Dental Trauma Primary Dentition

DENT 5312
Paediatric Dentistry Module

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Dental Trauma – Primary Dentition

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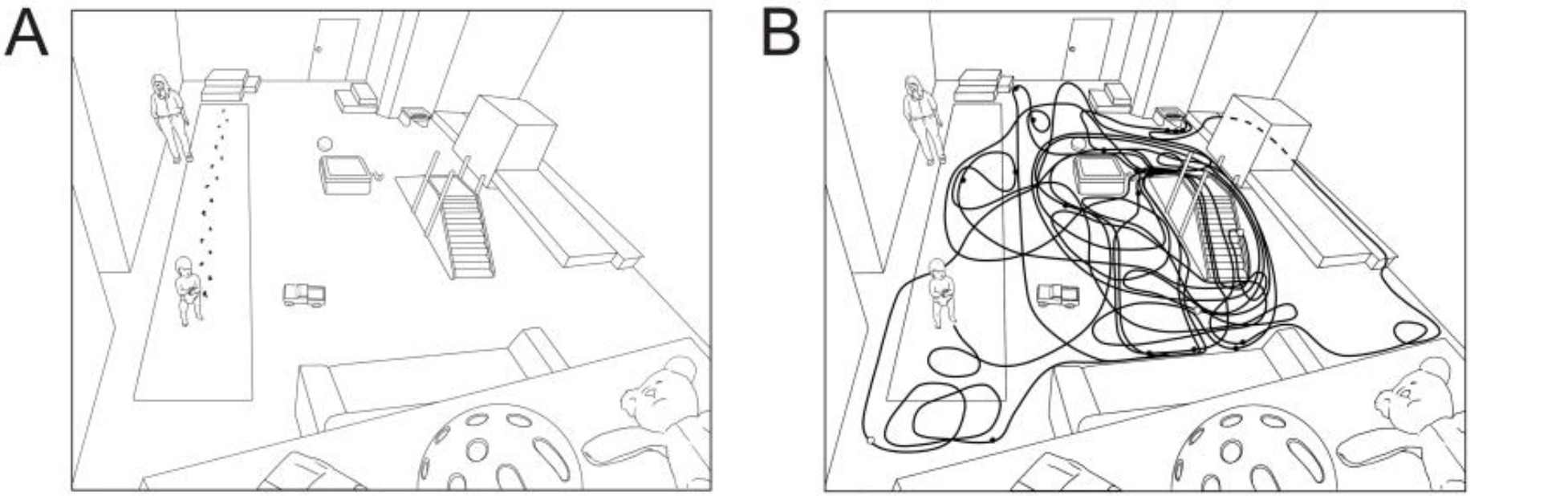
Prevalence

in preschool children: head and facial injuries make up 40% of somatic injuries

Glendor et al. 1996

toddlers fall over on average 17 times per hour!

Adolph et al. 2012



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Prevalence

30% of the children had sustained injuries to primary teeth

46% of the children had a history of traumatic injuries to primary and/or permanent teeth

Andreasen and Ravn 1972

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Examination

A rational examination procedure is essential in order to establish a complete and correct diagnosis of all soft and hard tissue injuries (Andreasen and Andreasen 1985, Bakland and Andreasen 1996, Andreasen et al. 2007).

- **Clean the face and the oral cavity with water or saline**. If there are soft tissue wounds, a mild detergent should be used. This cleaning will make the patient feel more comfortable and facilitate extraoral and oral examination.
- **Make a short medical and dental history**. The medical history should reveal possible allergies, blood disorders and other information that may influence treatment. The dental history should indicate previous dental traumas, information which may explain radiographic findings such as pulp canal obliteration or apical pathology.

Questions relating to the injury

- **Where did the injury occur?** This information may have legal implication for the patient and may on occasion indicate the possibility of contamination.
- **How did the injury occur?** This may lead to identification of the impact zones, i.e. a chin injury is often combined with crown or crown-root fractures in premolar and molar regions.
- **When did the injury occur?** This information may be essential in relation to many injury types. In relation to a tooth avulsion the extent of time and the extraoral storage condition becomes very decisive for later treatment.
- **Was there a period of unconsciousness?** If so, for how long? Amnesia, nausea and vomiting are all signs of brain damage and require medical attention.
- **Is there any disturbance in the bite?** An affirmative answer may indicate a luxation injury with displacement, an alveolar or jaw fracture or a fracture of the condylar region.
- **Is there any reaction in the teeth to cold and/or heat exposure?** A positive finding indicates exposed dentin and/or pulp.

