

The synthesis of aesthetics, health and structural stability

The advantages of using the Angulated Screw Channel (ASC) abutment system

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There are many reasons why cement-retained implant restorations gained popularity over the last few years, which can be attributed to aesthetics, ease of use and familiarity with cementation techniques. However, Pauletto, Gapski and others reported that cement excess was problematic; then Wilson's study established a positive relationship between excess residual cement and peri-implantitis.

Surveys on cements used for implant restorations indicated a diversity in material selection, application technique and volume. This suggested a lack of conformity and understanding of cement usage within the dental profession. To overcome the cement problem, it became evident



Fig. 1: Failed, removed implant, cement extrusion is noted on multiple threads.



Figs. 2a & b: The anterior teeth present a challenge to the screw-retained restoration unless an Angulated Screw Channel (ASC) abutment is used (a). In cases where the surgical placement is less than ideal, the ASC may help limit further compromise to the site (b).



Fig. 3: The ASC shows the angle redirection of the screw access channel.

Angulated Screw Channel saves the day

An innovative solution to the off-axial implant is the Angulated Screw Channel (ASC) abutment system developed by Nobel Biocare (Fig. 3).

angulations. CAD/CAM design enables the restorations to be efficiently designed and quickly manufactured at Nobel Biocare's production facilities (Fig. 5). Milled zirconia is highly aesthetic, thus especially useful at the soft tissue emergence site.

abutment, with its well-designed circumferential wall strength, is held through the abutment screw, optimising the ceramic's ability to withstand forces that have been seen to fracture non-titanium base abutments.

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Figs. 4a & b: Even with shallow margins and minimal cement (a), the elimination of cement extrusion still presents a clinical challenge (b).



Fig. 5: The Nobel Biocare CAD/CAM software allows ideal screw access site to be planned, then machine fabricated.



Figs. 6a-c: The screw access from Figure 2a has been redirected using the ASC abutment and crown (a & b), producing a pleasing natural appearance thanks to a screw-retained implant restoration (c).



that improved understanding was required for cement material selection, abutment design and the determination of cement margin depths. Even with the very best intentions, however, residual excess cement can lead to disease, affecting the health of the implant/tissue interface and remains a dominant risk factor.

The association of residual excess cement and peri-implantitis has resulted in the need to re-examine alternatives such as the screw-retained implant crown. For many implant systems, the ability to use a screw-retained implant restoration is limited to regions where the screw access channel emerges in an aesthetically 'safe' site.

Usually the anterior maxilla and mandible present the greatest challenges, as the long axis of the implant often projects through the proposed incisal edge or even facial to the final restoration (Fig. 2a). Occasionally, when the surgeon places the implant in a compromised site—or the implant is inappropriately placed—the traditional screw-retained implant restoration may seem to provide more of a challenge than a solution (Fig. 2b).

With the ability to alter the screw channel up to 25 degrees, it eliminates the need for cementation in the vast majority of cases like these. The ASC provides for an active synthesis of health, aesthetics, and excellent structural and mechanical abutment joint stability.

Health

With use of the ASC abutment system, cement extrusion into the fragile peri-implant soft tissues is eliminated. The ASC puts an end to the onslaught of cement fluid pressure and unset chemicals from the cement material. It also gets rid of the potential for foreign bodies being pushed around the implant site, which can jeopardise implant health (Fig. 4). In addition, the use of zirconia abutment superstructures in combination with titanium bases provides optimised materials for biocompatibility and health.

Aesthetics

With the ASC, the screw access channel can be projected away from high-aesthetic-risk areas and placed appropriately at a variety of different

Mechanical stability

CAD/CAM utilisation (Fig. 6a-c) allows for optimised screw access site planning, and the machining of components provides a precise, dedicated connection, optimised for the implant-abutment joint.

As with all implant-to-abutment connections, the optimised passive fit results when these surfaces are in intimate contact and forces are distributed universally. Casting abutments cannot always provide an even connection with joint contact, as they are often inadvertently damaged through cleaning and polishing, which alters the consequent fit (Fig. 7). When this occurs, the joint connection may fail, with screw loosening or even failure of the implants as a result.

Structural components

Titanium alloy abutment bases provide the most accurate fit with machining tolerances readily controlled. Abrasive wear, i.e. the release of titanium metal into the peri-implant tissues from the inside of the implant, is not an issue. The zirconia

Conclusion

The benefits of the ASC abutment system are numerous, reflecting a multiple symbiosis of engineering ingenuity and biocompatible materials, and allowing for the combination of good aesthetics and excellent health.

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Fig. 7: An actual case: Note cast abutment has been damaged through routine laboratory procedures.

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