Dental Trauma





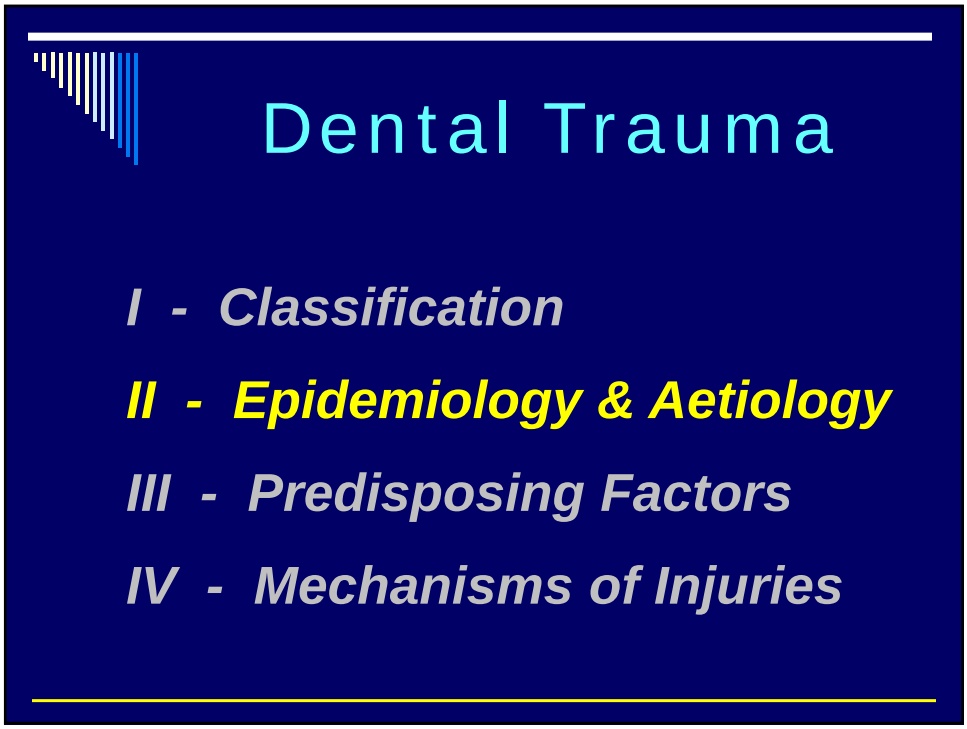
1

Trauma

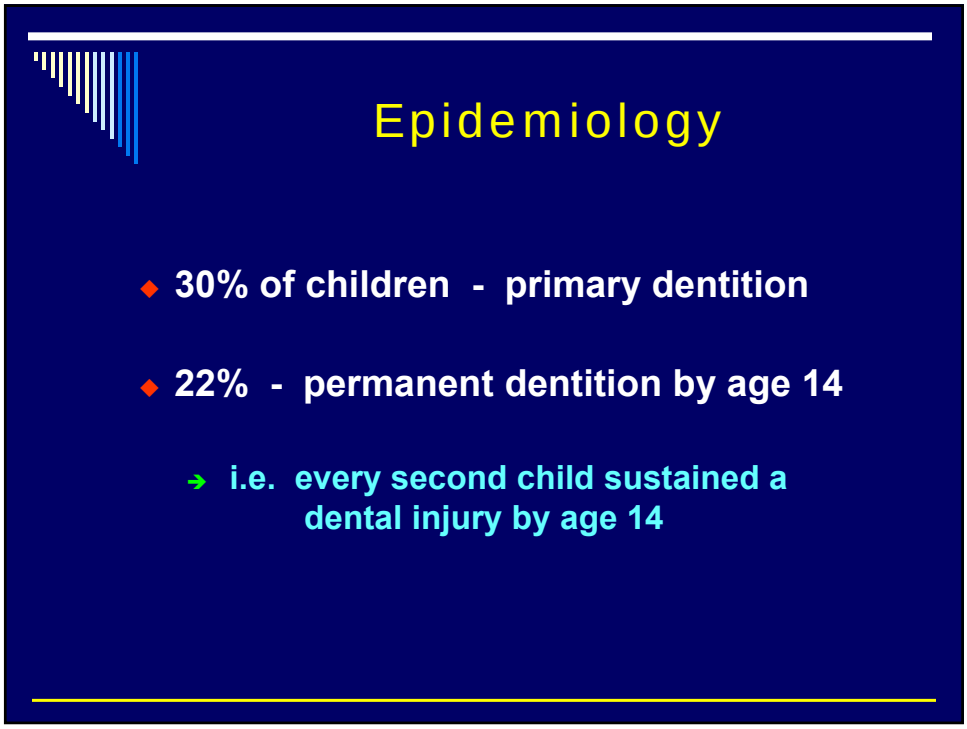
- **5,000,000 people die from all trauma every year**
  - **No. 1 cause of death in people up to 40 yrs old**
  - **Half of all deaths in 10-24 yr old age group**
- **Several 100's million people injured every year**

Petti et al - *Dent Traumatol* 2018;
Petti et al - *Lancet Global Health* 2018; Abbott - *Dent Traumatol* 2018

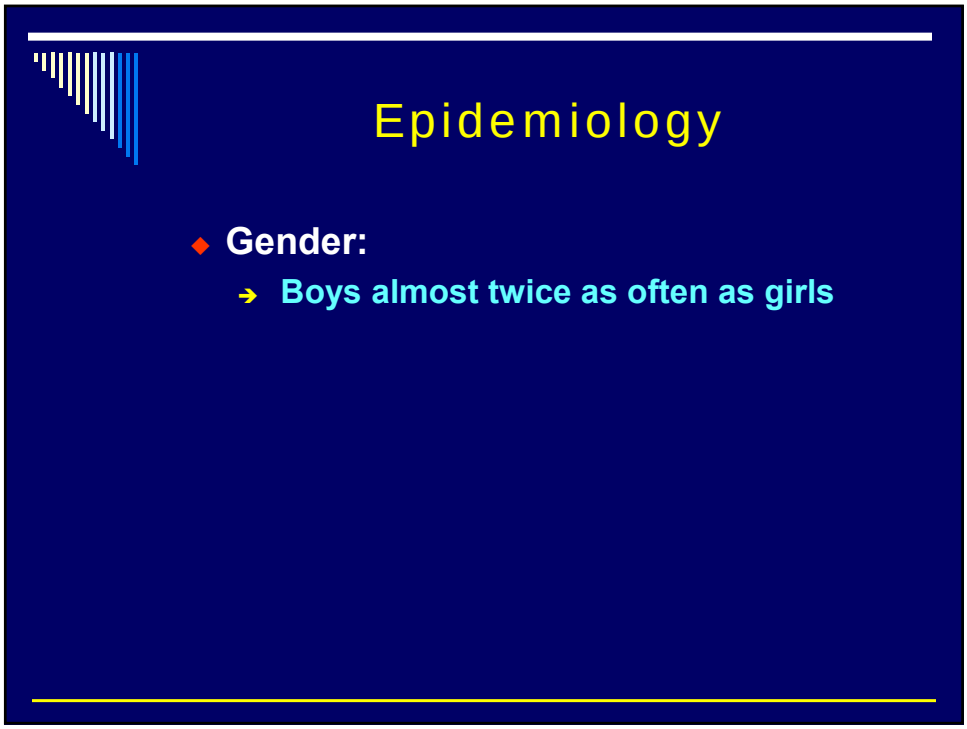
2


Dental Trauma
I - Classification
II - Epidemiology & Aetiology
III - Predisposing Factors
IV - Mechanisms of Injuries

