and the health care providers.

I respectfully urge the New Jersey State Board of Dentistry, the Department of Law and Public Safety to not eliminate effective diagnostic procedures that are valuable in the treatment of motor vehicle injuries to eliminate excesses. If you have any questions, comments and / or suggestions, please don't hesitate to call me. If I could be of any help or service let me know (619) 481-8688. For the protection of our patients health and cost containment,

Sincerely,

A concerned Neuromuscular Dentist- who treats injured victims

Clayton A. Chan, D.D.S.,  
Dipl. C.F.O., D.A.B.F.E., D.A.B.F.D., D.A.B.F.M., F.A.B.S., F.I.C.C.M.O.  
Fellow, International College of Craniomandibular Orthopedics  
Diplomate, College of Forensic Orthopedics  
Diplomate, American Board of Forensic Examiners  
Diplomate, American Board of Forensic Dentistry  
Diplomate, American Board of Forensic Medicine  
Fellow of the American Back Society

The Doctor's Perspective

AN ADVOCATE FOR BETTER CARE

THE GNATHOLOGICAL APPROACH versus THE NEUROMUSCULAR APPROACH to Dental  
Diagnosis and Treatment

by Clayton A. Chan, D.D.S.  
LITERATURE REVIEW I BIBLIOGRAPHY  
An Editorial:

There are two rivaling philosophies of treatment in this country today by which clinical dentist are treating their patients.

The first and oldest philosophy is that of Gnathology which is based on a belief that the temporomandibular joints hinge on an axis of rotation in the glenoid fossa of the skull. All occlusion is guided and brought together to a finally tuned order, determined by the axis of jaw joint rotation. The emphasis is on occlusion and joint position which is fundamentally called "centric relation".

The second newer philosophy is Neuromuscular, based on the understanding that the temporomandibular joints are in a physiologic resting position based on the guidance of muscles and stabilized by the occlusion of both the upper and lower teeth. Emphasis is on a physiologic position of the jaw/ mandible position to the skull (neuromuscular rest position), the physiology of rested muscles to support a physiologic occlusion for stability of all three entities: the TM joints, the muscle and the teeth.

#### The Great Debate

Both these philosophies are strongly debated among treating clinicians that have been seeking the answers to the mysteries of occlusion (the manner in which teeth fit together) with all its challenges that include the treatment and management of the mandible, the muscles of mastication, the supporting hard and soft tissue structures of the temporomandibular joints, the physical as well as the emotional factors that effect their patients. Jaw joint position has been a major contention among the various schools of thought, with strong opinionated feelings to support each ones view, clinical experience and teachings they have received.

#### A Battle to Success

It has been a battle as well as a struggle to reach this present day success of acknowledgment. Due to the natural obstacles that any newly developed innovation encounters, the neuromuscular principles that are presented are often misunderstood and are mercilessly and often illogically criticized by those who would not nor could not renounce their obsolete convictions regarding traditional thinking about the physiology of the masticatory complex involving the mandible, skull, musculature, temporomandibular joints and teeth.

#### What is Gnathology?

The term "Gnathology" was first coined by Dr. Harvey Stallard, of San Diego, California. This term stems from the Greek word gnathic or gnathos in origin referring to the jaw. Gnathology refers, in its broad and all-inclusive sense to the gnathic system - the system of measuring jaw relations and functions. Dentistry is a branch of medicine and deals with the teeth and supporting tissues whereas gnathology is a specialty of dentistry that concentrates on the entire gnathic system and the whole patient. Dr. Harvey Stallard a dentist and a founding father of the gnathological concept stated, "Gnathology includes the exact relations existing between the teeth and the morphological border movements of the condyles: the lateral, the anterior and the rearmost positions... and most importantly, gnathology includes knowing how the nine various directions the condyles move laterally and medially in vertical chewing movements. How the chewing cycle of cusp points may be related to centricly related cusp-fossa occlusion, is wanted gnathological knowledge." I myself for years emphasized that gnathological treatment endeavors to relate the teeth properly to each other in such a way that they will have a cooperative relation to the jaw motions and joints. I later realized through clinical practice that even though the concept and philosophy sounded well and good, it fall short of physiologic science and objective ideals proported when treating my patients daily in clinical practice, especially in those more challenging cases.

