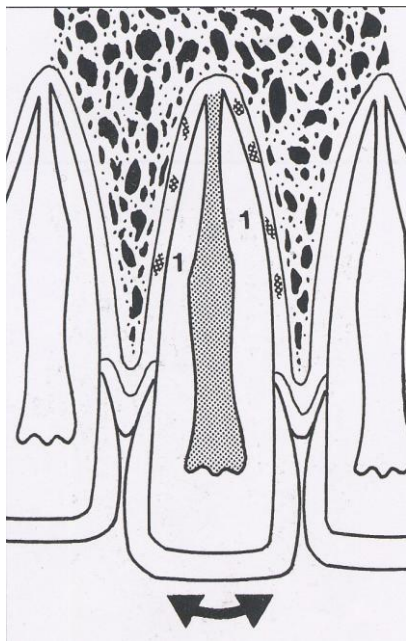


GUIDELINES FOR THE MANAGEMENT OF TRAUMATISED INCISORS

- Dentists need to understand that the decision to remove or not reimplant an avulsed incisor must be made very carefully. The loss of such a tooth in a child can have a huge impact in the psychological development of that child and on the parents. Therefore a decision to remove or not reimplant must be made with very clear explanations to the parents involved and very well recorded notes to reduce the risk of a subsequent litigation.
- These guidelines have been drawn up to help dentists decide on the best management of traumatised incisors. It is not the purpose to advise specifically on the long term management but more to focus on what should be done now.
- The majority of oro-dental injuries take place between 8-11 years. Dental management is therefore directed at preservation of pulp vitality whenever possible.
- **Please consult “Dental Trauma Guide” for more detailed information and references.**

LUXATION INJURIES

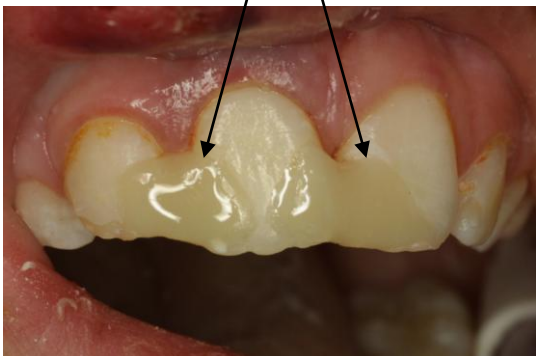
Subluxation (tooth loosening but no clinical displacement)



- Take a radiograph to exclude hard tissue injuries.
- Take pulp sensibility test.
- Advise soft diet and consider paracetamol.
- Splinting is rarely of benefit if there is no root fracture.
- Reassure and advise follow up with own GDP to review vitality.
- Soft diet 1 week.

