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NobelActive®
Over 10 years of clinical experience
NobelActive is an implant like no other. The back-tapered coronal design of NobelActive is designed to optimize bone and soft tissue volume for natural-looking esthetics. This is highlighted in the image in the foreground and the left inset. The right inset image focuses on a mesenchymal stem cell adhered to the proven TiUnite® implant surface. The background image shows the 3D mesh of the upper surface fading into a 2D outline illustration, combined with a NobelActive rendering focusing on the upper part of the implant.
Over ten years of clinical experience with NobelActive®

The innovation of NobelActive represented a breakthrough in implant design, harmonizing biomedical engineering expertise with the clinical needs and the wisdom of clinicians. NobelActive’s expanding tapered implant body condenses bone gradually while the apex with drilling blades enables a smaller osteotomy. These features help to achieve good primary stability in demanding situations, such as soft bone or extraction sockets.

**Perfect harmony of drilling protocol, geometric design and implant surface**

The NobelActive surgical protocol and implant design are designed to provide good primary stability and support immediate loading. Reverse-cutting flutes with drilling blades on the apex enable experienced clinicians to adjust the implant position during placement for an optimized restorative orientation, particularly in extraction sites. NobelActive’s patented back-tapered collar, together with the strong conical connection and built-in platform shifting, can aid in preservation of soft tissue and marginal bone.1, 2, 3, 4

The osteoconductive properties of NobelActive’s TiUnite surface, supporting fast apposition of newly formed bone, helps ensure that good stability achieved at implant insertion can be maintained throughout the critical healing phase. Clinically, this relationship between the osteoconductive effect of the TiUnite surface and implant stability in patients with predominantly soft bone was confirmed by Glauser et al, with Brånemark IV implants.5

**Good stability in the critical healing phase allows for Immediate Function**

Higher stability with immediately loaded TiUnite surface implants (external hexagonal connection) than with the same implants with machined surface in the posterior maxilla.4

The conical connection of NobelActive seems to have an advantage against leakage. Conical connection implants, including Nobel Biocare’s conical connection, showed lower bacterial leakage compared to flat connections, in an in-vitro model.6

**Good primary stability in demanding situations, such as soft bone or extraction sockets**

NobelActive’s expanding tapered implant body condenses bone gradually while the apex with drilling blades enables a smaller osteotomy.
Scientific evidence backs NobelActive® implants

In the more than 10 years since its introduction to the market, over 14,300 NobelActive implants in over 2,600 patients have been clinically evaluated in 41 clinical studies (see tables on pages 12 to 14).

Key findings of clinical studies with NobelActive are:

- Studies reporting mean marginal bone level change with NobelActive implants show low bone remodeling in the healing phase followed by stable or increasing bone levels.\(^1\), \(^2\), \(^3\), \(^7\), \(^8\)
- After up to 6.7 years of function, NobelActive shows excellent hard- and soft-tissue outcomes and 100% survival rate.\(^9\)
- The implant design and conical connection with built-in platform shifting result in less crestal bone change than a comparable implant without these features.\(^2\), \(^3\)
- Papilla size significantly improves during the first year, and from implant insertion until 3 and 5 years.\(^1\), \(^7\)
- The unique implant design ensures good primary stability\(^10\) even in soft bone and fresh extraction sockets.\(^1\), \(^3\), \(^7\), \(^8\), \(^9\), \(^11\), \(^12\)
- NobelActive is a reliable implant for Immediate Function protocols,\(^1\), \(^4\), \(^11\) as well as challenging cases such as severely atrophic maxilla.\(^13\), \(^14\)
- NobelActive is successful with full-arch restorations including the All-on-4\(^6\) treatment concept.\(^14\), \(^15\), \(^16\)

Twenty-two studies with 1 to 5 years’ follow-up have evaluated bone level change with NobelActive implants. No study with a minimum of 1-year and up to 5-years of follow-up had a mean bone remodeling of over −0.89 mm.\(^17\), \(^18\)

Studies report mean marginal bone level change from implant insertion with NobelActive implants

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<th>Mean marginal bone level change [mm]</th>
<th>Number of studies</th>
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<tr>
<td>0 to 3.0</td>
<td>6</td>
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<td>0 to −0.2</td>
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<tr>
<td>&gt; −0.91</td>
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</table>

NobelActive in patients with limited residual bone or inter-dental space

The design of NobelActive allows its insertion in difficult situations, e.g. in patients with limited residual bone or inter-dental space.

