

## Peer Review File

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### **Reviewer A**

Comment 1: The authors have compiled a case-series containing patients treated with orthognathic surgery with a combination of surgery first-approach and patient-specific plates. The cases are very illustrative and relevant for this publication. The cases are acceptably described and the reasons behind combining surgery first with patient specific plates is well discussed.

Reply 1: N/A

Comment 2: “There is only one major area where I believe that the manuscript should be improved. As this manuscript describes using VSP and patient specific plates, I would suggest that the illustration of each case contains both pre- and postoperative 3D scans as well as screenshots from the virtual surgical plan and the CAD/CAM design of the patient-specific plates. These illustrations will help visualize how close the orthognathic surgery repositioned the bony segments to the VSP, while also visualizing the treatment plan and CAD/CAM plates to the readers. Given the headline of the article, the readers would expect some sort of visualization of both VSP given this is surgery first, and the design of the patient specific plates.”

Reply 2: Pre-op and post-op images and digital renderings were added for each patient case where possible [lines 202-205, 277-279, 356-358, 429-434]

Comment 3: “Finally, the figure 5b, mentions that the 2 3D models from the CBCT scans are both preoperative. To me, it seems that only one 3D model is the preoperative, while the other is the postoperative. Please check to see if the legend is correct.”

Reply 3: The post-operative 3D model has been appropriately labeled as part of Figure 5a [Line 350] and appropriately referenced in line [318].

Changes in the text: The post-operative digital rendering was moved to be included in Figure 6 with post-operative follow up pictures. This change addresses this comment as well as editorial comment 19 to condense figures into single figures.

### **Reviewer B**

Comment 3: I suggest that you consider adding the following references to your manuscript:

Three-dimensional treatment planning of orthognathic surgery in the era of virtual imaging.

Swennen GR, Mollemans W, Schutyser F. J Oral Maxillofac Surg. 2009 Oct;67(10):2080-92. doi: 10.1016/j.joms.2009.06.007. PMID: 19761902

A paradigm shift in orthognathic surgery? A comparison of navigation, computer-aided designed/computer-aided manufactured splints, and "classic" intermaxillary splints to surgical transfer of virtual orthognathic planning.

Zinser MJ, Sailer HF, Ritter L, Braumann B, Maegele M, Zöller JE. J Oral Maxillofac Surg. 2013 Dec;71(12):2151.e1-21. doi: 10.1016/j.joms.2013.07.007. PMID: 24237776

Computer-aided Surgical Planning and Osteosynthesis Plates for Bimaxillary Orthognathic Surgery: A Study of 14 Consecutive Patients.

Shakoori P, Yang R, Nah HD, Scott M, Swanson JW, Taylor JA, Bartlett SP. *Plast Reconstr Surg Glob Open.* 2022 Nov 18;10(11):e4609. doi: 10.1097/GOX.0000000000004609. eCollection 2022 Nov. PMID: 36415614

Reply 3: These three references were reviewed and added to the manuscript in lines [108, 115, 505]

### **Editorial Comments**

Comment 1: The title should clearly indicate that this case series is about orthognathic surgery and also reflect the common condition among the four patients.

Reply 1: The original title was Surgery First: A Case Series of 3D Planning and Pre-bent Plates. The title was edited to “Surgery First Orthognathic Approach: A Case Series of 3D Planning and Pre-bent Plates in Patients with Single- and Double-Jaw Surgeries”

Changes in Text: The title was changed in lines [1-2]

Comment 2: The authors mentioned the two main topics, 3D planning and pre-bent plate, in the title. Therefore, it is necessary to clearly provide corresponding information in the abstract, highlight box, and throughout the article. For example :

- (1) The background section of the abstract states, “However, the appropriateness and feasibility of widespread adoption of pre-bent plates for all orthognathic cases, particularly in bilateral sagittal split osteotomies (BSSO), is still in question,” only addressing the unknown application of pre-bent plates in BSSO. What about 3D planning?

