TMJ INJURIES

By Michael L. Weiner

I. TMJ - WHAT IS IT?

A. Introduction

Like many other parts of the body, the temporomandibular joint (more commonly known by its abbreviation, TMJ) is usually ignored when properly functioning but the source of exceptional pain and disability when it is not. However, unlike many other parts of the anatomy, it is doubtful that a single part of the anatomy with such critical importance to the essential functions of life generates as much controversy in personal injury cases, particularly accidents where there is no direct trauma to the joint. This article will review the history of the controversy that exists in this area, and the medical literature lined up on both sides of the issue.

B. Basic Anatomy of the TMJ

By its very description, the TMJ is, of course, a joint, namely the junction of two or more bones in the skeleton. The TMJ joins the temporal bone, a part of the skull in the area of the temple (and hence its name) and the mandible, more commonly known as the jaw bone. While the anatomy of all of the structures that function together for the purpose of mastication (i.e. chewing) are quite complex, the critical portions of the anatomy that are necessary to understand the following materials are quite simple, and are shown in the diagram below. This diagram focuses on two basic structures of this joint, the bones (temporal and mandible) that make up the joint, and the meniscus (or disc) that serves a cushion between the two bones.

Schematic Drawing of Mandible and Articular Surface of Temporal Bone

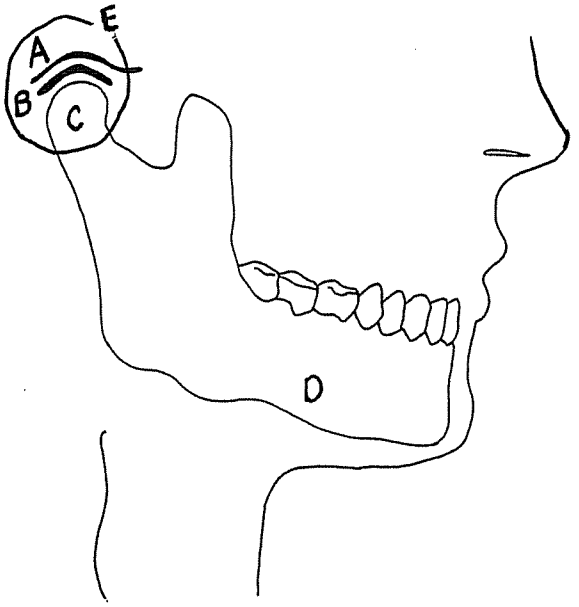
A. mandibular fossa of temporal bone

B. articular disc

C. mandibular condyle

D. body of mandible

E. temporomandibular joint



The TMJ has been described as the most complex joint in the body, because unlike most joints, such as the knee, elbow, wrist, finger and toe, which all act as hinges, the TMJ not only hinges, but also permits a gliding movement, where the bone of the mandible actually slides along the temporal bone. (A person can observe this hinging and gliding motion simply by putting their finger at the joint, underneath the ear, and feel both the hinging and sliding motion that occurs the wider one opens their jaw.)

1. The Bones of the Joint. The TMJ itself is simply convex and concave areas of bone, one fitting into the other. The ramus of the mandible extends upward and its uppermost portion, the condyle or condylar process, fits into the concave cavity called the mandibular fossa or glenoid fossa. The TMJ articulates, or hinges at this area, but the mandible will also slide forward, the condyle sliding out of the concave cavity of the glenoid fossa and along the temporal bone.

2. Meniscus (or Disc). Just as in the knee, where the meniscus (or cartilage) cushions the bones that make up the knee joint, or the spine, where intervertebral discs serve as cushions, the TMJ also has a cushion, referred to variously as the meniscus or articular disc. However, this disc is unique in function, for it must accommodate not only a hinging action, such as in the knee, but the gliding action that occurs between the temporal bone and mandible. The disc has a ligamentous type attachment at its rear, the posterior attachment, which allows the disc to actually move within the joint as the two bones hinge and glide.

Disc injuries most commonly cause the disruption of the function of the TMJ, and account for the "click" and "lock" symptoms that the public generally associates with TMJ problems. In essence, the disc no longer allows the bones to glide smoothly past one another. A thickening or bunching of the disc, or damage to its posterior attachment, causes the disc to get caught or interfere with the movements between the two bones, causing the clicking and locking.

