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Case Report

Dentistry Section

Restoring Anterior Aesthetics by a Rotational Path Cast Partial Denture: An Overlooked Technique

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ABSTRACT

Cast Partial Dentures (CPD) has long been known to restore missing teeth in patients with minimal invasion on hard and soft tissues. Although satisfactory otherwise, the main concern in CPD is the anterior display of metal. Also the technique sensitive lab procedures, together with the esthetic concern have built an iceberg around the frequent utilization of this treatment modality. With the advent of various techniques to get rid of the metallic display, it was predicted to have more CPD's done in the dental arena. But the conceptual technicalities of the procedure took away the limelight from this treatment modality and focused on the fixed prosthodontics. Although feasible in a large number of patients, fixed prosthesis still has areas of restriction. It is here, when we apply our knowledge and skill of esthetic CPD.

Esthetic CPD eliminates the metal display by utilizing desirable undercuts. The engaging action of the framework into these undercuts paves way for a rotational motion to seat the remaining prosthesis. Hence dual path of insertion helps eliminating the anterior clasp. In this case report dual path of insertion is discussed for replacing anterior teeth in an old male patient who had mild esthetic concerns. Following the conservative approach of CPD (over FPD) esthetic and restorative treatment was planned with patient's consent.

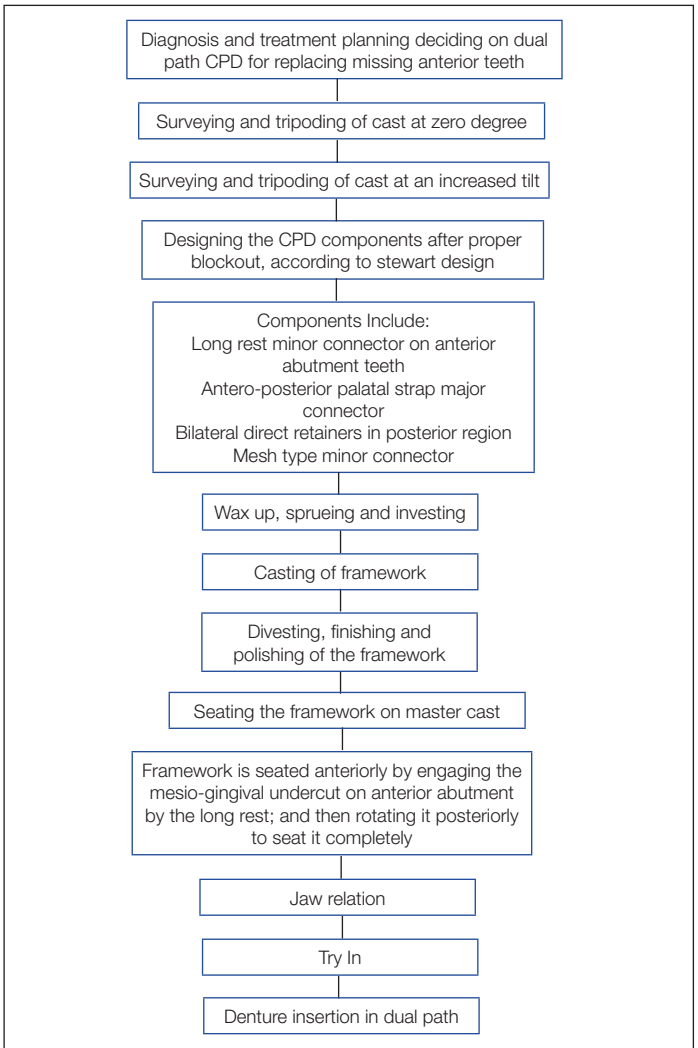
Keywords: Dual path cast partial denture, Long rest seat, Technique sensitive