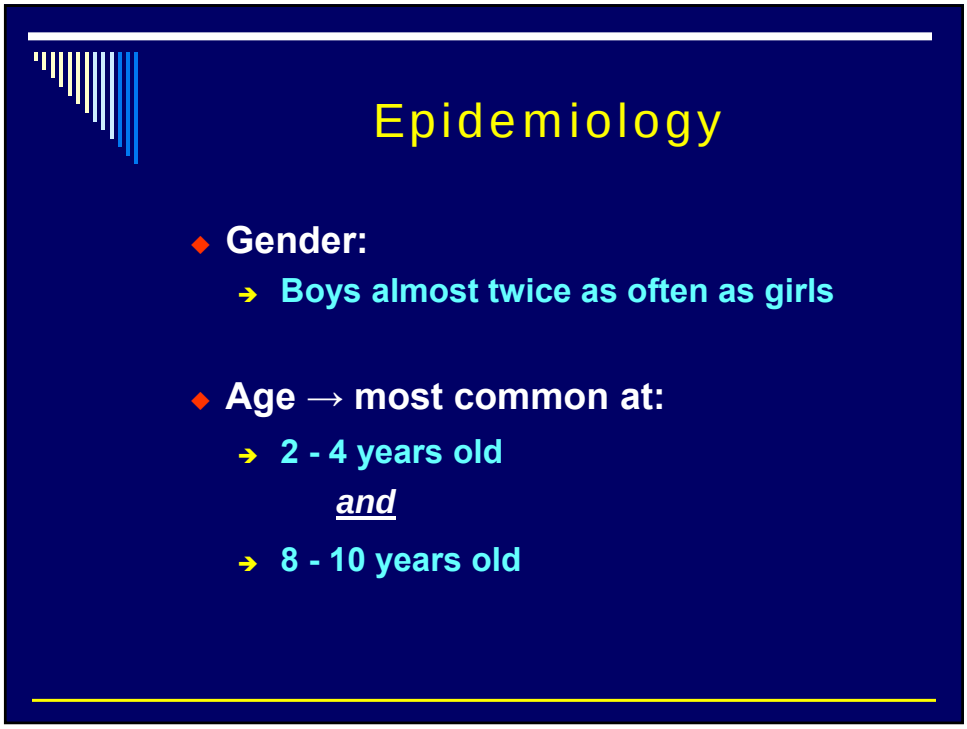
81


Epidemiology
30% of children - primary dentition
22% - permanent dentition by age 14
i.e. every second child sustained a dental injury by age 14

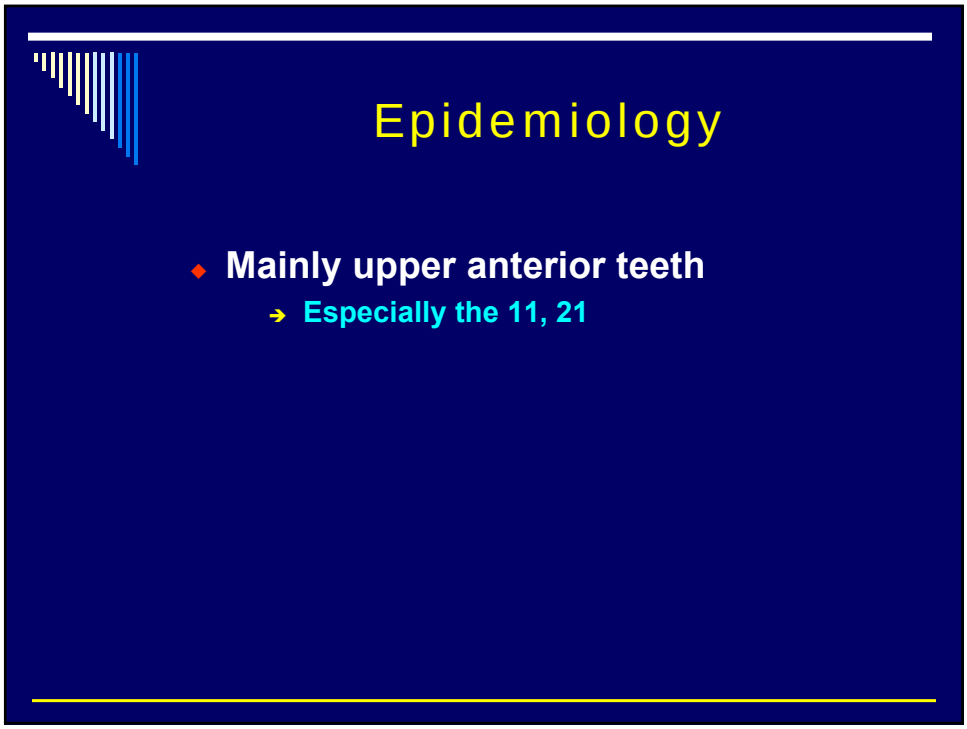
82


Epidemiology
Gender:
Boys almost twice as often as girls

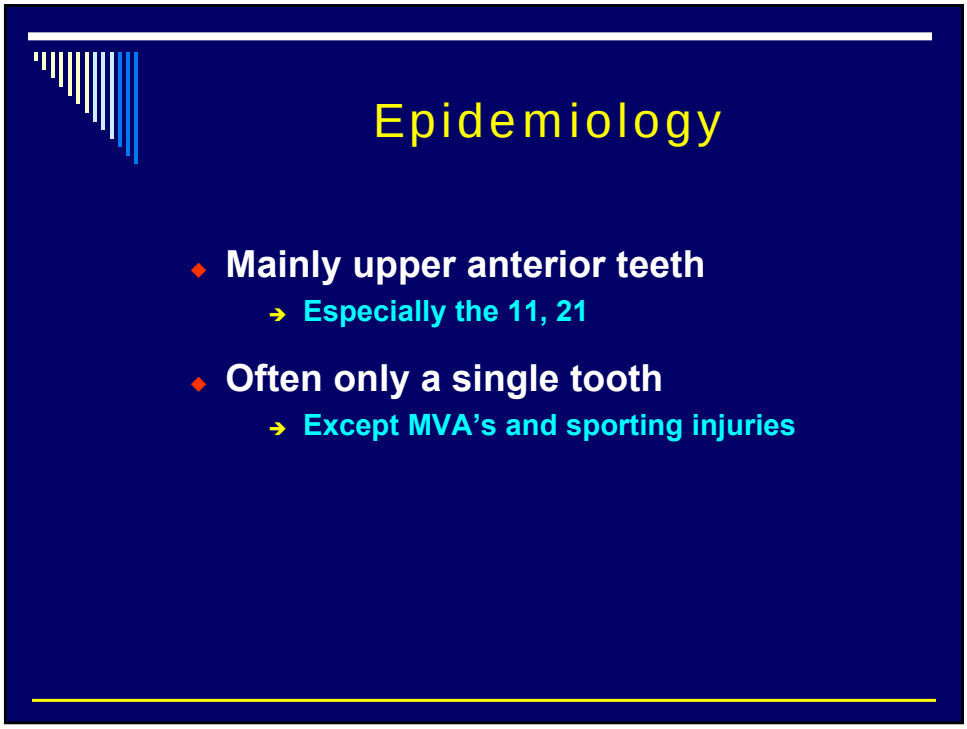
83


Epidemiology
Gender:
Boys almost twice as often as girls
Age → most common at:
2 - 4 years old
and
8 - 10 years old

84


Epidemiology
Mainly upper anterior teeth
Especially the 11, 21

85


Epidemiology
Mainly upper anterior teeth
Especially the 11, 21
Often only a single tooth
Except MVA's and sporting injuries

86

Epidemiology

- **Mainly upper anterior teeth**
  - **Especially the 11, 21**
- **Often only a single tooth**
  - **Except MVA's and sporting injuries**
- **Some people are *"accident prone"***
  - **Have repeated trauma**

87

Aetiology

- **Most common causes:**
  - **Falls, collisions, bumps, bicycles, sports, fights, epileptics, drug addicts, MVA's, etc.**





