



Axial Attachment Retained Mandibular Overdenture - A Case Report

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Abstract

The mandibular complete denture is a challenge for the dentist. Unfavorable anatomical and physiological conditions such low bearing surface and a significant bone resorption, often compromise the prosthetic retention. For this, prosthodontic practice should always concentrate on procedures that prevent the excessive loss of jaw bone and those that contribute in maintaining the alveolar ridge height. Overdentures are one such option wherein roots prevent alveolar bone resorption, provide better load transmission, maintain sensory feedback and achieve better stability of denture with emphasis on psychological aspect of not being completely edentulous. Additionally, the exploitation of residual roots is a reliable alternative that leads to a better prosthetic integration by increasing the retention by the use of attachments.

This article illustrates the contribution of the axial attachment (CekaPreci Line) in the prosthetic balance optimization of a mandibular supra-radicular total prosthesis.

Keywords: Subtotal Edentulousness; Axial Attachment; CekaPreci Line; Retention

Introduction

Low retention and instability are the main complaints in mandibular complete prosthesis. So, the use of additional means of retention, when conditions permit, is a valuable recourse [5,7]. The concept of preserving natural roots for better prosthodontic prognosis is very old. Ledger in 1856 [8] described something similar to overdenture prosthesis. His restorations were referred to as 'plates covering flangs' at that time. Overdentures received special attention and were popularized particularly between the period of 1970 and 1980 [3].

Root supported overdentures seem to be a valid alternative to conventional complete dentures. Moreover, maintaining a root on the arcade will contribute to the conservation of the alveolar bone and proprioception.

Different attachment systems were used to retain dental prostheses for completely and partially edentulous cases [10].

In this article we will be discussing a case report which provided a satisfactory and successful prosthetic rehabilitation by restoring function, esthetics and comfort to the patient using CekaPreci line (pre-fabricated) axial ball attachment.

Case Report

A healthy 55-year-old patient was referred to the removable partial dentures department-Dental Clinic, Monastir-Tunisia for prosthetic rehabilitation with functional and aesthetic request.

He had a subtotal edentulousness maxillary, only the 13, 18, 22 and 28 persisted. The examination of the bone mucosa surfaces reveals well-formed edentulous crests covered by firm and adherent fibro mucosa. In the mandible only the two canines persisted (Figure 1).



Figure 1: Initial clinical situation.

The retro alveolar x-ray showed that the axillary residual teeth must be extracted. The canines presented a good bone implantation with a: radiological crown/radiological root report <1 (RC / RR < 1) (Figure 2).



Figure 2: Retro alveolar x-ray of residual teeth.

The location and axis of the residual canines, and the straight anterior ridge oriented us towards the realization of a supra-radicular mandibular prosthesis with connecting axial attachment.

The study phase is an essential prerequisite, it allows to analyze and validate the prosthetic project from an aesthetic and functional level.

Therefore, a mounting of the study models on an articulator makes it possible to analyze the inter-ridge relationships and to evaluate the height necessary for a good integration of the attachments and the prosthetic teeth (Figure 3,4).



Figure 3: Aesthetic and functional wax mounting made according to the classic rules.

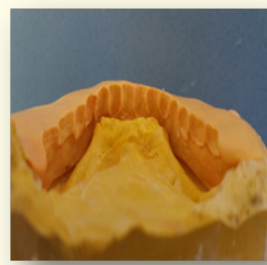


Figure 4: Mandibular labial key.

The realization of a director mounting materializing the prosthetic project will make it possible to

- Validate the aesthetic result
- Realize the vestibular and lingual silicone keys guiding the positioning of the attachments
- Validate the occluso-prosthetic scheme (bilaterally balanced occlusion)

Therapeutic steps

Pre-prosthetic phases

Hermetic endodontic treatment was performed to the 33 and the 43.

Prosthetic phases

Coronal and root preparations of teeth: The crown was first cut to about 2mm of the gingival level. Occlusal preparation of roots presented a plateau that follows the profile of the gingival scallop. The cervical margin of the preparation was a juxta-gingival peripheral chamfer with weak convergence of the walls. The housing for cylindrical-conical pin that respects the root anatomy was prepared; this housing must maintain apical sealing with a minimum of 3 to 5 millimeter (Figure 5).



Figure 5: Peripheral chamfer preparation of 1,5mm

The occlusal design of the cervical plate was prepared according to Richmond recommendations: the buccal wall is beveled while the palatal wall is straight. The buccal wall has a notch, which prevents the rotation of the cope (Figure 6).

