Dentoalveolar Trauma

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Guidelines?

- International Association of Dental Traumatology
- American Academy of Pediatric Dentistry
- American Association of Endodontists

Guidelines for the Management of Traumatic Dental Injuries: 1. Fractures and Luxations of Permanent Teeth

Originating Group

International Association of Dental Traumatology

Endorsed by the American Academy of Pediatric Dentistry

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Abstract: *Traumatic dental injuries (TDIs) of permanent teeth occur frequently in children and young adults. Crown fractures and luxations are the most commonly occurring of all dental injuries. Proper diagnosis, treatment planning and followup are important for improving a favorable outcome. Guidelines should assist dentists and patients in decision making and for providing the best care effectively and efficiently. The International Association of Dental Traumatology (IADT) has developed a consensus statement after a review of the dental literature and group discussions. Experienced researchers and clinicians from various specialties were included in the group. In cases where the data did not appear conclusive, recommendations were based on the consensus opinion of the IADT board members. The guidelines represent the best current evidence based on literature search and professional opinion. The primary goal of these guidelines is to delineate an approach for the immediate or urgent care of TDIs. In this first article, the IADT Guidelines for management of fractures and luxations of permanent teeth will be presented.* *(Dental Traumatology 2012;28:2–12; doi: 10.1111/j.1600-9657.2011.01103.x) Accepted January 7, 2012.*

KEYWORDS: CONSENSUS, FRACTURE, LUXATION, REVIEW, TRAUMA, TOOTH

Initial Evaluation

Diagnostic Workup

- Triage and stabilize (injuries can often be complex).
  - Airway
  - Breathing
  - Circulation
- Rule out cranial nerve injury.

Cranial nerve	Test	Pathological signs
I. Olfactory	Testing each nostril separately with eyes closed, using aromatic substances, e.g., vanilla extract or powdered coffee	Hyposmia, anosmia
II. Optic	See Chap. 8 Acuity, visual field (confrontation testing), fundus appearance (optic discs)	Reduced acuity, visual field defects, papilledema, optic disc pallor
III. Oculomotor IV. Trochlear VI. Abducens	See Chap. 10 Interpalpebral fissure, ocular motility (diplopia, oscillopsia), pupillary reactions (light/accommodation), look for nystagmus (positional and with head movement, using Frenzel's magnifying glasses)	Ocular muscle or gaze paresis, chooses eccentric gaze position, nystagmus, anisocoria
V. Trigeminal	Facial sensation, jaw muscles (open mouth against resistance, palpation of the masseters during clenching of teeth)	Peripheral ("isolated trigeminal branch") or central (onion peel dermatome) loss of sensation
VII. Facial	Facial muscles (furrow the brow, force eyes closed, turn up nose, pucker lips, blow cheeks open)	central (sparing the brow) or peripheral paresis (with Bell's phenomenon) See ■ Fig. 21.1
VIII. Acoustic	Monaural hearing tests with light rubbing of fingers together or whispering Tests of balance (nystagmus, standing, and gait tests)	Hypo-, hyper-, or anacusis
IX. Glossopharyngeal X. Vagus	Gag reflex, sensation of gums, and pharynx, swallowing Tests of palatal levators Hoarseness	Faulty swallowing, (unilateral) paralysis of palatal elevation, (pulling of the uvula towards the normal side), hoarse voice caused by paresis of the recurrent laryngeal nerve (a branch of the vagus nerve)
XI. Accessory	Head turning against resistance (sternocleidomastoids contralaterally innervated) and shoulder shrugging (superior trapezius) against resistance	
XII. Hypoglossal	Tongue protrusion	Unilateral paresis of the tongue (deviates to the healthy side) in peripheral disease and caudal brainstem disease, less so with supranuclear disease (cerebral lesions)

Source: Schiefer, Wilhelm, Hart (Eds.). Clinical Neuro-Ophthalmology - A Practical Guide. Springer, Berlin/Heidelberg/New York, 2007.

Diagnostic Workup

- Loss of consciousness, amnesia, nausea, vomiting or seizures could indicate intracranial injury in children who suffered a head trauma.
- Relevant considerations/questions include:
    - Age appropriate responsiveness?
    - Patient recollection of injury?
    - History of nausea or vomiting?

