Simultaneous Intrusion and Retraction in Begg Appliance and Evaluation of Same by Non-numerical Approach by Esthetic Analysis

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ABSTRACT

Many appliances, labial and lingual have emerged with different mechanics for simultaneous intrusion and retraction. Nowadays, the temporary anchorage devices are advocated as a method of augmenting anchorage. The present case utilizes the conventional technique of archwire modification according to Hocevar in Begg’s technique for true incisor intrusion and simultaneous retraction. A non-numeric approach analysis called esthetic analysis is used for lower third of face to evaluate the treatment results.

Keywords: Transpalatal arch (TPA), Aesthetic analysis (AA), Intrusion and retraction (IR).

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INTRODUCTION

The conventional Begg appliance was often criticized for effecting bite opening by extrusion of lower molars. However, the trend of using relatively heavy elastics and less rigid base wires has changed over the years; with more emphasis being placed on true incisor intrusion where needed and minimizing lower molar extrusion by minimal use of Class II elastics or alternate elastics, such as palatal elastics or elastics to power arms in high angle cases.

This case report will emphasize on these methods of simultaneous incisor intrusion and anterior teeth retraction (IR). It will also highlight the different archwire modifications for improving the efficiency of incisor intrusion.

Methods of Bite Opening

Bite opening, as mentioned by Proffit\(^1\)\(^-\)\(^3\) could be done by either of the following, either individually or in combination

a. Uprighting of incisors
b. Premolar or molar extrusion
c. True incisor intrusion.

The treatment procedure to be chosen from the above should be based on certain criteria as under:

a. Age of the patient: Extrusion of posteriors would be more stable in younger individuals because of the compensating vertical growth of the ramus.\(^4\)
b. Growth pattern: A horizontal grower would again, during growing years, tolerate posterior extrusion. However, in normal or vertical growers, molar extrusion should be avoided.
c. Incisor exposure at rest: This factor would determine which incisors need to be intruded. If the exposure of upper incisors is more than 3 to 4 mm at rest, true intrusion is warranted. On the contrary, if the incisor exposure is normal and there is a deep curve of Spee in an average grower, lower incisor intrusion would be more essential. The limits of orthodontic incisor intrusion would be in the range of 3 to 4 mm. Therefore, incisor exposure above 5 to 6 mm at rest should be given a second thought for a combined surgical-orthodontic treatment regime.
d. The facial profile: If the facial outline can tolerate or benefit from some incisor uprighting and where the space discrepancy is mild-moderate, incisor uprighting could be carried out. But one must remember that this kind of bite-opening if overdone, could prove to be a cause of instability of the treatment procedure.

Advantages with Begg Therapy

It is well accepted that the intrusion efficiency is maximized with bypass mechanics. Utility arches, Burstone’s intrusion arches, etc. utilize this mode to get true intrusion.\(^5\)

Begg mechanics has been utilizing the desired force vectors and with a proper understanding of the force systems, one can achieve intrusion of all six anteriors in a single continuous archwire.
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Other than the conventional anchor (tipback bend), modifications have been proposed by several authors.\textsuperscript{6-8} Advantages of the Hocevars modification in archwire along with TPA (transpalatal arch) are as follows:

1. The archwire produces two vertical vectors:
   a. The vertical force for the anterior dentition and
   b. Extra vertical intrusive force acting on the anterior teeth from labial side directed gingivally. So, the controlled intrusive effect on the anterior teeth intrude without molar extrusion.

2. Second, the Class I and II elastic force is not altered during intrusion and retraction.

3. The biomechanics is simpler to understand and patient’s compliance is not affected.\textsuperscript{3}

4. A single continuous archwire solves the purpose for effective incisor intrusion by passing the cuspid.

5. The moment created on the molars is negated by the TPA in all the three planes of space if the archwire is properly fabricated with appropriate anchor bend and bends located at mesial and distal to canine.

Checklist at the End of Stage I

a. Molar relationship—Preferably a Class I; however, not always necessary. The important point would be to check for distally tipped upper molars, lingually rolled lower molars which need to be corrected before taking the stage records.

b. Canine relationship—Needs to be a Class I

c. Midlines—Matching

d. Overjet and overbite—Nil (Edge-to-edge)

e. Crowding and crossbites—Relieved

f. Individual torqueing if needed.