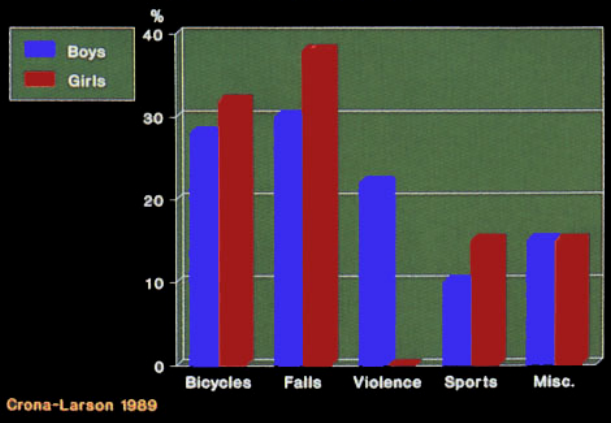
88

Aetiology

- **Most common causes:**
  - **Falls, collisions, bumps, bicycles, sports, fights, epileptics, drug addicts, MVA's, etc.**
- **Varies according to:**
  - **Age**
  - **Gender**
  - **Location - country, city**
    - **Related to typical sports played**

89

Aetiology



90

Aetiology

Type of Sport	Rel. freq. of dental injury %
Football	11.1
Skiing (x-country)	2.9
Skiing (downhill)	4.3
Skating	9.0
Swimming	20.3
Riding	3.3
Ice-hockey	7.8
Gymnastics	26.2
Other	15.1

Andreasen 1982

91

Incidence of trauma in the Western Australian School Dental Service

Stockwell AJ

***Comm Dent Oral Epidemiol* 1988; 16: 294-8.**

92

Incidence of trauma in 6-12 year old children in WA

- 1.66 children and 2.05 teeth per 100 children
- 11.7 teeth per 100 erupted teeth

Stockwell (1988)

93

Incidence of trauma in 6-12 year old children in WA

- 1.66 children and 2.05 teeth per 100 children
- 11.7 teeth per 100 erupted teeth
- 80.5% of children had 1 tooth per incident
- 88% of the traumatised teeth were upper central incisors

Stockwell (1988)

94

Type of Injuries

- 73.9% - Uncomplicated crown fractures
- 4.6% - Complicated crown fractures
- 0.4% - Root fractures
- 4.9% - Luxations / avulsions
- 12.6% - Subsequent trauma

Stockwell (1988)

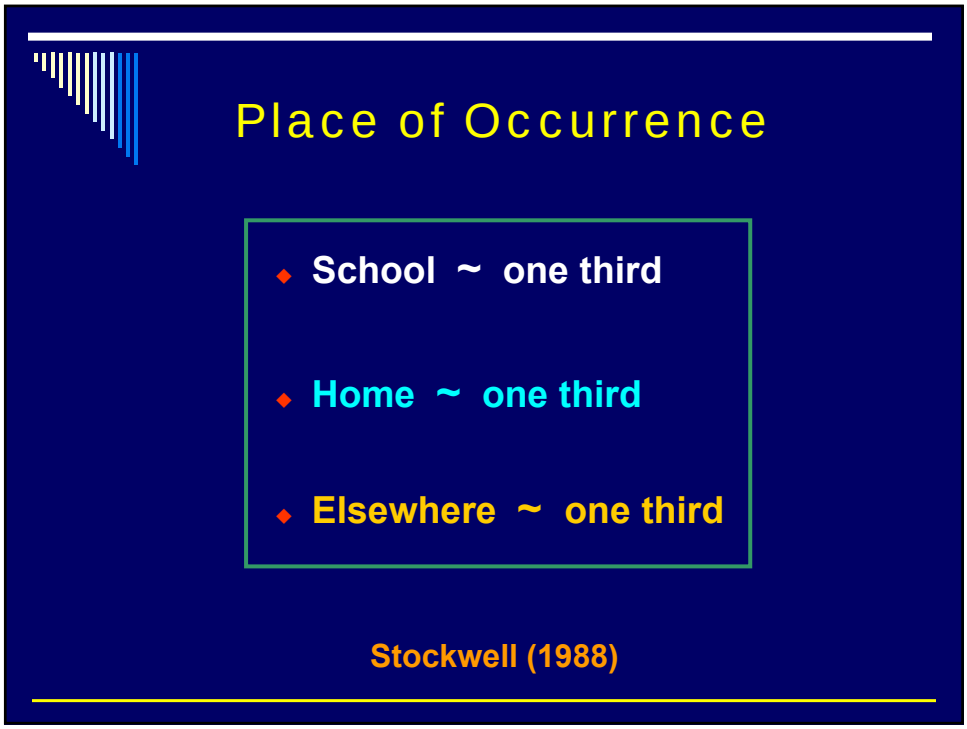
95

Causes of Trauma

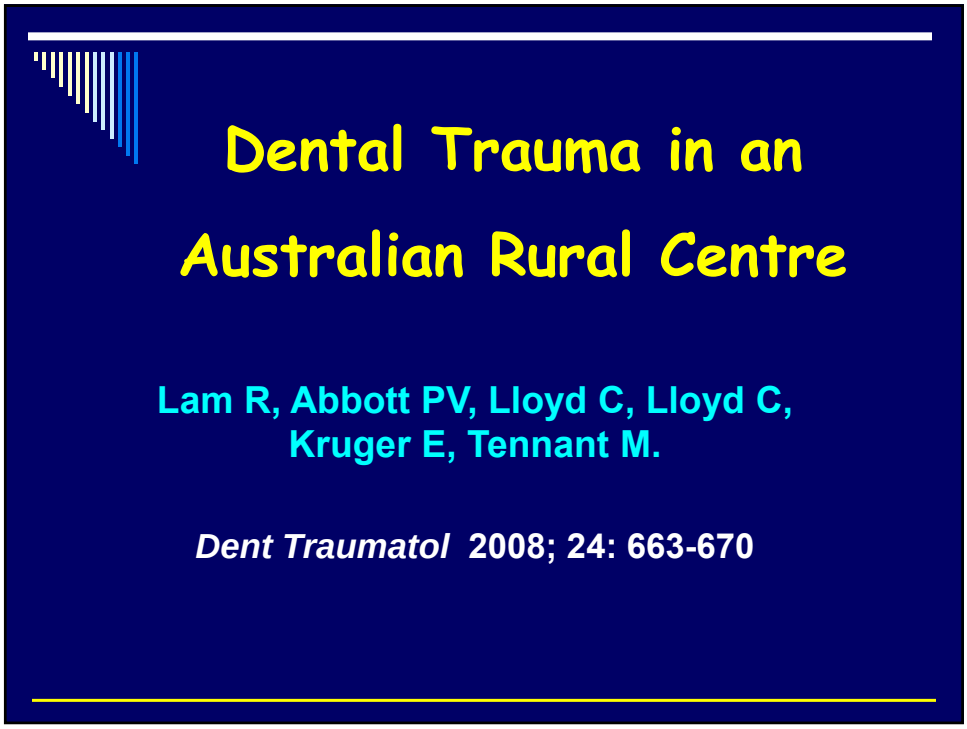
Fell or pushed	22.7%
Impact with person	15.9%
Impact with object	15.3%
Various sports	10.9%
Bicycle accidents	9.3%
Swimming/diving	4.9%
Car accidents	0.7%
Various other causes	20.3%

Stockwell (1988)

96


Place of Occurrence
School ~ one third
Home ~ one third
Elsewhere ~ one third
Stockwell (1988)

97


Dental Trauma in an Australian Rural Centre
Lam R, Abbott PV, Lloyd C, Lloyd C, Kruger E, Tennant M.
Dent Traumatol 2008; 24: 663-670

98

Dental Trauma in an Aust. Rural Centre

- Bunbury - 200 kms south of Perth
- Population: >30,000 + surrounding areas
  - Total "feed" area about 100,000 people
- Private dental general practice
  - Special interest in trauma
  - After hours "on call" service
  - Links with local general hospital and doctors

Lam, Abbott *et al* (2008)

99

Dental Trauma in an Aust. Rural Centre

- Period of study: 66 months
  - May 2000 - December 2005
- 323 consecutive patients with injuries to their teeth and/or mouths
  - Average 5 per month or > 1 per week

