



Top tips for managing orthodontic emergencies in primary care

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Introduction

The General Dental Council (GDC) in *Preparing for practice*¹ state the following learning objectives should have been achieved by dentists upon qualification, in relation to supporting patients undergoing orthodontic treatment. These objectives include explaining to patients the risks of orthodontic treatment and being able to undertake limited orthodontic appliance emergency procedures.

Whilst most orthodontic appliance emergencies are dealt with by specialist practices, there are occasions where the general dental practitioner (GDP) is faced with an anxious parent or patient with

an emergency they may not be so familiar with. Dentists report seeing an average of one orthodontic emergency every six months and reassuringly most are confident in how to deal with the majority of common problems.²

That said, there are times when patients can't access specialist practice facilities to deal with the problem for geographical or financial reasons, and problems relating to retention can occur long after discharge from their orthodontic practitioner.

Detailed guidance has previously been published on the management of orthodontic emergencies in a general practice,^{3,4,5} but in this short paper we discuss five likely presentations of orthodontic emergencies and share our pragmatic tips on how the GDP can manage them.

Trauma from a broken fixed appliance

This is documented as the most common cause of an orthodontic emergency⁶ and is usually a lost bracket or a protruding archwire. We do not recommend that GDPs replace lost brackets but may be called upon to manage a problematic archwire. When faced with this, we recommend that the practitioner considers why the archwire has become traumatic. These problematic archwires can cause trauma to the oral mucosa (Fig. 1) and this is often due to the following:

1. Tooth movement. When spaces are closed due to sliding mechanics on a straight wire appliance, wire begins to protrude out of the distal tube or band slot. Consider – wax and reassurance if mild (Fig. 2) or cut the offending distal end of the wire with distal end cutters (Fig. 3)



Fig. 1 Trauma to the oral mucosa from an archwire



Fig. 2 Wax on a protruding archwire end



Fig. 3 Cutting the distal end of an archwire

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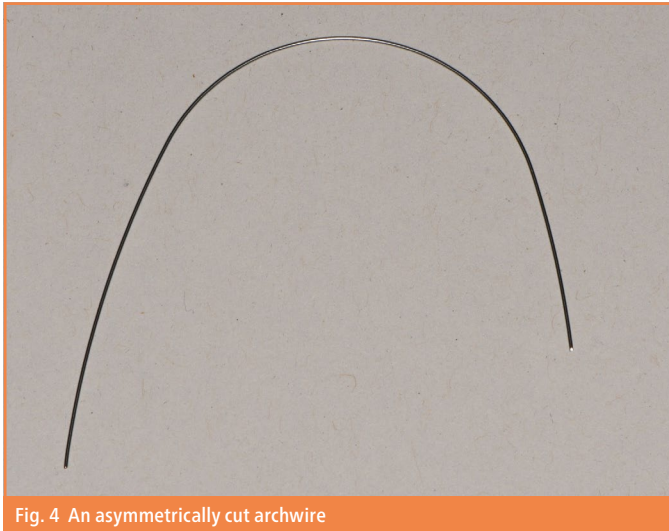


Fig. 4 An asymmetrically cut archwire



Fig. 5 Loss of a terminal molar band or tube

2. Swivelled or rotated archwire. This normally happens to patients in flexible aligning archwires due to occlusal forces directly or indirectly flexing the archwire between the brackets or tubes, causing it to move round. It is not dissimilar to losing one end of the cord in your swimming trunks! Archwire swivelling can also occur when an aligning archwire has been asymmetrically cut and then placed into a symmetrical arch form (Fig. 4). The asymmetric arch wire rotates over time to fit the arch form and protrudes out one end. To diagnose a swivelled wire, look at the contralateral side to see if it is short. Consider – wax and reassurance if mild, cut the distal end with distal end cutters or (if confident) grip and reposition the swivelled wire with a pair of utility pliers
3. Loss of distal band or tube. Sometimes, the distal tube or band becomes detached from the tooth, leaving a long length of wire protruding (Fig. 5). Consider – cut the distal end of the wire with distal end cutters
4. Wire displaced from distal tube or band slot. When the orthodontist has included the second molars on the appliance in addition to first molars, the wide inter-slot length can result in a flexible wire being displaced out of the tube slot due to occlusal forces. The wire can also come out of the first molar tube slot when unsupported in extraction or hypodontia cases. Consider – replace the arch wire in the slot with a pair of utility pliers or cut the arch wire distal to the terminal bracket with distal end cutters.

