

# Clinical Management of Trauma to Primary Teeth and Delay in Eruption of Permanent Successor Tooth

## Conduta Clínica de Trauma em Dente Decíduo e Atraso na Irrupção do Dente Permanente Sucessor

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### Abstract

Dental trauma is considered a complication in oral health, which has attracted the attention of researchers, as its prevalence has increased in recent years. Dental trauma in primary dentition can lead to early tooth loss and impairment of permanent successor teeth, depending on the stage of development of the tooth germ. The aim of the present study was to describe a clinical case of a 4-year-old child who was referred to a pediatric dentist after dental trauma and early loss of deciduous teeth. During the anamnesis, it was observed that the upper deciduous teeth (#51 and #61) were affected by successive traumas, resulting in the early loss of the affected teeth. Nance arch device with a tube-bar system was selected to restore function and aesthetics to the child, while the eruption of the successor permanent teeth was monitored. During the follow-up period, a delay in the eruption of #21 tooth was observed, and ulectomy of the region was indicated to allow the tooth eruption and the proper alignment of the central incisors, which occurred after 5 months of the surgical procedure. Through this report it was possible to conclude that the early diagnosis and the long-term periodic control of traumatic dental lesions in the primary dentition are of fundamental importance to prevent and minimize the damages that can occur to the permanent dentition.

**Keywords:** Tooth Avulsion. Tooth, Deciduous. Dentition, Permanent.

### Resumo

*O traumatismo dentário é considerado uma complicação à saúde bucal que vem chamando a atenção de pesquisadores, pois sua prevalência tem aumentado nos últimos anos. O trauma dentário na dentição decídua pode ocasionar a perda precoce dos dentes, e comprometimento dos dentes sucessores permanentes, dependendo do estágio de desenvolvimento do germe dentário. O objetivo do presente estudo foi descrever um caso clínico de uma criança de 4 anos de idade que foi encaminhada ao odontopediatra após traumatismo dentário e perda precoce de dente decíduo. Durante a anamnese, foi observado que os dentes decíduos incisivos superiores (#51 e #61) foram afetados por sucessivos traumas, resultando na perda precoce dos dentes afetados. O dispositivo arco de Nance com sistema do tipo tubo-barras foi selecionado para devolver função e estética à criança, enquanto a irrupção dos dentes permanentes sucessores foi acompanhada. Durante consulta de controle, um atraso na erupção do dente #21 foi observado e a ulectomia da região foi indicada para permitir a irrupção do dente e o alinhamento adequado dos incisivos centrais, que ocorreu após 5 meses do procedimento cirúrgico. Por meio do presente relato foi possível concluir que o diagnóstico precoce e o controle periódico a longo prazo das lesões dentárias traumáticas na dentição decídua são de fundamental importância para prevenir e minimizar os prejuízos que podem ocorrer à dentição permanente.*

**Palavras-chave:** Avulsão Dentária. Dente Decíduo. Dentição Permanente.

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### 1 Introduction

Early loss of deciduous teeth is a problem commonly found in Pediatric Dentistry, which can supplement other oral pathologies, such as dental caries and periodontal disease<sup>1</sup>, and dental trauma is one of the most frequent causes<sup>2</sup>.

Dental trauma is considered a complication to oral health that has been calling the attention of researchers, since its worldwide prevalence has increased in recent years<sup>1,3-5</sup>, and up to 40% of children are in the period of deciduous dentition<sup>6-8</sup>. In Brazil, preschool children are the most affected due to the stage of motor development in which they are in this phase<sup>3</sup>. The upper central incisors are the most affected (65.7%) when compared to the other teeth<sup>9</sup>.

When affecting the dental structure, trauma is presented

from a small enamel fracture to the definitive tooth loss<sup>10</sup>, which may result in different sequels, such as dental sensitivity, dental mobility at various degrees, necrosis of the pulp tissue, radicular reabsorption not compatible with rhizolysis<sup>11</sup> and alteration in the eruption chronology of the permanent successor<sup>12</sup>. Early loss of one or more teeth in childhood, especially when it comes to the anterior maxilla region, negatively impacts the smile esthetics<sup>13</sup> and the development of oral functions, such as chewing and phonation<sup>14,15</sup>. This fact can directly influence the child's quality of life<sup>13,16</sup> due to physical and emotional discomforts, besides negatively interfering in the social relationships of this population<sup>17</sup>.

Among the types of traumas that affect deciduous dentition, those that affect dental support tissues are the most frequent, highlighting the concussions, subluxations, intrusive

dislocations and avulsions<sup>10</sup>, since there is greater flexibility and plasticity of alveolar bone in young children, favoring their displacement and deformation<sup>18</sup>. Thus, after trauma, the risk of permanent successor commitment is significant, considering the chances of disorders in the formation and maturation of developing germs, due to the proximity of root apices of deciduous teeth to the successors, still in the formation process<sup>19</sup>.

The earlier the dental trauma occurs, the greater the probability of permanent successor commitment<sup>20</sup> due to the initial formation stage in which the dental germ is found<sup>21</sup>. The sequels of dental trauma in permanent successors consist of enamel hypoplasia, alteration in the eruption chronology and crown and root dilaceration<sup>22</sup>. Thus, any delay in the appropriate therapeutic conduct may favor an unfavorable prognosis of traumatized teeth and their successors<sup>23</sup>.

The objective of this report was to describe the clinical conduct of a case of early loss of previous teeth and sequel to permanent successor teeth.

## 2 Report of the Case Development

Patient D. V., male, 4 years old, appeared at the Pediatric Dentistry Office, accompanied by the mother, with the complaint of avulsion of a previous tooth. According to data obtained in the anamnesis, at 12 months, the child suffered dental trauma in the region of the anterior superior teeth, without clinical or radiographic complications. After 5 months, the child suffered a new trauma in the same region, which resulted in lateral dislocation of the upper left anterior deciduous (#61) to the palatine region, culminating in dental loss. During the thorough clinical examination, the presence of external root reabsorption in the apical third of the upper right anterior deciduous tooth (#51) was observed in a periapical X-ray of the maxilla anterior region, indicating endodontic treatment in the affected tooth (Figure 1A).

**Figure 1 (A and B).** (A) - Initial occlusal radiography. External root reabsorption in the apical third of the tooth 51. (B) Anterosuperior periapical radiography after endodontic treatment and tooth sealing 51



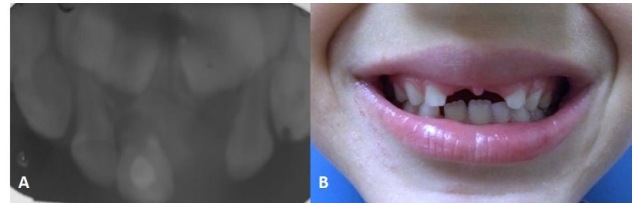
Source: The authors.

Initially, infiltrative anesthesia was performed in the tooth region #51, followed by absolute isolation of the upper anterior region. Root canal was instrumented with 21 mm Kerr type files (#K40, #K50 and #K60; Dentsply,

Baillargues, Switzerland), at a working length of 9 mm, under abundant irrigation of 1% sodium hypochlorite solution. Then, formocresol temporization (Biodinâmica Química Farmacêutica Ltda, Ibioporã, PR, Brazil) was placed and the tooth closed with IRM temporary restoration (Dentsply, Baillargues, Switzerland) (Figure 1B).

However, the patient only returned for care after 4 months, when the evolution of root resorption and the presence of dental mobility was observed in tooth #51 (Figure 2A), being exodontics of tooth # 51 indicated (Figure 2B).

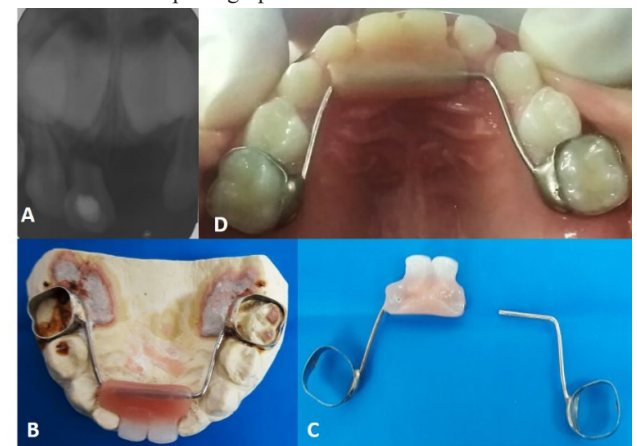
**Figure 2 (A and B).** (A) Occlusal radiography after 4 months, with evolution of tooth root resorption #51. (B) Photo of smile after performing the exodontics of tooth #51



Source: The authors.

In the following appointment, upper arch impression taking was performed to make the prosthetic device of functional esthetic Nance arch device with tube-bar system<sup>24</sup>, with the objective of filling the space of the region of the absent anterior teeth, since its permanent successors were in stage 6 of Nolla root development (complete crown formation)<sup>25</sup> (Figure 3A).

**Figure 3 (A–D).** (A) Periapical radiography, showing teeth 11 and 21 in Nolla development stage 6. (B) and (C) Functional esthetic Nance arch device with tube-bar system prior to installation. (D) Maxilla occlusal photograph after installation



Source: The authors.

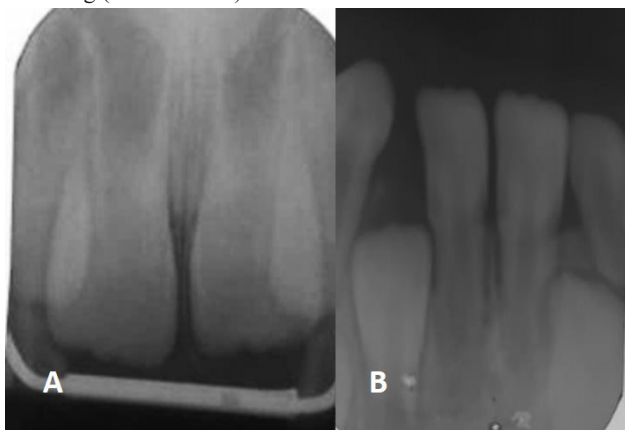
Orthodontic bands were previously selected for the upper deciduous second molars (Morelli, Sorocaba, SP, Brazil). After selection and the band testing (No. 31/tooth #75/left side; No. 30.5 /tooth #85/right side), upper arch impression taking was performed with alginate (Jeltrate Dustless; Dentsply, Pirassununga, SP, Brazil), the gypsum impression obtained through the casting with type III plaster stone (Asfer, São Caetano do Sul, SP, Brazil), the record of occlusion performed with pink wax no. 7 (Lysandra, São Paulo, Brazil) and then

