CASE REPORT

Correction of class II division I malocclusion after extraction using Roth prescription

Santosh Kumar Verma,¹ Arun Chauhan,¹ Khushboo Rastogi,² Rajarshi Bhushan¹¹Department of Orthodontics & Dentofacial Orthopedics, Kothiwal Dental College & Research Centre, Moradabad, Uttar Pradesh, India²Department of Periodontics & Implantology, Kothiwal Dental College & Research Centre, Moradabad, Uttar Pradesh, India**Correspondence to**Dr Khushboo Rastogi,
diya2001_rastogi@yahoo.co.in**SUMMARY**

A 19-year-old female patient with convex profile, posterior divergence having Angle's class II division 1 malocclusion with incompetent lips and rotations in various teeth was treated with fixed mechanotherapy. All the first premolars were extracted. Roth prescription of 0.022"×0.028" slot was used. Proximal stripping was performed to correct a black triangle in the embrasure area in the upper anteriors. The entire treatment took about 15 months.

BACKGROUND

One of the most interesting, and sometimes perplexing, problems in our specialty is the study of the face and its relationship not only to the bones of the face but also to the apical base which supports the teeth. So much has been written for and against the removal of teeth for the correction of malocclusions that it would be only repetitious to enumerate it again. The trend today in orthodontics appears strongly to be in favour of the removal of selected teeth in the correction of certain cases. In certain types of malocclusions, after a careful

study of the patient, photographs, X-rays and casts, it becomes apparent from case analysis that dental units must be removed if stable dentures are finally to be obtained after orthodontic treatment.^{1 2}

Class II division 1 malocclusion represents the second most common type of malocclusion after crowding and it is the most frequently seen skeletal disharmony in orthodontic population.³ Fixed appliance therapy is one of the most widely used treatment modalities in orthodontic therapy—appropriate placement of a bracket followed by engagement with rectangular arch wire confers adequate torque to the tip to the tooth. This allows correct inclination and angulations so that the finished treatment meets Andrews six keys to normal occlusion.⁴ Orthodontic treatment objectives can be stated as obtaining functional occlusion, aesthetic and stability. One of the criteria for obtaining a functional occlusion is to have an ideal axial inclination of all teeth at the end of active treatment.⁵

CASE PRESENTATION

A 19-year-old female patient presented with convex profile, posterior divergence having

Figure 1 Pretreatment extraoral frontal view.

Figure 2 Pretreatment extraoral lateral view.

To cite: Verma SK, Chauhan A, Rastogi K, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-009766

Figure 3 Pretreatment intraoral frontal view.

Angle's class II malocclusion, incompetent lips, rotations 11,12,21,22,31,32,33,41,42,43, proclined and protruded upper and lower incisors, increased overjet and overbite, having skeletal class II because of a retruded mandible with vertical growth pattern. Both overjet and overbite were increased, with deep upper sulcus depth and lip strain (figures 1–7). On model analysis total space discrepancy came out to be 12 mm.

Figure 4 Pretreatment intraoral lateral view left side.

Figure 5 Pretreatment intraoral lateral view right side.

Figure 6 Pretreatment intraoral maxillary occlusal view.

INVESTIGATIONS

Orthopantomogram and lateral cephalogram (figures 8 and 9).

TREATMENT

The case was treated with fixed mechanotherapy using Roth prescription (0.022" × 0.028" slot).

It was started as an extraction case. All first premolars were extracted. As this was a high anchorage case Trans-palatal arch in the upper arch and lingual holding in the lower arch was given for anchorage preservation. Anchorage was reinforced by using headgear.

Initially alignment and levelling was performed by using 0.016", 0.018", 0.020" round stainless steel arch wires. In upper arch, extraction space was utilised for correction of protrusion and proclination of upper incisors, rotations, lip strain and deep upper sulcus depth. It was performed using double delta loops. Frictionless mechanics was preferred. The wire used for this purpose was 0.019" × 0.025" stainless steel.

