NATIONAL CLINICAL GUIDELINES

THE MANAGEMENT OF DENTAL EMERGENCIES

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المبادئ الإرشادية السريرية لدولة قطر
NATIONAL CLINICAL GUIDELINES FOR QATAR

وزارة الصحـــــة العامـــــة
Ministry of Public Health
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1.0	Final	23rd September 2020	Guidelines Team	Final version for Publication.

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Abbreviations

The abbreviations used in this guideline are as follows:

CBCT	Cone Beam Computed Tomography
ED	Emergency Department
INR	International normalised ratio
NAI	Non-Accidental Injury
NSAIDs	Non-steroidal anti-inflammatory drugs
TMJ	Temporomandibular joint

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1 Information about this Guideline

1.1 Objective and Purpose of the Guideline

The purpose of this guideline is to define the appropriate management and prevention of dental emergencies in all age groups. The objectives are to:

- Encourage a consistent approach to the management of acute dental problems to reduce avoidable variation in clinical practice.
- Improve the quality of unscheduled clinical care for patients with acute dental problems.
- Provide a standard for the initial management of presenting symptoms for patients with acute dental problems.
- Ensure patients receive appropriate advice about subsequent care and/or referral to appropriate treatment providers, if applicable.

It is intended that the guidelines will be used primarily by dentists in all healthcare settings including dental staff directly involved in responding to emergency calls and to be familiarised by medical healthcare professionals.

1.2 Scope of the Guideline

The following aspects of care are included within this guideline:

- The diagnosis and management of dental emergencies in children aged ≥6 months and in adults.
- All population groups, irrespective of the healthcare setting or whether they are regular attendees for routine dental care.
- Prevention of dental emergencies.

The management of maxillofacial injuries is beyond the scope of this guideline.

1.3 Editorial Approach

This guideline document has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The guideline will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

The editorial methodology, used to develop this guideline, has involved the following critical steps:

- Extensive literature search for well-reputed published evidence relating to the topic.
- Critical appraisal of the literature.
- Development of a draft summary guideline.
- Review of the summary guideline with a Guideline Development Group, comprised of practising healthcare professionals, subject matter experts and patient representatives, from across Qatar.
- Independent review of the guideline by the National Clinical Guidelines & Pathways Committee, appointed by the MOPH, from amongst stakeholder organisations across Qatar.

Whilst the MOPH has sponsored the development of the guideline, the MOPH has not influenced the specific recommendations made within it.

1.4 Sources of Evidence

The professional literature has been systematically queried using specially developed, customised, and tested search strings. Search strategies are developed to allow efficient yet comprehensive analysis of relevant publications for a given topic and to maximise retrieval of articles with certain desired characteristics pertinent to a guideline.

For each guideline, all retrieved publications have been individually reviewed by a member of the Editorial Team and assessed in terms of quality, utility, and relevance. Preference is given to publications that:

1. Are designed with rigorous scientific methodology.
2. Are published in higher-quality journals.
3. Address an aspect of specific importance to the guideline in question.

Further information about the literature search and appraisal process is included in the appendix.

1.5 Evidence Grading and Recommendations

Recommendations made within this guideline are supported by evidence from the medical literature and where possible the most authoritative sources have been used in the development of this guideline. In order to provide insight into the evidence basis for each recommendation, the following evidence hierarchy has been used to grade the level of authoritativeness of the evidence used, where recommendations have been made within this guideline.

Where the recommendations of international guidelines have been adopted, the evidence grading is assigned to the underlying evidence used by the international guideline. Where more than one source has been cited, the evidence grading relates to the highest level of evidence cited:

- **Level 1 (L1):**
  - Meta-analyses.
  - Randomised controlled trials with meta-analysis.
  - Randomised controlled trials.
  - Systematic reviews.

- **Level 2 (L2):**
  - Observational studies, examples include:
    - Cohort studies with statistical adjustment for potential confounders.
    - Cohort studies without adjustment.
    - Case series with historical or literature controls.
    - Uncontrolled case series.
  - Statements in published articles or textbooks.

- **Level 3 (L3):**
  - Expert opinion.
  - Unpublished data, examples include:
    - Large database analyses.
    - Written protocols or outcomes reports from large practices.

In order to give additional insight into the reasoning underlying certain recommendations and the strength of recommendation, the following recommendation grading has been used, where recommendations are made:

- **Recommendation Grade A (RGA):** Evidence demonstrates at least moderate certainty of a net benefit from the recommendation.
- **Recommendation Grade B (RGB):** Evidence is insufficient, conflicting, or poor and demonstrates an incomplete assessment of net benefit vs harm; additional research is recommended.
- **Recommendation Grade C (RGC):** Evidence demonstrates potential harm that outweighs benefit; additional research is recommended.
- **Recommendation of the GDG (R-GDG):** Recommended best practice on the basis of the clinical experience of the Guideline Development Group members.

1.6 Guideline Development Group Members

The following table lists members of the Guideline Development Group (GDG) nominated by their respective organisations and the National Clinical Guidelines & Pathways Committee. The GDG members have reviewed and provided their feedback and approval of the guideline document. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

Guideline Development Group Members		
Name	**Title**	**Organisation**
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Dr Aju Koshy Abraham	General Practitioner Dentist	Qatar Red Crescent Society
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Ms Maria Elena	Patient Representative	-
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Guideline Development Group Members		
Name	**Title**	**Organisation**
Ms Wejdan Bassam Ibraighith	School Nurse	Primary Health Care Corp
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Mr Irwin Vilage	Patient Representative	-

1.7 National Clinical Guidelines & Pathways Committee Members

The following table lists members of the National Clinical Guidelines & Pathways Committee (NCGPC), appointed by the MOPH. The NCGPC members have reviewed and provided their feedback and approval of the guideline document. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

National Clinical Guidelines & Pathways Committee (NCGPC) Members		
Name	**Title**	**Organisation**
Ms Huda Amer Al-Katheeri	Chair of the NCGPC, Director- Strategic Planning & Performance Department	Ministry of Public Health
Shk Dr Mohammed Hamad J. Al Thani	Co-Chair of NCGPC, Director of Public Health	Ministry of Public Health
Prof Anthony Akobeng	Chair Clinical Practice Guidelines Committee	Sidra Medicine
Dr Alshaymaa Mohammed A. M. Al-Motawa	Consultant Family Medicine	Qatar Petroleum
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Dr Abi Khalil Charbel	Associate Professor of Medicine Consultant Cardiology	Weill Cornell Medicine - Qatar
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Dr Ghassan Youseph Hommos	Consultant Endocrinology	Al Emadi Hospital
Dr Hani Benhassen Kilani	Senior Consultant, Executive Director for Corporate Clinical Policy and Guidelines	Hamad Medical Corporation
Dr Egon Toft	VP and Dean	College of Medicine, Qatar University

1.8 Responsibilities of Healthcare Professionals

This guideline has been issued by the MOPH to define how care should be provided in Qatar. It is based upon a comprehensive assessment of the evidence as well as its applicability to the national context of Qatar. Healthcare professionals are expected to take this guidance into account when exercising their clinical judgement in the care of patients presenting to them.

The guidance does not override individual professional responsibility to take decisions which are appropriate to the circumstances of the patient concerned. Such decisions should be made in consultation with the patient, their guardians, or caregivers and should consider the individual risks and benefits of any intervention that is contemplated in the patient's care.

2 Dental Emergencies Pathways

2.1 Dental Trauma Pathway

Fig. 2.1: Dental Trauma Pathway [1].

