

Permanent Dentition Acute Management of Traumatic Injuries and Follow-up Care during the COVID-19 Pandemic

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Tooth Injury	Acute management	Follow-up	2W	4W	6-8W	3M	4M	6M	12M	Risk of resorption at 12M\$		Pulp necrosis at 12M\$
										Infection related	Ankylosis	
Enamel fracture	<p>Check and account for any fragments and reassure</p> <p>Give post-injury advice‡</p> <p>If sharp and causing soft tissue trauma patient (non AGP):</p> <ul style="list-style-type: none"> advise self-care to smooth edge with a nail file or emery board hand file by clinician with abrasive disc dry tooth with cotton wool and seal over fracture with GIC or RMGIC 	<p>Remote consult at 6-8W, and 12M: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment</p> <p>V. low risk of pulp and periodontal complications</p>			■				■	No data	No data	No data
Enamel-dentine fracture	<p>Check and account for any fragments and reassure</p> <p>Dry with cotton wool and seal over fracture with GIC or RMGIC (non AGP)</p> <p>Seal with conventional composite/flowable composite, if close proximity to pulp place calcium hydroxide lining, cover material with GIC, then composite or reattach fragment if available (AGP)</p> <p>Give post-injury advice‡</p>	<p>Remote consult at 6-8W, and 12M: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment</p> <p>V. low risk of pulp and periodontal complications</p>			■				■	No data	No data	No data
Crown fracture, involving pulp	<p>Check and account for any fragments and reassure</p> <p>If pin point exposure and seen within 24 hours - Direct Pulp cap with: non-setting calcium hydroxide base or non-staining calcium silicate cement over exposed pulp, cover with GIC, then composite or reattach fragment if available (AGP)</p> <p>Otherwise – under local anaesthesia, partial pulpotomy, non-setting calcium hydroxide base or non-staining calcium silicate cement over exposed pulp, cover with GIC, then composite (or for mature tooth RCT is an option) (AGP)</p> <p>Give post-injury advice‡</p>	<p>Remote consult at 6-8W: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment</p> <p>-Clinic review at 3M, 6M, 12M</p> <p>Low risk of periodontal complications</p>			■	*R		*R	*R	No data	No data	Different values for different treatments with immature teeth
Crown-root fracture	<p>Not involving pulp – under local anaesthesia, remove mobile coronal fragment, seal with composite^(AGP)</p> <p>Immature root – under local anaesthesia, remove coronal fragment, partial pulpotomy, non-setting calcium hydroxide or non-staining calcium silicate cement over exposed pulp, cover with GIC, composite^ (AGP)</p> <p>Mature root – under local anaesthesia, remove coronal fragment and either partial pulpotomy (described above) or RCT or bury root and construct immediate denture - see IADT guideline⁴ for full list of treatment options (all potential AGP)</p> <p>Give post-injury advice‡</p>	<p>Remote consult at 6-8W: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- further treatment</p> <p>Clinic review at 3M, 6M, 12M if uncomplicated injury</p> <p>Complex injury with guarded prognosis for tooth survival</p>			■	*R		*R	*R	No data	No data	No data
Root fracture (apical, mid)	<p>If little or no mobility with no change in position - reassure (Non AGP)</p> <p>If displaced coronal fragment - under local anaesthesia, reposition and splint (AGP)</p> <p>Give post-injury advice‡</p>	<p>Remote consult at 2W, 8W: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment</p> <p>Clinic review at 4W for splint removal, 4M, 6M, 12M</p> <p>Low risk of periodontal complications.</p> <p>Pulp necrosis data for immature teeth[€] is 0% (CI 0-29) at 12M</p>	■	*S*R	■		*R	*R	*R	No data	3% (CI 0-7)	26% (CI 13-38)

