

3D CD - Three Days Complete Denture Technique for Compromised Geriatric Patients

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ABSTRACT

Complete dentures make up a large part of the treatments done for geriatric patients amongst whom many are functionally dependent on others, thus travelling for repeated appointments becomes a hindrance. If the number of appointments can be reduced, it will be of great help in successful treatment. This report presents a case in which a completely edentulous patient was treated with a rapid method of treatment 3D CD (Three day complete dentures) technique, in which the treatment was completed in three appointments instead of conventional five appointments. The impression procedures were carried out in a single appointment along with ANTAG (Anterior teeth arrangement guide) fabrication followed by jaw relations recording along with maxillary anterior try-in and ultimately insertion of complete dentures. Thus, 3D CD can help us treat patients in least possible number of appointments, consequently help us serve a large geriatric population and develop the confidence of other such people to seek prosthetic treatment.

KEYWORDS: Three Day Complete Dentures, 3D CD, Institutionalised Elderly, Geriatrics

INTRODUCTION

History of the world of dentistry speaks for the complete dentures to be a successful successor for the complete set of natural teeth in most of the patients in terms of function and esthetics. Complete dentures also improve the general well-being of the patients.

Institutionalized patients who are functionally dependent make a considerable part of the population of 65 years and above. Most of them are unable to maintain oral hygiene on their own and can visit the dental office only if helped. Most of the frail or functionally dependent patients do not demand any prosthetic treatment because of the repeated visits and are satisfied with no dentures against the herculean task of visiting the dentist. But as the new generations of elderly people will come up, they will seek in more numbers for prosthetic replacement as compared to their predecessors who were less aware of the importance of dental treatment. So we will subsequently need more efficient and quick methods to treat this large growing population.¹

A large number of our population resides in the rural areas, and many of these areas are located remotely with inadequate facilities like health, transport services, etc. People from such areas have to seek the nearby urban areas for prosthetic treatments. For such patients due to the inadequate transport facility as well as long distance travelling, a multiple number of appointments becomes a problem and would ask for treatment in a lesser number of clinical appointments.

A conventional method for fabrication of complete

dentures usually includes five appointments. The first appointment consists of primary impressions for the fabrication of custom trays. The second appointment consists of border molding the custom trays and wash impressions. The third appointment consists of recording the jaw relations and the mounting the casts on the articulator. The fourth appointment consists of try-in of the temporary denture bases with teeth arranged according to the relations on the articulator. And at the fifth appointment the complete dentures are inserted in the patients' mouth. There is lack of evidence in the available literature, that a two-step technique has advantages over a single step impression for the long term success of the complete dentures.² In fact, in a couple of clinical trials, it has been shown that a single step impression procedure has given equally good results as the two-step procedure in terms of satisfaction of patients and overall quality of the dentures.^{3,4}

So, it would be wise to concise any two clinical steps in single clinical appointment for the advantage of the patients. Thus, on the same principles with few modifications a 3D CD (three-day complete dentures) technique has been devised to provide the patients for whom five conventional clinical appointments is a hurdle. This technique shows complete dentures fabrication in three clinical appointments.

CASE REPORT

A 67-years-old male visited the department of Prosthodontics with a complaint of missing teeth due to which he had difficulty in mastication, speech, and an impaired esthetics. The patient gave a history of

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extraction of the last remaining tooth four months back and had not worn any kind of prosthesis till now. The maxillary anteriors were the last teeth to be extracted.

On examination, the residual ridges were found to be high and well rounded with minor undercuts on the labial side of the maxillary anterior arch and disto-lingual area of the mandibular arch. The ridge relation was class-II with adequate inter-arch space.

First clinical appointment: On this appointment, maxillary and mandibular impressions were made, and ANTAG (Anterior Teeth Arrangement Guide) was fabricated. Appropriate perforated stock metal trays for edentulous arches were selected. They were checked, and necessary changes made according to the arch form. The wax was adapted on the tissue side of the trays in the canine and first molar areas and sufficiently softened, and trays were placed in the patient's mouth such that the borders of the trays were away from the sulcus areas in function. The trays were removed and immersed in chilled water for the wax strips to harden. These wax strips acted as tissue stops, prevented over-seating of tray and impingement of sulci by the tray borders. After checking for the extensions of the trays, impressions were made for the maxillary and mandibular arches subsequently with putty consistency addition silicone impression material (Affinis Perfect Impressions, Coltene Whaledent) (Fig. 1). Functional



Figure 1: Preliminary impressions of maxillary and mandibular arches using stock metal trays and putty consistency addition silicone impression material.

