Maintenance of Full-Arch Implant Restorations

Replacement of the terminal dentition with a full-arch, fixed dental implant restoration is well accepted as a successful treatment alternative. The number of implants placed, axial or tilted inclination, and fixture positioning, may differ, but the full-arch implant foundation has been shown to be a successful modality in supporting a dental rehabilitation.

A critical component of this restoration is its prosthetic design. Whenever possible, screw retention of the restoration is desirable in order to manage mechanical as well as biological complications after delivery and during the maintenance phase. The full-arch, screw-retained implant restoration can be fabricated in multiple compositions such as the following: cast metal framework overlaid in denture acrylic materials, milled titanium framework, milled zirconia with or without feldspathic porcelain overlay, or porcelain-fused-to-ceramic alloy substructure. All have their individual advantages and disadvantages, but all can provide excellent comfort, function, and esthetics. Adequate oral hygiene ensures successful maintenance, with plaque control paramount for reduction of inflammation, limitation of pathogenic oral bacteria, and prevention of stains and odors.

While patients must take responsibility for personal hygiene, the dentist must assume a cooperative responsibility when fabricating this complex restoration. Emergence profile of the prosthesis off the implant/abutment platform must have hygienic contours, and the inter-implant pontic sections should be self-cleansable and designed in keeping with standard prosthodontic guidelines. If proper design parameters are met, and the patient practices responsible home care coupled with professional recall maintenance, success of the rehabilitation can be expected.

Prevention of biological complications is of utmost importance for the long-term survival of dental implants. Biological complications that may be encountered can be either peri-mucositis, which is a reversible inflammatory process in the soft tissues, or peri-implantitis that involves a concomitant loss of peri-implant bone.[1] Professional maintenance protocols should include a review of changes in medical history and a comprehensive evaluation of the soft tissues surrounding the implants for inflammation signs such as redness, swelling, change in probing depths, bleeding on probing, and suppuration.[2] In addition, the presence of plaque and calculus must be assessed. Clinicians must have baseline probing depths and radiographs after the delivery of the final superstructures for comparison.[3] Baseline probing depths should be measured within approximately 2 weeks after delivery to allow for peri-implant soft tissue healing. Probing under fixed implant-supported prostheses can be challenging at times, particularly in maxillary sites imposed by the nature of the prosthetic design. In these cases, it is recommended that at least one surface be identified where proper probing can be performed.[4]

Radiographs should be retaken once every 1 to 2 years thereafter, or when there are any signs of infection. The importance of oral self-care practices and a long-term professional recall regimen must be emphasized at every visit. Clinicians should ensure that their patients can perform the required skills. Brushing at least twice daily, use of floss, interdental cleaners, and water irrigator is advised.

Management protocols for patients with mucositis or at risk for development of peri-implant disease can include use of antiseptic mouth rinses which may improve soft tissues and microbial outcomes around implants. Removal of a fixed, screw-retained implant prosthesis for evaluation is not needed unless there are signs of peri-implantitis, a demonstrated inability to maintain adequate oral hygiene, or there are mechanical complications that require removal.[5] It is important to remove calculus safely with cleaning instruments compatible with the material of the implants and superstructures. Ultrasonic devices with plastic tips or rubber cup and low-abrasive polishing paste may be used. In-office implant maintenance appointments at 2- to 6-month intervals should be scheduled and based on a patient's risk profile (e.g., history of smoking, history of periodontitis, systemic conditions, patient's limited vision and dexterity, etc.).[6]

The mechanical aspects of recall for full-arch fixed restorations focus on interface stability between the restoration and supporting intermediate abutments or implants. The stability of these interfaces is predicated upon two mechanical factors: passive fit of the restoration and proper assembly techniques at delivery.[7] Passive fit is thoroughly evaluated at delivery, but generally confirmed in a recall scenario with radiographs. If the restoration or any supporting components are not fully seated, the restoration would be removed, evaluated, and possibly re-made to achieve the prerequisite of passive fit.

The second mechanical factor is the assembly method at delivery. The critical elements include torque level, screw coatings, the pattern of tightening, and a second torque application to overcome the initial mechanisms of screw relaxation.[8] Once this assembly is complete, subsequent tightening of screws at recall visits is inappropriate and may lead to diminished interface stability from excessive screw elongation.[9]

If the restoration is in function and free of mechanical complications, there is no indication for removal and/or replacement of screws. When applied loads to the restoration are controlled, a properly assembled interface will remain stable over time.[9] If the restoration acquires a history of screw loosening or screw fracture, the etiology of these complications should be identified and addressed. The frequent replacement of screws to prevent complications may lead to more severe mechanical complications, such as implant fracture.[10] When a restoration must be removed, the use of new screws assists in achieving ideal assembly conditions for stable interfaces.[5,8]

Based upon the present literature, it is the position of the American College of Prosthodontists that removal of full-arch, implant-supported restorations at regular maintenance intervals is discouraged unless adequate professional hygiene is not possible with the superstructure in place, or the restoration presents with mechanical complications.

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