Screw-retained, implant-supported fix partial denture (FPD)

By Michael Nawrocki, DMD, MD, MS, and Dov M. Almog, DMD

A screw-retained implant-supported fixed partial denture (FPD) has certain physical advantages. However, according to several studies they require precise positioning of the implant for optimal location of the screw access hole. Also, obtaining passivity of frameworks that are screw-retained is difficult due to dimensional discrepancies inherent in the fabrication process.\(^1\) \(^2\) \(^3\) \(^4\)

Anchorage of prosthetic fixed partial dentures to implants can be achieved in two ways: some clinicians cement the prosthetic construction to implant abutment, while others suggest that screw retention is preferable. Screw-retained implant restorations have an advantage of predictable retention and retrievability, and the lack of potentially retained excessive sub-gingival cement.

On the other hand, a few disadvantages exist: obtaining passivity of screw-retained framework is difficult due to dimensional discrepancies inherent in the fabrication process. Screw-retained units generally have screw access openings, which can compromise esthetics, weaken the porcelain around the openings and at cusp tips, and establish unstable occlusal contacts.

Cementation of implant restorations eliminates unesthetic screw access holes. Cemented restorations also have the potential to compensate for any minor dimensional discrepancies in the fit of restorations to abutments, which can contribute to a lack of passivity.

It has the potential to reduce stress to splinted implants because the effects of minor misfit of the framework are not transferred directly to the implants, as is the case with prosthesis-retaining screws. In addition, the exposure of screw access holes in esthetic areas of the mouth can be avoided. On the other hand, any excess retained cement extruding from the prosthesis/abutment interface, especially when located sub-gingivally, can cause inflammation, infection and periodontal complications.

As more and more dental practitioners are focusing on implant-supported fixed partial dentures, restoring dentists need to understand the restorative options they may have. Many dental practitioners and dental labs will persistently use a screw-retained implant-supported fixed partial denture, and thereby promote choices that offer the utmost in serviceability, cosmetic result and maintenance of optimized bite possible.\(^1\) \(^2\) \(^3\)

At the same time, in recent years, the utilization of adjunctive state-of-the-art cone-beam CT and technologies and 3-D derived virtual planning software solutions altered the manner in which we pulled together diagnostic data, planned and executed both simple and complex implant cases.
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Ethics and Legal Aspects conference planned for February

The third Annual Ethics and Legal Aspects of Dentistry Conference sponsored by the American College of Legal Medicine will be held Feb. 25 and 26, at the Planet Hollywood Resort in Las Vegas. Seminars will include legal issues in dentistry and understanding the government’s role and the role of dental education, describe ethical, moral and diagnostic issues as they relate to the dental practice, evaluate risk management considerations, identify issues relating to patient care, learn more about mid-level care, issues around access to care and dental health care coverage, electronic record keeping and more.

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As a result, more and more implant trajectories are consistent with the planned prosthetic trajectories. Yet, some cases are still driven by the residual bone trajectories and are left to the restoring dentists’ decision as far as the final restorative option.

In other words, when the implant trajectories are inconsistent with the planned prosthetic trajectories, the screw-retained implant-supported fixed partial denture systems offer an opportunity to minimize any controversy between the surgeons, restorative dentists and the labs, creating greater understanding, appreciation and professional camaraderie.

Case report
Patient presented for implant-supported FPD after having teeth #8, 9 and 10 extracted with socket preservation. A CBCT study was performed with the iCAT CBCT machine (Imaging Sciences International, Hatfield, Pa.) and revealed reasonable alveolar dimensions, both vertical and horizontal.

However, by utilizing ImplantMaster™ software (Dent Imaging Inc., Foster City, Calif.), it was discovered that the residual bone trajectory and the planned prosthetic trajectory were in conflict, that is, projecting a compromised restorative trajectory lingually in implant site #9 and buccally in implant site #11 (Fig. 1).

Nevertheless, following a treatment planning conference, rather than considering bone grafting, a decision was made to proceed with these angulations and a 3-D reconstruction of the patient's anatomy was attained and a virtual surgical guidance template was designed and computer-manufactured with precise drilling holes' distribution and trajectory for implants #9 & 11.

The palatal trajectory of the implant in tooth position #9, the patient's deep bite which resulted in severely limited space for prosthetic components, dictated a screw-retained prosthetic FPD construction solution for the case.

The extremely buccal angulation of the implant replacing tooth #11 resulted in a buccally located screw access opening, which compromised esthetics and potentially weakened the porcelain around the screw opening in the proposed screw-retained three-unit FPD. The esthetic dilemma could be solved by either gold plating of the metal portion of the screw chamber, which can reduce the need for opaque composite material, or by metal cut back to hide the non-esthetic metal. We chose to overcome this esthetic and structural obstacle by using a separate telescopic crown design to cover the metal substructure of the screw-retained in #11 location.

Conclusion
As more and more dental practitioners are focusing on implant-supported fixed restorations, restoring dentists need to understand the restorative options they may have to deal with.

Dental practitioners and dental labs need to be prepared to use a screw-retained implant-supported fixed partial denture, and thereby promote choices that offer the utmost in serviceability, cosmetic result and maintenance of optimized bite.

References

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