

Case Report

Clinical considerations for retaining the over-retained deciduous tooth: A rare case report

ABSTRACT

We often encounter deciduous teeth which are retained in the oral cavity beyond the age of its exfoliation. In most instances, we are posed with a question as to whether to consider retaining it further or to extract and substitute. The concept and clinical considerations for retaining deciduous teeth and substituting it for its permanent successors are projected through a case illustration in this clinical case report.

Keywords: Adolescent, retained deciduous tooth, root resorption

INTRODUCTION

Many a times, we encounter the presence of a deciduous tooth that is well past its shelf life. More often, the choice is a simple one that is to eliminate the uninvited and get on with business as usual. However, there are times when the decision to retain a deciduous tooth has its advantages: though in choosing to do so, we are faced with the dilemma of its longevity. In a study done by Ith-Hansen and Kjaer, root resorption had not progressed up to 15 years after the age of natural exfoliation.^[1] Hence, the question that the clinician often asks himself or others while considering the retention of deciduous tooth is, what are the keys or critical essentials that make the deciduous tooth a good substitute for its missing counterpart. There are no reviews or articles published where the substitution with retained deciduous tooth without any root resorption. In this case report even after 3 years, there was no evidence of any root resorption, and the treatment stability was satisfactory.

Assessment criteria for root resorption are often varied and even conflicting as the pursuit progresses into the multidisciplinary domain. There are radiological, morphological, functional, and esthetic considerations which need to be weighed in equal measure and therein lay the challenge. According to the study by Kjaer *et al.*, patients who

have defective ectodermal phenotypes are more prone for root resorption of the deciduous teeth in the absence of their successors.^[2] Some of these considerations deemed critical will be highlighted through a case scenario involving retained deciduous teeth, to emphasize the criteria of importance as well as to outline necessary steps that can enable or aid in the decision-making process.

CASE REPORT

An adolescent patient with retained maxillary deciduous canines is presented. Along with both the deciduous maxillary canines in the arch, the clinical examination revealed an

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impacted permanent canine on the right upper quadrant and an incomplete eruption of the left upper permanent canine, which was palatally placed. Radiographic evaluation revealed an unfavorable palatal impaction of the upper right permanent canine (Grade 4)^[3] and a favorable position of the incompletely erupted left upper canine. There were no signs of root resorption in relation to the over-retained 53 and 63. The orthodontic treatment plan involved the decision to extract the unfavorably impacted right permanent canine, the left upper deciduous canine (63), and also the blocked out, lower left incisor. In retaining the right upper deciduous canine, care was taken to ensure that it was not subjected to any orthodontic force and was hence not bracketed [Figure 1].

Treatment objectives

To achieve ideal esthetic profile and establish Angle's Class I canine and molar relation. To manage deep bite, impacted canines, retroclined central incisors, and crowded lower anteriors.

Treatment alternatives

- Surgical removal of unfavorable impacted canine and blocked in lower single incisor by retaining the deciduous canine
- Extraction of both retained deciduous canines and blocked in lower single incisor extraction with forced traction of impacted canine
- Extraction of retained deciduous canines impacted upper permanent canines and blocked in lower single incisor and converts the first premolars to canines.

Treatment progress

An MBT prescription (0.022") was used to level, align, and close spaces. Maxillary and mandibular arch aligning and leveling was done with 016 round NiTi to 19 × 25 rectangular NiTi. During the active orthodontic treatment, the adequate space was created mesial and distal to the 53, to enable us to recreate the morphology of the permanent counterpart by a crown. In addition, the retained tooth was kept under observation during the entire duration of the treatment for signs of root resorption through periodic radiological evaluations. No root resorption was observed during the period of orthodontic treatment, and there were no signs of morphological variations or deviations in the crown-to-root ratio of the tooth [Figure 2]. The cephalometric value comparison between pretreatment and posttreatment is specified in Table 1. At the end of the orthodontic treatment, the decision was made to rectify the esthetic deficits of color and gingival contour of the deciduous tooth through

