NYUDentistry

Dental Traumatology, Contemporary Treatment Option and Prevention

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1

www.iadt-dentaltrauma.org

2

Why Dental Trauma Discussion is Important for All Dentists?

Of all dental issues this topic crosses most, if not all dental specialties, so it is important for all dentists have to have some knowledge because;

In case of emergency treatment:
- Any dentists (general and specialists) can be called to action!
- No dentists can have the excuse "I do not know."
- Every case is an emergency that very often is very time sensitive, such that if the correct treatment is not rendered within minutes to an hour the tooth/teeth are likely to be lost.

3

Next annual meeting

4

dentaltraumaguide.org

5

Dental Trauma

World traumatic dental injury prevalence and incidence, a meta-analysis

– One billion living people have had traumatic dental injury!

"Dental trauma is a neglected condition which could rank fifth if it was included in the list of the world's most frequent acute/chronic diseases and injuries."

(Petti S, Andreasen JO, Glendor U, Andersson L 2018)

6

Dental Trauma

World traumatic dental injury prevalence and incidence, a meta-analysis

"Traumatic dental injuries would be the fifth most prevalent disease or injury the Global Burden of Disease Study 2015, after:
permanent caries,
tension-type headache,
iron-deficiency anemia,
age-related and other hearing loss
preceding migraine and genital herpes."

(Petti S, Andreasen JO, Glendor U, Andersson L 2018)

7

Dental Trauma

Contradictions in the treatment of traumatic dental injuries and ways to proceed in dental trauma research.

"Almost all treatment procedures used for dental traumas are still today not evidence-based, a fact, which makes it difficult to analyze the long-term outcome of healing and its relationship to treatment."

(Andreasen et al 2010)

8

Dental Trauma

Contradictions in the treatment of traumatic dental injuries ….

For ethical reasons, it will be difficult to perform randomized studies on trauma victims!

We will therefore be forced in the future to rely on experimental animal studies supported by clinical observational studies.

(Andreasen et al 2010)

9

Dental Trauma

First-aid knowledge about tooth avulsion among dentists, doctors and lay people.

"Dentists, in comparison, have significantly more knowledge, but may need training in selection of the appropriate treatment option and handling and care of the avulsed tooth."

(Qazi and Nasir, 2009)

10

Guidelines of IADT

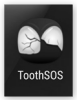
Available on www.IADT-dentaltrauma.org

11

Guidelines of IADT

Available:

And as a app in Apple and Play Store – "ToothSOS"



12

Dental Trauma

Age Distribution

Two peaks in incidence
- 2 to 4 years of age
- 8 to 14 years of age

Andreasen & Ravn 1972
Hayrinen‐Immonen et al 1990

13

Dental Trauma

Prevalence

Believed that between 20 and 30% of all 18 years old have sustained injury to their teeth.

2/3 are mild such that there is no permanent damage to the teeth.

1/3 are severe enough to potentially cause a permanent damage.

Andreasen et al 1972
Fosberg & Tedestam 1990

14

Dental Trauma

Sex differences

Previously reported to be at least 3 boys to 1 girl.

Now indications are more likely to be 3 to 2 or even 1 on 1!

(Alonge et al 2001, Oldin A., et al. 2015)

15

Dental Trauma

Prevalence

If a child or teenager has very severe overjet (8 mm or more in vertical direction) then the incidence increases up to 50 – 60%.

Many contend that this group requires early orthodontic intervention to reduce the risk of trauma
– has not been well confirmed in studies partly because of trauma often occurring prior to early intervention.