In the lower arch the extraction space was utilised for correction of proclination and the protrusion of lower incisors and mesialisation of molars. This was even carried out using double delta loops.

The lower molar were brought mesially using class II elastics for correction of the molar relationship.

Figure 7 Pretreatment intraoral mandibular occlusal view.

Figure 8 Pretreatment orthopantomogram.

After the space closure there was a black triangle formation in the upper anterior region because of the morphology of the tooth. To correct that proximal stripping was performed and the space was closed using elastic chains.

Finally, finishing and detailing was carried out using 0.0215×0.0275". Using loops for root paralleling and vertical elastics for settling of buccal occlusion and artistic positioning bends (figures 10–19).

DISCUSSION

The era of Roth prescription came into existence after the possibility to come up with a prescription for a special set of overcorrection brackets that would be applicable to most cases. To achieve desired tooth positions with the standard SWA, it was necessary to finish the mechanotherapy phase of treatment by placing compensating and reverse curves in the upper and lower arch wires, respectively. It was noticeable that with the standard SWA, it was necessary to be careful with anchorage control, especially on extraction cases, because the mesial inclination of the teeth in the buccal segments would tend to make those

segments drift mesially during treatment. According to Roth⁶ in severe cases or when full extraction sites must be closed, the treatment time saved might more realistically be 3–2 months. However, in all cases the chair time saved for the orthodontist is significant. With straight wire technique the chairtime required to treat a case decreases to 20% of what it was when we were using pretorqued and preangulated edgewise appliances on bands and bending rectangular steel wire to detail tooth positions.^{6 7}

Figure 9 Pretreatment lateral cephalogram.

Figure 10 Post-treatment orthopantomograms.

Figure 11 Post-treatment lateral cephalogram.

Figure 14 Post-treatment intraoral frontal view.

Figure 12 Post-treatment extraoral frontal view.

Figure 15 Post-treatment intraoral lateral view right side.

Figure 13 Post-treatment extraoral lateral view.

Figure 16 Post-treatment intraoral lateral view left side.

Figure 17 Post-treatment intramaxillary view.

Figure 18 Post-treatment intramandibular view.

Figure 19 Superimposition of prelateral and postlateral cephalograms.

Learning points

- ▶ In certain types of malocclusions, after a careful study of the patient, photographs, X-rays and casts, it becomes apparent from case analysis that dental units must be removed if stable dentures are finally to be obtained after orthodontic treatment.
- ▶ According to Roth in severe cases or when full extraction sites must be closed, the treatment time saved might more realistically be 3–6 months.
- ▶ In high anchorage cases as this one, trans-palatal arch in upper arch and lingual holding can be given in the lower arch for anchorage preservation.
- ▶ Further anchorage can be reinforced by using headgear.
- ▶ Proximal stripping is a good option of correction of black triangle.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Lewis PD. Space closure in extraction cases. *Am J Orthod* 1950;36:172–90.
- 2 Tweed C. *Clinical orthodontics*. St Louis: CV Mosby Co, 1966.
- 3 Onyeaso CO, Aderinokun GA, Arowoju-lu MO. The pattern of malocclusion among orthodontic patients seen in Dental Centre, University College Hospital, Ibadan, Nigeria. *Afr J Med Med Sci* 2002;31:207–11.
- 4 Andrews LF. The six keys to normal occlusion. *Am J Orthod* 1972;62:296–309.
- 5 Uğur T, Yukay F. Normal faciolingual inclination of tooth crowns compared with treatment groups of standard and pre-torqued beackets. *Am J Orthod Dentofacial Orthop* 1997;112:50–7.
- 6 Roth RH. The straight-wire appliance 17 years later. *J Clin Orthod* 1987;21:632–42.
- 7 Moesi B, Dyer F, Benson PE. Roth versus MBT: does bracket prescription have an effect on the subjective outcome of pre-adjusted edgewise treatment? *Eur J Orthod* 2013;35:236–43.

Copyright 2013 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow