

# RAPID PALATAL EXPANSION IN THE YOUNG ADULT- A CASE REPORT

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## Abstract:

A 15-year-old young adult presented for correction of a malocclusion that included a transverse maxillary deficiency. The patient was informed that he required orthognathic surgery to expand his upper jaw and extraction to correct his malocclusion, but he refused surgical expansion. Recent evidence indicates that rapid palatal expansion can be used without surgery in young adults. It was therefore decided to treat the patient non-surgically. Rapid palatal expansion of the maxillary arch was accomplished by means of a bonded Hyrax appliance. The post-treatment radiographs revealed an opening of the midpalatal suture. The belief still persists among some clinicians that young adult patients require orthognathic surgery for palatal expansion, but recent evidence supports a non-surgical approach after closure of the midpalatal suture.

**Key Words:** young adult; dental arch abnormalities; rapid palatal expansion.

## INTRODUCTION

Maxillary arch width deficiencies normally do not present an orthodontic challenge if they are detected before or during the adolescent growth spurt. Correction of these deficiencies with a maxillary rapid palatal expander was first popularized more than 40 years ago by Haas<sup>1</sup> and it yielded well-controlled and predictable results. However, once patients are past their growth spurt, which occurs at about the age of 14–15 years in males and 12–13 years in females,<sup>2</sup> the protocol for rapid palatal expansion (RPE) is not quite so clear. Some authors are of the opinion that expansion of the maxillary arch in mature patients is not possible.<sup>3-5</sup> Proffit<sup>3</sup> reports that “by the late teens, interdigitation and areas of bony bridging across the suture develop to the point that maxillary expansion becomes impossible,” in accordance with Melsen’s<sup>6</sup> study on histological suture appearance. Some studies suggest that it is indeed possible to successfully expand the palate in young adults.<sup>7-11</sup> This article reviews the recent literature on non-surgical RPE in young adults and recommends for using this approach based on a case the authors successfully treated by RPE alone. Surgically assisted RPE is not always accepted by patients and parents because of its invasive nature and associated risks. The palatal sutures are believed to close as early as 12–13 years of age.<sup>12</sup> Moreover, other sutures adjacent to the mid-palatal suture are so rigid that they are difficult to expand past the late teens.<sup>3,4,6,13</sup> Le Fort 1 osteotomy or osteotomies of the palatal suture and the lateral aspects of the maxillae combined with orthodontics is a popular treatment option from early adulthood onwards. However, many patients are unwilling for surgery. Treating patients after the closure of palatal sutures is a challenge for the clinician because until recently there was no other alternative treatment readily available for late teens and young adults. The following is a case report of authors’ experience of treating one patient with quite narrow maxillary arch using non-surgical RPE.

## CASE REPORT

A young adult male (15 years, 2 months of age) presented to the Orthodontic department having complaint of irregular teeth and wanted orthodontic correction for the same. Clinical examination and orthodontic records revealed that the maxillary arch was quite narrow. The patient was informed that surgery may probably be required to expand the palate, but he declined the surgical option. It was therefore decided that non-surgical RPE would be performed before full fixed orthodontic appliances. The patient was informed that surgical expansion may be used should the non-surgical RPE procedure fail.



