

Deprogrammer The De-Stresser- An Overview

Dr. Bhargav Ruparel¹, Dr. Nikhil Verma², Dr. Hriday Anand³, Dr. Simran Shah⁴

Mds 3rd Year Department Of Prosthodontics & Crown & Bridge, Geetanjali Dental & Research Institute,
Udaipur, Rajasthan, 313001, India

Dean & Head Department Of Prosthodontics & Crown & Bridge, Geetanjali Dental & Research Institute,
Udaipur, Rajasthan, 313001, India

Mds 3rd Year Department Of Prosthodontics & Crown & Bridge, Geetanjali Dental & Research Institute,
Udaipur, Rajasthan, 313001, India

Mds 3rd Year Department Of Prosthodontics & Crown & Bridge, Geetanjali Dental & Research Institute,
Udaipur, Rajasthan, 313001, India

Abstract-

Introduction- A deprogrammer is used to correctly evaluate the relationship of the maxillae to the mandible by relaxing the involved group of muscles and to eliminate excessive load on the temporomandibular joint due to any occlusal disharmony or muscle spasms. It further helps to record centric relation enhancing the prognosis of the prosthesis. Different deprogrammers have been used for orthodontic and prosthetic treatments to deprogram the temporomandibular joint and to revive the muscle memory back to the original centric rather than habitual centric position.

Summary- Deprogramming of masticatory group muscles is an integral step in determining and fixing the centric jaw relation in the diagnosis and treatment of patients with orthopaedic and orthodontic pathology of the maxillary system. A dental deprogrammer reduces muscle tension, headaches and excess wear on a person's teeth by relaxing the jaws.

Key Words- Deprogrammers, Centric relation, Orthopedic, Maxillomandibular

Date of Submission: 05-05-2024

Date of Acceptance: 15-05-2024

I. Introduction

A deprogrammer is defined as a type of device or material used to alter the proprioceptive mechanism during mandibular closure [1]. The purpose of deprogrammers is to relax muscles and thereby allow an accurate examination of the relationship of the maxilla to mandible, with muscles relaxed and condyles seated in a particular position and consequently help in accurately recording the centric relation.

Centric relation is described as the maxillomandibular relationship in which the condyles articulate with the thinnest avascular portion of their respective disks with the complex in the anterior-superior position against the shapes of the articular eminences. This position is independent of tooth contact and is clinically discernible when the mandible is directed superiorly and anteriorly. It is restricted to a purely rotational movement about the transverse horizontal axis [2].

Centric relation (CR) has been well described in the literature; although easy to understand, it is often elusive to achieve clinically. Therefore, certain measures have to be taken to record the correct centric relation also keeping in mind the muscle harmony and the future of the prosthesis.

II. Discussion

The two main components of the mastication process are the masseter and temporalis. It is not dependent on the occlusal scheme on muscular activity. Nonetheless, the forces produced by muscular activity are altered by the occlusal scheme. There are situations when changing the occlusal scheme changes the force vectors produced [3]. After reducing EMG activity in the masseter and temporalis muscles and returning the patient to "round zero," additional treatment should be administered.

The lateral pterygoid muscle, which is designed to position the jaw to prevent pain and posterior interferences in the arc of closure, is the one that often prevents condylar seating. Placing something in the anterior that breaks down posterior occlusal contact is typically how deprogramming is carried out [4] [5].

Since the lateral pterygoid no longer needs to hold the mandible in an anterior or lateral position to avoid posterior tooth contacts, it is now believed that the lack of posterior occlusal contact permits the lateral pterygoid to release. Furthermore, since the elevator muscles want to seat the condyles when they contract, the contraction of the muscles should help the lateral pterygoids stretch. [6]

Muscle deprogrammers relieve acute pain almost immediately, often in one to two hours. They also eliminate the need for supportive therapy such as muscle relaxants, analgesics, and other medications because they force the masticatory muscles to relax, which in turn relieves pressure on all anatomic structures, including the temporomandibular joint, muscles of mastication, teeth, and the supporting structures. Deprogrammers usually work by inhibiting the posterior teeth from coming together, which relaxes bite force and stabilizes the jaw joint.

Additionally, the lower jaw's position changes, leaving the joints in a more relaxed forward position that most likely corresponds to the patient's own centric relation [7]. As a result, the condyles are positioned in the fossae in a more relaxed and central manner. This is a position that can be repeated without the dentist using force.

Functions of deprogrammer

- a) Evaluating the stability of a patient's bite.
- b) Locating a patient's optimal jaw position.
- c) To distinguish between types of abnormal occlusal attrition.
- d) Aids in making the patient's bite easier to manage.

A deprogramming device can be used safely when our TMJ-occlusal examination indicates an occluso-muscular abnormality (or dysfunction) that needs treatment. This is demonstrated by the absence of joint discomfort during load testing in the presence of other instability-related indications and symptoms, particularly a positive result when the pterygoids, masseters, or temporalis are palpated [8].

A decreasing click on the lateral or medial pole may evolve to a non-reducing click by seating the condyles with a deprogrammer if persistent anterior disk displacement is indicated. When administering it to patients who have an intermittent lateral pole click or who have recently experienced a diminishing lateral pole click, caution and close observation are required. When using medial pole displacement, there will be a great deal of discomfort since the retrodiscal tissues are being compressed. Consequently, in the event that joint ache is felt, it is imperative to take the appliance out. In such cases, the joint should be treated initially with full coverage orthodontic treatment.