#### Outdated Dental Concepts

Gnathological principles originated in the 1930 s by some very innovated doctors who had the desire to understand mandibular/jaw movement by means of mechanical instrumentation called (articulators). These mechanical devices were designed based on notions and opinions of persistent doctors who believed the jaw joints functioned in a certain particular hinging-rotating manner, thus influencing their understanding of dental occlusion, mandibular movement and jaw function. Since these misleading concepts have

continued to persist through time to the present day, these notions are still pervading the present day dental curriculum handed down from the early inventors to today's learning dental student.

#### Science and Technology

Science and technology in the dental field has greatly advanced to a higher level of understanding of the masticatory system and accompanying structures through the work of Dr. Bernard Jankelson and continues to this day by his son Dr. Robert Jankelson. It is based on scientific instrumentation that objective quantifiable data can be recorded to access mandibular movements in function and at rest. Numerous scientific study have been published in scientific and referred journals nationally and internationally to bring to light the dynamics of mandibular function, muscle activity during resting modes and active modes. Mandibular paths of motion can accurately be recorded in six dimensions (vertical, anterior/ posterior, frontal/ lateral, pitch, yaw and roll) to determine pathologic activity from physiologic. These recordings and acquired data can effectively confirm the patients feelings and concerns due to this innovate technology. An optimal physiologic mandibular position can now be understood without bias and opinionated views for each individual patient, thus giving rise to accuracy in treatment and predictable success. Clear reliable evidence can now be gathered and studied to understand the true pathophysiology of mandibular movement, muscle activity, its function and its relation to occlusion/teeth and the temporomandibular joints for each individual patient needing treatment.

#### Clearing Up Historical Confusion

Today these innovative diagnostic aids (computerized electro-diagnostic instrumentation) can clearly help clarify the misunderstandings, the false and misleading theories that have plagued and clouded the understanding of the majority of today s dentists, dental schools, institutions and those in the health profession. No longer do we need to contend with treatment opinions and subjective experiential guesses to treat our patients. All doubt and question can be laid aside if those that are treating patients in need are willing and bold to lay aside old fashion concepts and face the truth of scientific evidence and objectivity.

#### A Neuromuscular Approach to Dentistry

Dr. Maurizlo Bergamini, M.D. stated so clearly, "The field of neuromuscular dentistry has matured to adulthood. Over twenty years of study and research confirmed by clinical and experimental controls have enabled this special discipline to assume a respected role within the medical sciences. At last, it has achieved wide acceptance, is taught in the universities of several countries, is discussed at medical meetings and congress, and is considered an indispensable clinical method for an increased number of clinicians."

Neuromuscular dentistry has been able to assert itself, with the thanks to Bernard Jankelson s keen intuition about the fundamental role played by the neuromuscular system involving all the components of the human anatomy of the head, neck, face, and the mouth with all its dysfunctions. He had the ability to measure and control the biophysical and biochemical phenomenon which determined jaw movements. Dr. Jankelson's brilliant motto sums up the neuromuscular approach so well: "If it has been measured, it is a fact; if it has not been measured, it is an opinion."

- -from the textbook titled: "Neuromuscular Dental Diagnosis and Treatment by Robed R. Jankelson, 1990.

#### Neuromuscular Dentistry Answers Questions that Gnathology Cannot

The neuromuscular approach although rarely talked about or discussed in common lectures and teaching institutions today, Is certainly welcomed in this age of dentistry among those that have been seeking the truth to understanding the complexities of dental care and treatment, especially in the realm of restorative dentistry and musculoskeletal TMJ/ myofacial pain problems. For many of us that have been the recipients of the outmoded teachings of gnathologies and seeing the short comings of the standard dental teachings in clinical practice, it is refreshing and inspiring to understand how the stomatognathic systems truly functions In light of supporting scientific instrumentation that can record and verify the observations and symptoms presented by our patients in everyday clinical practice.