2.2 Oral Pain Pathway

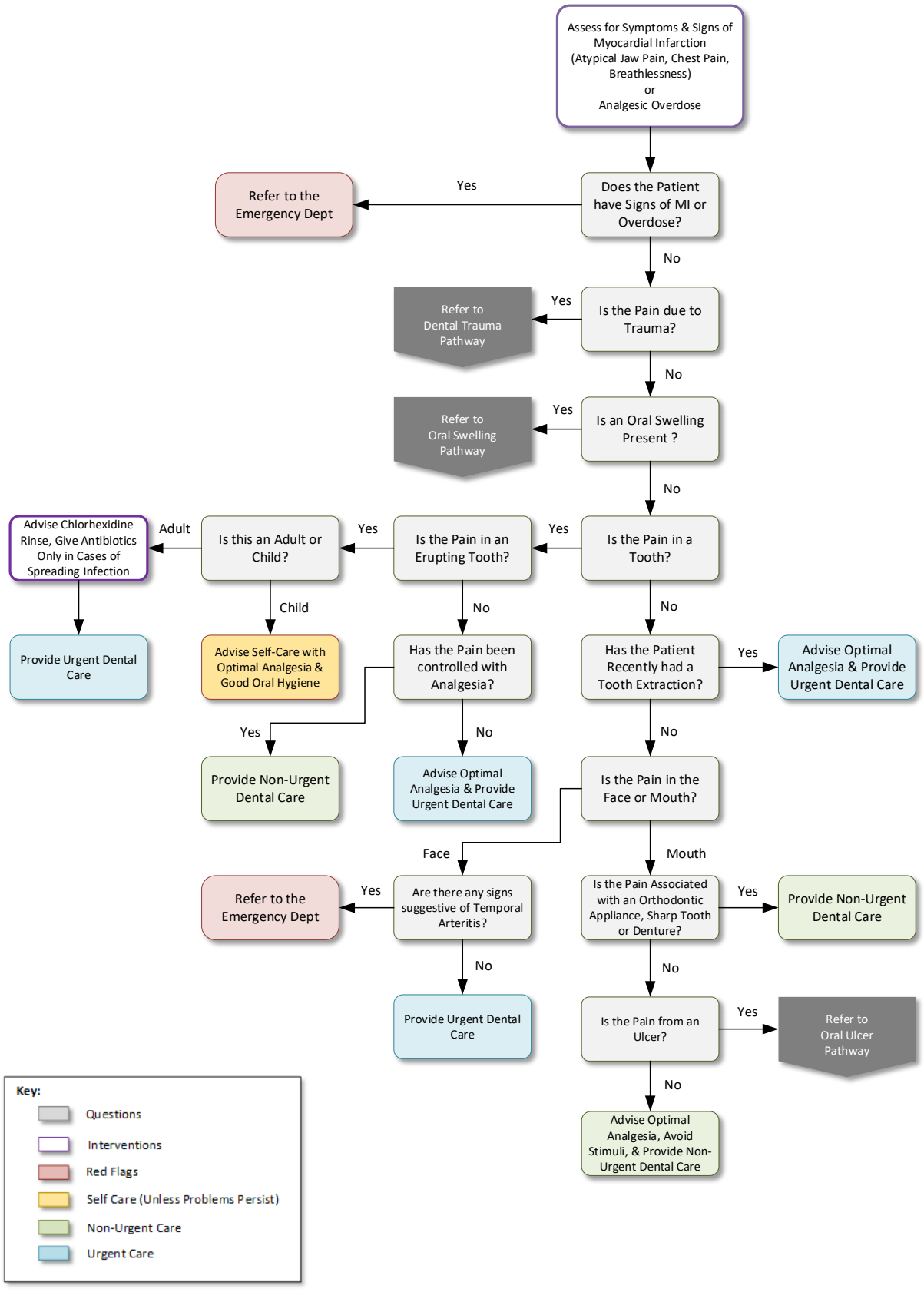

Fig. 2.2: Oral Pain Pathway [1].

2.3 Oral Swelling Pathway

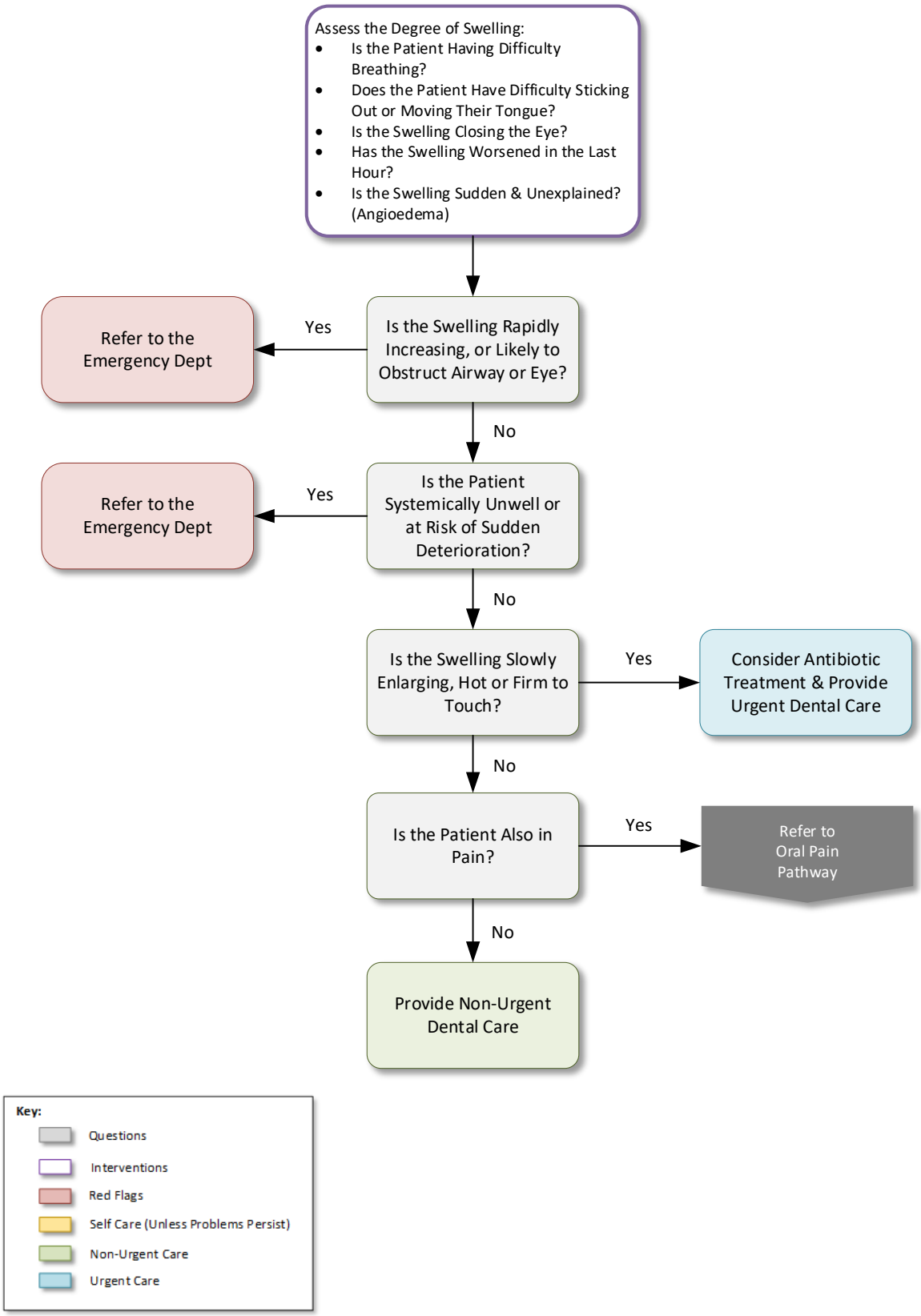

Fig 2.3: Oral Swelling Pathway [1].