Reply 1: The following section was added to lines [18-22] to address 3D planning: “Orthognathic surgery has undergone a slow and steady improvement, which over time has proven to be highly accurate and then adopted as the accepted minimum standard of care. The same can be said for how these cases are planned, with 3D planning today being accepted as a highly accurate and reproducible step undertaken prior to surgery. However, the appropriateness and feasibility of widespread adoption of pre-bent plates for all orthognathic cases, particularly in bilateral sagittal split osteotomies (BSSO), is still in question.”

- (2) In the “What is new” section of Highlight Box, it states, “Application of VSP to surgery first orthognathic cases where surgeons may lack occlusion to guide intraoperative movements improves accuracy and reduces operative time,” which only highlights the advantages of VSP application. What about the application of pre-bent plates?

Reply 2: The sentence was modified to include “pre-bent plates” and corrected to as follows: “Application of VSP and pre-bent plates to surgery first orthognathic cases where surgeons may lack occlusion to guide intraoperative movements improves accuracy and reduces operative time,” [line 58 in highlight box]

- (3) In the “rationale and knowledge gap” section of the introduction, only pre-bent plates are discussed. Please supplement the relevant information on 3D planning.

Reply 3: The rationale and knowledge gap section was modified to the following to address relevant information on 3D planning, specifically on [line 121]: “**Rationale and knowledge gap:** Although pre-bent plates are widely accepted in trauma and reconstructive surgery, evidence for the efficacy of pre-bent plates in orthognathic surgery is more limited (15). Studies have shown that the use of 3D planning, cutting and drilling guides and pre-bent titanium plates can accurately transfer a virtual plan to the operating room in Le Fort I osteotomies and bilateral sagittal split osteotomies (BSSO) for skeletal class II deformities and anterior open bite, but the appropriateness and feasibility of widespread adoption for all orthognathic cases is still in question (16, 17).”

Comment 3: Line 18: “2 patients also underwent BSSO”. We only found patient 2 underwent BSSO osteotomy from the current manuscript. Please kindly confirm the accuracy of the cases’ information.

Reply 3: This is correct that only 2 patients underwent BSSO. All 4 patients presented in the case series underwent a LeFort osteotomy, and 2 of these 4 patients had a BSSO in addition.

Comment 4: Line 27-29: “Additionally, our experience with VSP revealed an associated learning curve dependent on the experience of both the surgeon and software technician”, it seems that this content does not belong to the “case description”.

Reply 4: This sentence was moved to conclusion section below [45-46].

Comment 5: Line 89-91: “While the use of pre-bent plates has been successful in Le Fort I osteotomies, the appropriateness and feasibility of widespread adoption for all orthognathic cases, particularly in bilateral sagittal split osteotomies (BSSO), is still in question”, We recommend that the authors update the relevant literature on this viewpoint. There are more recent studies on the application of pre-bent plates in BSSO that can be discussed and analyzed, rather than just stating it as “in question”, such as PMID: 30243828, 33685740.

Reply 5: These studies were reviewed and included in the modification for comment 6. The rationale and knowledge gap section now reads: “Although pre-bent plates are widely accepted in trauma and reconstructive surgery, evidence for the efficacy of pre-bent plates in orthognathic surgery is more limited.<sup>12</sup> Studies have shown that the use of CAD/CAM cutting and drilling guides and pre-bent titanium plates can accurately transfer a virtual plan to the operating room in Le Fort I osteotomies and bilateral sagittal split osteotomies (BSSO) for skeletal class II deformities and anterior open bite, but the appropriateness and feasibility of widespread adoption for all orthognathic cases is still in question.” [Line 121-127]

Comment 6: Please provide the information on patients’ race and ethnicity in the case presentation.

Reply 6: The patients’ ethnicities were added to the case presentation in lines[154, 230, 302, 391]

Comment 7: Line 176-177: “At 7 days postoperatively, extraoral examination revealed a skeletal class I relationship with a planned Class II dental relationship (Figure 4a, 4b)”. Please kindly confirm the date. As shown in Figures 4a and 4b, the date was at “3 months or 5 months post-op” not “7 days post-op”.

