

Research Confirms TMJ-Tinnitus Connection

<http://home.earthlink.net/~dhmorgan/research.html>

The connection between temporomandibular joint disorder (TMJ) and ear dysfunction was first researched by Drs. David Goodfriend and James Costen in the 1920s. Hearing loss, tinnitus, vertigo and nausea was often mentioned in case histories of TMJ patients.

Most recently, the association between TMD and tinnitus was confirmed by Harold Gelb, DMD, at the Tufts University College of Dental Medicine; Michael L. Gelb, DDS, of the Department of Oral Medicine and Pathology at the New York College of Dentistry; and Melinda L. Wagner, DMD, of the University of Medicine and Dentistry of New Jersey. Earlier this year, they reported that patients with craniocervical mandibular disorders can present with tinnitus as a primary or secondary complaint. ("The Relationship of Tinnitus to Craniocervical Mandibular Disorders", The Journal of Craniomandibular Practice, Vol.15, No.2)

Their findings validated an earlier study by William S. Parker, DMD, Ph.D., and Richard A. Chole, MD, Ph.D., who reported clinical confirmation of the association between TMD and tinnitus in 1992. The University of California-Davis researchers cited the correlation in their findings of a controlled study involving 1,032 patients. ("Tinnitus, Vertigo, and Temporomandibular Disorders," Archives of Otolaryngology-Head and Neck Surgery, Vol. 188).

Douglas H. Morgan, DDS, an oral and maxillofacial surgeon, who has specialized in TMJ treatment for over 30 years, was sponsored by the American Tinnitus Association to do a special clinical research study. Twenty patients who suffered with tinnitus were chosen. These people had been to ENT specialists to rule out any organic or other otologic causes of their tinnitus. Also, none of these patients

complained of jaw joint or facial pain and were not aware of any jaw joint dysfunction. Dr. Morgan conducted an eight part comprehensive TMJ diagnostic study of these tinnitus patients. Among the tests used was a complete radiologic evaluation, which included transcranial lateral oblique x-rays, tomograms and magnetic resonance imaging in order to evaluate the condition and shape of the joint bones and meniscus. Electromyographic studies were also used to evaluate hyperactivity in the jaw and surrounding facial muscles. Other assessments included palpation of the TMJ area, orthodontic examination, range of jaw motion studies and joint sound evaluation.

The findings of this study were most interesting. Of that group of twenty, ten were tested positive for TMD in all diagnostic tests. Nine tested positive to one or more of the diagnostic procedures. Only one patient had no positive results of any jaw joint dysfunction. Dr. Morgan's findings were published in The Journal of Craniomandibular Practice ("Tinnitus of TMJ Origin: A Preliminary Report," Vol.10, No.2).

In another research project with Richard L. Goode, MD, professor of ENT and Head and Neck surgery at Stanford University's School of Medicine. Drs Morgan and Goode were able to establish the mechanical connection between the ossicles in the middle ear and the capsule and disk of the TMJ. ("The TMJ-Ear Connection," Journal of Craniomandibular Practice, Vol. 13, No.1).

Fortunately, non surgical treatment can restore function of the joint with surprising results. Clinicians who have treated individuals with TMD have noted that related conditions such as tinnitus have been improved and, in many cases, eliminated."

Non-surgical treatment is appropriate in cases where the symptoms are related to mild joint damage, muscle hyperactivity and/or dental-skeletal malalignments.

These interventions include application of heat and cold; injections of a local anesthetic into muscle trigger points; passive and active jaw exercises; medications--such as muscle relaxants and anti-inflammatories; multivitamins--neuromuscular orthotics; biofeedback and acupuncture; transcutaneous electrical neural stimulation; coronoplasty; and cortisone injections.

Surgical intervention can range from arthroscopy to a partial or total TMJ implant. Dr. Morgan uses a specially designed implant that does not cover the petrotympanic suture on the temporal bone in the posterior socket of the temporomandibular joint.

Another implant was taken off the market by the US Food and Drug Administration when it was found to cause degenerative joint conditions, including tinnitus. The Proplast implant put pressure on the suture where the chorda tympani nerve, anterior tympanic artery and discomalleolar ligament passed through.

Pressure on these structures can cause symptoms such as ear pain, tinnitus, subjective hearing loss, hyperacusis, vertigo and muscle pain.

When the Proplast implant was replaced by Dr. Morgan's articular eminence device, patients reported either a vast improvement or a cessation of the ear symptoms they had been experiencing.

If there is no obvious otologic reason for a patient's tinnitus, audiologists may want to develop a questionnaire that will help determine if the condition is linked to a jaw joint dysfunction. For example, clinicians can question their patients about whether they clench or grind their teeth. Many people do this because there is pathosis in the jaw joint structure. It is not necessarily caused by stress.

Audiologists also should determine if the patient has grating, popping or creaking sounds in the jaw joints. This indicates a misalignment or tear in the miniscus of the joints.