Forsberg & Tedestam 1993
Ehmer U et al. 1999

16

Prevalence and Incidence of Dental Trauma

Over two hundred million injuries to anterior teeth attributable to large overjet: a meta-analysis

Type of tooth	Overjet	Pooled OR	95% CI
Primary	3-4 mm	2.31	1.01-5.27
Permanent	3-4 mm	2.01	1.39-2.91
Permanent	6 + mm	2.24	1.56-3.21

(Petti S. 2015)

17

Prevalence and Incidence of Dental Trauma

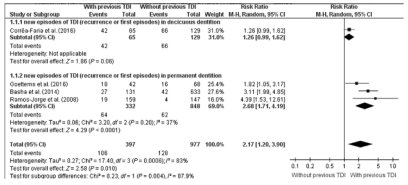
Incidence of dental trauma among adolescents: a prospective cohort study.
2 year follow-up, 416 (1/2 with history of trauma), aged 11-13 years.

History of previous trauma:
4.85 times greater odds ratio for additional trauma compared to the non-trauma group.
P = 0,005 after adjusting for incisal overjet, lip coverage and mother's schooling.

(Ramos-Jorge ML. et al. 2008)

18

The relationship of previous dental trauma with new cases of dental trauma. A systematic review and meta-analysis



(Magno MB et al. 2019)

19

Prevalence and Incidence of Dental Trauma

Incidence of dental trauma among obese adolescents – a 3-year-prospective study

3 year follow-up, 785 (422 boys, 363 girls, BMI) age as start 13 years, dropout rate 2.86%.

The overall prevalence of Traumatic Dental Injury:
- 17.43% of boys and
- 16.81% in girls, ($P = 0.18$)

Children with obesity and overweight were 2.78 times greater chance. (after adjusting for socioeconomic status, lip coverage, incisal overjet and previous history of trauma)

(Basha S. et al. 2015)

20

Violence and abuse: core competencies for identification and access to care

Violence and abuse is a significant public health problem, especially for females.

Injuries to the head, neck, and/or mouth are clearly visible to the dental team during examination.

Every one that deals with dental trauma should be familiar with diagnostic tools and surveys for identifying victims of all ages.

(Thompson LA et al. 2013)

21

Signs to look for in case of suspected child abuse

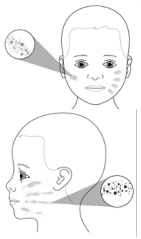
- Signs of old injuries without the patient being previously examined/treated.
- Vague explanation on how the injury occurred; explanation may differ depending on who you ask.
- Given explanation not in accordance with clinical findings / type of trauma.
- The child makes statements that are different from the parents'.
- Abnormal child-parent dialogue + child looks sad, or frightened + abnormal parents' behavior
- Parents contact the dentist late.

(Bakland LK & Andreasen JO, 1996)

22

Typical features of non-accidental injuries (injuries that should raise concerns)

Remember - Concerns are raised by:
- Injuries to both sides of the body
- Injuries to soft tissue
- Injuries with particular patterns
- Any injury that doesn't fit the explanation
- Delays in presentation
- Untreated injuries



23

A literature review of findings in physical elder abuse

A review of 9 articles (total of 574 articles screened) yielded 839 injuries.
The anatomic distribution in these was as follows:
- upper extremity, 43.98%;
- maxillofacial, dental, and neck, 22.88%;
- skull and brain, 12.28%;
- lower extremity, 10.61%;
- torso, 10.25%.

(Murphy, K et al. 2013)

24

Pattern of oral-maxillofacial trauma stemming from interpersonal physical violence and determinant factors

A retrospective analysis of 790 complete patient charts:

One hundred forty (17.7%) individuals had oral-maxillofacial injuries stemming from physical violence.
- 80 due to urban violence,
- 42 due to domestic violence,
- 18 combination or unknown.

Domestic violence was more prevalent among females (69%), and UV was more prevalent among males (67.5%).
(Ferreira MC et al. 2013)

25

"Your duty of care to patients experiencing domestic abuse"

In 2017/18 the police recorded 59,541 incidents of domestic abuse in Scotland. In 81% of these cases the victim was female and the perpetrator was male.

A Scottish study found that 80% of transgender people reported abuse from a partner or ex partner, yet the majority had not received support around this.

(Halkett G 2021)

26

Domestic Violence against Women Detected and Managed in Dental Practice: a Systematic Review

Among the dental care professionals:
- only 1-7.1% of the dentists included injury search and examination of their patients for signs of violence.
- less than 47% had knowledge to identify violence injuries.

