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Should Implant Superstructures Be Screw Retained Or Cement Retained?

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Fixed implant reconstructions can be screwed or cemented to the abutments. There are several possibilities to screw or retain implant reconstructions.

UCLA – Type Direct Gold Coping:

The abutment is screwed directly onto the implant. The restoration is waxed to the coping and cast on. UCLA type abutments cannot be used when the axis of the implant would cause access to the screw to be visible in the buccal ceramics.



Figure 1. Customized finish line on fixed abutments.

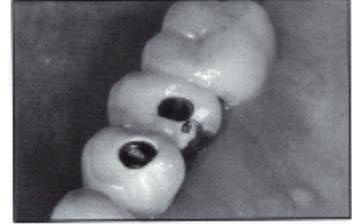


Figure 3. Chipping of ceramics.



Figure 2. Accumulation of plaque between preangled abutment and screw retained superstructure.



Figure 4. Splint to transfer the fixed abutments from the stone model to the dental implants.

Screwed Implant Reconstruction on Shouldered Abutments:

Shouldered abutments with different cuff heights and flares allow an ideal emergence profile. They are made from titanium or titanium alloy, which is well tolerated by the gingiva.

Implant Reconstruction Retained with Transversal Screw:

Transversal screws used to secure the prosthesis to the counterside of the framework will achieve a perfect fit.

Screw retention of implant prostheses allows retrievability. Alterations, extensions, and repairs of the restoration can be done easily. Access to the implants in case of necessary soft tissue management is guaranteed.

The prosthodontist will be able to complete implant prostheses even in very difficult cases. In spite of the obvious advantages of screwed implant restorations, their disadvantages should be considered.

Esthetic Disadvantages of Screwed Superstructures:

In the case of small interocclusal space, the retaining screw cannot be countersunk. The head of the screw will be visible on the occlusal surface.

In the case of countersunk screws, the head can be covered. In the course of time the composite may change its color and may affect the esthetic appearance of the implant crown.

Disadvantages Related to the Screwed Superstructure:

Disintegration of the composite cover:

A common problem of the screw access is the loss of the cover. This does not affect the function of the prosthesis but is an impairment for the patient.

Chipping of ceramics:

Ceramics chip more often when there is full ceramic screw access in the occlusal table. The smaller the occlusal ceramic surface related to the diameter of the screw access, the more likely the ceramics will chip.

Damage to periodontal tissue due to bacteria:

The space between abutment and crown framework causes plaque accumulation and bacterial development (**Figure 1**). Even small gaps are permeable by bacteria, causing inflammation of the soft tissue.

Damage to periodontal tissue due to crevice corrosion:

The pH value decreases in crevices without contact of oxygen and will cause corruptions even in highly precious metal alloys. Metal ions will affect the gingiva, causing peri-implant inflammation.

Tension on Implants:

Even high precision cast frameworks show tension if placed on several implants and screwed. Eisenmann proved that treatment of the superstructure with dental spark erosion technique reduced the tensions remarkably but did not eliminate it. It is generally accepted that tension on implants can be implicated in the loss of bone surrounding the implant.

Loosening and Fracture of Screws:

Screw loosening is another type of technical complication with screwed superstructures. Screw loosening incidents ranging for 6 % to 38% have been reported in several papers. Gunne reports screw loosening to be the second most frequent technical complication.

If we look at the high rate of complications with screwed prostheses, we have to take cemented prostheses into consideration. We have to rely on surgical and prosthodontic protocols, which only have a small failure rate. A major impact on the reliability in implant supported superstructures results from the prosthetic interface implant-abutment.

Binon has performed extensive research on prosthetic interfaces. He was able to prove that joint failure occurs more frequently in cases of joints with a larger rotational misfit. A precise connection with high lateral stability shows a low failure rate in cases with dynamic eccentric load.

Therefore, screw loosening, screw fracture and joint failure should not be seen in fixed implant prostheses completed under biomechanical aspects with a reliable interface like the Spline.

Cemented Implant Prostheses – A Simple Concept:

Cemented prostheses on fixed abutments are a simple treatment concept. The abutment will be individualized in the laboratory. No heat from grinding will affect the gingiva, the implant will not be damaged by grinding, and no metal dust will be sprayed in the gingival tissues. The individualized abutments have to be transferred in a resin splint. If abutments and framework are seated passively and exactly, the prostheses can be completed (**Figure 2**).

Implant prostheses should be temporarily cemented if alterations are foreseeable. If the implants have osseointegrated successfully and no soft tissue management will be necessary, the restorations can be fixed permanently.

In some cases we combine fixed abutments and screw abutments in one implant superstructure. The indications are bridges with only little friction and superstructures on several implants when there are reasons to have the prosthesis removable. In this combination, cementation on the fixed abutments must always be temporary.

Advantages of Cemented Superstructures:

Cement-retained restorations avoid the obvious disadvantages of screwed implant prostheses. Successful surgical protocols, reliable implant systems, and execution of biomechanical prosthodontics are the conditions for cementation of implant restorations.

Passive seated cemented restorations do not transfer stress on the implants. There is no effect to the gingiva due to corrosion and/or bacterial development in the crevice. High esthetics are achieved by the use of ceramics and galvana-gold frameworks on fixed abutments. Cost efficiency is a welcome side effect (**Figure 4**).

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