movements were made during impression making. The borders of these impressions were reduced using a sharp knife 2 mm short of the sulci in both the maxillary and mandibular impressions. Notches were made on the borders about 1mm deep and wide such that they created an undercut for retention of the border molding material to be added (Fig. 2). This impression acted as a custom tray for border molding and wash impression. Same putty consistency material (Affinis Perfect Impressions, Coltene Whaledent) was mixed according to manufacturer's recommendations and added to the borders of the impressions. The trays were placed in the mouth, and functional movements were carried out. It was made sure that the borders were properly molded to patients functional movements. The impressions were



Figure 2: Borders of the preliminary impressions trimmed 2 mm short of the sulcus and notches made on the borders for retention of additional material.

retrieved and checked for any discrepancies. The borders were then trimmed by another 0.5mm and wash impressions were made using light bodied consistency addition silicone material (Affinis Precious, Coltene Whaledent) (Fig. 3).



Figure 3: Final impressions of maxillary and mandibular arches using putty consistency addition silicone impression material for border molding and light bodied consistency addition silicone impression material.

ANTAG Fabrication: Modeling wax and sticky wax were mixed in a ratio of approximately 4:1 by volume in a hot water bath. When the mixture was sufficiently soft, it was tempered and adapted to the patient's anterior maxillary ridge with tin foil on the tissue side. After it was sufficiently hardened it was removed. The wax was added subsequently on the labial and incisal aspect of the ANTAG and placed in the mouth so as to give adequate fullness for the maxillary lip. Its incisal plane was so adjusted to be parallel to the interpupillary line with adequate visibility. (Fig. 4 and Fig. 5) This ANTAG guided the arrangement of the maxillary anterior teeth. Sticky wax was used in the fabrication of ANTAG to give it added rigidity on cooling. Proper teeth were selected taking into consideration the shape, size and shade of the teeth. (Combination AcryRock, Ruthinium Group).

First laboratory step: The impressions were beaded and boxed, and casts were poured in type III gypsum product or the dental stone. After retrieval of the casts from the



Figure 4: ANTAG (Anterior teeth arrangement guide) labial view.



Figure 5: ANTAG (Anterior teeth arrangement guide) incisal view.

impressions, ANTAG was adapted to the maxillary cast. Separating medium was applied to the tissue surface of the remaining maxillary cast, and a temporary record base was made for the posterior maxillary residual ridge using auto polymerising acrylic denture base resin (DPI-RR Cold Cure, Dental Products of India). Undercut was provided in the distal aspect of the ANTAG so that the temporary denture base material flows into and holds on to the ANTAG. A full arch mandibular temporary denture base was made using auto polymerising acrylic denture base resin (DPI-RR Cold Cure, Dental Products of India). The conventional maxillary occlusal rim was made for the posterior aspect, and a mandibular occlusal rim was made for the full arch. Maxillary anterior teeth arranged using the selected teeth set for the patient.

Second clinical appointment: In this clinical appointment, jaw relations were recorded along with maxillary anterior try-in. After the patient has been seated comfortably in the dental chair, maxillary temporary denture base along with the arranged maxillary anterior teeth was inserted in the mouth. The anterior teeth were checked for proper fullness and lip support. Pronunciation of the letters 'F' and 'V' were used to verify

the relationship of the incisal edges of the teeth with the lower lip. Esthetic considerations like the visibility of teeth during rest position and during speech, midline, size and shade of the teeth, etc were examined, and an approval for the same was obtained from the patient. After this the maxillary posterior occlusal plane was established such that it was parallel to the Camper's line (ala-tragus line). At this time, the canines and the lateral incisors can be adjusted if required. Following the establishment of the maxillary occlusal plane, mandibular temporary denture base was inserted in the mouth, and the mandibular occlusal plane was adjusted to the maxillary occlusal plane with 2-3mm freeway space present in the premolar area during resting position of the mandible. This vertical dimension at occlusion was verified by examining the Silverman's closest speaking space and by examining the patient's face for any drooping of the corners of the mouth or stretching of the peri-oral skin and tissues. When the vertical dimension of the denture was recorded and verified the patient was guided in centric relation position. This was done repeatedly and checked by marking midlines and canine lines on both the wax rims on the labial surfaces. After confirmation of this relation nicks and notches were made in the maxillary rim and a trough was made in the mandibular rim corresponding to the nick and notches. The relation was recorded in zinc oxide eugenol paste (DPI Impression Paste, Dental Products of India) at the centric relation position (Fig. 6) After the material had set, both the rims were separated, and the centric relation was again verified.



Figure 6: Maxillary and mandibular wax rims with arranged maxillary anterior teeth sealed using Zinc-oxide eugenol paste.