When it comes to knowledge to identify signs of domestic violence, positive answers were below 24%.

(Nascimento CTJS et al. 2022)

27

Dental Trauma

Which teeth are most likely to be involved?

1. Central upper incisors (40 – 60%)
2. Lateral upper incisors (20-30%)
3. Lower incisors (20-30%)

28

Traumatic Injuries

Diagnosis of dental trauma

29

Traumatic Injuries

- ✓Fact finding
- ✓Clinical exam
- ✓Radiographic exam
- ✓Pulpal tests

30

Traumatic Injuries

✓ **Fact finding**

1. Patient's name, age, sex, address, and contact numbers and for young pt. weight.
2. Any CNS symptoms after the injury?

31

Traumatic Injuries

✓CNS issues:

"Many times, facial fractures tend to distract our attention from more severe and often life threatening injuries"

(Hohlrieder M et al. 2004)

32

Traumatic Injuries

✓CNS issues:

Meta-analysis:

- The mean prevalence of intracranial haemorrhage after mild head injury was 8% (95% confidence interval 3% to 13%) in 13 studies with 12,750 patients.

- Loss of consciousness or post traumatic amnesia occurred in 61% to 100% of patients in individual studies (most commonly 100%).

(Hofman PA et al. 2000)

33

Traumatic Injuries

✓ CNS issues:

- Fluids from ear/nose.
- Loss of/or diminished conciseness.
- Situational confusion.
- Headache getting worse.
- Nausea / vomiting.
- Behavioral changes / unexplained irritation.
- Ataxia.
- Blurred vision / uneven pupils.
- Lack of concentration.
- Change in breathing.
- Difficulty of speech / slurred speech.

34

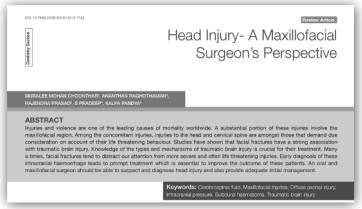
Traumatic Injuries

✓ CNS issues:

Remember:
Epidural Hematoma can be with a late onset of symptoms!

Pt. appears quite normal, then in minutes, hours or even days later symptoms appear.

35



Review Article

Head Injury- A Maxillofacial Surgeon's Perspective

MURALEE MOHAN CHOONTHAR*, ANANTHAN RAGHOTHAMAN*, RAJENDRA PRASAD*, S PRADEEP*, KALPA PANDYA*

ABSTRACT

Injuries and violence are one of the leading causes of mortality worldwide. A substantial portion of these injuries involve the maxillofacial region. Among the concomitant injuries, injuries to the head and cervical spine are amongst those that demand due consideration on account of their life threatening behaviour. Studies have shown that facial fractures have a strong association with traumatic brain injury. Knowledge of the types and mechanisms of traumatic brain injury is crucial for their treatment. Many a times, facial fractures tend to distract our attention from more severe and often life threatening injuries. Early diagnosis of these intracranial haemorrhage leads to prompt treatment which is essential to improve the outcome of these patients. An oral and maxillofacial surgeon should be able to suspect and diagnose head injury and also provide adequate initial management.

Keywords: Cerebrospinal fluid, Maxillofacial injuries, Diffuse axonal injury, Intracranial pressure, Subdural haematoma, Traumatic brain injury

(Choonthar MM et al. 2016)

36

Traumatic Injuries

✓ **Fact finding**

1. Patient's name, age, sex, address, and contact numbers and for young pt. weight.
2. Any CNS symptoms after the injury?
3. General health.
4. ***WHEN*** did injury occur?
5. ***WHERE*** did injury occur?
6. ***HOW*** did injury occur?
7. Treatment elsewhere.
8. History of previous dental injuries.

37

Traumatic Injuries

✓ **Fact finding**

9. Is there any disturbance in the bite?
10. Do the teeth react to thermal changes, sweet or sour sensitivity?
11. Are the teeth sore to touch, or during eating?
12. Is there spontaneous pain from the teeth?

