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# MAXILLARY ARCH EXPANSION USING QUAD HELIX APPLIANCE- A CASE REPORT

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**Abstract**: A Class I malocclusion in a 14-year-old patient presented with, a reduced anterior overjet and overbite, crowding with maxillary and mandibular anterior teeth, and wide buccal corridors, crossbite on left side with lower midline shift to left side. Maxillary arch expansion was done using quad helix appliance followed by fixed appliance therapy. Significant improvement was seen in the arch form, smile and aesthetics.

## INTRODUCTION

Numerous techniques have been used to widen narrow or collapsed maxillary arches[2], including orthodontic movement of teeth, skeletal movement, and combinations of the two[3]. A variety of appliances can be used: fixed, semi fixed, and removable. In this case the maxillary quad helix appliance [1] is used for treatment of maxillary arch constriction and/or posterior crossbite.

### Diagnosis and Treatment Plan

A 14-year-old patient reported to the Department of Orthodontics & Dentofacial Orthopaedics of D.Y. Patil University - School of Dentistry with a chief complaint of forwardly placed teeth. On Clinically examining the patient, it was revealed that the patient has a symmetrical face with a mesocephalic growth pattern. She displayed Class I molar relationship on right side and super class I molar relationship on left side, a reduced anterior overjet and overbite, crowding with maxillary and mandibular anterior teeth, and wide buccal corridors, crossbite on left side with lower midline shift to left side.

Soft tissue evaluation revealed a straight profile & competent lip.

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PRE-TREATMENT EXTRA ORAL PHOTOGRAPHS

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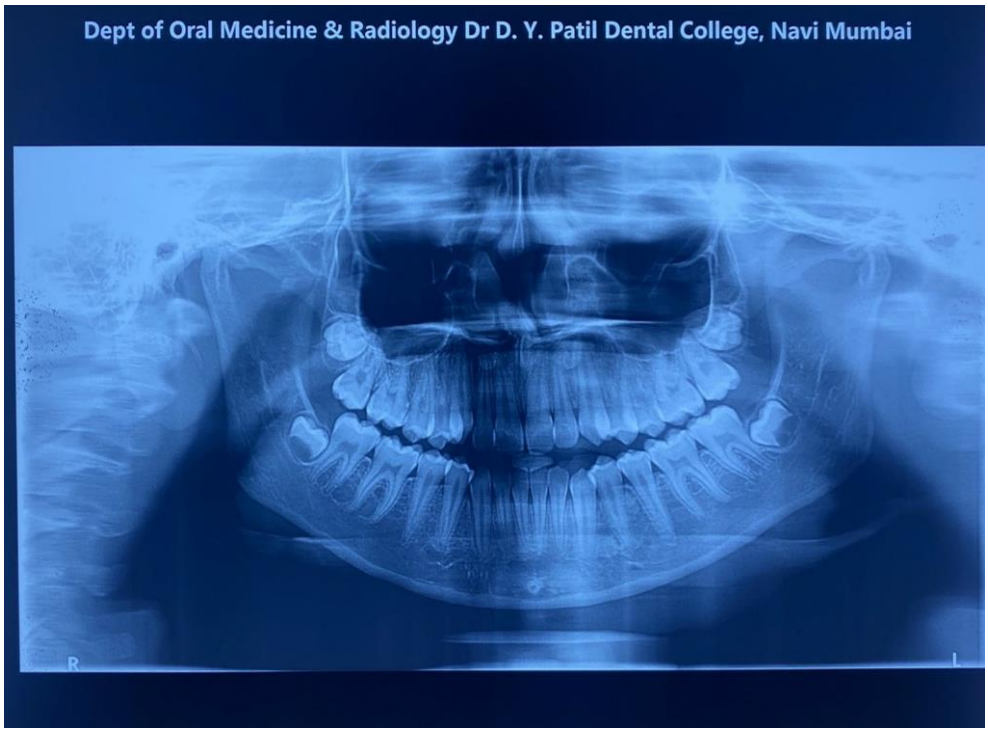


PRE-TREATMENT RECORDS

appraisal = +2mm) with retrusive lower incisors (1-NB = 20°; IMPA = 84°) and an average growth pattern (GoGn-SN = 28°; FMA = 27°).

