

Chapter 11

Employing Specific Immediate Complete Anterior Guidance Development (ICAGD) Occlusal Adjustment Protocols to Achieve Short Disclusion Time

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ABSTRACT

Disclusion Time Reduction (DTR) performed with the Immediate Complete Anterior Guidance Development (ICAGD) coronoplasty, is a well-established computer guided occlusal adjustment treatment protocol for treating the occluso-muscle subset of Temporomandibular Disorders (TMD). ICAGD aims to reduce prolonged duration (time in seconds) occlusal surface friction that occurs between opposing posterior teeth during mandibular excursions when patients normally chew, and when they parafunction. Long duration posterior friction initiates prolonged posterior tooth periodontal ligament fiber compressions and pulpal flexures that together neurally activate and trigger excessive muscle contractions within the masticatory muscles, and the muscles associated with swallowing. This unique neuroanatomy initiates and perpetuates chronic muscular TMD symptomatology, which can be readily resolved with the ICAGD coronoplasty utilizing the T-Scan 10 computerized occlusal analysis system synchronized with the BioEMG III electromyograph. This chapter describes in detail the proper DTR/ICAGD case selection criteria, the procedural T-Scan 10/BioEMG III setup and armamentarium, the step-by-step occlusal and muscular data recording sequences, the ICAGD coronoplasty clinical procedures, the bur positioning guidelines, the optimal ICAGD clinical endpoints, and the necessary post ICAGD follow-up patient care.

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INTRODUCTION

Chronic facial pain, temporal headaches, difficulty chewing food, clenching and grinding of teeth, jaw pain on waking up, eye fatigue, pain in the ear, teeth sensitive to temperature changes, mild clicking of TM Joints are some of the chronic, occluso-muscle symptoms that are a subset of TMD. The primary reason for the occurrence of these symptoms has been attributed to muscle hyperactivity initiated by parafunctional activities like bruxism, clenching of teeth, malocclusion, and occlusal interferences (both natural or iatrogenic). It has been established that trauma from occlusion causes bone loss, persistent periapical lesions (despite of achieving good periapical seal in endodontically treated teeth), fractures of teeth, and hypersensitivity of teeth (Jin & Cao,1992).

There are clinical reports in literature to show that occlusal corrections have lead to resolution of these signs and healing of tissues also has occurred (Jafari, Farooji, Ramezani & Nik, 2016). The intraoral periapical radiographs and Panoramic Radiographs helped in assessing the success of these occlusal adjustment protocols (Robo & Heta, 2020; Weimeei, Chen, Chen, & Liu, 2001).

Similarly, multiple studies have shown repeatedly that the DTR/ICAGD protocol, that employs the T-Scan 10 and BioEMG III synchronized technologies, can resolve these chronic muscular TMD symptoms (Kerstein & Wright, 1991; Kerstein & Farell, 1990; 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; Dewan & Thumati, 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). The pre DTR T-Scan EMG data and the post DTR T-Scan EMG data can be used to validate the resolution of symptoms in post DTR patients.

The challenge with traditional methods of occlusal adjustment is to determine the endpoint of treatment, wherein the treatment is paused or stopped upon resolution of patient's symptoms and hence the chances of relapse of the patient's symptoms is high. Uncertainty of the endpoint of treatment or markers for treatment completion makes the dentist less confident of the prognosis of the case. However, with the DTR protocol employing the T-Scan and BioEMG III synchronized technologies, the treatment endpoints are clearly determined and hence, the treatment outcomes are clearly predictable.

The traditional method of Occlusal Equilibration is mainly subjective in nature wherein the diagnosis, treatment procedure does not involve any measurement and hence the results obtained are inconsistent (Dawson, 1989; Dawson, 2007). However, the ICAGD procedure employed with the dynamic biometric diagnostic tests (JVA, T-Scan, BioEMG III) in conjunction with the 3D imaging techniques (CBCT, MRI), provide enough baseline data and guide in proper case selection, set up ideal treatment goals, assess the progress of the treatment and also help in reaching the treatment end points conservatively.

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