38

Traumatic Injuries

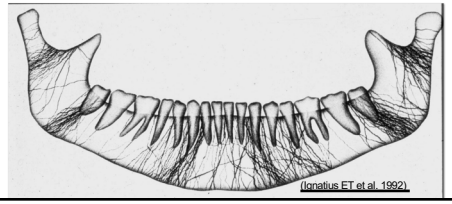
✓ Clinical Exam

Extra and intra oral observation
Extra and intra oral palpation
Note any midline deviation
- both in appearance and in movement

39

Traumatic Injuries

✓Clinical exam



40

Why do we take radiographs immediately after a dental trauma?

✓To assess the situation
✓To be able to decide on appropriate treatment
✓To have a base line to compare to

41

Why do we take radiographs immediately after a dental trauma?

Need to take:
✓Several radiographs
✓Quality radiographs with minimal distortion
✓Reproducible radiographs

42

Guidelines of IADT

Radiographic examination for every injury, incl. crown fractures: As a routine, several angles are recommended:

1. One parallel periapical radiograph aimed through the midline to show the two maxillary central incisors.

2. One parallel periapical radiograph aimed at the maxillary right lateral incisors (should also show the right canine and central incisor).

3. One parallel periapical radiograph aimed at the maxillary left lateral incisor (should also show the left canine and central incisor).

43

Guidelines of IADT

Radiographic examination for every injury, incl. crown fractures:
As a routine, several angles are recommended:
4. One maxillary occlusal radiograph.
5. At least one parallel periapical radiograph of the lower incisors centered on the two mandibular centrals.

However, other radiographs may be indicated if there are obvious injuries of the mandibular teeth (eg, similar periapical radiographs as above for the maxillary teeth, mandibular occlusal radiograph).

44

Traumatic Injuries

✓Radiographic exam

All teeth and tissue possibly involved, including supportive bone.

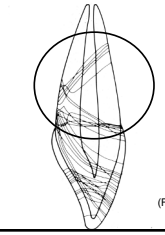
45

Radiographs

Any time there is a suspicion of a horizontal root fracture several radiographs with different vertical angulations needs to be taken!

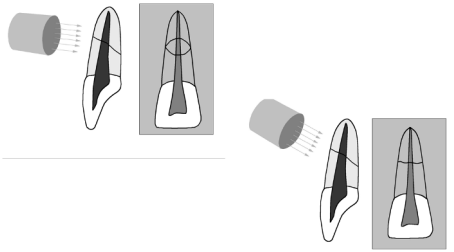
46

Crown-Root fractures



(From Dr. Andreasen 1979)

47



48

Radiographs

What is appropriate radiograph?
- Investigate the trauma!
- Conclude on possible injuries
- Then look for more injuries!

49

Why not CBCT?

A CBCT investigation of dental trauma is probably best evaluation!

However:
- access to the machine has to be immediate, not refer to another practice.
- ALARA principle (As Low As Reasonable Achievable) for radiation, remember even LFV covers large portion of the head of young individuals.
- Most radiologist do not recommend using CBCT for follow-ups.

50

Radiographic Imaging after Trauma

So is the CBCT the way to go?

51

Diagnosis of Dental Trauma
Why not CBCT for every case?

A CBCT investigation of dental trauma seems to be best evaluation!

However:
The highest incidence rate of dental trauma is between the age of 8 to 14 years old.
(Andreasen & Ravn 1972)

Research evidence concerning CBCT indications in children remains limited.
(Oenning A. et al. 2018)

Care should be taken not to use this 3D image modality lightly, knowing that the effective dose of a CBCT is around 20–400 fold that of an intraoral radiograph.
(Pauwels R. et al. 2012)

52

Diagnosis of Dental Trauma
Why not CBCT for every case?

A Review of Doses for Dental Imaging in 2010–2020
Development of a Web Dose Calculator

CBCT imaging:

The child phantoms received about 29% more effective dose than the adult phantoms received.

