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

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# 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.<sup>1</sup>. 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 bias<sup>2</sup>. Although substantial evidence was reported, at least three randomized controlled trials were not included<sup>3–5</sup>. 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 review<sup>2</sup>. This common error in search strategies occurs in 44% of systematic reviews<sup>6</sup>. 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 evidence<sup>6</sup>. 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 reviews<sup>6</sup>. 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 strategy<sup>2</sup>. 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%<sup>3</sup>, 0% (Le Fort I osteotomies)<sup>4</sup>, and 15.3%<sup>5</sup>. Furthermore, these studies report data regarding the location of plate placement. One study also provides data regarding the cause of plate removal<sup>3</sup>. 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.<sup>1</sup>.

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 discouraged<sup>2</sup>. 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 plot<sup>2</sup>. 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 excluded<sup>2</sup>. 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.

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### **Ethical approval**

Not applicable.

### **Competing interests**

None.

### **Patient consent**

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## 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 published<sup>1</sup>.

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%<sup>2</sup>, which is similar to the result obtained in the meta-analysis: 13.4% (95% confidence interval (CI) 9.6–18.3%)<sup>1</sup>. Yoshioka et al. reported a plate removal incidence of 3.3%<sup>3</sup>. Our review included articles with a similar plate removal incidence, like Verweij et al. (2%)<sup>4</sup> and O’Connell et al. (1%)<sup>5</sup>. Tuovinen et al. observed a plate removal incidence of 5%<sup>6</sup>. 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%)<sup>7</sup> and Velich et al. (6%)<sup>8</sup>.

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