TELESCOPING IMPLANT PROTHESES WITH GALVANO MesoSTRUCTURES
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Abstract: This article will describe the technique for the fabrication of the telescoping implant prostheses with a very precise fit, achieved by luting intraorally the galvano mesostructures. The main result is the strain reduction, similar to the cemented fixed prostheses (12, 21). By the use of galvano-telescopic copings, the advantages of retrievability can be combined with the improved fit of a cemented superstructure. The telescopic system permits simple retrievability for peri-implant hygiene, and repair procedures, if necessary. The precision of implant superstructures is determined by the entire clinical and laboratory fabrication process. Errors may occur during the impression making, fabrication of the definitive cast, casting of the framework and ceramic veneering (14). Also, after extended edentulous periods, the replacement of hard and soft tissues is often necessary for esthetic or phonetic reasons. To compensate for the resorptive processes of the maxilla, a buccal flange may be required for adequate support of the lips and the facial profile. In these situations, a removable prosthesis may be given preference over a cemented fixed prosthesis or a screw retained prosthesis.

Key words: telescopic implant prostheses, galvano-telescopic copings.

INTRODUCTION
Dental implants are made to be placed in the jaw bones to give prosthetic restorations stability and retention. The passive-fit of the implant superstructures is a prerequisite for the dental implant prostheses (2, 9). The lack of fitting of the frameworks to the implant abutments generates stress in two directions: in the superstructures (ceramic fissure) and connections (loosening and fractures of the screws) (1) and on the other hand it compromises the implant/bone interface with the result of bone loss and eventually implant failure. Because of the discrepancies of the screw-retained restorations, cementation of implant frameworks has been brought forward. However, the cement-retained prostheses have also disadvantages, including the lack of retrievability in case of the implant failure.

MATERIAL AND METHOD
Altough telescoping restorations was first proposed americans (18) the application of galvano-electroforming for telescoping units is primarily described in the German language literature. The galvano process is an electro-deposition of metal ions of an electrolyte solution to a negatively charged cathode, resulting in a pure metal structure on the cathode surface. It was introduced in the early 1960s for the fabrication of inlays and onlays. Only after the development of automatic systems with cyanid-free gold-sulfide baths could the electro-forming procedure be used in clinical practice (6, 21).
The main advantage of the galvanoformed coping is their retention, which is a non-friction one. The retention is an adhesion between the galvano coping and the prosthetic abutment, through the saliva pellicle. If one tries to take the prothesis off the prosthetic field, a vacuum effect is created because the saliva is inextensible and the restoration remains in place. A similar effect is obtained by the full denture’s “suction”. This type of retention is also known as hydraulic retention (3) or adhesive retention (fig.1). This kind of hydraulic retention can be obtained only when the fitting of the two structures (the galvano coping and the prosthetic abutment of the implant) is very precise and the marginal fit is between 20-30 μm.

**Fig. 1. Hydraulic retention**

**TECHNIQUE**

A number of 3 edentulos patients were rehabilitated using this technology (2 males and 1 female with ages between 49 and 60 years) – Table 1.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Diagnostic</th>
<th>Type of restauration</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.I.</td>
<td>54</td>
<td>M</td>
<td>Maxillary subtotal edentation</td>
<td>Partial fixed-removable prosthesis</td>
</tr>
<tr>
<td>P.I.</td>
<td>60</td>
<td>M</td>
<td>Maxillary complete edentation</td>
<td>Fixed-removable restauration</td>
</tr>
<tr>
<td>C.P.</td>
<td>49</td>
<td>F</td>
<td>Mandibulary complete edentation</td>
<td>Fixed-removable restauration</td>
</tr>
</tbody>
</table>

Make the indirect impression after second-stage surgery (Fig.2 a,b). Fabricate a stone cast of the artificial tooth arrangement as a guide for the dimensions of the framework and to preserve the desired position of the artificial teeth. Carve the prosthetic abutments with a 2-degree milling titanium cutter in the planned path of insertion, and place the abutment shoulder at the soft tissue level. (Fig.2 c,d). Fabricate an acrylic resin (Pattern Resin, GC) positioning jig over the completed abutments. Close the base of the abutments and the screw access openings with autopolymerizing acrylic resin (Pattern Resin, GC) and connect the abutments to an insulated wire (AGC Contact rod, Wieland). Carefully apply a thin layer of silver conductor (AGC Electroforming System, Wieland) to the abutments and the acrylic resin of the screw openings. Perform the electroforming process in the galvanobath. Create copings with a thickness of 0.3 mm (Fig. 2 e).