Clinical examination

- *Examine* the face, lips and oral muscles for soft tissue lesions.
- *Palpate* the facial skeleton for signs of fractures.
- *Inspect* the dental trauma region for fractures, abnormal tooth position, tooth mobility and abnormal response to percussion. Furthermore, registration of direction of displacement in case of luxation injuries. In case of fractures their relation to the gingival sulcus area is noted as well as possible pulp involvement.
- *Pulp testing* (usually electrometric) completes the clinical examination.

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Examination

Radiographic examination

- The completed clinical examination has now identified the trauma region and this site should now be examined with relevant radiographic techniques. Several clinical studies have shown that multiple radiographic procedures are needed to detect displacement of the tooth in its socket as well as presence of root fractures (Andreasen and Andreasen 1985, Andreasen and Andreasen 1988).
  It is essential to consider the radiographic film format used in order to achieve a high quality image of the traumatized tooth. A steep *occlusal exposure* (using a size 2 film (DF 58, EP 21)) of the traumatized anterior region gives an excellent view of most lateral luxations, apical and mid-root fractures and alveolar fractures. The standard periapical bisecting angle exposure of each traumatized tooth (using a size 1 film (DF 56, EP 11)) provides information about cervical root fractures as well as other tooth displacements. Thus, a radiographic examination comprising one steep occlusal exposure and three periapical bisecting angle exposures of the traumatized region will provide sufficient information in determining the extent of trauma to an incisor region.

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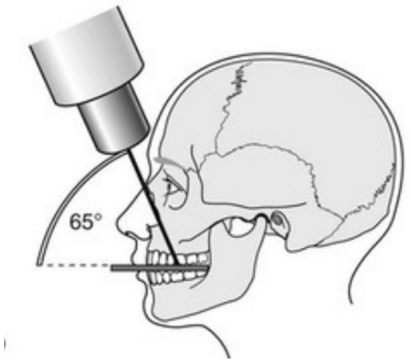

Hintze and Espelid

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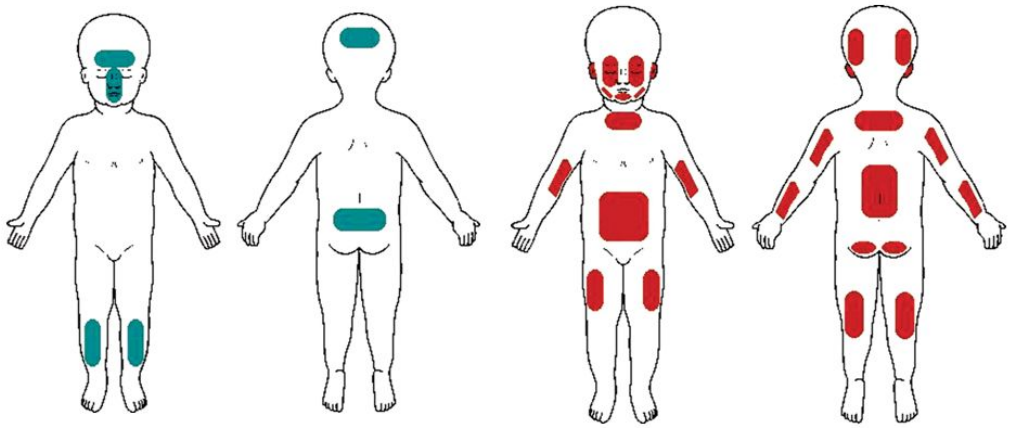
Examination

Photographic examination

What bruises are suspicious?

Accidental = peripheral

Non-accidental = central



Santos et al. 2007

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Fractures

Infraction

Enamel fracture

Enamel-dentin fracture

Enamel-dentin-pulp fracture

Crown-root fracture without pulp involvement

Crown-root fracture with pulp involvement

Root fracture

Alveolar fracture

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Luxations

Concussion

Subluxation

Extrusion

Lateral luxation

Intrusion

Avulsion

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Treatment options

1. Conservative management
    - soft diet, analgesia, ongoing review and monitoring

OR

2. Extraction
    - extent of injury
    - occlusal interference
    - pulpal exposure
    - degloving injuries

Andersson et al. 2012

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Treatment options

1. Conservative management

   - soft diet, analgesia, ongoing review and monitoring

Concussion or subluxation:

Low risk of complications (less than 10%)

(Complications: pulp necrosis, resorption, PCO, premature loss)

**Most complications occur within the first 12months*

**More likely in children >4yrs old*

Lauridsen et al. 2017

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Treatment options

1. Conservative management
   - soft diet, analgesia, ongoing review and monitoring

Intrusion:

80% of intruded teeth re-erupt spontaneously

(BUT 1/3 will develop complications e.g. infection or ankylosis)

Lauridsen et al. 2017

**lowest risk risk of pulp necrosis in children <2years of age*

**degree of intrusion or concomitant fracture did not affect complication rate*

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Case Example

Severe intrusive luxation of 51 and 61 on presentation

Spontaneous re-eruption 6 months later

Koch et al. 2017

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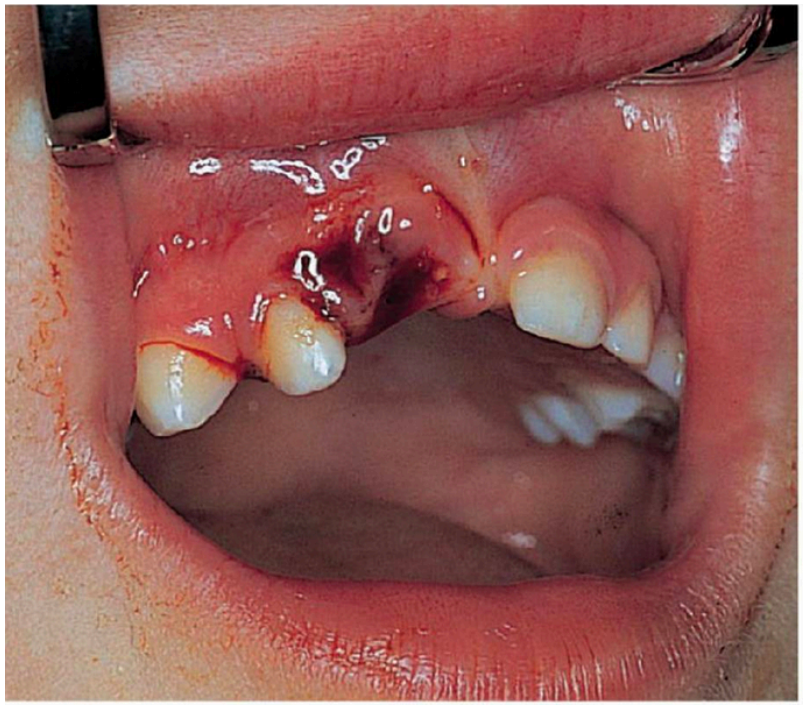
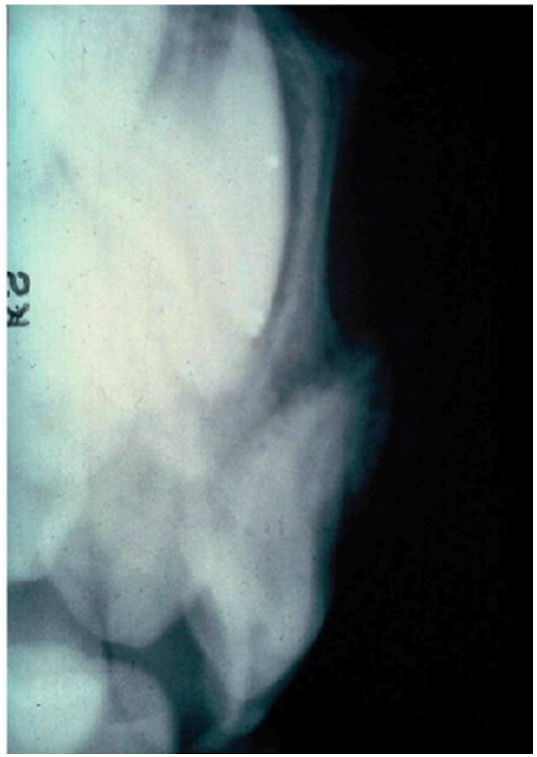
Case Example





Koch et al. 2017

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Treatment options

1. Conservative management
   - soft diet, analgesia, ongoing review and monitoring

Extrusive or lateral luxation:

Extrusion: ~15-43% complication rate

Lateral luxation: ~20-40% complication rate

(Complications: pulp necrosis, resorption, PCO, premature loss)