Assessment of Acute Traumatic Injuries

ASSESSMENT OF ACUTE TRAUMATIC INJURIES

PATIENT NAME:_____
DATE OF BIRTH: _____

DATE: **TIME:** **REFERRED BY:**

MEDICAL HISTORY:

ALLERGIES: DATE OF LAST TETANUS INNOCULATON:

DATE & TIME OF INJURY: TIME LAPSED SINCE INJURY:

WHERE INJURY OCCURRED:

HOW INJURY OCCURRED:

HISTORY

Check if present and describe:

- Non-dental Injuries
- Loss of consciousness
- Altered orientation/mental status
- Hemorrhage from nose/ears
- Headache/nausea/vomiting
- Neck pain
- Spontaneous dental pain
- Pain on mastication
- Reaction to thermal changes
- Previous dental trauma
- Non-nutritive oral habits
- Other complaints

MANAGEMENT PRIOR TO EXAM

By Whom:

Describe:

EXTRAORAL EXAM

Check if present and describe:

- Cranial nerve deficit
- Facial fractures
- Lacerations
- Contusions
- Swelling
- Abrasions
- Hemorrhage/drainage
- Foreign bodies
- TMJ deviation/asymmetry

OTHER FINDINGS/COMMENTS:

INTRA-ORAL EXAMINATION

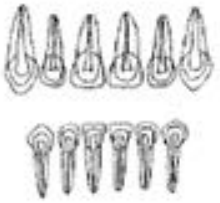
Check if injured and describe

- Lips
- Frenae
- Buccal Mucosa
- Gingivae
- Palate
- Tongue
- Floor of mouth

Occlusion

- Molar classification R____L____
- Canine classification R____L____
- Overbite (%) _____
- Overjet (mm) _____
- Crossbite Y N
- Midline Deviation Y N
- Interferences Y N

DIAGRAM OF INJURIES



TOOTH NUMBER

DENTAL INJURIES

- AVULSION
  - Extra-oral Time
  - Storage Medium
- INFRACTION
- CROWN FRACTURE
- PULP EXPOSURE
  - Size
  - Appearance
- COLOR
- MOBILITY (mm)
- PERCUSSSION
- LUXATION
  - Direction
  - Extent
- PULP TESTING
  - Electric
  - Thermal
- CARIES/PREVIOUS RESTORATIONS

RADIOGRAPHS

- PULP SIZE
- ROOT DEVELOPMENT
- ROOT FRACTURE
- PERIODONTAL LIGAMENT SPACE
- PERIAPICAL PATHOLOGY
- ALVEOLAR FRACTURE
- FOREIGN BODY
- DEVELOPMENTAL ANOMALY
- OTHER

TREATMENT

Check if performed and describe

- Soft tissue management
- Medication
- Pulp therapy
- Root conditioning
- Repositioning
- Stabilization
- Restoration
- Extraction
- Prescription
- Referral
- Other

INSTRUCTIONS AND DISPOSITION

Check if discussed

- Diet
- Hygiene
- Pain
- Swelling
- Infection
- Prescription
- Complications:
  - Damage to developing teeth
  - Abnormal position/ankylosis
  - Tooth Loss
  - Pulp damage to injured teeth
  - Other:
- Follow-up:
- Other

SUMMARY

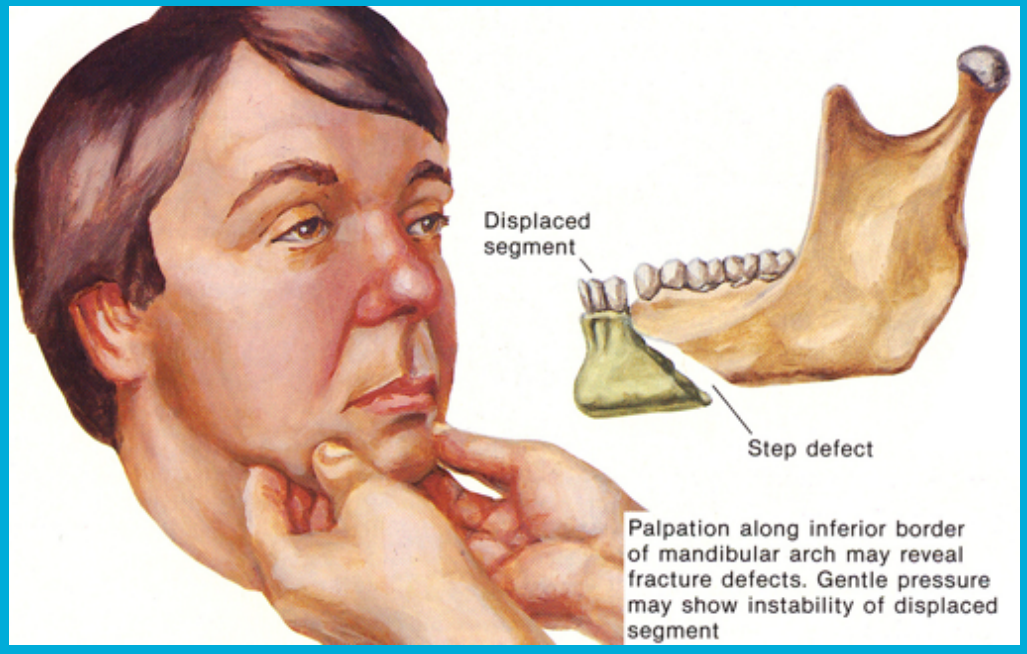
This sample form, developed by the American Academy of Pediatric Dentistry, is provided as a practice tool for pediatric dentists and other dentists treating children. It was developed by experts in pediatric dentistry, and offered to facilitate excellence in practice. However, this form does not establish or evidence a standard of care. In issuing this form, the American Academy of Pediatric Dentistry is not engaged in rendering legal or other professional advice. If such services are required, competent legal or other professional counsel should be sought.

