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Implant site preparation using a single bur versus multiple drilling steps: 4-month post-loading results of a multicenter randomised controlled trial

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Purpose: To compare the clinical outcome of implants inserted in sites prepared with a simplified protocol consisting of one single drill versus multiple conventional drilling steps.
Materials and methods: In two private clinics, 40 patients, requiring one single implant and having a residual bone height of at least 10 mm and a thickness of at least 5 mm measured on computerised tomography (CT) scans, were randomised after flap elevation to have the implant site prepared using a single drilling step with a newly designed tapered-cylinder drill (1-drill group) or a conventional procedure with multiple drills (multiple-drill group). Implants were left to heal non-submerged for 3 months and then they were loaded with a final metal-ceramic crown. Outcome measures were: implant failure; any complications; peri-implant marginal bone level changes assessed by a blinded outcome assessor; operation time; operator preference and post-surgical pain, swelling and analgesic consumption. All patients were followed up to 4 months after implant loading.
Results: Twenty patients were randomised to the 1-drill group and 20 patients to the multiple-drill group. No implant failed and no complications occurred. Four months after loading, implants in the 1-drill group lost 0.54 mm of peri-implant bone versus 0.41 mm for the implants in the multiple-drill group. There were no statistically significant differences for marginal bone level changes between the two groups (difference 0.13 mm, 95% CI -0.21; 0.47, $P = 0.108$). Less time which was statistically significant (3.66 mins, 95% CI 2.69; 4.63, $P < 0.0001$) was required to place the implant with the single bur. Both operators always preferred the single bur technique. Postoperatively, patients in the 1-drill group vs patients in the multiple-drill group reported statistically significant differences for pain level (difference 27.5, 95% CI 3.3; 51.7, $P < 0.0001$), number of days in which the swelling persisted (difference 3.4, 95% CI 2.4; 4.4, $P < 0.0001$) and the number of analgesic drugs taken (difference 2.8, 95% CI 1.4; 4.2, $P < 0.0001$)
Conclusions: Within the limits of this trial, both drilling techniques produced successful results over a 4-month post-loading follow-up period, but the single bur procedure required less surgical time and lead to less postoperative morbidity.

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