Traumatic Injuries to Permanent Teeth

Fred S. Margolis, D.D.S.
Ellis Classification

Traumatic Injuries
Class I Ellis

Fracture of Enamel
Steve M.  Class I Fx #9
Lacrosse Stick
Class II Ellis

Enamel and Dentin
Class II Ellis: 16 y.o male: Fistfight

Enamel and Dentin
Cade K. Class II Ellis Fx
Discus
Cheek and Lip Retractors
Ultrablend plus
Contains Calcium Hydroxide
Z-100 Composite

3M/ESPE
Class III Ellis Fracture

Pulp Exposure
Avi S. Age 10  Fx. #8
Patient fell out of wheelchair onto ground

Fractured segment removed
Temporary Composite after fractured segment removed
Fractured: Pulp Exposure

Open Apex: Pulp Cap if < 4 Hours
Pulpotomy if > 4 Hours

Closed Apex: Pulp Capping, Pulpotomy, RCT
Fractured: Pulp Not Exposed

- Calcium Hydroxide
- Restore with Acid Etched Composite
A.R. Age 10
Avulsed #8,9,10
Bike Accident 2yrs ago
Hawley Retainer with Pontics
Ellis Class VI

Root Fracture
Class VII

Dislocation
Fracture of Entire Crown
Natalie V. Age 10
Class VIII Ellis Fx

Sledding Accident
Root Canal Tx
The truth about Chocolate
Chocolate is extracted from the beans of the cocoa plant.

Beans are a vegetable!
Sugar is extracted from sugar beet.

Sugar beat is a vegetable!
Therefore Chocolate is a vegetable!
Let's spin the theory further...
Chocolate bars contain milk

Therefore chocolate bars are healthy!
Raisins, cherries, orange peel and strawberries in chocolate belong to the fruit family, so...

Eat as much as you like!
Chocolate is good for stress

Just think...
"STRESSED" read backwards means: "DESSERTS"
INTRUDED TOOTH

Open Apex: Allow to Re-erupt

Closed Apex: Reposition Surgically or Orthodontically
HISTORY

• When did the accident occur?

• Where did the accident occur?

• How did the accident occur?

• Previous history of trauma?
9 yr. Old Boy: Fell on Pavement

Swelling and Contusion of Lip
Contusion of Gingiva Labial #7

+ 1 Mobility Tooth # 7
Radiographs-Take 2 Views
Chris Age 7 Hit metal bar
#8- Midroot fx and alveolar fx
Foreign Body in Lip or Cheek?
CALM THE PATIENT/PARENT
Avulsed Permanent Tooth

- Reimplant ASAP
- Do Not Scrub Clean-Gently Rinse if Needed
- If Unable to Reimplant, Get to Dentist ASAP
- Plan for Splinting
- Plan for Root Canal Therapy
REIMPLANTATION

1) Tooth Replaced in Socket
2) Hank’s Solution
3) Milk
4) Saline
5) Water
Avulsed Tooth: Reimplant ASAP

INSTRUCTIONS:
1. Open jar and remove seal from container.
2. Drop tooth into jar.
   (Note: DO NOT RINSE OFF THE TOOTH OR ATTEMPT, IN ANY WAY, TO CLEAN IT OFF BEFORE DROPPING IT INTO THE CONTAINER).
3. Close jar tightly.
   Take patient and tooth to a dentist as soon as possible.
4. Identify patient on the “write on” area.
Save-A-Tooth
THE EMERGENCY TOOTH PRESERVING SYSTEM

CAUTION: To prevent the spread of infectious disease, do not place the teeth of more than one person in the same Save-A-Tooth system container. Sterility guaranteed unless seal is opened or damaged. Do not use if seal is broken.

INGREDIENTS: SODIUM CHLORIDE, D-GLUCOSE, POTASSIUM CHLORIDE, SODIUM BICARBONATE, SODIUM PHOSPHATE, POTASSIUM PHOSPHATE (MONOBASIC), CALCIUM CHLORIDE, MAGNESIUM SULFATE (ANHYDROUS).
Turn a dental emergency into a practice builder!

It can happen anytime, anywhere. A basketball player collides head-to-head on the court, baseball bat swings into a player's face or a tackle knocks a face mask out of position.

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SPLINTING: For How Long?

• AVULSED TOOTH: 7-10 Days
  – Open Apex: No Root Canal Tx
  – Closed Apex: Calcium Hydroxide for 6-12 mos.