It is Scientific and Physiologic

The Neuromuscular Approach is scientifically and physiologically based. There are many health and medical disciplines that support and confirm this view both clinically and physiologically. Other professionals that support and understand this approach to dental care and treatment are osteopathic physicians, certain physicians that are involved with head and neck pain management, chiropractors, cranio sacral massage therapist, physical therapist and nutritionist. This diagnostic instrumentation that is discussed in this site is used in many universities and countries internationally to carry out their scientific research and investigative studies.

Many of the questions have been now clearly answered allowing the neuromuscular dentist to further investigate with openness new doors that he never dreamed could be opened to him in the realm of dental diagnosis and treatment.

#### Future of Gnathology

Dr. Harvey Stallard stated, "What gnathologists should now make up their minds to do are: First, become proficient by learning the movements of the condyles and the effects of these movements upon cusp heights, cusp shapes, and cusp paths. Second, master the techniques of gathering the necessary data to put into the articulator which will reproduce the necessary jaw relations. Third, acquire an understanding of the anatomy and physiology of the mandibular joints. Fourth, comprehend how the neuromuscular system assists us to fix the teeth for the best oral automation. Fifth, give greater attention to the nature, structure and health of the periodontium. A gnathologist has arrived when he will be as interested in having glowing health of the gingivae as good form in the occlusion."

There is certainly still many inroads that need to be made into the present day establishment of dentistry; organized dentistry, dental school curriculum, dental continuing education programs, insurance companies, medical health organizations and programs, as well as current literature. Many of the older established instructors and leaders are hesitant to make changes in dental curriculum and continuing educational programs realizing the great sacrifice that they will have to make both professionally and personally. Years of established habits and entrenched concepts need to be altered. CHANGE IS ALWAYS DIFFICULT! Careers and reputations are at stake! The system is presently well established. To rock the boat and change the system after many years is always unwanted.

#### Conclusion

As a former gnathologist and still a practicing gnathologist in all its purist sense I have realized that all true gnathologists when understanding the complete craniomandibular/ neurovasomuscular/ cervical components as well as the occlusal concepts that impact the stomatognathic system is truly striving towards the Neuromuscular Approach. If all the dentists that practice the so called gnathological concepts/ philosophy as taught by doctors Harvey Stallard, B.B. McCollum, Charles Stuart Peter K. Thomas and all the followers, would perpetuate these teachings to their highest level, they would soon realize that the neuromuscular approach, as confirmed by scientific instrumentation, addresses the missing link of understanding all border movements of the mandible, the determinants of occlusion and the physiology between occlusion (teeth), the supportive and functioning muscles and the physiologic temporomandibular joint position.

A new and upcoming breed of forward thinking neuromuscular dentists are following in the paths of the innovative Dr. Bernard Jankelson and his son Dr. Robert Jankelson who have been opposed by the establishment for years. Responding to this call of rising to a "higher standard of care" for our patients is our professional obligation to reach this goal. From this neuromuscular perspective any dentist can begin to treat in a complete and comprehensive manner.

Thank you for reading this section.

#### A Dentist's Perspective

The view and opinions presented are of Clayton A. Chan, D.D.S.

Dr. Chan is a trained gnathologist. He has practiced gnathology for many years realizing that gnathologies did not answer nor confront the issues that were being faced with his patients under his care. After persisting to do the best dental care for his patients within the confinements of the standards of that philosophy, he soon realized that there had to be another way that addressed the issues that have been presented in this website. He is phased that he could share these thoughts with those that are seeking another side to the story of clinical dental care.

Today he practices Neuromuscular Dentistry with great success and predictability. If the viewer has any questions or concerns regarding what was presented, Dr. Clayton Chan will be phased to hear from you.

The Doctor's Perspective  
AN ADVOCATE FOR BETTER CARE  
OCCLUSION THEORIES  
Clayton A. Chan, D.D.S.

#### DEFINING OCCLUSION:

The Webster's dictionary defines occlusion as: the bringing of the opposing surfaces of the teeth of the two jaws into contact, also the relation between the surfaces when in contact.

#### OCCLUSION THEORIES

The following article is posted on this website with personal permission from Dr. Robert R. Jankelson. It is taken from the Forward of his textbook titled "Neuromuscular Dental Diagnosis and Treatment".

