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Immediately loaded machined versus rough surface dental implants in edentulous jaws: One-year post-loading results of a pilot randomised controlled trial



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Purpose: To compare the effectiveness of immediately loaded total prostheses supported by implants with a roughened surface versus implants with a machined/turned surface.

Materials and methods: Fifty edentulous or to-be-rendered edentulous patients requiring an implant-supported cross-arch prosthesis, were randomised either to receive four to eight implants with a roughened surface (25 patients) or with a machined/turned surface (25 patients). Provisional metal-reinforced acrylic prostheses were delivered 48 h after implant placement. Provisional prostheses were replaced after 4 months, by definitive screw-retained metal-resin cross-arch restorations. Outcome measures were prosthesis and implant failures, any complications and peri-implant marginal bone level changes. Patients were followed 1 year after loading.

Results: One year after loading no patient dropped out. No prosthesis failed, but two machined implants were found to be mobile at definitive impression taking in 1 patient (Fisher's exact test: $P = 0.312$; difference in proportions = 4%; 95% CI: -10 to 18). No complications occurred. Both groups presented a significant peri-implant marginal bone loss at 1 year after loading ($P < 0.0001$), -0.64 ± 0.20 mm for rough implants and -0.68 ± 0.23 mm for turned implants, respectively, with no statistically significant differences between the two groups ($P = 0.482$; mean difference = 0.04 mm; 95% CI: -0.17 to 0.25).

Conclusions: Up to 1 year after immediate loading, both implant surfaces provided good and similar results, however, the only two implants which failed early in the same patient had a machined surface. These preliminary results must be confirmed by larger trials with longer follow-ups.

Conflict-of-interest statement: I-RES, the manufacturer of the implants used in this study, donated their implants and prosthetic components, however, data property belonged to the authors and by no means did I-RES interfere with the conduct of the trial or the publication of its results.

Introduction

Nowadays the majority of dental implants sold on the market are characterised by surfaces which have been roughened using different technologies, in order to increase the bone-to-implant contact area,

with the aim of higher success rates, however there is not yet any reliable clinical evidence to substantiate this, although trends of early success rates are in favour of implants with roughened surfaces¹. On the contrary, data suggests that after 3 years in function, implants with a very rough surface have a 20%