Nobel Biocare NEWS

Information for the Osseointegration Specialist

Issue 3/2017

Bringing Joy to the People We Serve

Nobel Biocare does it again, addressing an unmet need with a life-changing innovation.

First came Brånemark System full-arch prostheses. Then came implant supported overdentures and zygomatic solutions for the maxilla. Procera prosthetic bridges revolutionized the esthetics of this burgeoning field, and the All-on-4® treatment concept was soon to follow, ushering implant-based therapy into the twenty-first century. Each of these was a groundbreaking advance in the struggle to tame edentulism. Nobel Biocare is now taking the next step forward.

By Frederic Love

In a conversation I had with Professor Per-Ingvar Brånemark for Swedish Television back in 1983, we discussed edentulism as a disability. "When you provide a toothless person with a new, bone-anchored dentition, you are not just restoring his or her smile, or even the ability to chew and speak without inhibition," he said. "No, first and foremost you are restoring the patient's dignity."

According to Brånemark, all the things that we talked about in that conversation—smiling, speaking and eating with confidence—are all social activities at their core. Today the dental community agrees. You may be able to survive without teeth, but you are not going to be able to live well.

"When you provide a toothless person with a new, bone-anchored dentition, you are ... first and foremost ... restoring the patient's dignity."
— Professor Per-Ingvar Brånemark

Trefoil redefines efficiency

A new system for treating the edentulous mandible is presented on pages five through eight in this issue of *Nobel Biocare News*.

It's called the Trefoil system. Think of it not as a replacement for other solutions from Nobel Biocare, but as yet another scientifically well-documented option for bringing the benefits of implant-based dentistry to new groups of potential patients.

At its most basic level, Trefoil consists of the first pre-manufactured bar with a passive fit. That's big news in and of itself. Because this titanium bar facilitates the production of a definitive acrylic prosthesis, it saves time for both the clinician and the technician. Depending on individual clinical preferences—and contingent upon close collaboration with the lab—Trefoil is such an efficient solution that it can make Immediate Function routine, as it makes fixed and definitive teeth on the day of implant surgery an option for more patients.

From the clinician's perspective

The Trefoil system manifests innovation aimed towards greater efficiency at every step, from the design and production of components to the definitive restoration. Compared to traditional modes of treatment with provisional prosthetics, the Trefoil system requires less chair time and provides shorter time-to-teeth by combining a pre-manufactured—yet versatile—titanium bar with 1) a simplified restorative workflow, 2) a fixed and definitive acrylic prosthesis and 3) fewer restorative components.

The patient's point-of-view

When patients discover that the Trefoil system may resolve the social and physiological issues they have been facing as denture wearers—and can provide a fixed and definitive prosthesis in short order—they are often profoundly impressed.*

Nancy Rojo, a patient who was one of the first to be treated with Trefoil in Chile—as part of a five-year multi-center study—puts it this way: "With my old prosthesis I never had peace of mind because it moved. With Trefoil, I can laugh with my mouth open again!"

For a formerly edentulous woman, being able to laugh whole-heartedly again is not a trivial accomplishment—and it is certainly what Per-Ingvar Brånemark meant when he spoke about restoring dignity. <

→ More to explore!

* Please turn to pages 5-8 for more information about the Trefoil system, the science behind it, and how it works in detail.

In this Issue

From the President

Hans Geiselhöringer, President

As the forerunner in edentulous solutions, Nobel Biocare is continuously advancing existing proven innovations to further increase predictability and efficiency for patients and clinicians.

A perfect example is the evolution of the original All-on-4® treatment concept. New componentry significantly reduces chair time, while the introduction of updated zygomatic implants and an extended line of NobelSpeedy implants enable even more patients to benefit from this life-changing solution. Now, the Nobel Biocare portfolio can cater even for patients that were previously deemed untreatable.

Addressing an unmet patient need is the driving force behind the launch of the Trefoil system—a groundbreaking new option for the edentulous lower jaw. Its IP-protected framework with a unique fixation mechanism enables the fixed, definitive, full-arch restoration of the mandible on the day of surgery.

Using the market as a testing ground for innovations is not the Nobel Biocare way. Prior to launch, one-year preliminary results of a global multicenter already showed outstanding results for Trefoil patients.

Just as our dedication to restoring quality of life for edentulous patients endures, so too does our dedication to scientific rigor and providing evidence-based solutions. <

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Scan, Plan, and Deliver!

New collaborative workflow offers a fully digital provisional restoration on the day of surgery.

The next generation of Nobel Biocare's integrated treatment workflow has been developed to improve collaboration between treatment partners while increasing both treatment efficiency and acceptance.

By Lilibeth Brogna Salas

Devised for partially edentulous patients, the new collaborative workflow from Nobel Biocare offers a time-efficient protocol for providing screw-retained, individualized provisionals on the day of surgery through the fully digital design and in-house production of TempShell temporary restorations.

Step-by-step

As with the current integrated workflow, the clinician takes a (CB)CT scan in line with his or her usual diagnostic procedures. Additionally, a dental scan of the intraoral situation is acquired from an intraoral or desktop scanner. The STL or PLY(color scan) file is then imported into NobelClinician.

This hard and soft tissue data can then be combined effortlessly using the SmartFusion function in the software to provide a detailed visualization of the anatomical situation.

The planning process is made even more efficient by the introduction of the SmartSetup feature. This automatically creates virtual teeth by analyzing the patient's remaining dentition. The clinician can subsequently diagnose and plan the implant treatment based on the underlying anatomy (hard tissue), the intraoral tissue, and the prosthetic information.

The final treatment plan can then be used to order a surgical template for pilot-drilling or fully guided implant placement.

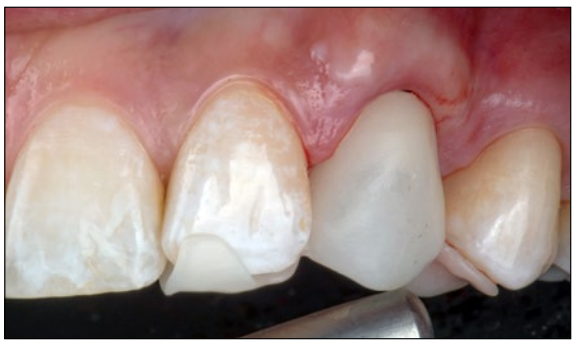
In the new collaborative workflow, the clinician is able to share the NobelClinician treatment plan via NobelConnect with a partner laboratory that is using the DTX Studio design software.* The lab uses the information from the treatment plan to finalize the TempShell (provisional) design and fabricate it in-house. Afterwards, it is sent directly to the clinician.

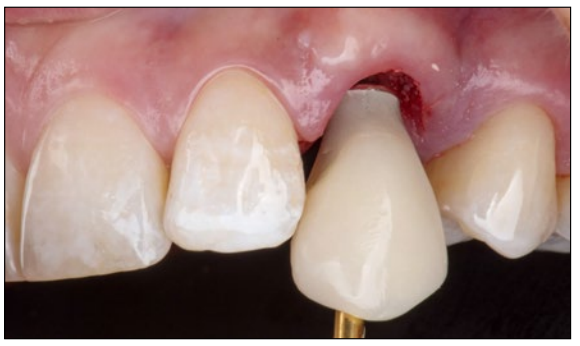
Because the TempShell is produced according to the digital treatment plan, the technician can be confident that it meets the needs of both the clinician and the patient.

On the day of surgery, the clinician places the implants and the temporary abutments, and then makes any needed modifications to the TempShell chairside to form a passive-fitting, screw-retained provisional.

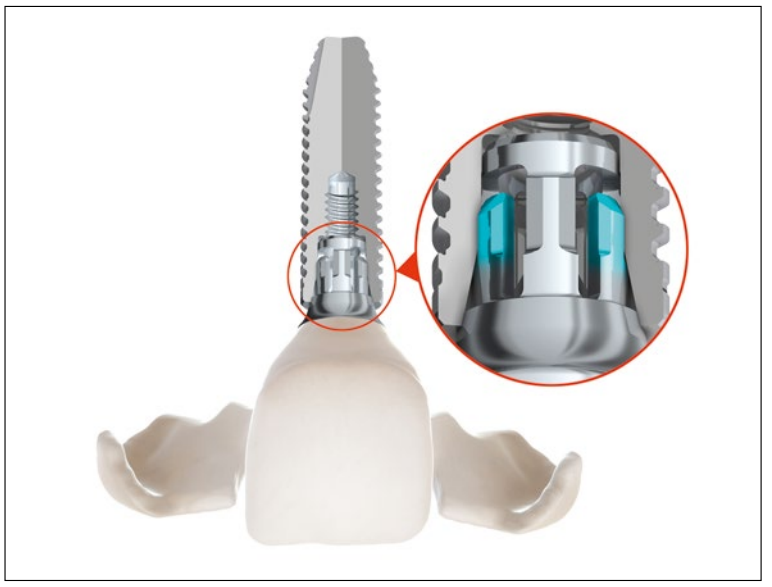
This updated workflow is designed not only to engender more time-efficient work and closer collaboration between the clinician and the lab, but also to reduce time-to-teeth for patients, making it possible for them to leave the dental office with a personalized, screw-retained provisional restoration on the day of surgery. <

* *DTX Studio is a digital platform for dental diagnostics and treatment consisting of modules connecting the patient's treatment workflow from beginning to end.*

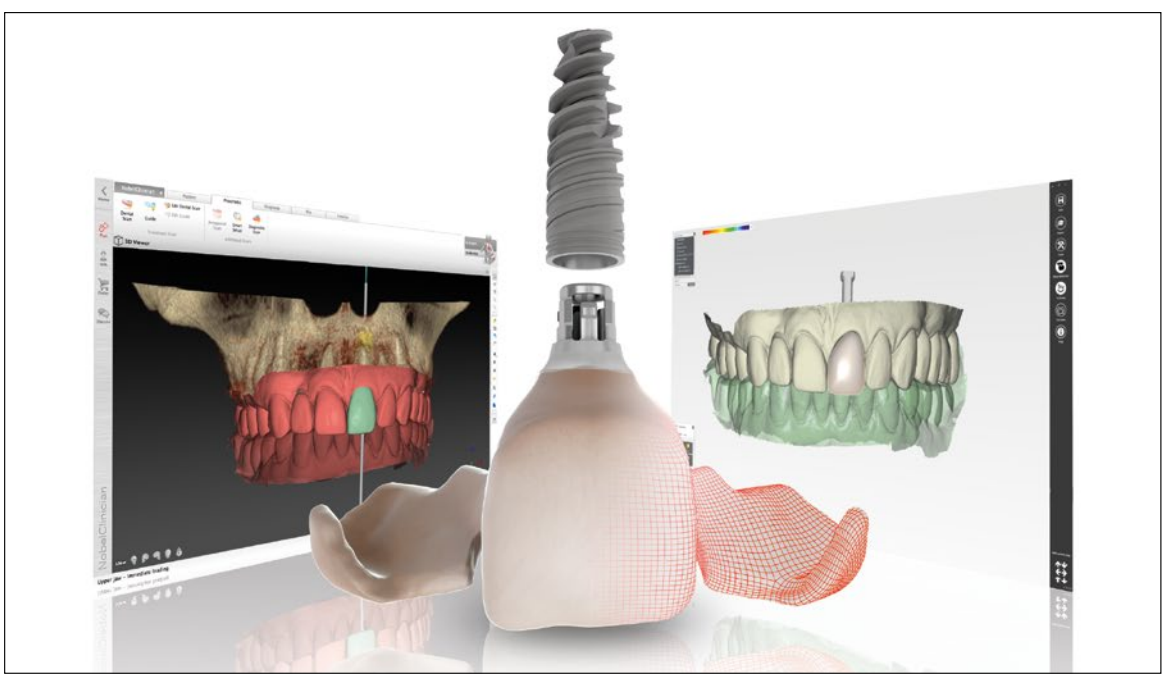




TempShell wings ensure correct positioning of the TempShell at try-in and are subsequently removed chairside before placement.