Reply 7: The sentence “At 7 days postoperatively, extraoral examination revealed a skeletal class I relationship with a planned Class II dental relationship (Figure 4a, 4b)” was deleted. To reflect the correct post-op days, the following sentence was added to lines [268-270]: At 3 months postoperatively, extraoral examination revealed a skeletal class I relationship with a planned Class II dental relationship (Figure 5a, 5b).

Comment 8: Line 222-223: “azathioprine was withheld for 1 week pre-operatively”, does that mean the patient still took prednisone and hydroxychloroquine during the perioperative period? And could you please explain the reason for discontinuing azathioprine?

Reply 8: The manuscript was updated to include information about prednisone and hydroxychloroquine administration perioperatively. The manuscript now reads: “The patient was optimized by rheumatologist for surgery, and per their request, azathioprine was withheld for 1 week pre-operatively and restarted 2 weeks after surgery. Prednisone was converted to dexamethasone post-operatively, and hydroxychloroquine was held on day of surgery and resumed on post-op day 2 per the rheumatologist’s recommendations. She was placed in orthodontic brackets 7 days prior to surgery.” [325-329]

Comment 9: If it’s available, please provide the pretreatment photographs of patient 4.

Reply 9: Patient 4 pretreatment digital renderings were added [lines 429-431].

Comment 10: Figure 7: The title should be revised to “Figure 7: Patient 4 at 4 weeks post-op”.

Reply 10: The title of previously-labeled Figure 7 was revised to “Figure 8: Patient 4 at 4 weeks post-op” [line 438]

Comment 11: It appears that the authors have not discussed the limitations of this case series in the Strengths and Limitations section

Reply 11: The following paragraph was added to the strengths and limitations section on lines [572-576] to address the limitations of this case series: “There are several different skeletal and dental relationships possible on patients who would be presenting for orthognathic surgery, whilst we have tried to demonstrate a variety of different cases, it in no way encompasses the entire spectrum. Similarly, we have demonstrated various surgeries with positive outcomes, another limitation would be it does not represent all the possible vectors and magnitude of the movements possible amongst the different surgical procedures.”

Comment 12: Please provide definitions for all abbreviations mentioned for the first time, such as “OMFS” (line 204).

Reply 12: The definition was provided for first time abbreviations, such as OMFS [line 307-308]

Comment 13: Line 114, 164: “ProplanCMF software”, when referring to the application of software, please indicate the developing company and country after the software name.

Reply 13: After “ProPlanCMF software”, the company and country were added after the software name as “(DePuy Synthes, United States)” in each instance.

Changes in text: In each instance where reference to “ProPlanCMF” was made, “(DePuy Synthes, United States)” was added after the software name [Lines 171, 246, 403]

Comment 14: Line 104: “skeletal class III malocclusion”, it would be helpful if the authors could cite the reference that proposed this classification system.

Reply 14: The reference that proposed this classification (Angle’s classification of Malocclusion) was cited on line [160]. The reference used was Gravelly JF, Johnson DB. Angle's classification of malocclusion: an assessment of reliability. *Br J Orthod.* 1974;1(3):79-86. doi:10.1179/bjo.1.3.79

Comment 15: Line 205: “systemic lupus arthritis (SLE)”, SLE stands for Systemic Lupus Erythematosus, not Systemic Lupus Arthritis. Please make the appropriate correction.

Reply 15: “systemic lupus arthritis” was corrected to “SLE”, and the abbreviation was defined as “systemic lupus erythematosus” on line [303].

Comment 16: Line 14: “In this review, ...”, this is a case series report, not a review.

Reply 16: The sentence was changed from “In this review...” to “In this case series report...” on line [24]

Comment 17: Line 93: Please also revise the statement “In this chapter” to “In this case series report”.

Reply 17: The statement “In this chapter...” was revised to “In this case series report...” on line [127]

Comment 18: To present a clearer view, we suggest combining the relevant image materials for each patient into a single figure.

Reply 18: White spaces were deleted in between images to create single figures, and figures were reformatted for each patient case.