Dr. Morgan believes tinnitus patients should see a TMJ specialist to determine if they have a TMJ condition that contributes to their problem.

Currently, Dr. Morgan is conducting clinical research on the relationship of temporomandibular joint disorders to fibromyalgia, chronic fatigue syndrome and hyperacusis.

Based on:

"Research Confirms TMJ-Tinnitus Connection"

Russell Crane

ADVANCE for Speech-Language Pathologists & Audiologists

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TMJ TREATMENT PROCEDURES

Non-surgical treatment

The diagnostic procedures enable the clinician to assess the severity and the cause(s) of the condition. In many cases, the symptoms are related to muscle hyperactivity and/or dental and skeletal mal-relationships with minimal joint damage. In these cases, successful treatment options are non-surgical, and may include:

1. Application of moist heat and cold spray.
2. Injections of a local anesthetic into muscle trigger points.
3. Physical therapy (passive and active jaw exercises).
4. Medication (muscle relaxants, anti-anxiety medication, anti-depressants, anti-inflammatories, and pain relieving medication)
5. Multivitamins, minerals, and natural enzymes.
6. Neuro-muscular orthotics to restore the proper vertical, lateral, anterior-posterior muscle resting length and the most comfortable physiologic position of the condyle to the eminence-fossa-meniscal complex.
7. Biofeedback and acupuncture.
8. TENS (transcutaneous electrical neural simulation) Myomonitor.
9. Coronoplasty (reshaping anatomy of tooth structures)
10. Orthodontics to restore proper relationship between the upper and lower jaw and teeth; after this relationship has been established by use of a neuro-muscular orthotic.
11. General dentistry to restore missing teeth and maintain proper relationship of the maxilla and mandible by use of partial and complete dentures, crowns, bridgework, and dental implants after this relationship has been established with a neuro-muscular orthotic.
12. Local anesthetic and cortisone injections into the joint to relieve pain and swelling.

Surgical treatment

In other, more severe cases, surgery is necessary to correct bone and tissue damage caused by disease, trauma, chronic dysfunction, and iatrogenic causes, i.e., Proplast. These may include:

1. Arthroscopic examination (lysis and lavage) and arthroscopic surgery to treat early and less severe damage to the joint.
2. Surgery to repair damaged bony joint and meniscal surfaces due to osteoarthritis. This is a wear and tear arthritis. This is done by use of a Vitallium articular

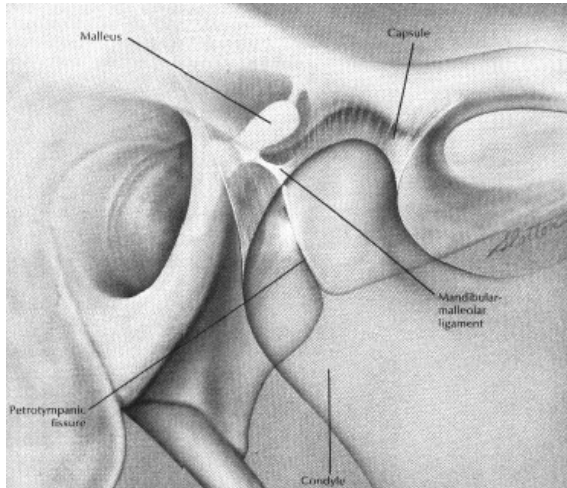
- eminence device. The device has been used over 30 years. There have been multiple long-term studies of its bio-compatibility and efficacy. [\(Note 4\)](#).
3. Total jaw joint implants are needed to restore extensively damaged joint surfaces. These devices are a Vitallium ramus and acrylic condylar head functioning against a Vitallium articular eminence device. This system has been in use for 30 years.

WHAT IS TMJ?

TMJ is a disorder of the jaw joint and related structures where the ball (condyle), socket (fossa), and cushioning disk (meniscus) of the joint are damaged or misaligned [\(Note 1\)](#). Over time, the meniscus becomes increasingly compressed and torn, allowing the bony structures of the ball and socket to deteriorate at an accelerating rate due to the grinding wear on the joint and the loss of cushioning effect of the meniscus. This grinding (crepitus) and concurrent pressure on the capsular ligament surrounding the joint can cause head pain, and may create difficulty in opening or closing of the mouth. The body attempts to realign the joint using the musculature in the face, jaw and neck. As these muscles become fatigued, additional muscles in the shoulders and back attempt to help this condition, then become stressed themselves. This can cause symptoms of generalized muscle pain and weakness that are diagnosed as Myofascial Pain Dysfunction Syndrome (Fibromyalgia) [\(Note 2\)](#) and/or Chronic Fatigue Syndrome.

