CASE REPORT

Crown fracture of the mandibular second primary molars in a 4-year-old child

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SUMMARY

Dental traumas are highly prevalent lesions in primary teeth, but crown root fractures are rare. Mostly anterior tooth segment is more commonly involved. Posterior crown root fractures are very rare. A 4-year-old girl reported to our paediatric dentistry department with a 10-day history of severe pain and discomfort in both right and left posterior teeth region. The child was suffering from severe and continuous pain and was unable to chew food. After an examination a fracture was noticed in intraoral periapical radiograph and treatment plan was decided to preserve the affected teeth.

BACKGROUND

Dentoalveolar injuries of primary dentition are serious problems especially in young children. Traumatic injuries in childhood many times represent unique problems for diagnosis and management. In primary dentition, different studies have found prevalence of 11.2% (Kuwait), 17.4% (Turkey) and 36.6% (South Brazil). Most frequent cause of the trauma to the primary dentition, as reported by the studies performed in Kuwait, Turkey, South Brazil and South Korea, was associated with fall with the prevalence estimate of 94.5%, 73.5%, 52.4% and 50.8%, respectively.¹⁻⁴

The peak incidence of dentoalveolar traumas in primary dentition occurs between the ages of 2 and 4 years, involving more boys than girls and affecting more frequently the maxillary central incisors.^{1 2 4} Most crown root fractures occur in anterior region and usually caused by direct force to the tooth. The occurrence of crown or crown root fractures in primary molars is very rare with the incidence of 0.8% of all injured primary teeth.⁵ These types of primary molar fractures usually occur as a result of indirect trauma when the mandibular teeth are forced up against the maxillary teeth due to an impact applied to the chin. It can also result in mandibular fractures; however, these are less common in children than in adults and if they do occur, the most common site is the condyle.⁶⁻⁸

The prevalence of traumatic injuries in children varies considerably, related to various factors such as age, gender and dentition.⁹ There are quite interesting findings for dental trauma of primary dentition along with the non-surgical endodontic management in the present case.

CASE PRESENTATION

A 4-year-old girl reported to the department with a history of severe pain and discomfort. The parents

were worried about her oral health as she was unable to chew anything and had been suffering from acute pain for the last 2 weeks.

As per the history given by the parents, the patient had a fall from the first floor of her house while playing and fell onto a tree and then crashed onto the ground. She had a direct blow to the lower left cheek region. The parents took her directly to the physician for emergency care where the extraoral wound was sutured, but the intraoral injuries remained unattended. Later the child presented with pain and was unable to chew, sleep and maintain the oral hygiene properly.

On general examination carried out at the department the child was found fit and healthy. Extraoral examination revealed that the temporomandibular joint functions were normal with no clicking and deviation of mandible. The scar was evident on lower left cheek region where sutures were removed before 3 weeks (figure 1). Her mouth opening was adequate. Intraorally, gingiva was normal in colour and consistency. No carious lesions were found. Tenderness on vertical percussion was present in 75 and 85 but fracture line was not visible clinically to the naked eye. The mesial step primary molar relationship was noticed on occlusal examination. The maxillary posterior primary right second molar was already treated in private dental clinic and pulpotomy was performed followed by cementation of stainless steel crown.

INVESTIGATIONS

As the fracture line was not visible clinically, further investigation like pulp vitality tests, orthopantomograph (OPG) and intraoral periapical (IOPA) radiographs for the particular teeth were advised, to rule out any further injury.

Figure 1 Extraoral scar seen on the left lower border of the cheek.

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Figure 2 Mesio-distal fracture line visible through the crown of 75 involving pulp.

IOPA showed vertical and oblique fracture line in crown portion of 75 and 85. Periapical radiolucency was not present in either of the involved teeth. Developing tooth germ of the first premolar as well as first permanent molar was recognised in the radiographs. After discussing the present scenario, the treatment plan was decided to save both the teeth by pulp therapy followed by permanent restoration to restore the functions. No other signs of trauma or fracture were seen in the OPG radiograph.

TREATMENT

Analgesics and chlorhexidine mouthwash was prescribed to aid in plaque control before starting the definitive treatment. Initial plaque control was performed. Local anaesthesia was administered and isolation was achieved through the rubber dam and saliva ejectors. Pulpectomy procedure was started and after access opening of 75 and 85 the fracture line became very evident (figures 2 and 3). A thin bleeding line was clearly visible through the fracture line, which was passing through the dentin and pulp chamber. It seemed that the buccal and lingual portion of the crown was separate but they were not. Hence, we adapted the band to the tooth to reinforce the buccal and lingual portion so that fracture does not exaggerate further. Pulpectomy of 75 was completed within two consecutive sittings. Pulpectomy in 85 was also performed and Metapex (Meta Bio Med., Korea) root canal filling material was used. Topical fluoride application (Pascal International, Bellevue Washington, USA) was performed. Both 75 and 85 were cemented by stainless steel crowns (3M ESPE, Minnesota, USA), and the patient was kept on follow-up for 1 month (figures 4 and 5), 3 and 6 months.

