

## ANSWERING REVIEWERS

**Name of journal:** World Journal of Clinical Cases

**Manuscript NO:** 52109. Invited manuscript number: 04122705

**Manuscript type:** META-ANALYSIS

**Title:** Long-term clinical performance of flapless implant surgery compared to conventional approach with flap elevation: a systematic review and meta-analysis

### Author comment:

We would like to thank the editor and reviewer for taking the time to provide valuable suggestions and feedback, this is much appreciated. Responses are indicated by 'Author response' and revisions outlined under 'Author action' below the reviewer's comment. Additionally, all the revisions are highlighted with blue in the updated manuscript for reference.

### REVIEWER 1

#### 1.1 Reviewer comment

The topic is interesting and the manuscript is well written, It would be advisable only to recheck the mentioned keywords because some of the keywords are broad terms that do not reflect the focus of the manuscript (e.g; Surgery and prognosis).

#### 1.1 Author response

Thank you for your positive feedback and taking the time to review this article. According to reviewer's suggestion, we changed the term "surgery, computer-assisted" to "computer-assisted surgery", which reflected the focus of manuscript on surgical procedures aided with computers. We also split the broad term "prognosis" to three keywords "implant survival rate", "marginal bone loss", and "complication rate" to indicate the focus on the long-term implant survival, marginal bone loss, and complications after the flapless and conventional implant surgeries.

The following revision has been made in the **Key words** section.

#### 1.1 Author action

Key words section, line 126-129, page 5-6: Flapless implant surgery; Dental implantation; Minimally invasive surgical procedures; Computer-assisted surgery;

Cone-beam computed tomography; Implant survival rate; Marginal bone loss; Complication rate.

## 1.2 Reviewer comment

Also some abbreviations were not explained in the first time they appears in the manuscript (e.g. CCTs, OR and CI).

## 1.2 Author response

Thank you for your attention to detail. We rechecked the entire manuscript and explained each of the abbreviations with its full term in the first time abbreviations appeared in the paper. Additionally, we eliminated abbreviations that were used only once (e.g. CENTRAL, ICTRP, and NTIS) in the manuscript.

We have now updated the following details for the appropriate use of abbreviations.

## 1.2 Author action

Abstract section, line 93-94, page 4: PubMed, EMBASE, Cochrane Central Register of Controlled Trials, and grey literature databases were searched from inception to 23 September 2019.

Abstract section, line 95-97, page 4: Randomised controlled trials (RCTs) and cohort studies comparing the long-term clinical performance after flapless implant surgeries to conventional approach over a follow-up of three years or more were included.

Abstract section, line 97-101, page 4: Meta-analyses were conducted to estimate the odds ratios (ORs) or mean differences (MDs) and their 95% confidence intervals (95% CIs) between flapless and conventional groups.

Material and methods section, line 243-245, page 10: PubMed, EMBASE, and Cochrane Central Register of Controlled Trials were searched systematically for articles published from inception to 23 September 2019 with no restrictions.

Material and methods section, line 249-251, page 10: The ClinicalTrials.gov and the International Clinical Trials Registry Platform were searched for unpublished reports of clinical trials.

Material and methods section, line 255-256, page 11: In addition, the Open SINGLE and National Technical Information Service databases were also searched as supplements.

In addition, we updated the format of manuscript according to the Guidelines and Requirements for Manuscript Revision and the Format for Manuscript Revision for Meta-Analysis:

1. Some details have been added to the abstract section:

Abstract section, line 97-103, page 4-5: Meta-analyses were conducted to estimate the odds ratios (ORs) or mean differences (MDs) and their 95% confidence intervals (95% CIs) between the long-term implant survival rate, marginal bone loss, and complication rate of flapless and conventional groups. Subgroup analyses were carried out to account for the possible effects of guided or free-hand method during flapless surgery.

Abstract section, line 111-119, page 5: Moreover, subgroup analyses revealed that there was no statistically significant difference between the implant survival rate (guided: OR = 1.52, 95% CI (0.19, 12.35), P = .70); free-hand: n=1, could not be estimated), marginal bone loss (guided: MD = 0.22, 95% CI (-0.14, 0.59), P = .23; free-hand: MD = -0.27, 95% CI (-1.10, 0.57), P = .53), or complication rate (guided: OR = 1.16, 95% CI (0.52, 2.63), P = .71; free-hand: OR = 1.75, 95% CI (0.66, 4.63), P = .26) of flapless and conventional groups either with the use of surgical guide or by a free-hand method.

