Section 5
Disclusion Time Reduction (DTR)

Chapter 10
Disclusion Time Reduction (DTR) With the Synchronized T-Scan 10/BioEMG III Technologies to Treat Chronic Muscular Temporomandibular Disorder (TMD)

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ABSTRACT

This chapter discusses chronic Occluso-Muscle Disorder, which is a myogenous subset of Temporomandibular Disorder (TMD) symptoms resultant from occlusally activated muscle hyperactivity. It also describes the computer-guided Occluso-Muscle Disorder treatment known as Disclusion Time Reduction (DTR), that studies since the early 1990s and continuing up to the present day, repeatedly show reduces many common muscular Temporomandibular Disorder symptoms. T-Scan I-based research determined that a significant etiologic component of Occluso-Muscle Disorder is prolonged (in time) posterior occlusal surface contact shared between opposing occluding teeth during mandibular excursions. This phenomenon, known as excursive friction, occurs in both normal chewing function and during parafunction, and results in prolonged pulpal flexure and prolonged compressions of the periodontal ligament (PDL) fibers of the involved teeth, which together neuroanatomically trigger excess muscle contractions to occur within the masticatory muscles and the muscles associated with swallowing. It is this unique peripheral nervous system (PNS) posterior tooth reflex arc that incites and perpetuates chronic muscular TMD symptomatology, that can be readily resolved in patients that meet the diagnostic criteria for DTR candidacy, using the Immediate Complete Anterior Guidance Development (ICAGD) coronoplasty. ICAGD is a measured occlusal adjustment procedure that is distinctly different from unmeasured Occlusal Equilibration, in that ICAGD requires time and force-based metrics to determine that optimum occlusal adjustment outcomes were met. And importantly, ICAGD

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is performed in the maximum intercuspal position (MIP) without requiring bimanual manipulation to centric relation, pre-treatment splints, deprogrammers, appliances, orthotics, TENS, or any mandibular repositioning to obtain therapeutic efficacy. The Specific Aims of this chapter are to describe in detail the unique posterior tooth neuroanatomy that is etiologic for muscular Temporomandibular symptoms, explain the Disclusion Time Reduction patient candidacy criteria; outline the ICAGD protocol and the needed treatment appointment sequencing, illustrate a few differing DTR clinical cases, and highlight some of the newest Disclusion Time Reduction therapy (DTR) research with natural teeth and dental implants that supports the clinical implementation of this highly effective, digitally measured occlusal treatment for many chronic muscular TMD symptoms.

INTRODUCTION

Chronic Occluso-muscle Disorder (Dawson, 1989a) is a myogenous subset of Temporomandibular Disorder symptoms that afflicts the masticatory musculature with chronic pain, headaches and dysfunction. The associated muscle hyperactivity is a primary source of the frequently observed and highly similar group of symptoms that suffering patients commonly describe (Glickman, 1979a; Dawson, 1989a):

- Chronic facial pain, chronic temporal headaches, frequent clenching and grinding of the teeth, morning jaw pain, eye strain, earaches, chewing fatigue, chewing muscle and tooth pain, temperature sensitive teeth, and mild clicking and popping of the Temporomandibular Joints.

Muscle hyperactivity etiologies previously cited within the literature are Bruxism (Clayton, Kotowicz, & Zahler, 1971; Dawson, 1989b), clenching habits (Bertram, Rudisch, Bodner, & Emshoff, 2002), malocclusion (Mohlin, et. al., 2004), Trigeminal Neuralgia (Zakrzewska & McMillan, 2011), and occlusal interferences (Glickman, 1979b; Baba, Yugami, Yaka, & Ai, 2001).

Longstanding advocated treatments for chronic masticatory muscle hyperactivity have attempted to treat the symptomatology (Herman, Schiffman, Look, & Rindal, 2002) without addressing the underlying non-physiologic occlusal surface friction problem, that has been shown to be etiologic for the hyperactivity (Williamson & Lundquist 1983; Kerstein & Wright, 1991; Kerstein, 1995; Kerstein, Chapman, & Klein, 1997; Kerstein & Radke 2006; Kerstein & Radke, 2012; Kerstein, 2010; Wang & Yin, 2012; Haralur, 2013; Thumati, Manwani, & Mahantshetty, 2014; Thumati, 2015; Dib, Montero, Sanchez, & López-Valverde, 2015; Kerstein & Radke, 2017; Yiannios, Kerstein, & Radke, 2017; Sutter, Yiannios, Kerstein, & Radke, 2017; Thumati, Sutter, Kerstein, Yiannios, & Radke, 2018; Kerstein & Radke, 2019; Qadeer, Ozcan, Edelhoff & Van Pelt, 2020; Sutter & Girouard, 2021; Thumati, Thumati, Poovani, Sattur, Srinivas, Kerstein & Radke, 2021; Thumati, Thumati, Kerstein, & Radke, 2021; Thumati,Thumati, Kerstein, & Radke, 2022). Despite the number of studies that have demonstrated an occlusal surface friction/masticatory muscle hyperactivity relationship leads to symptom appearances and frequency, an occlusal etiology as being causative for chronic Occluso-muscle Disorder symptoms, has not yet been widely accepted within the differing disciplines of Dental Medicine. In the traditional approaches to treating Occluso-muscle Disorder symptoms, the occlusion has been considered a limited component of the etiology, in favor of emotional and psychological factors, where it has been suggested that treatments be reversible and non-invasive to the teeth and oral structures.