

Detection of Degenerative Disease of the Temporomandibular Joint by Bone Scintigraphy: Concise Communication

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Nine patients with facial pain were evaluated with limited bone scans. The scintigrams correlated with microscopy in all patients (eight positive, one negative), although radiographs correlated with microscopy in only five patients (four positive, one negative). The degenerative disease process in the temporomandibular joint was more extensive in the patients with radiographic and scintigraphic abnormalities than in those with scintigraphic abnormalities alone. The limited bone scan appears useful in detecting early degenerative changes in the temporomandibular joint.

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Bone scintigraphy is a useful diagnostic modality for locating disease, both benign and malignant (1-11). The application of this technique to oral disease has been limited (12-27). Disorders of the temporomandibular joint (TMJ) have rarely been evaluated (12, 13). Laurie (14) suggests that this is a fertile area for investigation.

Facial pain has been, and still is, one of the most perplexing and challenging problems facing medicine and dentistry. The symptoms of TMJ disease are multiple. The differential diagnosis of other entities that might be considered is, then, a differential diagnosis of many, if not all, pain-producing entities of the head and neck. Table 1 lists the various causes that should be considered in the differential diagnosis of TMJ pain.

The limited bone scan is used in this study to evaluate its sensitivity in locating the presence of organic disease.

MATERIALS AND METHODS

Nine patients with facial pain were evaluated. All had a detailed clinical history, a thorough oral and maxillo-

facial examination, and evaluation of occlusion and myofascial balance. Periapical dental radiographs, a facial series, TMJ radiographs, panograph, and tomograms were obtained on each patient. The nine patients had surgery for their pain, at which time biopsy material was obtained.

In addition to routine evaluation, each patient had a limited bone scan after intravenous injection of 20 mCi Tc-99m MDP. Two to 4 hr after injection, 500,000-count scintiphotos were obtained of the head in the anterior, right lateral, and left lateral projections.

RESULTS

The patients were classified into three groups on the basis of radiographic, scintigraphic and histologic findings.

Class 1. One patient had normal histology, bone scintigrams, and radiographs. Histology of the glenoid fossa and mandibular condyle was normal. The meniscus was perforated.

Example 1. (Fig. 1). This patient was a 26-year-old man who presented with 6 mo of intermittent, diffuse, dull, right TMJ pain. The dental radiographs, panograph, facial and TMJ radiographs, and tomograms were within normal limits. The limited bone scan was also normal. A high condylectomy and meniscectomy was performed, with resection of the auriculotemporal nerve, artery, and vein, and ligation of the superficial

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TABLE 1. DIFFERENTIAL DIAGNOSIS OF TMJ PAIN

I.	Malocclusion
II.	Mandibular pain dysfunction syndrome
III.	Bruxism
IV.	Chronic subluxation or dislocation
V.	Osteoarthritis (degenerative arthritis)
VI.	Rheumatoid arthritis
VII.	Infectious arthritis
VIII.	Acute gouty arthritis
IX.	Acute traumatic arthritis
X.	Condylar fracture
XI.	Tumors (most commonly osteoma)
XII.	Ankylosis
XIII.	Whiplash (2° cervical traction)
XIV.	Myositis
XV.	Condylar hyperplasia
XVI.	Condylar agenesis
XVII.	Psychogenic pain

temporal artery and vein. The patient had been free of pain for 1 yr since surgery.

Class 2. Four patients had abnormal bone scintigrams and abnormal histology, but normal radiographs. All had pathologic findings in the glenoid fossa, with three of the four having normal bone in the mandibular condyle.

Example 2. (Fig. 2). This patient was a 24-year-old man who presented with 18 mo of right TMJ pain. The dental radiographs, panograph, facial radiographs, TMJ radiographs and tomograms were normal. The bone scan showed increased activity in the right TMJ. A high condylectomy and meniscectomy with arthroplasty relieved the pain. The surgical biopsy of the glenoid fossa showed periosteal necrosis and osteosclerosis. Biopsy of the condyle of one of the four patients in this classification was abnormal, the microscopy being consistent with the diagnosis of degenerative disease with fibrosis of the marrow spaces of the condyle. The other three patients,



FIG. 1. Example 1: limited bone scan and tomogram of right TMJ in 26-year-old man with 6 mo of pain.