A TempShell is a single or partial provisional, which is fully digitally designed from a treatment plan and fabricated in-house either by 3D printing or milling. At the heart of the concept for single unit restorations, a Temporary Snap Abutment can be used.



The new SmartSetup feature automatically generates the diagnostic tooth setup in the NobelClinician Software (left). It can then be transferred via NobelConnect to the DTX Studio design software (right) where the setup can be used to create the provisional design for the TempShell restoration (middle).

→ More to explore!

For information about Nobel Biocare's collaborative treatment workflow, please visit: nobelbiocare.com/tempshell.

Important notice:

The new Nobel Biocare collaborative workflow was launched in October at the European Academy of Osseointegration (EAO) Congress in Madrid, and is under 510k review by the FDA. It is not currently available in the USA and some other markets around the world. Please also note that immediate loading protocols should only be followed when the relevant clinical requirements are met.

Moving Forward

Report of expert consensus

FOR SCIENCE EDUCATION HUMANITY
FOUNDATION FOR ORAL REHABILITATION

The FOR consensus conference held at the University of Pennsylvania School of Dental Medicine on November 30 to December 1, 2016 gathered a panel of international experts to discuss the topic of prosthetic protocols in implant-based rehabilitation.

The methods by which single crowns and prostheses are designed and fabricated for implant-based treatments have changed over the years. Recently, new materials and innovative techniques have been introduced, and relevant scientific evidence has been compiled. Ten international experts each conducted a systematic review of the literature on a specific topic in the field of prosthodontics, yielding the following results.

Both fixed and removable complete arch implant prosthesis were associated with high implant survival rates (on average >90% after 10 years). Implant overdentures were associated with more maintenance needs / complications than fixed prostheses as well as with greater postplacement residual ridge resorption. The level of patient satisfaction was high, however, with both types of prostheses.

Monolithic zirconia with gingival coloring ("gingival staining"), or zirconia with veneered porcelain limited to the gingival area, offers promising results for fixed complete dentures.

The choice of prosthetic material seemed to have no influence on implant or prosthetic survival rates in fixed restorations.

A systematic review on the clinical outcome of monolithic ceramic implant-supported, single- and multi-unit prostheses determined that the risk of fracture and chipping was significantly reduced in monolithic restorations. Another systematic review determined that CAD/CAM abutments have good survival and success rates and provide comparable, if not better, clinical outcomes than conventional abutments. Ti-inserts for CAD/CAM monolithic implant-supported ceramic restorations improve the overall fracture strength of ceramic abutments and crowns, protect the implant connection from wear, and offer a better marginal fit when compared with all-ceramic abutments. However, independent clinical trials that document long-term performance need to be carried out.

Zygomatic implants offer an alternative treatment option for patients with severely resorbed maxillae, thus avoiding invasive bone graft procedures. The survival rate of prostheses is related to the number and position of the zygomatic implants. It reached 96–100 % with one to six years survival. Prosthetic complications included loosening and the fracture of prosthetic screws with the attendant fracture of abutment screws.

Intraoral scanning is more challenging than in-vitro scanning of a model, and more *in vivo* studies are needed to define clinical indications for different types of IOS. Such is also the case for the impact of the misfit at the prosthesis-implant interface on clinical outcomes of screw-retained implant prostheses, where the available literature does not provide sufficient evidence.

The Foundation for Oral Rehabilitation would like to express their appreciation to the organizers and all the presenters. (See *Nobel Biocare News 2/2017*.) To join the FOR community, please go to the website below.

→ for.org/en/user/sign-up

"Both a reason and the means to smile once more"

All-on-4® treatment concept makes life worth living again.

As a young woman, Silviana Ribeiro faced the all-too-common consequences of a failing dentition in her upper jaw. She received a removable maxillary acrylic denture, which did not meet her esthetic or chewing needs, due to lack of retention and stability. At the age of 37, she received a fixed prosthesis supported by 4 implants (in accordance with the All-on-4® treatment concept) in the upper jaw using NobelSpeedy Groovy implants. On the same day, an all-acrylic fixed provisional prosthesis was adapted, re-establishing the occlusal vertical dimension, esthetics and function.

By Silviana Ribeiro

Smiling once more, Silviana Ribeiro says, "I didn't just gain a winning smile and the ability to eat unabashedly again, I won back my self-confidence."

My teeth began to give me problems during my first pregnancy. At that point, they started to grow very weak and began to fracture. One after the other, they had to be extracted, and before my recent rehabilitation, I only had three teeth remaining in the upper jaw.

I had been using a removable denture since the age of 20, but it bothered me a lot, and I found it difficult to cope with its drawbacks.

It was difficult for me to eat, and I found no pleasure around the dining table anymore. In fact, I actually stopped eating many foods, such as bread and apples, for example. Because I could not chew properly, my overall health was adversely affected, of course. What's more, eating difficulties were only part of the problem. I stopped smiling. I felt ashamed of myself.

Wide-ranging impact

In my day-to-day life, I became a more closed person. I was embarrassed by my dentures and simply did not smile—not even on my wedding day!

I was afraid that someone would notice that I was wearing a prosthesis. When I didn't wear my dentures for one reason or another, I shut myself in. Although I never hid my predicament from my husband or my son, nobody knew my secret outside a small circle of family and friends. In short, the dentures were discomfiting and diminished both my physical and psychological well-being.

Seen and heard on TV

I first learned that there was a very promising potential solution to my situation when I saw Dr. Paulo Malo being interviewed on a television program that I was watching here in Portugal. I was reluctant at first to seek care, but my son signed me up without telling me. He is very young—but apparently not too young to worry about me. He understood that I was suffering and wanted to help me.

At MALO CLINIC, I saw cases rehabilitated via the All-on-4® treatment concept and it seemed like a dream to me. People were completely transformed. They looked so beautiful. Only those who have the kind of problems I've faced can understand that removable dentures are simply not a viable solution.

To say the least, I was motivated at this stage to solve my problem permanently. They scheduled me for treatment and soon it was underway.

After the surgery I was able to leave the clinic with new teeth in place.* What a change it made! A loose denture user no more, I was regaining well-anchored teeth, which was very important. My quality-of-life suddenly improved tremendously. This treatment is not just about having beautiful teeth, however. It's about being able to lead a normal life. When I looked in the mirror for the first time, I felt happy, truly happy. I still feel that way today.

"It changed my life!"

For me the results were transformational. My outlook on life—if not my personality itself—changed dramatically once I could smile uninhibitedly again.

Where I was once hesitant and socially insecure, I now greet the people around me with a sincere smile and an upbeat attitude.

These days, people tell me I'm very pretty, something I hadn't heard very often when I was wearing dentures. I didn't just gain a winning smile and the ability to eat unabashedly again, I won back my self-confidence.

Whenever I meet someone who is experiencing problems with a denture and is considering implant treatment, I tell them my story and recommend the treatment wholeheartedly. I never had any pain during my treatment and recovery was very fast. In short, I have only seen the advantages. This treatment is one of the best things that ever happened to me. It has given me both a reason and the means to smile broadly once again. <

→ More to explore!
To see how the All-on-4® treatment concept can revolutionize your practice, please visit: nobelbiocare.com/all-on-4.

** Loading with a fixed provisional restoration on the day of surgery is possible provided patient criteria are met and adequate implant stability is achieved.*

Science matters

Extraction and osseointegration

Contribution of the periodontal ligament to osteotomy repair and implant osseointegration. (Pei et al., J Dent Res. 2017)

The immediate placement of implants following extraction is increasingly commonplace. Yet, few studies have investigated how the healing of extraction sockets differs from that of osteotomies, and how any differences might influence implant osseointegration.

Pei and coworkers used mouse models to investigate these scenarios at the cellular level. In extraction sockets, the authors observed that remnants of a healthy periodontal ligament could mineralize and contribute to new bone formation. Healing of extraction sockets, where remnants of a healthy periodontal ligament were present, was also observed to be faster than the healing of osteotomies, where the periodontal ligament had been stripped out.

These observations suggest that surgical approaches to minimize trauma and maximize retention of formerly healthy tissue may benefit healing and, in turn, implant osseointegration.

→ ncbi.nlm.nih.gov/pubmed/28481696

A reliable angle

Mechanical complications associated with angled screw channel restorations (Greer et al., Int J Prosthodont. 2017)

Angulated screw channel (ASC) solutions overcome the esthetic challenges of screw-retained restorations in the anterior, improve occlusal access in the posterior, and eliminate the risks associated with excess cement. In this clinical study, Greer and coworkers examined the clinical performance of Nobel Biocare ASC abutments and crowns at a British dental hospital.

Sixty patients received a total of 84 single-implant restorations between 2014 and 2016. NobelProcera ASC crowns were used in 90% of restorations and NobelProcera Full Contour Zirconia crowns in the remainder. The clinic successfully used ASC restorations to replace single crowns in a broad range of applications. In 96% of patients, no prosthodontic complications were seen. When issues did arise, these were similar to those that affect conventional implant-retained solutions: one loose screw attributed to under-torquing, one ceramic failure due to poor occlusal management, and one implant failure.

