

# implant

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RESEARCH:

## **Kontakt<sup>®</sup> Implant Survival Rate: A Retrospective Study**

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# Kontakt<sup>®</sup> Implant Survival Rate: A Retrospective Study

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## SUMMARY

Survival Rate of the Kontakt<sup>®</sup> Implant.

## PURPOSE

The main aim of this study is to assess the survival rate of the Kontakt implant after at least one year of functional loading, through the results obtained by three practitioners at the end of two years, and to know if any factors like dimensions, location (maxillary or mandibular), site modifications by grafts, smoking addiction and immediate functional loading, affect this survival rate. Method: 1,478 Kontakt<sup>®</sup> implants were placed by three practitioners over a two-year period and loaded according to different protocols, i.e.: three-month waiting time for lower jaw implants, four months for the upper jaw and six months for those placed in a sinus filled with biomaterials. Immediate loading (IL) procedures were also performed (in accordance with the Naples consensus of 2006.<sup>15-16</sup> The surgical procedures were carried out indiscriminately with or without submersion. Patients were reviewed at loading time, after six months, one year after implant loading, and after two or three years for those fitted at the beginning of the study. Osseointegration was ascertained by standard criteria: radiological and clinical.

## RESULTS

Out of 1,478 Kontakt<sup>®</sup> implants fitted, 27 lost their osseointegration within one year of loading, which accounts for 1.8% of all Kontakt<sup>®</sup> implants fitted.

## INTRODUCTION

In 1981, Albrektsson et al. demonstrated that the successful osseointegration of an implant depended on various factors such as: biocompatibility, morphology, surface treatment, preparation, condition and nature of the receptor site, surgical protocol and loading conditions.<sup>1</sup> Emphasis was also placed on other critical success factors: patient selection, smoking,<sup>2,3</sup> primary implant stability, the clinical experience of the practitioner, chronology and time elapsed between placing and loading, and responses to transplanted materials.<sup>4-7</sup> Primary stability itself is a function of bone density, of the drilling protocol, and of the macroscopic and microscopic features of the implant.<sup>8</sup>

Patient-dependent factors which affect the success of osseointegration are essentially bone density and volume (which decrease gradually as the elapsed time between tooth loss and implant fitting increases).<sup>9-12</sup> Although it is well known that these basic criteria are conditioned by the expertise of the surgeon, it is accepted and obvious that the survival rate of an implant is one of its main reliability-defining characteristics, as suggested by Albrektsson in 1986.<sup>13</sup> For many years, single-step surgery and then immediate loading have progressed, somewhat due to pressure from patients pushing for simpler and less painful case management. These are techniques which follow specific protocols but exhibit high success rates and good predictability in terms of survival rates.<sup>14-16</sup>

Other authors have studied the survival rate of implants in the case of immediate or early loading, and even in cases involving just one surgical step. Although a comparative analysis of the different success rates would be difficult, it is important to stress that all these studies, based on the law of Kaplan-Meier,<sup>17</sup> show that one year after implant placement, the curve reaches a plateau and thus the survival rate becomes stable.<sup>18-20</sup> Bone augmenta-

tion has no bearing whatsoever on these results.<sup>21,22</sup> Also in order to improve survival rates, implant systems manufacturers constantly change the geometry and surface finish of implants; a rough surface finish and self-tapping thread are definitely and unanimously accepted as the gold standard.<sup>23,25</sup> Platform switching and Morse taper prosthetic connections which limit peri-implant bacterial invasion, likewise constitute significant factors in increasing survival rates.<sup>26,27</sup>

The Kontakt<sup>®</sup> implant (Biotech International) is made from sandblasted and acid-etched T40 titanium alloy; it is a self-tapping, cylindroconical implant with a double pitch thread which decreases in depth from the apex to the neck in order to reduce cortical bone stress and distribute it at apex level while providing excellent primary stability.

Its prosthetic connection, featuring an inner cone, defines a staggered emergence (platform switching) which prevents the spread of microbes from the intra-implant medium to the bone surrounding the implant. This reduces the risk of cratering and peri-implantitis.<sup>26,27</sup>

The purpose of this study is to analyze the short-term predictability and reliability of the Kontakt<sup>®</sup> implant, in conjunction with the size and location of the site, and the loading category (immediate or deferred).