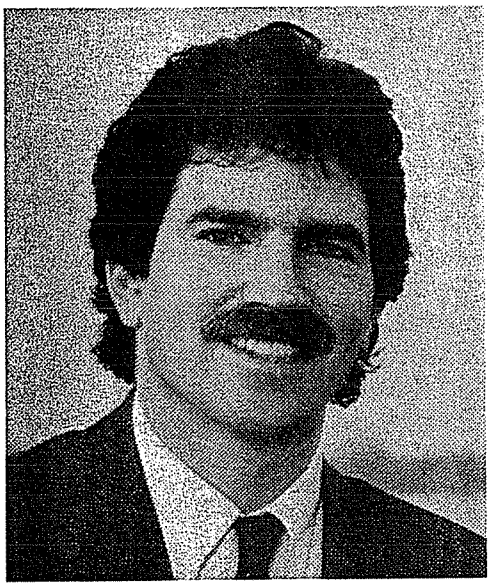
3. Other Structures. Other important portions of the joint include the synovial lining, which produces a fluid (synovial fluid) which acts as a lubricant in the joint. Although a TMJ case typically does not focus on a particular muscle of the TMJ (the four separate muscles involved are the masseter, temporalis, medial pterygoid and lateral pterygoid), these muscles, used to chew, are among the most powerful in the body. Like other muscles, they will go into spasm to "splint" an injured area and prevent further harm, the effect of which unfortunately causes further problems in the TMJ because of the pressure and force these muscles will then cause in the injured area when the person uses this joint for eating or talking.

C. Injuries to the TMJ.

As discussed more fully in the following section, it may be critical to distinguish between TMJ injuries from direct trauma to the joint (including trauma to the mandible) and TMJ injuries from hyperextension and hyperflexion of the neck (often referred to as "whiplash") because not only may the mechanism of injury be significantly different in the two circumstances, but the likely defenses may be different as well. In particular, a plaintiff's attorney may expect the defense (supported by medical literature) in a hyperextension/hyperflexion case that this mechanism cannot cause TMJ injuries under any circumstances in the absence of direct trauma to the joint.

Where there is direct trauma to the joint, such as in a car accident where the joint or the jaw comes in violent contact with the side window, steering wheel, windshield, etc., the possible injuries include fractures of the bones, damage to the disc, stretching or tearing of the various ligaments, tearing of the joint capsule itself, bleeding, inflammation, and swelling, all having various effects on function depending on the extent to which the structures are damaged or destroyed.

While direct trauma may damage various structures, the likely focus of TMJ injuries is usually the meniscus, which may be displaced (by damage to the disc or its supporting ligaments) or perforated. When a disc is damaged or displaced because of trauma, the disc is no longer seated in its ordinary position between the two bones, and no longer serves to cushion the two bones through both the hinging and gliding movements, resulting in various symptoms depending on whether the problem is chronic or acute. The symptoms of TMJ problems can vary significantly, from a low grade constant discomfort to an acute and excruciating pain. There may be only slight limitation of jaw opening or there may be extreme limitation and even a locking of the jaw. Generally, the difference in symptoms will depend on the extent to which the disc is damaged and/or out of position, and the amount of time this condition has persisted.



MICHAEL L. WEINER *is an attorney in the Minneapolis law firm of Yaeger, Jungbauer, Barczak & Roe, Ltd., practicing in the area of personal injury, wrongful death, product liability and Federal Employers' Liability Act. He is also an Adjunct Professor of Law at William Mitchell College of Law in St. Paul, MN, teaching products liability.*

Over time, the inflammation and wear that results from a damaged or displaced disc can lead to severe degeneration of the bones and other structures of this joint. Disc displacements are often classified under five different stages, stage one being the least severe and stage five being the most severe.

D. Diagnosis and Treatment.

The diagnosis and treatment of TMJ injuries and diseases is of relatively recent origin, and Dr. Clyde H. Wilkes of Minneapolis is among the first in recent years to use x-ray

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imaging to diagnose TMJ injuries. Building upon research by Dr. Fleming Norgaard, a Danish physician who wrote on the subject in the 1940's in Scandinavian medical journals, Dr. Wilkes made use of x-ray imaging to show injuries to the various structures.