The maximum CBCT effective dose with a small FOV for children, 245.2 μSv, about 8% of the effective dose that a person receives on average every year from natural radiation, 3110 μSv.

(Lee H and Badal A, 2021)

53

Traumatic Injuries

✓Pulpal tests

37 teeth subluxated
- 20 none responsive to EPT immediately
- 17 responsive to EPT immediately

At follow-up:
- 6 of 20 non responsive to EPT now responsive
- 2 of 17 responsive to EPT now non responsive

(Skieller 1960)

54

Sensibility tests

Cold test is most effective
Place cold on incisal 1/3 if possible.
False negatives common soon after injury.
Needs to be repeated at all re-eval appointments!
- > At least two signs and symptoms are necessary of make the diagnosis of necrotic pulp.

55

Aim of Treatment in Dental Trauma

Regain or maintain pulp vitality !!!

56

Maintain pulp vitality!!!

Why ?

to strengthen dentinal walls

avoid “difficult” endodontics

prevent the pulpal canal space from becoming infected

57

Dilemma with immature tooth

Recommended to wait for signs of pulp vitality!

But failure of revascularization will only show up so late that the prognosis of the tooth is severely limited by that time!

58

Traumatized teeth

Frequent nerve damage

=> no response to pulp testing for several weeks to months after the trauma even when the blood circulation has survived.

(Ohman 1965, Bhaskar & Rappaport 1973 Mesaros&Trope 1997)

59

Dilemma with immature tooth

Therefore early diagnosis of pulp necrosis is urgent.

A reliable method of pulp vitality assessment would be a great advantage.

60

Crown Fractures

The main focus in the treatment of crown fractures in young permanent teeth is to maintain the vitality of the pulp.

61

Dental Trauma
Crown Injuries

Types of trauma:
- ✓Crown infraction
- ✓Enamel fracture
- ✓Uncomplicated crown fracture
- ✓Complicated crown fracture
- ✓Uncomplicated crown-root fracture
- ✓Complicated crown-root fracture

62

Crown Fractures

Crown Infraction

Clinical Presentation

Craze lines

"Use fiber optic light"

63

Crown Infraction

Pulpal survival very good!

However:
If the pulp was compromised or became necrotic in the trauma it has been suggested that the craze lines in enamel could become a portal of entry for bacteria.

64

Crown Infraction

Treatment:

Baseline Sensibility tests

Radiographs: Peri-apical film indicated if other signs or symptoms are present

65

Crown Infraction

Follow-up

No follow-up generally needed unless associated with lux. injury or other fracture type.

*Providing sensibility test normal

66

Crown Infraction

Pulpal Consequences

Necrosis
Rare ~ 1.7 to 3.5%

(Ravn JJ. 1985a,b)

67

Uncomplicated Crown Fracture

Incidence

Most commonly reported dental injury!!

Estimated to be up to 1/3 –1/2 of all reported dental injuries

68

Uncomplicated Crown Fracture

Biologic Consequences:

Minimal!!

Pulp will most likely defend it self*
*unless we, the dentists, mess things up!

69

Uncomplicated Crown Fracture

Treatment

1.Account for tooth fragment

70

Uncomplicated Crown Fracture

Treatment

1.Account for tooth fragment

2. Sensibility tests

Sensibility tests should be done prior to any treatment!

71

Uncomplicated Crown Fracture

Treatment

1. Account for tooth fragment
2. Sensibility test
3. Radiographic evaluation:
   - periapical,
   - occlusal,
   - eccentric,
   - radiograph of lip/cheek if skin is broken.

72

Uncomplicated Crown Fracture

Treatment

1.Account for tooth fragment

2. Sensibility tests

3. Radiographic evaluation

4. Esthetic repair *

* If there is not time for an esthetic repair, a glass-ionomer or composite bandage should be placed on the exposed dentin at the initial visit.

