Retrofitting a Cast Dowel-Core on Salvaged Dental Implants

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Dental implant screw fracture involves attempting to retrieve the screw fragment or, as an alternative, attempting to salvage the dental implant. Circumstances that do not allow for screw retrieval require a solution in which the internal configuration of the dental implant can provide for a custom direct dowel fabrication. The proposed technique is to retrofit the fabrication of a custom cast dowel-core and provisional use of a direct procedure, which provides accuracy of fit, retention, and ease of production.

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IN IMPLANT prosthodontics, there are occurrences of screw loosening[1] and fracture[2] (Fig 1). If at all possible, it is beneficial to salvage the dental implant that has a fractured screw. There are methods advocated to recover the remaining fractured screw from the implant.[3]

It may be possible to retrieve the screw without damaging the internal retaining walls of the implant. If the screw cannot be recovered, or if the implant's screw threads have been damaged, it is possible to directly fabricate a dowel core into the implant. This technique would produce a less than satisfactory fit between the dowel core and the implant. There is nothing in the literature suggesting this method. This article discusses a technique that produces an accurate cast dowel core that is retrofitted into a salvaged dental implant.

Technique

1. Remove the fractured screw segment from the interior of the implant using sequentially No. 2 and No. 4 friction-grip carbide burs (Brassler USA, Savannah, GA). Smooth and taper the implant screw hole walls using round-ended, tapered, 8-mm-head-length diamond and carbide burs (Brassler USA) (Fig 2) with copious water spray. It is our intention to use all of the screw space and beyond its depth to ensure the longest and widest dowel space.
2. Select and fit a tapered plastic burn-out post (Metalor Technologies, U.S.A. Corp., N. Attleboro, MA) into the prepared interior of the dental implant. The end of the post is cut off at the length that accommodates a proper fit to the walls of the internal surface of the implant. The hexed gold collar[4] from a gold collar-waxing sleeve (Nobel Biocare, Inc., Yorba Linda, CA), appropriate to the size of the implant, is placed over the plastic post (Fig 3).
3. Adapt autopolymerizing acrylic resin (G.C. America, Clawson, MI) to the gold collar and the plastic post. The resin is adapted using a paintbrush technique. After the resin has polymerized, the post-collar pattern is removed from the implant. The resin portion of the core buildup is completed, ground, and finished to the appropriate length, width, and contour. The fabricated pattern is invested, cast, and finished using traditional techniques. The dowel-core pattern is cast in a nonprecious alloy (Fig 4). A retrofitted provisional dowel crown can be fabricated in a similar manner utilizing a tapered steel post (Metalor Technologies, U.S.A. Corp.) and a hexed gold collar from a

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Figure 1. Nonretrievable fractured screw in clinical dental implant.

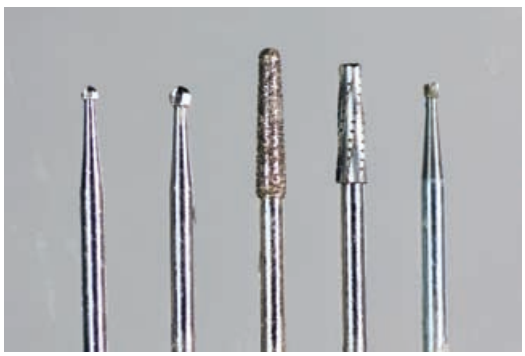

Figure 2. Armamentarium for clinical dowel space preparation.

Figure 3. Component materials for provisional resin dowel crown and cast dowel-core.

Figure 4. Cast dowel-core.

Figure 5. Resin provisional dowel crown.

gold collar-waxing sleeve (Nobel Biocare, Inc.) approximately the size of the implant (Figs 3 and 5).

4. Serrate the dowel surface walls with an inverted cone bur and air abrade to increase retention for cementation.
5. The resin-retrofitted gold collar steel dowel resin provisional crown is cemented into the dental implant, using a temporary cement (Fig 6).
6. Cement the dowel-core into the dental implant using a resin-composite luting system[5] (Fig 7).

After final cementation of the cast dowel-core, conventional prosthodontic procedures are accomplished to produce crown restoration (Fig 8).

Figure 6. Resin provisional dowel crown clinical placement.

Figure 7. Cast dowel-core clinical placement.

Figure 8. Final crown restoration clinical placement.

Summary

The proposed technique to retrofit a cast dowel-core and a provisional dowel crown provides ease of fabrication and accuracy of fit. It allows the maintenance of a salvaged dental implant, which would otherwise have to be surgically removed and replaced.

References

1. Haack JE, Sakaguchi RL, Sun T, et al: Elongation and preload stress in dental implant abutment screws. Int J Oral Maxillofac Implants 1995;10:529-536
2. Goodacre CJ, Kan JY, Rungcharassaeng K: Clinical complications of osseointegrated implants. J Prosthet Dent 1999;81:537-552
3. Williamson RT, Robinson FG: Retrieval technique for fractured implant screws. J Prosthet Dent 2001;86:549-550
4. Weinberg LA, Kruger B: Clinical utilization of non-rotational capability in osseointegrated prostheses: A case report. Int J Oral Maxillofac Implants 1994;9:326-332
5. Yoshida K, Tanagawa M, Atsuta M: In-vitro solubility of three types of resin and conventional luting cements. J Oral Rehabil 1998;25:285-291