Screw- or Cement-Retained Restorations

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Providing the patient with a reliable and lasting restoration is essential in today's highly competitive dental market.

The long-term clinical success of an implant-supported restoration depends on a multitude of biological and component-/material-related factors. Choices concerning the type of connection and the retaining system between an implant and the prosthetic restoration are two key aspects of the clinical decision-making process.

While some clinicians favor the use of cement-retained restorations, others consider screw-retained prostheses to be the best choice. While this issue is being debated in clinics, scientific studies have yet to provide conclusive data demonstrating superior outcomes for one technique over the other. Therefore, the clinician must evaluate and be aware of the advantages and potential disadvantages of each solution and their specific implications in any given clinical situation.

Pros and cons

Aside from personal preferences or scientific data, the primary factor in the decision-making process is the position and angulation of the implant in relation to the anticipated final restoration. If the screw access is favorable (e.g. in the central fossae of a bicuspid/molar or on the palatal side of an anterior crown), a screw-retained restoration may be fabricated.

Porcelain is directly fired onto the abutment, and the abutment-crown complex is screwed onto the implant. This type of restoration offers efficient and fast clinical handling protocols and easy maintenance. Retrievability and the absence of cement between the abutment and the crown are two of the greatest advantages vis-à-vis cement-retained solutions.

A disadvantage often discussed is the presence of an occlusal access channel for the screw that interferes with the morphological integrity of the occlusal table. While laboratory trials have shown a potential detrimental effect upon the application of load, clinical long-term follow-up studies do not support such assertions, reporting comparable outcomes instead. Furthermore, arguments of increased rates of screw loosening and fractures in screw-retained abutments should be classified according to their publication date and the type of components used at that time (e.g. formerly used gold screws instead of currentlyused titanium retaining screws; cast instead of industrially manufactured prosthetic components).

Cement-retained restorations on custom titanium or ceramic abutments, on the other hand, allow for the compensation of misaligned implants and can be treated like natural teeth. The non-disrupted morphology of the occlusal table may be considered a favorable aspect of this choice, eliminating the requirement for subsequent closure with composite resin and potential impairment of the esthetic outcome that occurs when metal-based frameworks are used.

Zirconia-based frameworks, however, eliminate this disadvantage. If white or shaded substructures are used, then easy, fast and esthetically pleasing closure of the screw access channel can be achieved with conventional composite resin materials.

The main disadvantages of cement- retained restorations are the potential risk for cement trapping in the peri-implant tissues and retrievability difficulties when peri-implant tissue assessment and/or the maintenance of prosthetic components are required. Despite the fact that some studies suggest the use of temporary luting agents to make retrievability practicable, such protocols should be carried out with great care when implementing all-ceramic restorations. Although widely recognized for years, the detrimental effect that cement remnants can have on peri-implant tissue health and integrity has only recently become the focal point of professional presentations and scientific articles. To reduce the risk for cement trapping, it is essential to position the height of the crown-abutment interface at, or slightly below, the gingival margin to allow for easy access and complete removal of luting materials. This prerequisite means that a customized implant abutment must be used in most cases.

