EDITORIAL

Nonoriginal Abutments

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An implant abutment is an implant component that serves as support and/or retention for a dental prosthesis. Implant-abutment connections can be of various types, including conical, morse taper, internal hex, external hex, and with any other shaped anti-rotational feature or without anti-rotational feature.[1] Implant abutments are manufactured by the original equipment manufacturer (OEM) or the same manufacturer who developed the implant fixture and is typically considered as the original abutments (OAs). Apart from the OEM, the implant abutment can also be manufactured or fabricated by other means and is considered a nonoriginal abutment (NOA). Based on the origin, these NOAs are known by different names, including third-party abutments, aftermarket abutments, compatible NOA, compatible stock abutments, nongenuine abutments, casted abutments, and milled abutments.

The clinicians and dental laboratory technicians have multiple options to choose the compatible NOAs if the OAs are not available or expensive.[2] The NOAs usually differ from the OAs for patent issues and different machining processes resulting in discrepancies in designs, shapes, accuracies, and dimensions. Discrepancies greater than 10 µ may lead to misfit and screw loosening.[2,3] Rizvi et al.[4] reviewed a total of 40 studies on the types of implant-abutment connections regarding the use of original and NOAs. Overall, OAs showed better precision of fit, ability to resist microleakage, prevention of rotational misfit and micromotion, and fatigue strength compared with the NOAs. However, few NOAs with external connections can provide acceptable precision fit and may also exhibit less catastrophic failures than NOAs with internal connections. Misfitting of the superstructure can result in the loosening of the screws, reduced preload, and in some cases, significant stress around the implant.[5] Berberi et al.[6] measured the peripheral and internal gap at the implant-abutment interface using either OAs or compatible NOAs on the Tx Astra Tech Implant System™. They found that the external and internal fit of the components is better when using OAs. Alonso-Pérez et al.[7] assessed the internal accuracy, mechanical behavior under static load, and screw loosening before and after cyclic loading of implant-supported crowns restored using the OAs or with the NOAs. They found that the OAs exhibited lower percentages of torque reduction after cyclic loading than NOAs.

In general, the NOAs are prefabricated or stock metal abutments. However, the castable burnout patterns (to fabricate the casted abutments) are available to purchase in the aftermarket, including the popular online shopping platforms. The casted abutments are riskier than any other machined prefabricated/stock NOAs as the casting accuracy varies with each laboratory, and it's difficult to put the quality checkpoints on the final product. This casted abutment geometry engaged with the internal implant geometry may have questionable precision fit, and one should not use such abutments. The casted abutments are not extensively studied in the literature.

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The milled abutments are either manufactured by the OEM or third-party manufacturers. The accuracy of the fit, material quality, and mechanical properties depend upon the agreement between the OEM and the third-party manufacturers. For example, Zest Dental Solutions, a third-party manufacturer, develops the locator overdenture attachment for many implant OEMs worldwide. Similarly, Dynamic Abutments are designed and manufactured by a third-third party manufacturer to cater to many implant OEMs.

Under the occlusal forces, the implant-abutment connections are the origin of the microgaps and micromovements and usually are potential sites of bacterial colonization leading to peri-implant inflammation, mucositis, and crestal bone loss.[8] Use of NOAs may increase the risk of higher microgaps and micromovements than OAs. There is a lack of information regarding the influence of connection geometry on many aspects of compatibility, and therefore the current clinical recommendation should be to use OAs.[4] More laboratory and clinical studies are recommended to evaluate the impact of the NOAs on the overall performance of implant-supported prostheses.

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