73

Uncomplicated Crown Fracture

Treatment

4. Esthetic repair:

Dentin bonding
Vs.
$Ca(OH)_2$ base

74

Uncomplicated Crown Fracture

Young human teeth (n=353):

Odontoblast numbers and dentine repair activity was more influenced by cavity variables, than of cavity filling materials or patient factors.

The most important variable was the remaining dentine thickness;
below 0.25mm the numbers of odontoblasts decreased by 23%, and minimal reactionary dentine repair was observed.

(I. About et al. 2001)

75

Uncomplicated Crown Fracture

When remaining dentine thickness was less than 0.5 mm, but not exposing the pulp,
the % of viable odontoblasts was found to be:
calcium hydroxide (100%),
polycarboxylate (82.4%),
zinc oxide eugenol (81.3%),
composite (75.5%),
enamel bonding resin (49.5%)

(I. About et al. 2001)

76

Uncomplicated Crown Fracture

Treatment

4. Esthetic repair.

If it is estimated that there is more than 0.5 to 1mm into the pulp then there is no need for additional pulpal protection!

77

Dentin Bonding of Fragments

The key is to get the best approximation possible:
- Etch and dry (don't over dry!!) both pieces

- Use minimal bond and no $Ca(OH)_2$ coverage if remaining dentin on the pulpal side is > 1mm

- If pulpal coverage is less than 1 mm then $Ca(OH)_2$ coverage over the deepest part and the corresponding area of the broken piece has to be dimpled appropriately.

78

Dentin Bonding of Fragments

Fragment dehydration for 48 h. caused a significant reduction in fracture strength;

was recovered by a 30-min rehydration.

(Capp, Cl. et al. 2009)

79

Dentin Bonding of Fragments

Effect of dehydration and rehydration intervals on fracture resistance of reattached tooth fragments using a multimode adhesive

Bovine teeth n=84

Conclusion: Rehydrating a tooth fragment for 15 minutes before bonding with a multimode adhesive appears to maintain sufficient moisture to increase reattachment strength.

(Poubel DLN. et al. 2017)

80

Uncomplicated Crown Fracture

Follow-up

6-8 weeks and 1 year*

Incl: Sensibility test and Radiographic evaluation

*Providing sensibility test normal

81

Crown Fractures

Crown Infraction

Uncomplicated crown fracture

Complicated crown fracture

82

Complicated crown fracture

Definition

Crown fracture involving enamel, dentin *and pulp*

83

Complicated crown fracture

Incidence

2 - 13 % of all dental injuries

84

Complicated Crown Fracture

Treatment

1. Account for tooth fragment
2. Sensibility test
3. Radiographic evaluation:
   - periapical,
   - occlusal,
   - eccentric,
   - radiograph of lip/cheek if skin is broken.

85

Vital Pulp Therapy

Requirements for success

1. Capping of healthy pulp
2. Bacteria tight coronal seal
3. ? Capping material ?

86

Vital Pulp Therapy

Requirements for success

1. Pulpal Status

Healthy pulp - success > 90 %

Inflamed pulp - success < 35%

(Al-Hiyasat AS et al, JADA 2006)

87

Complicated Crown Fractures

Biologic Consequences

1st 24 to 48 hours - minimal inflammation of 1-2 mm and pulpal proliferation

Necrosis *certain* if no treatment

88

Vital Pulp Therapy

Requirements for success

2. Bacteria tight seal

Cox CF et al:
Biocompatibility of various surface-sealed dental materials against exposed pulps.
J. Prosthet Dent 57:1987.

89

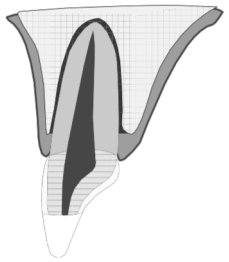
Vital Pulp Therapy

Requirements for success

? Capping material ?

Bonded resin:

90



91

Composite Pulp Capping

Animal studies on non-inflamed pulp encouraging.