Documentation

- With regard to the injury ask how? where? when?
- Review immunization status, especially tetanus.
  - If last tetanus booster was 5 or more years prior, and the wound is contaminated with soil/debris, tetanus toxoid booster is indicated.

Physical Examination

- Thorough head and neck examination to rule out facial injury:
  - Bony fractures
  - Abrasions
  - Lacerations
  - Foreign bodies


Displaced segment
Step defect
Palpation along inferior border of mandibular arch may reveal fracture defects. Gentle pressure may show instability of displaced segment

Dental Examination

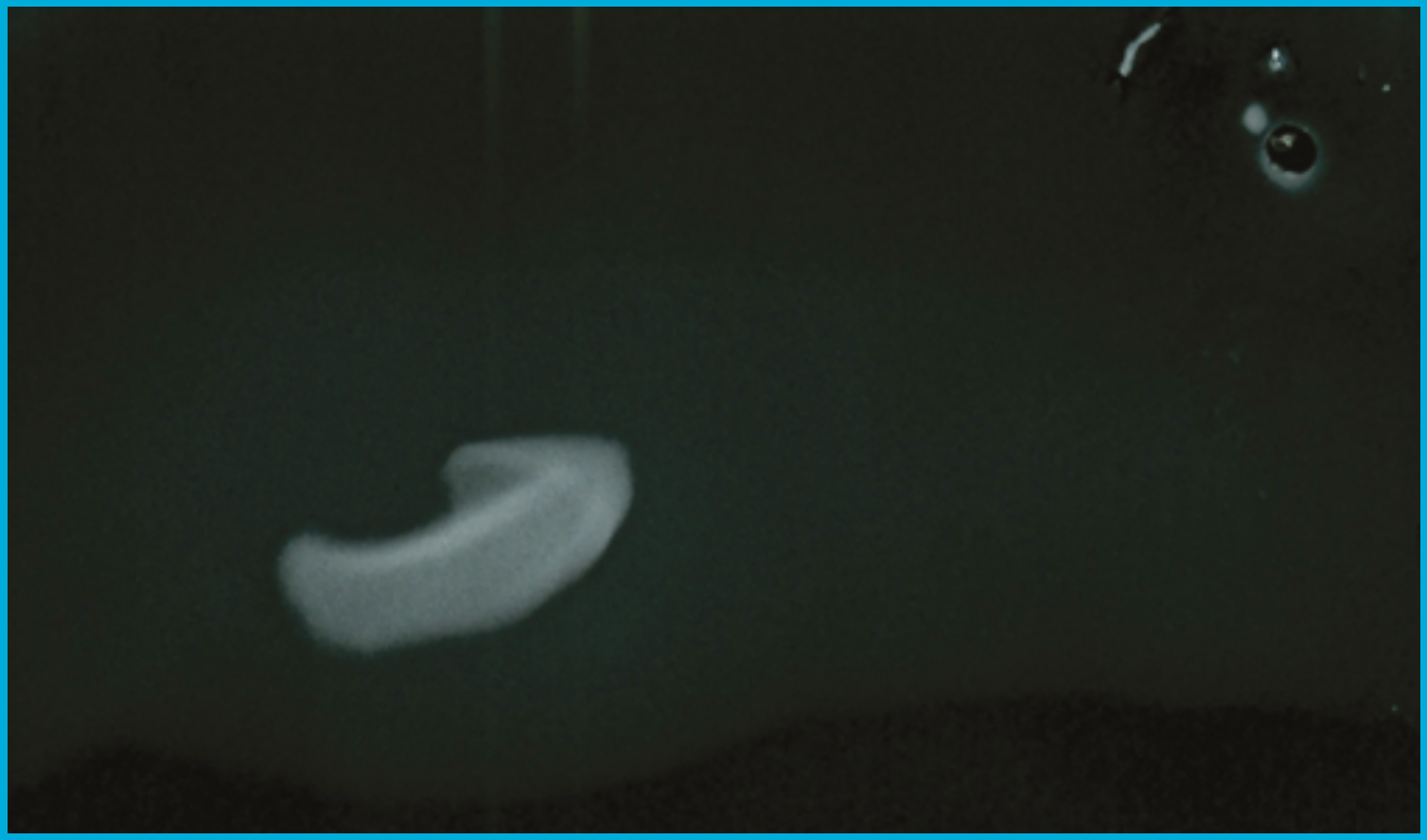
- Lacerations, abrasions, contusions, etc.
- Fractured, displaced and/or missing teeth
- Pulp exposure(s)