**Most complications occur within the first 12months (~96%)*

**More likely: in children >4yrs old and concomitant crown fracture*

Lauridsen et al. 2017

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Treatment options

1. Conservative management
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    - extent of injury
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Andersson et al. 2012

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- Crown fractures in the primary dentition
  - uncomplicated
    - conservative management and review
  - complicated
    - usually extraction
    - can be referred to a paediatric dentist if the parents want to look at options to maintain the tooth

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- Pulp necrosis
- Pulp canal obliteration
- Discolouration
- Ankylosis
- Gingival defect
- Premature tooth loss
- Root resorption

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Borum & Andreasen

Table 1. Frequencies of all complications seen among 387 traumatized primary teeth during the follow-up period according to type of luxation. One avulsed and replanted tooth and 7 teeth with no luxation diagnosis are excluded from the table

	Concussion *N*=14	Subluxation *N*=132	Extrusion *N*=10	Intrusion *N*=85	Lateral luxation *N*=146	Total *N*=387
Complication	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Color changes	5 (35.7)	56 (42.4)	8 (80.0)	41 (48.2)	91 (62.3)	203 (52.4)
Pulp necrosis (PN)	1 (7.1)	19 (14.4)	3 (30.0)	32 (37.6)	41 (28.1)	98 (25.3)
Pulp canal obliteration (PCO)	4 (28.6)	34 (25.8)	7 (70.0)	35 (41.1)	61 (41.8)	142 (36.7)
Gingival retraction	0 (0.0)	8 (6.1)	1 (10.0)	2 (2.4)	10 (6.8)	22 (6.7)
Permanent displacement	0 (0.0)	0 (0.0)	1 (10.0)	15 (17.6)	5 (3.4)	21 (5.7)
Surface resorption	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.2)	2 (1.4)	3 (0.8)
Inflammatory resorption	1 (7.1)	5 (3.8)	0 (0.0)	12 (14.1)	19 (13.0)	38 (9.8)
Ankylosis	0 (0.0)	0 (0.0)	0 (0.0)	2 (2.4)	1 (0.7)	3 (0.8)
Disturbed physiological resorption	0 (0.0)	1 (0.8)	1 (10.0)	2 (2.4)	7 (4.8)	12 (3.1)
No complications	8 (57.1)	57 (43.2)	0 (0.0)	10 (11.8)	17 (11.6)	97 (25.1)

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- Initial Presentation
  - 14mos old boy
  - 51 intrusive and palatal luxation
  - Repositioned under LA

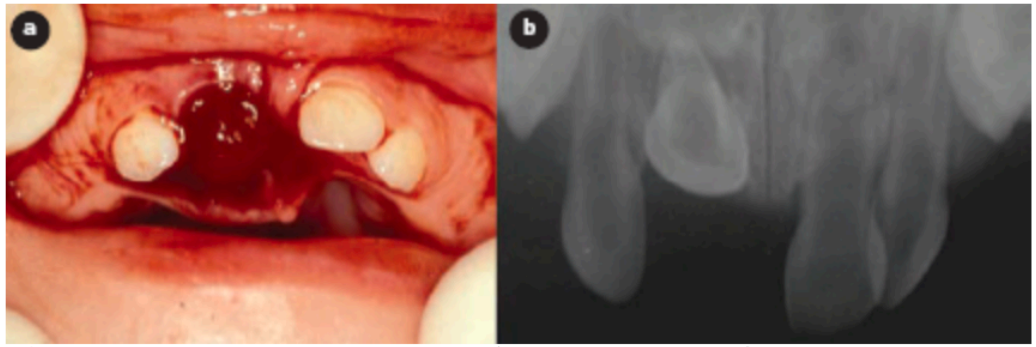

Figure 1: Initial examination: **a**) clinical view of the traumatized area; **b**) radiographic aspect of the intruded tooth.

