

Stability of 6mm-Implants Placed by Surgeons of Varying Experience In-Vitro



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Introduction

Short dental implants are usually placed to avoid vertical augmentations. However, surgical experience seems to be fundamental especially in compromised bone qualities. The aim of this study was to evaluate the importance of clinical experience on implant stability (IS) of 6mm implants placed in-vitro.

Materials and Methods

Methods: 480 implants (BioHorizons®-Tapered, 6mm with diameters 4.6mm and 5.8mm) were utilized (Figure 1). All implants were placed by three clinicians (A, B, and C) with different surgical experience levels. One master clinician (A); one third-year resident having surgical experience of almost 100 implants (B); and one resident without implant experience (C). Each surgeon prepared 40 osteotomies for each implant diameter in type I-bone and 40 osteotomies in type IV-bone quality (Sawbones®), respectively. In each group, 20 implants were placed at bone level, the other 20 implants 1mm supracrestal. The IS was evaluated using an Osstell® Beacon device (Figure 2). Comparison of IS between the A, B and C for all implant groups was performed using ANOVA and Bonferroni correction for multiple comparisons for significance level as $p < 0.05$.

Results

Results: Implants had a better stability when they were placed by clinician A than C. Implants placed crestally showed differences between clinicians (A/C- $p=0.0016$; B/C- $p=0.0075$) but not between A and B ($p=0.4435$). At supracrestal placement, IS for A/C was $p < 0.0001$ and B/C- $p=0.0001$ and between A/B, $p=0.2864$. In type I-bone, greater stability was achieved for A compared to C ($p=0.0016$) or B compared to C ($p < 0.0001$); however, in type IV-bone the comparison of stability showed $p < 0.0001$ for groups, A/B, B/C or A/C with best IS for A. In the different diameter groups, stability values in A/C and B/C showed $p < 0.0001$.



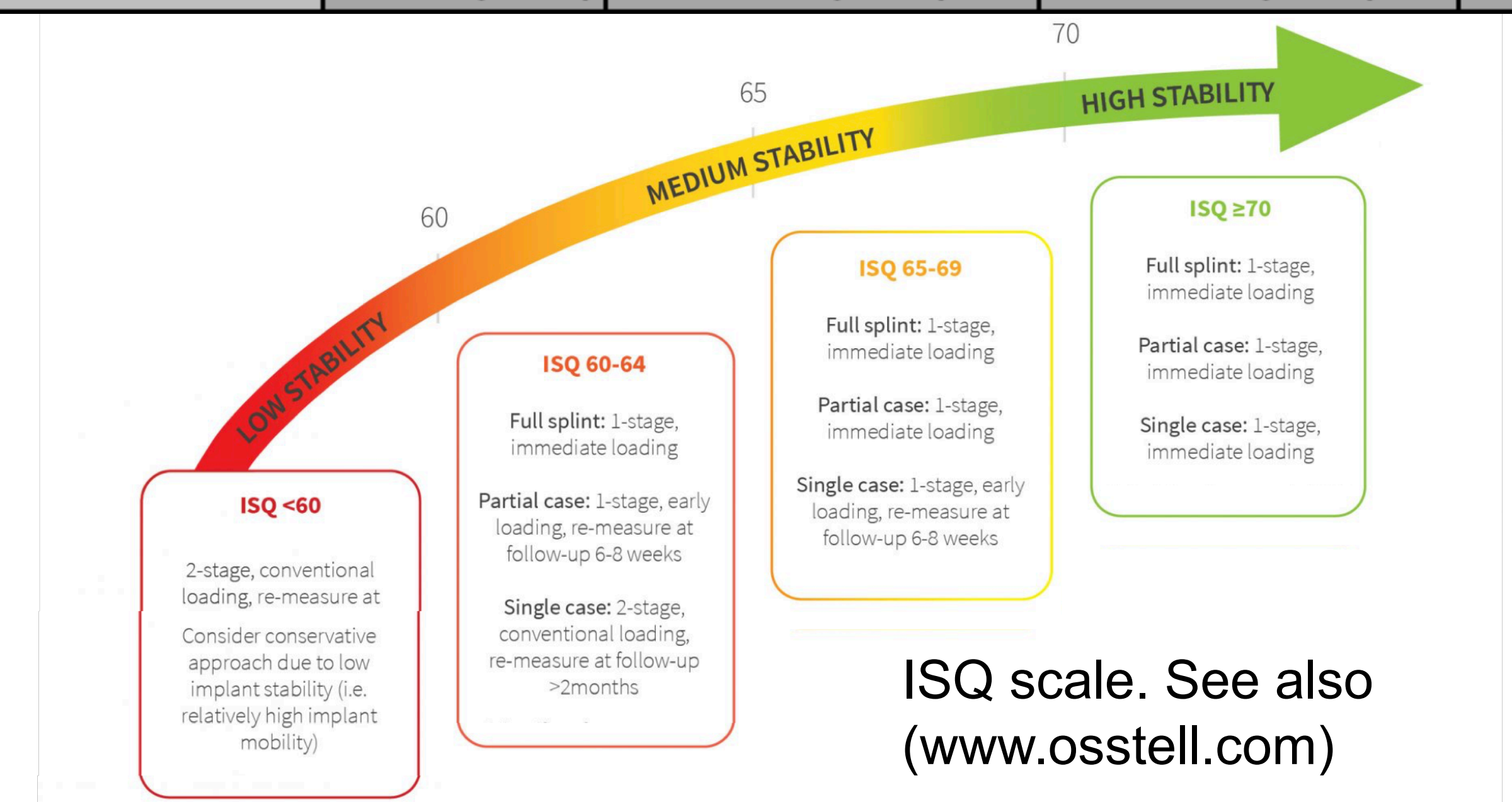
Figure 1: BioHorizons®-Tapered, 6mm with diameters 4.6mm and 5.8mm



Figure 2: Osstell® Beacon Device

ISQ (mean $\pm$ SD)

	Faculty	Resident (3rd Year)	Resident (1st Year)	p-value
Type I Bone	61.31 (5.18)	63.28 (5.34)	58.71 (4.81)	<0.0001
Type IV Bone	53.23 (4.90)	49.22 (3.39)	46.52 (3.39)	<0.0001
Crestal	59.34 (5.54)	58.44 (8.68)	55.28 (7.67)	0.0016
Supracrestal	55.19 (6.67)	54.06 (7.41)	49.94 (6.05)	<0.0001
4.6mm	55.20 (6.73)	54.04 (7.28)	52.69 (8.40)	0.1078
5.8mm	59.34 (5.48)	58.46 (8.79)	52.54 (6.27)	<0.0001



Conclusions

Conclusions: Overall, both master and moderate experienced surgeons presented increased stability on 6mm-implants compared to the inexperienced resident. Expert clinician achieved better stability of short implants in type IV-bone quality.

References

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- Romanos GE, Basha-Hijazi A, Gupta B, Ren YF, Malmstrom H. Role of clinician's experience and implant design on implant stability. An ex vivo study in artificial soft bones. *Clinical implant dentistry and related research*. 2014 Apr;16(2):166-71.