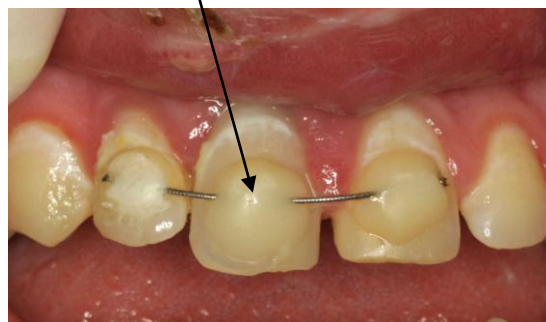
Temporary Crown Bridge Resin

Example of a Resin/Flexible Splint

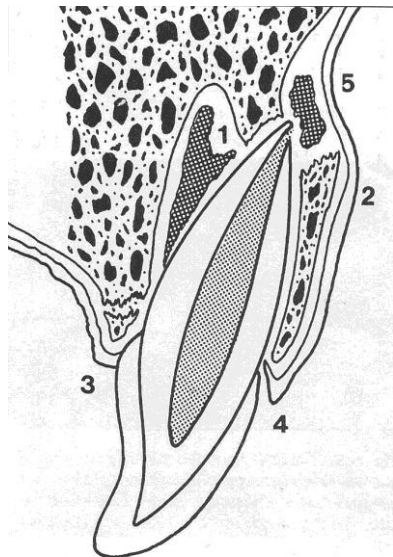


Composite

Example of a Wire Flexible Bridge

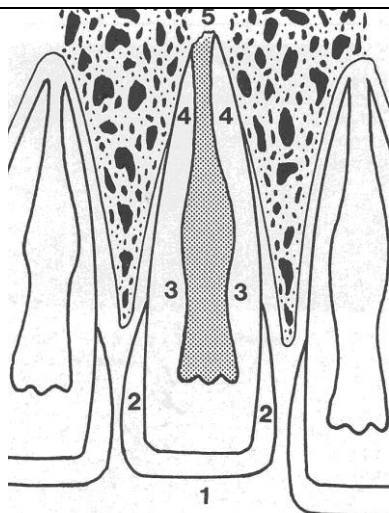


Lateral Luxation



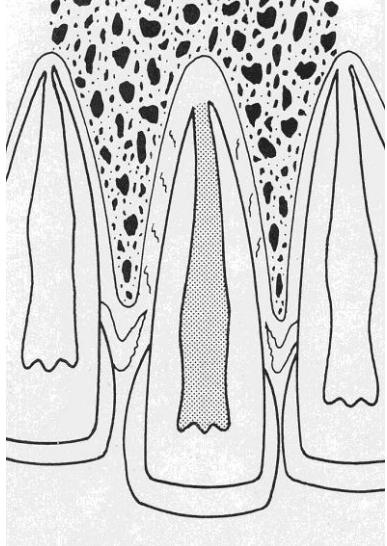
- Take radiograph to assess the extent of damage and state of root development.
- Take pulp sensibility test, (usually no response)
- Tooth mobile; gently reposition, flexible splint 14 days to allow for soft tissue healing
- Tooth firm (usually the case); reposition with LA, which may require a surgical approach to disengage root apex as in diagram. Then splint for 4 weeks with **Flexible** Splint (owing to bone fracture)
- If this is not possible refer for orthodontic realignment. This may require an appliance to be fitted immediately if there is occlusal interference but you should not begin tooth movements until 2 to 3 weeks have elapsed when preliminary healing is under way.
- Soft diet for 1 week. Good OH will influence soft tissue healing

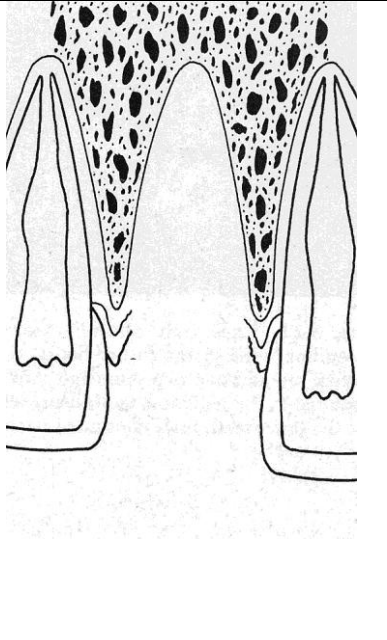
Intrusive Luxation



- **Prompt assessment essential.**
- Take radiograph to confirm diagnosis (no PDL space apically)
- Immature teeth can re-erupt, mature teeth do not.
- Loss of vitality likely in mature teeth and most immature teeth.
- Reposition tooth either surgically followed by splinting for 14 days or **rapidly** orthodontically over 3 to 4 weeks. (**Flexible** Splint)
- Carry out endodontic treatment **within** 3-4 weeks to reduce the risk of external replacement resorption or external inflammatory root resorption.
- Ca(OH)₂ as temporary filling in the root canal is recommended. This will reduce the risk of resorption and ankylosis.
- See table below

	Degree of intrusion	Repositioning		
		Spontaneous	Orthodontic	Surgical
OPEN APEX	Up to 7 mm	x		
	More than 7 mm		x	x
CLOSED APEX	Up to 3 mm	x		
	3-7 mm		x	x
	More than 7 mm			x

Extrusive Luxation	
 A line drawing showing a cross-section of three teeth in the jaw. The central tooth is displaced upwards and outwards from its normal position, with a visible gap between the tooth and the surrounding bone structure. The surrounding teeth are in their normal positions.	• Take radiograph to confirm diagnosis (expanded PDL) and no hard tissue damage. • Reposition with gentle pressure. LA usually not necessary • Splint 14 days (Flexible Splint) • Soft diet and good OH. • Regular follow up necessary. Open apex can revascularise. Negative pulpal sensibility then carry out RCT. • External replacement root resorption and external inflammatory root resorption can be slowed or arrested with temporary dressings of Ca(OH)₂.