Lam, Abbott *et al* (2008)

100

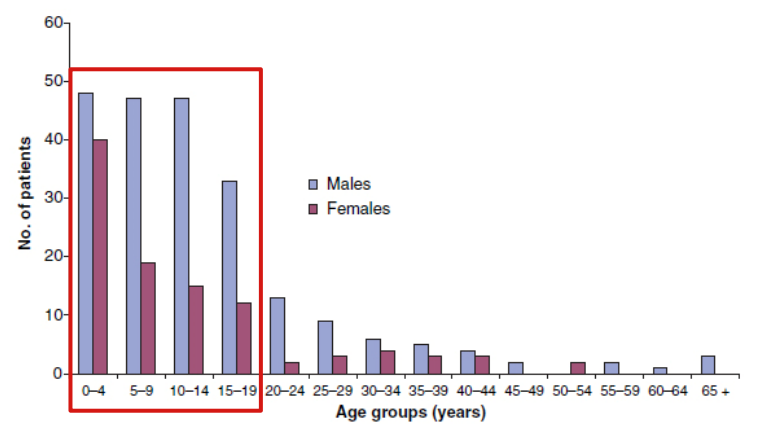
Dental Trauma in an Aust. Rural Centre

- **The patients:**
  - 68 % males; 32% females (Sig. diff.)
  - Age range: 10 months ➔ 78 years old
  - 92% were less than 34 yrs old
  - Mean age for males: 14.1 yrs old
  - Mean age for females: 11.6 yrs old

Lam, Abbott *et al* (2008)

101

Dental Trauma in an Aust. Rural Centre



Lam, Abbott *et al* (2008)

102

Dental Trauma in an Aust. Rural Centre

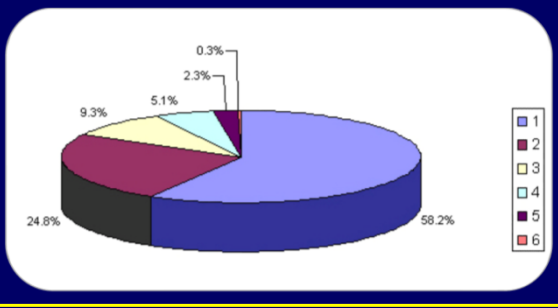
- **The teeth:**
  - 528 teeth were injured
  - Permanent teeth: 368 teeth (70%)
  - Deciduous teeth: 159 teeth (30%)

Lam, Abbott *et al* (2008)

103

Dental Trauma in an Aust. Rural Centre

- **The teeth:**
  - Average: 1.7 teeth per patient
  - Range: 1 - 6 teeth per patient



104

Dental Trauma in an Aust. Rural Centre

- The teeth:
  - Permanent Dentition

% of all teeth in the study

- → Maxillary Central Incisors - 44%
- → Maxillary Lateral Incisors - 13%
- → Mandibular Central Incisors - 7%
- → Mandibular Lateral incisors - 3%

Lam, Abbott *et al* (2008)

105

Dental Trauma in an Aust. Rural Centre

- The teeth:
  - Deciduous Dentition

% of all teeth in the study

- → Maxillary Central Incisors - 22%
- → Maxillary Lateral Incisors - 5%
- → Mandibular Central Incisors - 0.6%
- → Mandibular Lateral incisors - 0.4%

Lam, Abbott *et al* (2008)

106

Dental Trauma in an Aust. Rural Centre

- The soft tissues:
  - 116 patients had soft tissue injuries
    - → 108 patients had soft tissue injuries that were concurrent with other injuries
    - → 8 patients only had soft tissue injuries

Lam, Abbott *et al* (2008)

107

Dental Trauma in an Aust. Rural Centre

- Timing of the accidents:
  - No significant differences between the
    - → Day of the week
    - → Month of the year
    - → Season of the year

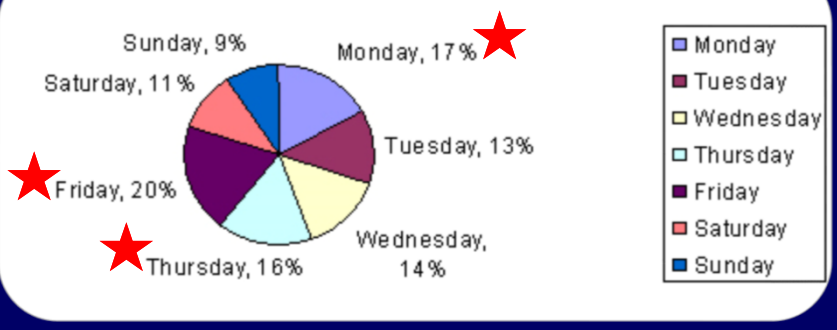
Lam, Abbott *et al* (2008)

108

Dental Trauma in an Aust. Rural Centre

Timing of the Accident / Injury

No significant differences between the days of the week



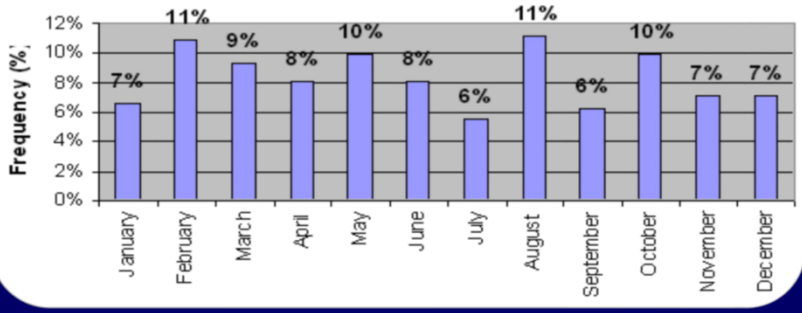
Lam, Abbott *et al* (2008)

109

Dental Trauma in an Aust. Rural Centre

Timing of the Accident / Injury

No significant differences between the months of the year

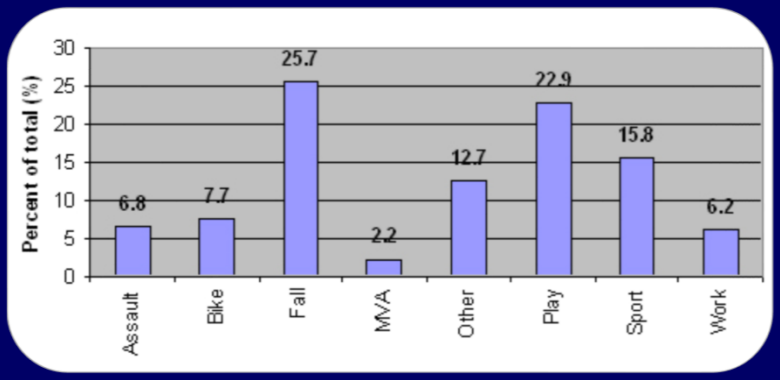


Lam, Abbott *et al* (2008)

110

Dental Trauma in an Aust. Rural Centre

Cause of the Injuries



Lam, Abbott *et al* (2008)

111

Dental Trauma in an Aust. Rural Centre

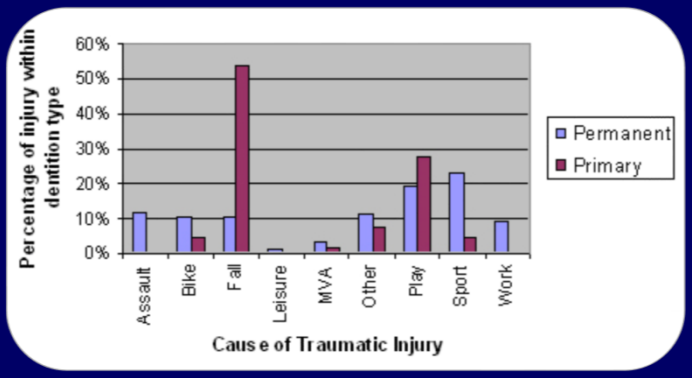
- **Causes of the injuries:**
  - **Significant differences for (compared to other causes in each dentition):**
    - ➔ **Permanent dentition - Sports**
      - Accidents while playing
    - ➔ **Deciduous dentition - Falls**
      - Accidents while playing