The conclusion was reached that Nobel Biocare ASC abutments and crowns, when used with Nobel Biocare Conical Connection implants, offer a reliable alternative to traditional cement or screw-retained restorations.

→ ncbi.nlm.nih.gov/pubmed/28453001

Promoting new bone formation

Tissue dynamics and regenerative outcome in two resorbable non-chemically cross-linked collagen membranes for guided bone regeneration: A preclinical molecular and histological study in vivo (Omar et al., Clin Oral Implants Res. 2017; doi: 10.1111/clr.13032)

The potential for some membranes used in guided bone regeneration (GBR) to behave as bioactive modulators of bone healing is increasingly being recognized. This study used a rodent model to investigate how two non-cross-linked collagen membranes, creos xenoprotect and Bio-Gide®, promoted cellular and molecular activity during bone healing in GBR. After the introduction of defects in the femoral epiphysis (trabecular bone) of anaesthetized rats, investigational sites were filled with deproteinized bovine bone and covered with either creos xenoprotect or Bio-Gide®. Both membranes promoted a comparable amount of bone formation overall. However, only creos xenoprotect encouraged significant new bone formation in the central region of the defects. These results suggest that creos xenoprotect, rather than being a mere passive barrier, may play an active role in regulating bone healing dynamics as well.

→ ncbi.nlm.nih.gov/pubmed/28703398

Regenerative Solutions For Clinical Success

Opening a world of exciting treatment options

Professor Werner Zechner, a specialist in bone grafting, implant surfaces and guided implant placement protocols, summarizes his experiences with creos regenerative solutions.

By Prof. Werner Zechner

From the very beginning, my experiences with the creos xenoprotect membrane have been very positive. It is simple to trim, even after soaking with autogenous blood. It's easy to handle during surgery and offers excellent stability.

My choice of membrane depends on the indication. I find creos xenoprotect is particularly well-suited to bone augmentation techniques, especially in situations with reduced soft tissue. In many clinical situations, it offers the balance I need between space-maintaining stability and a slow resorption rate.

Most importantly, what I expect from a membrane when using guided bone regeneration (GBR) is predictable clinical success. In a meta-analytic study that we performed, comparing creos xenoprotect with other collagen membranes, we have observed a reduced rate in dehiscences with creos xenoprotect. In general, we have seen fewer complications in healing, especially versus other stiffer and cross-linked membranes. We have also demonstrated the efficacy of the membrane in a multi-center study.

In addition, the creos xenogain bone substitute is available in a useful variety of packaging options. Depending on the indication and clinical situation, a vial, a syringe, or a bowl is offered. The latter avoids the use of an additional sterile dappen dish for mixing the particulate with autogenous blood, which I prefer in most of my surgeries.

In my overall experience, the creos xenogain bone matrix is a reliable choice. It has been in clinical use for many years and examined in various research and clinical publications, which is a very important consideration for me when selecting a bone substitute to treat my patients. <

Professor Werner Zechner is Co-head of the Department for Oral Surgery and Implantology at the University Dental Clinic of the Medical University in Vienna, Austria. He has published over 40 articles in peer-reviewed, international scientific journals and books.

→ More to explore!

See "In brief" on page 10 of this issue, and for the full references to this story, please visit: nobelbiocare.com/news.

NobelZygoma™ Dramatically Shortens Time-to-teeth

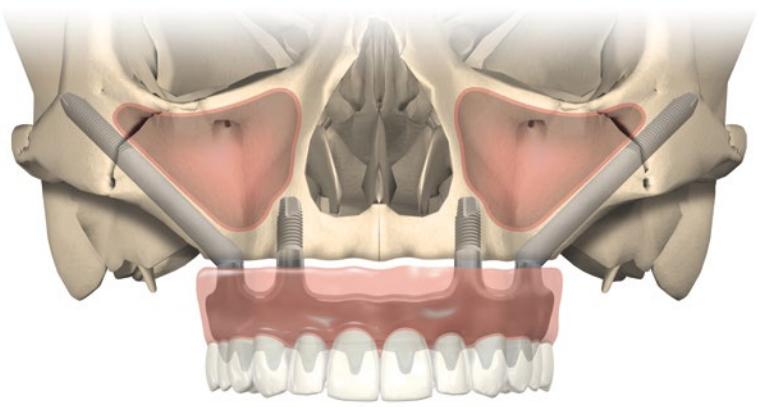
An excellent alternative to extensive grafting procedures

Prof. Paulo Malo successfully treated the first patient with the All-on-4® treatment concept decades ago. Here he comments on using the new NobelZygoma implant series.

By Professor Paulo Malo

The design features of the new NobelZygoma implant allow me to offer even better treatment solutions to my patients in a more effective way: The new apex shape gives me enhanced bicortical anchorage in zygomatic bone without spinning, and the non-threaded coronal part allows me to use the extra-maxilla technique, thus optimizing the prosthetic outcome.

We've been having nothing but great experiences with these new implants. The NobelZygoma implant basically has three major characteristics: 1) the apex, which is tapered for high primary stability and very important for immediate load; 2) the body of the implant, which is very kind to soft tissue; and 3) the head of the implant, which now comes both in 45 degree and zero-degree versions—the latter of which makes it possible for us to place the implant deeper, and therefore reach a more buccal position. This is a great improvement in terms of prosthetic flexibility and has completely changed the way we now do prostheses in the zygoma. <



NobelZygoma, the implant system of choice for immediate loading in cases of severe maxillary resorption. It also offers a broad choice of temporary prosthetic options, dramatically decreasing time-to-teeth.

→ More to explore!
nobelbiocare.com/nobelzygoma

Trefoil™ – Preliminary Results Now Available for Your Review

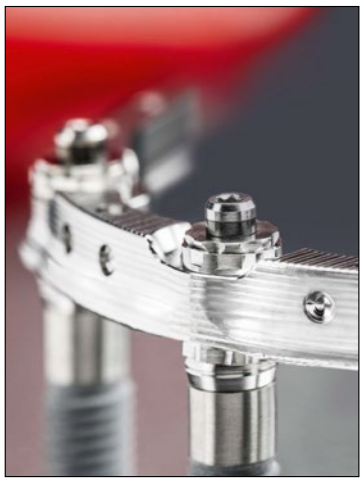
Report on an adaptive prefabricated full-arch framework on three implants in the mandible

At a series of professional meetings this fall, Dr. Kenji Higuchi and his colleagues have reported on early clinical outcomes of Trefoil, an innovative edentulous solution combining straightforward guided surgery with a simplified restorative protocol that allows for delivery of the definitive prosthesis on the day of surgery.

By Chris Kendall

The Trefoil system—featured in detail on the following four pages—uses a standardized prefabricated framework fitted with specialized adaptive mechanisms that ensure passive fit of the prosthesis by compensating for horizontal, vertical and angular deviations from the planned placement of the three supporting implants.

The first data are now being presented from a 5-year international multicenter clinical investigation that is being carried out to evaluate implant and prosthetic survival of the Trefoil system in the mandible.* Preliminary data, including six-month results for most patients and one-year outcomes for early recruits, have now been presented.



With the support of Nobel Biocare, clinicians in Australia, Chile, Italy, Spain and the United States are carrying out a five-year, international, multicenter, prospective study evaluating the implant and prosthetic survival of the Trefoil system in the mandible. This study includes 110 patients and 330 Trefoil implants. For details, such as inclusion criteria, declared purpose, etc. please visit the U.S. Library of Medicine's website: bit.ly/TrefoilMCS.

The results you expect from Nobel Biocare

When recruitment closed in February 2017, the study encompassed 110 patients (330 implants).

At the time of the Trefoil system launch, 94 patients had completed the six-month follow-up visit and 40 patients attended the one-year assessment. Implant survival rate was 98.2% (n=282) at six months and 97.6% (n=120) at one year. A total of eight implant failures were reported in six patients.

In four of these patients, a single implant failed, and their prostheses remained in function until the implants were replaced. These patients were advised to switch to a soft diet, and following a healing period, their third implants were replaced with either a new Trefoil implant (n=3) or NobelActive implant (n=1).

The prosthetic survival rate was 98.2% at one year, as two prostheses were removed due to two implants failing to osseointegrate in each case. Both patients were subsequently treated with a custom prosthesis.

Within the constraints of these preliminary findings, the Trefoil system demonstrates good early outcomes in terms of prosthetic and implant survival rates, as well as patient and clinician satisfaction.*

This innovative, adaptive, prefabricated framework supported on three implants allows for immediate loading of a final fixed solution for the edentulous mandible. As the study continues, outcomes for extended periods of time will be reported on a regular basis. <

→ More to explore!
Turn the page for more information about Trefoil, how it works, and what it can do for your practice. nobelbiocare.com/trefoil.

* *Higuchi K, Davó R, Liddelow G, et al. "An adaptive prefabricated full-arch framework on three implants in the mandible: preliminary results." Clin Oral Implants Res 2017;28(Suppl).*

Nobel Biocare 2017 Symposia – Voices in the Crowd

Eleven symposia, eleven memorable events

The last of this year's Nobel Biocare symposia—held in London, on November 10-11, 2017—has proven as successful as all the others held earlier this year. Most impressive: The science behind the products.

By Frederic Love

From locations as widespread as Portugal, the United Arab Emirates, Spain, Mexico, Russia, China, the US, Japan, the Netherlands, Croatia, and the UK, upbeat reports from organizers and participants alike have been overwhelming. They all seem to want to do it again.

Among the thousands of dental professionals who attended Nobel Biocare symposia this year, here are a few of the voices we've heard:

"The scientific program in Dubai was outstanding," said Professor Nabil Barakat of Lebanon. "The renowned clinicians who lectured succeeded in relating how Nobel Biocare has always joined science and innovative technologies in the constant evolution of their products to better serve dentists and their patients."

Something for everybody

Dr. Beatriz Aranguena of Spain, who attended the symposium in Santiago de Compostela, agreed. "We enjoyed a top-level scientific program. For me, the highlights were the interdisciplinary approach, the live surgeries, and also an excellent program for the laboratory technicians, who play a very important role in treatment—all of which is crucial for the benefit of patients."

On the other side of the globe, Professor Ye Lin of China said, "The Nobel Biocare symposium in Huangzhou was well-organized with fantastic academic topics. It provided dentists with a good chance to be exposed to the latest ideas and technologies of the dental implant industry." <

Nobel Biocare Symposia stand for global learning opportunities in a local setting. New products and innovative techniques have been presented in multiple forums at each of this year's eleven symposia, such as this one in North America.

