

## READER'S FORUM

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**Zygomatic miniplates for skeletal anchorage in orthopedic correction of Class III malocclusion: A controlled clinical trial.**

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I would like to appreciate the authors for carrying out such impressive research. Orthopedic correction of Class III malocclusion has been not only controversial but also important topic for orthodontists. There has been lots of effort to achieve correction of Class III malocclusions and to minimize the undesired dental side effects. Skeletally anchored facemask therapy was one of them. As a reader, I would like to ask several questions as followed.

**Q1.** According to the discussion in this article, one of the main goals of this study was the protraction of the maxilla without any rotation along the palatal plane by inserting the miniplates as close as possible to the center of resistance. The rotation of the maxilla, however, was determined by a point of action that is a location of the hooks, not an inserting position of the miniplates. Could you please explain more about how to decrease anterior rotation of the palatal plane by inserting the miniplates as close as possible to the center of resistance?

**Q2.** Duration of the maxillary protraction in this study was different from other studies, especially in which miniplates were inserted to zygomatic buttresses of the maxilla.<sup>1</sup> Patients in this article wore the facemask all day except during meals, on the other hand,

patients in other articles wore the facemask part time (12-16 hours a day). What do the authors think about the influence of these differences on the results of the study?

**Q3.** The number of screws with which plate was attached should be considered to increase the success rates for miniplates. It appears that failures were more likely with two screws than three.<sup>2</sup> Did the authors have any reason to use two screws with miniplates in skeletally anchored facemask patients? And I would like to ask how to increase the success rates for miniplates in these patients.

*Questioned by*

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We appreciate the journal editors and readers for their interest to our study and hope the following answers would be helpful to our readers.

**A1.** In the studies evaluating the miniplate anchored facemask therapy, when the zygomatic buttresses of the maxilla was preferred as miniplate insertion area, it is recommended that the miniplates should be inserted in forward and downward position to allow the alignment of screws and hook of miniplates with the same direction of the orthopedic force, which was 30° downward from the occlusal plane via elastics. Thus, when the elastics were attached to the hooks, the direction of orthopedic force vector would pass through the center of resistance where the miniplates were inserted.<sup>1,3</sup>

In the present study, a similar protocol was performed during the miniplate insertion and orthopedic force application (Figures 2 and 3 in the article). However, based on our clinical experiences it was not always possible to insert miniplates as mentioned due to the anatomical limitations, bone density, germs of teeth, etc. Therefore, the direction of force vector could pass below the center of resistance in some cases which could explain the insignificant  $0.31^\circ$  of anterior rotation in the present study. This is why we concluded in our study that a miniplate-anchored facemask decreased, not eliminated, the rotation of the palatal plane.

**A2.** The increase in the daily usage of maxillary protraction device with a tooth-borne anchorage unit causes more dental effects rather than skeletal correction. Therefore, it is recommended to use the protraction device 14 to 16 hours per day to achieve more skeletal and less dental effect with tooth-borne anchorage units.<sup>4</sup>

However, the use of skeletal anchorage units eliminates the need for dental anchorage and transfers the orthopedic force directly to maxilla. These appliances allow clinicians to apply a continuous force to reduce the total treatment time without any side effect which was our aim in using the facemask all day except during meals. The mean treatment time was  $1.08 \pm 0.35$  years in the present study.

In the literature, the miniplate anchored maxillary protraction therapies reported different daily use of device. A full time force application was reported by Kircelli and Pektaş<sup>5</sup> and Kaya et al.<sup>6</sup> with facemasks, and Sar et al.,<sup>7</sup> De Clerck et al.,<sup>8</sup> Cevdanes et al.,<sup>9</sup> and Coscia et al.<sup>10</sup> with intermaxillary elastics. The average treatment time was reported between 7, 6, and 18 months in mentioned studies. However, Lee et al.<sup>3</sup> reported 12 to 14 hours, Cha and Ngan<sup>1</sup> reported 14 to 16 hours, and Sar et al.<sup>11</sup> reported 16 hours daily facemask use with miniplate anchorage and the authors reported the total protraction time between 7, 4, and 12 months. These results showed that clinicians prefer full time force application in the intraoral maxillary protraction systems and the patient tolerance to the appliance is a determinant factor for the protraction force duration. Our treatment time was between the results of previous studies; therefore, it is not possible to conclude that wearing face mask all day except meals reduces total treatment time. For the evaluation

of different force durations during protraction therapy a comparative study is needed.

**A3.** In the present study all miniplates were fixed by two screws to maxilla. During the protraction therapy failure in the stability of miniplates due to the screw loosening were observed once in three miniplates and twice in one miniplate out of 36 miniplates. However, more stable results were reported with three screws.<sup>1,6</sup>

One of the main goals of the present study was insert the miniplates on center of resistance which was determined at the zygomatic buttress of maxilla.<sup>12,13</sup> While inserting a miniplate to this area with three screws it was possible to pass the zygomaticomaxillary suture for the third screw or the miniplate should be dislocated more below from the center of resistance. In the first situation one of the three screws will be inserted to zygomatic bone which results with resistance and failure in protraction of maxilla; however, in the second one it is possible to insert screws much more close to the maxillary sinus or germ of permanent teeth. Moreover, more anterior rotation in palatal plane will be observed due to the inserting miniplates below the center of resistance. Therefore, two screws were used considering the anatomical limitations and satisfying stable results were obtained during protraction therapy.

Thanks for your questions.

*Replied by*

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