Treatment of traumatized primary teeth: a conservative approach

Cunha RF, Pugliesi DMC, Percinoto C. Treatment of traumatized primary teeth: a conservative approach.

Abstract – This retrospective study examined some different types of treatment to primary teeth. The aim of this study was to assess the treatment of traumatized primary teeth and the importance of a long-term follow up. Brazilian children in the age group of 1–4 years from a baby clinic took part in the study. Three hundred and fifteen patients suffered some type of traumatic injury, a total of 338 affected teeth. Data were registered in specific records and submitted to statistic analysis. The most prevalent type of treatment was monitor only (85%) followed by tooth extraction and endodontic procedure. Invasive treatments were performed in case of severe traumas, usually 6 months after the injury. We verified that a careful follow up might be the preferential choice to the treatment of traumatic primary teeth even in some severe cases.

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According to some studies, the prevalence of traumatic injuries in the primary dentition varies from 11% to 30% (1–3). The incidence is higher between 18 and 30 months as the child begins to walk during this period (4). When the primary teeth are damaged during childhood, the inability of the patient to cooperate with the treatment becomes an important problem. Thus, the treatment strategy mostly adopted in these cases is limited to the extraction of the primary tooth (5–7).

Flores (8) suggests that the acute treatment of traumatized primary teeth should be restricted to close observations of the situation. In cases of tooth fracture with pulp involvement, luxation with close proximity of the luxated tooth and the permanent tooth germ or luxations that interfere with occlusion, extraction of the traumatized tooth is often recommended.

Recent experimental and epidemiological studies have demonstrated a great possibility for a more conservative approach to the treatment of primary dentition trauma (9–12). Knowledge of the professional, a well-conducted treatment, and long-term follow up are fundamental for the future health of the traumatized primary tooth (11). Thus, treatment should be planned in such a way as to alleviate the pain or discomfort of the child, giving priority to the maintenance of the traumatized primary tooth without losing sight of the maximum possible preservation of its permanent successor. The purpose of this retrospective study was therefore to evaluate the different types of treatment of traumatized primary teeth in patient's aged 0–3 years.

Materials and methods

The care protocol applied to patients with complaints of dental trauma attended at the Baby Clinic of the Araçatuba Dental School, UNESP, consisted of the reception of the patients and the accompanying persons, preliminary guidance, anamnesis, and clinical and radiographic assessment of the traumatized region, which was performed by dentists previously instructed by one of the authors. The history of trauma, involvement of soft and hard tissue, and the type of traumatic lesion were then recorded on a specific chart.

Selection of the sample

The study material comprised data from 1853 records from patients aged 0–4 years, attended at

the Baby Clinic, of both genders seen between February 1996 and August 2003. They were analyzed and only those reporting dental trauma were selected, resulting in a sample of 315 children.

Clinical and radiographic assessment of the traumatized area

All patients selected ($n = 315$) were invited for clinical and radiographic assessment to establish the condition of pulp vitality or necrosis. Clinical evaluation consisted of visual examination to determine the presence of symptoms in the traumatized tooth, degree of dental mobility, crown discoloration and the health status of the surrounding soft tissues. All these clinical findings when observed were recorded.

Radiographic analysis included, the determination of root integrity and scanning of the root canal, and supporting structures of the traumatized tooth. The clinical and radiographic information were analyzed by two of the authors according to the diagnostic criteria established in a previous study (13).

Establishment of treatment of the traumatized primary teeth

Depending on the trauma, the appropriate type of treatment is adopted with the aid of one dentist and the two authors mentioned above. The treatment of traumatized primary teeth was established on the occasion of the visit when the trauma was first reported by the parents or even by the dentist of the Baby Clinic him/herself, as there are occasions when the dental trauma is not noticed by the parents. From this point, the patients received individualized care including control visits during which, clinical and radiographic assessments were performed.

