



CEMENT-RETAINED IMPLANT SUPPORTED CROWN: A CASE REPORT

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ABSTRACT

Background Dental implants are considered a successful treatment modality. This treatment may be associated with complications leading to implant failure based on the type of restoration that is being used cement-retained restoration and screw-retained restoration. The choice of whether to screw or cement retain an implant restoration remains one considerable debate amongst dental professionals. The literature is consistent that the successes of both options are very high. Complication rates of both are essentially identical (3-5%). **Objectives:** in this paper, we discuss the advantages and disadvantages of cement-retained and screw-retained restoration, and related one clinical case illustrating the clinical realization of two implant-supported, cement-retained crowns. **Conclusions:** The treatment selection must be based on the significance criteria and the adequacy of the treatment option to the subject condition of the tooth. Therefore, the choice of retention treatment procedures depends upon the clinician who devises evidence-based decisions for selecting an effective treatment method.

KEY-WORDS: *implant, screw-retained, cement-retained, single-tooth restoration.*

1. INTRODUCTION

Missing teeth have conventionally been restored with bridges or removable dentures, however, implant treatment has become more common, implant treatment is superior to conventional prosthetic methods as it enables the dentition to be restored without imposing any additional burden on the supporting teeth [1, 2].

A fixed implant prosthesis can be either:

- Sealed on screwed", i.e. sealed on a screwed implant abutment,
- screw-retained "direct-implant", i.e. screwed directly into the internal thread of the implant,
- Screw-on", i.e. screwed onto a special abutment - called a "conical" or "multi-unit" abutment, which is screwed into the implant [3].

Indeed, the restorative connection may either be cement-retained or screw-retained.

The true prosthodontist's challenge is to choose the way the future prosthesis will be retained; indeed, as each type of implant-supported prosthesis has its benefits and disadvantages; only a good pre-prosthetic study will allow the dentist to choose wisely. The screw-retained restoration is favored due to its ease of irretrievability and lack of cement. The cement-retained restoration is favored due to its aesthetics in situations with angled implants and lower incidence of porcelain failure. There is not one solution applicable to all clinical scenarios and the distinct advantages and disadvantages of each must be taken into consideration in treating the specific case at hand. When properly executed, either restoration can produce a viable and predictable definitive solution for restoring single-unit implants for most situations.

Cemented implant-retained prosthesis:

Cement-retained prosthesis is defined as a restoration cemented to abutments screwed onto the implants. The cement-retained prosthesis can be made by a single or double restoration.

Stages depending on the clinical case and the choice of the implant system.

The single-stage cemented prosthesis is composed of:

- A standard internal tapered titanium abutment, straight or angled, which is screwed or screw-retained;
- A crown with a metal or ceramic framework, whose peripheral limit fits the implant perfectly. The crown is retained by sealing.

The two-stage cemented prosthesis consists of:

- A trans-gingival titanium prosthetic abutment screwed or screw-retained on the implant.
- A crown with a metal or ceramic framework whose peripheral limit fits the implant perfectly to the shoulder of the implant abutment. Crown retention is achieved by sealing [4, 3, 5].

The following clinical case shows the clinical steps of cement-retained crowns.

2. CASE REPORT

The patient F.C. is 50 years old, without any medical or surgical history, however, the patient received conventional orthodontic treatment to create the necessary prosthetic space for the implant-supported restoration of the first two mandibular molars.

At the end of the osseointegration period, 2 cement-retained implant-supported crowns were made on 36 and 46, the following steps are presented to illustrate, step-by-step their management (**Fig 1**).

2.1 Impression technique :

There are various techniques for taking an implant positioning impression. Our impression is obtained using the open tray (direct) method which gives high accuracy.

Errors more often occur with the closed tray (indirect) method during the removal and replacement of the coping, especially in the occluso-gingival direction. However, a limited mouth opening of the patient may be the reason why a clinician is enforced to use a closed tray technique.

An individualized custom made acrylic tray should be customized by cutting out a window over the area of the implant to allow clearance for the transfer. The impression tray should be assessed in the oral cavity to verify that the transfer and its screw protrudes through the tray (**Fig 2**).



Figure 1: The 2 Implants with the healing caps after healing of peri-implant mucosa.

