

The age of digital dentistry for practical and aesthetic prosthetic solutions



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Our group in the prosthodontics department at the University of Gothenburg is looking very closely at the use of CAD/CAM technology to fabricate implant superstructures. This technology allows for milling prosthetic frameworks from a single block of titanium (or other material). Cylinders of such frameworks are not cast, but rather these are integrated within a single piece of titanium. Our research is confirming that such milled frameworks are very accurate. When restorative materials such as porcelain and acrylic are applied, and the porcelain is fired, problems with distortion do not occur (in contrast to the literature relating to porcelain application on conventional gold-alloy constructions).

A good fit of the framework has several benefits. It enables a good preload and more predictability regarding accurate fit between implant restorative components and frameworks. Also, if the framework is highly accurate, it may be possible to omit one of the try-in appointments. Patients appreciate this time savings, as do clinicians.

In the future, I envision developments in digital dentistry that may eliminate the need for conventional impression making when fabricating implant superstructures. Here I believe that digital impressions such as the Encode® Impression System, will be useful. So far, no studies have been published evaluating master cast fabrication using impressions of the digitally coded abutment and robotic implant analog placement versus conventional impression techniques using impression copings. Our research group is currently investigating this subject. Advances in implant dentistry and the rapid development of digitized processes will continue, making computerized techniques more cost-effective and flexible. However more research is needed to further develop the digitized technique and improve its competitiveness.

We also hope to be able to present more evidence about the relationship of framework accuracy to the long-term prognosis of the prosthesis. We have one 10-year follow-up study recently published showing similar clinical results for milled titanium and cast gold-alloy constructions with very few framework fractures. We already know from our previous research that the predictability and long-term prognosis for implant treatment are excellent. In one recent study on the first generation of titanium frameworks, our group found a 15-year survival rate of 98.7% for implants placed in the lower jaw. This is an impressive accomplishment.