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CASE REPORT

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# Removable Partial Denture with dual path of insertion: clinical case report

PPR com dupla trajetória de inserção: relato de caso clínico

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## ABSTRACT

Removable Partial Dentures (RPD) with dual path of insertion are designed to overcome conventional RPD esthetic limitations, through the use of proximal undercuts for rigid direct retainers. Therefore, dual path RPD is considered a variation of conventional RPD. This paper reports a clinical case where proper function as well as excellent esthetics were obtained with this type of RPD.

## KEYWORDS

Dual path design; Rotational path; Removable partial denture.

## RESUMO

Próteses parciais removíveis (PPR) com dupla trajetória de inserção são próteses projetadas para superar limitações estéticas das próteses convencionais, utilizando-se retentores diretos rígidos nas áreas retentivas proximais dos dentes suportes. Desta forma, a PPR com dupla trajetória da inserção é considerada uma variação da PPR tradicional. O objetivo deste artigo é relatar um caso clínico onde se obteve uma resolução funcional e altamente estética através deste tipo de PPR.

## PALAVRAS-CHAVE

Dupla trajetória de inserção; Trajetória de inserção rotacional; Prótese parcial removível.

## INTRODUCTION

In times where aesthetics are primordial, even in the case of removable partial dentures, the dual or rotational insertion path, can, in determineted cases, be an excellent aesthetic solution. In a conventional removable partial denture, to compensate the lack of contour, position and inclination of supports teeth, variations in the insertion path is often indicated, usually perpendicular to the occlusal plane when the study model in delineator is [1,2].

Jacobson [3] says that a modification in the insertion path is classically made through changes in anteroposterior and/or side-to-side inclination of the model in the delineator, or with the use of a rotational path of insertion.

In prostheses with conventional insertion path, the location of the retentive terminal, if visible, it becomes a problem when the patient speaks or smiles. An alternative would be the use of precision or semi-precision attachments, but these devices have the disadvantage of the high cost and the laboratory technique ascertained.

Other alternative, mainly in cases of Class IV Kennedy, would be the use of proximal plaques on guide planes, but this combination has the disadvantage of loosing the friction retention after extended use of the RPP, as well as part of view proximal plaque in vestibular entrance standard (Figure 1). Although for some professionals, the no use of a visible proximal plaque can result in a loss of clamp requirements, the circumscription. Although little uncovered, the use of rotational insertion path may, in many cases, solve this problem.

The "design" of a RPD with rotational path of insertion basically use a small metal structure as the rigid direct retainers, that replaces conventional clamps [4-6]. Usually this rigid retention is given by minor connector or proximal plaque, that due to the close contact with the proximal surface of the retentive abutment, promotes retention when under extrusive forces action.

Jacobson [7] relates that customarily conventional RPD are made using a path of insertion relatively perpendicular to the occlusal plane. In the insertion path, all the supports are seated almost simultaneously. In the rotational insertion, the direct drive retainer gain the retentive area through a translational movement (Figure 2a) and posteriorly by a trajectory of rotational insertion, the prosthesis reaches the final seating position (Figure 2b). Thus, by having two separate paths, some authors called as dual trajectory prosthesis [4,8-10].

The union of an imaginary line between the rotational center positioned at the gingival portion of the minor connector or proximal plate, determines the insertion axis for the rotational trajectory. Within this, an vertical removal of this prosthesis is impossible, to remove, it is necessary a reverse movement in relation to the insertion through the rotational path.

The "design" of a double insertion RPD allows access to the retentive area of the abutment through the rotational insertion [3,5,9].

