

# The Choice of the Retention System in an Overdenture



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Fig. 1 — Diagnostic wax set-up to evaluate aesthetic and prosthesis. The diagnostic wax set-up facilitates to get a temporary prosthesis and / or a radiographic template.



Fig. 2 — Radiographic template with 7% and 14% mix of barium on the flanges for the CBCT examination, to determine the number and placement of the implants.



Fig. 3 — Lower surgical template made of certified plastic material for dental use. Some sleeves in a special polymer are inserted in the template that will guide the burs for osteotomy and the implant into position.

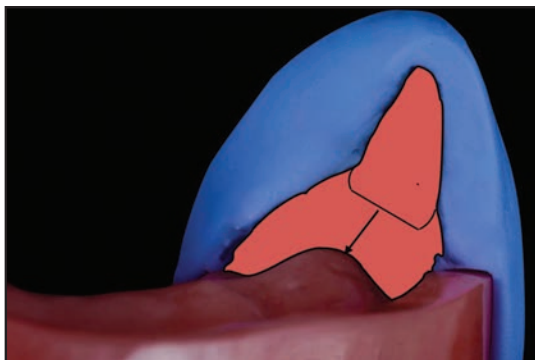


Fig. 4 — The silicone masks are used to evaluate the distance between the teeth base and the bone ridge to choose the best prosthetic solution. If the distance is short an implant fixed prosthesis can be done; if not, an implant retained removable prosthesis will be a better solution.



Fig. 5 — Low profile abutments positioned in the mandibular arch, allow a gain of prosthetic space for aesthetics but are potentially a rigid connection.



Fig. 6 — Wearing of a low-profile abutment as a result of incorrect insertion axis causing excessive prosthetic divergence; this will result in premature wear of the attachments and a poor denture's retention overloading the implant.



Fig. 7 — Low profile abutment that caused the implant loss

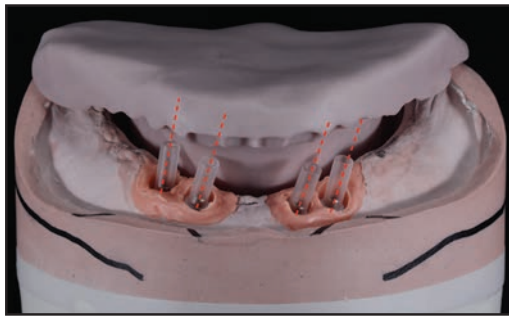


Fig. 8 — Severe divergence between the implants, will create difficulties for the insertion of the bar; it is advisable to reverse the hex from internal to external with the prosthetic components.

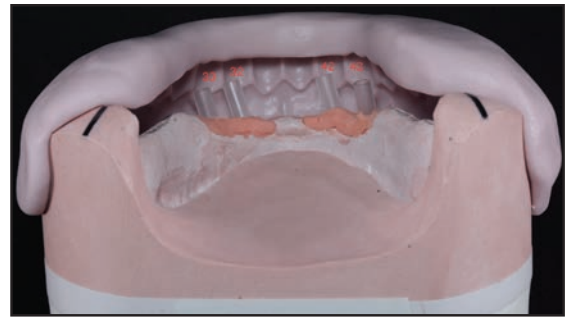


Fig. 9 — 4 Implants from canines to canine region.



Fig. 10 — Spherical abutments are preferable in cases when implant disparallelism is severe or when the implants are positioned in the anterior region.



Fig. 11 — Detail of the prosthesis with spherical attachments. Begin with a soft retention and then increase it gradually according to the patient's needs.

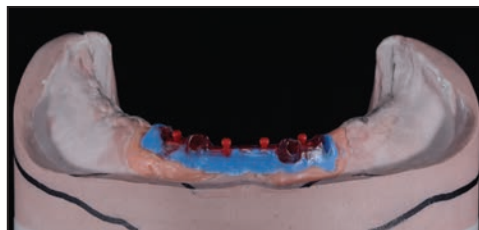


Fig. 12 — Castable bar with spherical retentive component.



Fig. 13 — Over the bar a layer of hydraulic Teflon is applied to create a calibrated tolerance and positioned on the castable housings for the retentive caps.



Fig. 14 — Milled bar with Ot Equator attachments.