Pain from orthodontic tooth movement

Orofacial pain is a common side effect of orthodontic treatment, occurring in 72–100% of patients.⁷ The pain usually starts 12 hours after orthodontic force application, peaks after 24 hours and lasts for 3–7 days. In a minority of cases, it can take up to one month to return to pre-treatment levels.

Orthodontic pain is caused by ischaemic changes in the periodontal ligament (PDL) and a resulting cascade of inflammatory responses that form part of the biology of tooth movement. The pain is ultimately controlled by endogenous analgesic mechanisms, but some patients benefit from intervention. Despite many interventions claiming to regulate orthodontic pain, the only approach based on robust evidence

is a pharmacological one. Consider – reassurance in the form of demonstrating an understanding of what is happening to the patient and the appropriate prescription of non-opioid analgesics or non-steroidal anti-inflammatory drugs.

Lost or broken retainers

Most orthodontic patients require indefinite retention to prevent long-term post-treatment changes to their occlusions.⁸ Therefore, the breakage or loss of a retainer must be addressed with urgency. We have identified the following as retainer emergencies and recommend some basic interventions to those practitioners with limited orthodontic experience, equipment, and materials:

1. Loss of a removable retainer. Consider – an impression or intra oral scan followed by provision of a replacement retainer to be worn as recommended by the patient's orthodontist
2. Complete loss of a bonded retainer. Consider – removal of the residual composite with a composite removing bur followed by an impression or intra-oral scan to provide a removable pressure-formed retainer. This will buy the patient time to find a practitioner to consider having the bonded retainer replaced if appropriate
3. Partial fracture of a bonded retainer. Consider – removal of redundant residual composite with a composite-removing bur and smoothing down of potentially traumatic wire ends with an abrasive disc. This can then be followed by an impression or intra oral scan to provide a removable pressure-formed retainer
4. Partial debond of a bonded retainer. Consider – removal of redundant residual composite from the tooth (fluted tungsten carbide bur and a slow handpiece) and retainer wire (utility pliers) followed by careful repair with new composite resin bonded by the practitioner's choice of system. Care must be taken to ensure the retainer wire is recemented correctly, ensuring that it is passive so as not to cause any unwanted tooth movement.

In the absence of any pre-existing instructions for the wear of removable retainers, we recommend overnight wear until the patient can return to the orthodontist supervising their retention. ▶▶



Fig. 6 Orthodontic appliance-related demineralisation

« Demineralisation

Demineralised lesions are caused by poor appliance cleaning and cariogenic diet (Fig. 6). They can take only four weeks to occur during orthodontic treatment⁹ and are prevalent in a significant percentage of orthodontic patients.¹⁰ The reinforcement of oral hygiene instructions to clean an orthodontic appliance and diet advice to reduce the frequency of sugars are paramount. The professional application of fluoride every 6–8 weeks during appliance therapy is associated with a reduction in the development of demineralised lesions.¹¹

With demineralisation in mind, it is imperative to have effective communication between dental colleagues when orthodontic treatment is planned. This allows the GDP to contribute to the risk assessment before treatment begins and develops a shared responsibility between all parties in the prevention of damage to the oral tissues.

Should the dental practitioner have concerns about the patient's oral hygiene or suspect that demineralisation has already occurred and the patient cannot immediately return to the orthodontic specialist, we recommend the following action:

1. Clean the teeth and appliance with a combination of prophylactic paste and rubber cup, ultrasonic scaler to remove calculus deposits and interproximal brushes to clean under the archwire adjacent to brackets
2. Rinse and dry the dentition and examine all teeth for demineralisation
3. Consider intra oral photographs, document findings and inform the patient.

If demineralisation has NOT occurred, then we recommend the following immediate action:

1. Reinforce diet advice and appliance cleaning instructions
2. Consider professional application of high dose fluoride¹²
3. Strongly advise the patient to seek a timely review with their orthodontic specialist
4. Communicate to the orthodontic specialist your findings and management actions.

If demineralisation HAS occurred and the patient has no timely access to an orthodontic practitioner, then we recommend the following immediate action:

1. Reinforce diet advice and appliance cleaning instructions

2. Remove the brackets and leave the residual composite resin on the tooth surface. DO NOT use a composite removing bur and handpiece as this may cause damage the enamel
3. Take an impression or intra oral scan and provide removable pressure formed retainers for part time wear
4. Consider prescription of products containing casein phosphopeptides-amorphous calcium phosphate (CPP-ACP)¹³
5. Strongly advise the patient to seek a timely review with their orthodontic specialist
6. Communicate to the orthodontic specialist your findings and management actions.