"Occlusion" is such a fundamental element in dentistry that almost all departments of dentistry are concerned with it. It has been one of the key issues for many years for every generation of our profession.

In prosthodontic dentistry where the aim is artificial reconstruction of occlusion to harmonize with the entire stomatognathic system, two major schools of theory have been advocated: One is the mechanical occlusion theory initiated by Dr. Gysi, where emphasis is placed upon mandibular movement. The other is a theory of functional occlusion system based on neuromuscular physiology.

The mechanical occlusion theory has been dominant in prosthodontics over the past 100 years and has led to the development of numerous adjustable articulators and related clinical techniques.

On the other hand, the oral physiology theory indicates that the functional occlusion system is made up of three major components: teeth, muscles, and temporomandibular joints. Occlusion is maintained by the activities of the masticatory muscles which are controlled by neural integration of the feedback from peripheral proprioceptors and the reflex mechanism from the central nervous system.

Unfortunately, however, this functional occlusion system theory based on neuromuscular physiology was overshadowed by the mechanical and geometric occlusion theory until about 1970. This was due to lack of scientifically supporting technology to link observations to clinical practice.

In 1970, Dr. Bernard Jankelson successfully developed electronic instrumentation for the diagnosis and treatment of stomatognathic disorders.

Review of the mechanical occlusion theory was triggered by his concept that a clinical approach to occlusion should not be hypothetical, but must have a firm theoretical and experimental basis derived from the total physiological phenomenon of the organism. The masticatory muscles, which position and connect the mandible to the skull, should be the focal point of correct occlusion.

His physiologic approach to occlusion and techniques with scientific backup has brought about new dimensions not only to patients suffering from stomatognathic pain which could not be cured by conventional occlusion theory, but also to the dentist seeking to understand what the true occlusion should be.

His concept has further been developed by many researchers and distinguished clinicians, and is now recognized as an established clinical procedure with scientific verification.

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#### PHYSIOLOGIC OCCLUSION:

The occlusion of choice Physiologic occlusion is the most natural and highest order of teeth fitting together in relation to unstrained TMJ s (temporomandibular joints or jaw joints), jaw bones, muscles, ligaments and soft tissue of the mouth. In the dental profession we have observed that nature has given us a template or a blue print which can be followed in order that this complex anatomy can function in harmony with one another and in a manner that prolongs the health of our teeth while biting and chewing. The aim and goal of physiologic occlusion is to have all the teeth fully occluded when the jaw joints are in the unstrained, rested, physiologic (neutral) posture. This occlusion should allow all the teeth to harmoniously separate in all the natural chewing and sliding motions without creating harm and interferences of one another, neither causing antagonistic muscle splinting to stimulate myofascial pain disorders. Dr. Chan is a strong advocate of a physiologic/ neuromuscular occlusion. Formerly trained and practiced the gnathological concepts for years, he is very aware and understands both sides of the occlusion issue. He realizes that these issues hit home to those in the academic, lecturing and teaching arena of dentistry. He also realizes that ignoring these issues will not perpetuate changes that are absolutely needed in the educational arena of the dental profession. He is an advocate for reform and change in this area of dental care. posturing, functioning, and happy?

In dentistry this is often overlooked and in the hustle and bustle of caring for patients we find ourselves in the “tooth business” of repair, rejuvenation, cosmetic coverings to enhance the appearances of these important body-mouth structures.

Only when our patients begin to complain, agonize, and whine about their headaches, facial pain, tooth aches, sensitivities, ill fitting bites from our dentistry repeatedly, do we then begin to consider that our flawless dentistry is not at all at fault, but the patient's psychological disposition is at fault. We can't afford to spend too much time with these whines and whims except to move on to the next potential tooth to do more “dentistry”.

#### Lack of Understanding

Our profession does not train us to handle and understand the connection between teeth, muscles that support our head, neck, jaw joints, face etc. We have often have no realization that some patients are more keen and detailed than others. We have very little understanding and awareness of the finer details about the body's neurological systems and its relationship to teeth (hard tissue) and muscle (soft tissue). We feel that a tooth is a tooth! Crowns are crowns. Fillings are done the same way for each tooth.