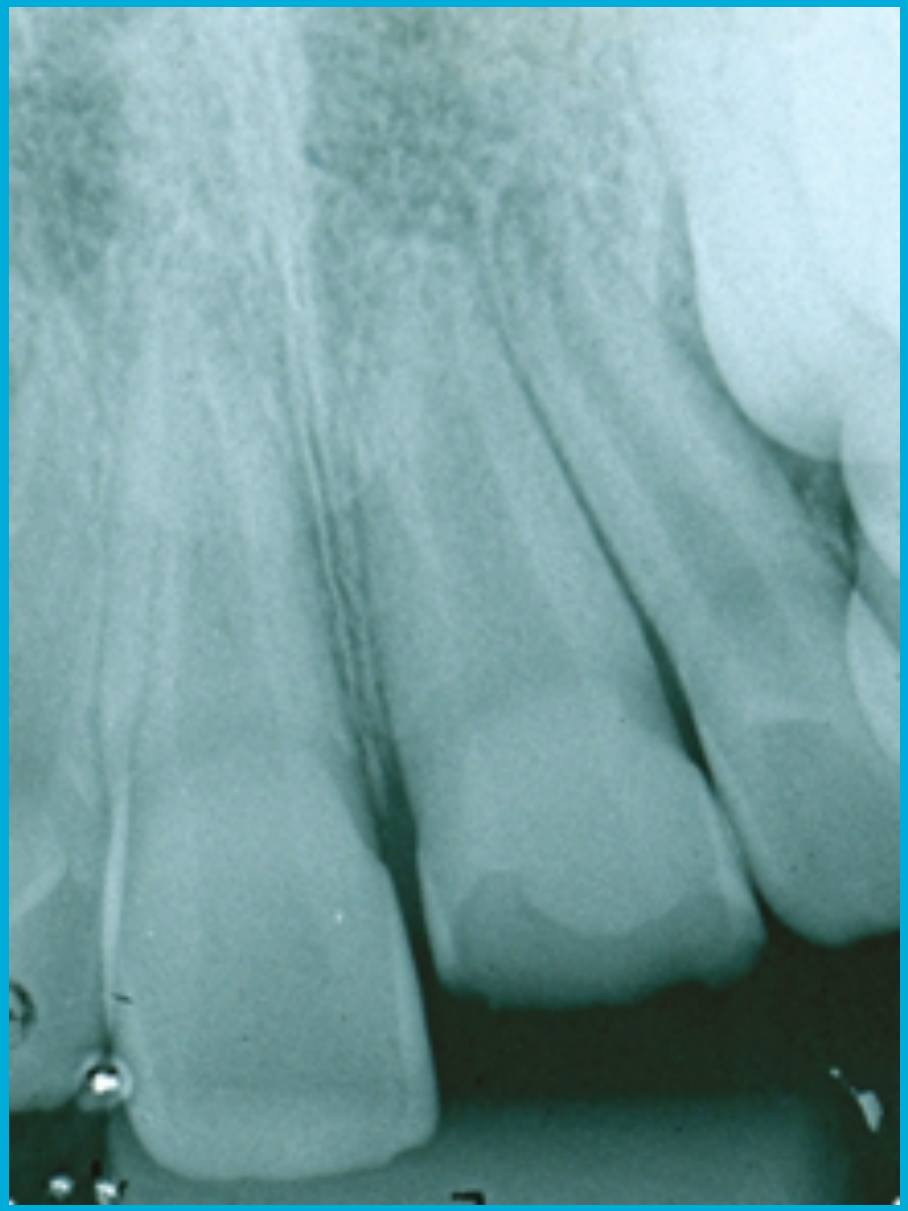
Radiographs

- When possible, take multiple radiographs from different angles to aid in the accuracy of diagnosis.
- Radiographic interpretation and documentation should include: pulp size, apical maturity, PDL space, periapical pathoses, alveolar fractures, foreign bodies, and developmental anomalies.

