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On implant surface designs

By Gerald Niznick, DMD, MSD, Academy News Guest Contributor

Dr. Daniel Buser's and Dr. Dennis Tarnow's articles in *Academy News*, Vol. 33, No. 1, 2022, advocated for a Hybrid Design (HD) implant surface, claiming it an important factor for avoiding peri-implantitis. A HD implant surface has a smooth neck with a rougher surface on the threaded portion. I agree with their prediction that a HD implant surface will be the prevailing implant design of the future, but I do not believe it is the only, or even the most critical, factor in preventing peri-implantitis.

The cause of peri-implantitis is multi-factorial. While peri-implantitis is related to bone loss, having a textured surface to the top of the implant has been proven to reduce bone recession.¹ Many popular, bone-level implants with well documented success rates do not have a HD surface. Straumann's tissue level implant has a smooth neck intended to be in the soft tissue with the textured surface extending down from the crest of the ridge.

Dr. Buser cites a Swedish 10-year study comparing three implants: Astra, Nobel Biocare and Straumann's Tissue Level implant claiming the latter exhibited significantly less peri-implantitis. Assuming part of the smooth neck of the Straumann TL implant was inserted in bone, which Dr. Buser seems to advocate, this would give it a hybrid

bone interface. It also adds the variable that the implant-abutment connection would be supra-crestal. I believe that the stability of the connection and its relationship to the crest of the ridge is at least as important a factor in minimizing peri-implantitis as a hybrid surface.

Historically, exposure of porous implant surfaces, such as TPS and TiUnite, has been recognized to contribute to soft-tissue complications. Straumann replaced TPS with SLA (Sand Blasted/Acid Etched) in 1998 and Nobel introduced TiUltra in 2019, positioning the porous TiUnite 2mm below a relatively smooth collar. Textured surfaces, as differentiated from porous surfaces, have proven successful in preserving crestal bone height when extended to the top of bone level implants.²

While it is clear that a textured surface is beneficial at the bone-implant interface and a smooth surface from an oral hygiene standpoint, is beneficial in the trans-mucosal area, the dilemma is that the crest of the ridge is often not flat and will recede from surgical trauma, especially if there is less than 1.5 mm of bone surrounding the implant at time of insertion.

To view Dr. Niznick's full response, please scan the QR code.



References

1. Zhang Q, Yue X. Marginal Bone Loss around Machined Smooth Neck Implants Compared to Rough Threaded Neck Implants: A Systematic Review and Meta-Analysis. *Journal of prosthodontics*. 2021;30(5):401-411. doi:10.1111/jopr.13333
2. Cavallaro JS Jr. Implant survival and radiographic analysis of proximal bone levels surrounding a contemporary dental implant. *Implant Dent*. 2011 Apr;20(2):146-56. doi: 10.1097/ID.0b013e31820fbc31. PMID: 21448024.

Editor's note: The views above reflect the opinion of the author. It's an example of issues raised in lively scientific debates during the 2022 AO Annual Meeting where various groups from North America and Europe presented a 40-year review of the past and made predictions about the future of implant design. In accordance with the theme of the Annual Meeting, we had asked Drs. Daniel Buser and Dennis Tarnow to write articles strictly focusing on implant surface designs from a historical aspect and make predictions about the future.



Dr. Gerald Niznick