Immediate restoration/loading of immediately placed single implants: is it an effective bimodal approach?
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CRD summary
The authors concluded that immediate oral implants placed in fresh extraction sockets were associated with higher risk of failure compared with those placed in healed ridges. The authors’ conclusion reflected the evidence presented, but the poor quality of the included trials made the reliability of the conclusion unclear.

Authors’ objectives
To evaluate the immediate restoration/loading of single implants placed in the aesthetic region under two different placement protocols (extractions sockets versus healed ridges) and examine the effects of several covariates in implant success.

Searching
MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Oral Health Group's Trials Register, NRR and ISI Proceedings were searched from 1969 to 2008. Search terms were reported. Several dental journals were handsearched from 1998 up to 2008. Bibliographies of identified articles and relevant reviews were checked for additional studies. No language restrictions were applied.

Study selection
Randomised controlled trials (RCTs) and non-randomised controlled studies that compared immediate placement of unsplinted single implants in non-infected extraction sockets versus placement in healed sites after at least four months of healing followed by immediate restoration/loading in the aesthetic zone (defined as maxillary and mandibular incisors, canines and premolars) were included. Only studies that used endosseous solid root-form titanium implants were eligible. Included studies needed to have an average follow up period of six months after implant placement and the immediate placement group should include at least 10 implants.

The primary outcomes of interest were rates of success (defined as absence of mobility, pain, peri-implant infection and suppuration and radiographic bone loss of less than 1mm in the first year follow up and 0.2mm for each succeeding year) and survival (defined as indications of functioning implant at the time of evaluation).

The included studies differed on number of characteristics including type of implants used, use of regenerative procedures and antibiotics, number of implants studied (range 24 to 111) and follow-up period (range six to 60 months). In the immediate placement group, the time at which the implants were restored with definitive crowns ranged from two weeks to an average of 50 weeks.

Two reviewers independently selected studies for inclusion. Any disagreements were resolved through discussion. A third reviewer was consulted only when necessary.

Assessment of study quality
The five-point Jadad scale was used to assess the study quality. This scale assigns score from 0 (poor) to 5 (high) based on method of randomisation, blinding and reasons for withdrawals/drop outs.

The authors did not state how many reviewers assessed the study validity.

Data extraction
Data were extracted to enable calculation of risk ratios (RR), mean differences (MD) and 95% confidence intervals (CI) of marginal bone level change (measured in mm), proportions of implant failures and survival rates in each treatment group and follow-up period. Authors were contacted for clarification or missing data.
The authors did not state how many reviewers performed the data extraction.

**Methods of synthesis**
RRs, weighted mean differences (WMDs) and 95% CIs were pooled in Mantel-Haenszel fixed-effect meta-analysis. $X^2$ and $I^2$ were used to assess heterogeneity. The effects of number of implants, length of follow-up and whether or not bone grafting was used were assessed in subgroup analyses. Publication bias was assessed using funnel plots.

**Results of the review**
Ten controlled trials (n=629 implants) were included. Nine out of 10 trials scored 0 and one trial scored 1 on the quality assessment criteria.

Survival rates of immediate single implants ranged 82.4% to 100%. Immediately loaded single implants in fresh extraction sockets had a significantly higher risk of implant failure (RR 3.62, 95% CI 1.15 to 11.45; six trials) compared to healed ridges. At 12 months follow-up a significant bone gain was found in the immediate placement group (WMD 1.96, 95% CI 1.20 to 2.73; two trials). Heterogeneity was not statistically significant.

Subgroup analyses showed that delayed placement was favoured in studies that included more than 60 implants (RR 3.57, 95% CI 1.02 to 12.53; five trials) and those did not use any bone grafting procedures (RR 3.99, 95% CI 1.00 to 15.86; five trials). No significant differences were found with length of study follow-up period.

The funnel plot results showed no indication of publication bias.

**Authors' conclusions**
Immediately restored/loaded oral implants placed into extraction sockets in the aesthetic zone had a higher risk of failure compared to those placed in healed ridges.

**CRD commentary**
This review had a clear research question and was supported by well-defined inclusion criteria. The literature search appeared adequate; several sources were used and included sources that offered unpublished material. No language restrictions were applied, which minimised risk of language bias. There was no substantial threat of publication bias. Sufficient attempts were made to minimise errors and bias in the selection of studies; review processes used for data extraction and validity assessment were less clear. The method of synthesis appeared appropriate, and the influence of clinically important factors were further explored. The authors' conclusion reflected the evidence presented, but the poor quality of the included trials made the reliability of the conclusion unclear.

**Implications of the review for practice and research**
**Practice:** The authors stated that clinicians should advise their patients on advantages and potential limitations of immediate single implant restoration compared with other treatment options.

**Research:** The authors stated that long-term well-conducted randomised controlled trials were required to confirm the validity of immediate single implant restoration/loading protocols as a treatment option.

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