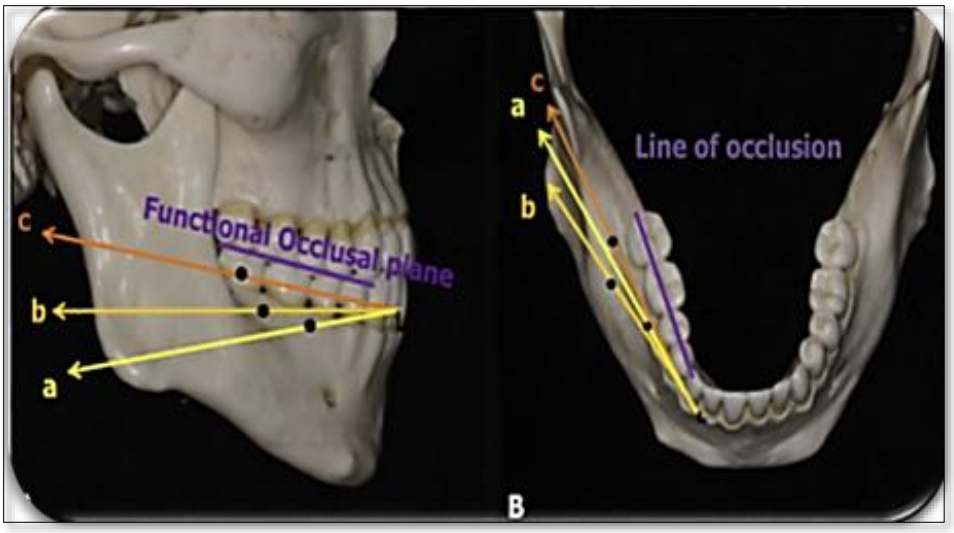

Figure 8. Comparison of the Force Vector in each Device: A, Lateral View; B, Occlusal View. Dots Indicate the Positions of the Miniscrew Head and the Ramal Plate Hook: a, Interradicular Miniscrew; b, Buccal Shelf Miniscrew; c, Ramal Plate Hook.

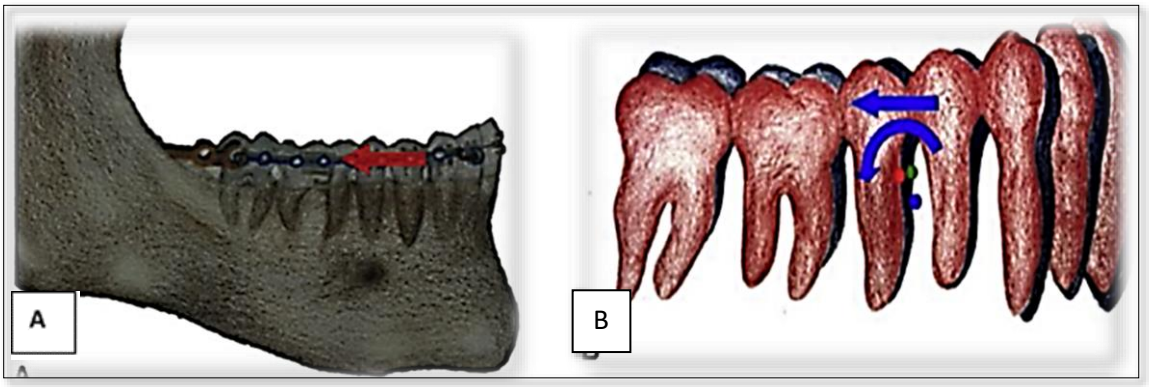

Figure 9. Force System and Tooth Displacement: A, Distalization Force Parallel to the Occlusal Plane at the Vertical Level of the Archwire; B, Distalization and Counterclockwise Potation of the Mandibular Occlusal Plane Around the Center of Rotation (Blue Dot), which is Slightly Apical to the Center of Resistance of the Mandibular Dentition (Green Dot, Pretreatment; Red Dot, Posttreatment); Blue Dentition, Pretreatment; Red Dentition; Posttreatment.

Lateral CBCT Cephalometric: Selected CBCT lateral cephalometric variables were identified for each cephalogram, representing skeletal, dentoalveolar, and soft tissue measurements **(Figures 2-5).**

Skeletal Change: Analysis of the treatment result indicated that there was a statistically significant change in the sagittal relationship between the mandible and maxilla. This result was highly statistically significant Wit's appraisal, p = 0.006. This result agreed with Yu [34], Yeon [35] Also, the current study result got a high statistically significant ANB° P-Value = 0.004 as shown in **Table 1,** this result was not in agreement with [34] However, statistically significant levels of SNA° and SNB° did not change significantly between pre- and post-treatment **(Tables 1).**

The two variable of Facial high ratio and FMA° result indicated limited craniofacial change after treatment since no statistically significant difference observed in most of cephalometric Skeletal angular parameter **(Table 1).** This result is agreed with that of Yu [34] but was disagreed with that reported by Yeon [35] where the FMA° had significant result.

Dental Changes: Evaluation of the post-treatment outcome showed improvement in most of the bilateral alveolar variables as shown in **Table 1** by highly significant in U1 to FH °P-Value = 0.000, IMPA °p-Value = 0.081 as well as the interincisal angle. [38] did not perform any statistical analysis in their research on this variable, and [34] did not take the same measurement parameter in their statistical analysis as the one that worked in this research. Our findings indicate that correction of the anterior reverse overjet and

overlay without significant change in the mandibular plane resulted in distalization of the mandibular teeth. This study improvement of interincisor angle was very significant while U1 to FH° and IMPA° were statistically highly significant as shown in **Table 1.**

Soft Tissue Changes: In the current study, four variables were used in an attempt to understand possible changes in different aspects of face, such as ANB° of soft tissue, nasolabial angle, upper lip and lower lip of esthetic plane line. Evaluation of the soft tissue profile in the 6 patients revealed an improvement a high statistically significant, especially in the ANB° of soft tissue has a high statistically significant p-value =0.000 as shown in **Table 1**. There is no agreement between our study and Yu [34] where there was no statistically significant effect on the position of the upper lip and nasolabial angle but their results agreed with our study in the lower lip.

CONCLUSION

After alignment and leveling the patients using recent application of Noval ramal plate in retromolar fossa, the retromolar fossa is an anatomically appropriate location. The force vectors that result is parallel to the occlusal plane, resulting in efficient molar distalization. With ramal plates, there was no significant change in the vertical position of the mandibular molar or in the MP angle. In the evaluation of dental variable, there were a statically significant in U1 to FH°, IMPA° and Interincisor Angle. In the evaluation of soft tissue there was a statically significant in Nasolabial Angle, Ls-E Line (mm), and Li-E line (mm). Therefore, ramal plates are an effective treatment option for Class III patients who are apprehensive about undergoing extraction teeth and or orthognathic surgery for mandibular complete arch distalization.

ACKNOWLEDGMENTS

The authors thank the Faculty of Dentistry, Sana'a University, Sana'a, and Yemen for their generous support.

CONFLICT OF INTEREST

No conflict of interest associated with this work.

AUTHOR'S CONTRIBUTIONS

This research is part of a master's degree in the Orthodontics, Pedodontics and Prevention Department, Faculty of Dentistry, Sana'a University, Yemen, first author Reem Hussein Sheikh Omar AL-Kaff, who conducted field work, and who did clinical work and other authors contributed to data analysis, drafting and review of the paper, and gave final approval to the research.

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