The misalignment of the joint can also affect the nearby ear structures, due to pressure on the petrotympanic fissure and tympanic bone. The tympanic bone separates the jaw joint from the ear canal. The mandibular malleolar ligament (disco-malleolar ligament) connects the malleolus as this ligament traverses through the fissure to attach to the meniscus and the capsular ligament of the TMJ. The capsular ligament is the sac surrounding the joint. The anterior tympanic artery, which is responsible for supplying oxygenated blood to the tissue around the tympanic membrane (ear drum) travels through this fissure. The chorda tympani nerve traverses through this fissure. This nerve gives pain sensation to the tongue [\(Note 3\)](#). Pressure on these structures can cause

dysfunction and symptoms such as ear pain, tinnitus (ringing in the ears), vertigo (dizziness), subjective hearing loss, hyperacusis (increased sensitivity to sound), Chronic Fatigue Syndrome, tongue pain, muscle pain, and other symptoms.



Mandibular-malleolar ligament

TMJ DIAGNOSIS

It is necessary to have a knowledgeable clinician perform a complete diagnosis before a successful treatment program can begin. This diagnosis should include the following:

- A complete medical and dental history.
- A complete clinical examination including:
 1. Transcranial Lateral Oblique X-Rays (8-view), Tomograms (3 cuts) and MRI procedures are necessary to evaluate the condition and shape of the joint bones and meniscus of the TMJ.
 2. Electromyographic evaluation of the tension (hyperactivity) in the jaw and facial muscles surrounding the joint.
 3. Range-of-motion studies and jaw tracking tests to determine the condition of the joint during function and at rest. (Myotronics, Seattle, Washington)
 4. Examination of posture and body symmetry.
 5. In some cases, the clinician may request a MMPI (Minnesota Multiphasic Personality Inventory) to evaluate possible psychogenic factors.
- Ear, nose and throat examination to rule out other conditions when necessary (acoustic neuroma).
- Neurological examination when necessary.
- Orthodontic examination when necessary.
- General internal medical examination when necessary.

DO YOU HAVE TMJ DYSFUNCTION?

COMMON SYMPTOMS ASSOCIATED WITH TMJ.

1. Does your jaw joint make a popping, clicking or snapping sound when you move it?
2. Do you hear and/or feel a grating sound in your jaw joint on movement?
3. Is the joint tender to external pressure? This can be assessed by manually pressing the area in the front of the ear.
4. Do you clench and/or grind your teeth at night or during the day?
5. Do you sometimes have difficulty opening or closing your mouth?
6. If you have tinnitus (ringing in your ears), does the ringing sound change in any way as you open and close your mouth while applying external pressure to the joint?
7. Do you have frequent episodes of vertigo and/or nausea?
8. Do you have ear sensitivity and/or pain associated with sound?
9. Do you have recurring ear aches for which the doctor can find no apparent cause?
10. Do you have recurring migraine-like headaches that do not respond to migraine medicine and for which the doctor can find no cause?
11. Are your neck and shoulder muscles constantly tense and/or painful?
12. Do you have a recurrent knot in the muscles on the edge of your shoulder blades closest to the spine?
13. Do you feel chronically fatigued and/or depressed?

If you answered yes to any one or more of these questions, you may have a TMJ disorder.

TINNITUS OF TMJ ORIGIN

Twenty patients whose chief complaint was tinnitus were examined. They were not known to have temporomandibular disorders. They did not have pain or dysfunction. They were examined by physicians for ear disorders and the results were considered negative. Each of these patients had a complete history and clinical temporomandibular joint examination. The clinical examination included muscle and joint palpation and stethoscopic examination of the joint. This examination also included selected computerized mandibular scans and electromyographic studies of selected facial muscles. Each subject had eight views of transcranial lateral oblique x-rays taken. It was determined that 19 of

these individuals had one or more clinical, electromyographic, and radiographic indications of a temporomandibular disorder. From this study, it appears that individuals who have tinnitus with no apparent otologic basis for this symptom should have a careful evaluation of the temporomandibular apparatus. A temporomandibular disorder may be one of the primary causes of this symptom.

Abstract from:

Tinnitus of TMJ Origin: A Preliminary Report

Douglas H. Morgan, D.D.S.

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THE TMJ-EAR CONNECTION

The article documents the existence of three structures that traverse through the petrotympanic fissure. These structures are the mandibular malleolar ligament, the chorda tympani nerve and the anterior tympanic artery. The mandibular malleolar ligament or the disk-malleolar ligament originates on the anterior process of the malleus. It traverses through the petro-tympanic fissure and attaches to the posterior portion of the capsule and disk of the temporomandibular joint. The chorda tympani nerve supplies sensory feeling to the posterior two thirds of the tongue. The anterior tympanic artery supplies blood to the area of the tympanic membrane. Clinical experience with implants that impinge or cover these structures can cause ear problems and other symptoms. Removal of these implants and placements with devices that do not cover these structures often relieve these symptoms.

Abstract from:

The TMJ-Ear Connection

Douglas H. Morgan, D.D.S., Richard L. Goode, M.D.

Robert L. Christiansen, D.D.S., Lonnie W. Tiner, D.D.S.

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