Figure2: Individualized acrylic tray customized by cutting out a window to allow clearance for the transfer.

Setting up the impression transfers :

After unscrewing the healing abutment, transfer suitable for the open-tray impression technique is placed on the implant body and tightened by manual clock-wise rotation using a hand screwdriver. The internal hexagon of the transfer must fit perfectly into the external hexagon of the implant. An intra-oral x-ray should be done to ensure that the mount is properly seated on the implant, incorrect positioning of the impression transfer will jeopardize the entire prosthetic procedure (**Fig3,4**).



Figure 3: The 2 transfers adapted to implants.

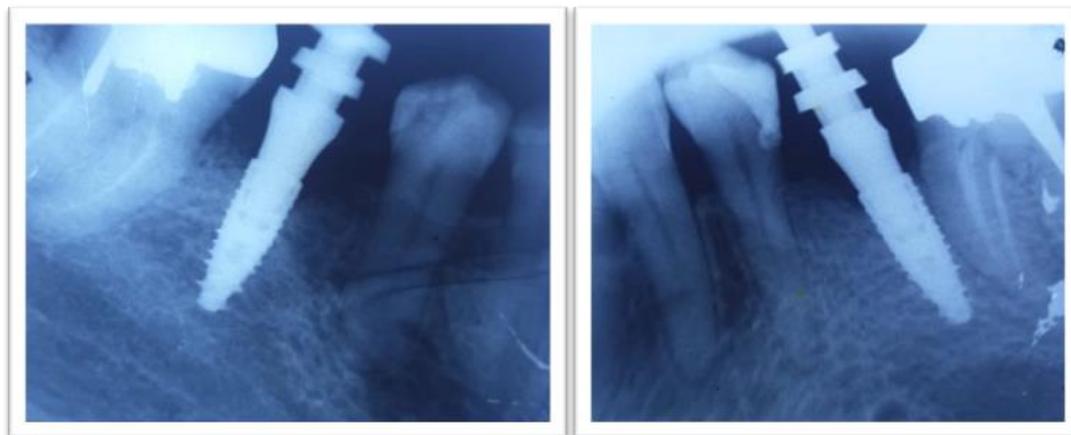


Figure 4: Intra-oral x-ray done to ensure that the transfers is properly seated on the implants.

Impression material application :

A Polyether impression material is syringed around the transfer and loaded in the impression tray then seated directly in the mouth. The excess impression material should be wiped off the screw of the transfer before it sets. Screw thread may be filled with wax or cotton to prevent impression material's adhesion (**Fig5**).



Figure 5: Impression taken with polyether, the transfer remains attached to the impression.

After the impression material sets, the transfer is separated from the implant by un-screwing it. Then the impression tray is removed from the mouth with the remaining transfer secured in the impression. Then the healing abutment is placed back onto the implant to prevent soft tissue collapse till the next visit.

Implant analog :

The analog is mated with the transfer by holding the analog in place while inserting the long screws through the access holes in the impression tray and tightened by the hand screwing.

The analog should be safely and precisely attached to the impression fixture mount. Caution to avoid the over-rotation of the transfer is needed during screwing since any slight movement may distort the impression (**Fig6**).



Figure 6: Impression with the transfer connected to the analog.

At the laboratory, a false gum was injected before the plaster cast. Unscrewing the impression transfers allows the working model to be disinserted.

After casting the impression, the dentist and the dental laboratory technician will select the implant abutments according to the implant diameter and the emerging profile.

The implant-abutment establishes and maintains a stable connection between the implant and the prosthetic restoration.

A standard 15°-angled abutment was chosen for the 46, while a straight one has been chosen for the 36; the main reason is that the two implants have different axes as well as the neighboring teeth. Each abutment has been tried and the good fitting was checked before bite registration, opposing impression, and shade of the restoration which was registered and sent to the dental laboratory (**Fig7,8**).

The final prosthetic procedure for metal-ceramic single crowns is carried out conventionally, after trying in the metal framework, mounting the ceramic, trying of unglazed ceramic, glazing and finishing the ceramic, the crown is cemented (Temp Bond, Kerr) to the implant abutment after the access hole has been closed with gutta-percha (**Fig 9,10**).