2. The “ARTICLE HIGHLIGHTS” section has been added to the manuscript:

Article highlights section, line 614-692, page 23-26:

## ARTICLE HIGHLIGHTS

### Research background

The conventional implant surgery involves flap elevation, which may result in increased postoperative discomfort and morbidity. The flapless surgical technique, aided by three-dimensional medical imaging equipment, has been regarded as a possible alternative to conventional approach to alleviate the above issues. However, the previous results regarding the role of flapless implant surgery are inconsistent and there is still concern about the long-term clinical performance of flapless surgical technique. To date, no meta-analysis or systematic review comparing the long-term clinical performance of flapless surgical technique to conventional approach have been published.

### Research motivation

The long-term clinical performance of dental implant treatment can be affected by different surgical techniques. Thus, it is important to compare the long-term outcomes of flapless implant surgery to conventional approach over a follow-up of three years or more. A better insight into this topic would help inform surgeons regarding which type of surgery techniques is more beneficial to the long-term prognosis of patients in need of implant insertion.

### Research objectives

To compare the long-term clinical performance after flapless implant surgeries to conventional approach with flap elevation.

## Research methods

This was a systematic review and meta-analysis study. The protocol of this study was defined by the authors prior to the literature search. Nine electronic databases were searched systematically from inception to 23 September 2019. A manual search was also carried out to identify studies that were not indexed in the above databases. Randomised controlled trials (RCTs) and cohort studies comparing the long-term clinical performance after flapless implant surgeries to conventional approach over a follow-up of three years or more were included in the current systematic review. The risk of bias of selected RCTs and cohort studies was assessed using the Cochrane Collaboration's tool for assessing risk of bias and Newcastle-Ottawa Scale respectively. Meta-analyses were conducted to estimate the odds ratios (ORs) or mean differences (MDs) and their 95% confidence intervals (95% CIs) between the implant survival rate, marginal bone loss, and complication rate of flapless and conventional groups. Sensitivity analyses were advocated to check if the findings of current meta-analyses were dependent on any individual study. Moreover, subgroup analyses were carried out to account for the possible effects of guided or free-hand method during flapless surgery.

## Research results

Of 1,839 records, ten articles (i.e. four RCTs and six cohort studies) involving a total of 8,607 participants and 20,428 implants satisfied the eligibility criteria and nine of them (i.e. four RCTs and five cohort studies) were included in the meta-analysis. Two RCTs (50%) were evaluated to have an unclear risk of bias and the other two RCTs (50%) were appraised at high risk of bias. Three cohort studies were appraised with low risk of bias, and the other three cohort studies were judged to have moderate risk of bias. After meta-analyses, there was no significant difference between the long-term implant survival rate (OR = 1.30, 95% CI (0.37, 4.54),  $P = .68$ ), marginal bone loss (MD = 0.01, 95% CI (-0.42, 0.44),  $P = .97$ ), and complication rate (OR = 1.44, 95% CI (0.77, 2.68),  $P = .25$ ) after flapless implant surgery and conventional approach. The overall results and conclusions of the meta-analyses were not affected by the exclusion or inclusion of individual studies. Moreover, subgroup analyses revealed that there was no statistically significant difference between the implant survival rate (guided: OR = 1.52, 95% CI (0.19, 12.35),  $P = .70$ ); free-hand:  $n=1$ , could not be estimated), marginal bone loss (guided: MD = 0.22, 95% CI (-0.14, 0.59),  $P = .23$ ; free-hand: MD = -0.27, 95% CI (-1.10, 0.57),  $P = .53$ ), or complication rate (guided: OR = 1.16, 95% CI (0.52, 2.63),  $P = .71$ ; free-hand: OR = 1.75, 95% CI (0.66, 4.63),  $P = .26$ ) of flapless and conventional groups either with the use of surgical guide or by a free-hand method.

## Research conclusions

It was indicated that the flapless surgery and conventional approach have comparable clinical performance over a long-term follow-up of three years or more. The guided or free-hand technique does not significantly affect the long-term effects of flapless surgery. Hence, the flapless technique can be considered as a promising alternative to conventional implant approach without significantly compromising the long-term outcomes of implant treatment.

#### Research perspectives

The overall results of long-term clinical performance after flapless implant surgery are acceptable. It provides surgeons an evidence-based practical insight that the flapless technique can be considered as an alternative to conventional implant approach in patients with proper alveolar bone and soft tissue condition. Although evidence from the study suggests that the guided or free-hand implant insertion does not significantly affect the long-term outcomes of flapless implant surgery, surgeons' experience and relevant cost-effectiveness should be considered regarding the option of a surgical guide or free-hand method in flapless surgery. Further high-quality RCTs with a long-term follow-up are needed for a more robust assessment.