Over time, it helps the patient to deprogram. Research indicates that a certain number of people who had a prominent prematurity should be administered treatment for a short period of time and may require many days or weeks to regain muscle coordination in their masticatory muscles when the prematurity is eliminated. This explains why some patients do not undergo instantaneous or short-term deprogramming. In these situations, it is impossible to get an accurate record until the person is fully deprogrammed.

The patient exhibits the jaw accurately moving into CR rather than being manipulated. This is a crucial factor in figuring out whether the patient has been deprogrammed. Without assistance or outside force, the patient must be able to passively shut into the same position each and every time.

There are various types of deprogrammers available

Lucia Jig

It is an acrylic based device. The device is centered on maxillary central incisor and is placed for 5 to 10 min in patient's mouth and CR is recorded immediately (figure 1 a).

Leaf Gauge

It is a series of thin leaves that can be made thicker or thinner by altering the number of leaves. It is placed between maxillary central incisor thereby relaxing muscles and recording accurate centric record (figure 1 b).

NTI-tss (Nociceptive Trigeminal Inhibition Tension Suppression System)

It has a prefabricated anterior bite stop which covers maxillary central incisor & it is used in treatment of bruxism and TMD and tension headache (figure 1 c).

Kois Deprogrammer

A maxillary acrylic device consisting of flat plane lingual to the anterior teeth. The device can be worn for upto 20 hours a day helps in distinguishing between constricted path of closure, occlusal disfunction & parafunction (figure 1 d).

Butterfly Deprogrammer

The device has a ramp that extends palatally in the midline of the central incisor. The device provides one point contact with the lower incisor thereby relaxing the masticatory muscle, thus providing appropriate jaw repositioning (figure 2 e).

Modified Butterfly

Unlike the conventional butterfly deprogrammer this device is designed to provide as much incisal contact as possible. Due to the multiple point contact the device provides faster relief than the conventional counterpart (figure 2 f).

Cranham's Deprogrammer

It has small flat anterior stop that contacts lower incisors and dis-occlude posterior teeth (figure 2 g).

Spear Mini Deprogrammer

It has canine to canine anterior bite plane with full occlusal coverage (figure 2 h).

Great Lakes Deprogrammer

It has 2nd premolar to 2nd premolar occlusal coverage. Used in patient with deep bite (figure 3 i)

Flat Plane Deprogrammer

Fabricated in maxillary arch, results in minimum change between maxillary and mandibular relation. Used in patient with TMD, 3-4 mm in thickness (figure 3 j).

B Splint

It is fabricated for both the arches and it opens by contact. Helps in relaxing pterygoid muscle. It has full occlusal coverage and small anterior dis-occluding element (figure 3 k).



FIGURE 1



FIGURE 2



FIGURE 3

III. Conclusion

This article gives an overview of different types of deprogrammers that can be given to TMD patient for different problems and for selecting an ideal deprogrammer, the clinician should have thorough understanding of dynamics of mastication and carry out a complete assessment of Temporomandibular joint and its general make-up. An ideal appliance with fewer complications should be delivered. This not only enhances the function of TMJ but also relieves the undue accumulation of stresses on the muscles involved in various TMJ movements. Deprogrammers along with their pros and cons have been widely utilised to relieve the muscle memory effectively and to record optimal centric relation for the greater good. But they should be used cautiously as not all the TMDs can be treated via deprogrammers. Hence, a thorough understanding of the TMJ, TMDs and Deprogrammers is essential to deliver optimal treatment to the patient.

References

- [1] Glossary Of Prosthodontic Terms, 10th Edition
- [2] Dawson, P. E. Optimum TMJ Condylar Position In Clinical Practice. *Int J Perio Rest Dent* 1985; 3:1 1.
- [3] Williamson. E. H. Et Al. Centric Relation: A Comparison Of Muscle Determined Position And Operator Guidance. *Am J Orthod* 1980;77:133-145.
- [4] Capp NJ And Clayton JA. A Technique For Evaluation Of Centric Relation Tooth Contacts Part II Following Use Of An Occlusal Splint For Treatment Of Temporomandibular Joint Dysfunction. *J Posthet Dent* 1985;54(5): 697-705.
- [5] Solberg WK. Temporomandibular Disorders: Masticatory Myalgia And Its Management. *Br Dent J* 1986;160:351-356.
- [6] *J Prosthet Dent*. 1988 May;59(5):611-7. Simple Application Of Anterior Jig Or Leaf Gauge In Routine Clinical Practice. Carroll WJ, Woelfel JB, Huffman RW. Department Of Restorative And Prosthetic Dentistry, Ohio State University, College Of Dentistry, Columbus
- [7] *Angle Orthod*. 1999 Apr;69(2):117-24; Discussion 124-5. The Use Of A Deprogramming Appliance To Obtain Centric Relation Records. Karl PJ, Foley TF.
- [8] Danko, M.; Chromy, L.; Ferencik, N.; Sestakova, M.; Kolembusova, P.; Balint, T.; Durica, J.; Zivcak, J. Literature Review Of An Anterior Deprogrammer To Determine The Centric Relation And Presentation Of Cases. *Bioengineering* 2023, 10, 1379.