2.4 Dental Bleeding Pathway

Fig 2.4: Dental Bleeding Pathway [1].

2.5 Oral Ulceration Pathway

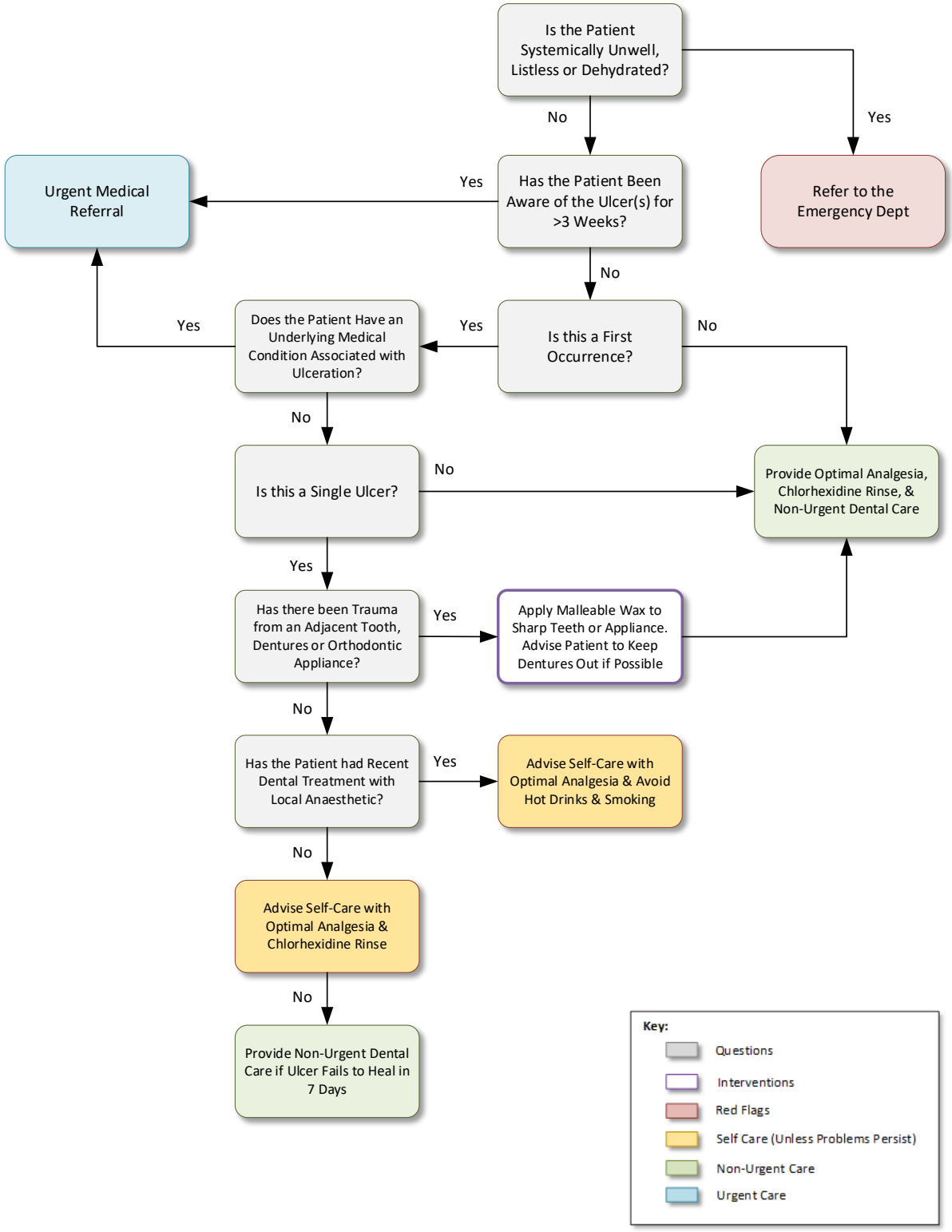

Fig. 2.5: Oral Ulceration Pathway [1].

2.6 Altered Sensation or Abnormal Appearance Pathway

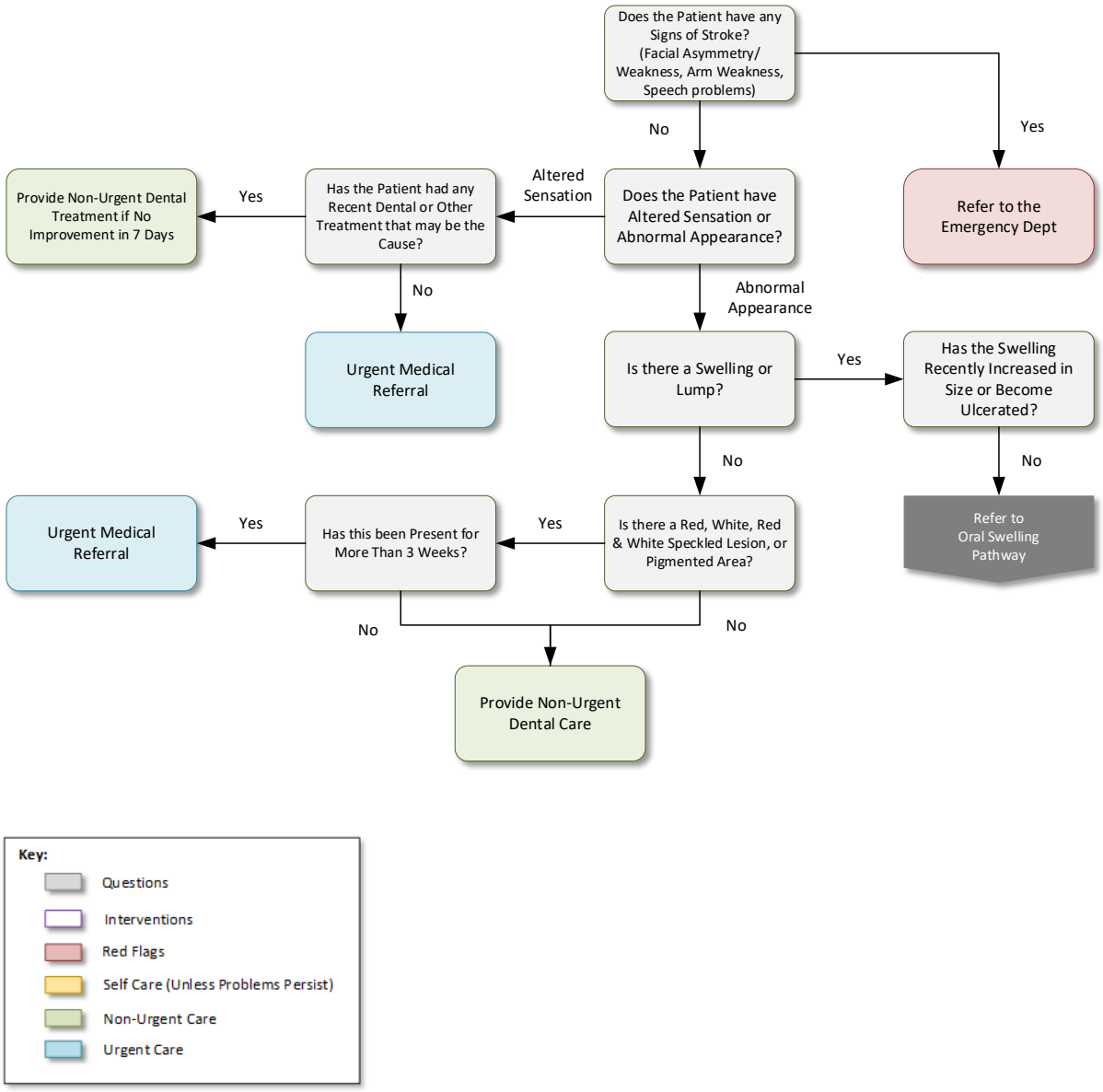

Fig 2.6: Altered Sensation or Abnormal Appearance Pathway [1].