Figure 3 Bucco-lingual fracture line evident in 85 involving pulp.

Figure 4 Post-treatment intraoral periapical radiograph of 75.

OUTCOME AND FOLLOW-UP

During every follow-up visit, clinical as well as radiographical examinations were performed. The treated teeth were found to be normal at function and the patient did not have any pain or discomfort. A positive dental attitude towards the dental treatment was established and eventually the patient's co-operation and compliance towards dental treatment increased. Her parents were also happy and satisfied. Oral prophylaxis and topical fluoride application was performed after 6 months of follow-up. The OPG radiograph was taken after 15 months of follow-up and oral hygiene was found good and the girl had no problems related to masticatory functions (figure 6).

DISCUSSION

Crown root fractures in primary molars are extremely rare and usually occur as a result of trauma to the chin.¹⁰ However, fractures of the posterior primary teeth are also often overlooked as in this case where the fractured teeth were not detected in accidental fall and emergency at the time of injury and there was a subsequent 3 weeks delay. Though anterior teeth are more prone to trauma than the posterior teeth,⁵ it is necessary that the posterior teeth are also carefully examined to ensure the accurate diagnosis, especially when there has been an injury to the chin.^{11 12}

Oliveira *et al*¹³ found that among 892 Brazilian 0.4–4.9 year-olds, the highest percentage for reported injuries was recorded in the 3–4 year-old group. It is hypothesised that children at this age still do not have a well-established muscle coordination, and they have a tendency to fall and injure their teeth.^{14 15}

There is some variability between the studies and countries regarding the predominant aetiological factors of dental trauma,

Figure 5 Post-treatment intraoral periapical radiograph of 85.

Figure 6 An orthopantomograph after 15 months of follow-up.

although accidental fall appear to be the most common factor.^{1–4} This might be because children of this age group (2–4 years) start to walk and run, which results in frequent falls. As demonstrated by other authors, most traumatic dental injuries occur at home or school, as also seen in our case.¹⁶

Some researchers showed the primary maxillary dentition is more affected by trauma than mandibular teeth.^{1–3} The maxillary central incisors were the most frequently injured teeth followed by maxillary primary lateral incisors.^{1,2} The prevalence of injuries to the supporting structures, the alveolar bone and periodontal ligament, was up to 1.5 times higher than for hard dental tissue injuries.² This was estimated because of the resilience of the facial skeleton and alveolar bone pattern found in children.¹⁷

In this case, the mandibular second primary molars were appearing sound; neither decayed nor restored, hence the tooth injury was not recognised for a long period as there were no obvious symptoms. However, crown root fractures in primary molars are extremely rare, so often it might be overlooked as it happened in this case. Common symptoms of these fractures include pain on mastication or pain as a result of thermal or chemical stimuli, similar history was given by the patient and parents of the present case.

On visual and radiographical examination, fracture lines are often difficult to detect and the patient's anxiety may make it even more difficult to obtain an accurate diagnosis for a clinician. Sometimes lateral pressure on the cusps will also often show a fracture line or stimulate pain.¹⁸ Fractures in primary molars commonly occur along the fissures.¹¹

Treatment of the fractured primary tooth or teeth depends on the severity and position of the fracture line as well as the length of the time that has passed between accident and treatment. Treatment may also depend on the ability of the child to cooperate with the treatment and number of teeth involved. There have been reports of fractured primary molars where extraction was treatment of choice followed by space maintainer,^{10,19,20} whereas in the present case only crown fracture was diagnosed, which was successfully treated by carrying out pulp therapy and full crown restorations.

In this case, many injuries were left by the parents without consulting a dental surgeon for management. Some studies reported that 10% and 15% of their study participants sought dental care 12 months after the trauma.²¹ It is imperative that information

should be provided to our society about the importance to visit a dental clinic immediately after dental trauma since there is a potential risk for more severe complications.

Learning points

- ▶ The authors recommend a community wide campaign to educate parents, children and dental/medical care providers on dental trauma prevention and treatment.
- ▶ Following up these types of cases is extremely important for determining the possible effects on the succeeding permanent tooth, thus avoiding more serious sequels.
- ▶ Despite anterior teeth being more susceptible to fractures, thorough examination of all posterior teeth must be made, especially when the child suffers trauma to the chin region.
- ▶ These types of cases pose challenges for dentists to establish adequate treatment plans and approach to provide comprehensive oral healthcare to the children.
- ▶ The prognosis is generally good when treatment is performed as soon as possible, following an injury.

Competing interests None.

Patient consent Obtained.

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