Radiographs

- Locating foreign bodies (soft tissue radiographs should be ¼ exposure time)
- Buccal object rule: the image of any buccally-oriented object appears to move opposite the direction from a moving x-ray source, lingual object moves in the same direction as source (SLOB)





General Considerations

Thought Process

- Primary vs. permanent
- Depth and size of injury/fracture (pulp exposure?)
- If permanent, open vs. closed apex
- Alveolar bone fracture

Primary Teeth

- Keep it simple due to behaviour.
- What is the lifespan of the tooth?
- Assess the full risk of treatment and potential sequelae to the permanent teeth versus any functional benefit.
- Advise parents of permanent tooth injury possibility.

Permanent Teeth

- Luxation injuries, particularly avulsions, dictate emergency treatment as positive outcomes diminish with time delay.
- The prognosis is often better for a tooth with an open apex vs. closed apex.

Concussion and Subluxation

Management

- No treatment
- If permanent, consider flexible wire splint for patient comfort, up to two weeks
- Monitor pulp for at least one year

Crown Fractures

My baby's tooth is broke!

Management - Primary

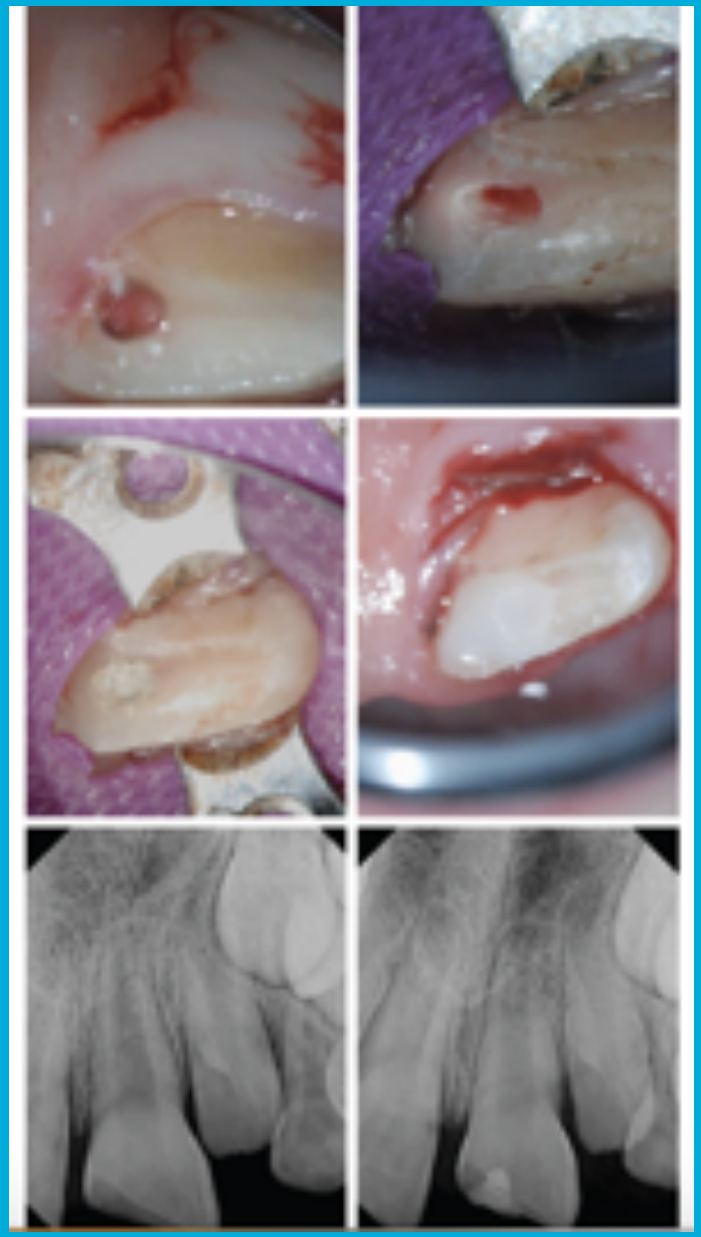
- Enamel - smooth or restore
- Dentine - smooth, restore or extract
- Pulp - pulp therapy and restore (if tooth is restorable) or extract