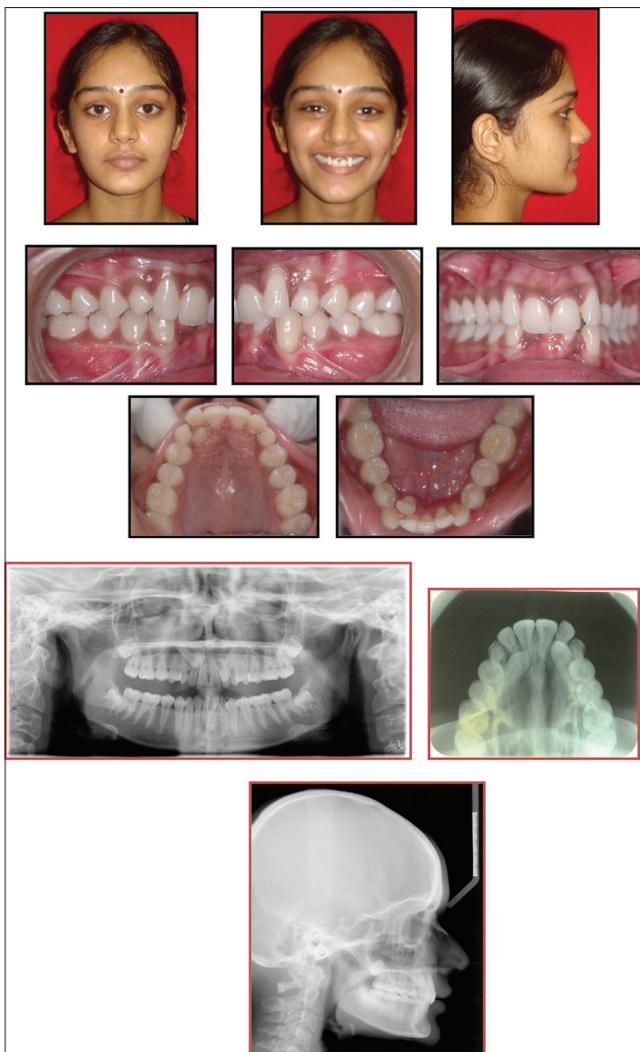


Figure 1: Pretreatment extraoral and intraoral photographs and radiographs

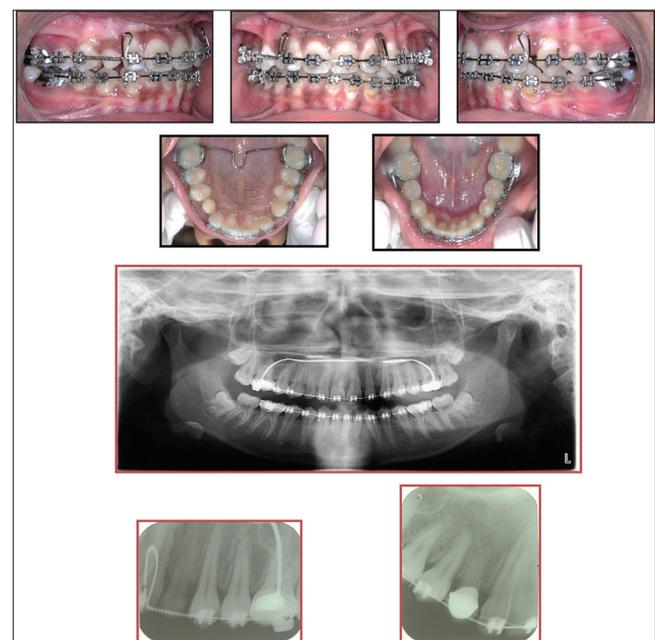


Figure 2: Midtreatment intraoral views and orthopantomogram for the assessment of the root position of 53 following space redistribution toward 13 reconstructions. Intraoral periapical views for the assessment of root angulations of 12 and 14 following crown placement (immediate)

Table 1: Pretreatment and posttreatment cephalometric values

Cephalometric values		Pretreatment	Posttreatment
SNA	83°	Class I skeletal base	83°
SNB	81°		81°
ANB	1°		1°
Wits appraisal	AO ahead BO by 1 mm		BO ahead AO by 2 mm
N ⊥ A	+4 mm	Orthognathic maxilla and mandible	+4 mm
N ⊥ Pog	+4 mm		+4 mm
NA Pg	2°		2°
Effect maxilla length	81 mm		81 mm
Effect mandible length	108 mm		108 mm
Go-Me	68 mm		68 mm
ANS-Gn	58 mm	Average lower facial height	57.5 mm
Sum of angles	392°		392°
FMA	21°		23°
Jarabak	66.6%		65.8%
Go-Gn to SN	30°		28°
U1 to NA	28°/6 mm	Proclined upper and lower incisors	24°/3 mm
U1 to SN	108°		100°
L1 to NB	28°/6 mm		26°/4 mm
IMPA	100°		95
Nasolabial angle	93°	Soft tissue	94°
L-lip to H plane	3 mm		2 mm

appropriate prosthetic and periodontal measures. A minimally invasive crown preparation was carried out to facilitate an esthetically enveloping ceramic crown, with a complimentary gingivoplasty undertaken, to match the existing discrepant gingival contour. Measures were also taken to ensure that the crown replacement was kept away from any occlusal contact to prevent any iatrogenic loading during functional excursions and/or otherwise to eliminate potential discordant triggers for resorption of the roots [Figure 3]. One-year retention protocol of the upper Hawley's and lower lingual fixed retainer was suggested for the patient.