Lam, Abbott *et al* (2008)

112

Dental Trauma in an Aust. Rural Centre

Cause of Injury Related to Dentition



Lam, Abbott *et al* (2008)

113

Dental Trauma in an Aust. Rural Centre

Cause of Injury Related to Gender

	Gender		
	Male *n* (%)	Female *n* (%)	Total *n* (%)
Assault	19 (8.6)	3 (2.9)	22 (6.8)
Bike	18 (8.2)	7 (6.8)	25 (7.7)
Fall	45 (20.5)	38 (36.9)	83 (25.7)
Motor vehicle accident	5 (2.3)	2 (1.9)	7 (2.2)
Other	23 (10.4)	18 (17.5)	41 (12.7)
Play	52 (23.6)	22 (21.4)	74 (22.9)
Sport	42 (19.1)	9 (8.7)	51 (15.8)
Work	16 (7.3)	4 (3.9)	20 (6.2)
Total	220 (68.1)	103 (31.9)	323 (100)

Lam, Abbott *et al* (2008)

114

Dental Trauma in an Aust. Rural Centre

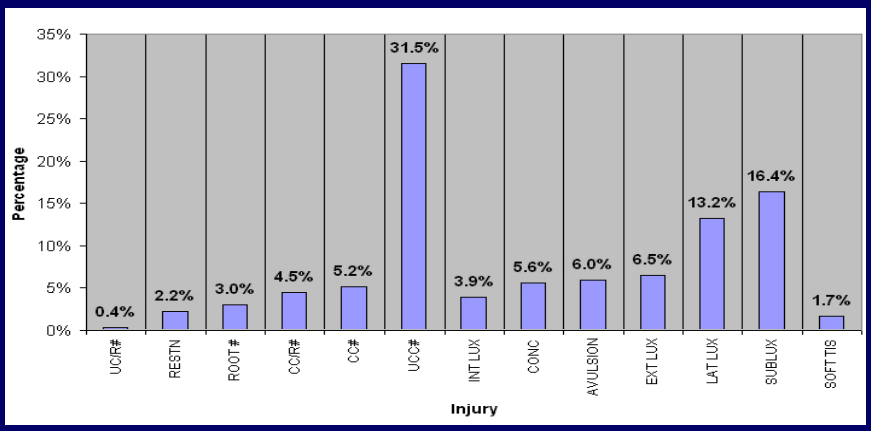
- **Most common injuries:**
  - **Uncomplicated crown fracture - 31.5%**
  - **Subluxation - 16.4%**
  - **Lateral luxation - 13.2%**
- **Similar for Permanent and Deciduous Teeth**

Lam, Abbott *et al* (2008)

115

Dental Trauma in an Aust. Rural Centre

Types of Injury

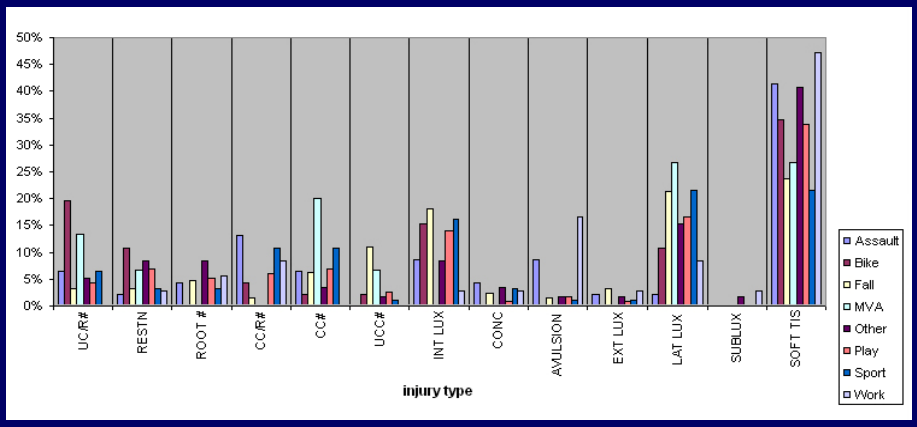


Lam, Abbott *et al* (2008)

116

Dental Trauma in an Aust. Rural Centre

Cause Related to the Types of Injury



Lam, Abbott *et al* (2008)

117

Dental Trauma in an Aust. Rural Centre

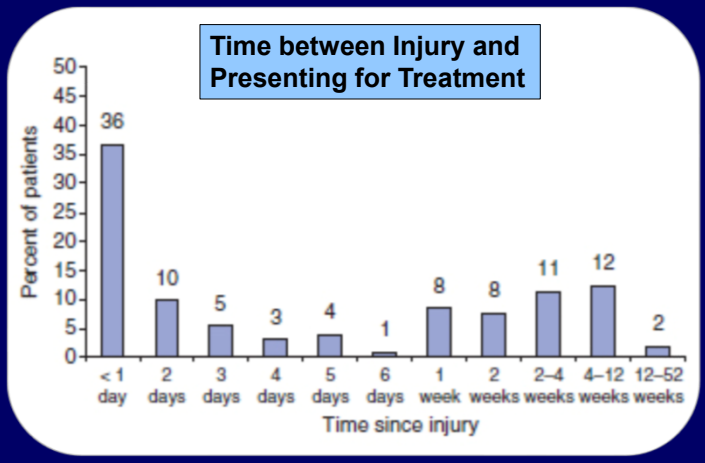
Time between Injury and Presenting for Treatment

- 1/3 of patients were seen within 24 hours
  - i.e. on the same day of the accident or overnight
- 1/3 of patients were seen within 1 week
- 1/3 of patients delayed seeking treatment for weeks, months or even up to 1 year.

Lam, Abbott *et al* (2008)

118

Dental Trauma in an Aust. Rural Centre



Lam, Abbott *et al* (2008)

