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**UNIVERSITÀ
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Doctoral Dissertation
Doctoral Program in Bioengineering and Surgical Sciences (38th Cycle)

**The rehabilitation of atrophic jaws using short
implants with different surface treatment**
A multicentred cross-over randomized trial

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Background: The presence of maxillary atrophy can often prevent the use of standard length implants for implant- prosthetic rehabilitation. In these cases, a variety of treatment strategies can be used such as bone implementation techniques or short or extra-short implants. Short implants allow the resolution of cases of edentulism in patients with reduced mandibular and/or maxillary bone level in the posterior sectors and represent an alternative and less invasive approach compared to surgical interventions for bone implementation, also allowing a reduction in treatment times. To improve the biological aspects of the interface between the implant and hard and soft tissues, different implant and prosthetic surface treatments have been proposed, producing contrasting results.

Aim: to evaluate the clinical outcome of short implants with a new design at a macro-structural level in atrophic jaws. also comparing two different surface treatments of the implant collar and transmucosal components.

Materials and Methods: three research centres are involved (Torino, Genova, Foggia). Each centre recruited a minimum number of 10 patients, for a total of 30 patients. Patients who needed to insert at least two short implants (length: 6 mm) contiguous in the posterior sectors of the mandible or maxilla were included. Patients must not present general or local contraindications to the planned surgical and prosthetic intervention and will sign a consent to join the research project. For each patient, the following were recorded: age, sex, smoking habit, cause of tooth loss, presence of parafunctions (clinically assessed on the basis of the presence of wear facets or reported by the patient) and type of antagonist.

Implants will be inserted in healed sites. Definitive transmucosal straight multiunit abutments (MUAs) of height 1 mm, with differentially treated surfaces, were immediately screwed. After 3 months, prosthetic rehabilitation with splinted zirconia crowns screwed to the MUAs was made. Marginal bone levels (MBLs) were evaluated at the time of implant placement (T0), after 3 months (T3), after 6 and 12 months (T6 and T12) through periapical radiographies. Periodontal indexes (probing depth [PD], bleeding on probing [BoP], and plaque index [PII]) were evaluated at the same time-points, with the maximum follow-up of 12 months

Results: at T3, the mean marginal bone loss was 0.40 ± 0.31 mm in the Test group and 0.42 ± 0.40 mm in the Control group ($p = 0.76$). At T12, these values increased to 0.63 ± 0.41 mm and 0.78 ± 0.43 mm, respectively ($p = 0.94$). Both groups showed physiological probing depths, with mean values ranging from 1.48 mm to 2.10 mm. The Plaque Index (PII) ranged from 0 to 1 in most cases, while Bleeding on Probing (BoP) was observed sporadically as isolated bleeding spots upon probing, with mean values between 0.20 ± 0.41 and 0.50 ± 0.52 . No statistically significant differences were detected between the two groups.

Conclusions: The anodized surface treatment of the implant collar and transmucosal components does not appear to affect marginal bone stability or the condition of periodontal tissues after one year of follow-up. Further long-term studies are required to confirm these findings.