

# The Use of Telescopic Crowns in Increasing the Retention of Esthetic Removable Partial Dentures

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**Abstract:** ***Introduction:** Esthetic requirements are often main concerns of every patient, including also patients that are candidate for removable partial dentures. This is a challenge for the clinician because of the presence of direct retainers which most of the cases are visibly shown. **Purpose:** The aim of this study was to compare the stability of the removable partial dentures with clasps toward those with telescopic crowns. Through this study we show the relevance of a careful planning and the evaluation of direct retentions, especially those of clasps and telescopic crowns for their impact on the longevity of the supporting teeth and tissues in different Kennedy classes. **Methods:** The removable partial dentures evaluated in the study are with a cast framework. In this study, are taken into observation 45 protheses from 33 patients (18 maxillary and 27 mandibular) aged 45 - 70 years old. We have analyzed the type of retainers used and evaluated the stability compared to the TC and clinical conditions of the abutment teeth in each case. **Conclusions:** After clinical examination we concluded that the telescopic retained removable partial dentures when the abutment teeth where of a correct choice, had a mobility scale within physiological parameters and overall better esthetic conditions compared to the abutment teeth where different type of clasps were used.*

**Keywords:** telescopic crowns (TC), primary / secondary crowns, direct retainers

## 1. Introduction

Almost every patient, regardless of the treatment plan presented to him by the clinical staff, has high expectations about the esthetics of the prosthetic restoration. But considering the technical stability issues and number of abutment teeth, that is not always possible. Removable partial denture (RPD) are still the primary treatment option from the patients' view because an implant - supported denture is relatively expensive from a financial point of view and require a surgical procedure that not in every case can be done, and a longer treatment time compared to treatment with removable partial denture. As we know, a partial denture is supported by the abutment teeth and residual ridges which have different support characteristics while being under pressure. The difference of supporting characteristics generates rotational movement of the denture when a force is exerted on the extension base, and it results in potentially destructive forces on the abutment teeth and residual ridges. In order to minimize the undesirable forces and maintain the health of the structures, different authors proposed biomechanical principles of removable partial dentures design which focused on distribution of the forces to the supporting tissues, like support, stability, and retention of the denture RPD<sup>4, 8</sup>. On the other hand, other authors advocated importance of the removable partial dentures design principle that takes into account plaque control for prevention of caries and periodontitis, cost - efficiency and clinical possibility of creating telescopic retained RPD in order to achieve maximal esthetics<sup>9</sup>. In the literature, these principles are generally accepted as fundamentals to designing removable partial dentures<sup>2, 4, 8, 9, 10</sup>.

In order to investigate the effectiveness of this biomechanical principle - based RPD design, we carried out a study to investigate the clinical outcome of different partial dentures, especially when using telescopic crowns compared to clasp retained ones.

## 2. Material and methods

### a) Subjects

In this study, are taken into observation 33 patients (22 female and 11 male) with a total number of 45 protheses divided in 18 maxillary and 27 mandibular dentures. The age group of the patients is between 45 - 70 years of age

### b) Design of removable partial dentures

From the 45 partial dentures, 34 were of cast framework base of Cr - Co, and 11 were from acrylic resin - base. Most of the extension - based dentures covered the lingual sides of abutment teeth and their adjacent teeth with plates to minimize denture mobility during function.

The methods and materials used depend on the type of the defect. We have analyzed the type of clasps used and evaluated mobility scale and clinical conditions of the abutment teeth in each case. For different groups of Kennedy classification, we have used different type of direct retainers<sup>1, 2, 5, 6</sup>.



Figure 1: Telescopic retained RPD

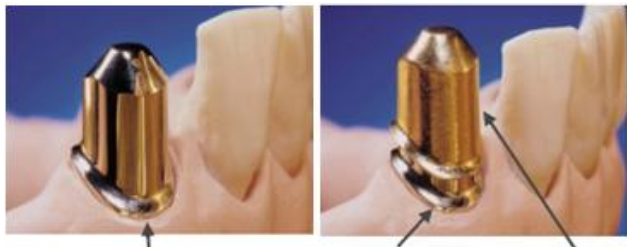
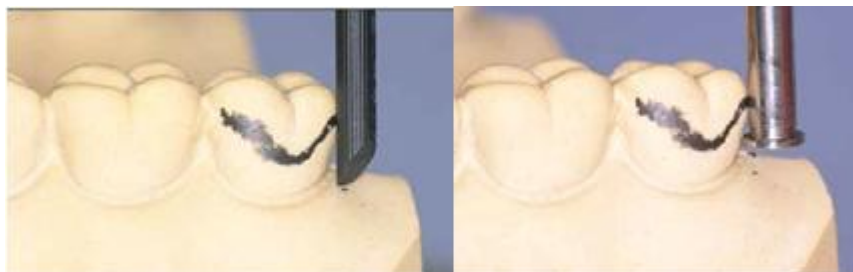


Figure 2: Primary and secondary crowns



Figure 3: Primary crowns cemented on abutment teeth.

There must be a thorough clinical evaluation of the abutment tooth prior to deciding if the patient is candidate for telescopic crowns retained removable partial denture. Periodontal health must not be compromised in order to obtain a stable environment where the denture will be placed. Tooth mobility and placement / distribution in the arcade is crucial for the clinician to design the RDP. Also



To achieve best retention properties it is important to evaluate the angle formed in between the maximal tooth convexity and the cylindrical instrument that is called the "angle of gingival convexity". When the convergence angle is less than  $10^\circ$  the clasp retention cannot be obtained<sup>3, 7, 10</sup>.

The statistical data regarding the cast framework RDPs will be published in a follow - up study after the recall of all the patients and thorough examination of the abutment teeth. Till now, approximately two years after completing the restorations, no significant evidence of problems regarding our discussion about cast framework RDPs are reported.

#### 4. Discussion

Before constructing aRDP, a thorough study is needed. This study must include the evaluation of the type of the defect, evaluation of the different forces that will be applied on the denture and the defining of the retentive elements to be used.

The main forces that the dentures are submitted are the chewing forces. But in the planning of a partial denture it is important to consider also the action of horizontal and

the alloy used in fabricating the primary and secondary telescopic crowns is important to keep in consideration.

#### 3. Results

From the 45 partial dentures applied, only 11 of them were retained by telescopic crowns and 34 were clasp retained. Almost 60% of the clasp retained dentures required at least 2 extra appointments for retouches and after 3 months, 50% of the patients had complaints about the visibility of the clasp especially on frontal teeth. The telescopic retained dentures were the most preferred because the esthetic is maximal due to the lack of metallic clasps. The patients with telescopic crowns toward those with classic clasp retained dentures had these differences:

- Accurate tissue adaptation (better retention).
- Easy to clean
- Perfect esthetics due to lack of visible direct retainers.

On the other hand, the classic clasp retained dentures showed overall much wider usage in all patient's groups and clinical classifications due to easiness of construction, lower laboratory costs and high stability with no evidence of fractures, of discomfort after 3 months. All the model preparations were made using the dental surveyor.

rotational forces. The vertical forces are well tolerated by the supporting teeth because the periodontal fibers get in action. It is important that the construction of the denture has a controlled distribution of the force along the axial direction of the tooth (made possible by the supporting arm of the clasp). The forces are also distributed by the retentive arm of the clasp and the denture body itself over the alveolar ridge<sup>1, 7</sup>.

Horizontal forces are harmful forces and applied on the supporting teeth and the alveolar ridge. To minimize their effect is important that the retentive and the stabilizing arm of the clasp to be fitted correctly in the appropriate areas on the tooth and also is important to find the right direction of insertion of the denture itself. Rotational forces may occur in absence of distal teeth, mainly in Kennedy class I and II<sup>1, 3, 8</sup>. These forces provoke the rotation of the base of the denture over the surface of the edentulous ridge. In this case it is necessary the use of indirect retentions by using supporting arms as far as possible on the other side of the axe of the rotation. Other factors that help minimize their effect are: a wide base of the denture, smaller denture teeth surface, and by taking compressed impression during the clinical phase in order to minimize the tissue resilience.

The elimination of the mesial - distal movement is achieved when the denture base has good contact with the proximal surfaces of the supporting teeth and the clasps include the tooth perimeter by over 180°. In the lower jaw these forces are better controlled by including the mandibular tuberculum in the base of the denture.

In cases of optimal condition of the abutment tooth it is important also to consider financial cost laboratory manufacture in making the telescopic crowns. This is because most of the patients eligible for RDP have made that choice due to financial restraint in considering other alternatives like dental implant interventions. This has to be taken in consideration because although esthetic outcome of the telescopic crown - retained RPDs is maximal, the cost efficacy ratio must be within reachable range for this group of patients.

## 5. Conclusion

The advantages of using telescopic crowns as primary direct retainers in constructing Removable Partial Dentures are:

- Maximum esthetics. Partial dentures constructed with telescopic crowns do not show the direct retainer because is embedded into the base of the denture.
- Durability. These dentures provide exceptional compressive, impact and bending strength and will not deteriorate chemically when it comes into contact with the fluids, bacteria and physical environment of the mouth.
- Biocompatibility.
- Stress - Breaking Function. The gingiva tissue is gently stimulated under mastication, and unnatural stresses on the remaining teeth are substantially reduced.
- Greater elongation limit.
- Superior strength.
- Increased retention.
- Easiness in cleaning.

The disadvantages of using TC as direct retainers are related to clinical conditions of abutment teeth and very high laboratory cost when comparing to classic RPD.

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