119

Dental Trauma

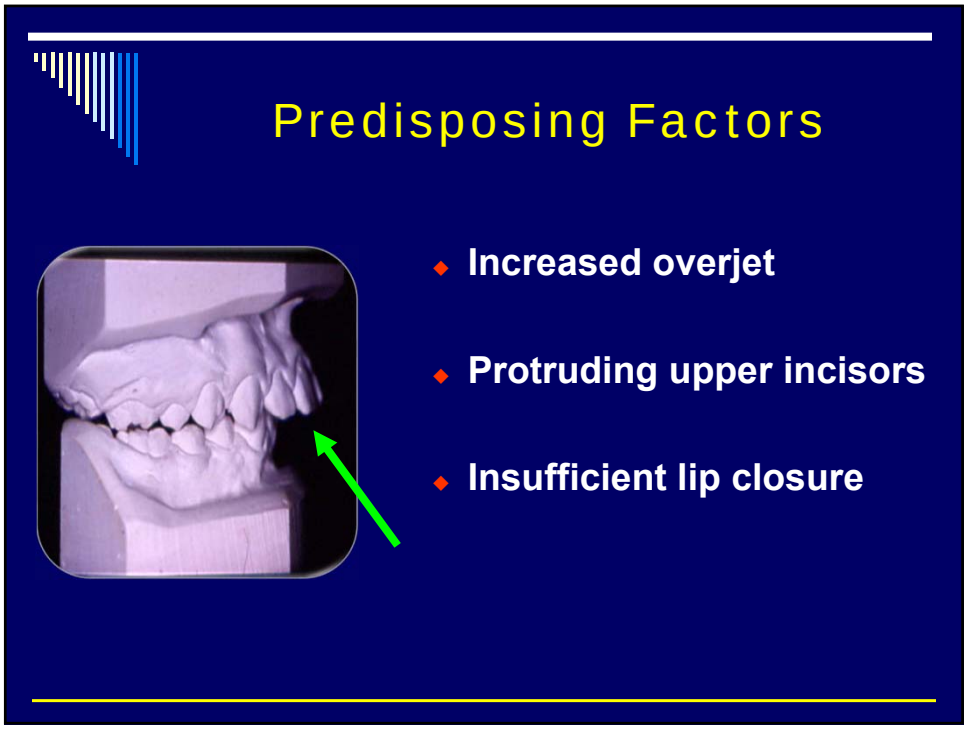
I - Classification

II - Epidemiology & Aetiology

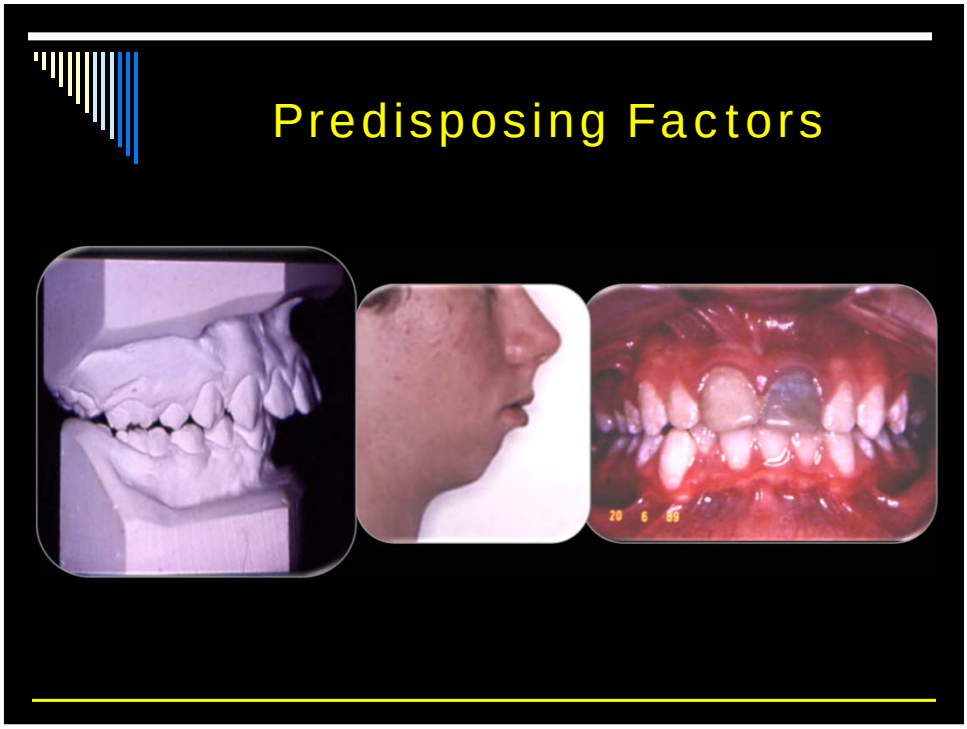
III - Predisposing Factors

IV - Mechanisms of Injuries

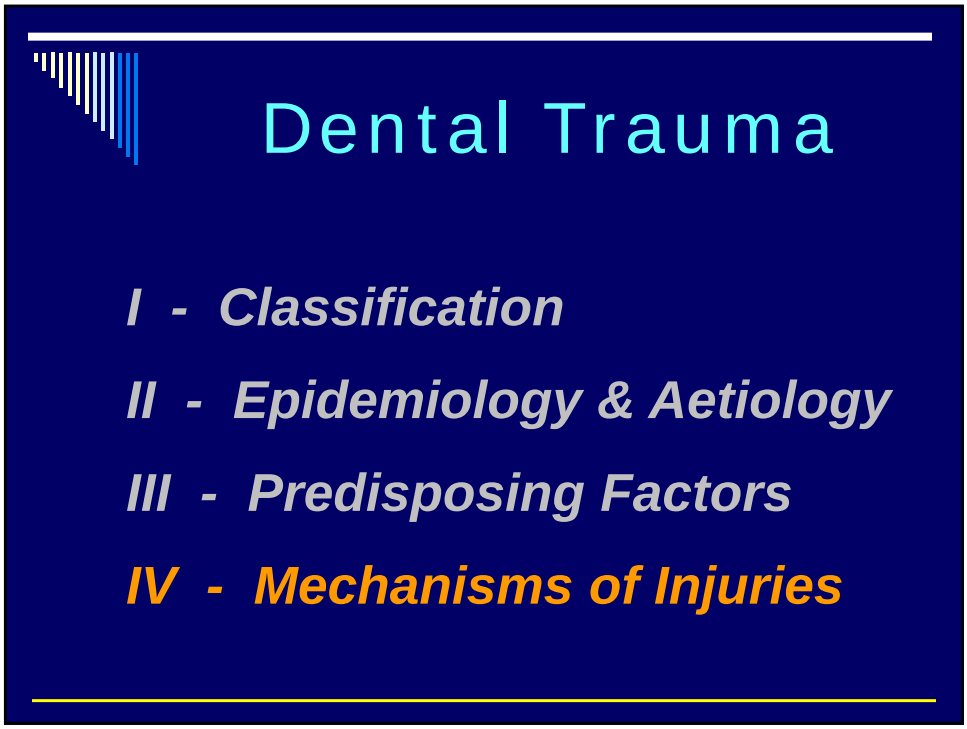
120


Predisposing Factors
Increased overjet
Protruding upper incisors
Insufficient lip closure

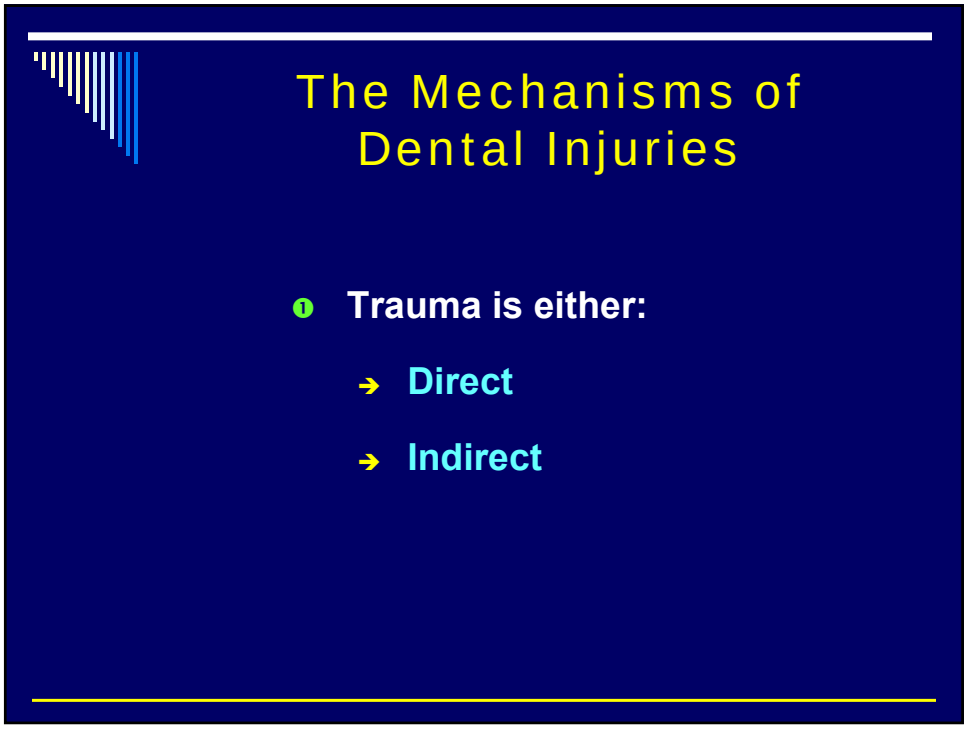
121


Predisposing Factors

122


Dental Trauma
I - Classification
II - Epidemiology & Aetiology
III - Predisposing Factors
IV - Mechanisms of Injuries

