

Case Report

Centric relation recording in completely edentulous patient with a severe skeletal class 2 ridge relation

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ABSTRACT

A skeletal class 2 maxillary to mandibular residual alveolar ridge relation in a completely edentulous patient seeking complete denture prosthesis is a clinically difficult situation since the interocclusal recording material is placed far away from the indexing notches. Modifying the respective occlusal rims by changing their inclination from the denture bases can be done only posteriorly since modification in the anterior region affects the profile contour of the occlusal rim which is esthetically an important landmark for teeth arrangement. We describe one such complete denture case with a severe skeletal class 2 residual alveolar ridge relation where centric relation record was obtained by modifying the mandibular occlusal rim using a modified stock partially edentulous impression tray. Teeth arrangement disclosed a severe overjet of more than 10 millimeters during the denture trial procedure.

Key words: Ridge relation, malocclusion, jaw relations, complete denture

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INTRODUCTION

The function of mastication in any dynamic prosthetic occlusion for complete denture prosthesis depends largely on the accuracy of the maxilla - mandibular relations particularly an accurate horizontal jaw relation. Controversy in centric relation hasn't undermined its clinical importance, though, since it is a single important factor in establishing a new occlusion. Besides its importance in developing artificial occlusion in dental prosthesis, its optimum and correct recording is important for comfort and function of temporomandibular joint and associated musculature. 1 The reliability of vertical dimensions are directly or indirectly dependant on the accurate centric relation. 2 A static tentative interocclusal record using a nick and notch method is a common method used in dental and academic clinical practice. However, in a skeletal Class 2 residual alveolar ridge (RAR) relation the maxillary RAR is placed posterior to the mandibular RAR which does not allow nick/ notch on one occlusal rim to coincide with opposing trough which carries the

interocclusal recording material. Micrognathia of the maxilla is mostly associated with skeletal class 2 malocclusion with a prevalence of 1/1,500 live births and is frequently associated with other skeletal abnormalities like cleft palate and tongue deformities (glossoptosis). 2 The problems associated with rehabilitation of such cases occur during both clinical and laboratory procedures of complete denture fabrication. With mandible situated posteriorly the relation between the opposing arch brings the mandibular posterior ridge in a position that is situated buccal to the maxillary alveolar ridge due to divergence of posterior mandibular RAR. This makes recording of jaw relations difficult while at the same time arranging of the teeth requires incorporation of either a cross bite in the posterior region or placement of mandibular teeth lingual to the underlying RAR.

The objective of this article is to describe a random creative method by modifying an old stock partially edentulous tray to make a tentative static interocclusal record in such cases. However, it is recommended that

this technique is just an emergency solution to the problem. The authors recommend that such clinical situations should be diagnosed during clinical examination and proper precautions should be documented in the treatment plan.

CASE REPORT

An elderly male patient aged 67 years was being treated by an intern student during his routine posting in the department of prosthodontics, for fabrication of a complete denture prosthesis. The patient's chief complaint was masticatory inefficiency due to complete edentulous nature of maxillary and mandibular arches. Medical, dental, social, drug and other relevant histories were insignificant. Extra oral features were within normal range except a pronounced mandibular retrusion. Intra orally the residual alveolar ridges presented typical residual alveolar ridge relations of skeletal class 2 malocclusion. The intern student had called the patient for jaw relation clinical procedure, but was not able to make a centric relation record due to the severity of mandibular retrusion. The patient was educated about the problems associated with the rehabilitation of such conditions following which his treatment consent was taken. Since the conventional procedure for recording centric relation had failed to obtain a centric relation interocclusal record, the following modification in the entire treatment procedure was done to achieve the desired objective:

Modification no 1: Existing diagnostic cast were immediately mounted on a mean value articulator using a tentative centric relation record using the staple pin and pooling method of centric relation recording (**Fig 1 a**). This not only allowed to understand the severity of mandibular retrusion and the abnormality of ridge relations, but also allowed accurate positioning and attaching of modified stock tray during jaw relation procedure of recording a tentative centric relation.

Modification no 2: An old perforated maxillary stock (partially edentulous) tray was modified by removing the entire palatal section of the tray and leaving behind only the front part of the tray (**Fig 1 b**). The cut edge of the horizontal broad portion was then heated and inserted into the labial portion of the mandibular occlusal rims (**Fig 1 c**). This was followed by application of sticky wax to increase its stability and strength. Once the tray was fixed, it was then placed again on the mounted diagnostic cast so that a relative position of outer edge of modified mandibular occlusal rim could be seen falling within the profile contour of the maxillary occlusal rim. The fit of each trial denture base was then verified on their respective master cast (**Fig 1 d**). At the time of recording horizontal jaw relations, the interocclusal record material was placed within the confines of the stock tray (**Fig 2 a**). Interocclusal record verification was done by again placing both occlusal rims on their respective master casts (**Fig 2 b**). Nick and notch indices were then checked and verified before selecting the denture teeth (**Fig 2 c**).



Figure 1: (a) Diagnostic mounting of completely edentulous casts showing the severity of mandibular retrusion (b) A modified stock, partial edentulous impression tray (c) Attaching the modified tray to the occlusal rims (d) Completed maxillary and mandibular occlusal rims



Figure 2: (a) Centric relation record using bite registration material (b) Inter occlusal record placed on a cast (c) Centric interocclusal record with a nick and a notch index (d) Anterior teeth arrangement showing the amount of overjet in frontal view and (e) Lateral view (f) Note the distance of mandibular incisors from the maxillary incisors

Modification no 3: As can be observed in the frontal (**Fig 2 d**) and lateral view (**Fig 2 e**), the amount of overjet between the maxillary and mandibular artificial teeth was excessive and under no circumstance would it have been possible to make a static tentative interocclusal record without the current modification, since occlusal rims were not touching anteriorly thus making it less stable. The amount of overjet in the present case exceeded ten mms (**Fig 2 f**) and couldn't be compensated by proclining the mandibular anterior teeth or retroclining the maxillary anterior teeth or a combination of both.

DISCUSSION

Prosthodontic rehabilitation of skeletal malocclusions is always compromised because it is impossible to create a balance among various solutions to multiple problems. Steep condylar guidance, divergent ridges,

extensive mandibular motion ranges, narrowed arches, increased overjet and sometimes overbite are some of the areas where compromise is reached. Since this article is intended to describe the problems encountered in recording centric relation records, it is important to have a basic knowledge of the anatomy and relation of normal residual alveolar ridges. To record any horizontal jaw relation, it is mandatory that the maxillary and mandibular occlusal rims are stable while a record is being made.⁴ When ridges are not in line with each other, the only way to have some form of occlusal contact between the occlusal rims is to change the inclination of occlusal rims that is projected from the trial denture bases.⁵ However, the anterior part of the occlusal rims won't still contact thus making the record bases unstable antero-posteriorly. If records are made without an anterior stop, the occlusal contact during centric relation recording lifts the anterior part of the occlusal rims thus making the record inaccurate. The technique described in this report, however, solves both the problems. In principle, we are extending the occlusal surface by using a stabilized modified stock tray anteriorly while at the same time the tray also provides a mechanism that will hold the interocclusal recording material within its confines.

CONCLUSION

The technique is simple, economical and less time consuming and can be done at the same appointment, but correct diagnosis and clinical examination during the first two appointments would have been better since such problem need to be planned before the patient arrives in the clinic for a treatment procedure. The perforated tray is ideal since it retains the interocclusal material mechanically.

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