Fig.1 Patient with posterior cross bite

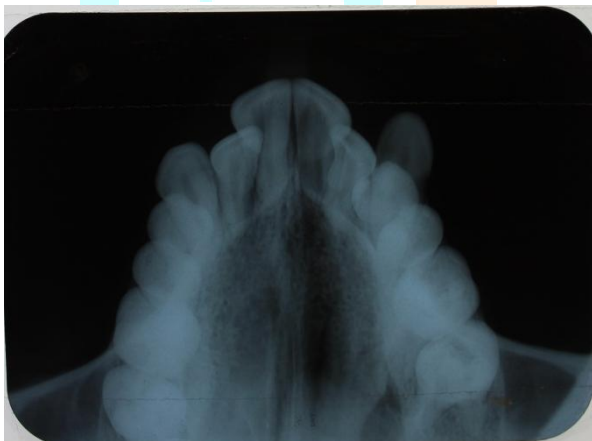


Fig.2 Pre treatment occlusal view



Fig.3 Intra oral photograph of cemented bonded RME



Fig.4 Front view of diastema after 3 week of activation

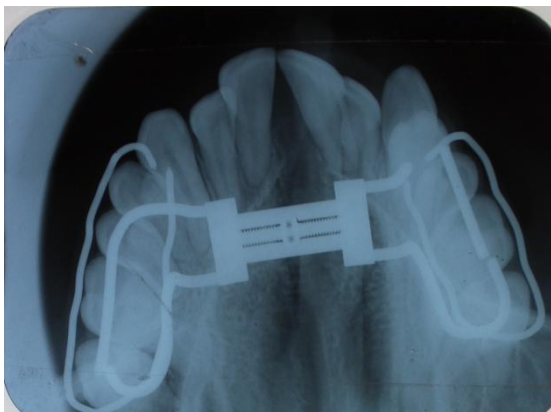


Fig.5 Post activation occlusal radiograph showing opening of mid palatal suture



Fig.6 Occlusal view of closure of diastema & retention

An anterior maxillary occlusal radiograph was taken to record the mid-palatal suture before treatment. A maxillary Hyrax bonded appliance with full acrylic coverage of the maxillary posterior teeth was made for the patient to maintain the vertical dimension and prevent cuspal interferences during the expansion procedure. The patient was instructed to turn the screw only once a day for first few days to loosen the suture and keep pain to a minimum. The patient turned the screw once a day for 4 days. The expansion measured on the appliance was 1.5 mm approximately at the expansion screw. Patient did not report any pain and no midline diastema was evident. Patient was then instructed to continue turning the expansion screw twice a day, once in the morning and once in the evening for the next 7 days. One week later 5 mm

expansion was measured, midline diastema was still not present. The patient was then instructed to continue turning the screw twice a day in morning and evening. The expansion measured on the Hyrax appliance was 8 mm twenty-one days after initial activation and the patient presented with a midline diastema of 4 mm. A post-treatment maxillary anterior occlusal radiograph was taken which revealed that the mid-palatal suture was split. The expansion screw was sealed with acrylic to fixate its position. The patient's midline diastema self-closed completely after approximately 4 weeks because of periodontal trans-septal fibre forces. A 3-month retention phase following RPE was followed for osteogenic formation in the midpalatal suture.

## DISCUSSION

An occlusal film radiograph should always be taken before RPE to evaluate the palatal suture. Radiographic studies<sup>14</sup> have demonstrated that the mid-palatal suture most often begins to close during the early teens and that maxillary expansion is best performed before the end of adolescence. It is generally assumed that the palatal suture is a straight running oronasal suture.<sup>15</sup> However, mid-palatal sutures do not always run straight.<sup>6</sup> If an occlusal film does not show a suture, it may be because the suture runs in an oblique direction in relation to the radiographic path or because the bone structures such as the vomer project above the suture. Results of one study<sup>15</sup> found that 9 out of 10 individuals (ranging in age from 18 to 38 years) examined post mortem could have undergone successful RPE, because less than 5% of the mid-palatal suture was obliterated. This finding is based on earlier research,<sup>16</sup> which found that if a 5% mid-palatal sutural closure is set as a limit for splitting the intermaxillary suture, this 5% closure will not have been reached in most patients younger than 25 years of age. Recent research<sup>15</sup> indicates that a mid-palatal suture which seems closed on radiographic examination may not be necessarily closed on histological examination. Researchers<sup>9</sup> attempting RPE in 38 patients ranging in age from the late teens to adulthood found that although non-surgical expansion failed in some subjects because of painful reactions, RPE in younger adults was completed successfully. The creation of a midline diastema was defined as successful expansion. The authors of this article and other researchers<sup>1,8,11</sup> disagree with the protocol of very rapid expansion and prefer an expansion rate of a maximum of 2 turns per day. Other similar studies also support the use of non-surgical RPE in young adults. One such study<sup>11</sup> assessed 82 patients under the age of 25 who underwent successful RPE without surgery. The oldest male to undergo expansion without surgery was of the age of 25 years. Studies<sup>7,8</sup> evaluating long term stability have also produced encouraging results. Fifteen patients ranging in age from 15 to 39 years (mean age of 22.3 years) were followed for 11 years; none of the patients experienced recurrence of their crossbite, but some amount of gingival recession was observed.<sup>8</sup> Another recent report<sup>7</sup> concluded that non-surgical RPE in adults is a clinically successful and safe method for correcting narrow maxillary arches.

## CONCLUSIONS

Histological and radiological evidences have proved that the mid-palatal suture is not fused enough to inhibit its opening in patients who are in their late teens or their early twenties. Clinical evidence also supports this finding. Activation schedule of RPE should be limited to 2 turns per day and may have to be reduced to only 1 turn on alternate days to ensure patient comfort. Evidence based studies reveal that palatal expansion without surgery is possible in patients older than 15 or 16 years of age. Our case report and the literature provide clinically based evidence indicating that although the mid-palatal suture may be closed when evaluated radiographically, it is not necessarily fused. Therefore, the mid-palatal suture can be orthopedically manipulated through RPE in patients at least into their early twenties. Some authors even provide evidence of success beyond this age.



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