Management - Permanent

- Enamel - smooth or restore
- Dentine - smooth or restore
- Pulp - pulp therapy and restore or extract if non-restorable

Cvek Pulpotomy

- Consider for young permanent teeth, especially ones with an incompletely formed apex.
- Tooth must be vital.
- Pulpal bleeding must be controlled after removal of inflamed pulp tissue.
- Agents of choice: calcium hydroxide or MTA



Root Fractures

Management - Primary

- Not displaced, non-mobile - no treatment, good follow-up
- Not displaced, mobile - caution with splint, may be best to extract
- Displaced or excessively mobile - extract, leave the apical fragment to resorb

Management - Permanent

- Reposition if displaced
- Check position radiographically
- If mobile - stabilize the tooth with a flexible wire splint
  - Typically four weeks
  - If more cervical, up to four months
- Monitor for at least one year to determine pulp status
- If pulpal necrosis - root canal treatment on the coronal segment to the fracture line

Flexible Wire Splint

- Allows physiologic mobility
- Easily fabricated in the mouth without additional trauma
- Nonirritating to the soft tissues
- Does not interfere with occlusion
- Allows endodontic access and vitality testing
- Easily cleansed
- Easily removed

Luxations, Intrusions and Extrusions

Management - Primary

- Extrusion and Luxation:
  - If mild, non-mobile and no occlusal interference - monitor
  - If severe, mobile and occlusal interference - extract
- Intrusion:
  - If mild and/or displaced away from the permanent tooth bud - monitor for spontaneous re-eruption
  - If severe and/or displaced toward the permanent tooth bud - extract

Management - Permanent

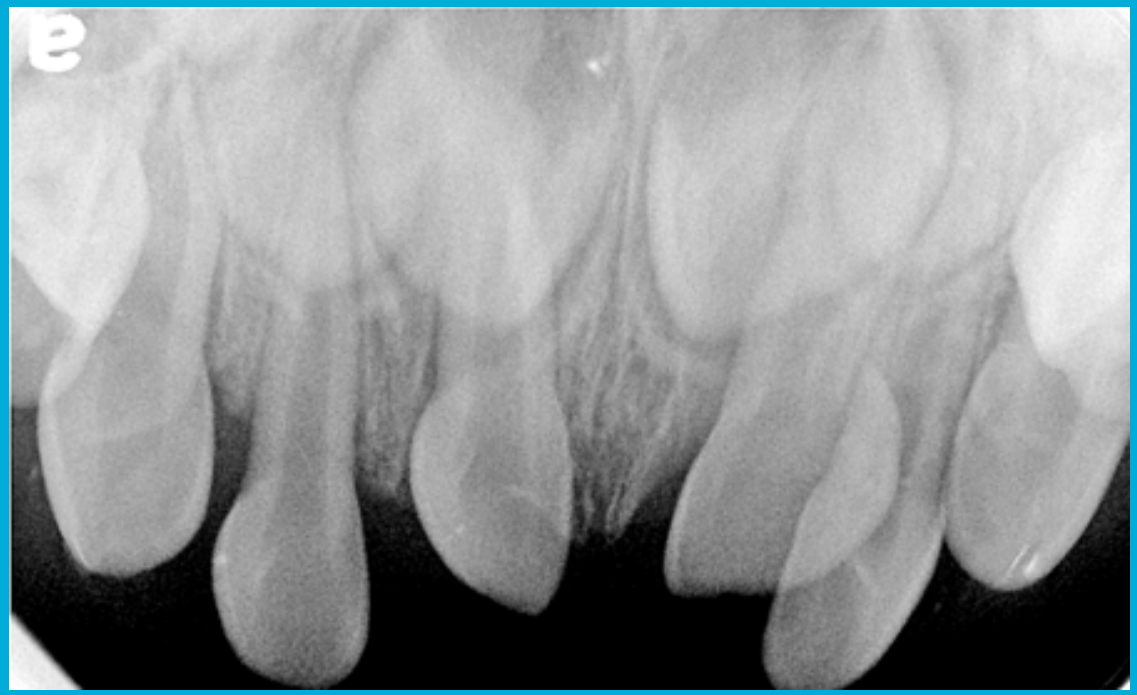
- Reposition - with your fingers or surgically
  - Intrusion with open apex - allow to passively re-erupt if less than 7mm, if no movement within a few weeks - surgically or orthodontically reposition
- Stabilize with a flexible wire splint:
  - Extrusion - 2 weeks
  - Luxation - 4 weeks
  - Intrusion - 4 to 8 weeks
- Monitor pulp closely - prepare for root canal treatment

