Implications of Retained Primary Dentition: a Multispecialty Approach

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Abstract

Purpose: Retained primary teeth may result in impaction of the permanent dentition and treatment such as surgical extrusion of the impacted teeth and prolonged comprehensive orthodontic treatment. The purpose of this presentation is to highlight the many implications of retained primary teeth and emphasize the importance of vigilant supervision of exfoliation of primary dentition within the pediatric patient population.

Methods: Multiple series of radiographs were reviewed and comprehensive intraoral examinations were conducted for a series of patients, all of whom possessed retained primary teeth. Each of these patients received an initial comprehensive exam by the pediatric dentist, followed by referrals to both the oral surgery and orthodontic departments for multispecialty care.

Results: Every patient within this case series received either extraction of the retained primary teeth, surgical extrusion of the impacted permanent tooth/teeth, or both. Each patient subsequently received an orthodontic workup to determine the most optimal orthodontic treatment sequelae.

Conclusions: The presence of all primary teeth should be examined during every visit, with age of the patient considered. Adequate and comprehensive series of radiographs should be captured for every patient, starting at age six, so that the biological and positional development of the permanent dentition can be seamlessly reviewed. When a patient is suspected to have either a retained primary tooth/teeth and/or a bilateral asymmetry of permanent dentition eruption, a swift referral should be made to both the orthodontist and oral surgeon to ensure further complications to the alignment and occlusion of the existing dentition do not occur.

Introduction and Background

Retained primary teeth occur when a child or adolescent's primary tooth remains in the oral cavity beyond its expected time of exfoliation.[1,2] This condition is commonly observed when the underlying permanent successor either fails to develop, erupts in an abnormal position, or becomes impacted.[1,2] Under normal circumstances, physiological root resorption of the primary tooth allows for timely exfoliation and replacement by the permanent dentition.[1,2] However, disruptions in this process can lead to prolonged retention, which may initially appear asymptomatic and clinically insignificant.[1,2] Despite this, retained primary teeth can interfere with the normal eruption sequence and alignment of permanent teeth.[1,2] Over time, this can contribute to malocclusion, crowding, and spacing issues that complicate overall dental development.[1,2,3] Understanding the early presentation and implications of retained primary teeth is therefore essential in preventing long-term complications.

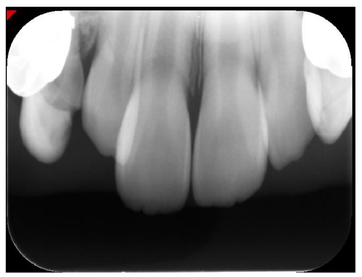
If left untreated, retained primary teeth can lead to a cascade of orthodontic and, in some cases, surgical challenges.[3,4] One of the primary risks includes ectopic eruption or impaction of permanent teeth, which may necessitate orthodontic or surgical interventions.[3,4] Additionally, prolonged retention can cause adjacent teeth to drift or tilt into improper positions, exacerbating alignment issues and potentially increasing the complexity and duration of future orthodontic treatment.[2,3,4] In cases where permanent teeth remain impacted, surgical exposure or extraction may be required to facilitate proper alignment.[3,4] Retained primary teeth may also undergo ankylosis, preventing normal exfoliation and further complicating eruption patterns.[2,3,4] Furthermore, the absence of timely intervention can lead to alveolar bone discrepancies and altered occlusal relationships, which may require more invasive corrective procedures.[2,3,4] Early diagnosis and management are therefore critical in minimizing these risks and promoting optimal oral and orthodontic outcomes.

Methods

Three patients, all age 10, were seen in the Department of Pediatric Dentistry at Rutgers School of Dental Medicine in Newark, New Jersey. Each patient received a comprehensive exam, including detailed intraoral exams of remaining primary dentition and at least one of the following: occlusal radiographs, panoramic images, and/or Cone-Beam Computerized Tomography (CBCT) scans. All patients received a referral to either the Rutgers School of Dental Medicine Department of Oral Surgery or the Department of Orthodontics for further evaluations and treatment.