The removal of orthodontic brackets and composite can result in minor enamel loss for all orthodontic patients,¹⁴ but is worse in patients with evidence of enamel demineralisation.¹⁵ As this iatrogenic enamel damage is mainly associated with the composite removal stage of appliance removal, we recommend that careful composite removal is carried out by the orthodontic specialist after attempting to remineralise the tooth surface.

Demineralisation can improve in the first six months following cessation of orthodontic treatment with improved diet and toothbrushing.¹⁶ High-dose fluoride applications are effective in preventing demineralisation but should be avoided in the immediate management of orthodontic demineralisation. The use of CPP-ACP (tooth mousse) could be considered.

'The removal of orthodontic brackets and composite can result in minor enamel loss for all orthodontic patients [...]'

Acute gingival conditions

Plaque-related gingivitis is common in orthodontic patients and although important to diagnose, inform and manage, in isolation is not an orthodontic emergency.

However, there are gingival conditions that present during orthodontic treatment that either require urgent management such as necrotising gingivitis/necrotising periodontitis (NG/NP) or cause great concern to patients due to the appearance, such as severe gingival enlargement (SGE).

NG/NP classically presents with pain, loss of inter-dental papilla, bleeding, halitosis, fever, malaise and lymphadenopathy. The incidence of NG/NP in orthodontic patients is unknown,¹⁷ but it may be more common in orthodontic patients due to the plaque retentive nature of fixed appliances.

It can present in a variety of forms with varied severity,¹⁸ and as necrotising ulcerative gingivitis (NUG) can cause irreversible damage to the gingiva, we recommend the following:

1. Cessation of modifying factors such as smoking
2. Oral hygiene instruction
3. Debridement of areas affected
4. If the patient is pyrexia – prescription of metronidazole 400 mg, three times daily for three days with chlorhexidine mouthwash to be used twice a day for seven days
5. Review. ▶▶

Box 1 Orthodontic equipment for managing orthodontic emergencies

- Distal end cutters
- Bracket removal pliers
- Utility orthodontic pliers (Weingarts)
- Composite removing bur
- Orthodontic wax
- Band removing pliers

Box 2 Simple skills to develop for managing orthodontic emergencies

- Cutting a distal end
- Placing orthodontic wax
- Removing and placing elastomeric modules
- Removing an archwire
- Repositioning a swivelled archwire
- Repair of a partially debonded fixed retainer
- Removing orthodontic brackets and bands

◀ Unless the orthodontic appliance is preventing access for debridement or is associated with enamel demineralisation, an immediate debond for NG/NP may not be indicated. A debond of the appliance followed by provision of removable retention could be considered if:

1. This is requested by a specialist periodontologist
2. The oral hygiene is extremely poor
3. The gingival condition fails to resolve after standard intervention
4. Loss of attachment is severe.

Gingival enlargement is positively associated with fixed appliance orthodontic treatment and when it occurs anteriorly has a negative effect on oral health-related quality of life.¹⁹ It is believed to be caused by plaque accumulation or local irritation from the appliances but can also be hereditary, allergic response or drug-induced. Interestingly, the amount of plaque present is not directly related to the severity of gingival enlargement but appears to be due to the make-up of the plaque and the host response.²⁰

Severe gingival enlargement is a chronic condition that is not normally associated with pain or loss of attachment but can be a cause of severe concern to a parent or patient. Although it is generally agreed that gingival enlargement resolves after completion/cessation of orthodontic treatment, some cases persist and may need gingival surgical procedures.²¹

If the dental practitioner is presented with a patient deeply upset by severe orthodontic-associated gingival enlargement, consider either:

1. Reinforcement of appliance cleaning and reassurance that ‘most’ cases resolve after completion of orthodontic treatment. Advise orthodontic review when next possible
2. If no foreseeable orthodontic review possible, gain consent for cessation of orthodontic treatment and provision of part time removable retainers if patient wishes to retain significant tooth

movements. As above, reassure patient that ‘most’ cases resolve after completion of orthodontic treatment.

We have described some simple interventions and equipment required (Box 1) to manage some common orthodontic emergencies. We encourage undergraduate dental students and general dental practitioners to work with their orthodontic colleagues to develop competencies (Box 2) to confidently deal with these situations.

