

University of Groningen

Trust, but verify: response to "Titanium plate removal in orthognathic surgery

Gareb, Barzi; Bakelen, van, Nico; Dijkstra, Pieter U. ; Vissink, Arjan; Bos, Ruud R.M.; Minnen, van, Baucke

Published in:
International Journal of Oral & Maxillofacial Surgery

DOI:
[10.1016/j.ijom.2020.09.003](https://doi.org/10.1016/j.ijom.2020.09.003)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2021

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Gareb, B., Bakelen, van, N., Dijkstra, P. U., Vissink, A., Bos, R. R. M., & Minnen, van, B. (2021). Trust, but verify: response to "Titanium plate removal in orthognathic surgery: prevalence, causes and risk factors. A systematic literature review and meta-analysis". *International Journal of Oral & Maxillofacial Surgery*, 50(5), 707-708. <https://doi.org/10.1016/j.ijom.2020.09.003>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Letter to the Editor

Trust, but verify: response to “Titanium plate removal in orthognathic surgery: prevalence, causes and risk factors. A systematic literature review and meta-analysis”

We read with great interest the work of Gómez-Barrachina et al.¹. Their systematic review covers the prevalence, causes, and risk factors of titanium plate removal in orthognathic surgery. We have some concerns, however, regarding the completeness of the review due to the search strategy used and the interpretation of funnel plots.

Systematic reviews aim to identify all available evidence that fits pre-specified criteria to answer a specific research question, while minimizing bias². Although substantial evidence was reported, at least three randomized controlled trials were not included^{3–5}. These trials should have been included when applying their pre-specified inclusion and exclusion criteria.

A thorough look at their methodology showed that some aspects of a sensitive search strategy were missing. This gap in methodology might have resulted in missing identification of relevant studies. Their search string for PubMed lacked medical subject heading (MeSH) terms (e.g., “Osteotomy, Le Fort”[MeSH]). Inappropriate use or not using MeSH terms at all may result in missing studies and, thus, in incompleteness of a systematic review². This common error in search strategies occurs in 44% of systematic reviews⁶. Furthermore, no explosion of terms (e.g., ‘orthognathic surgery’/exp) and no truncations were used in the PubMed, Scopus, and Embase search strategy (e.g., osteosynth*). Explosion of terms searches for specific terms underneath

a specific heading. Truncations are used to search variants of spellings of a term. Excluding both will result in a less sensitive search strategy with the potential of missing evidence⁶. Finally, their search strings for PubMed, Scopus, and Embase were identical, while each database needs a search string tailored to that database. This error occurs in 21% of systematic reviews⁶. As a result of such incompleteness, the guidelines for systematic reviews emphasize that authors should work closely with information specialists, preferably from the start of protocol writing, to ensure an appropriate and sensitive search strategy². How complete and reliable is a systematic review when eligible literature is not included? Hence, trust your search strategy, but have it verified by an experienced information specialist.

The three missed studies report prevalence rates of titanium plate removal in patients of 3.3%³, 0% (Le Fort I osteotomies)⁴, and 15.3%⁵. Furthermore, these studies report data regarding the location of plate placement. One study also provides data regarding the cause of plate removal³. Including these studies would have lowered the estimated plate removal prevalence, provided valuable information regarding the causes and risk factors for plate removal, and increased the power of the analyses performed by Gómez-Barrachina et al.¹.

Funnel plots are useful to assess publication bias but may result in false-positive test results when substantial between-study heterogeneity exists; in such cases, they are discouraged². The authors constructed funnel plots passing clinical (e.g., different procedures) and methodological (e.g., different study designs) between-study heterogeneity.

Furthermore, they reported that their funnel plots of the prevalence of plate removal were symmetrical, and that trim and fill methods showed no significant difference between observed and imputed studies. Thus, they concluded that there was no publication bias. However, the results of statistical tests for funnel plot asymmetry should always be interpreted in combination with a visual inspection of the funnel plot². The trim and fill test has low power in the case of substantial heterogeneity, and, thus, even when this test does not provide evidence of funnel plot asymmetry, bias cannot be excluded². We observed asymmetry in their funnel plots by visual inspection, i.e. smaller studies with a statistically significant higher prevalence of titanium plate removal are less often observed than expected. Therefore, based on between-study heterogeneity and visually observed funnel plot asymmetry, the authors cannot exclude the presence of publication bias. Hence, we advocate trusting the statistical tests, but verifying the conclusions by critically inspecting the funnel plots.

Funding

None.

Ethical approval

Not applicable.

Competing interests

None.

Patient consent

Not applicable.