CASE REPORT

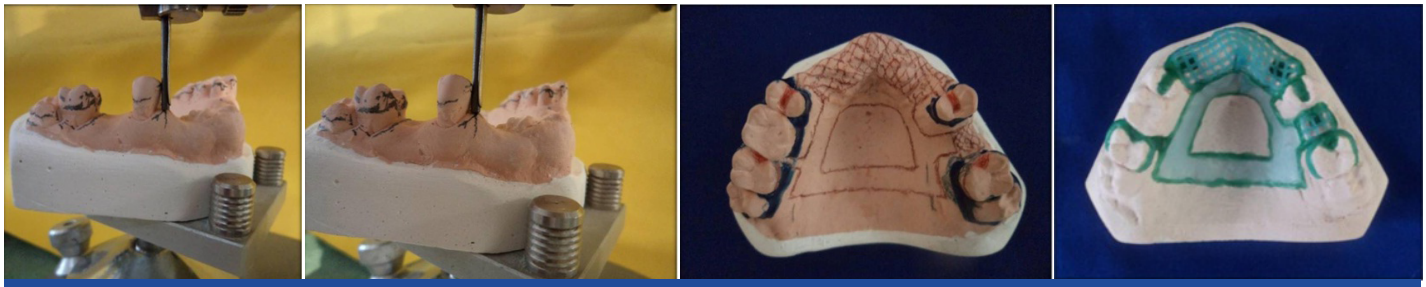
A 56-year-old male patient presented to the Department of Prosthodontics, in a dental institute, with missing 14,13,12,11,21,22,23,24 and 26 [Table/Fig-1]. The patient was an auto rickshaw driver and did not give any relevant medical history. The patient underwent extraction of 14,13,12,11,21,22,23,24 teeth, after their periodontal status deteriorated and 26 as it was grossly decayed. The patient presented a relatively V-shaped arch that totally discarded the option of fixed prosthesis. Also due to financial restraints implant treatment was not considered for the patient. Finally a Cast Partial Denture (CPD) with rotational path insertion was decided for the patient, keeping his esthetic demands in mind. Also the patient was informed about the treatment plan, (sequence of treatment shown in [Table/Fig-2] and upon his consent the procedure was carried out.

Diagnostic impressions were made with irreversible hydrocolloid (Neocolloid, Zhermack, Italy) and casts were poured in dental

[Table/Fig-1]: Intra oral view of maxillary arch.

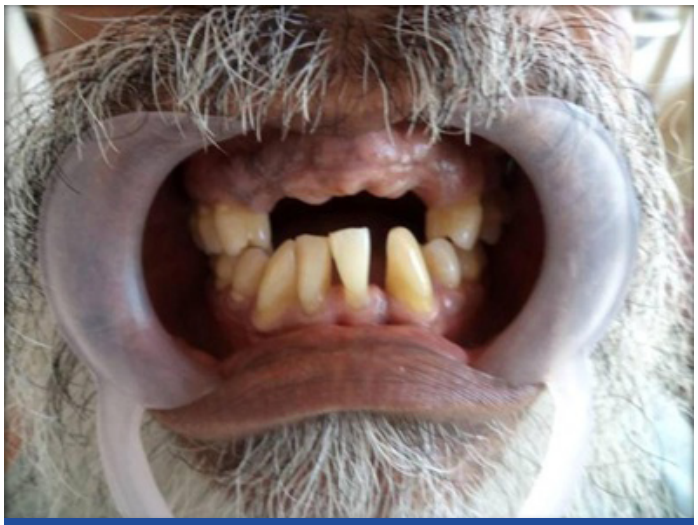


[Table/Fig-2]: Flow chart of the treatment.



[Table/Fig-3]: Surveying at zero degree tilt. **[Table/Fig-4]:** Surveying at increased tilt. **[Table/Fig-5]:** Cast partial denture design and blockout. **[Table/Fig-6]:** Waxed-up refractory cast.

[Table/Fig-7]: Framework. **[Table/Fig-8]:** First path of insertion. **[Table/Fig-9]:** Second/rotational path of insertion. **[Table/Fig-10]:** Post insertion.



[Table/Fig-11]: Pre-operative.

S.No.	Advantages	Disadvantages
1	Minimum tooth coverage by reduced no. of clasps	Crucial communication with lab technician
2	Esthetic	Technique sensitive
3	Conservative tooth preparation (than FPD)	

[Table/Fig-12]: Advantages and disadvantages over conventional RPD and FPD.

stone. The maxillary diagnostic cast was surveyed on a surveyor at 0° tilt [Table/Fig-3]. Then the platform was tilted slightly to diminish the undercut beneath the height of contour and surveyed again [Table/Fig-4] thus obtaining two survey lines. At both the positions the cast was tripoded.

The two survey lines obtained are the bearers of this rotational concept. The rotational centers are located in between these two survey lines, mesio-gingivally (facing the edentulous area).

The cast was then designed following the design guidelines as given by Stewart [1]. All the undesirable undercuts were blocked out with the block out wax. Since anterior teeth and one posterior tooth were missing anterio-posterior palatal strap major connector was planned. To facilitate the rotational path concept long occlusal rest seats were designed on 15 and 25. Conventional circumferential clasps were designed for 17 and 27 bearing an occlusal seat on each of them. Mesh type of minor connector was designed for the edentulous spaces as we had enough of interocclusal space.