→ More to explore!
To stay on top of upcoming events in the world of osseointegration visit: nobelbiocare.com/events

Upcoming Events

Meet Nobel Biocare at events around the world. These professional gatherings provide a great opportunity for catching up with the latest innovations and scientific research.

• 2017 •

ADF Annual Meeting
November 28–December 2
Paris, France

AAOMS Dental Implant Conference
November 30–December 2
Chicago, IL

DGI Congress
November 30–December 2
Dusseldorf, Germany

• 2018 •

Vision 21 – National Association of Dental Laboratories
January 18–20
Las Vegas, NV

25th Malaysian Dental Association SCATE
January 26–28
Kuala Lumpur, Malaysia

AEEDC Conference
February 6–8
Dubai, UAE

CDS – Chicago Dental Society Midwinter Meeting
February 22–24
Chicago, IL

LMT Lab Day
February 23–24
Chicago, IL

AO – Academy of Osseointegration Annual Meeting
28 February–3 March
Los Angeles, CA

Pacific Dental Conference
March 8–10
Vancouver, Canada

Expodental
March 15–17
Madrid, Spain

AADR Annual Meeting
March 12–14
Fort Lauderdale, FL

SIDP National Congress
March 15–17
Rimini, Italy

IDEM Scientific Conference
April 13–15
Singapore

American Academy of Cosmetic Dentistry • Annual Scientific Session
April 18–21
Chicago, IL

Centennial Meeting of the Academy of Prosthodontics
May 9–12
Chicago, IL

SEPES Primavera
May 19
Madrid, Spain

European Academy of Esthetic Dentistry Spring Meeting
May 24–26
Sorrento, Italy

→ More to explore
For the most recent updates, visit: nobelbiocare.com/events

Trefoil™ – The Next Full-arch Revolution

A cutting-edge, fixed solution—designed and implemented to treat more patients better—has just arrived.

Nobel Biocare has led innovation in full-arch solutions for over 50 years. The latest addition to the company's already extensive assortment of innovations for full-arch rehabilitation is the perfect example of this approach in action.

By Mike Stuart

The Trefoil system is a breakthrough in efficiency for treating the mandible. Previously, manufactured bars might have been cost-efficient, but passive fit always posed a challenge. Now, Trefoil has overcome this drawback with a unique fixation mechanism, which can adjust to compensate for inherent deviations from the ideal implant position. This feat of engineering lies at the heart of a new fixed solution that makes it possible for clinicians to offer patients fixed and definitive teeth in a single day.*

More patients can now benefit from a fixed solution

For a very large number of patients, conventional dentures do not provide an adequate solution to their masticatory, esthetic or even social needs. Consequently, the benefits of fixed solutions often outweigh the perceived lower cost of dentures—or even a fixed-removable—for many patients. For patients considering implant-supported solutions, the Trefoil system offers a fast, affordable, state-of-the-art fixed treatment solution.

Developed with the needs of the many in mind, the efficiency of the Trefoil system empowers clinicians to provide many patients who are held back by time or by finances with the premium-quality, fixed solution they deserve.**

Even before launch, the patient benefits of the Trefoil system are clear. A global, five-year multi-center study using the solution began in 2015 and has already yielded very telling results. With the Trefoil system now widely available, many more patients around the world will soon be able to experience the quality of life improvements that Trefoil was designed to deliver. <

**Depending on clinician preference and close cooperation with the laboratory.*

*** Loading with a fixed provisional restoration on the day of surgery is possible provided patient criteria are met and adequate implant stability is achieved.*

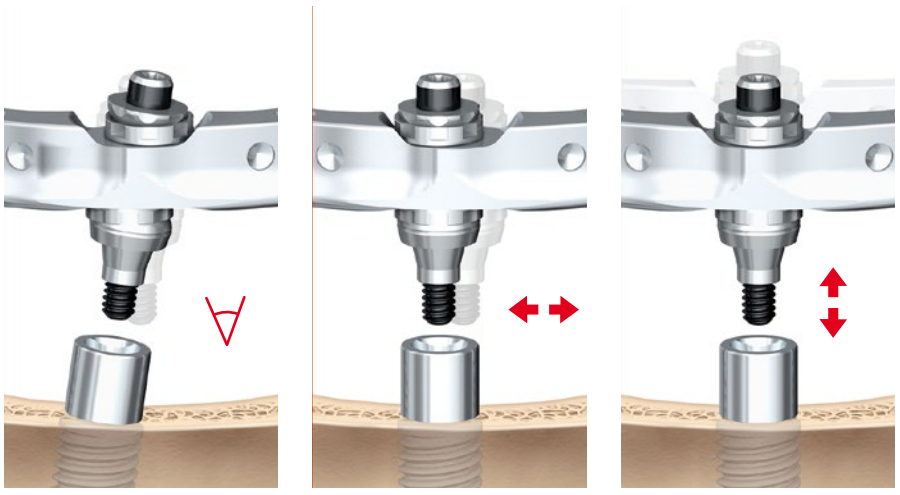
Leading in immediate solutions

By continually challenging existing treatment methods we aim to drive efficiency and make high-quality implant treatment a viable choice for more patients.

THE FIRST PRE-MANUFACTURED BAR WITH PASSIVE FIT

The ingenious fixation mechanism is a breakthrough in treating the edentulous mandible.

Anatomically designed for the natural arch of the lower jaw, the standardized bar contains adaptive joints that adjust to compensate for horizontal, vertical and angular deviations from the ideal implant position.



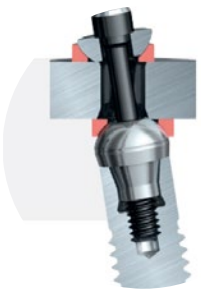
Angular deviation **±4.0°**

Horizontal deviation **±0.4 mm**

Vertical deviation **±0.5 mm**

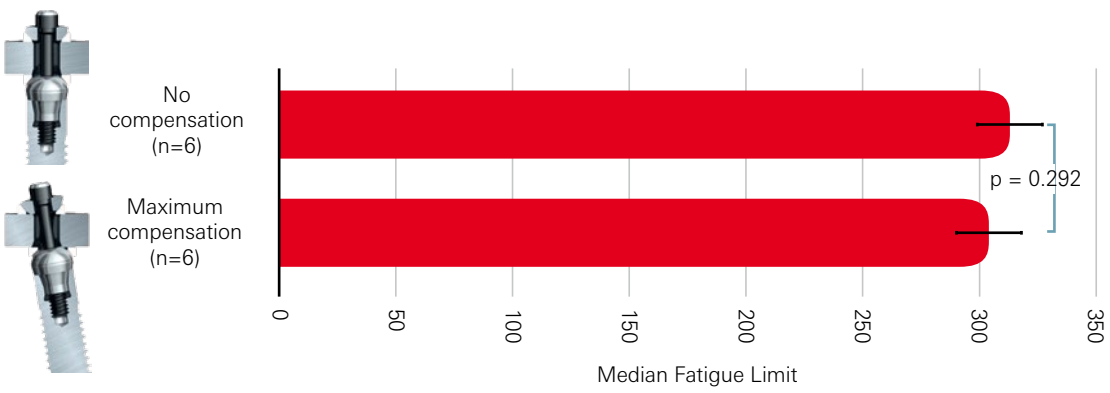
PATENT PENDING FOR FIXATION MECHANISM

Each mechanism has five self-adjusting joints that help correct the position of the prefabricated bar, enabling the passive fit of the definitive prosthesis.



PROVEN STRENGTH WHEN PUSHED TO THE LIMIT

The Trefoil system maintains its strength when pushed to the extreme of its compensation capability. In fact, tests prove almost no difference in fatigue limit between the maximum compensation configuration and the configuration without compensation.



FIND OUT MORE

Discover the detail behind this revolutionary full-arch solution: nobelbiocare.com/trefoil

DEFINITIVE TEETH IN ONE DAY*

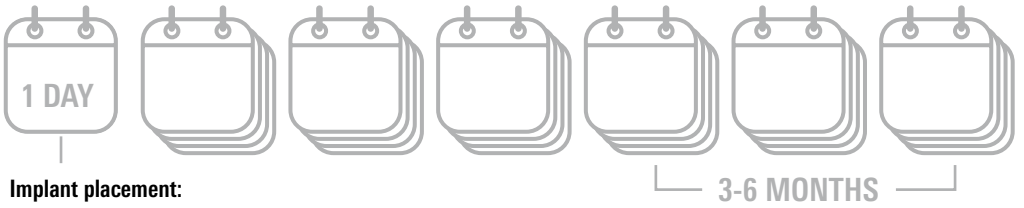
Dental implant patients are increasingly demanding immediate restorations.

The Trefoil system is a cost-efficient solution that allows Immediate Function and makes fixed and definitive teeth on the day of implant surgery* an option for more patients.

Trefoil

Implant placement and fixed definitive restoration in one visit.*

Conventional treatment



Implant placement:
Implant and provisional denture are placed.

Fixed and definitive restoration is placed.

*Depending on clinician preference and close cooperation with the laboratory.

STRAIGHTFORWARD PROSTHETIC WORKFLOW

Substantial time savings for the restorative clinician and the lab.

