Outcomes of treatment with sandblasted implants. A long-term clinical study.

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**Abstract**

Introduction: The surface of the implants is an important aspect of implant dentistry since their characteristics may affect a better tissue response of the host. The aim of this study was to show clinical long-term results of treatment with dental implants with sandblasted surface. Methods: 70 patients with partial or total tooth loss were treated with 275 implants with sandblasted surface MG Osseosse. All implants were stable after insertion and were loaded after a healing period of 3 months. Results: 148 implants were inserted in the maxilla (53.8%), whereas 127 were in the mandible (46.2%). 93 implants were inserted in the anterior region (30.8%) while 182 implants were inserted in posterior areas (66.2%). After the period of osseointegration the following restorations were made: 50 single crowns (44.6%), 50 fixed bridges (44.6%), 8 fully rehabilitations (7.1%) and 4 overdentures (3.5%). 17 implants were lost therefore the overall success of the study is 93.9%. 5 implants (1.8%) were lost at an early stage as a surgical complication of insertion; while 12 implants (4.3%) were lost by peri-implantitis. The average time of clinical follow-up was 146.2 months with a range of 120-160 months. Conclusion: This study indicates that treatment with dental implants with rough sandblasted surface maintain long-term osseointegration and are a successful implant alternative.

**Background and Aim**

Osseointegrated implants are widely used in the dental clinic and they have led to a considerable progress in oral and maxillofacial surgery. Today, it represents one of the options with the highest predictability and success rate, as well as advantages that allow the rehabilitation of patients with unitary or multiple edentulism. The surface of the implants is an important aspect of implant dentistry since their characteristics may affect a better tissue response of the host. The aim of this study is to show clinical long-term treatment results of dental implants with sandblasted surface.

**Methods and Materials**

70 patients with partial or total tooth loss were treated with 275 implants with sandblasted surface MG Osseosse. Patients are adults without serious systemic disorders. Informed consent is given. Surgical splint is used and orthopantomography or Cone Beam was done to assess the implant position. After a healing period of 3 months, the patients were loaded.

**Results**

<table>
<thead>
<tr>
<th>Implants Inserted:</th>
<th>MAXILLA</th>
<th>148 implants (53.8%)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>MANDIBLE</td>
<td>127 implants (46.2%)</td>
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<tr>
<td>ANTERIOR REGION</td>
<td>93 (33.3%)</td>
<td></td>
</tr>
<tr>
<td>POSTERIOR REGION</td>
<td>182 (66.2%)</td>
<td></td>
</tr>
<tr>
<td>Restorations:</td>
<td>SINGLE CROWNS</td>
<td>50 (44.6%)</td>
</tr>
<tr>
<td></td>
<td>FIXED BRIDGES</td>
<td>50 (44.6%)</td>
</tr>
<tr>
<td></td>
<td>FULLY REHABILITATION</td>
<td>8 (7.1%)</td>
</tr>
<tr>
<td></td>
<td>OVERDENTURES</td>
<td>4 (3.5%)</td>
</tr>
</tbody>
</table>

17 implants were lost: - 5 implants (1.8%) were lost at an early stage as a surgical complication of insertion; - 12 implants (4.3%) were lost by peri-implantitis.

**Discussion**

The average time of clinical follow-up was 146.2 months with a range of 120-160 months. Compared to other recent studies with long-term results, we get high success rates:

- **Prosthetic success:**
  - 10 years, 121 implants, 46 patients. - 92.5% success.
  - 20% immediate loading y 80% conventional loading.
  - 22 single crowns, 23 fixed bridges, 7 fully rehabilitations.
  - 99.2% success.

**Conclusions**

Titanium biocompatibility is related to the presence of an oxide surface. In contact with air or water, titanium quickly forms an oxide thickness of 3.5 nm at room temperature. The most common oxide is titanium dioxide (TiO2). This oxide is highly resistant metal, contributing to its biocompatibility. Furthermore, titanium is strong enough to become a material suitable for clinical application.

The implant surface is an important aspect of oral implantology, as their physical and chemical properties can influence the development of better tissue host response to them. In this regard, energy loading and surface composition of the implants have been modified in order to enhance the bone-implant interface. In fact, for more than 25 years, it has been accepted that the surface of the implants is one of the factors that influences tissue healing in implant bed, resulting in the phenomenon of osseointegration.

The importance of the dental implant surface may lie in the biological response in vitro (laboratory studies with cell cultures), in vivo (studies with experimental animals), and finally clinical applications as artificial dental roots in partial and totally edentulous patients.

The sandblasted with different agents can modify the macroscopic surface of the implants. Such surfaces have experimental evidence of increased cell adhesion (in vitro studies), a greater and more rapid bone-implant union (in vivo studies) and improved efficacy (clinical studies) in the treatment of various degrees edentulous patients.

Firstly, in vitro studies show that these rough surfaces increase the metabolic activity of osteoblasts with increased production of morphogenetic proteins, the bone-implant connection, and subsequent implant stability. Secondly, in vivo studies in experimental animal studies demonstrated that the rough surface implant by subtraction enhances bonding the implant to bone tissue. In this regard, histomorphometric studies confirm a greater difference in the percentage of bone-implant union between these surfaces and machined; and likewise, the values of torque force necessary for removal of the inserted implants were greater in implants with roughened surfaces by subtraction (35.4 Newton-cm) than the machined surface (29.2 Newton-cm).

Moreover, clinical experience shows that implants with rough biocompatibility can improve the osseointegration increase the prospects for success of patients and improved their effectiveness in more adverse clinical situations (posterior area of the maxilla, widening or expansion of narrow alveolar crest). These surfaces also improve the effectiveness in early and immediate loading protocols in partial and totally edentulous patients.

**References**

Experimental research and clinical experience in oral implantology has led the development of different implant surfaces that improve biological osseointegration phenomena and clinical outcomes of implants in the treatment of patients with varying degrees of tooth loss. This study indicates that treatment with dental implants with rough sandblasted surface maintains long-term osseointegration, being a successful implantologic alternative.