**FIG. 1 / Implant Kontakt<sup>®</sup>**

## MATERIALS AND METHODS

### MATERIALS

670 patients received a total of 1,478 implants over a two-year period. Three practitioners carried out the insertions, monitoring and loading of the prostheses. Monitoring visits were scheduled at six month intervals after loading.

### DISTRIBUTION

The length and diameter of each implant were recorded and compiled in a chart.

### METHOD

The following informations were recorded for each patient, to allow for the analysis of survival rates based on different factors:

- Location (maxilla or mandible)
- Implant size
- Smoking habits
- Loading type (late or immediate)
- Grafting augmentation or sinus filling

The case studies were conducted following a clinical and radiological examination (3D: CT scan or cone beam). Radiological examinations were performed during the follow up visits scheduled one year after implant loading.

### EVALUATION METHOD

Buser a Cochrane's success criteria<sup>10</sup> were used to establish implant survival, i.e.:

- Lack of mobility (clinically detectable)
- Absence of pain or tenderness
- Absence of peri-implantitis
- Absence of peri-implant radiolucency

## RESULTS

### OVERALL

Of the 1,478 Kontakt® implants fitted, only 27 lost osseointegration and were removed within the first year (1.8%).

### DISTRIBUTION OF IMPLANTS PLACED

The graphs on page 5 (Fig. 2 and Fig. 3) show the distribution of lengths and diameters, in numbers of implants placed, and the same distribution for the implants which failed.

### LOCATION

The distribution of fittings between the two arches was slightly in favor of the upper jaw: 52% vs. 48% for the lower jaw.

The failure rate was much higher in the maxilla than in the mandible: 1.8% vs. 0.8%.

### IMMEDIATE LOADING

Immediate load implants, according to the 2006 Naples consensus<sup>15</sup> accounted for 2.4% (35 implants) of all fittings, with only two failures reported (5.7%) less than 2% of the total number of implants placed according this protocol.

### GRAFTING

For sites prepared by autogenous grafting or the addition of a material (synthetic or from a bone bank) to lift the sinus membrane.

- By grafting: only eight sites thus prepared proved successful with regard to implant survival.
- Sinus elevation using xenografts: 99 implants (7%) were fitted using this method, eight of which failed (8%).

### SMOKING

There were 178 smokers in the study, accounting for 27% of patients in the study. 13 implants failed (50% of the total number of implants lost).

# NUMBER OF KONTACT IMPLANTS PLACED VS. REMOVED

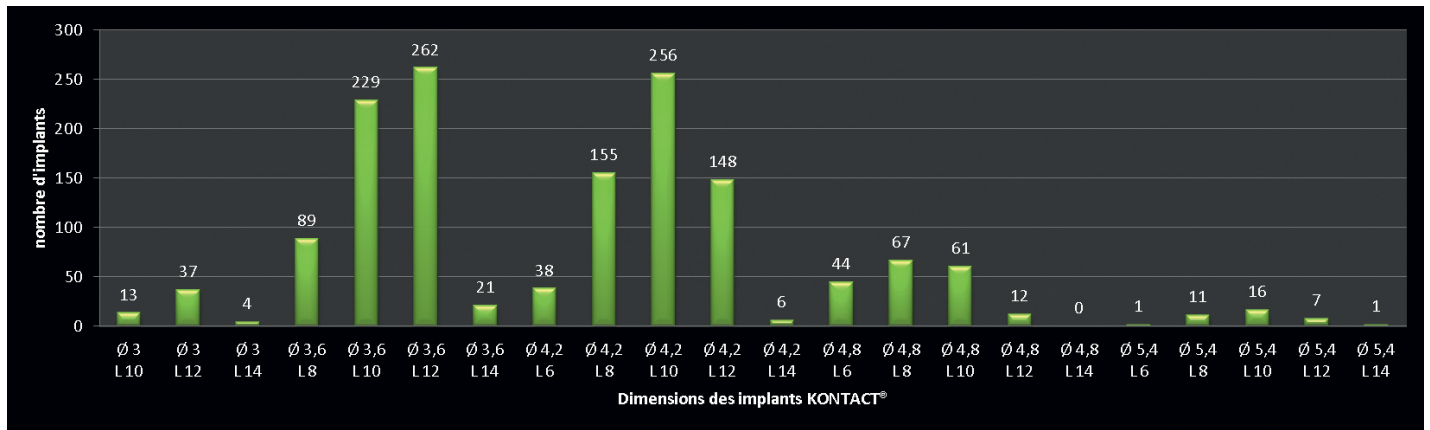


Figure 2: Distribution of Kontakt® implants placed in 2010 and 2011.