An important step at this point was to control the marginal adaptation of the crown radiographically and the occlusal control with articulating paper (**Fig 11-13**). There is a high risk of leaving excess cement in the subgingival area: it must be eliminated, otherwise, there is a risk of peri-implantitis.



Figure 7: Occlusal control of abutments position on 36 and 46 site.



Figure 8: Prosthetic space control for the metal-ceramic crown.

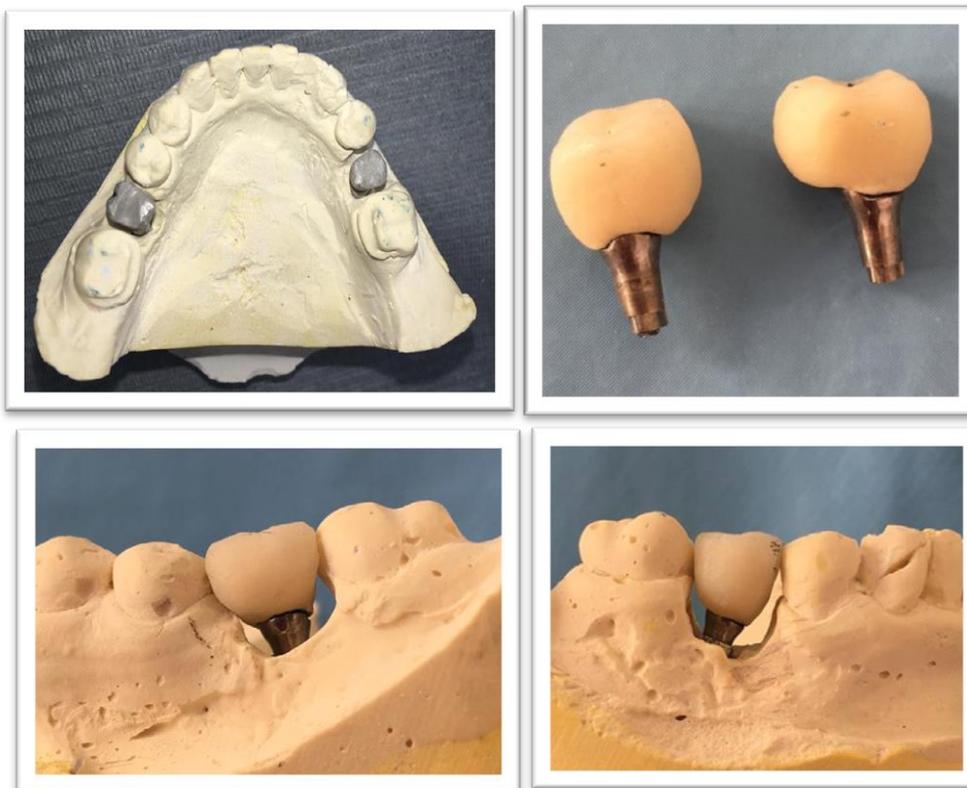


Figure 9: Crown fabrication according to the conventional process of a cement-retained prosthesis.



Figure 10: Fitting of both crowns 36,46 in the mouth.

