

The Big Question?

with

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I hope this second “Implant Essentials” segment will help guide you to a better understanding of the implant treatment you are delivering to your patients. Reducing complications will likely give you more pleasure than managing disappointed patients. Enough goes wrong when you do everything right. Unfortunately doing what is right is a moving target and you need to move to keep up!

My goal is to provide you with the highest quality information to help guide you along that exciting journey to becoming the excellent clinician you want to be.

Are Misfits OK?

There is a research report¹ that concludes “The effect of misfit between the superstructures on its supporting implants up to ~230 μm on the long-term clinical outcomes appears to be minor, apart from a slightly higher risk of screw-related adverse events.” Do you believe that? Let me help you interpret these conclusions, as they may lead to unintended damage to you and your patients.

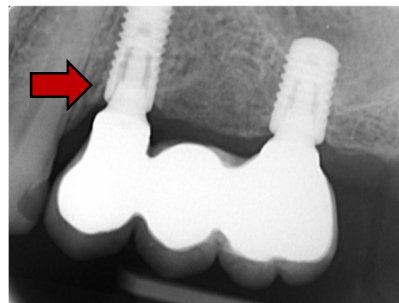
I would like to point out that the effects of these reported misfit joints are not relevant to most All-on-X cases. Are misfits a necessary consequence of prosthesis installation or are they inherent to a particular installation system? Can they be prevented? Yes, misfit implant-abutment and abutment-prosthesis connectors occur as a direct consequence of the current screw-in system of prosthesis installation.⁹ Yes, misfits can be prevented by incorporating an intra-oral cementation step into the screw-in prosthesis installation system.¹⁰ [References & More ...](#)

I will address your comments & questions in the next edition of Spectrum Implants and pose the Next BIG Question. Dr. Scott Froum¹⁴ published a short article titled “Dental Implants fail at a rate 10 times that of natural teeth in patients with treated periodontitis: New study.” He quotes a study by Guarnieri et al.¹⁵. I am sure it will stimulate a lively debate. This work begs the question “When should we replace periodontally involved teeth with dental implants?”

Please submit your comments and ideas for further investigation to drsvoboda@rogers.com

The BIG Question: Are Misfit Joints OK?

I welcome all your questions and comments. I hope this “Implant Essentials: The BIG Questions” segment of this journal will help guide you to a better understanding of your craft, so you can do the best possible job for your patients. Besides, it would probably give you more pleasure basking in the glory of success, rather than trying to manage disappointed patients with complications. Enough goes wrong when you do everything right. Unfortunately doing what is right is a moving target and you need to move to keep up! My goal is to provide you with the highest quality information, to help guide you along that exciting but perilous journey to becoming the excellent clinician you want to be.



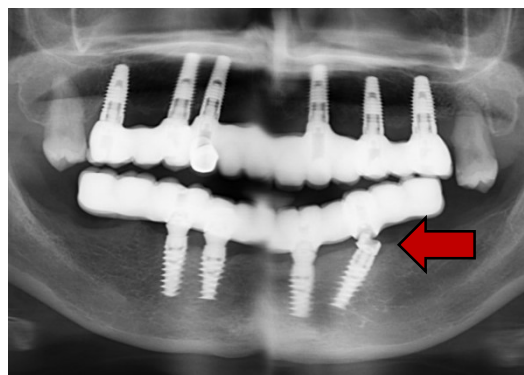
There is a research report¹ that concludes “**The effect of misfit between the superstructures on its supporting implants up to ~230 μ m on the long-term clinical outcomes appears to be minor, apart from a slightly higher risk of screw-related adverse events.**”

Let me help you unravel this conclusion, as it may mislead you. In scientific journal etiquette, it is proper not to overstate the significance of your research findings. Indeed, the goal of the “Conclusions Section” of an article is to confine your conclusions to the evidence presented. This is intended to prevent readers from erroneously extrapolating those conclusions to unlike situations, that could cause unintended damage to your patients.

The conclusions drawn from this research article are based on **high-water** prostheses design, where the prostheses were installed onto 5 implants in the mandible according to the common **screw-in technique**. All 30 prostheses tested had misfit connections that ranged from **95 to 232 microns**, between their transmucosal elements (abutments) and their gold cylinder prosthetic connectors. All these misfit joints existed in the **supragingival** environment.

Let’s address the questions I posed in the Jan/Feb 2022 issue of Spectrum Implants.

Do you believe misfits are OK? I don’t, and neither do Heitz, Heitz and Lange (2020)² as they describe the risk factors for peri-implant disease and implant failure. Indeed, they and many others think misfits are a risk factor for disease. Indeed, misfits, are an inherent problem for prostheses installed by the screw-in technique.^{3,4} Other inherent risk factors related to the screw-in technique may include stressing these misfit joints by cantilevering off them and thus also blocking access to effective care of the peri-implant environment. According to some authors, the location of the misfit is important, as well as access to care.² I would say the high-water design was intended to provide great access to care and to keep the misfit joints high off the gingiva.



These High-water design results would be difficult to extrapolate to the all-on-x cases that are being done today. Their misfit joints are often subgingival and their wide prosthesis designs can provide poor or no access to effective daily care or even intermittent professional care. Plaque is a well-known risk factor for peri-implant disease.²

I am relieved that astute clinicians such as Dr. Baig⁵ also mentioned the problem of misfits in the Jan/Feb issue of Spectrum Implants. This is warranted since 81% of our implant patients can expect to suffer peri-implant disease or implant loss over 10 years⁶ and fixed prostheses retained by 4 or more implants can experience **15 times** that rate of peri-implantitis than those treated with prostheses retained by fewer implants.⁷ Yes, I would say one could suspect misfit parts and poor access to care as contributing factors for observed complications, as there is no subgingival cement to blame for them.