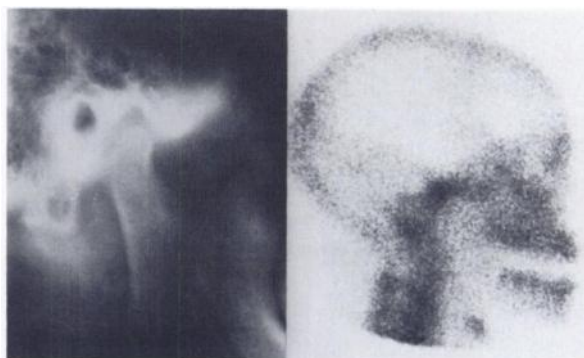


FIG. 2. Example 2: limited bone scan and tomogram of right TMJ in 24-year-old man with 18 mo of pain.

including the example, had normal condylar histology.

Class 3. Four patients had abnormal radiographic, scintigraphic, and histologic findings. These patients had pain that had lasted from 3 to 8.5 yr. The surgical biopsy showed degenerative changes in the glenoid fossa and mandibular condyle.

Example 3. (Fig. 3). The patient was a 33-year-old man complaining of 8.5 yr of increasing pain and crepitus of the right TMJ, with pain referring to the right ear. It had worsened progressively during the past 2 yr while he had been on trifluoperazine (Stelazine). His dental radiographs, panograph, and facial film series were all within normal limits. The TMJ radiographs showed a decreased joint space on the right. Tomograms of the right TMJ showed an intracapsular fragment of ossification, erosion of the right articular eminence, and decreased right joint space. The scintigram showed marked increase of the tracer in the right TMJ and diffuse increase in the mandible and maxilla. A high condylectomy and meniscectomy with arthroplasty was performed, with complete relief of pain. Histology of all glenoid fossae demonstrated osteosclerosis, and all condyles showed fibrosis of their marrow spaces.

DISCUSSION

A covert cause of diffuse facial pain is a diagnostic

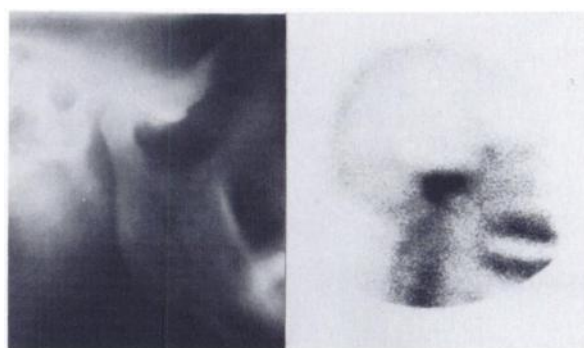


FIG. 3. Example 3: limited bone scan and tomogram of right TMJ in 33-year-old man with 8.5 yr of pain.

challenge. The nine patients studied have been classified by their radiographic, scintigraphic, and histologic findings. Class 1 is for the patient with normal radiographs, bone scintigrams, and histology. Class 2 patients are those with normal radiographic studies but abnormal scintigraphy and histology. Class 3 patients are those with abnormal radiographic, scintigraphic, and histologic results. The patient in Example 3 also had diffuse increase in the mandible and maxilla, secondary to advanced periodontitis of his maxillary and mandibular alveolar processes.

The causes of facial pain, as listed in Table 1, are many; it may be caused by a mechanical, infectious, congenital, or neoplastic process. A well-defined, nonorganic cause is pain of a psychogenic origin. The diagnosis of temporomandibular joint disease is difficult when based on clinical evaluation and routine radiographic techniques. In fact, in four of eight patients with proven bone disease, the radiographs were normal. However, in all eight of these patients the bone scintigram picked up evidence of an abnormality. In the one Class 1 patient, with a perforated meniscus and no osseous disease, the bone scintigram, as expected, remained normal.

Therefore, in patients with facial pain and normal radiograms, the limited bone scan appears to be useful in detecting early degenerative TMJ changes.

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