Occlusal adjustment by selective grinding and use of an anterior déprogrammer
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A method of occlusal adjustment that incorporates an anterior déprogrammer was used in 15 patients with temporomandibular joint dysfunction and a discrepancy between centric relation and the maximal intercuspation position. Temporomandibular joint dysfunction was first treated by means of a bite plate, and then the new position of the mandible was perpetuated by equilibration according to the proposed technique. The technique was found to facilitate selective grinding and provided the patients with easy lateral movement of the mandible; gradual control of occlusal contact, allowing grinding to be performed progressively on the balancing and working sides and in centric position; and control of the vertical dimension on both sides, obtained through a déprogrammed neuromuscular system. (Quintessence Int 1990;21:887-892.)

Introduction
When selective grinding is used to obtain occlusal equilibrium, skill in prognosticating desirable morphofunctional results (occlusal contact relationships and occlusal activity related to the lesion1) is necessary because the goals and procedures are frequently difficult:

1. Moving the mandible laterally (because of a lack of neuromuscular relaxation)
2. Neuromuscular relaxation in the patient (freedom from the signs and symptoms of temporomandibular joint [TMJ] dysfunction)
3. Commencing and completing the occlusal adjustment in a single operation (which is recommended, because minor adjustments are dangerous, especially in patients with TMJ dysfunction)
4. Adhering to the principles and rules of adjustment
5. Analyzing the large number of tape marks on the occlusal surfaces

To eliminate these difficulties, an occlusal adjustment technique that employs an anterior déprogrammer, similar to the jig described by Lucia,2 is proposed. The proposed technique is not by itself a treatment for TMJ disorders. The equilibration will perpetuate the mandibular position obtained by treatment with a bite plate.

Method and materials
Fifteen patients presenting with symptoms of TMJ dysfunction (headache, pain in the head and face, muscular spasms, nausea, and vertigo) and a discrepancy between centric relation (CR) and the maximal intercuspation position (MICP) (Figs 1 and 2) were treated following the technique outlined below.

Case report
The casts from one patient, who was representative of the TMJ dysfunction described above, were mounted on the semiadjustable articulator. The maxillary cast was mounted with a facebow, and the mandibular
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Fig 1 Patient with maxillary and mandibular arches in the centric relation position.

Fig 2 Patient with maxillary and mandibular teeth in the maximal intercuspation position. There is a discrepancy between the centric relation (see Fig 1) and maximal intercuspation positions (habitual occlusion).

Fig 3 Anterior déprogrammer. A jig-type anterior bite plate (after Lucia) is used as a neuromuscular déprogrammer: (A) horizontal surface (slightly laterally convex); (B) mark produced on horizontal surface by contact of incisal edges of mandibular incisors.

The cast was mounted in CR, which was obtained by means of an anterior déprogrammer fitted into place 3 hours before the registration was made in the wax wafer (Fig 3). The anterior déprogrammer had a nearly flat, horizontal surface along the anteroposterior axis on the lingual side and slightly convex surfaces where the incisal edges of the mandibular central incisors made contact. Afterward the condylar guidance was adjusted to 52 degrees on the right side and 55 degrees on the left side, and the Bennett angle was set to 12 degrees on the right side and 15 degrees on the left side.

For the patient whose treatment is being described, occlusal analysis showed that in CR there was premature contact between the maxillary and mandibular first and second molars on the right side and great disclusion on the left side. In MICP there was contact on all teeth; however, in the articulator, the right condyle was shown to dislocate from the glenoid fossa.

During lateral movements there were balancing interferences, mainly on the right side because of incorrect occlusal contact among the large amalgam restorations. This situation was common among the 15 patients analyzed in this study. These occlusal factors may, in conjunction with emotional stress, result in TMJ disorder syndrome, because of compression of the innerved and vascular structures of the TMJ (disk) and/or stretching of the articular ligaments.

Subsequently, a complete maxillary bite plate was made on the articulator in CR by applying the principles of optimal occlusion. The interferences were deactivated, allowing occlusal bilateral contacts simultaneously in centric relation occlusion position (CRO). Disclusion of the posterior teeth in protrusion was forced by the construction of an anterior guide on the plate. During excursive lateral movements, the balancing side was discluded through the construction of a canine guide on the working side of the plate. These details must be correctly adjusted on each patient.

The patient used the bite plate continuously including during mastication, thereby inducing correction of mandibular and condylar positioning in the glenoid fossa and resulting in TMJ stability. The bite plate was adjusted as the mandible repositioned itself. This produced physiologic muscular relaxation as described by Krogh-Poulsen.

After 2 weeks the patient was free from the signs and symptoms of TMJ dysfunction through the use of this device.