But what about the patient and their supporting mechanics of their jaw, joints, muscles, teeth and neurology. Are there hidden things that we can not observe on a routine examination? Our patients do not always know. They are often unaware of hidden pathologies? Especially the pathologies of the temporomandibular joints. Sure we are able to adapt to these malalignment, clickings and popping in the joints, neckaches, sore shoulders, teeth sensitivities etc. We pass these mild to moderate ailments off as growing older pains and dysfunctions, stress related, job related etc.

There must be a better standard than the present “Standard of Care”! Consider evidence-based care, using objective data to help clarify these often seemingly mysterious undiagnosed, and often mistreated conditions. If you have a concern that is bothering you inquire further and be well informed!

Dr. Clayton Chan

## FUTURE TOPICS AND PERSPECTIVES: Stay Tuned

The following are brief editorials and opinions of Dr. Chan. They are in no way a reflection of the organizations or memberships that Dr. Clayton Chan associates himself with. These are only his views and his only.

1. Evidence-based care should be implemented in a manner in which objective data is gathered first.

Taking a neuromuscular approach has not been considered in the treatment of most dysfunctions of the head and neck. I have found that taking the Neuromuscular Approach to treating TMJ using computerized electro-diagnostics to be the most successful. Eliminating guesswork and gaining consistent results predictably due to objective verifiable data gathering techniques will result in accurate definitive decisions and success. This approach will result in reliable predictable outcome.

2. Gnathological principles are effective as long as the jaw joints are healthy (no pathology).

It falls short of being objective. It is very mechanical in philosophy and technique. These principles are commonly taught in dental curriculum, with very little concern for the true physiology of muscle and joint function. These same principles have not kept pace with the advances in research and technology that have enlightened the understanding of those that are pursuing the biophysiology of jaw movement and function. Due to the flawed assumption that jaw joints rotate on an axis of rotation, it thus builds all its ideas and treatment protocols. If the joints are found to function different than what has been taught, the profession as a whole is bewildered by these common anomalies that are seen daily and are either ignored since this was not part of the basic learning process in the curriculum. When pathologic joints are present gnathologic principles can no longer be the most effective means of treatment. Gnathological principles inadequately addresses the aspects of vertical dimension that is commonly overlooked, in spite of what the flawed literature says and advocates.

3. Many opponents that oppose computerized diagnostics (those that know only part of the information) and those that are treating "TMJ" mainly are dealing with a Phase I treatment therapy.

Yes, it is possible to treat without bio-instrumentation - but the results will vary, and the percentage of success, the accuracy and predictably is diminished, the time involved is lengthened in resolving the pain of the patient. Sure they all treat TMJ. Question?? How long does their average most difficult pain case take to resolve? How many visits does it take on average to get success with that treatment protocol? What treatment modalities do they advocate? Invasive? when all else fails? Then what is after that after that doesn't work??

4. Implementing orthodontics to deal with TMJ will lead to unpredictable outcomes unless the clinician is taking a functional orthopedic orthodontic approach and is aware of joint position and condition.

5. There are always those doctors that get success, but how long does it take them?

How many visits does the patient have to follow through with? How many months/ years does it take? What specific joint condition does the patient present with. How many doctors have they seen for this particular problem?

6. Is the case stable after TMJ treatment - Phase I.

How does the doctor know? He doesn't unless it is measured objectively!

The real test is when the patient wants to then later go on to Phase II treatment involving an orthodontic phase, restorative phase, a combination of both, or stay in the removable phase. Do you really know if your case is stable and ready to move to Phase II treatment? Does the patient really know? Without measuring, you do not know.

7. If the doctor does not do Phase II treatment he does not have to contend with a potentially re-developing problem.

The Phase II treating doctors are typically restorative dentists who may or may not have the knowledge like the TMJ specialist who only deals with a Phase I protocol. The real question is: Who is qualified to finish the case and maintain a stable situation? The one that understands the present condition, is able to measure objectively, and understands where that case will end up predictably is the one that will be most successful. Guess work is unacceptable when one is dealing with someone's life of pain.