• ROOT FRACTURE: 10-12 Weeks

• DISPLACED TOOTH: 7-10 Days
Avulsed Tooth Reimplanted < 1 hour

9 y.o. - Baseball Injury
Causes of Failure in Replantation

- External Resorption
- Internal Resorption
- External and Internal Resorption
- Ankylosis
- Necrosis
#8 Avulsed on Picasso Statue

- Dec ‘97
- Dec. ‘97
- Jan. ’98
- Nov. ‘98
Managing Tooth Avulsion

“The most important element is to aggressively reduce the extraoral dry time (EODT) interval between the avulsion accident and dental treatment. The periodontal ligament (PDL) tissue is critical for a successful treatment outcome…”

“EODT intervals beyond 1 hour have been shown to drastically decrease successful treatment outcomes.”
Storage media for avulsed teeth:

- Alveolar socket
- Hanks’ Balanced Salt Solution
- Milk
- Viaspan organ transplant fluid
- Saliva
- Ringer’s lactate
- Tap water
- Plastic wrap
Undesirable Outcomes from Tooth Avulsion

- Inflammatory Root Resorption
- Replacement Root Resorption

- 62% of all avulsed teeth will experience some degree of pathologic resorption. (Andreasen)
<table>
<thead>
<tr>
<th>Injury Type</th>
<th>Splinting Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avulsion</td>
<td>1-2 weeks</td>
</tr>
<tr>
<td>Intrusion</td>
<td>1-4 weeks</td>
</tr>
<tr>
<td>Extrusion</td>
<td>2-3 weeks</td>
</tr>
<tr>
<td>Lateral Luxation</td>
<td>3-8 weeks</td>
</tr>
<tr>
<td>Root Fracture</td>
<td>4-8 weeks</td>
</tr>
</tbody>
</table>
Antiobiotic Coverage Following Tooth Avulsion:

Doxycycline  25-50 mg/kg children age 8 and over

Penicillin V   25-50 mg/kg children under age 8

Length of antibiotic coverage: 1 week
EODT < 60 minutes: Root Canal Treatment Following Replantation

• Pulpectomy 7-10 days after replantation with Calcium Hydroxide

• Closed apices: Gutta percha after 2 weeks to 3 months

• Open apices: 3-6 months-repeat until apical closure, then Gutta Percha
EODT over 1 hour: Root soaking agents to prevent replacement resorption:

- 2.4% Acidulated phosphate fluoride
- Citric Acid Soaks
- Emdogain (enamel matrix protein)

Note: Antimicrobial mouthwashes, such as Chlorhexidine, post-reimplantation, have not been shown to be effective.
EODT > 60 minutes:
Avulsed teeth with immature open apices

- “Avulsed teeth with immature open apices should not be replanted according to the current AAE and IADT guidelines. This is based on the finding that young children have high bone turnover rates, which precipitate a much higher liability for replacement resorption.”

- “The clinician will have to appeal to judgment, being careful to include the parents in any decision for replanting or not implanting immature teeth beyond the 1 hour EODT.”
AVULSION
EODT < 1 HOUR

OPEN APEX
- Soak in Doxycycline
- Replant
- Splint for 7-10 days
- Ca(OH)2 pulpectomy
- Monitor 3-6 months
- Gutta-percha fill

CLOSED APEX
- Replant
- Splint for 7-10 days
- Ca(OH)2 pulpectomy
- Monitor for 2 weeks
- Gutta-percha fill
AVULSION
EODT > 1 HOUR

OPEN APEX

- Do not replant (according to guidelines)

CLOSED APEX

- Soak in Citric Acid
- Soak in Fluoride
- Soak in Doxycycline
- Extraoral pulpectomy
- Ca(OH)2/ Gutta-percha
- Apply Emdogain to root surface and socket
- Replant and splint 3-4 weeks
- Gutta-percha fill if no signs of resorption
Repositioning Fractured Incisor
Brandon S. Age 9
Class II Ellis Fx
Fragment embedded in lip

Patient fell on floor
Clean, Etch, Bonding Agent
Tooth and Fragment
**Step 1:**
Etch- 15 secs.

**Step 2:**
Bonding Agent Applied to both sections.

**Step 3:**
Composite placed over fx line
One week Post-trauma
One year Post-trauma
It is estimated by the National Youth Sports Foundation that more than 5 million teeth will be knocked out in sporting activities this year.
The National Youth Sports Foundation for Safety reported that dental injuries are the most common type of oral facial injury sustained during participation in sports.
Which Sport Has The Highest Number of Oral Injuries?
Which Sport is #1 for Oral Injuries?
How to Prevent Oral Sports Injuries?
4 Types of Mouthguards
Can Mouthguards Prevent Concussions?
Take Pressure Off The Condyle!
Hockey Puck Avulsed # 8
20 y.o. Semi-Pro Hockey Player
Special Olympics Special Smiles
Porcelain to Metal Crowns

“Thank you for helping my smile.”
Dangerous Toothbrush!!!
THE END!