3 Key Recommendations of the Guideline

The key recommendations of this guideline are summarised in this section:

Triage and Prioritisation (*Section 5*):

- Emergency Care:
  - Contact with a clinician is required within 1 hour and additional treatment should be completed within an appropriate period of time depending on the severity of the case [2] [**L1, RGA**].
  - Some severe cases will need to be referred for ED and hospitalisation [**R-GDG**].
- Urgent Care:
  - Contact with a clinician is required within 24 hours, however, patients must be given self-care advice and should be encouraged to report any worsening of symptoms[2] [**L1, RGA**].
- Non-Urgent Care:
  - Contact with a clinician is required within 1 week if needed. Meanwhile, patients should be given self-care advice and encouraged to report any worsening of symptoms [2] [**L1, RGA**].
- Self-Help and Routine Care:
  - Patients can manage their presenting conditions without further involvement of a clinician or healthcare practitioner.
  - However, patients should be advised that if the symptoms persist or worsen, they should contact a dentist or their primary care physician [**R-GDG**].

Assessment of Dental Trauma (*Section 6.1*):

- If a dental emergency is secondary to a more significant problem (e.g. a significant facial injury) or is associated with severe symptoms (e.g. difficulty breathing, severe dehydration), initial contact should be with appropriate emergency medical services [**R-GDG**].
- Maxillo-facial fractures and soft tissue Injuries require specialist care and are normally managed by oral and maxillofacial surgery team [**R-GDG**].
- Refer to the *Dental Trauma Pathway* in *Section 6.1* to triage patients appropriately[1].

Assessment & Management of Dentoalveolar Injuries (*Section 6.3*):

- The assessment and management of specific dentoalveolar injuries is provided in *Tables 6.3.1* and *6.3.2.*

Non-Traumatic Dental Emergencies (*Section 6.4*):

- Oral Pain:
  - Pain can be evaluated using the acronym SOCRATES [5] [**L1, RGA**] (see *Section 6.4*).
  - In paediatric patients, pain scores should be calculated by using a pain assessment tool appropriate to the patient's age, developmental level and clinical state [**R-GDG**].
  - Refer to the *Oral Pain Pathway* in *Figure 6.4.1* to triage patients appropriately[1].
- Oral Swellings:
  - In patients presenting with rapidly increasing oral swelling, determine whether there are features of airway compromise such as [1,6,7,12] [**L1, RGA**]: Restriction in speech, swallowing or breathing or the inability to push the tongue forward out of the mouth.
  - If the airway is not compromised, the duration of the altered appearance or swelling in the patient should be assessed [1,6,7,12] [**L1, RGA**].
  - Refer to the *Oral Swelling Pathway* in *Figure 6.4.2* to triage patients appropriately[1].

- Dental Bleeding:
    - Bleeding following an extraction is fairly common[3]. Other causes of bleeding are less common but need to be considered to determine whether emergency medical care is required[1].
    - Refer to the *Dental Bleeding Pathway* in *Figure 6.4.3* to triage patients appropriately[1].
- Oral Ulceration:
    - Ulcers are caused by numerous conditions, most of which are benign[1].
    - Other causes include adverse reactions to drugs, nutritional deficiencies, some gastrointestinal diseases and, more seriously, oral cancer[1].
    - Refer to the Oral Ulceration Pathway in *Figure 6.4.4* to triage patients appropriately[1].
- Altered Sensation or Abnormal Appearance of the Head and Neck:
    - Patients may present with altered sensation or abnormal appearance of the head and neck[1]. Refer to *Figure 6.4.5* to triage such patients appropriately[1].

Management of Specific Dental Conditions (*Section 7*):

- Refer to *Section 7* for an overview of the management of the following conditions:
    - Acute Apical Abscess.
    - Acute Pericoronitis.
    - Necrotising Periodontal Disease.
    - Periodontal Abscess.
    - Perio-Endo Abscess.
    - Pulpitis.
    - Alveolar Osteitis.
    - Post-Extraction Haemorrhage.
    - Cracked, Fractured, Loose or Displaced tooth Fragments and Restorations.
    - Trauma from an Orthodontic Appliance.
    - Acute Temporomandibular Joint Conditions.
    - Salivary Gland Obstruction or Infection.
    - Osteonecrosis.
    - Peri-Implantitis.

Referral Criteria to Specialist Dentistry (*Section 8*):

- See *Section 8* for specific referral criteria to the following specialists:
    - Endodontist.
    - Paedodontist.
    - Oral and Maxillofacial Surgeon.
    - Periodontist.
    - Orthodontist and Prosthodontist.

4 Background information

4.1 Definitions

- **Dental Emergencies:** Patients who require immediate treatment in order to minimise the risk of serious medical complications or prevent long-term dental complications (see *Section 5.1*).

- **Dental Urgencies** are cases that require treatment within 24 hours of presentation (see *Section 5.2*).

- **Dental Non-Urgencies** are cases in which patients should be advised to see a dentist within 7 days if necessary, or sooner if the condition deteriorates [**R-GDG**] (see *Section 5.3*).

- **Self-Care:** The patient should be able to manage the problem without the need for further involvement of a healthcare professional. However, advise the patient that if the symptoms persist or worsen, they should contact a dentist or general medical practitioner [**R-GDG**] (see *Section 5.4*).

- **Maxillofacial Injuries** are any injuries caused by physical force, a burn, or a foreign object that affects the face or the jaws[4]. They may involve soft tissues (lacerations or bruises) and or the facial bones (nasal and jaw fractures)[4].

- **Dental Trauma:** Refers to injuries to any parts of the mouth including the teeth, gums, lips, tongue, and alveolar bone [**R-GDG**].

4.2 Prevalence of Dental Emergencies

The prevalence of dental emergencies is not well defined. However, a meta-analysis performed in 2015 suggested that the worldwide prevalence of dental trauma among children and adolescents may be as high as 17.5%, but variances exist between different geographies[5].

Variances in dental emergencies can be attributed to different factors, including[5]:

- Different cultural sanitary practices.
- Economic status.
- Type of activities and professions practised.
- Ecological characteristics such as fluoride concentration in tap water.

Most dental emergency visits are the result of[6]:

- Trauma.
    - Dental trauma is more common in males[5].
    - Trauma incidence is also higher in children and adolescents [6].
- Pain.
- Bleeding.
- Swelling

5 Triage and Prioritisation

Patients for dental treatment may present to dental services during working hours. Whilst during non-working hours, patients may attend the ED. Following clinical assessment, the patient should be prioritised and managed according to the urgency of the care that is required to prevent long term sequelae[2] [**L1, RGA**].