The restorative workflow is simplified thanks to the use of the pre-manufactured bar. An experienced clinician and lab will require approximately six hours of active working time to create the definitive acrylic prosthesis.**

**The comparison above demonstrates possible treatment methods with approximate treatment times.

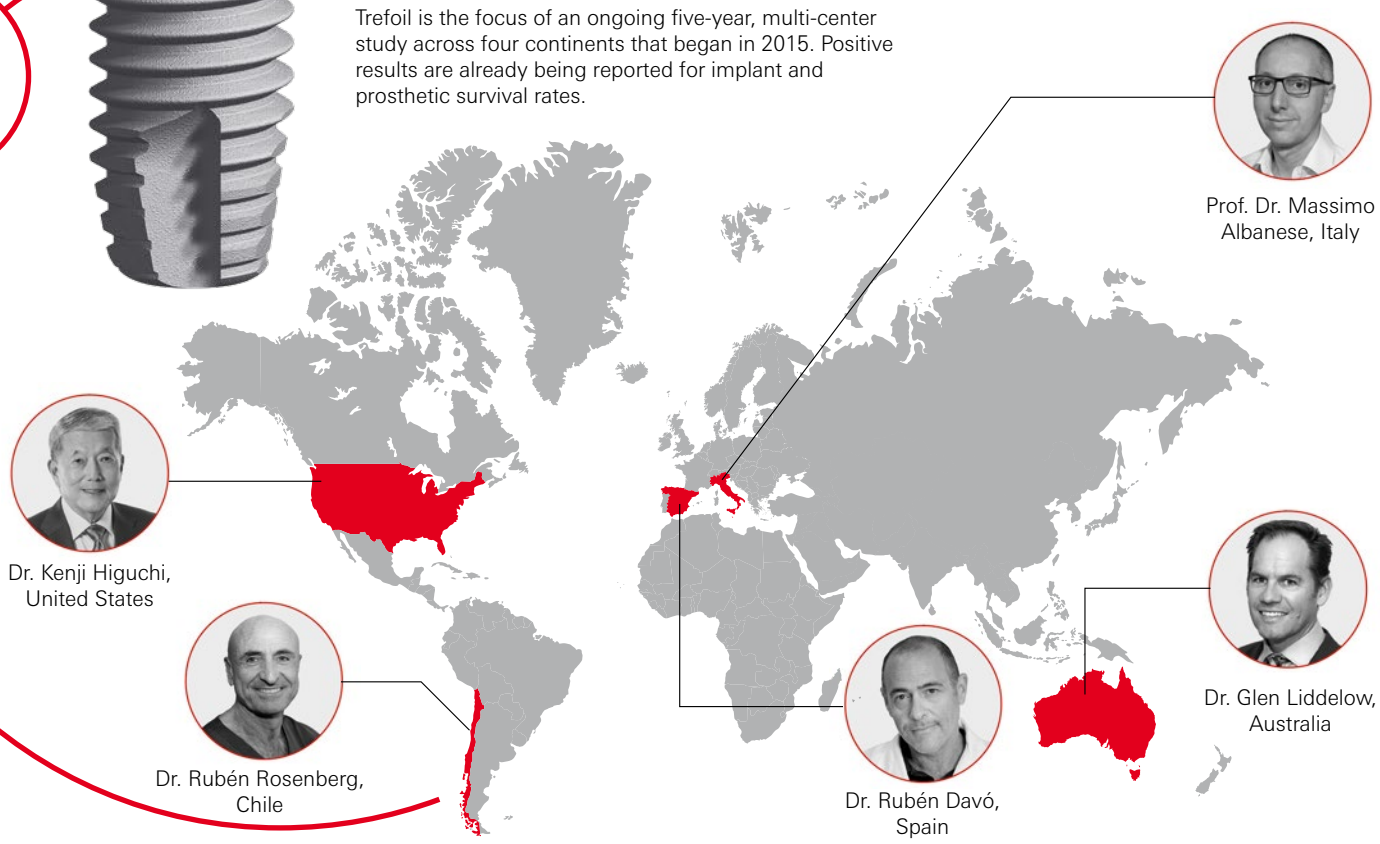
5 YEARS

4 CONTINENTS

110 PATIENTS

ALREADY BACKED BY CLINICAL RESEARCH

Trefoil is the focus of an ongoing five-year, multi-center study across four continents that began in 2015. Positive results are already being reported for implant and prosthetic survival rates.



Prof. Dr. Massimo Albanese, Italy

Dr. Kenji Higuchi, United States

Dr. Rubén Rosenberg, Chile

Dr. Rubén Davó, Spain

Dr. Glen Liddelow, Australia

Breakthrough in Efficiency with Trefoil™

Speaking with *Nobel Biocare News*, Dr. Glen Liddelow addresses one of the key breakthroughs of the treatment – efficiency.

Dr. Glen Liddelow, from Western Australia Surgery and Prosthetics in Perth, has been treating patients with mandibular edentulism or failing mandibular dentition using the Trefoil system since 2016. He has performed over 40 Trefoil treatments and is a principal investigator in an ongoing, 5-year Trefoil multi-center study.

According to Dr. Glen Liddelow, the Trefoil system is an efficient way to get a high-quality immediate prosthesis. Ever since the first loaded bridges were introduced 18 years ago, reductions in time and cost have improved treatment acceptance dramatically, and he sees the Trefoil system as yet another step in the right direction.

At what key stages do you save time with the Trefoil system in comparison with conventional fixed full-arch treatments?

Dr. Glen Liddelow: The real time-saver is the fact that there is no temporary bridge in the Trefoil system workflow, and that there are fewer steps required than for a conventional custom bridge.

With the Trefoil system you cut out all of the appointments required to produce a definitive bridge, such as impressions, jaw relations, tooth try-in, framework try-in and definitive bridge insertion. This is significant for the clinician as well as the patient.

We treat many patients that live considerable distances from our practice, and the ability to almost immediately provide a definitive bridge can save them airfares, travel costs and time off work. The impression procedure is much quicker than other treatments—it takes me around ten minutes. I don't do a wax-rim type of jaw relation, so my jaw relations take about five minutes. Then the insertion of the bridge typically takes about 15 minutes; but do I allocate about 30 minutes to have a chat with the patient and go through such things as oral hygiene instructions.

Trefoil treatment time: Active working time estimate based on median time observed in clinical use.*

Q&A

Questions and Answers

In total, how much time do you spend on treatment with a case using the Trefoil system?

Liddelow: In total, an experienced clinician and lab will require around six hours of working time.

I spend around 2.5 clinical hours on treatment at the practice, including both surgical and restorative procedures. Compared with conventional full-arch treatments, I can save around 4.5 clinical hours. If the surgical and restorative steps are carried out separately, and if you do a wax rim and a try-in before bridge insertion, treatment takes around 3.5 clinical hours.

A clinician that does both surgical and restorative work will immediately save a lot of time with the Trefoil system. I spend a similar amount of time on the surgery as with conventional treatments. As usual with any new surgical technique, times have gradually improved along the learning curve. It's important to note in this context that comprehensive training is recommended before starting with the Trefoil system.

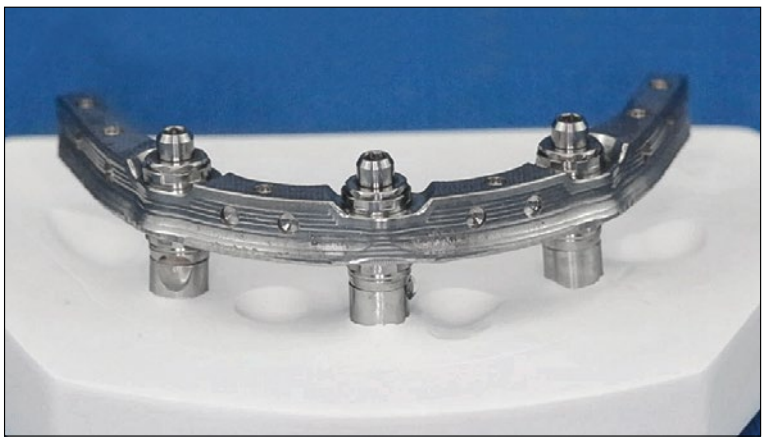
Both time-savings and cost-savings can be realized at the laboratory. With the pre-manufactured bar there is no need to design the bridge framework. The fit is determined in the lab utilizing the fixation mechanism, so a surprise is less likely than when receiving a custom framework from a third party, where there can be scanning or milling errors. The biggest factor is the time-saving in waiting for the framework—the technician can get on with the production of the bridge and not have to wait while tracking framework delivery.

How would you describe the prosthetic workflow of the Trefoil system?

Liddelow: The flexibility of the Trefoil system allows for variations in prosthetic workflow to suit the clinicians involved and their respective practices. It can be managed a number of ways. (Editor's note: Please see the *Trefoil Procedures Manual* for more information.)

Because I do both the surgery and prosthetics, I combine the impression and jaw relation at the time of surgery, then provide the bridge at a separate appointment. If the treatment is divided between specialists on the other hand, there could be more prosthetic appointments for jaw relations and try-in, for example.

The impression or verification part of the treatment is very efficient. A surgeon with little experience in implant impressions could provide this at the time of surgery, save significant time, and improve patient comfort by lessening the need for manipulation of tissues immediately after the operation.



Verifying the fit of the Trefoil bar.

How do you expect the introduction of the Trefoil system to affect your dental practice?

Liddelow: The most significant impact comes from the time- and cost-efficiency of the Trefoil system. With pre-manufactured components, no multiple customization and no provisional phase, it allows me to treat more patients with a fixed, full-arch solution. That provides a big growth potential for the practice and—more importantly—an opportunity to better serve the community.

How would you describe the main patient benefits of the Trefoil system?

Liddelow: Getting a definitive prosthesis is fast: there is no provisional phase, a simplified workflow and less active working time for both practice and lab.

Not only does time-efficiency make the treatment convenient for the patient, it also has the potential to translate into greater affordability. These gains are consolidated by the efficiency of pre-manufactured, pre-assembled components. The Trefoil system forms a great alternative to fixed-removable options and gives more people than ever before access to something that feels like a third dentition. <

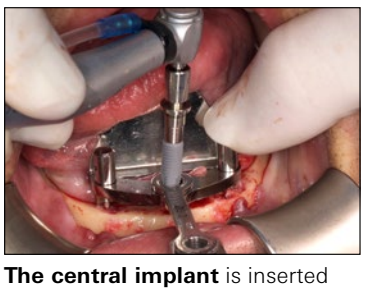
→ More to explore!

Discover the detail behind this revolutionary full-arch solution: nobelbiocare.com/trefoil.

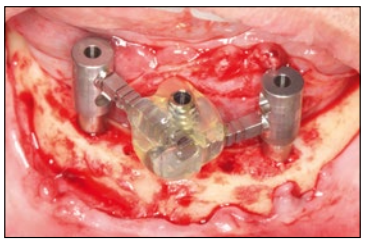
Case images courtesy of Dr. Glen Liddelow and Michael Standish Dental Laboratories.

** Data on file from use by experienced clinicians and lab technicians.*

Pre-treatment view of the mandibular residual ridge.



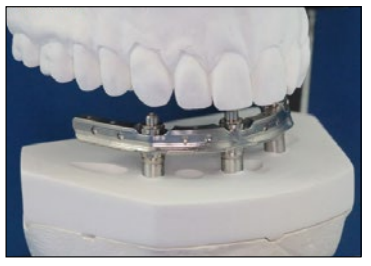
The central implant is inserted into place using the positioning template.



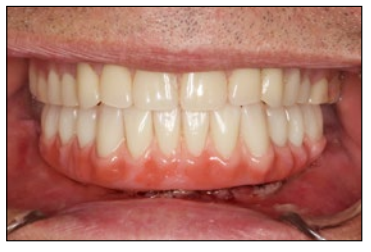
The Transfer Abutments and a non-engaging temporary abutment are placed to construct the verification index. The Transfer Abutments are luted with light-cured resin to fix the verification index.