While Dr. Baig et al. painstakingly catalogued the many different implant-abutment configurations, he did not discuss that all of these configurations actually will have had to pass Health Canada and FDA stability tests to be sold in Canada and the USA.⁸ They all are stable under load when installed optimally. Here is the problem. If you are installing these abutment-prosthesis complexes into the mouth by the screw-in technique, you are using an installation technique that almost guarantees misfit connections. Is that what you want for your patients? I sure hope not. I have discussed this problem multiple times and offered ways to consistently optimize the fit of parts.⁹ Perhaps all these implant-abutment configurations shown by Baig et al.⁵ will work as expected by government regulators when dentists learn how to put them together optimally.

What joints were Jokstad and Shokati reporting on? This certainly was not clear from the words used in the conclusions made in this article. However, now we know they were talking about **supragingival misfits** between the transmucosal elements (abutments) and the gold cylinders (prosthetic connectors) embedded in the prosthesis according to a High-water design. Heitz et al.² place the risk of **supragingival misfits** causing peri-implant disease much lower than misfits that are subgingival. Most of the screwed-in prosthetics, including the all-on-x variety, appear to have subgingival misfits. So, the results of the Jokstad and Shokati study¹ are probably not so relevant to subgingival misfits.

The range of misfits reported in their article ranged from 95 to 232 microns. Now we must remember the oral pathogens causing peri-implant disease are about 1 micron in diameter and many can swim. Were there any zero misfit cases? There were none. So why did the conclusion say zero to ~230 microns? All the prostheses were misfit and the smallest misfit sample measured was 95 microns. **Their conclusions should not report on data that was not tested.**

The misfit prostheses were sorted into 2 groups according to the size of their misfits. One group had an average of 134 microns of misfit, while the other group had an average misfit of 169 microns. The authors found no difference in marginal bone loss between groups, but they found more screw loosening with the larger misfits, almost half the cases had one screw loosening, and 27% of the prostheses had to be remade.

Here is the thing. Negative results are those that were not able to discriminate a difference. That does not mean there is no difference. In this experiment, why would you even expect any difference in bone loss between these misfit groups? **All the cases had supragingival misfits that were quite large in comparison to the oral pathogens they were supposed to exclude.** What was their concept regarding the mechanism of peri-implant disease in this circumstance? Is bone loss not largely the result of an infective process occurring in the subgingival environment? Would abundant access to maintenance of the supragingival environment around the supragingival misfits not be similar between groups and confound results?

I would like to suggest that the most relevant conclusion from this article is the confirmation of the **100% incidence of misfits** related to the screw-in installation system and to reveal their large range of vertical size from 95 to 232 microns. This was important to quantitate.

Indeed, it would have been nice to be able to compare the effect of supragingival misfits with subgingival misfits, where the oral pathogens residing in the misfits would be pumped directly into the peri-implant environment. That is more like what is occurring today with all-on-x cases. What we do know is that these screwed-in prostheses all had large vertical misfits. Indeed, Derks et al.⁷ report that larger prostheses retained by 4 or more implants had 15 times the peri-implant disease than those retained by fewer implants. So, it might not be wise to assume misfits are OK. We know that misfit joints are less stable and less able to prevent penetration by oral pathogens. We also know access to care of the peri-implant environment is also important.

Are misfits a necessary consequence of prosthesis installation or are they inherent to a particular installation system? Can they be prevented? Yes, misfit implant-abutment and abutment-prosthesis connectors occur as a direct consequence of the current screw-in system of prosthesis installation.⁹ Yes, it can be prevented by incorporating an intra-oral cementation step into the screw-in prosthesis installation system.¹⁰ The current cement-in installation system can optimize the fit of parts but has a problem with residual subgingival cement and overhanging

and open margins. The Reverse Margin System of installation can prevent all those risk factors for peri-implant disease.^{11,12}

If specified installation-related risk factors for complications can be prevented by design and process, does a consent to treat protect the dentist from perceived negligence? I would expect NO. Now that we understand or should understand the root causes of misfits and the other risk factors for complications, we should always be able to tell the patient and indeed a judge, what we did to protect the patient. Current installation systems simply have not been designed to do that. Yes, perhaps it is time for a change. **What do you think?** Should we upgrade our education systems to educate dentists on how to prevent risk factors for complications? Should students be compelled to learn some new terminology that allows them to discuss some new concepts about safer installation?¹³

I will address any comments or questions in the next edition of Spectrum Implants. Then I will pose the next **BIG Question.** Dr. Scott Froum¹⁴ published a short article titled “Dental Implants fail at a rate 10 times that of natural teeth in patients with treated periodontitis: New study.” He quotes a study by Guarneri et al.¹⁵ I suggest you search this article through Google Scholar. I am sure it will stimulate a lively debate. It begs the question “When should we replace periodontally involved teeth with dental implants?” or indeed, should we replace such sick teeth with dental implants?

Submit your responses and ideas for further investigation to Email@DrESvoboda.com. Please indicate whether you wish your name to be published with your answers/opinions/suggestions. **Let’s talk about these and many more BIG Questions in the next issue of Spectrum implants.**

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