study

Early and late implant failure of submerged versus non-submerged implant healing: a systematic review, meta-analysis, and trial sequential analysis
—

Giuseppe Troiano, Lucio Lo Russo, Luigi Canullo, Domenico Ciavarella, Lorenzo Lo Muzio, Luigi Laino
J Clin Periodontol. 2018;45 (5): 613-623.

RELEVANT BACKGROUND

A two-stage approach, based on a period of submerged healing aimed at optimising the process of new bone formation and remodelling that follows implant placement, is considered the gold-standard procedure. On the other hand, the desire to provide patients with faster and less invasive treatment and to avoid postponing implant loading and prosthesis delivery, has led one-stage surgery and non-submerged healing to gain popularity. Some studies have performed a direct comparison between submerged and non-submerged approaches, but differences are not clear in terms of early and late implant failure or changes in marginal bone level (MBL).

AIMS

To analyse the current evidence regarding possible differences in early and late implant failure (respectively defined as before or after six months from implant placement) as well as changes in marginal bone level (MBL) between submerged and non-submerged healed dental implants.

MATERIALS AND METHODS

PUBMED, SCOPUS, EMBASE, and Web of Science databases were searched for prospective randomised and non-randomised controlled studies including direct comparisons between submerged and non-submerged healed dental implants (not subjected to immediate loading), in terms of early and late implant failure, and MBL changes.

Regarding early and late implant failure, the relative risk (RR) between non-submerged and submerged healing was calculated. Regarding MBL, the mean difference (MD) and its standard error (SE) were calculated.

Sensitivity analyses were also performed for early and late implant failure, omitting articles on the basis of risk of bias and study design.

Risk-of-bias assessment was performed using the Cochrane collaboration tool for randomised clinical trials. Meta-analysis was performed on the implant as the statistical unit and the power of the meta-analytic findings were determined by trial sequential analysis (TSA).

JCP DIGEST 05

Selected from
Journal of Clinical Periodontology
VOLUME 45/2018

Scientific release from the EFP
EFP
European Federation of Periodontology

results

- Eleven studies, with a follow-up time ranging from six months to five years, were included in the review. Six studies were of low risk of bias and five studies were of high risk.

- Early implant failure rate was significantly higher with non-submerged healing (4.5%) compared to submerged healing (1.7%).

- Late-implant failure rate was not significantly different between non-submerged and submerged healing (1.4% vs. 0.5%, respectively), but the power of evidence is low, as determined by TSA.

- MBL changes one year after loading ranged from 0.02mm to 0.86mm for non-submerged implants and from 0.18mm to 0.77mm for submerged implants.

- Non-submerged healing resulted in significantly less MBL loss compared with submerged healing. However, the effect size was only 0.13 mm.

LIMITATIONS

- The effect of one- versus two-stage implant placement in case of simultaneous bone regeneration was not analysed.

CONCLUSIONS

- The results of this systematic review revealed a slightly higher rate of early implant failure when a non-submerged healing approach was used.

- No differences were found for failures occurring later than six months from implant placement, although the power of evidence regarding this issue is low.

- The power of the evidence about the effects of different healing approaches on the crestal bone level is low, but the results of the present systematic review seem to favour a non-submerged healing, albeit with a very small effect size.

IMPACT

- Within the limits of this systematic review, it was shown that a non-submerged healing modality was associated with a slightly higher rate of early implant loss compared with submerged healing.