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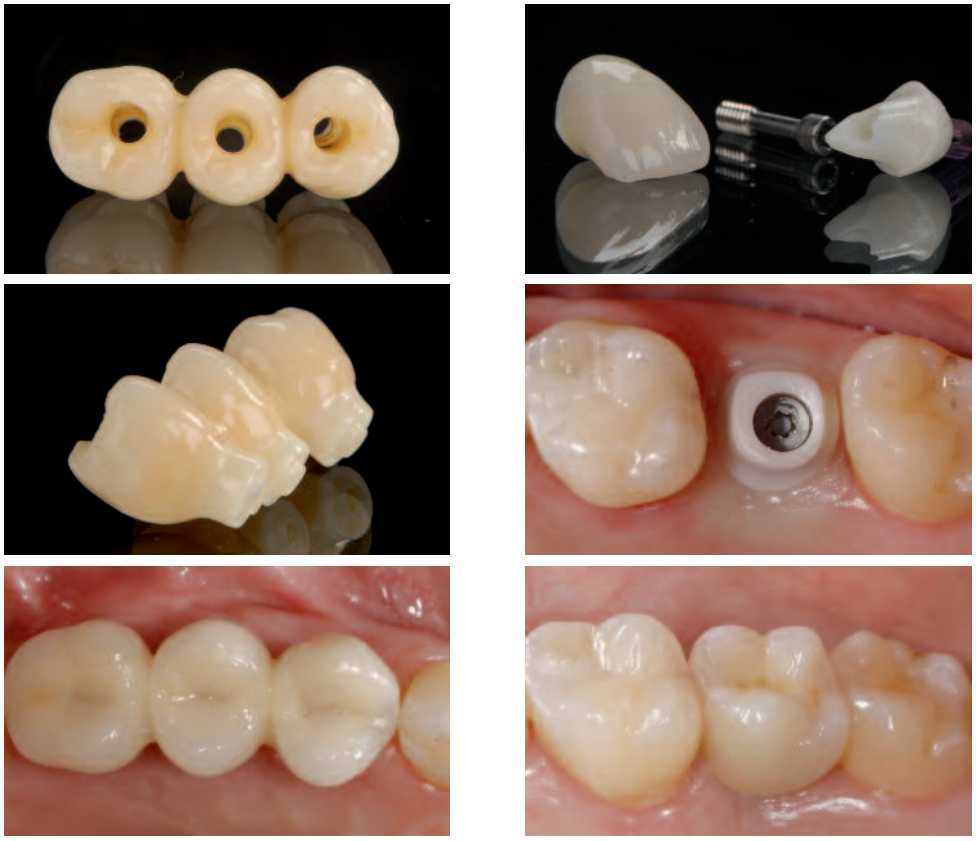

High quality standards and precision ensure longevity for both screw-(left) and cement-retained (right) NobelProcera custom solutions.

Changing the odds via cad/cam

The choice between screw- and cement-retained prostheses does not only need to be made for single-unit implant restorations. It is equally important for multiple splinted implants.

Whenever an implant-retained bridge framework (i.e. fixed dental prosthesis, or "FDP") is connected to implants, the clinical longevity and need for maintenance repair depends to a great extent on the precision of the manufactured components. Non-passively fitting implant-supported superstructures are still considered to be a potential cause for the high incidence of technical complications associated with these restorations.

In cement-retained implant superstructures, the cement layer can compensate for dimensional discrepancies between the abutment and the restoration to some extent, working as a filling medium to more uniformly transfer loads to the implant–prosthesis–bone complex.

This type of compensation for misfit is not possible in screw-retained superstructures, where even small dimensional discrepancies result in localized loads and stress concentrations that are transferred to the implant-abutment complex/components. Scientific evidence shows that with conventional fabrication methods, three-dimensional distortions of the finished restorations inevitably occur, thus precluding passive fit.

The computer-aided design-/computer-aided manufacturing (CAD/CAM) of restorations has been shown, however, to result in significantly greater accuracy when compared to traditional fabrication techniques such as casting.

Due to the above-mentioned quality-of-fit shortcomings of cast components, cement-retained restorations became the predominant solution for multiple-implant restorations in the past. With the availability of CAD/CAM systems and high quality precision products, however, a trend towards an increased use of screw-retained solutions is evident today, due to fast and simple clinical protocols and other attendant advantages.

In summary, it can be concluded that the decision to cement- or screw-retain an implant-supported crown or FDP depends on the personal preference of the clinician and the patient-specific clinical situation. The availability of CAD/CAM manufacturing technology and biocompatible materials, such as titanium and zirconia offer a multitude of patient-specific treatment options and alternatives, which make it feasible to routinely provide patients with the best possible quality solutions.