Orthodontic treatment goals were to level and align the teeth, relieve the crowding in both the arches, correct the crossbite on left side, achieve overjet and overbite within normal limits, to achieve good facial aesthetics & proper lip position.

**Treatment Progress**

Quad helix appliance was given for the expansion of maxillary arch. Active expansion was done for 4 months. Later the appliance was kept in mouth for retention for 4 more months.
The teeth were bonded with MBT 0.022'' Bracket system with standard torque values.
Levelling and aligning was carried out in both arches till 19X25 SS wire.
Post levelling & aligning
The patient was debonded & debanded and upper & lower Hawley's retainer were placed for retention.
Superimposition of tracings showed significant movement.

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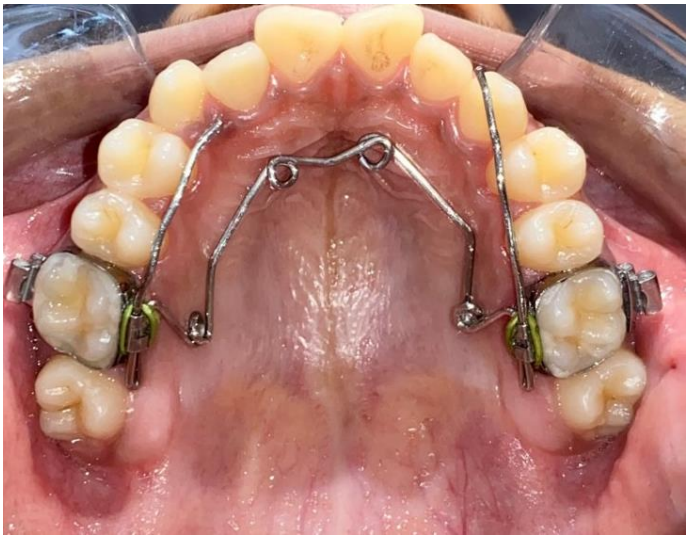

QUAD HELIX APPLIANCE

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MID TREATMENT EXTRAORAL PHOTOGRAPH

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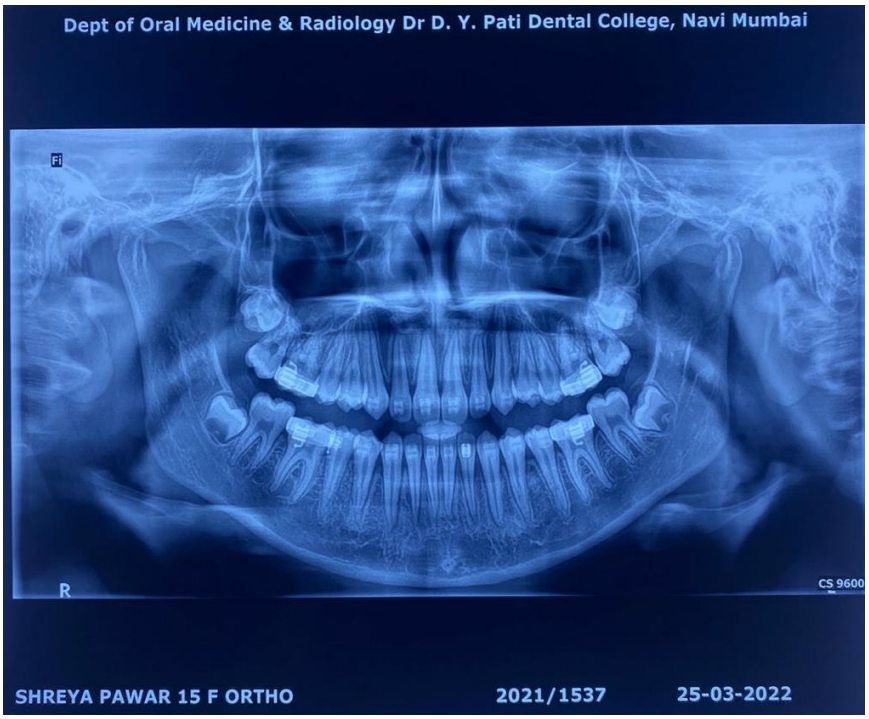
MID TREATMENT INTRAORALPHOTOGRAPHS

