

Case Report

Esthetic Clasp Cast Partial Denture

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INTRODUCTION

It is very unfortunate for patients to lose their teeth at a very young age. The reasons and factors for tooth loss may vary, but the emotional turmoil they go through is very similar. In partially edentulous conditions, implants have become a treatment of choice for the doctors for their patients over removable prosthesis but the various other factors such as anatomic, physiological, psychological, medical, and financial considerations of the patients being the reasons for deciding on the type of removable prosthesis. Removable partial dentures (RPDs) are the most cost-effective and best treatment option for partial edentulism^[3] but patients are concerned about the metal exposure in cast partial dentures and hence worried about the esthetic appearance.^[4,5]

Removable cast partial dentures are considered as definitive removable prostheses, but the location of clasps may affect esthetics. Hence, when the patient is

ABSTRACT

Denture esthetics as defined by Glossary of prosthodontics terms the effect produced by a dental prosthesis that affects the beauty and attractiveness of the person.^[1] Removable partial dentures (RPDs) are the widely accepted and treatment of choice for most cases as it is both effective and affordable. Partially edentulous treatment planning includes both esthetics and masticatory function. A prosthesis that is highly esthetic will improve patient's motivation and acceptance. It is a very wrong notion to expect that patients will tolerate unesthetic partial dentures because good masticatory capability has been achieved. Esthetics plays a vital role in the success of partial dentures, and the length and mobility of the patient's lips play a significant role in achieving it.^[2] Patients with short lips or highly mobile lips pose problems as esthetics are compromised because most clasp arms, denture borders, and other components will show when the patient smiles or speaks.^[3] RPDs can easily look artificial; hence, special emphasis should aim toward restoring function, phonetics, esthetics with a long-term benefits which requires meticulous attention during fabrication. This case reports is an esthetic clasp designed for a cast partial denture for a young girl for esthetic and function.

KEYWORDS: *Esthetic clasp, cast partial denture, clasp, high lip line, low lip line, tooth colored*

more concerned about esthetics and appearance, flexible partial dentures which are esthetically superior to flipper and cast partial dentures may be considered as a treatment of choice. However, for the success of flexible RPD, proper diagnosis, treatment planning, and insertion technique of this prosthesis is very important which may not be accepted by the patients because of the cost of the material. Hence, this case report clears all the concerns of the patients with esthetic clasps located in various esthetically concerned areas which achieve excellent esthetic outcomes on appearance.^[6] Dissatisfaction of dentures was related mainly to age, health, prior experience with a prosthesis, and the type of opposing dentition and esthetics^[7,8] Failure to recognize patient expectations can lead to noncompliance and failure of treatment.

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Most patients refuse to wear the cast partial dentures due to esthetic reasons, and the treatment is therefore deemed unsuccessful. Unsuccessful treatment rate for clasp retained cast RPDs ranges from 3% to 40% (mean 26%).^[8] When so many patients do not comply with treatment, it is instructive to reflect on why and how the treatment is performed.

This case report mainly emphasizes the esthetic considerations during planning and fabrication of cast partial dentures. The dentist must be able to follow all the clinical considerations to achieve superior esthetic outcomes to reach the patient's realistic expectations. Esthetic RPD planning includes proper diagnosis, treatment planning followed by execution of the laboratory steps such as surveying, mouth preparation, framework designing, placement of various components, denture base and teeth.^[9]

CASE REPORT

A 22-year-old female patient reported with the chief complaint of replacing missing teeth in the lower jaw [Figure 1]. The patient was very young and was a mixed diet consumer, which demanded a restoration which improves the appearance and masticatory efficiency. Medical history was not significant. Dental history recorded a loss of mandibular right 1st and 2nd molars (46, 47) and left first molar (36) due to caries. However, the space needed for replacing 36 was more than required due to the physiological migration of teeth. The whole set of maxillary teeth were intact. Intraoral examination revealed this dentate situation as Kennedy Class II mod 1 based on Kennedy's classification.

Social, drug, and history of habits were not significant. Extraoral examination disclosed a high lip line and a broad smile showing up to the molars. A detailed examination revealed oral hygiene was satisfactory and

her periodontal condition for all remaining teeth was good. Diagnosis and treatment plan was done after radiographic investigations and a diagnostic mounting on a semi-adjustable articulator. After presenting different treatment options, the patient opted for a cast partial denture in relation to mandibular arch.

Diagnostic models were analyzed, and surveying was done on a dental cast surveyor. The four principal factors were evaluated, namely the path of insertion and removal, esthetics, interferences, and guiding planes.^[4,10,11] After evaluating the condition Cast partial denture was decided as the treatment plan. The denture design had been planned as Lingual bar as major connector as the lingual sulcus depth was more than 8 mm when measured. Surveying of the cast was done using the surveyor, and according to the favorable undercuts circumferential clasps with mesial rest on 37, 45 and circumferential clasp with distal rest on 35 has been planned. Mockup mouth preparations were done on the diagnostic models and the desired mouth preparations were executed in the patient's mouth and final impressions were made with putty and light body and monophasic polyvinyl siloxane impression material (Aquasil Elastomer Impression Material, Dentsply, Germany). The casts were then poured using die stone (Ultrarock). Surveying the master cast was done, the unfavorable undercuts were blocked, and refractory casts were fabricated using phosphate bonded investment material. Wax pattern were contoured using preformed wax patterns. The refractory model with the wax pattern was invested, and casting procedure was carried out. Finishing and polishing were done in the conventional manner. The metal framework was tried in the patients' mouth for accurate adaptation. The occlusal rim was made and teeth setting was done and to check for proper alignment and tried again.



Figure 1: Intraoral preoperative



Figure 2: Intraoral try in of esthetic clasp cast partial denture

Once curing was done in the conventional way, and the final prosthesis was issued, the patient was extremely satisfied with the fit and esthetics [Figure 2]. The patient was put on a strict follow-up protocol for 1 month during which she adapted well to the prosthesis. The patient was highly satisfied as there was no metal exposure of the clasps and the tooth-colored clasps masked the artificial appearance, and the young patient was happy with the esthetic outcome [Figures 3-6]. A 3-month and 6-month follow-up was done the esthetics, function and did not show any sign of looseness and the patient was very satisfied.

MATERIAL USED FOR ESTHETICS

The traditional use of the conventional metal clasps such as cobalt-chromium (Co-Cr), gold, stainless steel, and titanium damages esthetics due to display in the oral cavity which hampers the patient's self-esteem. Acetal resin (polyoxymethylene [POM]), a thermoplastic resin, may be used as an alternative denture clasp material. Acetal was first proposed as an unbreakable thermoplastic resin RPD material in 1971. These injection molded

resins were promoted mainly on its ability for superior esthetics, which allowed the clasps to better match the color of abutment tooth.

POM materials formed by polymerizing formaldehyde where the homopolymer is a chain of alternating methyl groups linked to each other by an oxygen molecule. Acetal as a homopolymer has good short-term mechanical properties, but as a copolymer has better long-term stability. This may be used as an alternative denture clasp material.^[12] Acetal resin had increased strength, resistance to wear and fracture flexible, high creep resistance and high fatigue endurance, being hydrophobic to water or saliva. All these characteristics make it an ideal material for preformed clasps for partial dentures, single-pressed unilateral partial dentures, partial denture frameworks, provisional bridges, occlusal splints, and even implant abutments.^[13]

DISCUSSION

Agerberg and Carlsson reported that cosmetics and esthetics was the primary reason for prosthodontic



Figure 3: Esthetic clasp on cast



Figure 4: Cast partial denture intraoral with bilateral occlusion



Figure 5: Left lateral



Figure 6: Right Lateral

treatment expressed by patients, with improved mastication being the second-most common reason.^[10] The demonstration of clasps by means of photographs and models is done along with the planning of clasp placement after surveying. According to Kapur *et al.*, two principal designs for distal extension partial dentures are Rest, Proximal Plate, I Bar (RPI) concept and circumferential design which did not differ in terms of success rates, maintenance care, and effects on abutment teeth in their randomized clinical trial. Care has to be taken during designing the symmetry of clasp assemblies, in both the maxillary and mandibular arches is crucial for esthetic reasons.^[11] Numerous patients fail to wear the partial dentures as they find the display of clasp assemblies esthetically unacceptable.^[5,12] Clasps are used as direct retainers for the RPD. The flexible clasp tip engages the undercut of the abutment to provide retention.^[7,14,15] Ideally, the clasp assembly must not impact the esthetics adversely, but the location of clasps, clasp type, clasps material, clasp location in the dentition and the number of clasps plays a crucial role. Clasps fabricated with cast chromium covers larger areas of the tooth resulting in more metal to be displayed.^[7] 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, the dual path of insertion helps eliminating the anterior clasp.^[16] A prototype nonmetal clasp denture could be fabricated using CAD/CAM technology.^[17] The CAM clasp made by repeated laser sintering and high-speed milling can be used effectively as an RPD component.^[18] Technopolymer clasps have been developed for overcoming the esthetic concerns of cast partial dentures^[19] They are manufactured from thermoplastic acetal resin (POM) material with a highly crystalline structure which ensures high transverse strength, greater flexibility, and radiolucency. Esthetics constitutes its major advantage as several tooth shades are available for use anteriorly, but long-term studies still need to be conducted.^[19]

Acetal resin clasps can be used in larger and deeper undercuts than recommended for chromium-cobalt alloy due to their low modulus of elasticity which also exerts minimal stresses on abutment teeth. In clinical situations, where esthetics and periodontal health are priorities, this may be advantageous.

Acetal resin provides much lesser retention compared to chrome cobalt. Hence, further study has to be carried out for various thicknesses and designs of clasps and framework for its successful dental application.^[20]

CONCLUSION

Currently, RPDs are a treatment of choice for most patients. The aim is not only toward restoring function and phonetics but should also special emphasis should be on restoring esthetics with long-term benefits which require meticulous attention during planning and fabrication. Patient experience and expectations need to be constituted before treatment, as components of the cast partial denture may be visible which may not be acceptable to the patients. In view of the importance of esthetics, creative clasp design offers the possibility of reducing the visibility of clasp assemblies, rendering them more acceptable to the patient. Reports show that acetyl resin has high impact strength and are highly resistant to organic solvents. The modification technique followed in the treatment of this patient to improve esthetics is a simple but yet effective treatment plan for providing an optimum treatment for an individual.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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