Table 1 was elaborated to help in the choice of treatment according to the type of trauma. These treatment guidelines were a consensus of previous studies and professional experience (9, 10, 13–15).

The different types of treatment were conducted in the following manner:

1. Monitor only (M): for injuries to the hard tissue, clinical and radiographic assessment was performed at 7 and 30 days, 6 months and 1 year. For injuries to the supporting tissue and combinations, clinical and radiographic assessment was scheduled at 7, 15 and 30 days, and after 3, 6, 12 and 24 months.
2. Restoration (R): this procedure was performed using acid conditioning, adhesive and composite resin.
3. Repositioning and Splint (RS): repositioning of the tooth and fixation by suture or by acid conditioning and composite resin. After 2 weeks the fixation was removed.
4. Endodontic procedures (EN): filling of the canal with calcium hydroxide in a single session.
5. Tooth extraction (EX): performed with a forceps or extractors.

The data collected were recorded on specific charts and the following variables were analyzed: gender and age of the patient, number and teeth most frequently involved, type of trauma, presence of pulp vitality or necrosis, treatment instituted, and time elapse between the occurrence of trauma and seeking care.

The data were analyzed with the Epi-Info software, version 6.04. Proportion test and chi-squared test were used for statistical analysis, with the level of significance set at 5%.

Table 1. Proposed treatment according to the different types of trauma reported in the literature

Traumatism	Treatment
ECF	M
EDCF	R and M
CCF	EN, R, EX
CRF	M, EX
CONC	M
SUBL	M
LAT LUX	RS, EX, M
INT	M, EX, RS
EXT	RS, EX, M
RF	M, EX, S
ASSOC	RS, EX, M

ECF, enamel crown fracture; EDCF, enamel-dentin crown fracture; CCF, complicated crown fracture; CRF, crown-root fracture; CONC, concussion; SUBL, subluxation; LAT LUX, lateral luxation; INT, intrusion; EXT, extrusion; RF, root fracture; ASSOC, association; M, monitor only; R, restoration; EN, endodontic; EX, extraction; RS, reposition and splint.

Results

Of the total 1853 patients analyzed, 315 (17%) patients participated corresponding to a total of 338 traumatized primary teeth. Twenty-three suffering from avulsion were excluded from the analysis because none of them was reimplanted, and the remaining 315 analyzed teeth.

Table 2 shows that monitor only, was the most prevalent type of treatment (85%), followed by tooth extraction (9%) and endodontic procedures (5%) at much lower percentages.

Table 2. Types of treatment performed at the Baby Clinic between February 1996 and August 2002

Treatment	Total	%
Monitor only	269	85
Tooth extraction	27	9
Endodontic	17	5
Restoration and splint	2	1
Total	315	100

The relationship between the type of dental trauma and the type of treatment performed is shown in Table 3. Monitor only was the most prevalent type of treatment for enamel crown fractures ($n = 144$), concussions ($n = 34$), intrusive luxations ($n = 27$), and subluxation ($n = 22$).

Table 4 shows the relationship between the type of trauma and the type of treatment grouped according to treatment characteristic and whether or not the tooth remained in the oral cavity. Treatment was found to be less invasive when the type of trauma was less intense, i.e. monitor only predominated in the case of injuries to the hard tissue (61%), whereas, in injuries to the supporting tissue, endodontic procedures and tooth extraction were the most frequent (47% and 45%, respectively). This association was statistically significant ($P = 0.0003$).

Table 5 illustrates the relationship between the time necessary to establish treatment of the sequelae and the type of treatment. Most treatments of sequelae were initiated after a period of 180 days, with a predominance of tooth extraction and endodontic procedures.