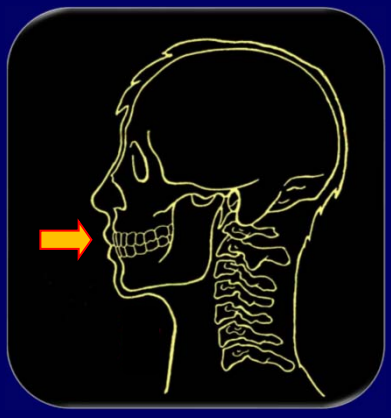
123


The Mechanisms of Dental Injuries
Trauma is either:
Direct
Indirect

124

Direct Trauma

- Occurs when the tooth itself is struck
- Implies injuries in the anterior region



125

Direct Trauma

- Occurs when the tooth itself is struck
- Implies injuries in the anterior region

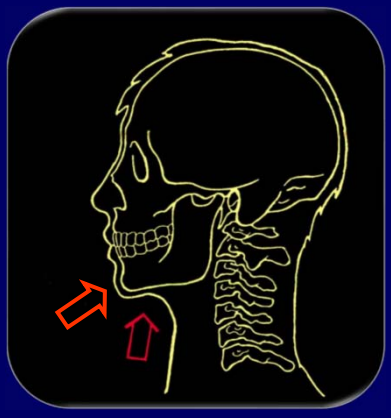




126

Indirect Trauma

- Occurs when the lower arch is forcefully closed against the upper arch
- Favours crown fractures and crown-root fractures in the posterior teeth
- Also causes jaw fractures in the condyle and symphysis regions

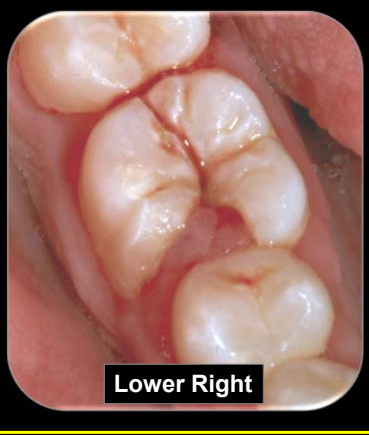


127

Indirect Trauma

- e.g. Soldier feinted while on parade





128

The Mechanisms of Dental Injuries

- **Factors that characterize the impact & determine the extent of dental injuries:**
  1. **Energy of impact**
  2. **Resiliency of impacting object**
  3. **Shape of impacting object**
  4. **Direction of impacting force**

129

Energy of Impact

- includes both mass & velocity

$E = mc^2$

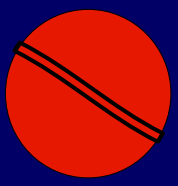


130

Energy of Impact

- includes both mass & velocity

- **Low mass**
  - → **Less damage than high mass object**



Cricket ball



Tennis ball

131

Energy of Impact

- includes both mass & velocity

- **Low mass**
  - → **Less damage than high mass object**
- **Low velocity**
  - → **More damage to the supporting structures**
  - → **Few tooth fractures**

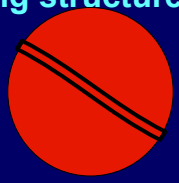


132

Energy of Impact

- includes both mass & velocity

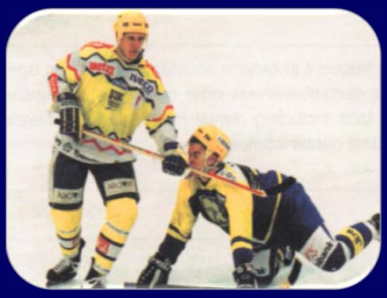
- **Low mass**
  - → Less damage than high mass object
- **Low velocity**
  - → More damage to the supporting structures
  - → Few tooth fractures
- **High velocity**
  - → Crown fractures more likely
  - → Little damage to the supporting structures



133

Resiliency of Impacting Object

- **Resilient or cushioned objects will distribute the impact more**





134

Resiliency of Impacting Object

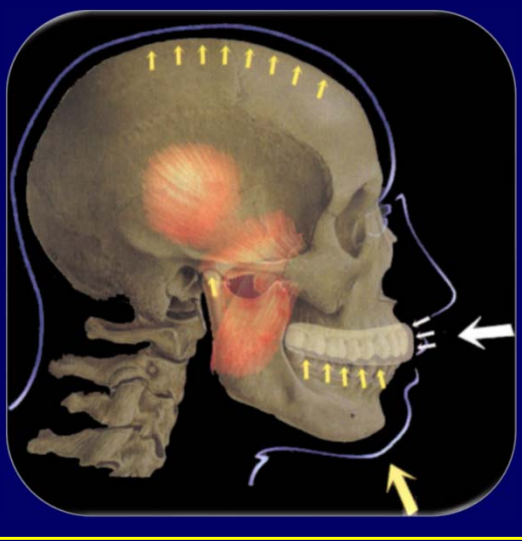
- **Resilient or cushioned objects will distribute the impact more**
  - **Less chance of crown fracture**
  - **Higher risk of luxation & alveolar fracture**





135

Resiliency of Impacting Object



136

Resiliency of Impacting Object

- **Resilient or cushioned objects will distribute the impact more**
  - → **Less chance of crown fracture**
  - → **Higher risk of luxation & alveolar fracture**
- **The lips can absorb some of the impact**



137

Shape of Impacting Object

- **Sharp object**



- **Blunt object**



138

Shape of Impacting Object



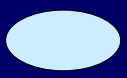
- **Sharp object**
  - → **Clean crown fractures with minimum displacement of tooth**
    - **Since a rapid blow over limited area**
- **Blunt object**

139

Shape of Impacting Object

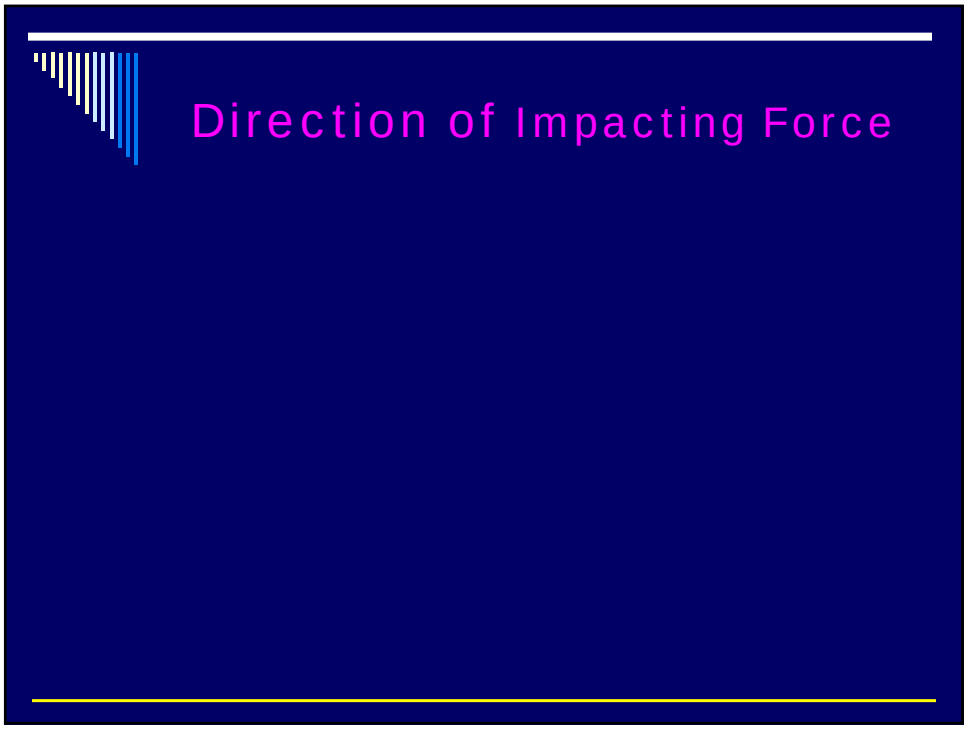


- **Sharp object**
  - → **Clean crown fractures with minimum displacement of tooth**
    - **Since a rapid blow over limited area**
- **Blunt object**