Among the national experts on the imaging of the TMJ is a local radiologist, Dr. Kurt P. Schellhas (of the Center for Diagnostic Imaging in Minneapolis) who, working in part with Dr. Wilkes, has written numerous articles on the imaging of TMJ injuries, using such imaging techniques as arthrograms (the injection of radiographic dye into a joint), computer assisted tomography (CAT scans), and magnetic resonance imaging (MRI). Dr. Schellhas' articles explain in detail these various techniques, their accuracy, the manner of injury to the structures of the TMJ, and their clinical correlation. These articles are highly recommended to the practitioner to help understand the anatomy of this joint, and how various forms of imaging can show injury and disruption to the function of the TMJ. (A listing of these article is available from the author upon request.)

Imaging is often particularly useful in showing the continuing deterioration or destruction of joint structures over time. One of the important aspects of TMJ injuries is that the injury is often progressive, resulting in further deterioration of the various structures, such as resorption (or loss) of bone, spurring, adhesions, and a host of other complications that effect the structures and functioning of the joint.

The treatment of TMJ injuries may be by conservative (non-surgical) means or by surgery. Conservative methods may be as simple as rest, or it may include treatment intended to reduce stress on the joint through various splints or mouth guards worn by the individual. Because TMJ problems can often be related to malocclusion, which puts pressure and stress on the joint, these stresses may be treated by various dental means, (i.e., adjusting bite, bridges or dentures).

Surgical treatment includes, most commonly, repair or removal of the injured disc, in an attempt to either restore the disc to its ordinary shape and function, (referred to as a "plication") or by removing it entirely because the damage is too severe to repair. When a disc is removed, the person then relies on the synovial fluid and the cartilagineous linings of the two bones to separate them and to cushion and lubricate their hinging and gliding action.

II. PRESENTING A TMJ CASE

A. Causation--Direct Trauma to Jaw or Joint

The actual mechanism of injury by direct trauma will, of course, vary significantly depending upon the nature of the force applied, its direction and its severity. Just as trauma to other parts of the body may cause fractures, tearing of soft tissues, dislocations, contusions, bleeding and the like, the same may occur in the TMJ. The bones of the joint may be fractured, there may be significant tearing of the ligaments, muscles or other soft tissues, and there may be significant bleeding and swelling, all of which should be immediately apparent both clinically and by diagnostic techniques such as regular x-rays, tomograms, arthrograms, CAT scans and MRI's. There will generally be immediate pain, and limitation of function of the joint. While some of these symptoms may be less noticeable immediately due to more significant injuries elsewhere in the body, the fact that there is direct trauma to the jaw or joint may also more commonly lead to a more immediate connection between the trauma and the injury both by the accident victim and the treating physician.

B. Causation--Flexion/extension injuries (i.e. non-direct trauma).

One of the most difficult areas of causation in TMJ injuries is, unfortunately for injured plaintiffs, also the most common, namely the hotly disputed issue of whether flexion-

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extension injuries (i.e., "whiplash") can cause TMJ injuries. The basis for the dispute over causation in these cases is whether this mechanism of injury can result in sufficient forces upon the structures of the TMJ to actually cause damage to these structures, most particularly the meniscus and its supporting ligaments.

There is a significant split in the medical community and in the medical literature on this issue, and practitioners who ignore this split do so at their peril. Because defense counsel will always have available an adverse doctor who, supported by this medical literature, is willing to testify that a flexion-extension injury cannot, under any circumstances cause a TMJ injury without direct trauma to the joint, plaintiff's counsel must be aware of and understand the nature of this controversy. Typically, this plaintiff was injured in a rear end collision and suffered a cervical flexion-extension injury, more commonly known to the public (and many defense attorneys) as "whiplash." When this person ultimately is diagnosed with a TMJ injury, the case may well turn on whether the car accident caused the TMJ injury, or whether the injury was the result of factors independent of the accident.

The following medical literature addresses this question, literature the plaintiff's attorney must be aware of because they can be sure that the defense's adverse doctor will rely on it to conclude that there can be no such relationship.

1. Medical Literature

a. Early Literature

For a medical issue so hotly disputed, the medical literature on this subject is actually somewhat limited. In fact, there are only a handful of truly significant articles, most of which have been written in the last ten years.