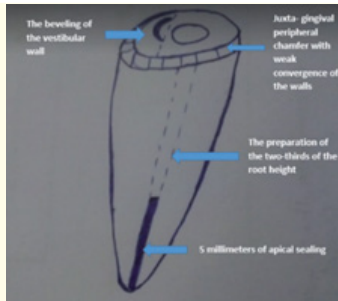


Figure 6: The richmond cervical.

Full impressions of the preparations and of the bone mucosa support surfaces were made with individual trays (elaborated on models from the primary impression) and a medium viscosity polyether (Figure 7-9).



Figure 7: Secondary mandibular impression with impression of prepared root canal.



Figure 8: Axial ball attachment CEKA.

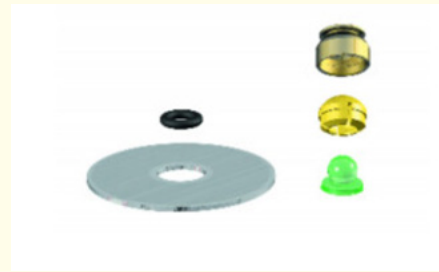


Figure 9: Preci ball PC #1205 Female part in titanium and male part in burnout plastic.

The fixing of the male part of the axial attachment on sub-root coping is made in the laboratory, throughs pacific instruments mounted on the dental surveyor (Figure 10). The validation of the attachment choice and position was done using the fabricated silicone key (Figure 11).



Figure 10: Fixing of the male parts of axial attachments on wax patterns of the root posts copes.



Figure 11: Spacing control between the axial attachments and the mandibular teeth profile.

The ball position is chosen so as not to interfere with the teeth from one side and the space allocated to the tongue from other side (Figure 12).



Figure 12: The ball position is chosen so as not to interfere with the teeth from one side and the space allocated to the tongue from other side.

The obtained wax model was set into the cylinder and we proceed to the casting, and then metallic sub-root coping was validated in the mouth (Figure 13).



Figure 13: Clinical trying of the post copes surmounted by attachments, precision control and marginal adaptation of the edges.

The resin of the prosthesis was cured, the copings fitted with attachments sealed on dental roots and the complete removable prosthetics are integrated in the mouth. During this step, the intrados of the mandibular denture was recessed in front to the attachments. Occlusion is controlled and equilibration is carried out (Figure 14-16).

The spacers were in place and the female parts of attachments was integrated in the prosthetic intrados using chemical curing resin under occlusal pressure (Figure 17).



Figure 14: Placing spacing rings and female parts of axial attachments.



Figure 15: Final view.



Figure 16: The female part of the attachments were incorporated into the mandibular denture intra back.

Maintenance and prosthetic follow-up

Prosthetic success in the medium and long term is closely linked to the Control and maintaining rigorous hygiene, [6] and dento-periodontal-prosthetic maintenance sessions are carried out at 1 week after placement of the prosthesis, then at 1 month and then every 6 months for 2 years and then once a year.



Figure 17: Satisfied patient.

Discussion

The participation of dental roots to the second retention of the complete mandible prosthesis improves patient comfort.

In our clinical case, we chose axial ball attachment instead of the conjunction bar, because the patient had macroglossia, the bar will be more cumbersome.

Several authors have underlined the advantages of using complementary means of retention (roots or implants) as an alternative to the conventional complete prosthesis, essentially represented by the conservation of bone volume by opposing the phenomena of resorption, a good masticatory efficiency and a better psychological integration of the complete removable prosthesis [1].

The alveolar bone with its overlying mucosa will never be intended to receive the full force of a complete denture. Thus, the major problem with complete dentures is the constant and rapid loss of alveolar bone [5]. This resorptive process referred to as reduction of residual ridges varies among individuals and is a chronic progressive, irreversible disabling disease [8]. Almost 1.63mm of resorption in conventional denture wearers in 5 year period has been reported. This remodeling of the bone results in insufficient retention, stability and support. Excessive amounts of resorption leads to excessive ridge atrophy leading to problems with appearance, habituation of denture, psychological and economical effects. The application of Overdentures has proved to result in less alveolar bone resorption in contrast to complete dentures [4].

However, the long-term therapeutic success of this restoration depends on many factors, including mastery of the technique, the appropriate choice of retention means and quality of occlusion. The prognosis, on the other hand, remains dependent on the patient's oral hygiene and the quality of maintenance during periodic check-ups at the dental office [6].

Conclusion

Loss of teeth have bad impact in patients' health and appearance. Partially edentulous patient have problem with proper retention and stability, to overcome these problem with cost effective solution by using different type of attachments.

The pre-prosthetic study, especially for the evaluation of the prosthetic space, is essential for the success of the prosthetic project.

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