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MID TREATMENT RECORDS

POST TREATMENT EXTRAORAL PHOTOGRAPHS

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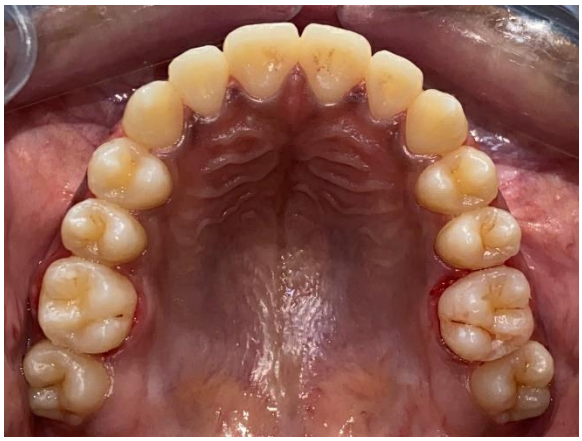

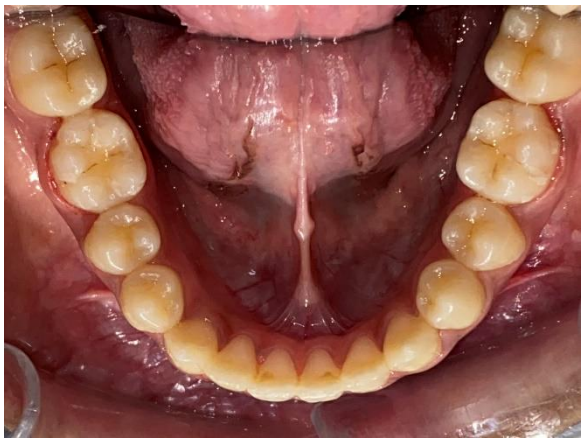

POST TREATMENT INTRAORAL PHOTOGRAPHS

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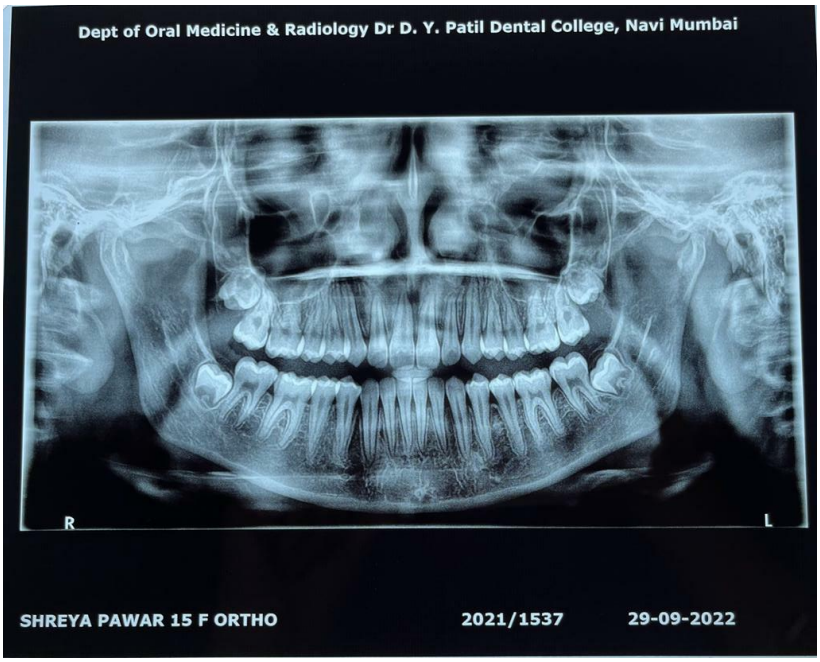