**Figure 1 -** Visible proximal plates when adapted on guide planes.

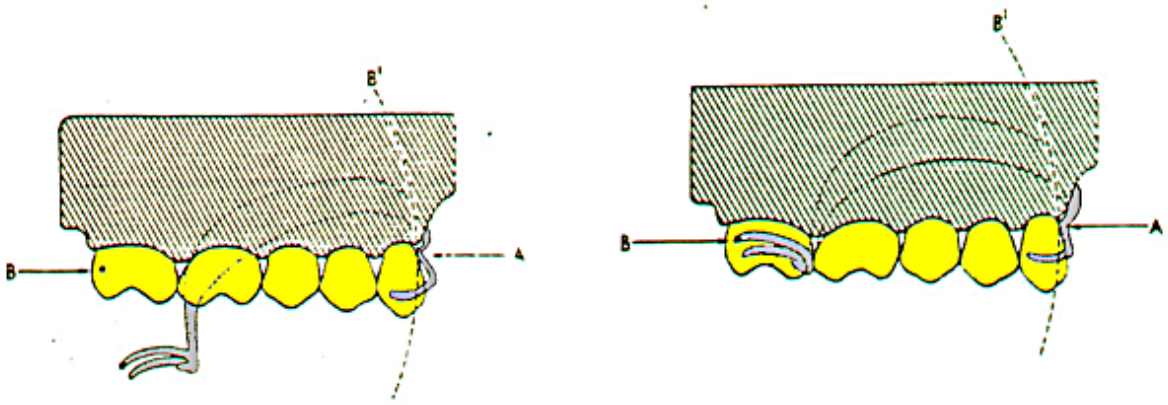


**Figure 2 -** a) setting of the rotational centers; b) final setting by rotation of the prosthesis.

***Classification of RPD with double insertion***

There are several methods of classification, however, we believe that the simplest classification is the one proposed by Firtell & Jacobson [11] (1983):

- Anteroposterior (AP) - When the rigid direct retainers are the medial teeth, and conventional direct retainers are positioned in the distal supports teeth.

- Postero-anterior (PA) - When rigid direct retainers are located in the distal teeth, and conventional direct retainers in the mesial support.

- Side - they use for the rigid retainers, the retentive distal surface of the mesial support tooth, and retentive mesial surface of the distal abutment tof the same hemiarch, where the rotational center will be located.

## CASE REPORT

A female patient, 25 years old, presented with anterior edentulous space with loss of the anterior superior incisors, as well as the loss of tooth 16 (Figure 3). As it is, the replacement of the anterior teeth during anamnesis found to aesthetic concern by the patient. It is well known that exposure of the retentive terminal or part of the metal structure in anterior teeth is an objection by the majority of the patients.

We could offer various treatments such as superior rehabilitation through partial fixed prosthesis, RPD retained by attachment, conventional RPD and a implant-supported prostheses. The use of attachments or fixed prosthesis is costly and requires the preparation of the supports teeth. The implant-supported prostheses require the surgical phase and are costly, and the conventional RPD in this case would not provide a good aesthetics resolution. In this case, there was a clear advantage in employing the rotational path of insertion.

After analyzing the study casts, we observed that there were retentive areas in the mesial surfaces of the canine, as well as in the molars. In this way, we opted for the treatment by the use of a RPD with rotational insertion path.

Although a typical example for the treatment by rotational insertion trajectory is the Kennedy Class IV, the clinical case, classified as Kennedy Class III Modification 1, is also reported as an indication for this kind of insertion. However, some care is necessary for the use of this type of treatment when there are multiple edentulous spaces.

Planning implies the use of rigid direct retainers in canines and conventional direct retainers in the posterior supports teeth. Therefore, it is necessary to make undercuts on the mesial surfaces of the canine when the model is with the occlusal plane parallel to the ground.

The preparations of the support in the canines must be of long, in inverted "V", with well-defined lines and asymmetrical walls. The preparations to support the posterior teeth follow the principles and conventional dimensions.

In Figure 4, after the planning and design of the study cast, we can see that there were no preparation in the mesial surfaces, of guide plans in the canines, as these undercuts were needed for the construction of RPD rotational trajectory.

After obtaining a functional cast, we carried out the relief needed for future metal frame could reach the final seating position without interference from undercuts.

Initially we made a reliev with wax in the region corresponding to the marginal gingiva of the mesial faces of canines. Following we filled with wax the distal face of the tooth 15, as well as the mesial of the tooth 17. We begin to study the rotational insertion movement using a compass (Figure 5). The compass must tangent the more oclusal portion of the tooth and reaches the mucosa. This path should always be relieved with wax so that the minor connector of the conventional clasp does not contact the retentive area.

The working cast, properly relieved, was sent to the dental laboratory with the designed model, taking care to contact the technician to explain how this type of prosthesis works.

With the metal frame (Figure 6), we passed to the test and adjustment phase, where we observe: if there was intimate contact between the hard direct retainer and abutment; the relief area of the subsequent smaller connectors was respected; if the support were in contact with the preparations; the insertion path was correct and the other conventional requirements of a test with RPD were respected.

After the test in the model, we placed the frame in mouth, to check if the above items were also observed in the mouth. It is important at this stage to observe proper seating of the rotational centers, as well as insertion path in a rotational movement to the final seating. We also conducted a draw in the previous metal grid saddle to check if there was a displacement of rigid direct retainers (this move should not occur).

After preparation of the wax-up, we demarcate the reference lines and set up the models in the articulator, for mounting the artificial teeth (Figure 7). Held proof of teeth in patient, the prosthesis was processed in conventional manner.

Installation and control of the prosthesis, care must be taken that the RPD has adequate retention and stability: the rigid direct retainers and conventional direct retainers should not wear out or polish on their inner faces, so that they maintain a close contact with the surfaces of retainers. After installation, vertical retention test must be held, or pull the anterior region to verify retention. In addition to other normal control care, the patient should be instructed to insert and remove the prosthesis only in the rotational path.

To obtain better aesthetics and lower interference of the flange, can be used metallic saddle, provided there is no excessive resorption.

In Figure 8, there is a high aesthetic yield obtained by this treatment, where the resolution was conservative and less expensive when compared to other kinds of treatment.

**Figure 3 -** Patient with absence of maxillary incisors and tooth 16

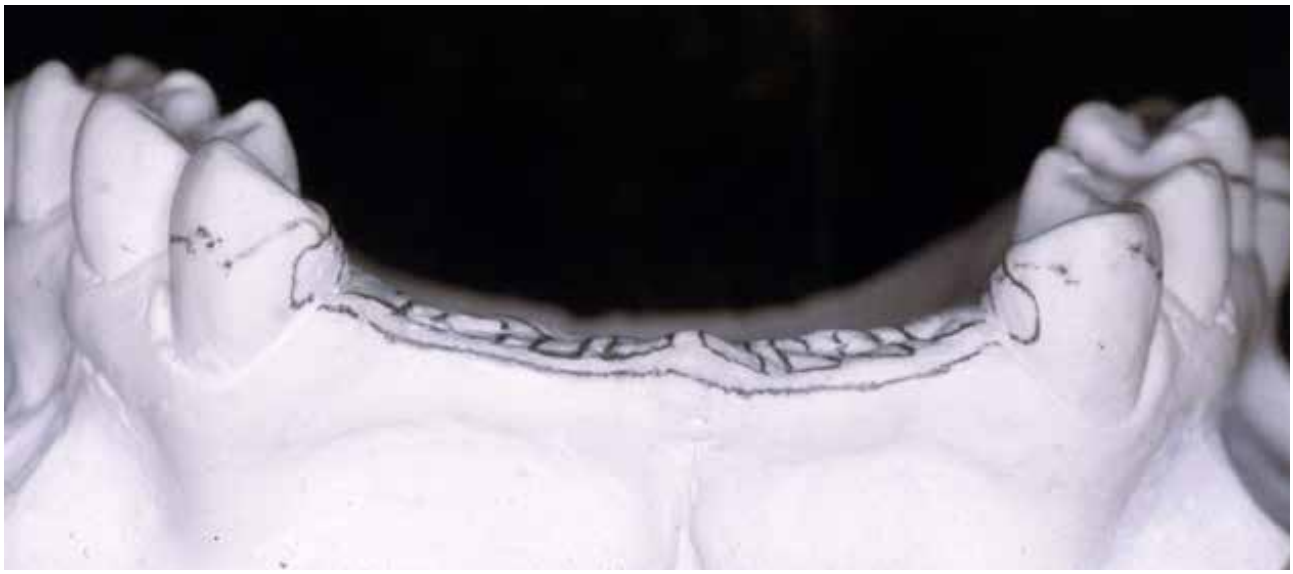

**Figure 4 -** Retentive areas in the mesial of the canines and absence of guide planes.

**Figure 5 -** Wax reliefs performed using the compass.

**Figure 7 -** Teeth proof; It is noted that the proximal plates are not visible.

**Figure 6 -** Test and adjustment of metal frame

**Figure 8 -** High aesthetic yield proportioned by the double trajectory technique or rotational path of insertion.

## DISCUSSION

The use of rotational path of insertion have been of great value to the solution of Class IV Kennedy cases.

The advantages are basically, the decrease in number of components of RPD without compromising the basic requirements of direct retainers. This decrease in the number of components provides a better aesthetic yield the patient, less possibility of permanent deformation of the direct retainer and less accumulation of plaque, bacteria, which consequently affects the periodontal health and in caries index [7,8,12,14].

This "design" also provides the use of proximal undercuts in the absence of retentive buccal and lingual areas.

However, it requires an attentive diagnostic model study, as well as knowledge of the professional trajectory of rotational concepts. Preparation for support with special format, requires professional training and skill in their execution, as well as a laboratory technician with notions of PPR rotational trajectory.

Normally, the indication of this technique are the tooth-supported cases, however, some authors [7,9] use it in Class II Kennedy cases.

Works such as Jacobson [10,13] shows the durability and effectiveness of this type of prosthesis over ten years and second Firtell & Jacobson [11] when properly designed and constructed, the use of trajectory of rotational insertion may result RPD in a sturdy, hygienic and aesthetic.

## CONCLUSION

RPD with double path of insertion requires sensitive technique and skill to its construction, but when properly planned and built can be very useful, considering that is a type of prosthesis that will complement the traditional RPD.

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