Fig. 15 — Detail of the prosthesis with metal counterpart and retentive soft caps (retention 1.2 Kg.).



Fig. 16 — The spherical attachments allow the tilting of the prosthesis so to follow the resilience of the soft tissues. Recommended for the retention of the lower dentures.

## Introduction

A project of an overdenture on implants should borrow the knowledge of three different rehabilitation disciplines: the full dentures, the partial dentures and the overdenture on natural teeth.

While in the latter case it is impossible to decide the position of the retentive residual elements, in implant prosthesis, through a project, we could determine where to place the implants strategically. The junction ring between the implant supported and the mucosa-supported dentures, is represented by the diagnostic teeth set-up (Fig. 1) that evaluation of aesthetics and the overall dimensions; it can be duplicated into a radiographic and possibly surgical template (Fig. 2 - 3), and it will help the clinician and technician to evaluate the available spaces with



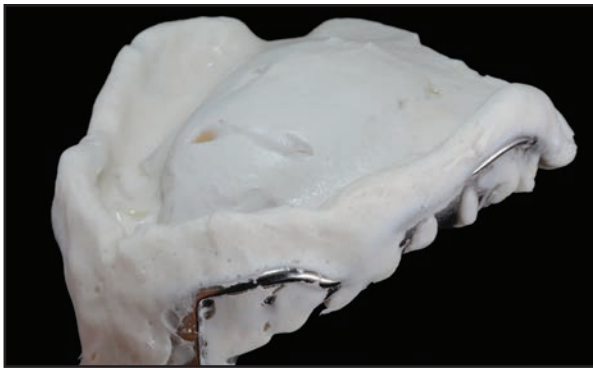


Fig. 17 — Preliminary upper impression.



Fig. 18 — Preliminary lower impression.



Fig. 19 — Upper preliminary model, for the case's study.



Fig. 20 — Lower preliminary model (third grade plaster), for the case's study.



Fig. 21 — The old photographs are an important aspect to evaluate tooth position and shape.

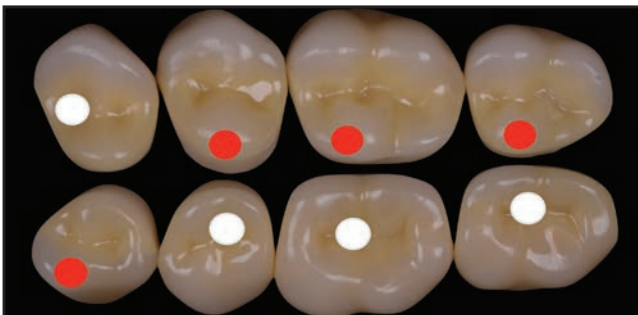


Fig. 22 — The lingualized occlusion, theorises a cusp-fossae tooth relationship. Prof. Gerber theorized the stamp cusp of the lower teeth occludes in the fossae of the upper antagonist.



Fig. 23 — Frontal view of the waxed prosthesis, ready for the mouth try-in.



Fig. 24



Fig. 25

Fig. 24-25 — Sagittal view of the waxed prosthesis.



Fig. 26



Fig. 27



Fig. 28

Fig. 26-28 — Details of the resin-cured prosthesis



Fig. 29 — The Sphero Block abutments replace the locators for a better function of the lower denture.



Fig. 30 — The prostheses in the mouth.



Fig. 31



Fig. 32

Fig. 31-32 — The smile of the patient and the aesthetics of the prosthesis.



Fig. 33 — Diagnostic wax set-up ready for the try-in, frontal view; it will allow the patient to evaluate the aesthetics and prosthetic dimensions.



Fig. 34



Fig. 35

Fig. 34-35 — Sagittal view of the wax set-up, 37-mesially inclined and extruded teeth suggest the extraction of the dental element.



Fig. 36 — After the try-in test the patient accepts the aesthetic result and the diagnostic resin denture were produced.



Fig. 37



Fig. 38

Fig. 37-38 — Sagittal view of the prostheses, the tooth 37 was extracted and the third premolar replaced with a molar.





Fig. 39 — The diagnostic wax is duplicated with a transparent resin to make the radiographic template. Some radiopaque points are strategically placed by the clinician.



Fig. 40 — Once the implants inserted, the radiographic template is used as an impression tray.