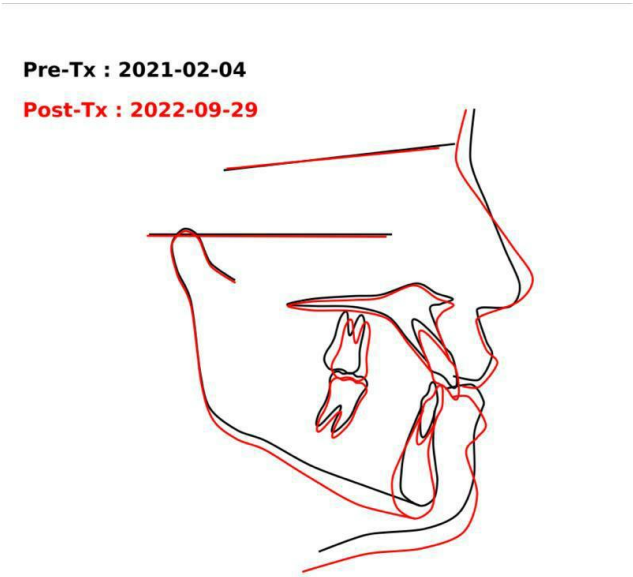


POST TREATMENT RECORDS

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| **VARIABLE** | **NORMAL** | **PRE TREATMENT** | **MID STAGE** | **PRESENT STAGE** |
|---|---|---|---|---|
| **Skeletal relationship** | | | | |
| SNA | 82+2$^{o}$ | 81$^{0}$ | 83° | 82° |
| SNB | 80+2$^{o}$ | 79° | 80° | 81° |
| ANB | 2+2$^{o}$ | 2° | 3° | 1° |
| Wits Appraisal | -1mm | -1mm | -1mm | -1mm |
| | | | | |
| FMA | 25$^{o}$ | 27° | 27° | 32° |
| SN plane-mandibular plane (GoGn-SN) | 32˚±2˚ | 28° | 24° | 30° |
| Y – axis | 59.4º | 59° | 61° | 66° |
| **Dental relationship** | | | | |
| Upper incisor to NA (deg/mm) | 4mm/22˚ | 28$^{o}$/8mm | °28/7mm | 28°/7mm |
| Upper incisor to SN plane | 102˚±2˚ | 107° | 108° | 108° |
| Lower incisor to NB (deg/mm) | 4mm/25˚ | 20°/3mm | °22/4mm | 25°/4mm |
| IMPA | 90˚ | 84° | 87° | 91° |
| Lower incisor to A-Po line | 1±2mm | 3mm | 3mm | 1mm |
| Inter-incisal angle | 131˚ | 132° | 131° | 128° |
| **Soft tissue** | | | | |
| Nasolabial angle | 90˚-110˚ | 100° | 99° | 101° |

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**Treatment Results**

After the treatment was completed, records showed that the facial profile has improved. The crowding in the arches was successfully corrected, the crossbite & malpositioned premolar was brought into correct position, overjet and overbite within normal limits and angles Class I molar and canine relationships on both sides were achieved.

A 2° improvement in the SNB angle, which led to a correction of the ANB angle, was confirmed by post-treatment cephalometric examination. While the mandibular incisors showed very slight proclination, the maxillary incisors were prolonged and had moderate palatal root torque. No considerable root resorption or other disease was visible on the post-treatment panoramic radiograph.

The Class III elastics simultaneously tipped the mandibular molars distally with some extrusion, while palatal expansion and accompanying hinging of the molars' palatal cusps caused the extrusion and mesial tipping of the maxillary molars. Additionally, the lower posterior teeth's extrusion was likely made more severe by the lingual root torque. The straight profile and face convexity were improved, as well as the dental and skeletal Class III malocclusion.

CONCLUSION:

The quad helix appliance is often recommended for the treatment of children with crossbite. It is characterized by high effectiveness, low cost and short treatment time. Its modification with asymmetric arms enables asymmetric expansion of upper arch.

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