Results

All patients included in this case series underwent active intervention to address their retained primary teeth, which consisted of extraction of the primary teeth and either surgical evaluation of the impacted permanent tooth or teeth, or an orthodontic evaluation for comprehensive orthodontic care to allow for normal eruption and orientation of the adult dentition. The diagnoses and decisions for treatment were based on factors such as the position and development of the permanent successor, the degree of impaction, and the overall effect on occlusion. Surgical extrusion was considered in cases where the permanent tooth was present but unable to erupt properly, allowing it to be repositioned into a more favorable location within the arch. Following these initial procedures, each patient was referred for a comprehensive orthodontic evaluation to assess alignment, spacing, and bite relationships. This orthodontic workup was essential in determining the most appropriate next steps, including the need for space management, guided eruption, or full orthodontic treatment. The coordinated approach ensured that both the immediate issue of retained primary teeth and the long-term functional and esthetic outcomes were addressed in a structured and efficient manner.



Figures 1 and 2. Figure 1 shows a maxillary occlusal radiograph, captured on February 10, 2026, which reveals retained maxillary primary canines bilaterally. These maxillary primary canines were later extracted, and the patient received a scan and impression for a Nance appliance to manage the crowding of the maxillary arch. Figure 2 shows a Panoramic image of the same patient, captured on March 4, 2026, which illustrates the significant amount of crowding, as well as additional retained primary dentition on the mandibular arch.

Figures 3 and 4. Figure 3 shows a frontal view of a Cone-Beam Computerized Tomography (CBCT) scan, captured on July 29, 2025, which reveals retained maxillary primary canines bilaterally, in addition to significantly impacted maxillary permanent canines. These maxillary primary canines were later extracted, and the patient received a thorough orthodontic evaluation to manage the crowding and lack of space and width of the maxillary arch. Figure 4 shows a Panoramic image of the same patient, captured on January 23, 2026, which illustrates the significant amount of crowding, as well as additional retained primary dentition on the mandibular arch. This patient received extractions of the primary mandibular canines to manage space loss in the mandible. In addition, this patient received a comprehensive treatment plan in the Department of Orthodontics, which consisted of a planned maxillary Hyrax palatal expander and a mandibular lip bumper.

Results (Continued)

Figures 7, 8, and 9. Figures 7 and 8 are right- and left-angled maxillary occlusal radiographs, captured on February 2, 2026, which reveal retained maxillary primary canines bilaterally, in addition to significantly impacted maxillary permanent canines. This patient has permanent lateral incisors that have a significant distal angulation, which is the supposed cause of permanent maxillary canine impaction. Figure 9 shows a Panoramic image of the same patient, captured on February 2, 2026, which illustrates the significant amount of crowding, as well as additional retained primary dentition on the mandibular arch. Figure 9 demonstrates a lack of space and retained mandibular primary canines. This patient is scheduled to receive a comprehensive orthodontic evaluation to determine the best treatment plan to aid in the normal eruption of the permanent maxillary canines, in addition to addressing the crowding of dentition in both arches.

Conclusions and Future Directions

Frequent radiographic and clinical evaluations are essential for identifying potential retained primary dentition. All patients should receive their first panoramic radiograph between ages 7 and 10, with additional occlusal radiographs taken promptly when impaction and/or retained primary dentition is suspected. Alongside imaging, active monitoring of which teeth are exfoliating and erupting is essential, allowing for timely and accurate treatment planning as the dentition develops. A proactive approach to management is equally important – this includes early planning and placement of space maintainers or regainers, particularly following extractions, to help preserve arch integrity. Additionally, timely referrals to orthodontists and oral surgeons should be made in cases of severe impaction or constricted arch form, ensuring that patients receive comprehensive, multidisciplinary care when needed.

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