One of the earliest reports in the medical literature on the connection between flexion-extension injuries and TMJ disfunction is a letter to the editor of Lancet, in which the author, Dr. Richard H. Roydhouse, reviews 14 of his patients with "whiplash symptoms" and suggests a link between their whiplash and TMJ symptoms. In his letter, Dr. Roydhouse states:

> The relationship of T.M.J. dysfunction and whiplash can be explained as deceleration effects on the mandible and thus on the T.M.J. Alternatively, a neurological dysfunction of C1, 2, 3, and 4 with the hypoglossal and trigeminal nerves is possible, or some postural or functioning relationship of neck, jaw and head may be involved. . .
>
> Some patients with deceleration injuries may be treated for head pains by attending to apparent T.M.J. dysfunction. Objective data are lacking, but clinical and anecdotal material strongly suggests that deceleration injuries may affect the mandibular complex through direct injury or through neurological involvement.[1] (Emphasis added)

The next two significant articles were both written in 1983, by Dr. Lader[2] and Dr. Meyer Leonard[3]. In his article, Dr. Lader described a somewhat circular process whereby the postflexion-extension injury caused cervical spasm, which caused abnormal mandibular posturing, which in turn leads to muscle or mastication myospasm.

The article by Dr. Meyer Leonard is of interest to the practitioner, particularly those in Minnesota, because its author, Dr. Meyer Leonard, is a commonly used defense expert locally for the proposition that flexion-extension injuries do not cause TMJ injuries. In Dr. Leonard's article (written with Dr. Quentin N. Anderson, who is the chief of radiology services at Hennepin County Medical Center) the authors discuss the use of arthrography as an aid to diagnose injuries to the TMJ even where there is no actual fracture to the bones of the joint. Drs. Leonard and Anderson discuss the movements of the TMJ during its function, give six case histories, and conclude that the trauma can cause injury to the tissues of the TMJ even where there has been no fracture.

We believe that in some patients who sustain a blow that does not fracture the jaw, the jaw is

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> nevertheless propelled backward and one or both condyles impact on the posterior part of the joint cavity and probably rupture or tear the ligament. The meniscus is jettisoned forward as a melon seed from between the fingers. Id. at 124

The authors also conclude that the soft tissue injuries are more likely if there has been no fracture, because if the blow had fractured the jaw, "the energy of impact has been dissipated in the fracture." Id. at 124

In the leading article discussed below by Drs. Weinberg and Lapointe, Dr. Leonard's article is cited as supporting the authors' conclusion that flexion-extension mechanism can cause TMJ injuries. However, Dr. Leonard vigorously contends that Drs. Weinberg and LaPointe have misinterpreted his article, and that his article stands only for the proposition that direct trauma to the joint can cause a TMJ injury.[4]

The leading article on this issue was written in 1987 by two oral and maxillofacial surgeons at the University of Toronto, Drs. Simon Weinberg and Henry LaPointe.[5] This article reviews the literature of Roydhouse, Lader, and Leonard and Anderson and as well as a number of other articles, and assesses 28 patients with "post-whiplash temporomandibular joint (TMJ) symptoms." The authors found internal derangements arthrographically in 22/25 patients and their observations were then confirmed in ten patients who elected to have surgery. The authors conclude that there "appears to be a relationship between acceleration-deceleration type of automobile accidents and internal derangements of the temporomandibular joint." Id. at 654 (Emphasis added)

The authors then attempt to determine the mechanism that explains this connection, and conclude that there is a anatomic "Achilles heel" of the TMJ which leads to a "stretching and tearing of the posterior attachment and synovial tissues and loosening or tearing of the discal attachments to the medial and lateral condylar poles." Id. at 655. Essentially, the authors conclude that when the head is propelled forward, the soft

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tissues of the disc and its attachment are crushed between the two bones that make up the joint. The authors also conclude that subsequent spasm of the jaw muscles may further displace the disc and "perpetuate the TMJ symptoms." In particular, the authors refer to the effect of the spasm as "stretching or tearing" the posterior attachment of the disc, which "inevitably leads to progressive worsening of the disc displacement, with the attendant symptoms and pain persistent lacking." Id. Ultimately, the authors conclude:

> Persistent TMJ symptoms in patients who have suffered cervical hyperextension injuries should arouse a high index of suspicion that there may be more than a purely muscular problem involved. Arthrographic examination of the TMJ[s] is recommended when the patient's symptoms fail to respond to a reasonable course of conservative therapy. Id. at 656.

