

Role of Anterior Deprogrammers in Full Mouth Rehabilitation -An Overview

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ABSTRACT

In patients requiring full mouth rehabilitation, the centric relation position does not necessarily coincide with the maximum intercuspation position. Use of an anterior deprogramming device allows for separation of posterior teeth obviating the neuromuscular avoidance mechanism. This allows the patient to relax into centric relation position without occlusal interferences and to close into an operator-defined repeatable position without any assistance.

This scientific paper aims to describe in brief various anterior deprogrammers like Dawson's B-splint, Great Lakes Mini deprogrammer, Kois deprogrammer, Cranham deprogrammer, Lucia jig, NTI-tss and Leaf gauge. These provide an anterior stop which helps in proper manipulation of mandible which is necessary for equilibration procedures, for examining premature contacts and for recording centric relation in full mouth rehabilitation cases.

Key words: Anterior deprogrammers, full mouth rehabilitation, centric relation

Introduction

Centric relation is the position in which the condyles are in the musculoskeletal stable position. Although easy to understand, it is often difficult to achieve clinically.¹ Restorative dentists have suggested using this stable and reproducible position to reconstruct the dentition.² However, in most patients, centric relation does not coincide with MIP. Mounting dental casts in centric relation on an articulator helps to detect occlusal interferences. This may reveal a malocclusion which is more severe than that seen with teeth in MIP.³ Thus, it is important to record this position. Use of an anterior deprogramming device allows the patient to close into a musculoskeletally stable position (centric relation) without any assistance.⁴ It is suggested to use this appliance prior to taking a centric relation registration for a patient whose mandible is deemed not easy to manipulate.⁵ Centric relation is defined as a maxillomandibular relationship independent of tooth contact, in which the condyles articulate in

the antero-superior position against the posterior slopes of the articulating eminences.

Maximum intercuspation position (MIP) is defined as complete intercuspation of opposing teeth individual of condylar position.⁶

Locating the centric relation position

The first step of locating centric relation is to deprogram muscle contraction. Dawson has described an effective technique for guiding the mandible into centric relation (bilateral manipulation technique)⁷ (Fig 1). Another method is by using the muscles themselves to seat the condyles. This is achieved by placing an occlusal stop in the anterior region which acts as a fulcrum. Without posterior tooth contacts, the directional forces provided by elevator muscle allow the condyles to seat into their musculoskeletally stable position.²

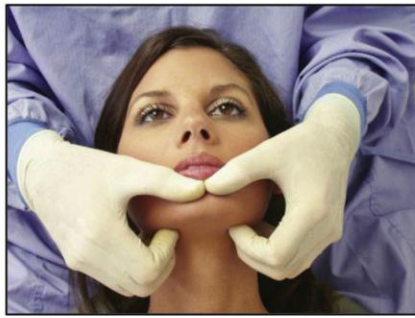


Figure 1

This can be accomplished by the use of various devices like;

- i. Leaf gauge
- ii. Lucia Jig
- iii. NTI-tss
- iv. Cranham deprogrammer
- v. Dawson B-splints
- vi. Great Lakes mini deprogrammer
- vii. Kois deprogrammer

Leaf gauge⁸

A number of leaves are placed between anterior teeth to slightly separate posterior teeth (Fig 2). For its effective use, the patient must close on the posterior teeth with mild force and avoid any heavy masseter contraction. The leaves are removed one by one until tooth contact is achieved. The first tooth contact is initial one in centric relation.



Figure 2

Lucia Jig⁹

It is a device made with a chemically activated acrylic resin which is adapted to the maxillary incisors provided with an occlusal stop for lower incisors. When the patient is asked to close on the posterior teeth, anterior tooth contact on the jig will stop the mandible from complete closure and bring the condyles into centric relation position (Fig 3). This is usually coupled with bilateral manipulation technique given by Dawson.