See notes and references at bottom of table

Tooth Injury	Acute management	Follow- up	2W	4W	6-8 W	3 M	4M	6 M	12 M	Risk of resorption at 12M\$		Pulp necrosis at 12M\$
											Infection related	
Root fracture (cervical) For supracrestal fracture-see crown/root fracture	Under local anaesthesia, reposition coronal fragment if displaced and splint (AGP – see splinting section below) Give post-injury advice‡	Remote consult at 2W, 8W: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment Clinic review at 4W, 4M for splint removal, 6M, 12M Low risk of periodontal complications – but guarded prognosis for tooth survival Little prognosis data for immature teeth available on DTG	■	*R	■		*S*R	*R	*R	No data	No data	31% (CI 9-54)
Alveolar fracture	Under local anaesthesia, reposition displaced segment and splint (AGP – see splinting section below) Give post-injury advice‡	Remote consult at 2W, 8W: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment Clinic review at 4W for splint removal, 4M, 6M, 12M Low risk of periodontal complications Little prognosis data for immature teeth available on DTG	■	*S*R	■		*R	*R	*R	2% (CI 0-4)	1% (CI 0-3)	38% (CI 31-46) this figure rises to 45% at 10 years
Concussion-immature€	Reassure (Non AGP) Give post-injury advice‡	Remote consult at 4W, and 12M: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment Low risk of pulp and periodontal complications Concomitant crown fracture increases chances of pulp necrosis		■					■	0% (CI 0-7)	0% (CI 0-7)	0% (CI 0-7)
Concussion-mature	Reassure (Non AGP) Give post-injury advice‡				■					■	0 (CI 0-4)	0% (CI 0-7)
Subluxation-immature€	Reassure (Non AGP) Give post-injury advice‡	Remote consult at 2W, 3M, 6M, 12M: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment Clinic review at 3M, 12M for subluxation injuries involving a mature tooth	■			■		■	■	0% (CI 0-3)	0% (CI 0-3)	0% (CI 0-3)
Subluxation-mature	Reassure (Non AGP) Give post-injury advice‡	Low risk of pulp and periodontal complications Concomitant crown fracture increases chances of pulp necrosis	■			*R		■	*R	0% (CI 0-12)	0% (CI 0-3)	13% (CI 6-19)
Extrusion-immature€	Under local anaesthesia, reposition displaced tooth and splint (AGP – see splinting section below) Give post-injury advice‡	Remote consult at 2W, 8W, 6M: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment Clinic review at 4W for splint removal 3M, 12M Low risk of pulp and periodontal complications Concomitant crown fracture may increase chances of pulp necrosis	■	*S*R	■	*R		■	*R	3% (CI 0-9)	0% (CI 0-12)	6% (CI 0-14)
Extrusion-mature	Under local anaesthesia, reposition displaced tooth and splint (AGP – see splinting section below) Give post-injury advice‡	Remote consult at 2W, 8W: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment Clinic review at 4W for splint removal, 3M, 6M, 12M Low risk of periodontal complications Concomitant crown fracture increases chances of pulp necrosis	■	*S*R	■	*R		*R	*R	0% (CI 0-37)	0% (CI 0-37)	57% (CI 38-75)
Lateral luxation-immature€	Under local anaesthesia, reposition displaced tooth and splint (AGP – see splinting section below) Give post-injury advice‡	Remote consult at 2W, 8W, 6M: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment Clinic review at 4W for splint removal, 3M, 12M Low risk of periodontal complications Concomitant crown fracture increases chances of pulp necrosis	■	*S*R	■	*R		■	*R	0% (CI 0-10)	0% (CI 0-10)	5% (CI 0-11)

