

Gnatho Dynamic Teeth Arrangement in Complete Denture Prosthesis

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ABSTRACT

Gnatho dynamic prosthesis introduces the concept of stomatognathic compatibility of a dental prosthesis. The complexity of the mandible and its relation to the maxilla and the entire cranium often create fear and apprehension amongst dental students, especially when they see complex instruments or devices that have been used to record them. This article in effect is an attempt to eliminate the use of complex instruments and present a simple technique that in effect achieves the same desired objectives. The technique is based on recording the condylar guidance using a functional chew in procedure and using the same interocclusal record to program a semi adjustable articulator. Balancing of occlusion is achieved by arranging the teeth against the records that have been functionally modified in the patient's mouth utilizing various mandibular movements.

Keywords- *gnathology, occlusion, condylar guidance, complete denture, teeth arrangement*

INTRODUCTION

Balancing of occlusion in complete denture prosthesis is an essential biological component in the otherwise purely technical step of teeth arrangement. Ability to perform such steps often

differentiates a postgraduate student from an undergraduate student. However, many postgraduates fail to deliver such features in their prosthesis consistently after they start their dental

practice. Amongst the many excuses, use of a face bow and adjustable articulator seems to be universal. Very few know that one does not use an adjustable articulator to achieve an occlusal balance. In gnathodynamic terms, balancing an occlusion involves a definite arrangement of tooth contacts in harmony with mandibular movements.¹ Applying, such definition clinically means that all artificial teeth in complete denture prosthesis should at least contact simultaneously and evenly when they are in centric.²⁻⁴ However, an important component added to this is that they should never come into contact during any eccentric movement of the mandible; if they do come they would interfere and thus compromise denture stability. To prevent these interferences, one needs to not only know the influence of condylar guidance (protrusive and lateral) but also to record the same so that the articulator can simulate the concerned movements. This article presents a functional chew in method that allows a clinician to program a semi adjustable articulator and then arrange the teeth accordingly to achieve a clinically balanced occlusion in complete denture prosthesis.

CLINICAL CASE REPORT

An elderly female patient aged 62 years, seeking complete denture prosthesis for the first time without any history or clinical evidence of temporomandibular joint disturbance was chosen for the procedure (Fig.1). After obtaining ethical clearance and required informed consent for the study, routine clinical history and investigations were done. Medical, social, drug and dental history were non-contributory. Extra oral and intra oral

examination disclosed routine, normal, soft and hard tissue. The patient displayed a good neuromuscular control and coordination. Routine steps of denture fabrication were done till jaw relations. After recording of vertical dimensions and its associated relations, the occlusal rims were prepared with a nick and notch to record horizontal jaw relations. At this stage, a centric interocclusal record was made using a bite registration wax (Take 1, Kerr, Romulus, MI, USA) that could be easily removed and placed back without undergoing or causing distortion. After verifying the correctness of the centric interocclusal record, the next step included using a mixture of impression plaster and Carborundum to record the protrusive and lateral movements.

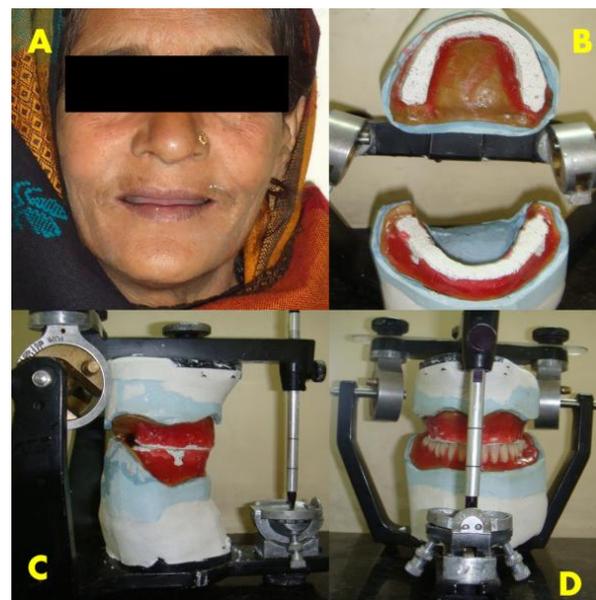


Figure 1: (A) Extra oral view (B) Interocclusal registration (C) Mounted occlusal rims (D) Arranging mandibular teeth against maxillary record



Figure 2: (A) Protrusive balance (B) Lateral balance (C) Patient displaying complete denture prosthesis

The plastic mix was placed on the occlusal surface of the maxillary occlusal rim at one time and the patient was instructed to move the mandible in protrusion as well as in lateral direction. This allows one of the occlusal rims to carve a pattern over the records placed on the opposite rims guided totally by the patient's mandibular motion. A similar procedure was followed for the opposing occlusal rims. The maxillary occlusal rim was then mounted on a semi adjustable articulator (Hanau Widevue, Waterpik, Ft Collins, USA) with the help of a face bow (Spring bow, Hanau). After mounting of both occlusal rims that are carrying a functional chew in record, the articulator was programmed according to the thickness of the interocclusal records posteriorly (**Fig 1 B and C**). The next step was to arrange mandibular teeth against the maxillary functional interocclusal record present on the articulator (**Fig 1D**). Once the mandibular teeth were arranged the maxillary teeth followed the inclination of the mandibular teeth in complete occlusion. A denture trial was done after arranging the teeth in occlusion. At the trial in procedure, all necessary balancing

contacts were evaluated and final approval was given after verification of the centric relation. The dentures were processed in heat cure denture base acrylic resin (DPI, Mumbai, India) and after corrections in occlusion by a laboratory and clinical remounting procedure, the complete denture was delivered to the patient who was followed up regularly (**Fig 2 A, B and C**). The presence of balancing contacts was evaluated by a different team of Prosthodontists who, after critical evaluation approved the prosthesis.

DISCUSSION

Besides achieving biological objectives through balancing of occlusion in complete denture prosthesis, it is important to know that balancing has many components and although every component is not necessarily incorporated within the denture but it should be at least present when the prosthesis closes in centric position.^{5, 6} For achieving balance in centric, the only thing that is required is a correct centric relation that mounts the maxillary and the mandibular casts correctly on the articulator.⁷ The technique mentioned in this article does not stress on this aspect of balancing, it emphasizes the role of protrusive and lateral movements. After placing a plastic mixture of recording material on the occlusal rim, when the patient protrudes the mandible, the condyles in the mandibular fossa move anteriorly and downwards thereby creating a space in the occlusal rims posteriorly. Because the recording material is too soft and tends to displace, frequent building up in increments avoids possible errors. While the patient moves the mandible laterally, it produces a lateral

curve within the recording material. Arranging the buccal cusps of the mandibular teeth so that the tips of the buccal cusps are touching the record while the palatal cusps are touching the inner side of the record arranges all the teeth in an arrangement wherein the lateral curves get incorporated according to functional movement of the mandible. Variations to the above mentioned technique have been described in the literature.⁸⁻¹⁰ Limitation of the technique mentioned above includes patients who have poor neuromuscular control and coordination. When the patient is commanded to move the mandible in a predetermined direction, inability to do so will lead to frustration. Therefore, it is imperative that this technique is employed in either ideal patients or patients who have been adequately trained in the procedure.

CONCLUSION

Balancing occlusion in complete denture prosthesis conventionally is a time consuming and a technically sensitive procedure. Loss of balancing contacts in the teeth leads to frustration. The technique described above is simple and less time consuming and does not require much skill.

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