Fixation of the mechanism using either laser welding or resin. The bar shown here is laser welded.

Conventional wax-up and processing for a wrap-around hybrid acrylic / titanium fixed prosthesis.



Articulation of the bar to the opposing arch.



Delivery of the final bridge on the day of surgery. Occlusion is checked for even contact and anterior guidance. Accessibility for cleaning is verified and screws are tightened to 35 Ncm. Access holes are sealed with Teflon and composite.

Overcoming Obstacles

Ground-breaking work is underway to accelerate implant osseointegration at extraction sites.

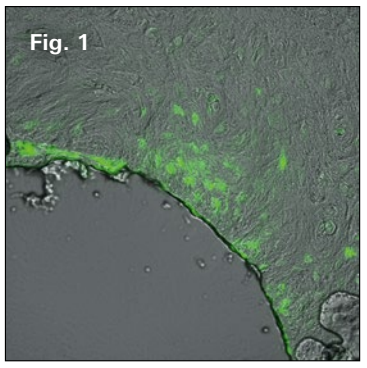
Working with researchers Xing Yin, Jingtao Li, and Xibo Pei at the Stanford University Department of Surgery, Professor Jill A. Helms has been studying the biology and mechanics of immediately loaded implants. In this, the third of a three-part series on the topic, Dr. Helms discusses the molecular mechanisms of bone formation, implications for immediate implants and interesting directions for further long-term research.

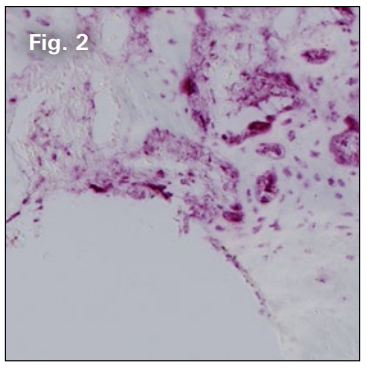
By Professor Jill A. Helms

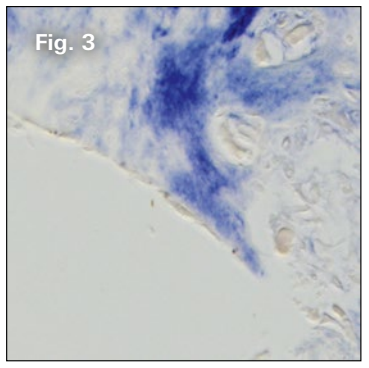
In the previous two issues of *Nobel Biocare News* we discussed the extraction socket and what happens—from both biological and biomechanical perspectives—around implants that are placed in extraction sockets. In this third and final article, we focus on overcoming obstacles to accelerate implant osseointegration at extraction sites.

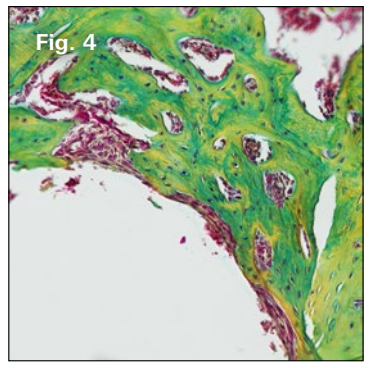
Of all the dental specialties, the field of implantology stands apart as a leader in design innovation. New materials, modifications in surface textures and implant shapes—as well as advances in osteotomy site preparation—have all contributed significantly to the success of dental implants. And yet there remains still more design space for improvements. In my laboratory at Stanford, our goal is to tweak the body's natural bone-making capacity to accelerate bone formation around implants.

Some people wonder if new bone is actually necessary. After all, when you place an implant, and it's stable, it's reasonable to wonder why you might need new bone. The answer has to do with the fact that even the most careful implant site preparation still damages bone, and this damage can be exacerbated if an implant is placed with excessively high insertion torque.









Figures 1-4 (left to right). Histology sections of rodent osteotomy site: Dying osteocytes (Fig. 1) trigger bone resorption by osteoclasts (Fig. 2) and the void left behind needs to be filled with new bone (Fig. 3). It is this new bone that is ultimately responsible for the long-term osseointegration of an implant. (Fig. 4)

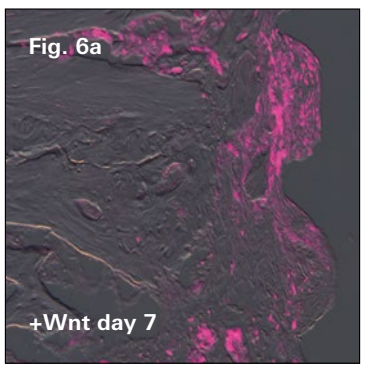
These types of damage are essentially "erased" from the bone because this tissue is in a constant state of turnover: dead osteocytes (Fig. 1) trigger bone resorption by osteoclasts (Fig. 2) and the void left behind needs to be filled with new bone (Fig. 3). It is this new bone that is ultimately responsible for the long-term osseointegration of an implant (Fig 4).

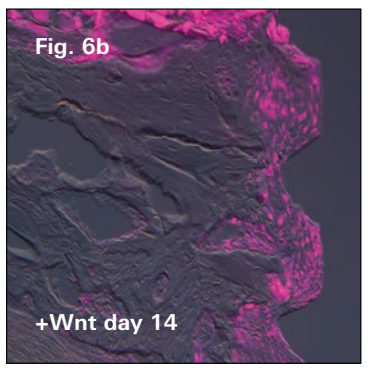
R&D
Research and Development

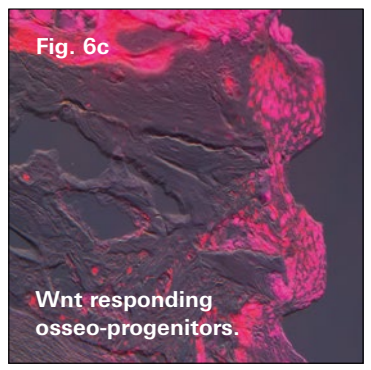
My colleagues and I started with a simple enough question: Where does this new osseointegrating bone come from? The answer is that the new bone arises from a population of bone-forming progenitor cells lining the socket, and are especially concentrated in the remnants of the periodontal ligament left behind after tooth removal (Fig. 5a). These osteo-progenitors are Wnt responsive (Fig. 5b).

Potent proteins

Some people may have heard of Wnt proteins acting as intercellular signals in other contexts, but for many readers this may be an unfamiliar word in the context of dentistry. Here's the reason they are so interesting: Wnts are potent bone-inducing proteins. Patients with high bone mass diseases have too much Wnt signaling, while patients with osteoporosis have too little. In my lab, we see Wnts as a potential therapeutic agent to accelerate implant osseointegration.







Response to Wnt stimulus over time. (Fibroblasts around saline-treated implants showed no such response.)

Serious team science

The cells responsible for osseointegration are Wnt-responding cells, that is, they respond to the body's own Wnt signal. We wanted to test whether or not delivering Wnt protein itself to the tissues around an implant could accelerate the formation of new bone. Proving this was a challenge. Even in rodent models, miniaturized dental implants routinely osseointegrate! Therefore, we had to recreate a condition where implants would reliably fail, and then potentially rescue that failure with the Wnt therapeutic. We created this scenario in an animal model by intentionally placing implants into oversized osteotomies.

What came next required some serious team science: biochemists had to purify the Wnt therapeutic and make it ready for *in vivo* use, bioengineers had to characterize the mechanical environment, and an international group of talented surgeons had to devise methods to place the implants in sleeping mice.

As anticipated from human data, the loose-fitting implants in the rodents were surrounded by a persistent fibrous envelope. Using these unstable implant cases, one-half were treated with the Wnt therapeutic (delivered by injection into the fibrous tissue capsule) and the other half received an injection of saline. Then we waited.

The first sign we looked for was evidence that the Wnt therapeutic "activated" cells in the fibrous tissue envelope. Within 24 hours of injection, we saw the first signs that fibroblasts responded to the Wnt stimulus and began to multiply (Fig. 6a). Fibroblasts around the saline-treated implants showed no such response.

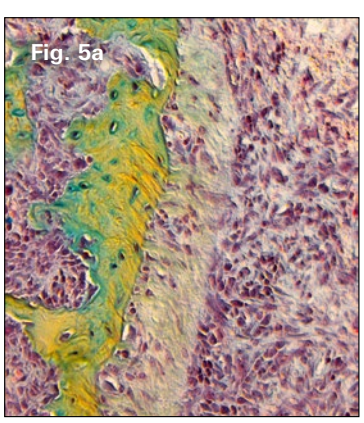
A few more days passed and the Wnt responsive osteoprogenitors continued to multiply (Fig. 6b and 6c). A few more days and the once-loose implants that had been treated with the Wnt therapeutic were encased in bone, whereas those treated with saline remained in a fibrous tissue envelope (Fig. 7b and 7a respectively). We succeeded in rescuing the failing implants!

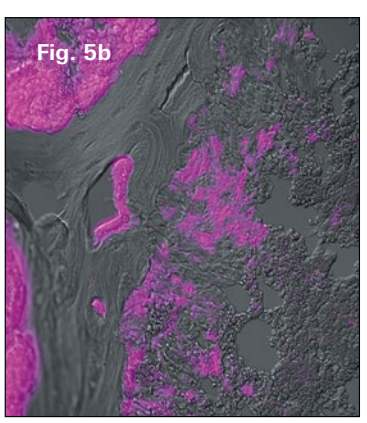
We still have challenges ahead before a Wnt therapeutic is available for implant specialists. A bone anabolic agent must be safe after all. Some might remember issues surrounding use of Bone Morphogenetic Protein 2 (BMP2) in dental and orthopedic patients; these reported complications are unacceptable for non-life-threatening indications such as dental implants. The protein also must be manufactured to meet regulatory specifications. Finally, any new biologic must fill an important gap in clinical care.

Our research, and the biologics that are the fruit of that research, specifically address challenges to the osseointegration of immediate implants in routine clinical practice. The work continues.