In a retrospective study to evaluate the clinical performance of 153 NobelActive implants placed in a tilted manner in fresh extraction sockets and immediately restored with Multi-unit Abutments, the survival rate was 99.3% at 3-year follow-up.\(^19\) Abutment angulation and implant diameter had no impact on mean marginal bone remodeling, which was −0.68 mm ± 1.2 mm after 3 years.\(^19\)

NobelActive 3.0 implants in the esthetic zone allow clinicians to restore lateral maxillary incisors and lateral and central mandibular incisors immediately, with a high level of survival. In a recent publication by Kolinski and coworkers,\(^20\) interim 1-year results of a 5-year study with 82 NobelActive 3.0 implants in the esthetic zone were reported. Implant survival was 96.7% and no implants fractured. Bone levels were stable with only −0.57 mm remodeling from insertion to 6 months, and −0.25 mm from insertion to 1-year follow-up. Pink esthetic scores significantly improved from 6.3 ± 0.4 at pre-treatment, to 8.5 ± 2.1 after placement of the definitive prosthesis, and to 10.5 ± 2.5 at 1 year. This further speaks to the crucial interrelationship between implant surface, drill protocols and geometrical design.

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A Only peer-reviewed publications with minimum of 10 implants and minimum one-year follow-up. Meeting abstracts, reviews, single case reports, technique descriptions, animal and in-vitro tests are excluded.

B Note: Findings may have been reported in clinical studies presented as conference abstracts.
Clinical view of the two investigated implant designs.

Characteristics of the two different implant designs and connections used in this study.

Periapical radiographs after 1 year in function:
(a) NobelSpeedy Groovy implant (control group); (b) NobelActive implant (test group).

Periapical radiographs after 3 years in function:
(a) NobelSpeedy Groovy implant (control group); (b) NobelActive implant (test group).

Pozzi A, Tallarico M, Moy PK
Original abstract

**Purpose:** To compare the clinical and radiological outcomes of two implant designs with different prosthetic interfaces and neck configurations.

**Materials and methods:** Thirty-four partially edentate patients randomly received at least one NobelActive implant (Nobel Biocare, Goteborg, Sweden) with back-tapered collar, internal conical connection and platform shifting design, and one NobelSpeedy implant (Nobel Biocare) with external hexagon and flat-to-flat implant-abutment interface according to a split-mouth design. Follow-up continued to 3 years’ post-loading. The primary outcome measures were the success rates of the implants and prostheses, and the occurrence of any surgical and prosthetic complications during the entire follow-up. Secondary outcome measures were: horizontal and vertical peri-implant marginal bone level (MBL) changes, resonance frequency analysis values at implant placement and loading (4 months), sulcus bleeding index (SBI) and plaque score (PS).

**Results:** No drop-out occurred. No implants and prostheses failures were observed to the 3-year follow-up. MBL changes were statistically significant different with better results for the NobelActive implants for both horizontal and vertical measurements (p = 0.000). After 3 years post-loading, the NobelActive implants underwent a mean vertical bone resorption of 0.66 mm, compared with 1.25 mm for the NobelSpeedy Groovy implants (p = 0.000); the mean horizontal bone resorption was 0.19 mm for the NobelActive implants and 0.60 mm for the NobelSpeedy Groovy implants (p = 0.000). A high ISQ value was found for both implants, and no statistically significant difference was found for ISQ mean values between interventions (p = 0.941 at baseline; p = 0.454 at implant–abutment connection; p = 0.120 at prosthesis delivery). All implants showed good periodontal health at the 3-year-in-function visit, with no significant differences between groups.