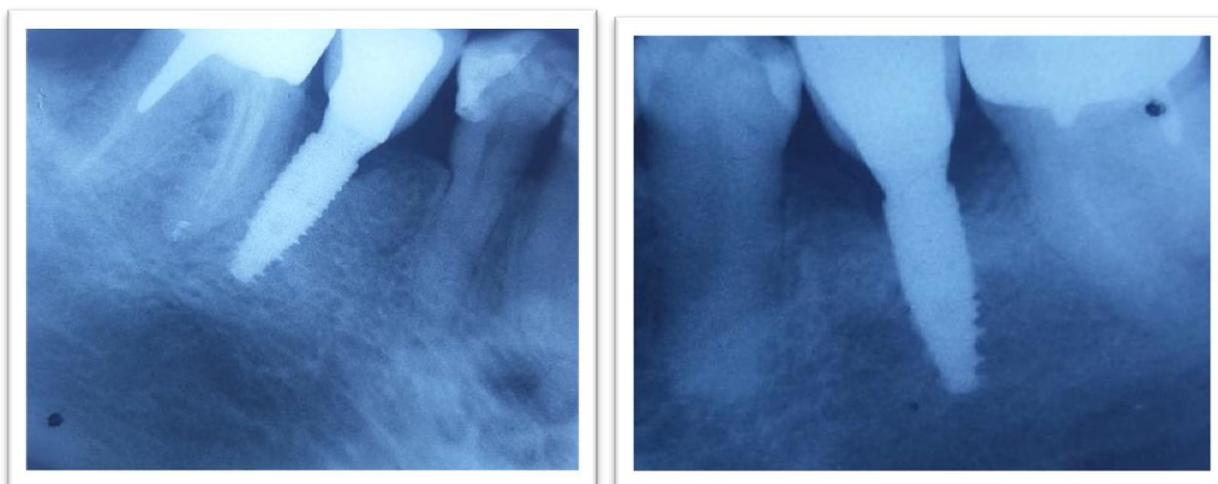


Figure 11: Radiographic check showing a good fit of the crowns on the implant abutments



Figure 12: Occlusal control with articulating paper.



Figure 13: Occlusal control.

3. DISCUSSION

The connection's selection to be used for final restoration for implanting through screw-retained abutment is an important decision concerning implant prosthodontics. The restorative connection may either be cement-retained or screw-retained [6].

Al-Fahd et al., (2015) showed conflicting results concerning the implant reconstruction using a screw and cement-based restorations [7]. Similarly, a systematic study of Sailer et al., (2012) showed that cement dental implant poses severe biological complications, which contradicts the results of de Brandao et al., (20139) which revealed no difference between the two types of implants [8,9].

The review of the two-implant reconstruction method shows that each dental implant treatment has its advantages and disadvantages [6]. The increasing popularity of cement-retained implant restorations is due to several factors, as follows. The process of delivering a cement-retained restoration is familiar to clinicians; superficially, it seems no different than cementing a restoration on a natural tooth. Cemented implant crowns have shown significantly less porcelain failure (4%) compared to screw-retained (38%) at 5 years. Abutment screw loosening is 6 times lower and Crown loss is 3 times lower with cemented, single-unit implant crowns, cement-retained implant restorations had other important benefits including :aesthetics, accuracy of connection-abutment fit, respect of the occlusal anatomy, easier occlusal balancing, anatomical emergence profile, large-diameter abutment-implant connecting screw: fracture resistance, simple fabrication of temporary prosthetic elements and possibility of correcting divergent implant axes [9-10-6-11].

The disadvantages are significantly less than those of the screw-retained prosthesis, essentially the loss of the "alarm signal" that the gold screw in a screw-retained prosthesis may represent; the cement sealer, during crown placement, may irritate the peri-implant mucosa in case of fusion or incomplete removal in the soft tissues and need for sufficient prosthetic height available:

- If the abutment screw is unscrewed, it may be necessary to cut the crown despite the use of temporary cement;
- The maintenance is difficult to perform if it hasn't been anticipated previously.

On the other hand, the screw-retained prosthesis allows easy and risk-free disassembly ; this method of fixation was for a long time in the majority of cases at a time when unscrewing was much more frequent than today. It Avoids the risks of sealing ; no cement overflows in subgingival, responsible for peri-implantitis, easy insertion and control, excellent esthetic results of the units in the anterior areas and can be indicated in the presence of a reduced prosthetic space [4,3-12].

For disadvantages of this option, the literature has reported the mechanical weakness of the screw connection of the prosthetic element in the abutment ; reduced resistance to screw fracture.*

If the access port is occlusal : questionable occlusal morphology; risk of interference when adjusting the occlusion, and fracture of the cosmetic element; unattractive appearance even if the well is masked by a composite, ceramic splinter, wear of the screw head making it difficult or impossible to unscrew it.

A recent Meta-Analysis concluded that cemented reconstructions exhibited more biological complications (implant loss, bone loss > 2 mm) and screw-retained prostheses exhibited more technical problems. Clinical outcomes were influenced by both fixations in different ways [6-13, 14].

5. CONCLUSION

The treatment selection must be based on the significance criteria and the adequacy of the treatment option to the subject condition of the tooth. Therefore, the choice of retention treatment procedures depends upon the clinician who devises evidence-based decisions for selecting an effective treatment method.

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