See notes and references at bottom of table

Tooth Injury	Acute management	Follow-up	2W	4W	6-8W	3M	4M	6M	12M	Risk of resorption at 12M\$		Pulp necrosis at 12M\$
											Infection related	
Lateral luxation-immature	Under local anaesthesia, reposition displaced tooth and splint (AGP – see splinting section below) Give post-injury advice‡	Remote consult at 2W, 8W to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment Clinic review at 4W for splint removal, 3M, 6M, 12M Low risk of periodontal complications Concomitant crown fracture may increase chances of pulp necrosis	*	*S*R	*	*R		*R	*R	1% (CI 0-3)	1% (CI 0-3)	65% (CI 55-75)
Intrusion-immature€	Allow re-eruption without intervention - Passive re-eruption (Non AGP) Give post-injury advice‡	Remote consult at 2W: to assess oral hygiene, healing and complications. If concerns see in clinic earlier than 4W Clinic review at 4W, 8W, 3M, 6M, 12M: if no signs of re-eruption after 8W discuss care with specialist colleagues Concomitant crown fracture increases chances of pulp necrosis	*	*R	*R	*R		*R	*R	33% (CI 13-54)	6% (CI 0-16)	50% (CI 30-70)
Intrusion-mature	Less than 7mm - allow re-eruption without intervention - Passive re-eruption (Non AGP) Greater than 7mm – under local anaesthesia, surgically reposition and splint (AGP– see splinting section below) Give post-injury advice‡	For teeth treated with passive re-eruption Remote consult at 2W, 8W, 6M: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment Clinic review at 4W for RCT, 3M, 12M For teeth repositioned surgically Clinic review at 2W for splint removal and RCT, 3M, 12M Remote consult at 4W, 6M: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment	*	*R RCT	*	*R		*	*R	5% (0-14%)	10% (0-24%) with figure increasing to 38% at 10 years follow-up	100% (CI not available)
Avulsion-immature€	Under local anaesthesia, replant and splint (AGP– see splinting section below) Give post-injury advice‡	Remote consult at 2W: to assess oral hygiene, healing and complications. If concerns see in clinic earlier than 4W Clinic review at 4W for splint removal, 4W, 8W, 3M, 6M, 12M	*	*S*R	*R	*R		*R	*R	37% (CI 15-59)	31% (CI 15-59)	58% (CI 36-80)
Avulsion-mature	Under local anaesthesia, replant and splint (AGP– see splinting section below) Give post-injury advice‡	Clinic review at 2W for splint removal and RCT, 3M, 12M Remote consult at 4W, 6M: to assess oral hygiene, healing and complications. If concerns see in clinic for detailed assessment +/- treatment	*S*R RCT	*		*R		*	*R	13% (CI 3-22)	54% (CI 40-68)	100% (CI not available)
<i>See notes and references at bottom of table</i>												

Managing traumatic dental injuries to the permanent dentition and minimising the risk of transmission of COVID-19 to patients and staff. This guidance is to be read in conjunction with wider guidance on resuming general dental services¹, principles for acute care during the pandemic² and the new 2020 IADT trauma guidelines^{3,4,5}. The document aims to maintain the quality of care and outcomes for patients with traumatic dental injuries while minimising both the number of face to face clinic visits and Aerosol Generating Procedures. BSPD and Dental Trauma UK feel that where the decision has been made to see the patient in clinic, gold standard care should be provided even if it is likely to involve an Aerosol Generating Procedure (AGP) rather than choosing a non-Aerosol Generating Procedure AGP (non AGP) option (this may lead to poorer outcomes or the need to return to clinic sooner than anticipated – e.g. lost restoration or premature debonding of a splint). However, we are aware that in some situations dental care may be provide in sites restricted to non AGPs and potential modifications are discussed in the splint and splint removal sections below. This guidance is likely to evolve over time as dental services return to normal, at which point this guidance will be withdrawn in preference for the new 2020 IADT trauma guidelines^{3,4,5}.

Following acute injury, remote consultation (e.g. telephone, photographs or video conferencing) can help clinical teams to clarify a provisional diagnosis and treatment. In addition to history taking, this facilitates discussions with parents or carers and the patient, preparing them for what to expect and allows-mask-free interactions. An effective remote consultation may also reduce the face-to-face time on clinic, and thereby maximising the potential use of clinic and minimise Personal Protective Equipment usage. For severe trauma cases (such as crown/root fractures, cervical third root fractures, intrusions and avulsions) it is often helpful to discuss their management with specialist colleagues, and emergency care should focus on stabilising the dentition and keeping treatment options open.