Table 3. Distribution of the number of the different types of trauma according to the type of treatment

	Monitor only	Endodontics	Tooth extraction	Restoration and splint	Total
ECF	144	2	5	0	151
EDCF	21	4	4	0	29
CONC	34	5	0	0	39
SUBL	22	1	3	0	26
LAT LUX	5	1	0	0	6
INT	27	1	7	0	35
EXT	2	0	0	0	2
CRF	0	0	2	0	2
ASSOC	14	3	6	2	25
Total	269	17	27	2	315

ECF, enamel crown fracture; EDCF, enamel-dentin crown fracture; CONC, concussion; SUBL, subluxation; LAT LUX, lateral luxation; INT, intrusion; EXT, extrusion; CRF, crown-root fracture; ASSOC, association.

Table 4. Relationship between the type of dental trauma and treatment group

Trauma	Monitor only (preserved teeth, %)	Endodontics, restoration, splint (preserved teeth, %)	Tooth extraction (loosed teeth, %)	Total (%)
Hard tissue	165 (61)	6 (32)	9 (33)	180 (100)
Supporting tissue	90 (33)	9 (47)	12 (45)	111 (100)
Association	14 (6)	4 (21)	6 (22)	24 (100)
Total	269 (100)	19 (100)	27 (100)	315 (100)

Table 5. Distribution of the number of treatments and the time necessary for the establishment of treatment

Time to establish treatment (days)	Endodontics	Tooth extraction	Restoration and splint	Total
0	0	1	2	3
1–15	1	1	0	2
16–30	0	1	0	1
31–180	5	3	0	8
181–1633	11	21	0	32
Total	17	27	2	46

Discussion

The types of treatment performed are shown in Table 2, with monitor-only predominating in 85% of cases, followed by tooth extraction in 9% and endodontic procedures in 5%. Analysis of relationship between the type of treatment and dental trauma (Table 3) showed that, except for root fractures, in which tooth extraction was performed in two cases, follow-up predominated in the case of the other types of trauma. According to Flores (8), luxation injuries can be treated by monitor only, except for extrusive luxation in which occlusal interferences may occur, requiring repositioning and fixation. We believe that the expressive number of trauma cases treated by monitoring in the present study can be explained by the fact that, the manifestation of sequelae in traumatized primary teeth is related more to the extent of the initial injury than to the type of treatment instituted. Nowadays, this opinion has been practically accepted unanimously in the literature (16–21).

It is interesting to note that even in cases of less severe trauma such as enamel crown fractures, concussion and subluxation, both considered to be less severe luxations, pulp necrosis might occur over time, a fact justifying even more the need for follow-up. In this respect, Rusmah recommended 2 years of follow-up, whereas, Mackie & Blinkhorn suggested half this time (5, 22). The patients seen at the Baby Clinic are followed up until the time of exfoliation of the traumatized tooth, an approach that permits a longitudinal evaluation of the different types of trauma.

In Table 4, of the 180 cases of trauma to the hard tissue, 165 were submitted to follow-up care. An important result is that only 27 (8.5%) of the 315 traumatized primary teeth analyzed were extracted, with only injuries to the supporting tissue prevailing in these cases. For the 288 teeth that remained in the oral cavity, most injuries affected the hard tissue and follow-up was the predominant type of treatment.

Analysis of the time that elapsed before treatment of the sequelae (Table 5) showed that treatment was initiated 1 month after the occurrence of trauma in eight of the 46 cases, including endodontic

procedures in five cases and tooth extraction in three. However, treatment was initiated at least 6 months after the trauma in most cases. This result confirms the need for long-term assessment of dental injuries because of the late manifestation of sequelae, or because tooth extraction may be required in cases of endodontically treated teeth.

We have to take into consideration the limitations present in every clinical study, especially for the age-group analyzed here. The patient behavior, parents compliance, and the psychological factors involved in the situation, played an important role in the treatment decision.

The assistance provided to patients with traumatized teeth at the Baby Clinic is characterized by a conservative approach, offering each patient individualized care, which is based on the care guide shown in Table 1. There is a great need for dentists to reconsider their treatment strategies for traumatized primary teeth. Current data indicate that treatments that are more conservative are more appropriate.

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