Fig. 41



Fig. 42



Fig. 43

Fig. 41-43 — Details of the master model with the analogues and the removable silicone mask.



Fig. 44 — Analysis of the ridge on the sagittal plane.



Fig. 45 — Side-view of the wax denture.



Fig. 46 — Front-view of the wax denture.



Fig. 47 — Silicone mask.



Fig. 48 — With the teeth positioned in the mask for the remounting, the possible interference and spaces are evaluated.



Fig. 49 — Polished milled bar, positioned on the model.

appropriate silicone masks (Fig.4), to select a suitable prosthetic solution.

### First case:

A full denture, with four low-profile attachments, two in the maxillary arch and two in the mandibular arch (Fig. 5); the patient complains about a general instability of the lower denture and is dissatisfied with the aesthetic result, claiming that the prosthesis is unnatural, because it doesn't reflect the original natural teeth alignment.

The choice of a rigid attachment on the two implants prevents the physiological tilting movement of the prosthesis around the attachment. The immediate consequence is the early wear of the retentive cap and of the abutment (Fig. 6); the risk in the longer term, will be the loss of the implants due to an overload stress, as happened in Fig. 7, there is noticeable wearing of the abutment's platform. The choice of a low profile abutment, in our opinion, is unfavorable in cases with a number of implants less than 4.

We prefer in these cases a prosthetic solution that best exploits the resilience of the soft tissues: the spherical abutments (Fig. 10 - 11), or if implant splinting is preferred, a bar with spherical retention and a counter bar with an appropriate tolerance is advisable (Fig. 12 - 13).

In cases with four implants, where the two distal implants are in a position between the premolars, a purely implant supported removable prosthesis is a possible solution (Fig. 14 - 15).

In this case, it was decided to replace only the two low profile abutments with two spherical attachments in the lower jaw (Fig. 16), and to let the two locator in the maxillae to avoid additional costs; nevertheless, both dentures were redone to improve the aesthetics.

As usual, two preliminary impressions were taken to make the models for the individual trays for the master casts to be mounted on the articulator (Fig. 17 - 20). For the shape and positioning of the front teeth, an old picture was used in order to reproduce the original natural tooth morphology (Fig. 21). For the posterior occlusion, a lingualized tooth positioning of the tooth with the cusp-fossae relationship reversed in the fourth teeth was planned (Fig. 22). The two wax set-ups (Fig. 23 - 25) were tried in the mouth, and were finalized following the protocol (Fig. 26 - 32).

### Second case:

The clinical case is related to a patient woman, relatively young but edentulous.

This patient has refused to document her treatment plan with some figures, but for a better understanding of the case, we prefer to describe the starting situation.

Ms. D.F. with U/L removable dentures is dissatisfied with the aesthetics and complains about the instability of both dentures; further more trying to achieve a

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Fig. 50 — On the bar are placed two Ot Equator attachments in occlusal position.



Fig. 51 — Threaded Ot Equator to be cemented into the bars.

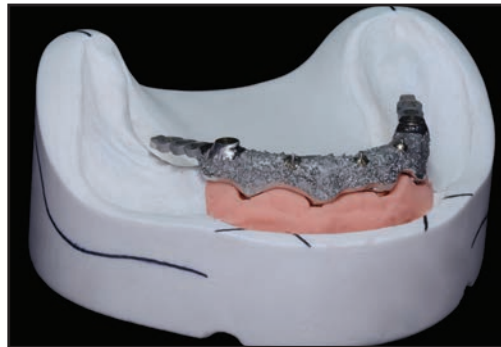


Fig. 52 — Counterpart in cobalt chromium.



Fig. 53 — The prosthetic spaces are verified with the bar and the counterpart positioned on the model.

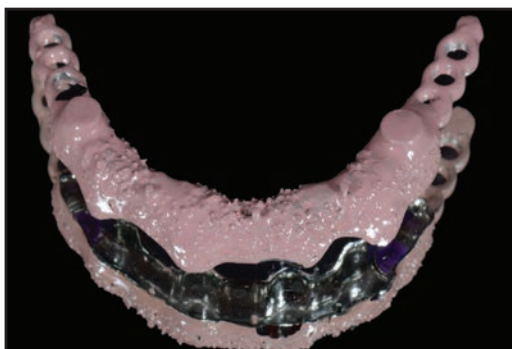


Fig. 54 — The counterpart is treated with opaque pink.