Surgical Repositioning

Orthodontic Repositioning

The Missing Tooth

- Take a radiograph, always.
- This simple investigation could prevent the need for unnecessary (and potentially invasive) procedures.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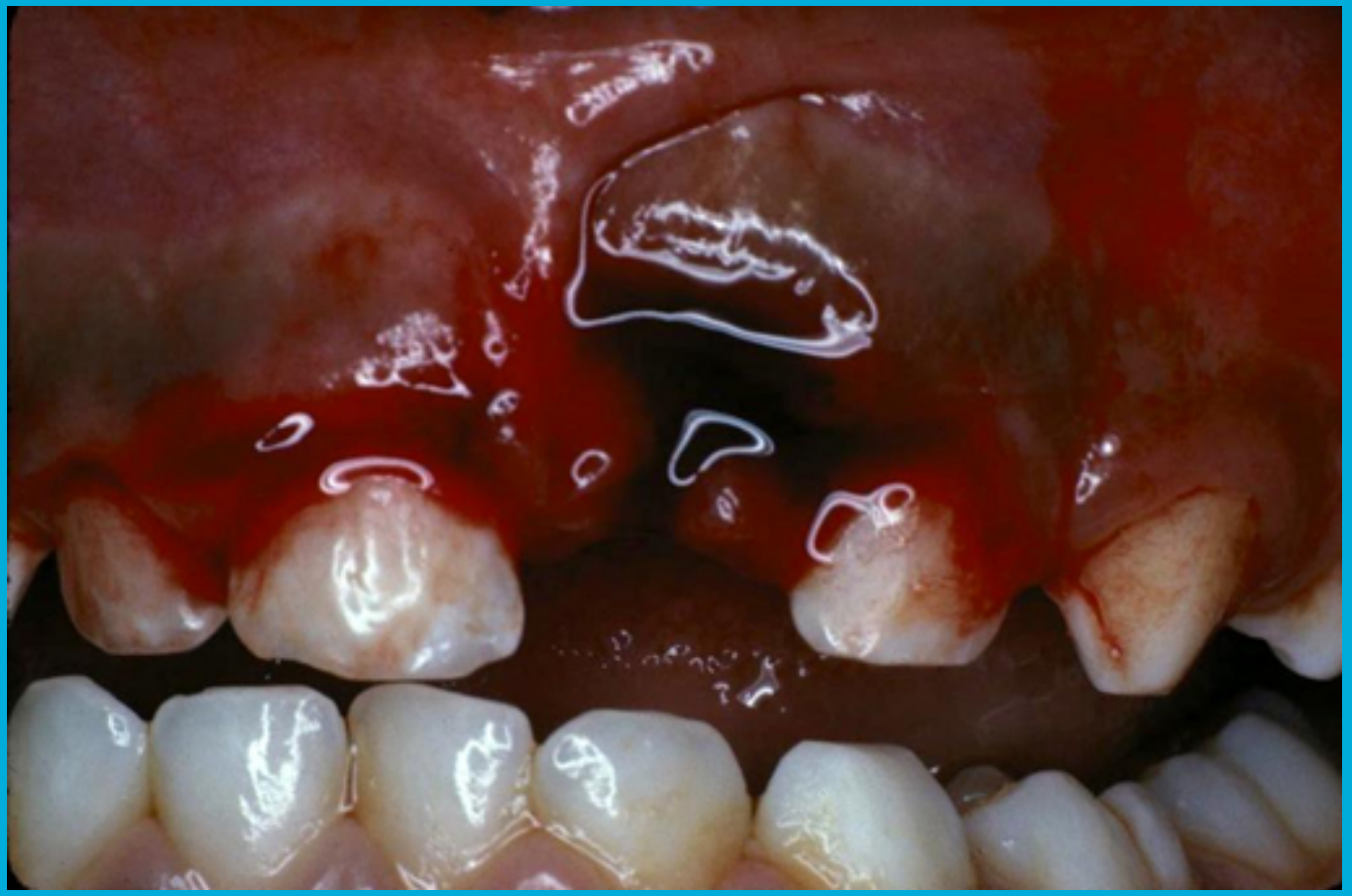
Alveolar Bone

- A coincident alveolar bone fracture may severely compromise the overall prognosis, and must be managed appropriately.



