


# Chapter 8

## Joint Vibration Analysis (JVA) and the Diagnostic Process in Temporomandibular Disorders (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 a detailed overview of the various vibratory waveforms that indicate TM Joint pathology is present. The chapter then illustrates the utility of Joint Vibration Analysis as a Temporomandibular Joint diagnostic adjunct, while describing a simplified JVA-based diagnostic process. When JVA data is combined with a thorough clinical exam, a detailed medical history and a comprehensive intake form, a “bottom up” diagnostic approach absent of clinical biases affords the clinician an efficient way to present important clinical information to the patient that is easily understood. Lastly, this chapter refutes the Biopsychosocial theory of Temporomandibular Disorder etiology with a modern TMD patient JVA/Disclusion Time Reduction treatment study that found pretreatment depression symptoms were fully relieved once the treated TMD patients’ painful symptoms were resolved from high precision occlusal adjustments.*

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## 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 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 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).

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