Following the publication of this article, a New York doctor, Arthur Kupperman, criticized in a letter to the editor of this Journal in April, 1988, the conclusions of Drs. Weinberg and LaPointe, stating that his "objection is that various studies show that 10% to 40% of the general population has TMJ derangement." Dr. Kupperman argues that the authors could reach their conclusions only if they had a significant random sample of all whiplash patients because these particular patients had been referred to their office for TMJ treatment. Dr. Kupperman also disagreed with the mechanism for injury proposed by Drs. Weinberg and LaPointe, arguing that the masseter muscle of the jaw is "one of the strongest muscles in the body and could easily brace the jaw against any extreme force." In a particularly vivid description, Dr. Kupperman concludes:

> It is more likely that the eyes would fly out of their sockets than the mandible be displaced in such a proposed manner, considering the extreme force required. Id. at 519

In their reply in this same issue, Drs. Weinberg and LaPointe dispute their need to use a random sampling of the population, stating that their conclusions were based upon the "temporal relationship of the whiplash injury and the onset of symptoms of TMJ internal derangement." The authors pointed out that "almost all of their patients who developed TMJ symptoms following their whiplash injury did so within one to two days post-injury." They also suggested a comparable analogy that "yesterday's kick in the shins is responsible for today's bruise." Finally, the authors point out that Dr. Kupperman's suggestion that the strength of the masseter muscle would brace the jaw against this force is not applicable, because in a "whiplash injury, the elevator muscles of the mandible are usually in a relaxed state." Id. at 519

b. Recent Adverse Literature

Plaintiff's attorney in a flexion-extension TMJ case can expect to see a number of recent articles used as support for the proposition that flexion-extension injuries will not cause TMJ injuries. In a 1989 article by Drs. Schneider, Zernicke, and Clark[6] the authors note the large number of clinical findings of TMJ disorders following whiplash injuries and attempt to actually measure, by means of a head-neck model with movable jaw and computer simulation, the actual stresses upon the various TMJ structures caused by a flexion-extension injury. By means of these computer simulations and numerous physics formulas, the authors then attempt to actually simulate jaw motions during rear end collisions at various speeds. Cautioning that the "absolute values in time course of our results for the jaw segment must be viewed with caution, since that part of the model has not yet been validated fully", the authors then nevertheless attempt to reach certain conclusions about the absolute forces upon the joint.

Pointing out that physicians often report TMJ symptoms following whiplash injuries, that women are more vulnerable to whiplash injuries than men because they tend to have smaller neck muscles, and that many clinic patients claiming motor vehicle related trauma as a cause of their TMJ disorder "didn't recognize the problem until several weeks after the accident," the authors then ask

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"whether the TMJ problem was a preexisting disorder or a direct result of the accident trauma." (emphasis added) The authors then state their views that "while whiplash syndromes may have a physical basis, whiplash syndrome may be partly viewed as a culturally-constructed illness behavior, because whiplash victims can be awarded compensation by the courts and insurance companies.

Ultimately, the authors qualify their data in numerous ways, stating "it is difficult to address injury mechanism without any data on what happens during the injury," that their "jaw-head-neck model has not yet been fully validated," and that "refinements must be made to the model during the course of validation with the experimental data for whiplash for the accurate dynamic responses of the jaw-head-neck system during impulsive loading to be predicted." Despite all of these qualifications, this article has and will be used by defense experts to support the proposition that there is not sufficient force to cause damage to the TMJ from a flexion-extension injury.

Also disputing the connection between flexion/extension and TMJ injuries are the authors of a November 1991 article (the lead author being Dr. Richard Howard, a Physician-Engineer and Associate at Biodynamic Research Corp in San Antonio, Texas), who examine Weinberg and LaPointe's leading 1987 article and conclude that the mechanism proposed by Weinberg and LaPointe "is inaccurate."[7] The authors state that their article:

> assesses the proposed mechanism of injury, points out misconception to the previously published physical and biomechanical analysis, and compares the magnitude and direction of actual forces in extension-flexion events to those that would be expected to occur in routine non-traumatic events.

In their analysis of what happens to the various structures as the head accelerates and decelerates, the authors essentially conclude that certain forces are necessary to cause injury. Since this force would have to be transmitted through the neck, this amount of force could be borne "only with the expectation of serious or fatal cervical injury." In their analysis, the forces experienced at the TMJ from "mild to moderate extension-flexion internal motion of the neck" act "in a similar directional range as forces generated at the joint during normal chewing activity" and "necessarily of a substantial lesser magnitude." To put it in another way, the authors conclude that ordinary chewing possess a greater potential to injure the TMJ than does an extension-flexion injury. Id. at 1213

One particularly important point to note about this 1991 article is that it is really nothing more than an editorial on the subject, and is not based on case studies or independent research. (In contrast to, among others, the leading articles by Weinberg and LaPointe, Pressman, and Garcia, all of which support this relationship.)