Second laboratory step: The sealed occlusal rims were placed on their respective casts, and they were mounted on a mean value articulator in the recorded relation. The teeth were arranged on both the maxillary and mandibular occlusal rims. This was followed by waxing and appropriate carving of the cervical areas of the teeth and the root forms of the teeth. After verifying the occlusion for any changes to have occurred during waxing and carving, the casts were demounted from the articulator. They were appropriately invested and the complete dentures were processed using heat-cured denture base

acrylic resin (Acrylyn-H Denture Material, Asian Acrylates) in a conventional manner. The dentures were retrieved, trimmed and polished and stored in water for 24 hours before insertion.

Third clinical appointment: After ensuring the comfort of the patient on the dental chair, maxillary denture was inserted. It was checked for proper retention and stability. The borders were verified by functional movements, and additional relief was given if required for the freni. After this the mandibular denture was inserted in the patient's mouth. This was similarly checked for retention, stability, extensions and relief for the freni. After proper adjustments the patient was guided in centric relation position and the occlusion was checked for maximum intercuspation. Premature contacts if any were identified with articulating paper and correction was done accordingly. The vertical height of the dentures was verified using phonetics and esthetics as the parameters. Pressure points if any were verified with pressure indicating paste and similar spots were reduced on the denture and polished. The patient was shown the inserted



Figure 7: Pre-operative photograph of the patient with completely edentulous arches and no prosthesis.



Figure 8: Post-operative photograph of the patient with complete dentures inserted in the patients mouth.

changes the dentures were again polished and inserted (Fig. 7 and Fig. 8). The patient was instructed, methods of proper denture hygiene and maintenance. As this was the first denture of the patient, he was made aware of the masticating and speech difficulties initially and assured of the adjustment after proper use and practice. The patient leaving with a happy smile and satisfaction is the most pleasurable moment for the dentist and so did it happen.

DISCUSSION

Rehabilitation of the patients who are completely edentulous is extremely necessary as edentulism has an adverse effect on the patient's physical well-being. Without any complicated, invasive and costly procedures, a simple set of complete dentures has shown to improve the general well being of the patient to a great extent⁵.

It is usually seen in edentulous patients that they are enthusiastic about the replacement of missing teeth with dentures at the beginning but due to the prolonged time and an excessive number of appointments, they, especially the very old, become fatigued and irritated. This can have an effect on the success of the treatment. Patients who are institutionalized or bed-ridden and who are dependent on someone else for locomotion need a rapid but appropriate treatment regime¹. Rural population makes up for the major part of our total population where dental care is not available adequately. These patients have to travel to nearby urban areas which can range from a few kilometers to a couple of hundred kilometers or even more for any of the treatments which itself can be tiring. For such patients too, a rapid treatment protocol is needed in which such patients can be treated in the least possible number of appointments. Such an effort will help us serve a large number of people and also will develop the confidence of other such people to seek prosthetic treatment.

In the 3D CD technique, the treatment was completed in three clinical appointments instead of the five conventional appointments. It can be said that the number of visits was reduced by 40%.

Owen CP and MacEntee MI in 2013⁶ have described a technique CD4 to provide dentures in four clinical appointments. This technique is based on Appropriatech method which was introduced to provide prosthodontics to large masses in limited resource and time.

Duncan JP and Taylor TD in 2001⁷, compared the conventional method and shortened method for complete denture fabrication and concluded that stock tray impressions made in alginate significantly reduced the visits. The corrective procedures required in conventional and abbreviated technique showed no significant difference in a 3 month follow-up period.

Kawai Y et al⁴ in 2005 in a randomized control trial showed there to be no major difference in conventional and simplified technique in relation to the satisfaction of the patient or the objective denture quality.

The impression made in this technique was in compliance with the conventional technique as to primary and secondary impressions were made. But all this was accomplished in a single appointment. It also decreased the time lost in laboratory steps. During the jaw relations recording procedure, repeated confirmation of the centric relation recording was done which helped to decrease the possible errors in complete denture occlusion. The maxillary anterior trial was done which helped in confirming the size, shade of the artificial teeth, the midline and also have a confirmation from the patient about his approval regarding esthetics. These both procedures were accomplished in a single appointment.

The number of post insertion appointments required for further adjustment of dentures was almost the same as required for conventional dentures. The patient had no other complaints and is been using the denture successfully.

Although the number of appointments was reduced the amount of time required at the first appointment was considerably long. One step impression technique has more chances of improper border extensions as compared to impressions made with custom trays. Also as the try-in appointment was excluded there was no chance of any changes and error if any would be replicated in the final denture.

CONCLUSION

3D CD technique will help us serve more people in less time. It will also help us to serve that part of the population who are themselves unable to approach us for any treatment. Although the method has a few shortcomings amidst many advantages, with the

appropriate and careful procedure and further experience, even the shortcomings can be overtaken, and treatment as close as possible to the conventional technique with added benefits can be provided.

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