Reviewer's report

Title: Fully customized placement of orthodontic miniplates: A novel clinical technique

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Reviewer: Steve Bowman

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Review of “Fully customized placement of orthodontic miniplates: A novel clinical technique”

1. The description of this technique is useful and innovative.
2. Methods are appropriate but need some refinement in their description.
3. There are no data – this is a description of technique
4. See #1.
5. With some minor revisions, the discussion is fine.
6. Title and abstract are accurate with some minor revisions.
7. With minor revisions, the writing is more than acceptable.

The manuscript in question is a description of an improved clinical technique for the insertion of surgical mini-plates for use as orthodontic anchorage.

The novel approach described within the paper is informative and useful. My comments will be primarily to improve the manuscript for the reader to better understand the material being communicated.

I suggest that authors insert page numbers in their manuscripts to assist their reviewers.

Abstract:

“The purpose of this study . . . “ This submission is not a study, it is a description of an improvement of a surgical technique.

Methods: “In order to perform the proposed method . . .” What proposed method? It is confusing to introduce the methods section in this manner.

“Special software . . .” What is special about it? Briefly define what the software is intended to do. It has a purpose.

I will re-word some sentences to help to avoid confusion:

The digital image of the mandible, created from a 3D scanner, is used to print a stereo-lithographic (STL) model. [is that accurate? I assumed the image was created from a CBCT scan – not an intraoral scanner – please clarify]
Prior to the surgical procedure . . . “What surgical procedure?

Prior to surgically inserting the mini-plate, it is adapted onto the stereolithographic model in a pre-determined position. [what pre-determined position, how pre-determined? I don’t understand]

. . . jig is fabricated in order to assist with accurate placement . . .

Conclusions:

[suggestion] The technique facilitates accurate adaptation of mini-plates and insertion of retaining surgical screws; thereby, enabling clinicians to more confidently increase the use of bone plates, especially in anatomical areas where in the success of non-osseointegrated mini-screws is less favorable.

Introduction:

. . . cortical bone thickness for initial . . .

. . . there are not many areas with enough bone to insure . . .

. . . around the canine area can provide useful options for . . .

. . . normal eruption of the permanent canine. [are there no concerns with the insertion of the mini-plate retaining screw adjacent to the root of the canine? In the case example accompanying this paper, the screw appears quite close to the apex of the distally tipped canine. If the canine is uprighted with braces, I would imagine the apex may end-up touching that screw]

. . . are usually not significantly more expensive than mini-implants. [I realize there is a reference the authors have offered to support this statement. I would take issue with the conclusion. The cost of the two material items may be similar but the associated costs are dramatically disparate. Mini-implants are often placed in the orthodontic operatory with costs of the screw, the driver, topical and/or injectable local anesthetic, and perhaps a total time of 10-15 minutes. In stark contrast are 2 mildly invasive surgical procedures (one to insert, one to remove); often performed in an oral surgeon’s office. The costs involve not simply the plates and screws and anesthetic, but also the surgical procedure costs (blades, sutures, etc.) and time for both surgeries along with the costs of the CBCT scans. I would re-state the comment to specify that the cost of the materials may not be that different, but the risks of infection, pain, and the dual surgeries should be addressed if this point is to remain in the manuscript. Furthermore, if a mini-implant fails, it typically falls-out or is removed in seconds. If, however, a mini-plate fails, a surgical procedure is required to remove it and a new plate cannot just simply be reinserted in the same location at that moment] I understand that the present manuscript is not intended to discuss the pros and cons of mini-implants vs mini-plates. Consequently, it would be advice to eliminate the point-of-contention about cost from this paper.

. . . since they can basically be placed anywhere within the basal bone of the
mandible and the maxilla. [I take issue with this statement as well. There are obvious anatomical concerns for insertion of plates in some locations – the mental foramen for one]

. . . due to the need of a surgical procedure . . . [actually, 2 surgical procedures – this has to be addressed here]

. . . they present a high acceptance rate among both, orthodontists and patients. [Given the choice between the costs and risks and pain of 2 surgical procedures versus the insertion of mini-screws, I find it unlikely that patients and orthodontists would find these two procedures equal in acceptance]

. . . and reduce the time of surgery. [I believe the real advantage to your technique is that it may reduce the failure rate of the plates. Mention that here.]

. . . adaptation of the mini-plates on the bony contour of a printed model of the patient’s mandible.

Materials and Methods

. . . special software, the preferred position . .

. . . of virtually placing the screws in the selected area of bone and, therefore, allows the clinican to accurately visualize the desired result prior to the surgery.

[Back briefly to the discussion of costs: now we have costs of CBCT (perhaps 2 scans), cost of special software and time spent, cost of stereolithographic models, cost and time of fabricating a transfer stint. How does that compare to a 10-minute procedure of inserting a mini-screw? The authors must decide if they wish to enter into a cost/risk/benefit analysis or simply describe their novel technique.]

. . . the CBCT dataset is converted from . .

. . . MacOs was used in the case presented. [What case? There has been no case discussed or introduced. Does this refer to Figure 3? If so, it should be noted.]

. . . plates are adapted to the . . . [How are they adapted? The plate portion is adapted to the contours of bone, but what about the connecting arm? How is it bent to fit? What pliers are used (the singular of pliers is pliers)? ]

What screws are used to secure the adapted plate to the model? The same screws used for surgery? How is mechanical retention verified? Does this mean that screws didn’t strip? I don’t understand what that means or how it is significant?

. . . incisal edges of at least three teeth to key the position of the plate to those teeth when it is transferred to the patient’s mouth.

. . . case presented in Figure 5, an arcuate incision was made. [if you have a diagram or picture of that incision it might be helpful, but not a necessity]
is located in the attached gingival [gingiva instead of gingival]

Discussion

do precisely determine the desire final position of the plate prior to the surgery.

Conclusions

The benefit of increased accuracy and potentially decreased failure rate is the key to the author’s new technique. I would state that in the first sentence of the conclusion.

Figure Legends

Figure 1: Workflow [of what? What procedure is the diagram describing – the reader should not have to find that in the body of the manuscript]

Figure 2: Do you wish to note the proximity of the apex of the canine root to the retaining screw? If the canine is tipped, that root is likely to touch the screw – consequences? Concerns?]

Figure 3: (a) allows to create a permits the creation of a digital outline [I am not sure how image (b) relates to the positioning of the connection bar – that should be clarified as it’s not discussed in the manuscript]

Figure 4: (c) what is the red arrow pointing to – it’s point is on the bone – that is not what you intended is it? What kind of pliers [not plier] was used and what type of bends were made at the arrows and what were the bends made for?

Figure 5: This image depicts the position of the transfer jig and retaining screws with the gingival tissue elevated and reflected. I’m not sure it depicts: “simple, safe, and time efficient . . . “ That is a conclusion, not a caption for this figure.

Figure 6: It is a second scan after the surgery, but what is the point of the scan? What is it demonstrating? Is confirming that roots didn’t hit teeth, that the plate is where you intended it to be placed? In this view it doesn’t confirm that the adaptation was correct to conform to the contours, that the screws are seated, or that the connecting bar is avoiding tissue and teeth. Is the scan necessary?