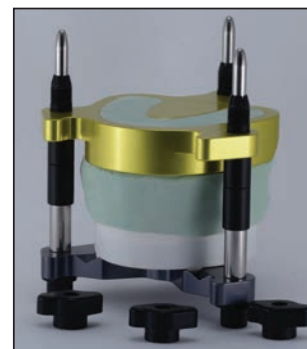


Fig. 55 — Curing flasks with suitable silicones for the curing of the resin.



Fig. 56 — Lower prosthesis cured and characterized with stains.



Fig. 57 — Detail of the metal counterpart and of the purple caps (retention 2.7 kg)



Fig. 58



Fig. 59



Fig. 60



Fig. 61

Fig. 58-59 — Full upper mucosa-supported denture, lower prosthesis screwed on implants.

Fig. 60-61 — Screwed prosthesis on Ot Equator abutments, with the Elastic Seeger system.



better stability she uses adhesive creams and demands a fixed restoration on implants but has limited financial resources.

The case begins with the prosthetic wax-up (Fig. 33 - 35), which allows the patient and the prosthetic team to make the necessary considerations regarding the aesthetics and the dimensions of the future prosthesis.

After receiving the patient's consent, the remaining teeth are extracted; the diagnostic wax is turned into a temporary prosthesis (Fig. 36, 37 and 38). The new denture is duplicated with a transparent resin (Fig. 39) and provided with the appropriate radiopaque points to facilitate radiographic examination which will allow the clinician to establish the number and the position of the implants.

Ms. D.F. reports to be satisfied with the diagnostic removable dentures; she claims good aesthetics and particularly the stability of the upper denture is optimal; on the contrary, she would like to improve the retention of the lower denture.

Therefore, in agreement with the clinical and the patient, it was decided to stabilize the new removable prosthesis, with four implants and a bar. After the osseointegration, four abutments, to convert the internal connection into external, were screwed in the implant.

The lower radiographic template is used tray as a transfer for the registered maxillary relations; to obtain this the clinician blocks the impression abutments with a resin (low expansion coefficient, and relined with a polysulfide impression material) (Fig. 40).

At this stage with all the information stored in the radiographic template, we can transfer the new models directly on the articulator (Fig. 41 - 44).


The teeth set-up was duplicated in wax (Fig. 45- 47) and with the silicone mask; all the available spaces for the bar can be correctly evaluated without interference with the aesthetics (Fig. 48).

Two equator attachments were screwed into the bar (Fig. 49 - 51), and were rechecked with silicone masks (Fig. 52 - 53).

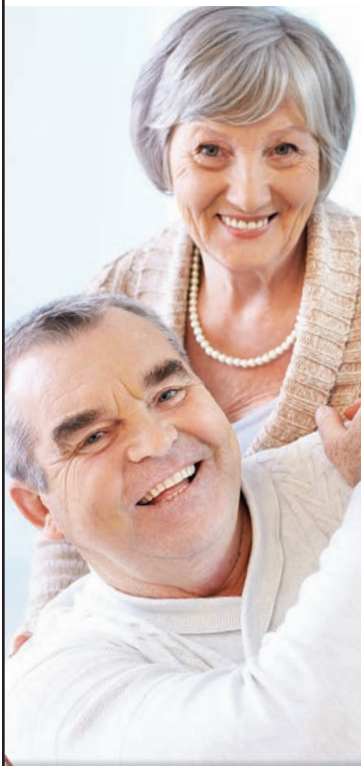
The counterpart was treated with opaque (Fig. 54) and set for the curing (Fig. 55). The resin is individualized with stains as to obtain a more natural result of the prosthetic flange (Fig. 56, 57).

(Fig. 58 - 61) depict the final prosthesis of the patient with enhanced stability.

## Conclusion:

The removable overdenture is a viable alternative to the implant fixed prosthesis. It allows the patients an easier daily self-cleaning, an easier access to the implants for the clinician and is cost effective. It also offers the advantage of quicker maintenance like the relining or the fixing in case of troubles. From aesthetic point of view, the removable overdenture allows an adequate support of the lip musculature. 

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