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Original Research

MR Imaging of Temporomandibular Joint Abnormalities Associated with Cervical Hyperextension/ Hyperflexion (Whiplash) Injuries[1]

Barry D. Pressman, MD • Frank G. Shellock, PhD • Joseph Schames, DMD • Mayer Schames, DDS

Patients often have temporomandibular joint (TMJ) dysfunction–related symptoms after cervical hyperextension/hyperflexion injuries ("whiplash") caused by rear-end motor-vehicle collisions. To determine abnormalities of the TMJ associated with these injuries, 33 consecutive symptomatic patients (66 joints) with no direct trauma to the jaw, mouth, head, or face due to the accident and no prior history of TMJ dysfunction underwent magnetic resonance (MR) imaging, and the images were retrospectively analyzed. Overall, 29 (88%) patients had some type of TMJ abnormality related to whiplash injury. Displacement of the disk was seen in 37 (56%) of the TMJs as follows: 21 (32%) had anterior displacement with reduction, nine (14%) had anterior displacement without reduction, six (9%) had lateral or medial displacement, and one (2%) had posterior displacement. On T2-weighted images, 43 (65%) TMJs had abnormal joint fluid or edema, predominantly affecting the joint capsule and/or lateral pterygoid muscles. The finding that many of the patients had joint fluid and/or soft-tissue edema indicates that T2-weighted images are especially useful for assessment of patients with a history of whiplash injury.

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Abbreviation: TMJ = temporomandibular joint.

TRAUMA IS A PRIMARY CAUSE of temporomandibular joint (TMJ) dysfunction (1–5). Magnetic resonance (MR) imaging is considered to be the diagnostic imaging modality of choice for internal derangements of the TMJ, particularly those that are secondary to traumatic injuries (3–9). In addition, MR imaging is useful for identifying the presence of joint effusions, edema, and inflammation of the soft tissues often found in association with TMJ disorders (3,4,6,10).

Hyperextension/hyperflexion of the cervical spine—or "whiplash"—that typically occurs during rear-end motor-vehicle collisions is the most common cause of injuries to individuals involved in automobile accidents (11). These patients frequently report symptoms and/or demonstrate clinical signs of TMJ dysfunction (11–18). One study reported that 30% of patients with TMJ abnormalities had sustained major trauma, mainly in automobile accidents (19). Also noteworthy is that whiplash not only produces injury to the associated soft tissues of the TMJ but may aggravate a preexisting internal derangement (3,14,16). Although patients often have symptomatic TMJs after whiplash injury, to our knowledge, no study has evaluated these patients with MR imaging immediately after injury (3).

In consideration of the above, we retrospectively analyzed the MR examinations of patients who sustained whiplash injuries to determine the frequency of internal derangements and/or other related abnormalities of the TMJ.

• MATERIALS AND METHODS

Thirty-three patients (66 joints; 14 men, 19 women; age range, 21–44 years) who had TMJ symptoms (ie, headaches, clicking, crepitus, jaw locking, ear pain, facial pain, etc) after sustaining whiplash injuries during rear-end motor-vehicle collisions were studied in this retrospective analysis of data obtained from consecutive patients. Each patient was evaluated by one of two dentists (J.S., M.S.) with extensive experience in dental trauma and TMJ disorders. None of the patients had direct trauma to the jaw, mouth, face, or head due to the automobile accident or had a previous history of TMJ dysfunction. The average length of

[1] From the Departments of Radiology (B.D.P.) and Dentistry (J.S., M.S.), Cedars-Sinai Medical Center, Los Angeles; University of California, Los Angeles, School of Medicine (F.G.S.); and Tower Musculoskeletal Imaging, 444 San Vicente Blvd, Los Angeles, CA 90048 (F.G.S.). Received March 3, 1992; accepted May 12. **Address reprint requests to F.G.S.**