8. Is the Patient and the doctor ready to contend with the outcome???

Or do they both concede that it is a psychological problem when he does not realize that the standard gnathological/ mechanical approach just does not hold up under those joint pathological, unstable conditions. He may be or may not be aware of joint pathology?

9. Joint pathology does play a major role in phase II restorative treatment.

Does the doctor realize this? Does he also know that muscles, vertical dimension, unstrained muscles at a physiological rest plays a role. Or does he ignore or is oblivious to the facts of the physiology of muscle, joints and teeth play together.

10. Do you restore the bite to a habitual acquired position?

What is the tolerance/detail level that the patient requires?? If the patient is an extremely detailed (5-10 micron level of detail) and the clinician works at a 40 micron level then there is certainly going to be a mismatch in success. The clinician must be aware what level of detail he is capable of delivering for his patient. He also must be aware of the level of detail his patient requires in order for the case to be successful. If the doctor is less detailed than the patient's demands there will be frustration!

11. As a TMJ/ Restorative dentist I choose to remove all guess work?

I want to increase my predictability and success of each case through Phase I and Phase II treatment.

I like to shorten the painful curing phase to the shortest time possible. Patients have been in pain long enough. No need to continue guessing. Measure, measure, and measure. Use objective analysis not educated guesses. Cut to the chase and get the job done right!!!

12. It is your life, your time, your money, your health.

Why settle for more subjective educated guesses.

13. Literature is flawed - that is the reason for the confusion in the literature and the criteria of success or non successes.

I want predictability, I am tired of all the guessing and frustration that patients have to go through, as well as all the time and money spent on trial and error techniques.

By using his skill, knowledge, experience, and expertise Dr. Chan is able to decrease treatment time

14. Some doctors/dentists say that computerized electrodiagnostics are an over-kill in diagnostics.

It is only an over-kill if you do not know why and when to use this type of instrumentation. It is not an over kill when the patient has been to numerous treating doctors and still in pain. I would like to present the reasons why this objective diagnostic approach is absolutely necessary and needful in this day and age, especially for those patients that fall in the category beyond the typical 85% TMJ/myofascial pain cases.

This approach leaves no room for guessing and subjective feelings. For patients that fall in the category of having the most difficult TMJ problems (the top 5-10%), to most treating clinicians and health care providers, (these patients are by now considered whiners and complainers). The objective, neuromuscular approach is the best way to accurately treat, decrease treatment time, remove questions and doubts regarding chronic pain of the head, neck, teeth, jaw joints, and facial pain.

Inaccurate diagnostics and treatment modalities will result in inaccurate outcomes, mis-diagnosis, delayed results, and misguided treatment protocols, resulting in further expense and frustration! Those clinicians that criticize this protocol, have very little understanding/ knowledge, have little to no experience in the use of computerized electro-diagnostics, nor understand the effectiveness of such an approach. By not implementing this equipment would surely be a waste and the patient's problem will surely become society's problem. "Ignorance will keep you in the darkness, half the truth is dangerous".

I will agree, that those patients that can gain the help first by means of the standard, simple and typical approach certainly need not progress to this means of diagnostics and treatment.

This is an approach when all other means have been tried by numerous clinicians, doctors, health care providers including, dentists, physicians, neurologists, rheumatologists, pain clinics, medications, massage therapists, chiropractics, physical therapists, ENT specialists, ophthalmologists, optometrists, "TMJ specialists", prosthodontists, orthodontists, restorative dentists, splint therapies (upper and lower), MRI, CAT Scans, Joint surgeries (one-two times previously), etc. Taking a multi-disciplinary is certainly needed. When the patient is desperate and tired of continuing to try the educated guessing treatment protocols, then they might consider this approach. Those that accept inaccurate treatment protocols will get inaccurate treatment outcomes. Those that seek accurate objective protocols will receive accurate objective outcomes!

15. Dental physiology of the head, neck and cervical regions - a missing ingredient to dental stability. It is often overlooked that the supporting muscles that connect the mandible to the skull that impact the stability of the teeth and TMJoints. Without the understanding of these fundamental components dental treatment at best is "tooth dentistry" rather than complete dental health.

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