- 12 month review

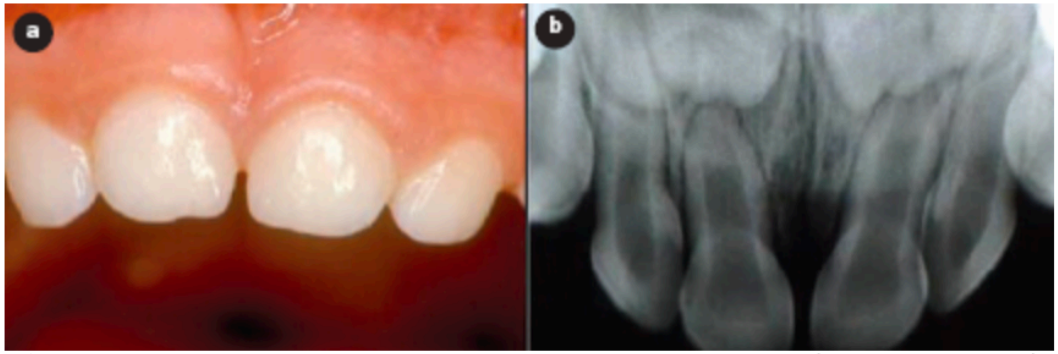

Figure 2: Clinical and radiographic views, 1 year after trauma: **a**) clinical examination revealed normal mucosa and no discoloration of the dental crown; **b**) radiographic examination showed normal characteristics.

Gomes et al. 2010

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- 4 year review

Figure 3: Radiographic examination 4 years after dental trauma revealed signs of alteration in the germ of the maxillary right central permanent incisor.

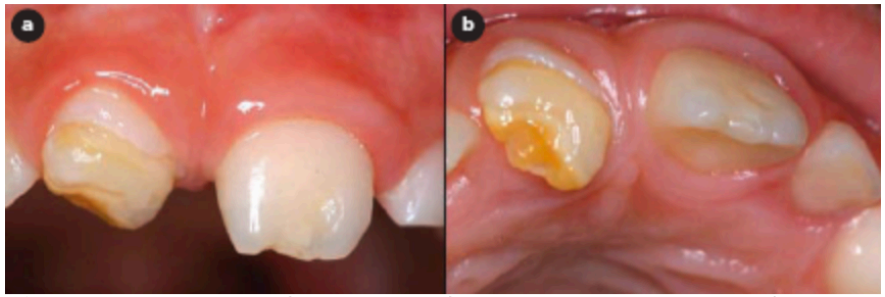

Figure 4: Crown malformation of the permanent teeth: **a**) intraoral view showing enamel hypoplasia on the permanent maxillary right central incisor and circular enamel hypoplasia on the permanent left central incisor; **b**) intraoral view showing dilaceration of the crown of tooth 11 and discoloration.

Gomes et al. 2010

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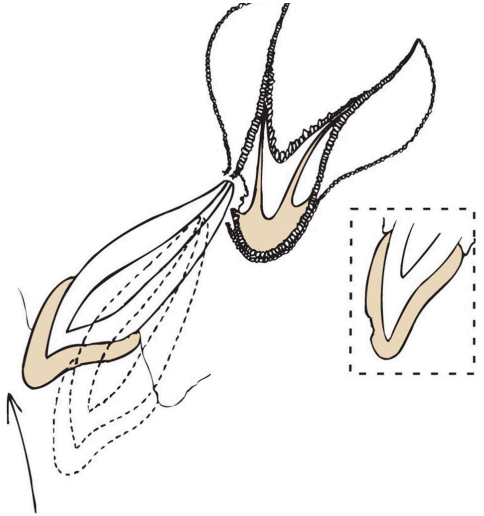

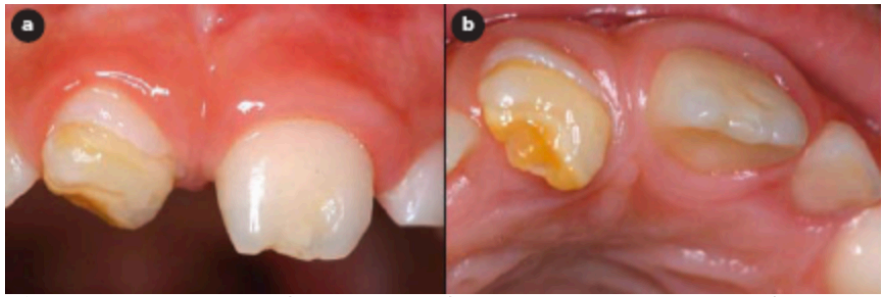

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Gomes et al. 2010

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- Recommended Reading
- Dental Trauma Guide
- *Andersson L, Andreasen JO, Day P. Guidelines for the Management of Traumatic Dental Injuries: 3. Injuries in the Primary Dentition. Dent Traumatol 2012;28:174-182*