Figure 3

NTI-tss (Nociceptive trigeminal inhibition-tension suppression system)¹⁰

It is a pre – fabricated semi customizable intra oral anterior bite stop (Fig 4). It covers at least one maxillary/mandibular incisor. It is used for reducing trigeminally-innervated muscular activity. US FDA has approved the device for; prevention of occlusal trauma, prophylactic treatment of medically diagnosed migraine pain, migraine associated tension type headaches, prevention and treatment of bruxism and temporomandibular disorders.



Figure 4

Cranhamdeprogrammer¹¹

It features a small flat anterior stop that contacts lower central incisors and slightly discludes the posterior teeth (Fig 5). Patients are usually asked to wear it a night before. The next morning, the dentist finds it easy to detect initial occlusal discrepancies. The appliance is adjusted until deflective interferences are found and relieved.



Figure 5

B splint – Dawson academy¹²

An anterior deprogrammer consisting of full occlusal coverage with a small anterior discluding element such that there is a point contact for opposing centrals (Fig 6). It eliminates interferences during function.



Figure 6

Koisdeprogrammer¹³

It is a palatal coverage maxillary acrylic device with a flat plane lingual to anterior teeth (Fig 7). It separates the dental arches and provides a single lower central incisor contact against anterior bite plane.

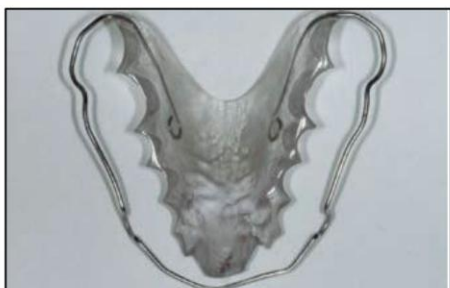


Figure 7

Mini deprogrammer¹⁴

It is designed with a flat anterior bite plane to disocclude posterior teeth (Fig 8). In addition to determine centric relation and to take centric relation records, it can also be used as a night guard to relax muscles and to treat bruxism.



Figure 8

Discussion

It has been suggested that the use of an anterior deprogramming appliance provides a quick and a practical approach to improve mandibular manipulation and centric relation registration.⁶ The classic patient for an anterior deprogrammer is the one who is experiencing obvious muscle disharmony and is very difficult to manipulate into centric relation. Various deprogrammers are being used by dental surgeons to promote neuromuscular re-programming in normal subjects or in patients with TMD of the masticatory system¹⁵. A study by Nassaretal¹⁵ concluded that the use of Lucia jig leads to neuromuscular reprogramming of the jaw which subsequently allows the dentist to diagnose patient's occlusal position accurately. Galoetal¹⁶ observed that after using Lucia jig, it was easier for dentists to manipulate the mandible of normal subjects and to obtain an accurate centric relation record. Santosa et al demonstrated that the use of leaf gauge eliminates posterior occlusal contacts and promotes relaxation of masticatory muscles.¹⁷ A technique for recording centric relation in dentate patients as described by Hunter et al wherein a flat anterior plane was used instead of an inclined plane eliminates the possibility of operator induced errors commonly associated with manipulative techniques.¹⁸ Dr. John Kois in his manual has described that the Kois deprogrammer is an effective device to achieve accurate centric relation bite registrations.¹⁹ Various other uses of anterior deprogrammers have been enlisted like diagnosis of occluso-muscle disorder. Lucia jigs, NIT's, Cranham deprogrammers, and Dawson B-Splints all fall into the category of temporomandibular joint disorder diagnosis appliances. At their bottom line, they all achieve the same goal, eliminating muscle hyperactivity and thus getting accurate centric relation. However, their use should be avoided in the presence of any intracapsular pathology. It is important to discontinue the deprogrammer if there is any discomfort at the level of the joint.¹²

Summary

Diagnosis of accurate condylar position is very important in developing a proper treatment plan in patients requiring full mouth rehabilitation. It may be extremely difficult to obtain a true centric relation position without deprogramming certain patients. Deprogramming the muscles is an essential step and this is easily achieved by

anterior deprogrammers. These devices allow disocclusion of posterior teeth immediately prior to centric relation record fabrication. This results in patient forgetting established protective reflexes that are reinforced each time the teeth come together, making mandibular hinge movements easy to reproduce.

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