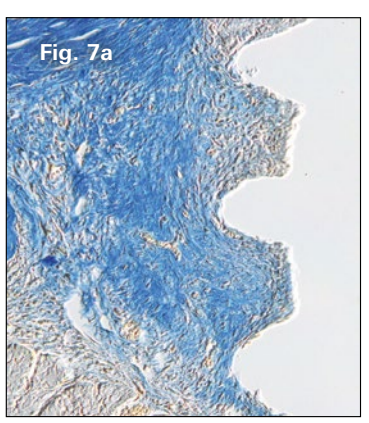
We'll have more to report soon. <

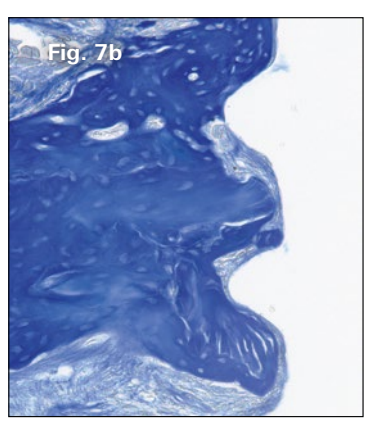
→ More to explore!
The two previous installments of Professor Helm's series, "Understanding the Biology and Mechanics of Immediate Placement," are available online at:
nobelbiocare.com/news





Wnt-responsive osseoprogenitor cells in an extraction socket.





Loose-fitting implants treated with saline (7a) and the Wnt therapeutic (7b).

Ribbon-cutting Ceremony At Yorba Linda Institute

Fulfilling a commitment to post-graduate and continuing education

Surrounded by Nobel Biocare associates and civic leaders, Tom Olsen, President and General Manager, Nobel Biocare North America, cut the red ribbon on July 12 to re-open the Nobel Biocare Training Institute in Yorba Linda, California, after a comprehensive facility upgrade.

Nobel Biocare supports its customers through every phase of professional development, offering world-class training and education along with practice support and patient information materials. The company recently re-opened and re-dedicated the Nobel Biocare Training Institute at Yorba Linda in order to remain a leader in the field of post-graduate and continuing education.

Nobel Biocare has called Yorba Linda, California, home for the past 18 years. This summer, the company opened its doors to the Yorba Linda community in order to share in the completion of a state-of-the-art remodeling of its highly-regarded training institute.

In partnership with the Yorba Linda Chamber of Commerce, Nobel Biocare employees welcomed members of the local community, partner customers and close friends for the ribbon cutting ceremony and subsequent open house.

The renovated space provides training and education venues for a wide variety of health care professionals, and a modern workplace for everyone working at Nobel Biocare.

Guests toured the 100-seat auditorium, its fully outfitted surgical suite, the Interactive Health Care Professional Lounge, an imaging center with the latest in 3D technology, the Digital Dental Technology Training Lab, multi-purpose hands-on training rooms, and collaborative meeting spaces for everyone involved in the teaching and learning experience. <

Optimizing the Prosthetic Outcome

Place with confidence, restore with ease!

The On1 restorative concept makes it possible to maintain the soft tissue healing process without interruption. Read here what an experienced clinician has to say!

By Dr. Giacomo Fabbri

My first reaction to the On1 restorative concept was, "Why hasn't anyone thought of this before?" This innovative prosthetic component helps us to optimize the prosthetic outcome while providing a more comfortable treatment plan for the patient.

On1 gives us the opportunity to move the prosthetic interface of the restoration from the bone level to a more coronal position. This means that any biological or biomechanical complication that may arise at this interface will be at the soft tissue level rather than in proximity to the bone, enhancing — as I see it—the reliability of the prosthetic outcome.

Compare the On1 concept to traditional transmucosal implants, and you'll find multiple advantages. First of all, the On1 concept implements platform-switching at the bone crest level, thus facilitating bone maintenance around the implants. Additionally, the two base-height options—1.75 mm, and 2.5 mm—provide versatility. This means that we can select the ideal height in relation to soft tissue thickness.

Dr. Giacomo Fabbri: "Why hasn't anyone thought of this before?"

The On1 concept also entails surgical flexibility, in as much as you can use the On1 concept with three different conical connection implant systems—NobelActive, NobelParallel and NobelReplace.

Working with Nobel Biocare's conical connection with platform switching means that we can work flexibly in terms of the vertical position of the implant, which can be located either at the bone crest level or below the bone crest. We can select the appropriate On1 Base height and choose the vertical position of the implant to adapt to the specific soft tissue thickness.

Thanks to the On1 concept, we can virtually manage any kind of clinical situation in reference to soft tissue thickness. <

In Brief

Thumbs up for creos® xenoprotect

The full results of a study highlighting the efficacy of the creos xenoprotect membrane are now available via open access.

A randomized controlled clinical trial confirmed that creos xenoprotect, a resorbable, non-cross-linked collagen dental membrane, facilitates bone gain to support implant placement in dehiscence defects. These findings, published in the peer-reviewed Clinical Oral Implants Research, are relevant for dental clinicians as they support creos xenoprotect as a scientific-evidence-based choice to meet all their guided bone regeneration (GBR) needs.

In a double-blind, multicenter, prospective study, Dr. Bastian Wessing and his colleagues placed implants to support single restorations in 49 patients, with bone augmentation material placed at dehisced implant sites. This material was immobilized with either creos xenoprotect (Nobel Biocare) or the reference membrane, Bio-Gide® (a registered trademark of Geistlich Pharma AG). The results show the efficacy of creos xenoprotect in facilitating bone augmentation and non-inferiority to Bio-Gide®.

For more details about the study and a direct link to the online report in Clinical Oral Implants Research, please use the following URL:

→ bit.ly/creosxenoprotectstudy

All-on-4® webinar wildly popular

An All-on-4® treatment concept online course was launched just a year ago. In the first five months alone, more than 10,000 trainees from over 100 countries had already registered to participate. Professionals from across the dentistry spectrum are taking part. The course has proven especially popular with general practitioners who place and restore implants and want to learn more about the opportunities offered by the All-on-4® treatment concept.

The training was developed with Drs. Saj Jivraj and Hooman Zarrinkelk, and was recently ranked the most creative webinar of the year by the On24 Platform. Of the trainees who responded, 100% rated the speakers good or excellent, and over three-quarters shared the course with colleagues or partners. On completion of the course, participants earn three CE credits and a certificate from Nobel Biocare. Register for free and expand your knowledge by visiting:

→ nobelbiocare.com/all-on-4course

On1™ e-book now available online

The On1 concept is unique. It's the first concept to preserve the soft tissue attachment and maintain full restorative and surgical flexibility. The concept also radically simplifies the restorative procedure, as the On1 Base moves the restorative platform of Nobel Biocare conical connection implants from bone level to tissue level. It remains in position from implant placement to finalization, which leaves the soft tissue undisturbed for optimized healing.

Want to learn more? Now there's a book: *The Importance of the Soft Tissue Barrier: An introduction to the On1 concept.* This e-book brings together work from leading implantology experts. They explore the significance of unimpaired soft tissue healing for the success of dental implant treatment. And they will introduce you to the On1 concept, which is specifically designed to preserve soft-tissue adhesion. Many different resources are available in this e-book, including clinical studies, articles, videos and quizzes. *The Importance of the Soft Tissue Barrier* is available free of charge at the web address below.

→ nobelbiocare.com/on1-ebook

Taking the All-on-4® Treatment Concept to the Next Level

This minimally invasive solution – with a fixed full-arch restoration for high patient satisfaction – just keeps getting better.

For patients, the All-on-4 treatment concept stands for a rapid improvement in their quality-of-life. For clinicians, providing a fixed full-arch prosthesis on the day of surgery can quickly lead to improved patient satisfaction in terms of function, esthetics, sense, speech and self-esteem. Now, some new components make it more effective than ever before.

By Chris Kendall

A revolution when it was first introduced almost two decades ago, the many benefits of the All-on-4® treatment concept are now well proven.

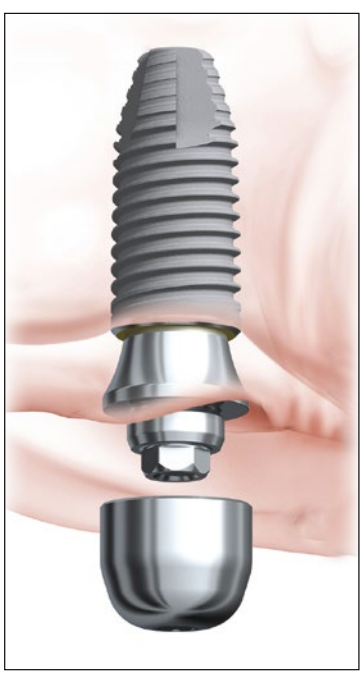
A key enabler of the concept today is the Multi-unit Abutment, a catalyst of the trend for restoring multiple teeth using tilted implant placement.

PinD

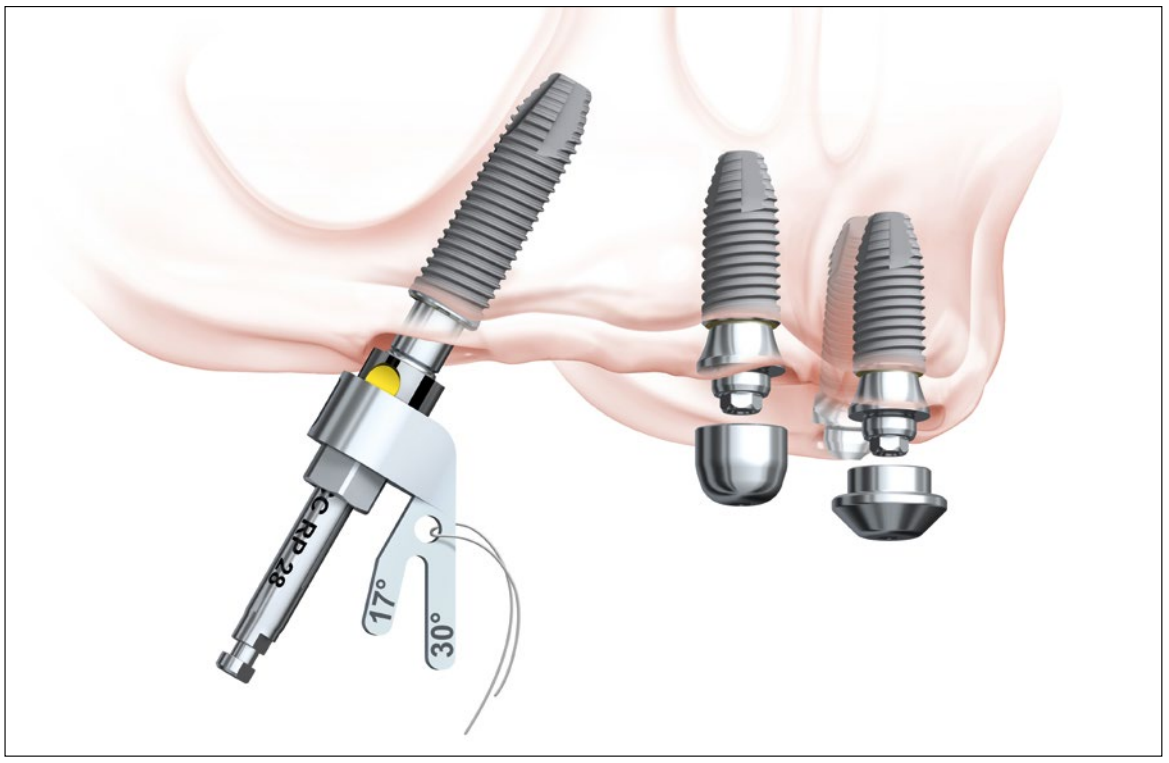
Products in Development

First developed by Nobel Biocare in 2000—and a first in the industry at the time—the technology continues to evolve.