The four categories of urgency are:

- Emergency care.
- Urgent care.
- Non-urgent care.
- Self-help and routine care.

5.1 Emergency Care

Contact with a clinician is required within 1 hour and additional treatment should be completed within an appropriate period of time depending on the severity of the case [2] [**L1, RGA**]. Some severe cases will need to be referred for ED and hospitalisation [**R-GDG**].

Examples of dental emergencies include[2]:

- Uncontrollable post-extraction bleeding.
- Elevated temperature due to a dental infection.
- Oro-facial laceration and/or dentoalveolar injuries such as the avulsion of a permanent tooth.
- Oro-dental conditions that may lead to the worsening of existing systemic medical conditions such as diabetes.
- Severe trismus.
- Rapidly increasing swelling which might compromise the swallowing or breathing.

Provider [**R-GDG**]:

- During normal working hours:
    - Dental practice where registered.
    - ED via the dental on-call staff or via oral and maxillofacial on-call staff.
- Out-of-hours: ED via dental on-call staff or via oral & maxillofacial on-call staff.

5.2 Urgent Care

Contact with a clinician is required within 24 hours, however, patients must be given self-care advice and should be encouraged to report any worsening of symptoms[2] [**L1, RGA**].

Examples of dental urgencies include [2]:

- Severe dental and facial pain that cannot be alleviated using pain control medicines.
- Fractured teeth or tooth with pulpal exposure.
- Dental and soft-tissue infections without a systemic effect.
- Spontaneous gum bleeding.
- Post-extraction bleeding beyond 8-12 hours after dental operation.

Provider [**R-GDG**]:

- During normal working hours: Dental practice where registered, or other local access.
- Out-of-hours: ED through dental on-call staff or via oral and maxillofacial on-call staff.

5.3 Non-Urgent Care

Contact with a clinician is required within 1 week if needed. Meanwhile, patients should be given self-care advice and encouraged to report any worsening of symptoms [2] [**L1, RGA**].

Examples of non-urgent cases include:

- Mild or moderate pain:
  - Pain is not associated with an urgent care condition and responds to pain-relief measures.
- Post-extraction bleeding that the patient can control using self-help measures.
- Loose or displaced crowns, bridges, or veneers.
- Fractured or loose-fitting dentures and other appliances.
- Fractured, loose, or displaced fillings.
- Treatments normally associated with routine dental care.
- Bleeding gums.

Conditions requiring routine self-care advice include patients with mild or moderate dental pain [2] [**L1, RGA**].

Provider [**R-GDG**]:

- During normal working hours: Dental practice where registered, or other local access.

5.4 Self-Help

Patients can manage their presenting conditions without further involvement of a clinician or healthcare practitioner. However, patients should be advised that if the symptoms persist or worsen, they should contact a dentist or their primary care physician [**R-GDG**].

Analgesic advice includes:

- For adults in moderate pain [7]:
  - Ibuprofen 400mg (4-6 hourly); or
  - Paracetamol 1g (4-6 hourly).
- For adults in severe pain [7]:
  - Ibuprofen and paracetamol can be used alternately; or
  - Ibuprofen 800mg single doses can be used for short durations.
    - NB: do not exceed 2.4g of ibuprofen or 4g of paracetamol within a 24 hour period.
- For children in pain [8]:
  - Ibuprofen oral suspension 50-100mg (8 hourly); and/or
  - Paracetamol oral suspension 120-500mg (4-6 hourly).
    - NB: Dosage depends on the age and weight of the child.

Provider [**R-GDG**]:

- During normal working hours / Out-of-hours: contact the Dental Helpline for guidance.

6 Assessment & Management of Dental Emergencies

Most patients presenting with an acute dental problem will report one or more of the following conditions: pain, swelling, bleeding, or injury due to trauma[1]. Some patients may present with other symptoms, particularly ulceration, altered sensation or an abnormal lesion, lump, or abnormal appearance[1].

In order to reduce the pain and the risk of complications in patients presenting with a dental emergency or urgency, it is essential to make an accurate early diagnosis and to plan the treatment accordingly[6].

If a dental emergency is secondary to a more significant problem (e.g. a significant facial injury) or is associated with severe symptoms (e.g. difficulty breathing, severe dehydration), initial contact should be with appropriate emergency medical services [**R-GDG**].

6.1 Assessment of Dental Trauma

Trauma to the head and neck can result in injuries to the teeth and/or the surrounding tissues and structures in the mouth, face, and jaws. This takes various forms and can be broadly categorised as:

- **Maxillofacial fractures and soft tissue injuries**, including fractures of the mandible and/or maxilla and lacerations to the mucous membranes lining the oral cavity.
- **Dentoalveolar injuries**, including broken, displaced, or lost teeth and injuries to the supporting bone.

Following an initial assessment for serious injury, obtain a focused history from the patient and perform a physical examination [**R-GDG**].

The history should include[9,10] [**L1, RGA**]:

- Nature of the presenting complaint.
- Time of onset, frequency, and duration of the symptoms.
    - History of trauma.
    - The timing of the incident.
- Date of last dental visit.
    - Is there any history of previous dental work involving the traumatised tooth?
- Patient's expectations.
- Tetanus immunisation history.
- Head, neck and brain injury should be excluded by obtaining detail about how the presenting symptoms occurred and by assessing the ability to open the eyes and the verbal and motor responses [11] [**L1, RGA**].

In all patients presenting with traumatic dental injuries, assess for[7] [**L1, RGA**]:

- Airway compromise from swelling or aspiration of teeth or tooth fragments.
- Haemodynamic instability or shock.
- Sepsis.
- Monitor and record vital signs: pulse, blood pressure, respiratory rate, level of consciousness.

Refer urgently for medical treatment as appropriate [**R-GDG**].

The Dental Trauma Pathway in *Figure 6.1* applies to patients who have suffered trauma to the mouth or who otherwise have teeth that are, chipped, cracked or broken[1].

Fig. 6.1: Dental Trauma Pathway [1].

6.2 Maxillofacial Fractures and Soft Tissue Injuries

Maxillo-facial fractures and soft tissue Injuries require specialist care and are normally managed by oral and maxillofacial surgery team [**R-GDG**].

6.2.1 Injuries Related to Jaw Fractures

A detailed assessment of the dentition should be made including fractured, missing and displaced teeth[11] [**L1, RGA**]. Following exclusion or management of serious injury, take clinical photographs of the teeth and soft tissues, as these will serve as documentation and a baseline for future comparisons[10,11] [**L1, RGA**].

Ask the patient to bite their teeth together tightly. Disturbances in a patient's ability to bite are signs of bone fractures or tooth displacement[4].

If a bony fracture is suspected, Assess for [**R-GDG**]:

- Pain exacerbated by movement.
- Bleeding.
- Swelling.
- Teeth/dentures do not meet together in the way that they did before.
- Segmental teeth mobility.
- Paraesthesia.

Consider radiographic assessment:

- Radiographic images; and/or
- Cone beam computed tomography (CBCT) scan:
    - To identify fractures of the bones and of the roots of the tooth or teeth[11] [**L1, RGA**].
- A chest radiograph must be obtained if:
    - The patient with a missing tooth complains of respiratory symptoms after the injury, such as cough or shortness of breath[11] [**L1, RGA**].