Erich Arch Bars

Avulsions

Emergency Treatment

- Immediate replantation into the socket is the best course of action at the time of the accident.
- DO NOT REPLANT PRIMARY TEETH!

Storage Medium

- The best storage medium is the socket.
- Extra-oral dry-time will significantly affect the prognosis.

Reality

- Most patients will report to your office with the avulsed tooth in milk or wrapped in a Kleenex.

Management - Dry Time < 60 Minutes

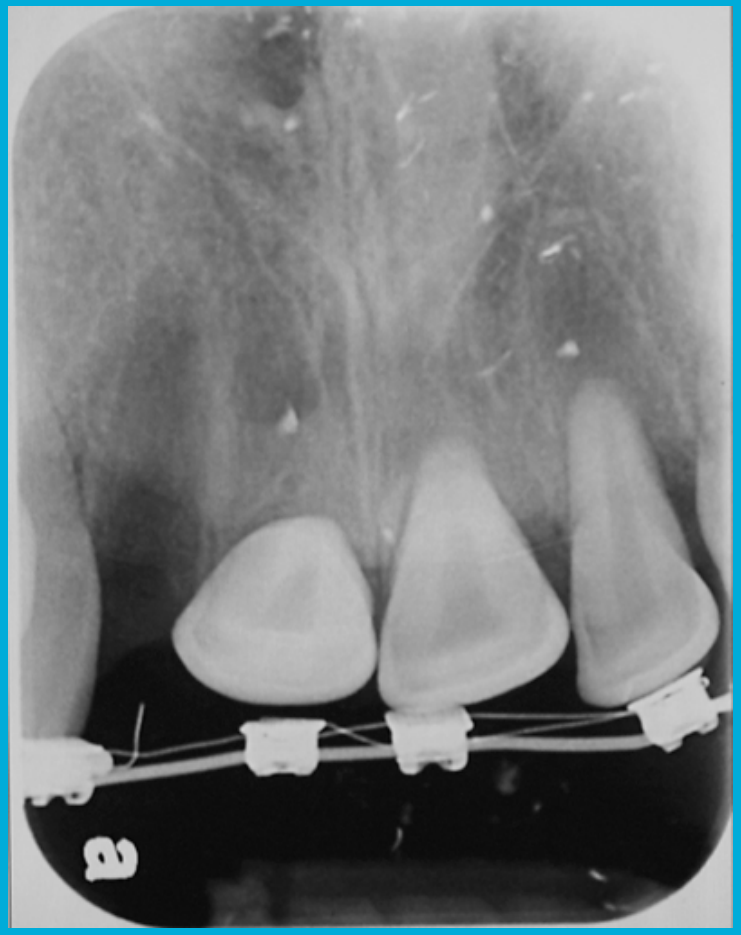
- Clean root with saline solution.
- Administer local anesthesia.
- Irrigate the socket with normal saline.
- Rule out alveolar fracture.
- Replant the tooth with slight digital pressure.
- Verify position with radiograph.
- Suture any gingival lacerations.
- Apply a flexible wire splint for up to 2 weeks.
- Provide a prescription for antibiotic therapy - amoxicillin is the weapon of choice.
- Provide post-operative instructions.
- Initiate root canal treatment 7-10 days after replantation and before splint removal.

Management - Dry Time > 60 Minutes

- Remove attached, non-viable soft tissue carefully.
- Root canal treatment can be carried out in hand prior to replantation.
- Administer local anesthesia.
- Irrigate the socket with normal saline.
- Rule out alveolar fracture.
- Replant the tooth with slight digital pressure.
- Verify position with radiograph.
- Suture any gingival lacerations.
- Apply a flexible wire splint for 4 weeks.
- Provide a prescription for antibiotic therapy - amoxicillin is the weapon of choice.
- Provide post-operative instructions.

Immature Teeth

- Revascularization is possible for immature teeth with a dry time less than 60 minutes.
- Monitor closely as inflammatory root resorption can be rapid.



Post Operative Instructions

- Maintain good oral hygiene including splint care - chlorhexidine mouth rinse, alcohol free for kids
- Soft diet for a minimum of 10 days
- Avoid contact sports
- Possible complications may include swelling, increased mobility, etc.
- Pain control, and remember that children may not complain of pain
- Timeline for follow-up and future treatment

Tooth Discolouration

- Crown discolouration may occur following dental trauma.
- With primary teeth, no treatment is needed unless the child reports pain and/or a fistula develops.
- Dark discoloured teeth should be followed carefully to detect sign of infection as soon as possible.

Thank You

Questions?