The introduction of the Multi-unit Abutment Plus in 2016 supported a significant reduction in chair time for the All-on-4® treatment concept. This evolution of the original Multi-unit Abutment eliminates the need for screw fixation during try-in and adjustment of the provisional prosthesis.



The Titanium Multi-unit Healing Cap is a temporary component designed to facilitate the placement of the provisional prosthesis.



The Multi-unit Aligning Instrument reduces the time required to place the implant in the proper position for an easy restorative workflow. It also facilitates selection of the most suitable Multi-unit Abutment.

Now, for ease, speed and efficiency, the Multi-unit Aligning Instrument and Titanium Multi-unit Healing Cap represent the latest step forward in the All-on-4® treatment concept.

Three angulations in one

Selecting a less-than-optimal implant position for the seating of the Multi-unit Abutment, or the wrong Multi-unit Abutment, can cause significant inconvenience for both clinician and patient during subsequent steps of the restorative workflow. When this happens, the restorative technician must potentially remove and then re-seat four or more abutments, costing time and money that could have been avoided.

For ease, speed and efficiency in choosing the correct Multi-unit Abutment rotational position and angulation, Nobel Biocare has designed the Multi-unit Aligning Instrument. This latest innovation has been designed to reduce chair time by indicating three different angulations using one tool.

The new healing caps are partially threaded for easy positioning and screwing into the abutment.

The instrument makes it easy to identify the angulation of the most-suitable Multi-unit Abutment and the rotational position of the implant, helping to optimize the final abutment position and prosthetic design. This is further helped by easy-to-see laser-etched markings. Clinicians can easily identify the screw-hole trajectory to avoid facially protruding screws and to optimize prosthesis design.

Compatible with existing implant drivers and the manual torque wrench, the new and reusable aligning instrument complements the Nobel Biocare product range in facilitating straightforward placement of the abutment.

The instrument is particularly beneficial for the All-on-4® treatment concept procedure, both for improving the speed and efficiency of experienced clinicians, and in supporting new clinicians in making the correct choice of Multi-unit Abutment and rotational position of the implant.

Multi-unit healing caps: an individualized approach to soft tissue healing

The Titanium Multi-unit Healing Cap assortment is a new facilitator for the placement of the provisional prosthesis. Designed to help individualized treatment, this newly expanded portfolio of healing caps provides clinicians with a choice of dimensions and designs to suit the thickness of the soft tissue, in order to gain improved access to the Multi-unit Abutment.

The new healing caps have been developed with ease of use in mind, helped by a new internal design. The inside of the cap is only partially threaded, with 0.3 mm of smooth surface at the tip. This makes it easy to slip into position and place onto the abutment. For strength and ease of placement, the new caps are one-piece components made of titanium.

The external design features special markings to facilitate the visual identification of healing cap heights for both the lab technician and clinician, and the caps are conveniently delivered ready to use in packs of two.

Efficiency through versatility—this tool enables the identification of three angulations and six rotational positions using one instrument.

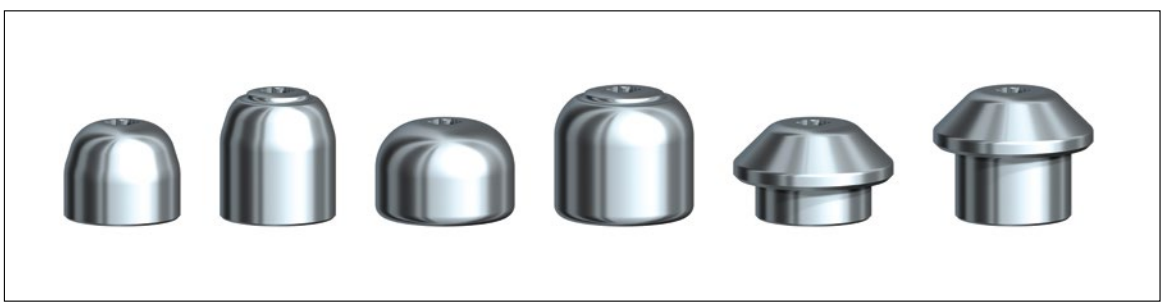
It's important to note that the caps are for single use only. There are a variety of reasons for avoiding reuse. For example, research has shown that 99% of healing abutments may show protein contamination at one or more sites following cleaning and sterilization. What's more, whichever sterilization method is used, the pristine surface of the original abutment will never be restored.

Next generation of the All-on-4® treatment concept

The All-on-4® treatment concept is now accepted as an industry standard. Nobel Biocare's ongoing development of the concept and associated technologies doesn't just help experienced surgeons in offering their expertise faster, but supports the next generation of All-on-4® treatment concept practitioners. <

→ More to explore!

Find out more about the Multi-unit Abutment and other new components at: nobelbiocare.com/mua. For a full list of references to this article, please see: nobelbiocare.com/news.



The Titanium Multi-unit Healing Cap range has been expanded for individualized treatment for different anatomies.

Bringing Science to the Surface

An interview with Professor Matthias Karl of Saarland University about a major meta-analysis of TiUnite

A recently published meta-analysis evaluating Nobel Biocare's TiUnite implant surface is believed to be the largest such evaluation of a single implant brand ever conducted.

In the interview below, the lead author of "Clinical performance of dental implants with a moderately rough (TiUnite) surface,"* Professor Matthias Karl of Saarland University in Germany, discusses the relevance of the study for clinicians and patients.

What was your rationale for conducting a meta-analysis correlating clinical performance of implants with the TiUnite surface?

Professor Matthias Karl: The TiUnite surface was launched over 15 years ago and in that time certainly has set the standard in implant dentistry.

It's one of the major implant surfaces on the market. We felt that it was time to evaluate TiUnite implants in a comprehensive meta-analysis of prospective clinical studies—not with pre-clinical data, not with retrospective data, not with case reports, but a real focus on the highest possible quality of evidence.

How did you decide which studies to include in the analysis?

Karl: We had strict inclusion criteria. We looked only at prospective clinical studies with at least 20 patients receiving TiUnite implants from the beginning of the study. A minimum of one-year post-loading follow-up was also required. In terms of reporting we had to be able to either derive the accumulative survival rate from the paper or calculate the survival rate based on the data given in the paper.

Despite the strict inclusion criteria, the study is thought to be the largest analysis of this kind on a single brand of implants. What was the scale of the data examined?

Karl: It's certainly the largest such study I've seen. Of 32,519 studies screened, we reviewed 106 well-documented prospective clinical studies.

To have such a high number of primary studies in a single review is rather unique, to say the least. In total, over 12,000 TiUnite implants were part of the evaluation. This represents a huge database and should be perceived as a real strength for Nobel Biocare, the clinicians using Nobel Biocare implants and their patients. I think it's really the highest level of evidence we have right now documenting the clinical success of a single implant surface.

What did you set out to discover within all this data?

Karl: We did not have any predetermined expectations—this is another strong point of this review in my opinion. It was really, "let's look and see what we find." Our aim was not to cherry-pick data, but to conduct an unbiased review of the literature.

Another unique feature of the study is that we used implant placement as a base line. Bone remodeling takes place predominantly between implant placement and abutment connection. In many studies, it's only at the time of prosthetic restoration that the clock starts to run. But by then a certain amount of remodeling has already taken place; it's more honest to go back and report the implant surgery as the base line and assess the bone levels from then on.

We were able to really look at marginal bone level changes from the beginning—from the surgery, for many, many studies—and also looked into biological complications if they had been reported. Of course, we were also looking at peri-implantitis and peri-implant pathology.

The definition of peri-implantitis is presently a much-debated topic. How did you define it for the purposes of this paper?

Karl: The definition of peri-implantitis is indeed a hot topic right now. What we have done in the paper is not to over- or underestimate peri-implantitis. If the primary author referenced peri-implantitis or if there was peri-implant inflammation or peri-implant pathology, we counted this as peri-implantitis no matter what. We are well aware that these authors were acting on different scales, but if they used the term "peri-implantitis," or something similar, we did not question it.

No cherry picking! The Karl-Albrektsson study includes all patients with a TiUnite implant prospectively evaluated in a clinical study with a minimum of 20 patients and 12 months of post-loading.

What were the key findings of your analysis?

Karl: For me, the key finding was that TiUnite is a highly reliable implant surface even in very challenging situations. Nobel Biocare has a full range of implant designs with the TiUnite surface and we could not differentiate implant performance between different implant geometries. In the end you can absolutely say it's a really great surface. It keeps the implant in place, the longevity is definitely there—it's proven. The prevalence of peri-implantitis is extremely low. There were no major biological complications and the marginal bone level changes are well within the accepted thresholds for a successful implant.

How can the findings of your analysis be used to optimize clinical practice?

Karl: Clinicians can use the values presented in the paper as a reference. This is the real benefit of such an extensive review. In our own practices we can only see a limited number of patients. What we have here is an analysis of over 12,000 implants spanning a 15-year period. I would say, look at these values and compare them with what you see in your practice. Then you can ask yourself, "Where am I in relation to the data and why might that be?" If you are not seeing the same success, why is this? The findings are a helpful benchmark for modern practice. <

→ More to explore!

For more information about the TiUnite surface, visit nobelbiocare.com/TiUnite.

* *Karl, M., and Albrektsson, T.: "Clinical performance of dental implants with a moderately rough (TiUnite) surface: A meta-analysis of prospective clinical studies," Int J Oral Maxillofac Implants. 2017 Jul/Aug;32(4):717-734. doi: 10.11607/jomi.5699.*

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