**Implant Surface Enhancement - Myth and Reality**

**Comparative analysis of currently available implants**

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### Introduction

Implant surface characteristics are considered to play a major role in accelerating the processes leading to osseointegration. Some manufacturers claim for a reduced healing time (3-6 or 8 weeks). A better understanding of such processes would require the analysis of parameters like availability, positive or negative surface charge and surface-free energy. The topography of dental implant surfaces can influence cell attachment and subsequent osseointegration.⁵ Several cell types are involved in this process. Some of these cells can be categorized as fibroblasts. These cells show similar morphological behaviour and affinity to rough titanium surfaces.⁶

The aim of this poster is to present the topographical aspects of currently available implant surfaces.

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### Material and Methods

Different commercially available dental implants have been investigated to compare surface roughness and reproducibility of advertised properties. Scanning electron microscopy was used for topographical evaluation, backscattered electron imaging (BSE) was used for density and/or atomic number analysis, and x-ray micro-analysis (XRM) was used for elemental analysis.

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### Results

**3i Osseotite** (Solely acid-etched)

- Embossed particles on threads
- Topography of solely acid-etched surface
- Highly roughened surface structure
- SEM of particles on implant surface

**Straumann SLA** (Grit-blasted/acid-etched)

- Surface of grit-blasted and acid-etched implant
- Topography of grit-blasted and acid-etched surface
- SEM of particles on implant surface

**Nobel Biocare TiUnite** (Anodic oxidation)

- Embossed particles on threads
- Topography of anodically treated surface
- SEM of particles on implant surface

**ZL TICER** (Anodic oxidation)

- Chromogenic particles on threads
- Topography of anodically treated surface
- SEM of particles on implant surface

**Ankylos** (Solely grit-blasted)

- Embossed particles on threads
- Topography of grit-blasted surface
- SEM of particles on implant surface

**Astra TiOblast** (Solely titanium-blasted)

- Embossed particles on threads
- Topography of titanium-blasted surface
- SEM of particles on implant surface

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### Conclusion

Some marketing claims on implant surface characteristics should be critically evaluated and discussed on their clinical evidence. Embossed particles of the production process like grit particles can be observed as well as inhomogeneous structures. Nevertheless, within the range of available methods very high success rates have been documented. Topographical similarities of different implant surfaces can be observed. This could lead to the conclusion that reduced healing times claimed for a specific surface could also be related to surfaces with similar topographies. Surface roughness values are not clearly related to topographical appearance. Further development of enhanced implant surfaces should lead to morphologic structures which are homogeneously distributed to enable an allow high level of close cell attachment. Limited data on the influence of embossed production particles on the implant surface is available. However, Postamonti et al. have demonstrated that non-statistic evidence could be provided to support the hypothesis that surface inorganic contamination could affect osseointegration of titanium dental fixtures.⁷

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### References


3. European Association for Osseointegration

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**Awarded second prize for the poster contribution**

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