6.2.2 Intraoral Lacerations

Soft tissues should be examined for[11] [**L1, RGA**].:

- Lacerations.
- Abrasions.
- Gingival tears.

Patients with the following oral lacerations must be referred for emergency medical care and/or oral and maxillofacial surgeon review[12,13] [**L1, RGA**].:

- Involve the attached gingival tissue >1 cm in length.
- Stripping of the oral tissues from the underlying bone - degloving injury.
- Lacerations of outer part of the lip >1 cm in length, that have crossed the vermillion border onto the facial skin.
- Lacerations across the tongue.

Consider the following local measures in managing patients with small intra-oral lacerations who do not require suturing[27]:

- Clean the affected area by rinsing gently with a mild antiseptic.
- Inspect wounds and lacerations of the perioral region to determine whether any foreign bodies are present and if foreign objects are present, remove them.

- Apply pressure with a finger to stop any bleeding.
- Apply ice packs to soft tissue injury and swelling.

If the patient requires suturing, consider[14–16]:

- Repairing the injured teeth prior to soft-tissue repair, to prevent soft-tissue manipulation and damage to sutures already placed in the soft tissue.
- Antibiotics should be prescribed if a significant amount of devitalised or crushed tissue is present or if the wound is through-and-through.

NB: It is important to rule out domestic violence as a cause for the presenting emergency considering the behaviour of the patient[5,6] [**L1, RGA**]. If the patient is a child, consider the behaviour of the parent or carer. Consider appropriate local referral if non-accidental injury (NAI) is suspected[6,17].

6.3 Dentoalveolar Injuries

6.3.1 Injuries to Permanent Teeth

The following table details the clinical findings, radiographic findings, management, and follow-up of specific traumatic injuries in permanent teeth [18,19].

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Enamel Infraction	• A fissure (crack) in the enamel without causing other damage to the tooth structure. • Non-tender. • Normal mobility.	• A periapical view is recommended. • Additional radiographs may be required depending on the symptoms.	• In case of marked infractions, etching and sealing with resin may be used to prevent discolouration of the infraction lines. • Otherwise, no specific treatment is necessary.	• No follow-up required.
Enamel Fracture	• Fracture of tooth enamel without exposure of dentin. • Non-tender. • Normal mobility. • Sensibility pulp test usually positive.	Enamel loss is typically visible on radiograph: • Periapical, occlusal, and eccentric exposures are recommended. • A radiograph of the lips or cheeks may also be necessary to search for tooth fragments or foreign materials.	• If the tooth fragment is available, it can be bonded to the tooth with contouring or restoration using composite resin, depending on the extent and location of the fracture.	• 6-8 weeks with a clinical and radiographic examination; and • 1 year with clinical and radiographic examination.
Enamel-Dentin Fracture Without Pulp Exposure	• Fracture confined to enamel and dentin, with loss of tooth structure, but the pulp is not exposed. • Non-tender. • Normal mobility. • Percussion test normal. • Sensibility pulp test usually positive.	Enamel-dentin loss usually visible on radiograph: • Periapical, occlusal, and eccentric exposures are recommended. • A radiograph of the lips or cheeks may also be necessary to search for tooth fragments or foreign materials.	• If a tooth fragment is available, it can be bonded to the tooth. • Otherwise, perform a provisional treatment by covering the exposed dentin with glass ionomer or a more permanent restoration using a bonding agent and composite resin or other accepted dental restorative materials. • If the exposed dentin is within 0.5 mm of the pulp (pink, no bleeding), place calcium hydroxide base and cover with a material such as a glass ionomer.	• 6-8 weeks with a clinical and radiographic examination; and • 1 year with clinical and radiographic examination.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Enamel-Dentin Fracture With Pulp Exposure	• Fractures involving enamel and dentin with loss of tooth structure and exposure of the pulp. • Non-tender. • Normal mobility. • The exposed pulp will be sensitive to external stimuli.	Enamel-dentin loss is typically visible on radiograph: • Periapical, occlusal, and eccentric exposures are recommended. • A radiograph of the lips or cheeks may also be necessary to search for tooth fragments or foreign materials.	• Pulp capping or partial pulpotomy may be helpful in young patients to preserve pulp vitality. • Calcium hydroxide is a suitable material to be placed on the pulp wound in such procedures. • Root canal treatment is usually the treatment of choice in patients with mature apical development. • If a tooth fragment is available, it can be bonded to the tooth. • The fractured crown may require further restoration.	• 6-8 weeks with a clinical and radiographic examination; and • 1 year with clinical and radiographic examination.

Crown Root Fracture without Pulp Involvement	• A fracture involving enamel, dentin, and cementum with loss of tooth structure, but not exposing the pulp where the crown fracture extends below gingival margin.
	• Tender on percussion.
	• Coronal fragment is mobile.
	• Sensibility pulp test usually positive for apical fragment.
		Apical extension of fracture is usually not visible on radiographic examination:
		• Periapical, occlusal, and eccentric exposures are recommended to detect fracture lines in the root.
			Temporary stabilisation of the loose segment to adjacent teeth, can be performed as an emergency treatment until a definitive plan can be formed.
			
			Non-emergency treatment options:
			• Fragment removal:
			  ○ Remove the coronal crown-root fragment and restore the apical fragment exposed above the gingival level.
			• Fragment removal and gingivectomy (sometimes ostectomy):
			  ○ Perform a gingivectomy. An ostectomy with osteoplasty may be necessary.
			  ○ Remove the coronal crown-root segment with subsequent endodontic treatment and restoration with a post-retained crown.
				• 6-8 weeks with clinical and radiographic examination.
				• 1 year with clinical and radiographic examination.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up

			• Orthodontic extrusion of the apical fragment:
			  ○ Remove the coronal segment and perform endodontic treatment and orthodontic extrusion of the remaining root with sufficient length after extrusion to support a post-retained crown.
			• Surgical extrusion:
			  ○ Remove the mobile fractured fragment and surgically reposition the root in a more coronal position.
			• Root submergence:
			  ○ An implant solution is necessary.
			• Extraction:
			  ○ Extraction with immediate or delayed implant-retained crown restoration or a conventional bridge.
			  ○ Extraction is inevitable in crown-root fractures with a severe apical extension, the extreme being a vertical fracture.	

Crown Root Fracture with Pulp Exposure	• A fracture involving enamel, dentin, and cementum and exposing the pulp. Such fractures are typically tender on percussion and the coronal fragment is mobile.	• Apical extension of the fracture usually not visible on radiograph and periapical and occlusal exposures are recommended.	Temporary stabilisation of the loose segment to adjacent teeth maybe necessary as an emergency treatment. In patients with open apices: • Preserve pulp vitality by a partial pulpotomy. • Calcium hydroxide compounds are suitable pulp capping materials. • Root canal treatment should be used in patients with mature apical development.	• 6-8 weeks with clinical and radiographic examination. • 1 year with clinical and radiographic examination.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up

			Non-emergency treatment options:
			• Fragment removal and gingivectomy (sometimes ostectomy):
			  ○ Indicated in crown-root fractures with palatal subgingival extension.
			  ○ Perform a gingivectomy (sometimes ostectomy with osteoplasty may be necessary).
			  ○ Remove the coronal fragment with subsequent endodontic treatment and restoration with a post-retained crown.
			• Orthodontic extrusion of apical fragment:
			  ○ Remove the coronal segment with subsequent endodontic treatment and orthodontic extrusion of the remaining root with sufficient length after extrusion to support a post-retained crown.
			• Surgical extrusion:
			  ○ Remove the mobile fractured fragment with subsequent surgical repositioning of the root in a more coronal position.
			• Root submergence:
			  ○ An implant solution is necessary, the root fragment may be left in situ.
			• Extraction:
			  ○ Extraction with immediate or delayed implant-retained crown restoration or a conventional bridge.
			  ○ Extraction is inevitable in very deep crown-root fractures, the extreme being a vertical fracture.	