the material was forwarded to the making of the prosthetic device (Figures 3B and 3C).

Prior to the device installation, it was tested and no interference was observed. The deciduous molars received prophylaxis with pumice stone and water, and under relative insulation with cotton rollers, the bands cementation was performed with Riva Light Cure glass ionomer cement (SDI, Victoria, Australia), manipulated according to the manufacturer's recommendations (Figure 3D).

Control appointments were performed every three months after the prosthetic device installation, in which periapical radiographs of the region were performed to follow up of germs development of permanent successors. After 18 months of use, Nance Arch was removed based on the confirmation of root development of teeth #11 and #21 reaching Nolla stage 7, that is, with a little more than 1/3 of the root formed (Figure 4A), which ensured its removal, considering that the upper incisors were close to rupture in the oral cavity. The child was referred to a therapeutic evaluation and therapeutic conduct with maxillary functional Orthopedics, due to the crowding presented in the region of the lower incisors, whose perimeter of the lower arch was insufficient for the eruption of the right lateral incisor permanent teeth (#42) and left (#32) (Figure 4B).

**Figure 4 (A and B)** - (A) Periapical superior radiography, showing teeth # 11 and # 21 in Nolla development stage 7. (B) Inferior periapical radiography, with inferior lateral incisors crowding (#32 and #42)



Source: The authors.

After 7 months of removal of prosthetic device, during the control appointment, only eruption of the #11 element (upper right central incisor) was observed. In the next two months, tooth #11 presented more than 2/3 of the exposed crown (Figure 5A), but without the presence of its counterpart. Therefore, ulectomy in the region of tooth #21 (left upper central incisor) was indicated (Figure 5B). After 48 hours of the surgical procedure, the eruption of tooth #21 in the oral cavity was observed (Figure 5C). The patient was evaluated after 30 days (Figure 5D) and after 5 months (Figure 5E), denoting the proper alignment of teeth #11 and #21.

**Figure 5 (A – E)** - (A) Eruption of permanent central incisors. Tooth 11 with 2/3 of the exposed crown and absence of tooth 21 in the oral cavity. (B) Ulectomy procedure. (C) Tooth 21 after 24 hours of ulectomy. (D) Control after 30 days. (E) Control after 5 months of ulectomy, demonstrating complete eruption of both central incisors



Source: The authors.

Regarding quality of life, with permanent superior incisors in functional position, it was possible to provide satisfaction to the patient in the social and emotional aspect.

## 2.1 Discussion

The sequels after a trauma in deciduous dentition are diverse and may vary according to the intensity and type of trauma that occurred<sup>10</sup>. In this clinical case, trauma resulted in pulp necrosis of tooth #51 and avulsion of tooth #61. Months later, tooth #51 had indication of exodontics due to the exaggerated mobility.

Early loss of deciduous teeth can lead to failures in the process of eruptive sequence of permanent teeth, and consequently to cause malocclusion<sup>22,23</sup>. In order to solve the early loss of the patients' superior incisors, in the present report, it was decided to install a prosthetic Nance arch device with a tube-bar system, a type of system that allows expansion according to the maxilla growth<sup>24</sup>.

In cases of delay in the eruption of a dental element, clinical and complementary examinations must be carried out carefully to plan and perform the treatment efficiently<sup>26</sup>. In the present study, ulectomy in the region of tooth #21 was indicated, considering that from the Nolla development stage 7, the tooth already has eruptive force<sup>25</sup>, and the dental element in question was at a more advanced stage.

The follow-up of the present case allowed a relatively early diagnosis, and it was possible to establish a treatment with a better prognosis. Due to ulectomy, it was possible to allow the eruption of the tooth which was previously impacted, preventing functional, emotional and social discomfort to the child<sup>13,16</sup>.

### 3 Conclusion

Dental trauma in deciduous dentition may cause sequels in permanent dentition, such as delayed eruption of permanent successors, and ulectomy for removal of fibrous tissue and release of affected tooth may be indicated. The installation of tube-bar type Nance arch is a viable option in cases of early loss of anterior deciduous teeth, since they are fixed esthetic devices, do not depend on the child's collaboration, prevent extrusion of antagonistic teeth and allow maxilla lateral growth and, permanent successors to be guided in their eruption process.

Early diagnosis and long-term periodic control of traumatic dental lesions in the primary dentition are of fundamental importance to prevent and minimize the damages that can occur to the permanent dentition.

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