Detach the galvano copings from the abutments and remove the silver connector with 25% nitric acid. Position the abutments and the galvano copings on the working cast and number the copings (Fig.2 f).

Fabricate the frame for the prosthesis from a rigid nonprecious cobalt-chromium alloy. Allow enough space (approximately
0.1 mm) between framework and galvano copings for passive fit and the luting agent. Verify the clearance between the framework and the galvano copings.(Fig.2 g).Silanize (Rocatec, 3M ESPE) the framework and copings to prepare for intraoral luting. Attach the abutments to the implants by using the acrylic resin positioning jigs to verify the abutment position. Torque the abutments afterwards as recommended by the manufacturer. Place the galvano secondary copings intraorally and verify the passive fit of the tertiary framework. Bond the secondary copings intraorally to the framework with composite resin (AGC Cem; Wieland). Verify the final wax arrangement on the cast (Fig.2 h) and intraorally. Complete the acrylic resin portions of the denture with auto-polymerizing polymer. Finish and polish the prostheses in the conventional way. (Fig.2 i) Attach and torque the abutments to the implants as previously described. Cover the abutment screws with a thin layer of white gutta-percha material for retrievability. Place the completed telescoping denture intraorally (Fig. 2 j). Verify esthetics, function, and appropriate retention. Instruct the patient on the use and maintenance of the prostheses.
RESULTS
The described technique permits the fabrication of a retrievable implant-supported denture with a passive fit comparable to cemented restorations. Retrievability allows simple repairs and modifications of the acrylic resin dentures and easy access for periimplant hygiene. The telescopic design with intraoral luted galvano copings provides excellent prosthesis retention and stability. All the patients were pleased with the quality of the restorations which are excellent looking after about one year of use.

DISCUSSIONS
The correlation between misfit of implant-supported prostheses and an increased rate of mechanical failures is established, but the degree of fit accuracy necessary to prevent mechanical complications remains unclear (1). Although cementation of implant prostheses can compensate for fit discrepancies and cemented metal-ceramic prostheses can have esthetics superior to metal-resin dentures, fixed dental prostheses may not be indicated in all situations. The high costs of full arch metal-ceramic restorations are a limitation for many patients. In addition, porcelain failures remain a common problem. Esthetics and durability of adhesive systems for intraoral porcelain repair may not be satisfactory, and the removal and laboratory repair of a cemented metal-ceramic prosthesis is a potentially hazardous and costly procedure.

For patients with extensive residual ridge resorption, replacement of hard and soft tissues with a removable prosthesis may
be considered a more suitable option than a cemented restoration. No screw access openings interfere with occlusal surfaces, improving esthetics and occlusion compared to conventional screw-retained prostheses. The thin galvano copings allow adequate space to be completely covered with the framework, which in association with the silanization procedure allows a durable connection.

Although telescoping using galvanoformed copings is relatively new in implantology it is starting to accumulate implantology because of the major advantages it offers: passive fit, high mechanic resistance, permise for good hygiene and the possibility of numerous adjustments.

CONCLUSIONS
1. With this kind of restorations it is possible to obtain the Passive Fit Adaptation which is a decisive factor for implant supported protheses;
2. The restorations are removable which gives the patients the possibility for very good oral hygiene, the medic possibility to work around the implants and technicians to correct whatever failure may occur
3. We recommend to extend the use of these restorations in our country because of the numerous advantages even though the cost is a little higher.
REFERENCES