DETAILS OF THE PRESENT CASE

In the present case report, a skeletal Class II relation (Figs 1 and 2) with dentoalveolar Class I relation with proclination in upper and crowding in lower arch was treated with extraction of all bicuspid (first premolar).

After aligning the upper and lower arch, care was taken that there was active intrusion and retraction of upper anteriors. The case required critical anchorage in upper and lower arch so the upper arch was attached with a transpalatal arch for anchorage conservation. Care were taken that there is no negative effect on the molars while intrusion and retraction of upper anteriors was undertaken.

The simultaneous intrusion and retraction carried in this case could effectively loose anchorage in vertical, sagittal and transverse plane. To nullify this, the transpalatal arch is effective to counteract the reciprocal forces generated in all three planes of space due to simultaneous intrusion and retraction of anteriors along with proper bends in the archwire. The archwire in the anterior segment in Hocevar’s modification is subjected to bends mesial and distal to canine so that it has an extrusive effect on the canine and intrusive component on the anteriors favouring the magnitude of force toward the center of resistance favouring more axial in direction combined with the Class I and II elastic force.\textsuperscript{1,4}

The forces acting on the anterior teeth during simultaneous (IR) intrusion and retraction are as follows.\textsuperscript{9}

1. Intrusive effect on the anterior teeth due to the accessory bends.

2. Extrusive component of force on the canine.

3. Distal tipping force negated by the TPA.

4. Extrusive force on the lower molar due to Class II elastic force negated by using ultra light force, such as pink elastic.

5. The combined effect of Class I and II elastic not only change the axial inclination of the anterior teeth but also contributes...
to the simultaneous intrusion and retraction as the forces from elastics generated during the various functional movements and parafunctional movements. The force values generated due to stretching of Class II elastics during functional movements has a major role in intrusion as it favors vectors in distal movement of teeth and thereby correcting the axial inclination. The Class I elastic force reduces as the distance of stretch reduces due to utilization of extraction space in simultaneous intrusion and retraction.

6. The Class I elastic force can be increased at the end of retraction (Fig. 3).

DISCUSSION

The mechanics in continuous archwire has to be understood with the counterbalancing forces. Since, Begg mechanics utilizes the differential force principle with the current enhanced quality of AJ Willcock wires. The clinician with their clinical experiences can utilize the biomechanics toward the intended tooth movement. The Hocevar’s modification was utilized in this case as the patient’s clinical finding suggested true intrusion of anteriors.

Since, there was a controlled intrusion and retraction achieved in this case. This exemplifies that the continuous arch mechanics has potential of achieving results as achieved through the utility arches in preadjusted appliance, segmental arch technique and others stage three mechanics of Beggs appliance done in upper and lower arch (Fig. 4).8-10 Individual forgiving can also be used (Fig. 5).

In this case, the esthetic analysis of the profile was used for evaluating the position of the incisors as this analysis concentrates on the lower third of the face pertaining to the position of anterior tooth in upper and lower arch. Also it emphasizes the anterior limit of chin, the lip position and thickness (Fig. 6).9

In this case, the patient’s pretreatment profile according to the esthetic analysis was showing upper and lower lip eversion along with proclination of upper teeth and retrusive chin position. The post-treatment profile analysis revealed the amount of incisor intrusion and retraction achieved in this case. The incisor position achieved in this case was normal according to the esthetic analysis (Fig. 6). However, the chin was still retrusive which preexisted. The ideal treatment protocol would
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The present case exhibits that the appliance whether using Beggs or preadjusted appliance, knowledge of biomechanics is essential for effective tooth movement with anchorage conservation can minimize the chances of undesirable tooth movements. Application of non-numerical approach for the evaluation of the profile is an easy method to identify the problems of lower third of face and the treatment result achieved in such cases.

CONCLUSION

The results received with camouflage therapy is appreciable in this case (Figs 7 to 9).

REFERENCES

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