**Conclusion:** The results of this research suggest that in well-maintained patients, the MBL changes could be affected by the different implant design. After 4 months of unloaded healing, as well as after 3 years in function, both implants provided good results, however vertical and horizontal bone loss had statistically significant differences between the two groups (difference of 0.58 ± 0.10 mm for the vertical MBL, and 0.4 ± 0.05 mm for the horizontal MBL), with lower values in the NobelActive implants, compared to the NobelSpeedy Groovy implants.
Summary of the study

Kolinski et al. (2014) report excellent results: high CSR, stable bone levels, good soft tissue health and patient satisfaction using NobelActive implants. A total of 60 implants were placed in 55 patients at 6 centers, all in extraction sites and subjected to Immediate Function. Patients requiring major bone augmentations were excluded, while minor augmentations were permitted. CSR after 3 years was 98.3%. Bone levels were exceptionally stable: Bone remodeling of a mere –0.2 mm during the first 6 months quickly stabilized and showed even a non-significant bone gain of 0.3 mm at 3 years. Papilla scores increased significantly (p < 0.001) from insertion to 3-year follow-up, with most of the increase occurring during the first year.

The results on quality of life are also noteworthy, with significant improvements in patient self-ratings on esthetics, self-esteem, function, sense and speech. The authors therefore conclude that NobelActive can be used safely and effectively under demanding conditions such as immediate tooth replacement in extraction sites – not only with regards to CSR and hard- and soft-tissue health, but also in terms of patient satisfaction.
Excellent esthetic outcome at 8-year follow-up with immediate temporization on a NobelActive implant


Radiograph showing temporary after surgery.

Clinical view of soft tissue before finalization.  Zirconia abutment in situ.

Radiograph following finalization.

Screw-retained crown

Clinical view following finalization.

Radiograph following finalization.

Excellent esthetic outcome at 8 years' follow-up

Radiograph at 8 years' follow-up

Images courtesy of Dr. Giacomo Fabbri, Italy.
**NobelActive supporting hard and soft tissue long-term**

Immediate implant placement in a fresh extraction socket of a NobelActive RP implant 4.3 mm × 13 mm. Socket augmentation was performed, using xenograft and autogenous soft tissue grafting harvested from the tuberosity area, to close the socket and increase the amount of soft tissue at the recipient site. A lithium disilicate crown was cemented onto an anatomically shaped zirconia abutment.

![Radiological outcome with NobelActive at 1-year follow-up, showing stable bone.](image1)

![Radiological outcome with NobelActive at 3-year follow-up, showing stable bone.](image2)

![Radiological outcome with NobelActive at 5-year follow-up, showing stable bone.](image3)

![Radiological outcome with NobelActive at 7-year follow-up, showing stable bone.](image4)

![Radiological outcome with NobelActive at 9.5-year follow-up, showing bone overgrowth over time onto the implant platform.](image5)
Clinical outcome with NobelActive at 1-year follow-up, showing healthy papilla.

Clinical outcome with NobelActive at 3-year follow-up, showing healthy papilla.

Clinical outcome with NobelActive at 5-year follow-up, showing healthy papilla.

Clinical outcome with NobelActive at 7-year follow-up, showing healthy papilla.

Clinical outcome with NobelActive at 9.5-year follow-up.

Clinical outcome with NobelActive at 5-year follow-up, showing healthy papilla.
Overview of studies

The following overview includes clinical studies using NobelActive implants. The studies are ordered by follow-up time.

Only peer-reviewed publications are listed. Meeting abstracts, reviews, single case reports, technique descriptions, and animal and in-vitro tests are excluded. The total number of implants and patients included in this overview is over 14,300 and 2,600 respectively, with mean implant survival rate of 98.5%.