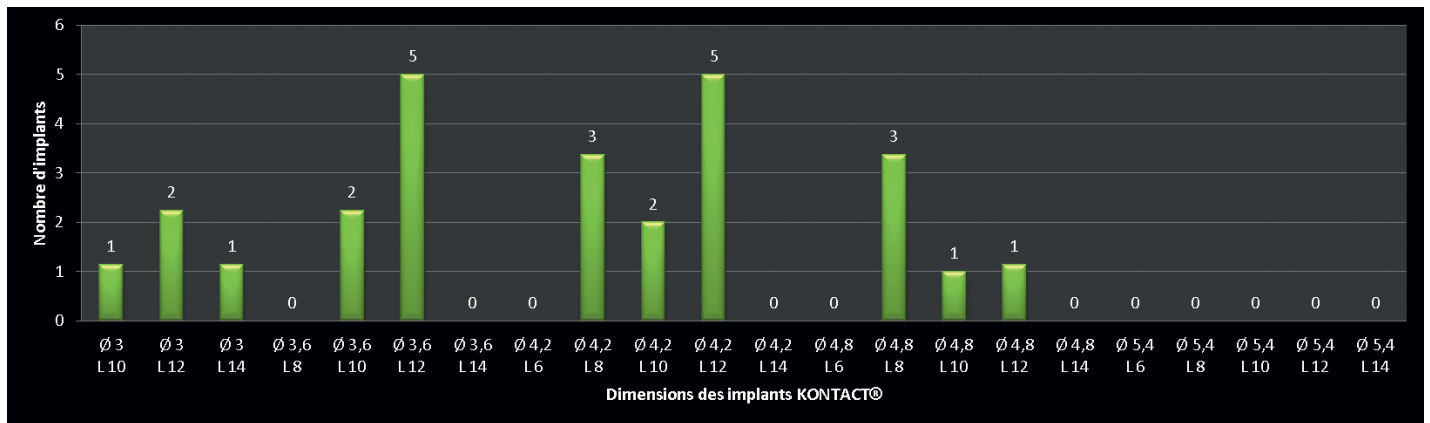


Figure 3: Distribution of Kontakt® implants removed in 2010 and 2011.

## DISCUSSION

Since the beginnings of modern implantology, whose foundations were laid by Brånemark in the late 60s, dental implants have been subject to constant innovations designed to improve their performance and success rate. The trends observed for implant thread patterns and surface finishes, respectively, tend towards self-tapping and sandblasting.<sup>28</sup> Cylindroconical designs with thread patterns that decrease in depth towards the neck improve primary stability and stress distribution. Lastly, a number of authors consider that the Morse taper connection, thanks to its tightness and the shift in the implant/abutment connection, prevent peri-implant contamination.<sup>26,27</sup>

A comparison of the overall short-term success rate of implants whose design is similar to that of the Kontakt® Implant<sup>28-31</sup> shows the superior success rate of Kontakt® implants (98%).

A comparison of the mandibular and maxillary locations shows better results for the mandibular arch vs. the maxillary, which is due to the lack of success of sinus floor elevation. Although the number of augmentations with autogenous bone grafts performed was insufficient for the number to be representative, it is worth noting the lack of failures associated with this procedure.

In contrast, the increased rate of failure associated with sinus elevations (8%) shows that this protocol is a trickier one to use.

**Regarding geometries:** A higher prevalence of failure was noted with small-diameter and short dental implants.

Finally, this study confirms the already proven and significant impact of smoking on failure rates,<sup>32</sup> with a 50% share of all lost implants associated with this factor. This figure should be taken into consideration with regard to survival rates and when selecting implant candidates.

## CONCLUSION

Based on this study, it appears that the Kontakt® implant is a safe and versatile device which yields good results in the vast majority of the clinical cases practitioners may be faced with.

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### ADDRESS OF THE MANUFACTURER

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### Référencement Bibliographique

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