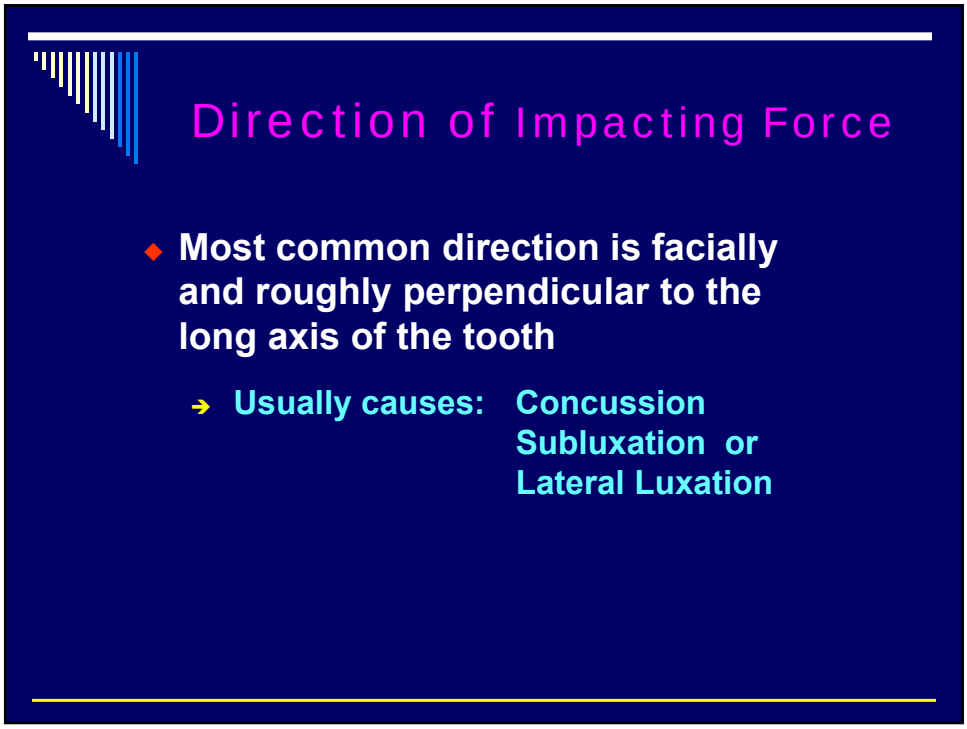


  - → **Increased area of resistance to the force in the crown transmits some of the impact to the root, which causes luxation or root fracture**

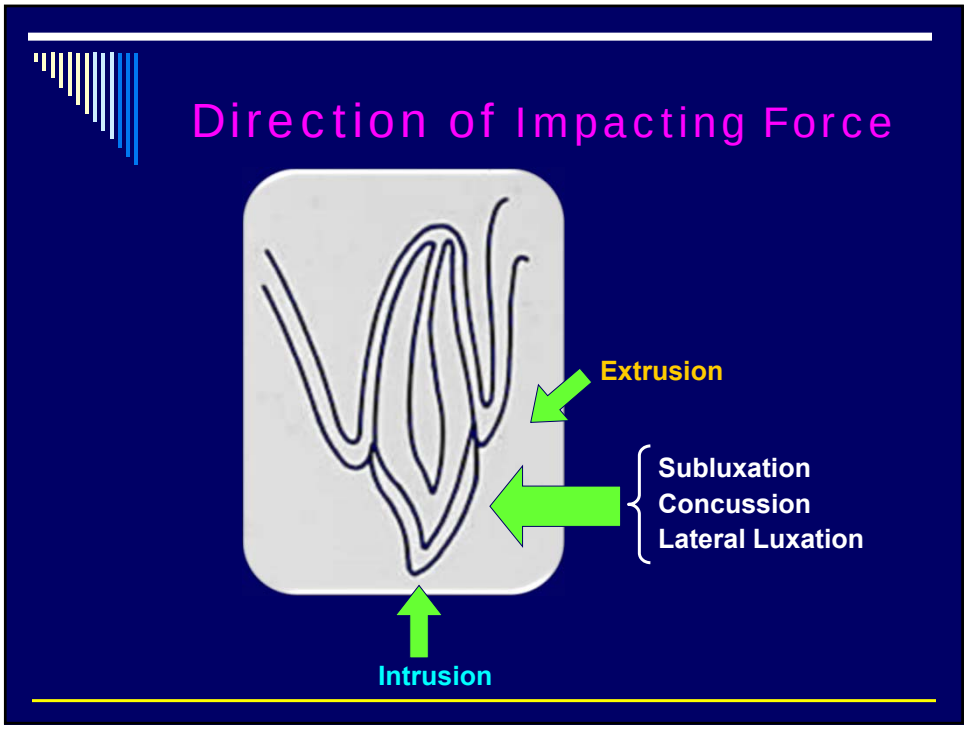
140


Direction of Impacting Force

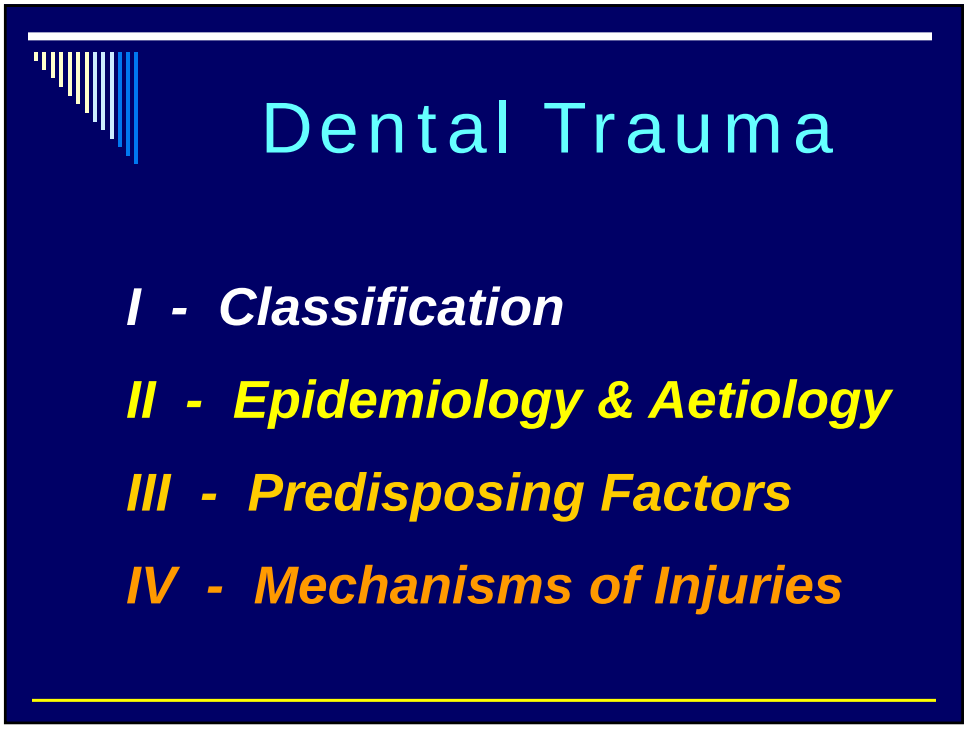
141


Direction of Impacting Force
Most common direction is facially and roughly perpendicular to the long axis of the tooth
Usually causes: Concussion
Subluxation or
Lateral Luxation

142


Direction of Impacting Force
Extrusion
Subluxation
Concussion
Lateral Luxation
Intrusion

143


Dental Trauma
I - Classification
II - Epidemiology & Aetiology
III - Predisposing Factors
IV - Mechanisms of Injuries

144