Conclusions

Orthodontic emergencies, whilst relatively rare, can present at inopportune moments. The tips presented in this paper allow guidance on how some frequently presenting acute orthodontic problems may best be managed in primary care when timely access to a specialist orthodontist may not be feasible. ■

References

1. General Dental Council. Preparing for practice. Dental team learning outcomes for registration (2015 revised edition). Available at: <https://www.gdc-uk.org/docs/default-source/quality-assurance/preparing-for-practice-%28revised-2015%29.pdf> (accessed February 2023).
2. Popat H, Thomas K, Farnell D J J. Management of orthodontic emergencies in primary care – self-reported confidence of general dental practitioners. *Br Dent J* 2016; **221**: 21–24.
3. Sodipo I, Birdsall J. Orthodontic first aid for general dental practitioners. *Dent Update* 2016; **43**: 461–471.
4. Dowsing P, Murray A, Sandler J. Emergencies in orthodontic practice Part 1: Management of general orthodontic problems as well as common problems with fixed appliances. *Dent Update* 2015; **42**: 131–140.
5. Dowsing P, Murray A, Sandler J. Emergencies in orthodontic practice Part 2: Management of removable appliances, functional appliances and other adjuncts to orthodontic treatment. *Dent Update* 2015; **42**: 221–228.
6. Kwon O, Sivamurthy G, McIntyre G. Patient experience and usage of orthodontic emergency clinics: a local re-audit. *BOS Clinical Effectiveness Bulletin*, November 2019.
7. Long H, Wang Y, Jian F, Liao L, Yang X, Lai W. Current advances in orthodontic pain. *Int J Oral Sci* 2016; **8**: 67–75.
8. Littlewood S, Dalci O, Dolce C, Holliday S, Naraghi S. Orthodontic retention: What's on the horizon? *Br Dent J* 2021; **230**: 760–764.
9. Reilly M M, Featherstone J D. Decalcification and remineralization around orthodontic appliances: An in vivo study. *Am J Orthod Dentofacial Orthop* 1987; **92**: 33–40.
10. Ogaard B. Prevalence of white spot lesions in 19 year olds: a study on untreated and orthodontically treated persons 5 years after treatment. *Am J Orthod Dentofacial Orthop* 1989; **96**: 423–427.
11. Benson P E, Parkin N, Dyer F, Millett D T, Germain P. Fluorides for preventing early tooth decay (demineralised lesions) during fixed brace treatment. *Cochrane Database Syst Rev* 2019; doi: 10.1002/14651858.CD003809.pub4.
12. NHS Education for Scotland. Prevention and management of dental caries in children. Dental Clinical Guidance. 2018. Available at: <https://www.sdcep.org.uk/published-guidance/caries-in-children/> (accessed August 2023).
13. Sampson V, Sampson A. Diagnosis and treatment options for anterior white spot lesions. *Br Dent J* 2020; **229**: 348–352.
14. Ryf S, Flury S, Palaniappan S, Lussi A, van Meerbak B, Zimmerli B. Enamel loss and adhesive remnants following bracket removal and various clean up procedures in vitro. *Eur J Orthod* 2012; **34**: 25–32.
15. Cochrane N, Ratnesar S, Reynolds E. Effect of different orthodontic adhesive removal techniques on sound, demineralized and remineralized enamel. *Aust Dent J* 2012; **57**: 365–372.
16. Khoroushi M, Kachuie M. Prevention and treatment of white spot lesions in orthodontic patients. *Contemp Clin Dent* 2017; **8**: 11–19.
17. Sangani I, Watt E, Cross D. Necrotizing ulcerative gingivitis and the orthodontic patient: A case series. *J Orthod* 2013; **40**: 77–80.
18. Rodríguez-Pulido J, Quiroga-Zúñiga N, Martínez-Sandoval G. Clinical diagnosis and treatment of necrotizing ulcerative gingivitis in the orthodontic patient. A case report. *J Oral Res* 2016; **5**: 119–123.
19. Pinto A, Alves L, Eduardo J, Zenkner A, Zanatta F, Maltz M. Gingival enlargement in orthodontic patients: Effects of Treatment duration. *Am J Orthod Dentofacial Orthop* 2017; **152**: 477–482.
20. Vincent-Bugnas S, Borsari L, Gruss A, Lupi L. Prioritisation of predisposing factors of gingival hyperplasia during orthodontic treatment: the role of the amount of biofilm. *BMC Oral Health* 2021; doi: 10.1186/s12903-021-01433-2.
21. Kouraki E, Bissada N, Paloma J, Ficara A. Gingival enlargement and resolution during and after resolution. *N Y State Dent J* 2005; **71**: 34–37. ✦