

Chapter 6

Joint Vibration Analysis (JVA) and the Diagnostic Process in TMD

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ABSTRACT

This chapter describes joint vibration analysis technology (JVA), that assesses pathological changes that can occur within the temporomandibular joints. The diagnostic process and a simplified approach to better understand and efficiently treat temporomandibular dysfunction (TMD), will be overviewed. With over 38 different etiologies under the umbrella term “TMD,” the need to streamline and effectively determine an accurate definitive diagnosis and potential treatment options becomes apparent. Joint vibration analysis (JVA) uses tissue accelerometers to objectively capture vibrations given off by structurally compromised, internal TM joint anatomy. This structural breakdown leads to altered mandibular movement patterns during chewing function. Different attributes of representative JVA vibrations have been shown to indicate the presence of various disease states, often seen within the temporomandibular joint complex. After being recorded, the JVA software displays the various vibration waveforms for clinician analysis, to determine the specific internal derangement present. This chapter provides an overview of the various vibratory waveforms that indicate TM Joint pathology is present, and illustrates the utility of joint vibration analysis as a temporomandibular joint diagnostic adjunct. When this information is combined with a thorough clinical exam and medical history, a clinician can then begin to efficiently present the information to the patient. Significantly, proper communication begins with presenting information that is easily understood and familiar to the patient. A simplified approach utilizing a JVA-based diagnostic process, will be overviewed in detail.

INTRODUCTION

Temporomandibular Joint (TMJ) Anatomy

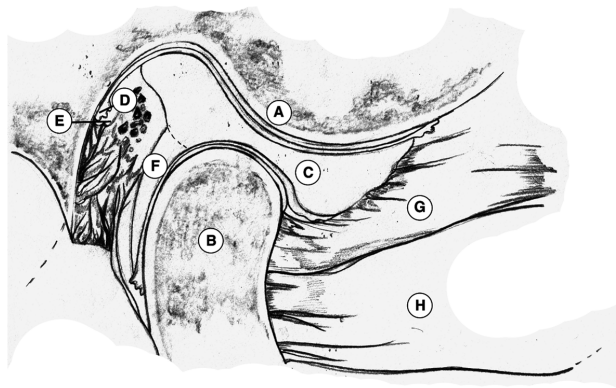
The Temporomandibular Joint (TMJ) is a ginglymoarthroidial joint, which is also diarthroidal, in that it translates and rotates throughout function. It is comprised of the following structural components:

- The posterior slope of the eminentia
- The mandibular condyle
- The articular disc
- The synovial tissue
- The vascular and innervated retrodiscal tissue, which includes the posterior attachment of the articular disc to both the mandible, and to the temporal bone
- The posterior attachment tissue, which is vascular and innervated

The articular disc is a biconcave fibro-cartilaginous capsule that normally rests between the head of the mandibular condyle and the articular eminence of the temporal bone. The disc is attached to the lateral and medial poles of the condyle, while also being elastically attached posteriorly, to both the temporal bone and the mandible. Anteriorly, the disc is attached to a few fibers from the superior belly of the lateral pterygoid muscle, which assists in translating both the disc and the condyle forward during mandibular excursions (Figure 1).

Figure 1. A lateral cross-sectional view through the right Temporomandibular Joint showing: A-posterior slope of eminentia with typical convex contour; B-mandibular condyle; C- biconcave articular disc fitted between a convex eminentia and a convex condylar head; D-synovial tissue; E-retrodiscal tissue including the posterior attachment of articular disc and temporal bone; F-posterior attachment tissue which is innervated and vascular; G-superior belly of lateral pterygoid muscle with fibers attaching to medial aspect of articular disc; H-inferior belly of lateral pterygoid muscle attaching to condyle.

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