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up

Root Fracture	• Coronal segment may be mobile or displaced.
	• The tooth is usually tender to percussion.
	• Bleeding may be noted from the gingival sulcus.
	• Sensibility testing may give negative results initially, indicating transient or permanent neural damage.
		• Horizontal or oblique plane root fracture.
		• Horizontal fractures detected using periapical 90^{o} angle film with central beam through the tooth.
		• Oblique fractures are better detected using occlusal radiographs with varying horizontal angles.
		• Cone Beam Computed Tomography (CBCT) may also be employed
			• Reposition the coronal segment of the tooth, as soon as possible, if it is displaced:
			  ○ Check the position radiographically.
			• Stabilise the tooth with a flexible splint for 4 weeks.
			  ○ If the root fracture is near the cervical area of the tooth, stabilisation is beneficial for a longer period of time (up to 4 months).
			• Monitor healing for at least 1 year to determine pulpal status. If pulp necrosis develops:
			  ○ Root canal treatment of the coronal tooth segment to the fracture line is indicated to preserve the tooth.
				• Clinical and radiographic examination after 4 weeks, 6-8 weeks, 4 months, 6 months, 1 year and 5 years.
				• Splint removal after 4 weeks.
				• Splint removal in cervical third fractures after 4 months.

Alveolar Fracture	• Fractures involve the alveolar bone and may extend to the adjacent bone. • Segment mobility and dislocation with several teeth moving together, is typically found on examination. • An occlusal change due to misalignment of the fractured alveolar segment is also usually noted. • Sensibility testing may or may not be positive.	Fracture lines may be located at any level, from the marginal bone to the root apex and above the apex: • 3 radiograph angulations and occlusal film are usually necessary. • Additional views such as a panoramic radiograph can also be helpful in determining the course and position of the fracture lines. • CBCT may also be used.	• Reposition any displaced segment and then splint. • Suture gingival lacerations, if present. • Stabilise the segment for at least 4 weeks.	• Clinical and radiographic examination after 4 weeks, 6-8 weeks, 4 months, 6 months, 1 year and 5 years. • Splint removal after 4 weeks.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Concussion	• Tender tooth. • Non-displaced. • Normal mobility.	• No radiographical abnormalities are noted.	• No treatment required. • Monitor pupal condition for 1 year.	• Follow-up at 4 weeks, 6-8 weeks, and 1 year with clinical and radiographic examination.
Subluxation	• Tender tooth. • Increased mobility but not displaced. • Bleeding from gingival crevice may be noted. • Sensibility testing may be negative due to transient pulpal damage.	• No radiographical abnormalities are noted.	• Pulpal response should be observed for accurate diagnosis. • Normally no treatment is needed, however, a flexible splint to stabilise the tooth for patient comfort can be used for up to 2 weeks.	• Clinical and radiographic examination after 2 weeks, 4 weeks, 6-8 weeks, 6 months and 1 year. • Splint removal after 2 weeks.
Extrusive Luxation	• The tooth appears elongated and is excessively mobile. • Sensibility tests are usually negative.	• Widened periodontal ligament space on radiography.	• Reposition the tooth by gently reinserting It into the tooth socket. • Stabilise the tooth for 2 weeks using a flexible splint. • In mature teeth where pulp necrosis is anticipated, or if several signs and symptoms indicate that the pulp of mature or immature teeth is becoming necrotic, root canal treatment is indicated.	• 2 weeks, 4 weeks, 6-8 weeks, 6 months, 1 year, and once yearly for 5 years. • Splint removal after 2 weeks.
Lateral Luxation	• Displaced usually in a palatal/lingual or labial direction and is immobile. • Percussion typically gives a high, ankylotic sound. • Fracture of the alveolar process is present. • Sensibility tests are negative.	• A widened periodontal ligament space is seen on eccentric or occlusal radiographic exposures.	• Reposition the tooth digitally or with forceps to disengage it and gently reposition it into its original location. • Stabilise the tooth for 4 weeks using a flexible splint and monitor the pulpal condition: ○ If the pulp becomes necrotic, root canal treatment is indicated to prevent root resorption.	• Clinical and radiographic examination after 2 weeks, 4 weeks, 6-8 weeks, 6 months, 1 year, and once yearly for 5 years. • Splint removal after 2 weeks.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up

Intrusive Luxation	• The tooth is displaced axially into the alveolar bone, is immobile.
	• Percussion may give a high, metallic (ankylotic) sound.
	• Sensibility tests are negative.
		• The periodontal ligament space may be absent from all or part of the root on radiographic examination.
		• The cemento-enamel junction is located more apically in the intruded tooth than in adjacent non-injured teeth.
		• It may at times be even apical to the marginal bone level.
			Teeth with incomplete root formation:
			• Allow eruption without intervention.
			• If no movement within few weeks, initiate orthodontic repositioning.
			• If the tooth is intruded more than 7 mm, reposition surgically or orthodontically.
			Teeth with complete root formation:
			• If the tooth is intruded less than 3 mm.
			  ○ Allow eruption without intervention.
			  ○ If no movement after 2-4 weeks, reposition surgically or orthodontically.
			• If the tooth is intruded 3-7 mm:
			  ○ Reposition surgically or orthodontically.
			• If the tooth is intruded beyond 7 mm:
			  ○ Reposition surgically.
			• The pulp will likely become necrotic in teeth with complete root formation.
			  ○ Root canal therapy using a temporary filling with calcium hydroxide is recommended.
			  ○ Treatment should begin 2-3 weeks after repositioning.
			• Once an intruded tooth has been repositioned surgically or orthodontically, stabilise with a flexible splint for 4 weeks.
				• Clinical and radiographic examination after 2 weeks, 4 weeks, 6-8 weeks, 6 months, 1 year, and once yearly for 5 years.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Avulsion: First Aid	• Complete loss of a tooth.	• Determine whether the tooth is a permanent tooth or a primary tooth. • Primary teeth should not be replanted.	First aid treatment advice for patients: • Handle the tooth by the crown and avoid touching the root. • If the tooth is dirty, wash it briefly for 10 seconds under cold running water and reposition it. • Try to encourage the patient to replant the tooth. • Bite on a handkerchief to hold it in position. • If this is not possible: ○ Place the tooth in a suitable storage medium, e.g. a glass of milk, saline, saliva, or a physiological storage medium for avulsed teeth (e.g. Hanks Balanced Salt Solution).	• See a dentist immediately for treatment.

