

Reshaping implantology

New solution to reduce guesswork of site preparation

Nobel Biocare, Switzerland



When it comes to innovations in implant dentistry, the refinement of site preparation has fallen behind the advancements of implant design. Prof. Stefan Holst, Vice President of Premium Implants at Nobel Biocare and co-author of an original research study with Stanford University on the OsseoShaper™ design and biological benefits, describes some of the challenges presented by conventional drilling protocols and explains how this new device has been designed to overcome these problems.

Prof. Holst, what is the new OsseoShaper™ device?

The OsseoShaper™ is a completely new approach to site preparation that addresses some challenges of conventional drilling protocols. Instead of using high-speed drills to create an osteotomy, the OsseoShaper™ gently 'shapes' it in a controlled way. It has been developed as part of our recently announced Nobel Biocare N1™ implant system.

Site preparation protocols have hardly changed in over 50 years. What inspired you to focus on such well-established methods?

Our very first step in developing a new implant system was to examine every stage of implant treatment based on our 50 years' clinical experience. What are

the main challenges clinicians have? How can we try to avoid more errors? How can we optimise workflows? It became clear that drilling protocols can be improved, both practically and biologically. So, we funded new basic research

to better understand the biology of bone healing, which is relevant to early integration and long-term performance. With this refined understanding, we could engineer features that embrace biology before even a single prototype of OsseoShaper™ was made. This approach has made this new and exciting technology possible.

How did that research influence the design?

Research at Stanford University showed how conventional high-speed drilling creates heat, causing bone cell death around the osteotomy,¹ and that this Zone of Death leads to bone resorption and remodelling. The common way to reduce heat is water irrigation. However, this has another drawback—it washes away the bone chips that can speed up peri-implant bone formation, which can help early osseointegration and stability. This is why we developed the OsseoShaper™ to operate at slow speed; it reduces the Zone of Death compared to a high-speed protocol and eliminates the need for water irrigation.¹ The OsseoShaper™ has also been designed for bone chips to remain inside the

Fig. 1: In most cases, site preparation for the N1™ implant system involves only two surgical steps: creating depth and angulation with the OsseoDirector™, then shaping the osteotomy with the OsseoShaper™. The OsseoShaper™ creates an implant site that reflects the macro-design of the N1™ implant.

Fig. 2: The OsseoShaper™ has also been designed for bone chips to remain inside the osteotomy.



Direct

Shape

Place

OsseoDirector™ OsseoShaper™ Nobel Biocare N1™ implant

osteotomy, and the benefits of this have already been shown in preclinical data.¹

What kind of practical problems are associated with conventional drilling protocols?

Bone quality and quantity are unique in every patient. Decision making can be challenging, and we know that clinicians sometimes deviate from manufacturers' recommendations and modify the drill sequence to their own preference and judgement. So, we realised that modifying the site preparation procedure could help them make these important decisions and avoid guesswork—especially given that the fastest growing segment of clinicians offering implants place just 20–50 per year. We wanted an instrument that respects the need for ease of use, that provides a gauge to indicate bone quality and creates an implant site that reflects the shape of the implant. Site preparation should be an integral part of the implant system.

How does the OsseoShaper™ help clinicians take decisions when preparing the osteotomy?

The OsseoShaper™ torques determine surgical steps, so it reduces guesswork and decision making. This is made possible by the very slow rotation speed of 50rpm and no irrigation. Secondly, the implant site reflects the macro-design of the N1™ implant, enabling ideal stress distribution to the surrounding bone and implant stability for early and immediate loading.² Finally, in most cases,

the site preparation involves only two surgical steps: first creating the crucial depth and angulation with the OsseoDirector, then shaping the osteotomy with the OsseoShaper. We now have two years' clinical experience with this concept and, so far, almost 80% of all implants could be placed with just two site preparation steps.³

Have clinicians using the Nobel Biocare N1™ implant system seen any other benefits?

Absolutely. Clinicians have told us that patients really appreciate the reduced noise and vibration compared to conventional drilling.⁴ So, patient comfort is greatly increased. And, for the clinicians, the low speed of site preparation gives them much greater control over this process.

Author's note: The OsseoShaper™ is part of the Nobel Biocare N1™ implant system, introduced at the Global Symposium 2019 held in Madrid, Spain. For more information, visit nobelbiocare.com/N1.

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