

## Management of dental trauma

### - Clinical case of the intrusion of immature permanent teeth -

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#### Introduction

In pediatric dentistry, many patients present to the hospital with a chief complaint of dental trauma. The occurrence of dental trauma is high in immature permanent teeth as well as primary teeth. The severity of injury varies widely, which makes it difficult to examine, diagnose and determine the course of the treatment. The procedure and course of the injured teeth could affect not only masticatory function and aesthetics but also the growth of the dental arch. Thus, the procedures at the first visit are critical for the prognosis of the injury.

Types of dental trauma include mobility, fracture, intrusion, extrusion, dislocation and shedding. A few reports are available on the dental treatment of intruded teeth. According to the report of the Japanese Society of Pediatric Dentistry, this is considered to be due to the low occurrence of intrusion of immature permanent teeth. The frequency of intrusion is 21 out of 1,028 teeth (2%). In this study, we conducted a clinical investigation into the treatment of intruded immature permanent teeth.

#### Methods

The sample consisted of 6 injured immature permanent teeth of 5 patients (7 years and 2 months old to 12 years and 10 months old) who visited Tokyo Dental University Chiba Hospital, Department of Pediatric Dentistry with a chief complaint of dental trauma. Patients were analyzed according to age, sex, site of injury and etiology. Furthermore, development of the root, severity of the intrusion and the approach to the dental treatment were investigated at the first visit. Tooth discoloration, pulp status, fixation period and pathologic resorption of the root were investigated in the visits that followed.

#### Results

Table 1 shows a comprehensive description of clinical cases. Patients' age at the first visit ranged from 7 years and 2 months to 12 years and 10 months.

Of 5 patients in total, 3 patients were male and 2 were female. All the injured teeth were upper incisors (6 incisors in total: 5 central incisors and 1 lateral incisors). Tumbles are the leading cause of injuries, accounting for 4 out of 6 teeth (66.6%). Complete intrusion was the most frequent type of intrusion, accounting for 5 out of 6 teeth (83.4%). Three out of 6 teeth were repositioned and fixed, and the other 3 were rinsed and observed in the expectation of spontaneous re-eruption. No teeth were extracted at the first visit. Most teeth re-erupted spontaneously to the pre-injury position in 3 to 4 months. However, clinical problems were observed during the follow-up period regardless of procedures performed at the first visit. Clinical problems observed included crown discoloration and external resorption of the root. None of them were serious enough to require extraction. The following is a representative clinical case.

#### Case report

Figure.1

- \* Age at the first visit: 7 years and 9 months
- \* Sex: Female
- \* Chief complaint: complete intrusion of the upper left central and lateral incisors
- \* Present history: falling at school, followed by a visit to the hospital
- \* Procedure at the first visit:  
Upper left central incisor- repositioning and fixation  
Upper left lateral incisor- observation of the clinical course
- \* Prognosis:

- Upper left central incisor  
3 weeks later- removal of the fixation  
1 month later- external resorption(Figure.2)  
3 months later- root canal treatment  
1 year and 5 months later- progression of external resorption  
Upper left lateral incisor (Figure.3)  
4 months later- completion of the spontaneous reposition (Figure4)  
1 year and 5 months later- successive development of the root

Table 1.Clinical case

Case	Teeth	Age	Cause	Degree of intrusion	Root growth degree	Treatment	Follow up period
					Clinical problems		
1	<u>11</u>	7.2	Fall	Complete	2/3	Preserve	32months Discoloration
2	<u>11</u>	7.9	Tumble	Complete	2/3	Repositioning and splint	37months Root resorption
	<u>12</u>	7.9	Fall	1/3	1/2	Preserve	37months -
3	<u>11</u>	9.6	Collision	Complete	2/3	Preserve	36months Root resorption
4	<u>11</u>	12.5	Tumble	Complete	2/3	Repositioning and splint	5months -
5	<u>11</u>	12.1	Tumble	Complete	3/4	Repositioning and splint	32months -



Fig.1



Fig.4



Fig.2



Fig.3

### Discussion

Prompt and appropriate diagnosis and treatment are important in the treatment of dental trauma. The procedures for intruded immature permanent teeth vary according to the severity of intrusion and physiological development of the root. Regular

observation of the root development and healing of the periodontal tissue is required.

Andreasen et al. reported that spontaneous eruption can be expected in intruded immature permanent teeth with incomplete or complete root development. It is also reported that rapid repositioning may cause clinical problems including external resorption of the root.

According to AAPD guidelines, spontaneous eruption can be expected in teeth with immature root formation. In mature teeth, the goal is to reposition the tooth with orthodontic extrusion and initiate endodontic treatment within the first 3 weeks of the traumatic incident.

In this study, marked external resorption was observed both in teeth repositioned and fixed and in teeth observed in the expectation of spontaneous resorption. The root formation at the time of the injury and the timing of the root canal treatment affect the prognosis of intruded teeth. Because the number of clinical cases is limited, the best procedure cannot be determined by the present study alone.

Further clinical cases are needed to determine the treatment course of intruded immature permanent teeth.