AGP = aerosol generating procedure/s AGP – see national (Scottish and Welsh) guidance^{1,6} for dental activities classed as AGP

Follow-up appointments are undertaken to assess healing, oral hygiene and complications. The incidence of pulp and periodontal complications is provided in the table for each injury. The IADT guidelines^{3,4,5} recommends clinical reviews and radiographs to be undertaken at the time points highlighted in green and blue. Remote consultation, highlighted in green, should assess patient reported healing, complications/concerns and reinforced oral hygiene. BSPD and Dental Trauma UK has tried to balance the potential risk for late identification of complications while minimising face to face consultations. During phase 2b¹, we anticipate a return to standard clinic-based follow-up appointments.

* = review appointment = clinic consultation

* = review appointment = remote consultation (e.g. telephone, photographs or video conferencing). If complications (such as signs of pulp necrosis) are suspected then the patient should be seen in clinic for further assessment. This appointment will need to be planned with the provision that an AGP may be necessary and therefore time allowed for this.

R = radiograph advised if attending for a clinical visit.

GIC = glass ionomer cement

RMGIC = Resin Modified Glass Ionomer – Orthodontic guidance⁸ describes how light cured modified GIC can be used without generating an AGP. Its suitability in dental trauma situations is unknown.

^ = for crown root fractures some clinicians may prefer to use other materials in subgingival areas such as, but not limited to, GIC or RMGIC

Splinting - the new IADT 2020 guidelines^{2,3,4} and wider literature⁷ describe a number of different approaches to splint placement. A composite wire splint is the gold standard and is an AGP owing to the use of a 3-in-1. If dental care is provided in sites restricted to non AGPs an alternative approach could use a protocol described for orthodontics⁸ using a light cured modified GIC or self-etch primer to hold a splint in place. These non AGP techniques are described in detail⁸, but their effectiveness in the dental trauma situation is unknown.

S = splint removal - conventional removal of a splint using a handpiece is an AGP. Non AGP options include the use of orthodontic wire cutters to cut the wire but leave the composite in-situ or orthodontic bracket removers to fracture the composite away from the teeth. Rough margins of composite can be reduced by hand using abrasive discs. Orthodontic brackets and 0.016 orthodontic wire provide a simple option for splint removal; however, the placement of orthodontic brackets requires a skilled operator to ensure passive placement of the wire and prevent unintended orthodontic tooth movement.

RCT = root canal treatment e.g. first stage endodontic treatment (extirpation, disinfection and dressing with an appropriate intracanal medicament such as non-setting calcium hydroxide). The British Endodontic Society⁹ provides detailed guidance on how to safely undertake this procedure while AGPs are a concern.

Pulpotomy – the British Endodontic Society⁹ provides detailed guidance on how to safely undertake this procedure while AGPs are a concern.

‡Post injury advice – (i) Care when eating not to further traumatise the injured teeth while encouraging a return to normal function as soon as possible, (ii) To encourage gingival healing and prevent plaque accumulation, clean the affected area with a soft brush or cotton swab combined with an alcohol-free chlorhexidine gluconate mouth rinse applied topically twice a day for one week. Confirm allergy status before advising the use of chlorhexidine.

Antibiotics – the prescription of antibiotics is recommended following avulsion injuries⁴ and at the discretion of the clinician for other injuries³.

§ Prognosis data is provided in the Dental Trauma Guide (www.dentaltraumaguide.org). Pulp necrosis data is based on the absence of a crown fracture and an unknown response to sensitivity testing at the time of injury.

DTG is the Dental Trauma Guide (www.dentaltraumaguide.org)

CI – confidence interval

€ Immature tooth prognosis is based on convergent root canal morphology, Moores 5 classification, with data provided in the Dental Trauma Guide (www.dentaltraumaguide.org). For more immature teeth, pulpal prognosis is often better than the figure provided

& Avulsions treatment and prognosis figures relate to a dry time of 0-5 minutes and wet time of more than five minutes. Prognosis data for alternative scenarios is provided in the Dental Trauma Guide (www.dentaltraumaguide.org) and IADT guidelines⁵.

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