Mouth preparation: A round occlusal rest seat was prepared with a round bur (No.4) to a depth of 0.75 mm on 17 and 27. A long occlusal rest seat was prepared on 15 and 25. Guiding plane was prepared on mesial aspects of 15, 25 and 27 using a round end taper bur.

After completion of mouth preparations, addition-reaction silicone impressions (Elite HD, Zhermack, Italy) were made. The definitive cast was again surveyed at two tilts and blocked out [Table/Fig-5]. A refractory cast was obtained and waxed up [Table/Fig-6]. A cast chrome RPD framework was fabricated (Wiralloy, Bego, Germany) [Table/Fig-7].

The framework was evaluated intraorally and adjusted. The rotation path of insertion of the framework was evaluated by placing the gingival part of long rest in the mesio-proximal undercut of the anterior teeth, and then rotating the entire assembly posteriorly to seat it completely [Table/Fig-8,9].

After maxilla-mandibular jaw relation records were completed, denture teeth were arranged and evaluated intraorally. The denture base was processed and finished. The denture was inserted and the patient was pleased with the functional and esthetic results [Table/Fig-10,11].

DISCUSSION

When CPD is chosen as the treatment plan over implant and fixed prosthesis, accounting for their non feasibility in certain cases [2,3], main concern lies in the esthetic rehabilitation of the patient. To fulfill the esthetic demands of the patient eliminating or modifying the clasps in anterior region can improve the esthetic quotient of the CPD. Much experimentation has been done in the designing of CPD to improve patient compliance as the anterior display of metal (clasp) is the most objectionable element in a CPD. One major breakthrough made in CPD utilizing a dual path or rotational path of insertion totally altered the perspective of CPD [4]. This concept is old although, but it is often not considered as an option because its cumbersome and technique sensitive procedure. However, when used, it gives remarkable esthetic results along with good oral hygiene maintenance and positive patient comfort.

Rotational path CPD differs from conventional straight path CPD as it seats one portion of partial denture first, gaining access to the adjacent undercut areas, and then the framework is rotated in its final position. The conventional clasps are replaced by rigid retentive units, consisting of a rest and its retentive component [5].

According to Firtell and Jacobson a rotational RPD allows reduced coverage of tooth surface, hence proper plaque and caries control [6]. The rotational path CPD can incorporate either lateral path or anterio-posterior path of insertion depending on the location of the framework rotational centers [5]. Category I designs replace missing posterior teeth and category II replace missing anterior teeth.

In the present case report, we have replaced the missing anterior teeth using the category II design. In this type, the rotational centers are located gingivally as rigid extensions of the minor connectors extending proximally and terminating into a long rest seat. The proximal plate provides intimate contact with the proximal tooth surface below the height of contour at zero degree tilt [7]. The plate engages into the undercut along the first path of insertion and then maneuvered into rotation – the second path of insertion, to fully seat the prosthesis [8]. This eliminates the need of labial clasp. However, conventional clasps can be placed in the posterior region. In the modification space of 26 a minor connector and a conventional clasp on 27 were placed. Minor connector was designed after blocking out all the undesirable undercuts. Undesirable undercuts are determined by placing a divider on the axis of rotation of the prosthesis (on anterior abutment) and rotating it in the modification spaces. The block out required, will assume a curvature coinciding the arc of placement [9].

Jennifer and Edward explained the restoration in one such case but with missing mandibular anterior teeth [10]. A similar protocol was followed to deliver an esthetic and structurally robust CPD.

Thus keeping in mind the basic logic of dual path CPD, its execution is totally dependent on the understanding and skill of the clinician. He should evaluate the possibility of a dual path CPD in a given individual and assess the advantages over the disadvantages [Table/Fig-12] [10].

CONCLUSION

Cast partial dentures are truly an innovative way to restore missing teeth. Improper and short communication with the lab technicians and short time duration of restorations, impulses the dentist to go for 'Fixed Prosthesis'. Also a probable reason for not recommending CPD by many dentists can be the fear or lack of trust in their ability.

However if a thorough understanding is deemed in for this concept, conventional or dual path, the results can be very satisfactory, esthetic and comfort wise and is conservative for both, patients and the dentist. Also the expected outcome of this treatment modality can be very predictable with the proper attention to oral hygiene, periodontal considerations, and judicious fabrication of partial denture.

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