The mandibular position obtained by the use of the
The bite plate had to be perpetuated by equilibration. The diagnostic adjustment was first made on the casts and then on the patient using four differently colored ribbons:

1. Red: centric stops
2. Black: protrusive interferences
3. Green: working side interferences
4. Blue: balancing side interferences

To begin the adjustment, the complete bite plate was removed, and grinding was performed to correct the interferences in protrusive movements, applying the methods of Stuart. All protrusive and lateral interferences were removed first and then the remaining interfering contacts in centric relation were attended to, because this was the only phase in which occlusal adjustment was made without the anterior deprogrammer in place (Stuart CE: Personal communication, 1973). The other adjustments were then made with the anterior deprogrammer fitted into place.

Initially, the patient was asked to touch the horizontal surface and perform lateral movements. If no contact occurred between the posterior teeth during the lateral movements then the horizontal surface on the anterior deprogrammer was ground until the patient indicated when the first lateral posterior interference was felt. If the first interferences were found on the balancing side, blue ribbon was used to mark these interferences. The anterior deprogrammer was then removed and red ribbon was placed in position to mark CR contacts, using the technique described by Dawson.

After the anterior deprogrammer was placed again, grinding of the blue marks on the balancing groove of the stamp cusps was begun on the balancing side, while the red centric relation contact marks were left in place (Figs 4 to 8).

After those interferences had been removed, the horizontal surface of the anterior deprogrammer was re-ground and refitted into position, and the mandible was moved laterally. If the working side touched, the interferences (green marks) were then ground according to the BULL rules,* while the red centric contacts and cusp guide were maintained (Fig 9). Thus, suc-

* Schuyler's BULL rule: The BULL rule applies to the correction of interferences during lateral movements (correction will be carried out on the Buccal cusps of Upper teeth and the Lingual cusps of Lower teeth).
cessive grinding steps were performed both on the flat horizontal surface of the anterior deprogrammer and on the interferences that became progressively visible on the teeth, until the CR contacts began to appear with the deprogrammer still in place.

The final stage was the adjustment of the centric relation. The equilibration, made with the help of the anterior deprogrammer, gave the patient a neurophysiologically stable centric relation position. Red marking ribbon was placed between the maxillary and mandibular posterior teeth while the mandible was held neuromuscularly by the anterior deprogrammer. If it is difficult to hold the mandible in CR, then the Dawson technique is applied, with the deprogrammer in position, to acquire the desired result.

The Schuyler and Jankelson rules were applied to grind the premature contacts until simultaneous bilateral contacts were obtained, which stabilized the mandible in position with coincidence of CR and CO (centric relation occlusion), and transmitted the pressure axially (Figs 10 to 13).

Schuyler’s rule to correct interfering tooth contacts in CR: Only correct a cusp tip if it interferes not only in centric relation but also in lateral and protrusive movements. If this is not the case, then always deepen the opposing fossa.

Jankelson’s rule: “Lateral slopes should be relieved by narrowing the interfering areas to point or line contact rather than reducing them bodily. This will sharpen them into cutting edges or points and reduce the contacting area.”

Fig 7 Interferences on balancing side on the maxillary second and third molars.

Fig 8 Interferences on balancing side on the mandibular second and third molars.

Fig 9 Interferences on working side (green marks). Note the appearance of centric contacts (red marks).
Fig 10. Bilateral, simultaneous, centric contact marks on maxillary teeth obtained with and without deprogrammer placed in position.

Fig 11. Bilateral, simultaneous, centric contact marks on mandibular teeth obtained with and without deprogrammer placed in position.

Fig 12. Maxillary and mandibular teeth in maximal intercuspation position coinciding with the centric relation position obtained with deprogrammer fitted (CRO).

Fig 13. Maxillary and mandibular teeth in maximal intercuspation position coinciding with the centric relation position obtained without the deprogrammer fitted.

Results and discussion

Two weeks after the first adjustments, patients continued to show relief from the symptoms and signs of TMJ dysfunction.

The horizontal flat surface of the anterior deprogrammer helped position the mandible in CR and allowed easy performance of lateral movements. It also gradually revealed the interferences, facilitating their visibility, localization, and progressive grinding.

The occlusal adjustment must be performed with the condyle in the correct neuromuscular (physiologically) position in the glenoid fossa in CRO. The anterior deprogrammer permitted both centric and lateral adjustments (on both the working and balancing sides) and allowed the neuromuscular system to reacquire final coordination. This is an advantage over the other currently employed techniques, which are applied only in centric adjustments, such as the leaf-gauge technique described by Long.

Conclusion

Clinical experience in 15 patients showed that occlusal adjustment by selective grinding in conjunction with an anterior deprogrammer permitted:

1. Facility of mandibular movement
2. Control of occlusal contacts, which appeared grad-
ually, permitting progressive adjustment on the bal-
ancing and working sides and in CR.
3. Control of vertical dimension of both sides, ob-
tained through the deprogramming of the neuro-
muscular system.

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