In a second article on this subject by Dr. Howard in 1995[8], the authors again dispute the connection between flexion/extension injuries and damage to the TMJ. This time, the authors use live human subjects in low velocity rear end collisions to actually attempt to measure the forces on the applicable structures. Their ultimate conclusion is the "force magnitudes generated at the TMJ constitute a minor fraction of the forces experienced at the joint during normal physiologic function. It is a conclusion of this study that injuries to the TMJ attributed to low-velocity 'whiplash' cannot be accounted for by the joint forces produced by this maneuver." Expanding on their conclusion, they write:

> Forces computed from the head-neck-mandible model considered by Schneider et al are similar to the forces resulting from this study. The conclusion that the magnitude and direction of these forces in low-velocity rear-end collisions does not constitute a mechanism for significant injury to the joints is consistent with the findings in a recent clinical study by Heise et al. The significant distraction forces predicted to occur at the TMJ during whiplash maneuvers by Roydhouse, Lader, and Weinberg and LaPointe are not corroborated by this study. The magnitude, direction, and duration of measured joint forces in the low-velocity whiplash maneuver are shown to fall well within the physiological envelope of forces routinely experienced at the TMJs. Although other mechanisms for whiplash-induced injury to the TMJs and muscles of mastication may exist, it would appear from the results of this experimental study that those mechanisms would not be directly related to the short-acting biomechanical forces generated by this maneuver. Id at 262 (footnotes omitted)

Finally, the practitioner should be familiar with the 1992 article by Dr. Heise, referenced above by Dr. Howard, in which the authors state their conclusions resulting from their follow up of patients with "whiplash injury":

> These data indicate that the incidence of TMJ pain and clicking following whiplash

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injury is extremely low, and that patients who do not have clicking on resolution of their initial pain/ dysfunction subsequently do not develop this problem.[9]

C. Recent Favorable Literature

From the plaintiff's perspective, two recent articles are particularly helpful (and credible) because they show, by objective radiological evidence, the damage to the TMJ. In the first of these two, a 1992 article written by radiologist and dentists, the authors agree with the conclusions of Weinberg & LaPointe that hyperextension/hyperflexion injuries do cause TMJ dysfunction. This article, MR imaging of temporomandibular joint abnormalities associated with cervical hyperextension/hyperflexion (whiplash) injuries, by Dr. Barry D. Pressman, et al.,[10] is based upon a review of the cases of 33 patients who have TMJ symptoms after sustaining "whiplash injuries during rear-end motor vehicle collisions." The authors note the literature discussed above, and point out that "although patients often have symptomatic TMJs after whiplash injury, to our knowledge, no study has evaluated these patients with MR imaging immediately after injury." Consequently, the authors retrospectively analyzed the MR examinations of these patients sustaining whiplash injuries to determine the "frequency of internal derangements and/or other related abnormalities of the TMJ." Id. at 569

The results of this study were that 29 of these patients, or 88%, had some type of abnormality in the TMJ, as shown by MR imaging. 56% of the patients had displacement of the disc, and 65% of the TMJs showed the presence of joint fluid and/or soft tissue edema.
In their discussion of the mechanism of injury, the authors basically agree with the analysis proposed by Weinberg & LaPointe, where the disc and posterior attachment may be "crushed
between the mandibular condyle and glenoid fossa during hyperflexion." Id. at 571. The authors also note that they have attempted to screen those with pre-existing TMJ dysfunction, although they note "the potential for financial recovery might have tainted the quality of their medical histories." The authors state their conclusions as follows:

> In conclusion, the results of the present study show that symptomatic patients with whiplash injuries frequently have abnormalities of the TMJ. These abnormalities include internal derangements of the TMJ, with or without joint effusions and/or soft tissue edema. Internal derangement is well seen on T1- and proton-density-weighted images, T2-weighted images are required for delineation of joint fluid and soft tissue edema, both of which may be present without associated internal derangement. Because the detection of joint fluid or soft tissue edema is particularly important in these patients, we recommend that T2-weighted images be obtained routinely in patients who have a history of whiplash injury and TMJ dysfunction and/or symptoms. Id. at 573-74. (Emphasis added).