Total Luxation (Avulsion)	
 A line drawing showing a cross-section of three teeth in the jaw. The central tooth is completely detached from the jawbone, with a significant gap between the tooth and the socket. The surrounding teeth are in their normal positions.	• Advise on phone to wash the tooth in running water for 10 seconds, do not scrub and push the tooth back into the socket immediately. • If this is not possible transport the tooth in isotonic fluid e.g. saliva, cold milk or contact lens fluid. • At surgery wash tooth briefly if dirty and place in sterile normal saline. Check tetanus status and refer if necessary afterwards. • In most cases the tooth should be reimplanted. • Administer LA. Irrigate socket to remove blood clot. Push tooth firmly into socket. • Splint (Flexible) 14 days. Prescribe antibiotics (Pen V/Amoxyl) or Doxycycline. Consider Tetanus if was in soil. • Soft diet 14 day and good OH • RCT in 7-10 days after reimplantation with Ca(OH)₂ dressings.

Closed apex - extraoral time less than 60 minutes tooth has been kept in an isotonic fluid - as above.

Closed apex – extraoral time over 60 minutes or other reasons resulting in non viable cells – poor prognosis expect ankylosis and resorption of root. Reimplantation still indicated as above except RCT can be done prior to reimplantation, flexible splint needs to be on for 4 weeks and tooth can be placed in 2% sodium fluoride solution for 20 minutes prior to reimplantation to slow down replacement resorption.

Open apex – extraoral time less than 60 minutes tooth has been kept in an isotonic fluid. Clean root surface and apical foramen well with a stream of sterile saline (topical antibiotics have been shown to be an advantage). Reimplant as above and the aim is revascularisation. Risk of infection related resorption which if it occurs is rapid in children. If no revascularisation occurs then carry out RCT as above.

Open apex – extraoral time over 60 minutes or other reasons resulting in non viable cells – poor prognosis and eventual outcome is ankylosis and root resorption. Aim is to reimplant and RCT can be carried out prior to reimplantation but post reimplantation only carry out RCT if there is clinical or radiographic evidence of pulp necrosis. As above but Flexible splint needs to be fitted for 4 weeks.

Please note dentists are advised to consult the “Dental Trauma Guide” on the internet for more comprehensive advice and references.

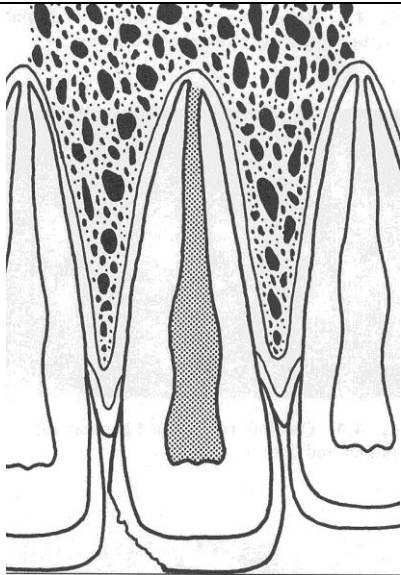
Contraindications to Reimplantation

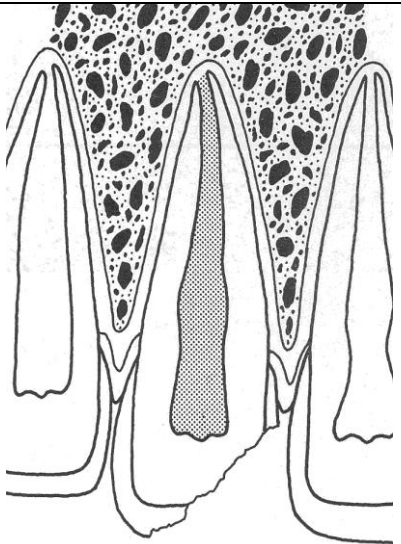
Avulsion:

In a few situations reimplantation is not appropriate and these include:

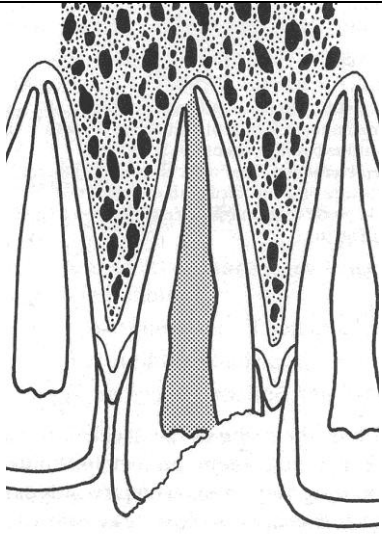
- Primary teeth
- Where other injuries are severe and warrant preferential emergency treatment and / or intensive care
- Where the medical history indicates that the patient would be put at risk by reimplantation of a tooth (such as impaired immune system as a result of active chemotherapy, taking immune-suppressant as a result of an organ transplant or a primary or secondary immunodeficiency). In these cases or with other children who have significant medical histories, for example congenital cardiac defects it is prudent to discuss the treatment options with the child's pediatrician
- For very immature permanent teeth with a short root and wide open apex, where healing by ankylosis is the only outcome. In this situation, however, clinicians may still replant the tooth and leave the further management and decisions to the specialist inter-disciplinary team.

CROWN FRACTURES

Fracture of Enamel	
	• Check vitality. • Take radiograph to ensure no hard tissue damage. • Assess luxation injury and if present refer to Luxation Guidelines. • Smooth enamel if necessary and or • Refer for definitive composite restoration. • Consider unwanted tooth movements and if these are likely make sure this is communicated to patient.

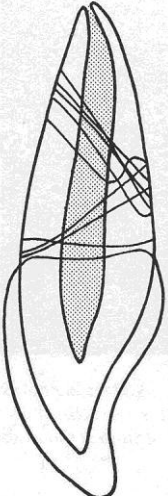
Fracture of Enamel & Dentine	
	• Treatment objective is to protect the pulp. • Very important to cover the exposed dentine. • Take radiograph to ensure no other hard tissue damage. • Assess Luxation injury and if present refer to Luxation Guidelines. • Place rapid setting calcium hydroxide cement e.g. dycal over exposed dentine tubules and protect in the short term with a layer of glass ionomer cement or composite. • Refer for definitive composite restoration. • Consider unwanted tooth movements and if these are likely make sure this is communicated to patient

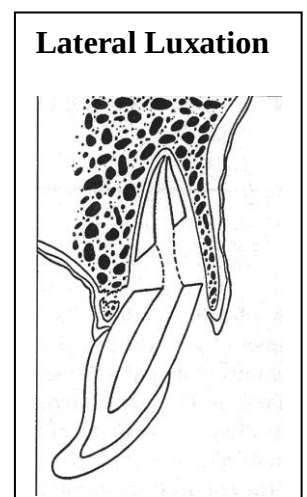
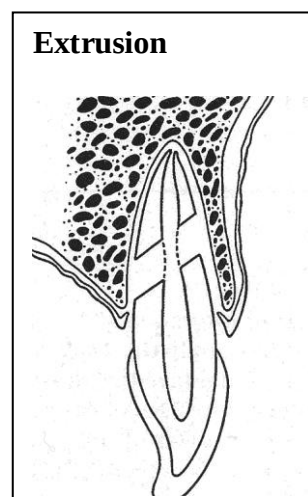
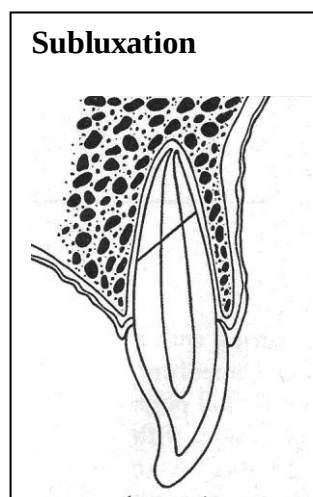
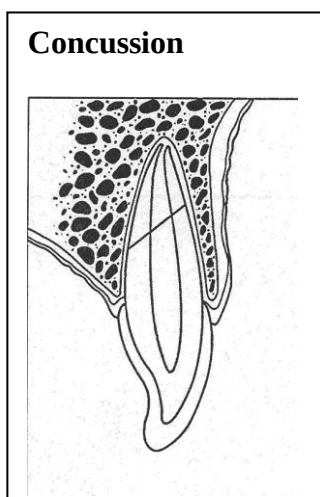
CROWN FRACTURES CONTINUED