References

- Gómez-Barrachina R, Montiel-Company JM, García-Sanz V, Almerich-Silla JM, Paredes-Gallardo V, Bellot-Arcís C. Titanium plate removal in orthognathic surgery: prevalence, causes and risk factors. A systematic literature review and meta-analysis. *Int J Oral Maxillofac Surg* 2020;**49**:770–8. <http://dx.doi.org/10.1016/j.ijom.2019.11.003>.
- Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA. *Cochrane handbook for systematic reviews of interventions* version 6.0 (updated July 2019). *Cochrane* 2019 [Accessibility verified: 28 June 2020]<http://www.training.cochrane.org/handbook>.
- Yoshioka I, Igawa K, Nagata J, Yoshida M, Ogawa Y, Ichiki T, Yokota R, Takamori K, Kashima K, Sakoda S. Comparison of material-related complications after bilateral sagittal split mandibular setback surgery: biodegradable versus titanium miniplates. *J Oral Maxillofac Surg* 2012;**70**:919–24. <http://dx.doi.org/10.1016/j.joms.2011.02.136>.
- Tuovinen V, Suuronen R, Teittinen M, Nurmenniemi P. Comparison of the stability of bioabsorbable and titanium osteosynthesis materials for rigid internal fixation in orthognathic surgery. A prospective randomized controlled study in 101 patients with 192 osteotomies. *Int J Oral Maxillofac Surg* 2010;**39**:1059–65. <http://dx.doi.org/10.1016/j.ijom.2010.07.012>.
- Gareb B, van Bakelen NB, Buijs GJ, Jansma J, de Visscher JGAM, Hoppenreijts THJM, Bergsma JE, van Minnen B, Stegenga B, Bos RRM. Comparison of the long-term clinical performance of a biodegradable and a titanium fixation system in maxillofacial surgery: a multicenter randomized controlled trial. *PLoS One* 2017;(12):1–12. <http://dx.doi.org/10.1371/journal.pone.0177152>.
- Sampson M, McGowan J. Errors in search strategies were identified by type and frequency. *J Clin Epidemiol* 2006;**59**. <http://dx.doi.org/10.1016/j.jclinepi.2006.01.007>. 1057.e1–1057.e9.

B. Gareb*

Department of Oral and Maxillofacial Surgery, University Medical Centre Groningen, University of Groningen, Hanzeplein 1, PO Box 30001, 9700 RB Groningen, The Netherlands

N.B. van Bakelen

Department of Oral and Maxillofacial Surgery, University Medical Centre Groningen, University of Groningen, Hanzeplein 1, PO Box 30001, 9700 RB Groningen, The Netherlands

P.U. Dijkstra¹²

¹ Department of Oral and Maxillofacial Surgery, University Medical Centre Groningen, University of Groningen, Hanzeplein 1, PO Box 30001, 9700 RB Groningen, The Netherlands

² Department of Rehabilitation Medicine, University Medical Centre Groningen, University of Groningen, Hanzeplein 1,

PO Box 30001, 9700 RB Groningen, The Netherlands

A. Vissink

Department of Oral and Maxillofacial Surgery, University Medical Centre Groningen, University of Groningen, Hanzeplein 1, PO Box 30001, 9700 RB Groningen, The Netherlands

R.R.M. Bos

Department of Oral and Maxillofacial Surgery, University Medical Centre Groningen, University of Groningen, Hanzeplein 1, PO Box 30001, 9700 RB Groningen, The Netherlands

B. van Minnen

Department of Oral and Maxillofacial Surgery, University Medical Centre Groningen, University of Groningen, Hanzeplein 1, PO Box 30001, 9700 RB Groningen, The Netherlands

*Address: Barzi Gareb, Department of Oral and Maxillofacial Surgery,

University Medical Centre Groningen, University of Groningen, Hanzeplein 1, PO Box 30001, 9700 RB Groningen, The Netherlands. Tel.: +31 503611054; Fax: +31 503612831

E-mail address: b.gareb@umcg.nl (B. Gareb)

Response to “Trust, but verify”

In response to the Letter to the Editor, “Trust, but verify”, we thank the readers for their interest and contributions.

It is true that a systematic review is complex and that the search strategies employed in the review are equally complex given the enormous amount of information that exists nowadays in medical databases. In this case, the search strategy was not sufficiently sensitive to detect all of the articles published¹.

We agree with the readers’ suggestion to include an information specialist in the team from the beginning of the process and we will do so in future projects.

Regarding the three articles that were mentioned as not being included in the systematic review, Gareb et al. obtained a plate removal incidence of 16.4%², which is similar to the result obtained in the meta-analysis: 13.4% (95% confidence interval (CI) 9.6–18.3%)¹. Yoshioka et al. reported a plate removal incidence of 3.3%³. Our review included articles with a similar plate removal incidence, like Verweij et al. (2%)⁴ and O’Connell et al. (1%)⁵. Tuovinen et al. observed a plate removal incidence of 5%⁶. We obtained this incidence from the following data: 40 patients with inserted plates (29 mandibular and 11 maxillary), of which 10 were bimaxillary and two patients with titanium plates removed.

The plate removal incidence of 5% is similar to some articles that were included, such as Baas et al. (6.9%)⁷ and Velich et al. (6%)⁸.

Figure 1 shows a forest plot with the three recommended studies included. We obtained an estimated incidence of titanium plate removal of 12.5% (95% CI 9.1–16.8%), which hardly differs from the previously obtained 13.4% (95% CI 9.6–18.3%). Despite the incorporation of the three new studies, we can rely on the estimate presented in our meta-analysis.

With respect to publication bias, we agree with the readers’ considerations and the limitations of assessing publication bias, since it is a controversial analysis based on assumptions that may not be