Dynamic Chiropractic

TMJ and Whiplash: Of Forces and Farces

Arthur Croft, DC, MS, MPH, FACO; Dennis P. Steigerwald, DC

Over the last decade, chiropractic, medical, and dental providers have become increasingly aware of temporomandibular joint (TMJ) disorders, many of which arise posttraumatically. A large share of these are the result of cervical acceleration/deceleration (CAD) injuries. It has been difficult to estimate the actual incidence of CAD (whiplash) associated TMJ disorders primarily due to the common delay in onset of symptoms, which may be as long as several months;[1,2] however some estimates have been as high as 37 percent.[3]

The head and neck are exposed to non-centroidal acceleration, which usually far exceeds the acceleration of the vehicle itself. This is a non-linear relationship and varies from 2-1/2 times at 8 mph collisions, to well over 10 times at higher speed collisions.[4] Reports of injuries to cranial nerves, cerebrum, brain stem, pons, and vestibular apparatus attest to the violence of this acceleration.[5] Certainly the TMJ is not isolated from injury. Schneider et al.,[6] added a mandible to a previously experimentally validated head-neck model and tested it with 15 mph and 30 mph simulated, rear-impact collisions and demonstrated significant torque and acceleration forces within the TMJ.

Our best current model of the mechanism of trauma to the TMJ from rear-impact collisions is as follows:

1. The head-neck complex moves into extension.
2. Due to its own inertia and muscular attachments, the mandible lags behind resulting ultimately in hyperextension to the TMJ.
3. The disc is compressed between condyle and temporal bone resulting in internal disruption.
4. The posterior joint attachment tissues and the medial and lateral attachments of the disc/condyle complex are torn.
5. As the head-neck complex moves forward during deceleration, the TMJ is subjected to only benign forces. Detailed descriptions can be found elsewhere.[2,5]

Subsequently, a number of complex biomechanical events take place and a chronic synovitis often ensues. Symptoms of clicking, popping, closed lock, and pain are prominent among a host of others. Because of the typical time lag between trauma and onset of symptoms, and because many of these patients are predisposed to TMJ dysfunction as a result of various types of malocclusion, extractions, partial plates, and parafunctional habits, such as bruxism, many health care providers are unwilling to diagnose these conditions as posttraumatic. In medicolegal settings, this can have disastrous results for patient plaintiffs.

Recently, an article authored by Howard et al.,[7] asserted that forces at TMJ encountered during a CAD injury were no greater than those occurring during the simple act of chewing. As evidence for this, they provided a diagram illustrating the head-neck-jaw dynamics during a rear-impact collision. In their model, no motion occurs at the head-neck junction. Furthermore, no motion occurs in the cervical spine. There are two degrees of motion (flexion and extension) occurring at a pivot point at the cervicothoracic junction. Finally, as the head-neck moves into extension, the jaw

does not open.

Certainly, if one considers this a reliable model, their hypothesis might have some credibility. In fact, however, there is virtually no experimental evidence to verify or support such a simplistic and biomechanically-void model, and their conclusions therefore cannot be taken seriously. Unfortunately, this article has served to further stir the already muddy waters surrounding this controversial and complex area of clinical practice. Practitioners are cautioned to be aware of both the facts and the myths surrounding the TMJ.

References

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