Healthy human pulps not consistent results.
- Delayed healing
- Lingering inflammatory infiltrates
- Foreign body responses

(Hebling et al. 1991, Gwinnet and Tay 1998, Pereira et al. 2000, Horsted-Bindslew et al. 2003)

92

Complicated Crown Fracture

Human, n=12, 1 and 30 days

Single Bond adhesive on pulpal exposures – no caries.

Frequent gaps between the restoration and the dentin substrate;
- unpolymerized monomers,
- interface breaks with blood extravasation between the layers of the adhesive system,
- rupture of the odontoblast layer,
- multinucleated giant cells close to the bonding agent.

(Silva GA et al. 2013)

93

Complicated Crown Fracture

Direct bonding:

Persistence of the coagulum-clot has been demonstrated as being detrimental to pulp healing

=> has to be removed prior to sealing (even when placing $Ca(OH)_2$)

(Schröder & Granath 1971)

94

Complicated Crown Fracture

Direct capping:
5% NaOCl in a cotton pellet:
Causes chemical amputation of the blood coagulum
Removes the damaged pulp cells, dentin chips and other debris.

Provides hemorrhage control with minimal damage to the "normal" pulp tissue underneath.

(Hafez AA, Cox CF et al. 2002)

95

Vital Pulp Therapy

Requirements for success

? Capping material ?

Bonded resin:

Calcium hydroxide:

96

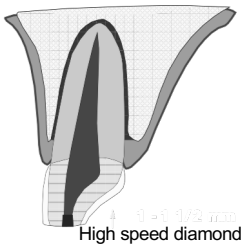
Complicated Crown Fracture

Calcium Hydroxide ($Ca(OH)_2$):

Action unknown, possible due to the high pH (11-12) combined with inhibition of bacterial proliferation and effect on endotoxins.

$Ca(OH)_2$ can not be used to treat an existing pulpitis
- it has no direct curative effect on inflammation,
- it does not appear to contribute Ca^{++} to the bridge formation.

97



High speed diamond bur with copious water cooling

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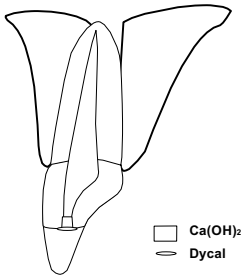

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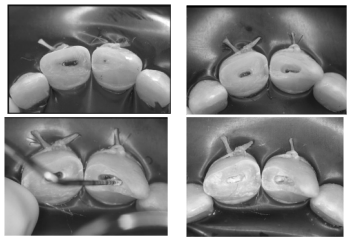


(Case by Dr. A. Ritter)

100

Vital Pulp Therapy

Requirements for success

? Capping material ?

Bonded resin:
Calcium hydroxide:
Mineral Trioxide Aggregate (MTA):

101

Mineral Trioxide Aggregate (MTA):

Has been shown to be very biocompatible and fairly good sealant when placed as a pulp capping agent.

The pulp will react to the MTA with mild reaction followed by a dentin bridge.

However not recommended any longer in anterior teeth because of potential staining of the remaining crown.

102

Complicated Crown Fracture
Biodentine

Humans, Trauma n=51, follow-up 24 months

Biodentine Pulpotomies on Permanent Traumatized Teeth with Complicated Crown Fractures

Survival rate of 100%, success rate of 91%.
4 failures at 1-, 6-, and 15-month follow-up
Radiographic outcomes showed dentinal bridge formation in 91% of cases,
All immature teeth showed continued root formation.
Slight discoloration was noted on 8 teeth (17%).