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In the second of these favorable articles, published just months ago, The Relationship between Cervical Whiplash and Temporomandibular Joint injuries: An MRI Study, Garcia R, Arrington J, The Journal of Craniomandibular Practice, July 1996, Vol. 14, No. 3, the authors again use objective imaging studies to conclusively show the link does in fact exist.

> The Relationship between cervical whiplash and TMJ injuries has been widely reported in the literature; and now with the widespread use of MR imaging, TMJ injuries in post MVA cervical Whiplash patient are being scientifically documented.
>
> The present study documents the high prevalence of TMJ abnormalities in a group of patients who had no TMJ-related complaints prior to receiving a cervical whiplash injury in a motor vehicle accident, but due to the lack of a suitable MRI evaluated control group, no conclusions are drawn regarding the incidence of TMJ abnormalities in post MVA cervical whiplash patients. Nevertheless, the fact that previously asymptomatic patients became symptomatic after a post MVA cervical whiplash injury supports the position that the TMJ Symptoms are reasonably related to the cervical whiplash injury.
>
> Heise, et al. reported a very low incidence of TMJ symptoms in post MVA cervical whiplash patients, in fact, they reported clicking in only 1.9% of their sample. This figure contrasts significantly with the findings of four separate studies on more general adult populations which reported clicking in 16.1, 16.7, 28.8, and 29%. The disparity between the Heise, et al. study and the other studies might be partially explained by the Ishigaki and Bessette study regarding the perception of TMJ sounds by patients and doctors. They determined that the patient's perception of TMJ sounds demonstrated a sensitivity of 43% and the doctor's perception of TMJ sounds demonstrated a sensitivity of 54%.
>
> Although we could draw no conclusions from our study regarding the incidence of TMJ abnormalities in post MVA cervical whiplash patients, it is our impression that the Heise, et al. findings regarding TMJ clicking are much too low, considering that other studies on less restricted adult populations demonstrated clicking to be present from over eight to over 19 times more often than it was in the Heise, et al. study.
>
> . . .
>
> Many of the symptoms previously attributed to cervical whiplash injury (headaches, facial pain, earache, tinnitus, ear stuffiness, difficulty swallowing, etc.) have been shown to be a result of the mandibular whiplash that occurs simultaneously with the cervical whiplash. Recognizing this relationship, Shellock, stated that "physicians have always assumed that injuries to the cervical spine cause whiplash symptoms, but they've overlooked the jaw." We can no longer overlook the jaw-MR imaging clearly demonstrates the relationship between post MVA cervical whiplash and TMJ injuries. Based on the foregoing, an examination of the TMJs for possible injuries should be an integral part of any comprehensive evaluation of post MVA cervical whiplash patients. Id. at 236-39. (Emphasis added)

In light of this significant dispute in the medical literature, one can assume that these articles are not the

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Heartbreak Hotel . . . . Open for Business!

The Minnesota Trial Lawyer magazine is pleased to announce that **Pamela Finney Rochlin** and **Mark D. Streed** of **Meshbesher & Spence, Ltd.** will become the new editors of "*Heartbreak Hotel.*" Beginning with the Spring issue, they will continue in the tradition of Kathy Tatone and Mike Tierney by helping our members learn from other members' (sometimes humorous) mistakes.

Help Pam and Mark by sending them your horror stories for publication. Anonymous entries are welcome.

Mail to either Pamela Finney Rochlin, 8360 City Centre Drive, Suite 100, Woodbury, MN 55125 or Mark D. Streed, 1616 Park Avenue, Minneapolis, MN 55404 or to Editor, Minnesota Trial Lawyer, 706 Second Avenue South, 140 Baker Building, Minneapolis, MN 55402.

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last word on the subject, and particular care must be taken by the practitioner to stay current in the medical literature. The practitioner should also be aware that the medical texts concerning TMJ injuries generally support the plaintiff's perspective and the link between flexion/extension impacts and TMJ injuries.[11]

2. Preexisting Conditions

The plaintiff's attorney with a flexion-extension TMJ case without evidence of direct trauma, (and even to some degree those with direct trauma) can expect not only that the defense will vigorously dispute that this mechanism can cause a TMJ injury, but they can also expect the blame for the TMJ injury will be placed on a preexisting condition. This defense can be expected in virtually every case because a significant portion of the population suffers from TMJ problems, and there are many other sources of TMJ symptoms other than trauma, including changes in dental occlusion, bite abnormalities, anatomical abnormalities and bruxism (clenching and grinding).[12] Even accepting the view of Dr. Shellhaus that the clinical incidence, significance and long range consequences of injury to the TMJ are underestimated by most health care providers, this still leaves a large percentage of TMJ injuries as non-traumatically induced.[13]