Fracture of Enamel Dentine and Pulp	
	• Treatment objective is to maintain viability of exposed pulp. A concomitant luxation injury will reduce success because of associated damage to apical vascular supply. • Consider pulp capping with rapid setting $\text{Ca}(\text{OH})_2$ if treatment is within 8 hours – this requires washing off the thin layer of bacterially contaminated fibrin first. Protect with GI cement, which will require a composite cover within 24 hours. • If pulp inflamed or bacterial contamination suspected remove at least 2 mm of pulp tissue with a diamond bur and copious water. Gently irrigate until bleeding stops (7-8 mins). Place $\text{Ca}(\text{OH})_2$ or MTA cap over and hold in place with GI cement. Composite required within 24 hours.

ROOT FRACTURES

These guidelines are only given for the immediate management of root fractures. Long term management is the responsibility of the patient's existing or future GDP.

	• Root fracture is rare accounting for only 1% of all dental injuries. Accurate repositioning of fragments is very important. • These are normally associated with luxation injuries using the same terminology (see below). • Radiographs. When a root fracture is suspected take 2 radiographs at different angles to help with diagnosis. • Treatment Objectives. 1. To encourage hard tissue union between root fragments. 2. To maintain pulp vitality. 3. To allow completion of root growth (immature teeth). • Method. By reduction of fracture, Flexible splint for 4 weeks. If root fracture is near the cervical area of the tooth, stabilisation is beneficial for up to 4 months with regular follow up testing for vitality • Vitality. The apical fragment nearly always remains vital whilst the coronal fragment retains vitality in 75% of cases. When pulp necrosis does occur the coronal fragment can be root treated to the fracture line.
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Healing can occur by hard tissue union (Fig. 1) or by ingrowth of connective tissue and bone (Fig. 2)

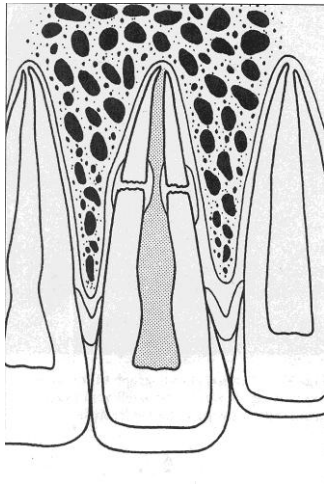


Figure 1

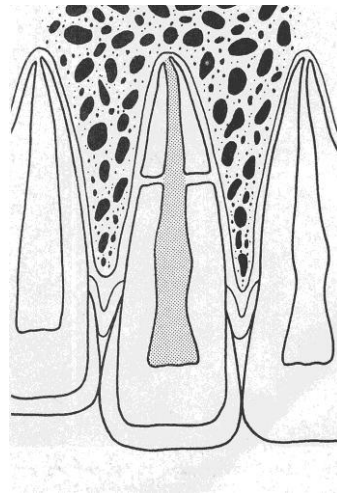
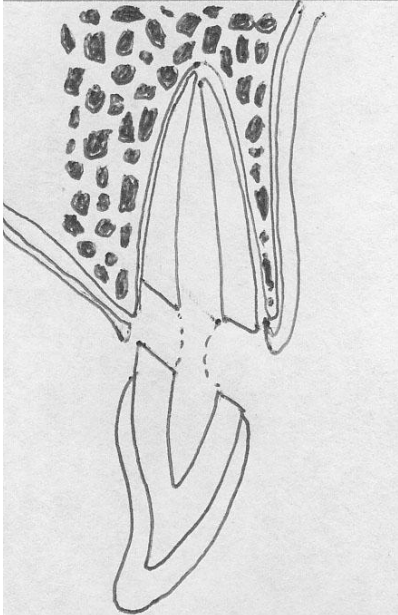


Figure 2

High Level Root Fractures	
	• In these cases the coronal portion cannot be saved long term • Consideration can be given to a permanent restoration in the form of a post crown. • This will depend on the length of remaining root (see radiograph). If the root length is favourable the root can be orthodontically extruded at a later date to a more favourable relationship with the alveolar processes. • If this treatment is a viable option then the pulp should be extirpated and the root canal dressed with a non-setting Ca(OH)_2 paste together with a glass ionomer cement root face seal. • If the coronal fragment is available return this to the patient. It may be possible for their dentist to benefit from it in the medium term management of the anterior aesthetics.