(Haikal L et al. 2020)

103

Complicated Crown Fracture

Follow-up

6-8 weeks, 3 months, 6 months

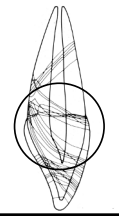
and 1 year*

Incl: Sensibility test and Radiographic evaluation

*Providing sensibility test normal

104

Crown-Root fractures



(From Dr. Andreasen 1979)

105

Crown-Root fractures

Treatment principle to convert the crown-root fracture to crown fracture

Can be done with:
- Gingivectomy/crown lengthening
- Orthodontic extrusion
- Surgical reposition

(Dr. Andreasen 1979)

106

Crown-Root Fracture

Follow-up

6-8 weeks, 3 months, 6 months

1 year* and then yearly for at least 5 years

Incl: Sensibility test and Radiographic evaluation

*Providing sensibility test normal

107

Root Fracture

108

Root Fracture
Definition

Fracture involving dentin, cementum and pulp

109

Root Fracture

Treatment

- reduce the displaced segment
- immobilize (?)
- follow-up critical

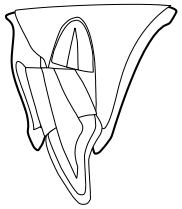
110

Root Fracture
Treatment

- reduce the displaced segment

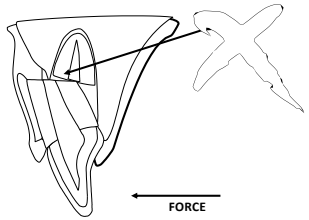
111

Root fracture - Extrusion Luxation



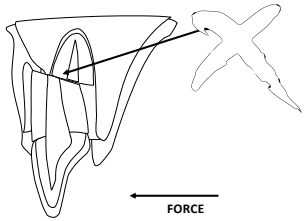
112

Root fracture - Extrusion Luxation



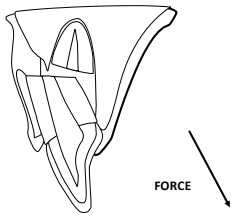
113

Root fracture - Extrusion Luxation



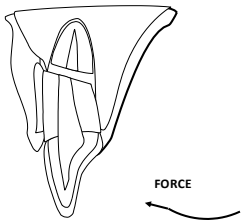
114

Root fracture - Extrusion Luxation



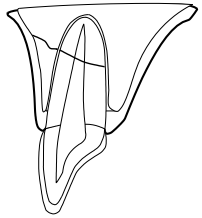
115

Root fracture - Extrusion Luxation



116

Root fracture - Extrusion Luxation



117

Root Fracture

Prognosis:
Pulp necrosis was found in 20%,
70% of those successfully treated endodontically and almost all of them only in coronal segment.

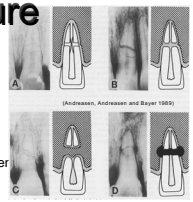
(Zachrisson and Jacobsen 1975)

118

Root Fracture

Three types of healing possible:
- Hard tissue union
- Interposition of connective tissue
- Interposition of bone and connective tissue

Non healing with granulation tissue between fragmer



119

Root Fracture

Influences on Prognosis:
1. The degree of dislocation of the coronal fragment.
2. The localization of the fracture influenced repair only slightly.
3. Somewhat increased mobility in some cases did NOT affect the longevity a tooth.

(Zachrisson and Jacobsen 1975)

120

Root Fracture

"It is concluded that when optimally treated by repositioning, fixation and relief of occlusion, anterior teeth with root fracture have a favorable prognosis, even when pulp necrosis occurs."

(Zachrisson and Jacobsen 1975)

121

Root Fracture

Retrospective study by Cvek et al. (2001) indicated:

- that rigid, long term splinting of root fractured teeth was not important variable in the prognosis of the tooth.

- How far the coronal segment was luxated from the root was important (and thereby possibly the reduction of the two segments).

122

Root Fracture

Follow-up

4 weeks: splint removal
6-8 weeks
4 months
6 months
1 year
And then at least yearly for 5 years

All Inc: Sensibility test and Radiographic evaluation

123

Root Fracture

Follow-up

Cervical Third fracture
4 weeks
6-8 weeks
4 months: splint removal
6 months
1 year
And then at least yearly for 5 years

All Inc: Sensibility test and Radiographic evaluation

124

Alveolar Fracture

Follow-up

4 weeks : splint removal -
6-8 weeks
4 months
6 months
1 year
And then at least yearly for 5 years

All Inc: Sensibility test and Radiographic evaluation

125