**Immediate loading of three (fixed-on-3) versus four (fixed-on-4) implants supporting cross-arch fixed prostheses: One-year results from a multicenter randomised controlled trial**

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**Abstract**

When rehabilitating edentulous jaws with fixed implant-supported prostheses usually at least four implants are placed(1) though there are several alternative options in terms of number of implants than can be used and the position they can be placed in. The more implants are placed, the more increase costs and difficulties to fabricate precise metal frameworks to be passively fixed on the implants. From the patient perspective, it would ideal to obtain a functional fixed prosthesis within a couple of days from implant placement, with a minimal surgical intervention, reducing discomfort, treatment time and costs, providing the risk of implant failure is not increased. Therefore it would be interesting to know whether it could be possible to rehabilitate fully edentulous patients using just three, immediately loaded, implants to support a cross-arch fixed prosthesis. The aim of this multicenter RCT was to compare the clinical outcome of three (test group) versus four (control group) implants immediately restored with metal-resin screw-retained cross-arch prostheses in edentulous jaws.

**Methods and Materials**

Forty-eight edentulous or to be rendered edentulous patients were randomised in 6 centres (8 patients per centre) to the Fo3 group (34 patients: 12 upper and 12 lower jaws) and to the Fo4 group (24 patients: 12 upper and 12 lower jaws) according to a parallel group design. To be immediately loaded implants had to be inserted with a minimum torque of 40 Ncm. Outcome measures were prosthetist and implant failures, complications and peri-implant marginal bone level changes evaluated up to 1-year post-loading.

**Results**

One maxillary prosthesis per group was delayed loaded because implants could not be placed with a torque of at least 40 Ncm. Ten patients in the Fo3 group and 4 in the Fo4 group had implants placed flapless. One-year after loading no drop-out occurred. One patient of the Fo3 group lost 3 implants versus 3 patients of the Fo4 group who lost 4 implants, the difference being no statistically significant (risk difference = -0.08; 95% CI: -0.27 to 0.10; Fisher’s exact test P = 0.609). One mandibular Fo3 and one maxillary Fo4 prosthesis failed. Six Fo3 patients were affected by complications versus 3 Fo4 patients (risk difference = 0.12; 95% CI: -0.10 to 0.34; Fisher’s exact test; P = 0.481). Both groups lost marginal bone in a statistically significant way (0.22±0.20 mm for Fo3 patients and 0.40±0.21 mm for Fo4 patients), with Fo3 group showing less marginal peri-implant bone loss than Fo4 group (estimate of the difference = -0.18 (Standard error: 0.06) mm; 95% CI: -0.30 to -0.06; P<0.005). There were no differences in clinical outcomes between the six operators.

**Conclusion**

This study was designed to investigate whether the Fo3 treatment concept was a viable treatment option. Unfortunately, half of the centres who accepted to join the trial did not recruit any patients. At trial initiation (and still now) we were unable to predict with reasonable certainty the long-term outcome of the Fo3 rehabilitations therefore it seemed prudent not to recruit a larger patient population into the trial. Both procedures were tested in real clinical conditions, using relatively broad patient inclusion criteria and several operators. Therefore, the generalisation (external validity) of the present findings to other settings can be done with more confidence since the operators obtained similar results, however it should also be considered that the follow-up is yet too short and longer follow-ups are needed. These preliminary 1-year results suggest that both immediately loaded mandibular and maxillary cross-arch fixed prostheses can be successfully supported by only three dental implants, however longer follow-ups are needed.

**References**


