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[Intervention Review]

Interventions for replacing missing teeth: different times for loading dental implants

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ABSTRACT

Background

To minimise the risk of implant failures after their placement, dental implants are kept load-free for 3 to 8 months to establish osseointegration (conventional loading). It would be beneficial if the healing period could be shortened without jeopardising implant success. Nowadays implants are loaded early and even immediately and it would be useful to know whether there is a difference in success rates between immediately and early loaded implants compared with conventionally loaded implants.

Objectives

To evaluate the effects of (1) immediate (within 1 week), early (between 1 week and 2 months), and conventional (after 2 months) loading of osseointegrated implants; (2) immediate occlusal versus non-occlusal loading and early occlusal versus non-occlusal loading; (3) direct loading versus progressive loading immediately, early and conventionally.

Search methods

The following electronic databases were searched: the Cochrane Oral Health Group's Trials Register (to 8 June 2012), the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2012, Issue 4), MEDLINE via OVID (1946 to 8 June 2012) and EMBASE via OVID (1980 to 8 June 2012). Authors of identified trials were contacted to find unpublished randomised controlled trials (RCTs). There were no restrictions regarding language or date of publication.

Selection criteria

All RCTs of root-form osseointegrated dental implants, having a follow-up of 4 months to 1 year, comparing the same implant type immediately, early or conventionally loaded, occlusally or non-occlusally loaded, or progressively loaded or not. Outcome measures were: prosthesis and implant failures and radiographic marginal bone level changes.

Data collection and analysis

Data were independently extracted, in duplicate, by at least two review authors. Trial authors were contacted for missing information. Risk of bias was assessed for each trial by at least two review authors, and data were extracted independently, and in duplicate. Results were combined using fixed-effect models with mean differences (MD) for continuous outcomes and risk ratios (RR) for dichotomous outcomes with 95% confidence intervals (CI). Summary of findings tables of the main findings were constructed.

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Main results

Forty-five RCTs were identified and, from these, 26 trials including a total of 1217 participants and 2120 implants were included. Two trials were at low risk of bias, 12 were at high risk of bias and for the remaining 12 the risk of bias was unclear. In nine of the included studies there were no prosthetic failures within the first year, with no implant failures in seven studies and the mean rate of implant failure in all 26 trials was a low 2.5%. From 15 RCTs comparing immediate with conventional loading there was no evidence of a difference in either prosthesis failure (RR 1.90; 95% CI 0.67 to 5.34; 8 trials) or implant failure (RR 1.50; 95% CI 0.60 to 3.77; 10 trials) in the first year, but there is some evidence of a small reduction in bone loss favouring immediate loading (MD -0.10 mm; 95% CI -0.20 to -0.01; $P = 0.03$; 9 trials), with some heterogeneity ($\text{Tau}^2 = 0.01$; $\text{Chi}^2 = 14.37$, $df = 8$ ($P = 0.07$); $I^2 = 44\%$). However, this very small difference may not be clinically important. From three RCTs which compared early loading with conventional loading, there is insufficient evidence to determine whether or not there is a clinically important difference in prosthesis failure, implant failure or bone loss. Six RCTs compared immediate and early loading and found insufficient evidence to determine whether or not there is a clinically important difference in prosthesis failure, implant failure or bone loss. From the two trials which compared occlusal loading with non-occlusal loading there is insufficient evidence to determine whether there is a clinically important difference in the outcomes of prosthesis failure, implant failure or bone loss. We did not identify any trials which evaluated progressive loading of implants.

Authors' conclusions

Overall there was no convincing evidence of a clinically important difference in prosthesis failure, implant failure, or bone loss associated with different loading times of implants. The quality of the evidence is assessed as very low due to high and unclear risk of bias of primary studies and there is some evidence of reporting bias so clinicians should treat these findings with caution. A high value of insertion torque (at least 35 Ncm) seems to be one of the prerequisites for a successful immediate/early loading procedure. More well-designed RCTs are needed and should be reported according to the CONSORT guidelines (www.consort-statement.org/), and registered with a trials registry.

PLAIN LANGUAGE SUMMARY

Interventions for replacing missing teeth: different times for loading dental implants

When people have dental implants in their jaws, they usually wait several months for the bone around the implants to heal before artificial teeth are attached to the implant. During this period they use removable dentures. This review looked at the effects of attaching artificial teeth either the same day that the implant was placed, or early (after only 6 weeks) compared to the usual delay of at least 3 months. Some studies also compared the artificial tooth being attached so that it did not touch the opposite tooth (non-occlusal loading). The search of studies was updated on 8th June 2012. The review found no evidence that attaching artificial teeth either immediately, after 6 weeks (early) or after at least 3 months (conventional) led to any important differences in the failure of the implant or the artificial tooth, or to the amount of bone which surrounded the implant (any bone loss would be an undesirable consequence). More research is needed in this area.