Consequently, the plaintiff's attorney in any TMJ case, particularly those involving flexion-extension injuries, can expect a defense focus on preexisting conditions, and it is essential to examine prior medical records, including dental records, for prior problems that might have some connection to the present TMJ injury. However, even preexisting conditions or problems do not necessarily relieve a defendant from liability if the accident aggravated what was otherwise a non-symptomatic problem, as Dr. Schellhaus noted may occur. (See footnote No. 13)

C. Damages

1. Pain, Disability and Loss of Function.

a. Medical care and future risks.

Because the severity of TMJ injuries runs the full spectrum, from minor bruising which will completely resolve, all the way up to the total destruction of the joint with 100% loss of function, medical care will vary accordingly. At one end is conservative care consisting of nothing more than rest, at the other end is surgery, up to and including a total TMJ replacement with a prosthesis. Also, depending on the extent of the injury, there may be significant future risks to an already damaged TMJ. For example, where the TMJ injury requires surgery to repair the disc or its attachments, most doctors will agree that this person is going to be highly susceptible to future trauma. For example, a surgically repaired disc and its supporting ligaments may be so susceptible to slight additional trauma that the disc would have to be surgically removed, leaving the individual without any cushioning at all between the bones of the joint. Similarly, a repaired ligament might be particularly susceptible to tearing in a subsequent accident, again leaving that person at risk of future surgery and increased pain and disability.

Finally, and perhaps most important, is the progressive nature of TMJ injuries, and the need for future medical treatment. When a TMJ does not function properly, additional stresses are placed upon the various structures, often leading to further deterioration of the disc, and even changes in the bones of the joint. When these changes occur, additional stresses can result, leading to a vicious circle of increased pain and disability. In his previously referenced article on the imaging of temporomandibular joint injuries (footnote No. 13), Dr. Schellhaus explains the necessity of continued follow-up imaging of the TMJ to look for progression of the injury. While each TMJ case will be unique, it is likely that in most involving significant injuries, there will be required follow-up, significant future risks, and the potential for future degenerative changes even without any new injuries to the joint.

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CONCLUSION

The most important task for the plaintiff's attorney in proving a TMJ case is to educate the jury on this unique and important part of the anatomy. In light of the anticipated defenses to a TMJ injury, there is simply no substitute for immersing one's self in the medical literature and working closely with the treating doctors or dentists.

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[1] Roydhouse, R.H.; Whiplash and temporomandibular dysfunction. Lancet 1:1394, 1973

[2] Lader, E: Cervical Trauma as a Factor in the Development of TMJ Disfunction and Facial Pain. Craniomand Pract 1:85, 1983

[3] Leonard, M.S., Anderson, Q.N: Temporomandibular Joint Arthrography as an Aide in Diagnosis of Trauma to TMJ in the Absence of Fracture, In Jacobs JR (Ed): Maxillofacial Trauma in an International Perspective. New York, Praeger, 1983, page 119

[4] In a case which this author was involved, Dr. Leonard, testifying for the defense, stated:

> Q. Would you agree that there are other articles that are written that have cited your case studies in your article?
>
> A. They have cited it frequently and misquoted it even more frequently.
>
> Q. And what, sorry?
>
> A. Misquoted it. I have seen it quoted in support of this whiplash theory and I have to write and say this is untrue, the article does not at all substantiate or support that idea and yet it has been listed in the reference as supporting.

This testimony is available from the author upon request. It is also important to be aware that Dr. Quentin N. Anderson, Dr. Leonard's co-author of this article, presented a seminar through Professional Management Resources, Minneapolis, TMJ INJURY, Temporo Mandibular Joint, the injury of the decade, in April 1991, in which he stated that "hyperextension and hyperflexion type injuries . . . associated with the typical whiplash type accident can also cause injury to the temporomandibular joint complex." (emphasis added)

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[11] Friction, James R., D.D.S., Ph.D., and Dubner, Ronald, D.D.S., Ph.D. "Orofacial Pain and Temporomandibular Disorders," *Advances in Pain Research and Therapy*, vol. 21, (1995), p. 186

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[13] Schellhaus, K, Temporomandibular Joint Injuries, Radiology, Volume 173, Number 1, Pages 211-216, October 1989