Marginal bone level change is reported only for studies where implant level baseline is presented. For more information on these studies visit PubMed at pubmed.gov.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Mean follow-up time (years)</th>
<th>Study type</th>
<th>Indication/study focus</th>
<th>No. of implants</th>
<th>No. of patients</th>
<th>Implant survival rate [%]</th>
<th>Mean change in marginal bone level (SD) [mm]</th>
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<td>Retrospective</td>
<td>Fully edentulous, Maxilla, Immediate loading</td>
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<td>Li et al., 2017</td>
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<td>NR</td>
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<td>NR</td>
<td>98.1</td>
<td>NR</td>
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<td>Partially edentulous, Maxilla, Posterior, Implant survival rate [a]</td>
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<td>117</td>
<td>96</td>
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<td>55</td>
<td>98.3</td>
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<td>44</td>
<td>34</td>
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<td>−0.67 (0.4)</td>
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[a]Mean follow-up time (years)
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<th>Indication/ study focus</th>
<th>No. of implants</th>
<th>No. of patients</th>
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<td>100</td>
<td>−0.72 @ 1 year (NR) &lt;sup&gt;0&lt;/sup&gt;</td>
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<td>Retrospective</td>
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<td>165</td>
<td>57</td>
<td>98.2&lt;sup&gt;1&lt;/sup&gt;</td>
<td>NR</td>
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<td>Retrospective</td>
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<td>169</td>
<td>99.8</td>
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<td>34</td>
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<td>210</td>
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<td>60</td>
<td>183</td>
<td>100&lt;sup&gt;2&lt;/sup&gt;</td>
<td>≤−1.0 (NR)</td>
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<sup>1</sup> NobelActive
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<th>Mean follow-up time [years](^a)</th>
<th>Study type</th>
<th>Indication/study focus</th>
<th>No. of implants</th>
<th>No. of patients</th>
<th>Implant survival rate [%]</th>
<th>Mean change in marginal bone level (SD) [mm]</th>
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<td>40</td>
<td>40</td>
<td>100</td>
<td>−0.70 (NR) (^D)</td>
</tr>
<tr>
<td>Slagter et al., 2016(^a)</td>
<td>1</td>
<td>Prospective</td>
<td>Maxilla, Anterior, Cement &amp; screw, Single-tooth, Healed &amp; extraction, 2-stage, Delayed loading</td>
<td>40</td>
<td>40</td>
<td>100</td>
<td>−0.53 (NR) (^D)</td>
</tr>
<tr>
<td>Cristalli et al., 2015(^a)</td>
<td>1</td>
<td>Prospective</td>
<td>Maxilla &amp; mandible, Anterior &amp; posterior, Cement, Single-tooth, Extraction, 1-stage, Immediate loading</td>
<td>25</td>
<td>24</td>
<td>92</td>
<td>−0.33 (NR) (^D)</td>
</tr>
<tr>
<td>Rokn et al., 2015(^a)</td>
<td>1</td>
<td>Prospective</td>
<td>Mandible, Posterior, Single-tooth</td>
<td>25</td>
<td>NR</td>
<td>100 (^D)</td>
<td>−0.68 (0.5)</td>
</tr>
<tr>
<td>Antoun et al., 2017(^a)</td>
<td>1</td>
<td>Retrospective</td>
<td>Maxilla &amp; mandible, Anterior &amp; posterior, Cement &amp; screw, Single-tooth, Fully &amp; partially edentulous, 1-stage &amp; 2-stage, Immediate loading, Early &amp; delayed loading</td>
<td>134</td>
<td>NR</td>
<td>97.0</td>
<td>NR</td>
</tr>
<tr>
<td>Zuiderveld et al., 2018(^a)</td>
<td>1</td>
<td>Retrospective</td>
<td>Maxilla, Anterior, Screw, Single-tooth, Extraction, 1-stage, Immediate loading</td>
<td>60</td>
<td>60</td>
<td>96.7</td>
<td>−0.01 (^D)</td>
</tr>
<tr>
<td>Kolinski et al., 2018(^a)</td>
<td>1</td>
<td>Prospective</td>
<td>Maxilla &amp; mandible, Anterior, Cement &amp; screw, Single-tooth, Healed &amp; Extraction, Immediate loading</td>
<td>82</td>
<td>71</td>
<td>96.7</td>
<td>−0.25</td>
</tr>
</tbody>
</table>


A: Arithmetic mean weighted by number of initially placed implants (implant survival rate).
B: Where the mean follow-up time was not available the reported follow-up time was used (minimum one-year follow-up). Last radiological follow-up for mean marginal bone level change may differ from the overall study follow-up.
C: Minimum 10 implants.
D: The percentage of surviving implants/prostheses or MBL was calculated.
NR: Not reported.
References