Treatment result

The final result was esthetically pleasing and its stability was confirmed both by clinical and radiological means during the 2-year recall of the patient. Settled occlusion and esthetically pleasing smile could be achieved by 1 year and 7 months [Figure 4].

DISCUSSION

The causes or potential triggers of root resorption of the deciduous teeth still remain nonspecific to any singular causative factor, and it is this multifactorial and often unrecognized variability that leads to the tooth's failure when retained in the oral cavity for a long term.

Among the considerations favoring the retention of a deciduous tooth, an important factor is the absence of

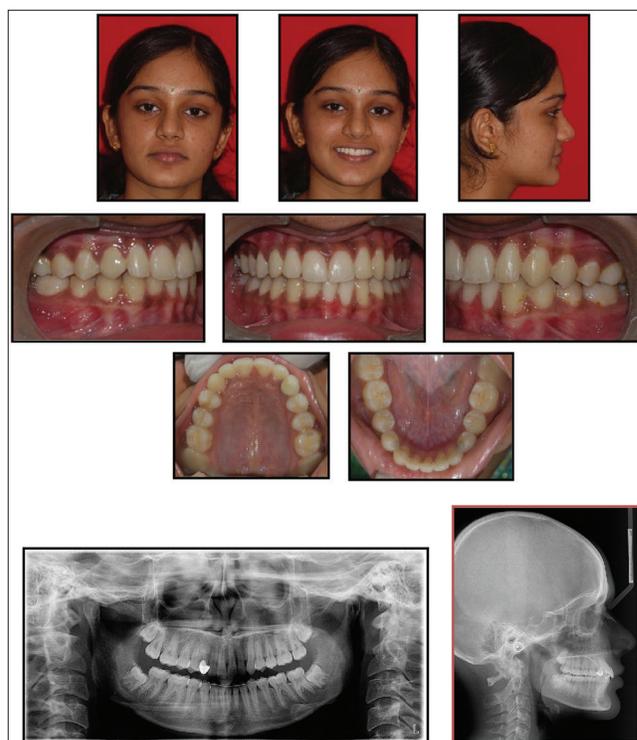


Figure 3: Posttreatment extraoral and intraoral photographs and radiographs

its permanent successor. It has been cited that resorption of the root of the deciduous tooth can be triggered by pressure from its erupting permanent successor as it forms an important prerequisite for the initiation of its emergence into the oral cavity.^[4] The absence of the permanent tooth in such scenarios thus enhances the chances of the deciduous



Figure 4: Two-year follow-up extraoral and intraoral photographs and intraoral radiographs

tooth maintaining its primary or original morphological form, critical to the preservation of its integrity and longevity when its retention is considered. In case scenario, this formed an important part in the decision-making process, coupled with the fact that the radiological evaluation revealed a good root form with a favorable crown-to-root ratio (1:1).^[5,6]

Daniel *et al.* have managed substitution of retained deciduous second molar under review period of 12 years and stated as out of 28 molar teeth, only 4 teeth had to go for extraction.^[7]

Among other criteria, subjecting the deciduous tooth to inappropriate forces can be detrimental to its long-term stability. It is also known that iatrogenic forces such as orthodontic or functional stresses which are eccentric or away from the ideal can potentiate root resorption. As clinicians, we must always keep in mind this factor during all stages of treatment and treatment planning.

Considering all these factors, the criteria for selection of retaining a deciduous tooth are:

- Absence of permanent successor – a potential trigger
- Ectodermal phenotype of the erupted permanent teeth (absence of morphological deviations in the crowns or roots)
- Morphology of the retained tooth – maximum morphology ensures maximum functional load or stress distribution or a positive abutment factor

- Existing root length and form – same as above
- Position in the arch and occlusal loading characteristics – related to the above
- Significance of adjacent contact relationship and location
- Angulations and inclination characterization with the associated segment – an inclination away from the tooth can potentially cause a concentration of occlusal stresses, thereby resulting in a potential trigger
- Radiological indicators and assessment guide – bone and periodontal ligament space verification
- Preliminary verification through canine and laterotrusive movements.

CONCLUSION

In certain clinical situations, despite an obvious indication to extract the retained deciduous tooth, the challenge is not the extraction but solution that is offered by the clinician to preserve the space, especially when the decision involves a young adult. An attempt made to retain the deciduous tooth rather than opt for the latter, and if the execution of the orthodontic plan is precise, it offers a very viable option to any of the current temporary replacement solutions. The posttreatment stability of preserving the deciduous canine without root resorption has a good prognosis; hence, other extensive treatment modalities of conversion of premolar to canine and replacement of missing tooth could be able to avoid by preserving the deciduous canine.^[8]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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