Avulsion:
Re-implanted Tooth with Closed Apex
	• An avulsed tooth with a closed apex has been re-implanted prior to the patient's arrival.	• Verify normal position of the replanted tooth both clinically and radiographically.	• Leave the tooth in place and clean the area with water spray, saline, or chlorhexidine.
			• Suture gingival lacerations if present.
			• Apply a flexible splint for up to 2 weeks.
			• Administer systemic antibiotics.
			• If the avulsed tooth has been in contact with soil, and if tetanus coverage is uncertain, refer to physician for a tetanus booster.
			• Initiate root canal treatment 7-10 days after replantation and before splint removal.
			• Patients should be advised:
			  ○ To avoid participation in contact sports and eat only soft food for 2 weeks.
			  ○ Brush teeth with a soft toothbrush after each meal.
			  ○ Use a chlorhexidine (0.1 %) mouth rinse twice a day for 1 week.
				• Clinical and radiographic examination after 4 weeks, 3 months, 6 months, 1 year, and once yearly for 5 years.
				• Splint removal after 2 weeks.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Avulsion: Un-implanted Tooth with Closed Apex	• An avulsed tooth with a closed apex has been kept in a physiological storage media or osmolality balanced media (e.g. milk, saline, saliva, or Hank's Balanced Salt Solution) or has been stored dry for less than 60 minutes.	• Verify normal position of the replanted tooth both clinically and radiographically.	• Clean the root surface and apical foramen with a stream of saline and soak the tooth in saline thereby removing contamination and dead cells from the root surface. • Administer local anaesthesia and irrigate the socket with saline. • If there is a fracture of the socket wall, reposition it with a suitable instrument. • Replant the tooth slowly with slight digital pressure and without using force. • Treatment as for Reimplanted Tooth with closed apex.	• Clinical and radiographic examination after 4 weeks, 3 months, 6 months, 1 year, and once yearly for 5 years. • Splint removal after 2 weeks.
Avulsion: Delayed Implantation	• An avulsed tooth with a closed apex has been dry for over 60 mins or there are other reasons to suggest non-viable cells. • The periodontal ligament will be necrotic and will not be expected to heal.	• Verify normal position of the replanted tooth both clinically and radiographically.	• The goal is to restore the tooth for aesthetic, functional and psychological reasons and maintain the alveolar bone contour. • However, the expected eventual outcome is ankylosis and resorption of the root and the tooth will be lost eventually. • Remove attached non-viable soft tissue carefully, with gauze. • Root canal treatment can be performed prior to replantation, or it can be done 7-10 days later. • Administer local anaesthesia and irrigate the socket with saline. • If there is a fracture of the socket wall, reposition it with a suitable instrument. • Replant the tooth slowly with slight digital pressure and without using force. • Suture gingival lacerations if present. • Stabilise the tooth for **4 weeks** using a flexible splint. • Administer systemic antibiotics.	• Root canal treatment 7-10 days after replantation. • Place calcium hydroxide as an intra-canal medicament for up to 1 month followed by root canal filling with an acceptable material. • An antibiotic-corticosteroid paste may be placed immediately, or shortly following, replantation and left for at least 2 weeks. • Review at: ○ 4 weeks for splint removal and clinical and radiographic examination.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
			○ If the avulsed tooth has been in contact with soil, and if tetanus coverage is uncertain, refer to physician for a tetanus booster. • To slow down osseous replacement of the tooth, treatment of the root surface with fluoride prior to replantation has been suggested (2% sodium fluoride solution for 20 min). Patients should be advised: • To avoid participation in contact sports and eat only soft food for 2 weeks. • Brush teeth with a soft toothbrush after each meal. • Use a chlorhexidine (0.1 %) mouth rinse twice a day for 1 week.	○ 3 months, 6 months, 1 year and then annually thereafter.
Avulsion: Re-implanted Tooth with Open Apex	• An avulsed tooth with an open apex has been re-implanted prior to the patient's arrival.	• Verify normal position of the replanted tooth both clinically and radiographically.	• Treatment is as for teeth with a closed apex. • The goal for replanting immature teeth in children is to allow for possible revascularisation of the tooth pulp. If that does not occur, root canal treatment is recommended. • However, root canal treatment should be avoided unless there is clinical or radiographic evidence of pulp necrosis.	• Clinical and radiographic examination after 4 weeks, 3 months, 6 months, 1 year, and annually for 5 years. • Splint removal after 2 weeks.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Avulsion: Un-implanted Tooth with an Open Apex	• An avulsed tooth with an open apex has been kept in a physiological storage media or osmolality balanced media (e.g. milk, saline, saliva, or Hank's Balanced Salt Solution) or has been stored dry for less than 60 minutes.	• Verify normal position of the replanted tooth both clinically and radiographically.	Treat as for teeth with a closed apex: • The goal for replanting immature teeth in children is to allow for possible revascularisation of the pulp space. • The risk of infection-related root resorption should be weighed up against the chances of revascularisation. Such resorption is very rapid in children. • If revascularisation does not occur, root canal treatment may be recommended. ○ Root canal treatment should be avoided unless there is clinical or radiographic evidence of pulp necrosis.	• Clinical and radiographic examination after 4 weeks, 3 months, 6 months, 1 year, and once yearly for 5 years. • Splint removal after 2 weeks.

Table 6.3.1: Management of Injuries to Permanent Teeth[18,19].

6.3.2 Injuries to Primary Teeth

The following table details the clinical findings, radiographical findings, management, and follow-up of specific traumatic injuries in primary teeth[20].

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Enamel Fracture	• Fracture of tooth enamel without exposure of dentin.	• No radiographic abnormalities.	• Smooth any sharp edges.	• No follow-up is required.
Enamel-Dentin Fracture	• Fracture confined to enamel and dentin, but the pulp is not exposed.	• No radiographic abnormalities. • The relation between the fracture and the pulp chamber will be disclosed.	• If possible, completely seal the involved dentin with glass ionomer to prevent microleakage. • In case of large lost tooth structure, the tooth can be restored with composite.	• Patients should be followed up at 3-4 weeks for further clinical examination.
Enamel-Dentin-Pulp Fracture	• Fractures involving enamel and dentin and pulp is exposed.	• The stage of root development should be determined by radiographic examination. • Only one exposure is usually necessary.	• If possible, preserve pulp vitality by partial pulpotomy. • A well condensed layer of pure calcium hydroxide paste can be applied over the pulp, covered with a lining such as reinforced glass ionomer with restoration of the tooth using a composite. • Extraction is usually the alternative option.	• 1 week for clinical examination. • 6-8 and 1 year for further clinical and radiographic examination.
Crown Root Fracture	• Fracture involves the enamel, dentin, and root tooth structure. • The pulp may or may not be exposed.	• In laterally positioned fractures, the extent of the fracture in relation to the gingival margin can be seen. • One exposure is necessary to disclose multiple fragments.	• One option is fragment removal only if the fracture involves only a small part of the root and the stable fragment is large enough to allow coronal restoration. • The alternative option is tooth extraction.	• 1 week, 6-8 weeks and 1 year with further clinical examination. • Radiographic examination at 6-8 weeks.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Root Fracture	• Root fractures involve the alveolar bone and may extend to adjacent bone. • Segment mobility and dislocation are common findings.	• The fracture is usually located in the mid-root or apical third.	• If the coronal fragment is not displaced, no treatment is required. • If the coronal fragment is displaced, repositioning and splinting may be considered, otherwise, extract only that fragment. • The apical fragment should be left to be resorbed.	If no displacement of the fracture: • 1 week and 6-8 weeks, and 1 year. • Perform clinical, and radiographic monitoring until eruption of the permanent successor at each subsequent year until exfoliation. If extraction has been performed: • Follow up at 1 year and annually thereafter until eruption of the permanent successor.
Alveolar Fracture	• The fracture involves the alveolar bone and may extend to the adjacent bone. • Segment mobility and dislocation are typically found on examination. • Occlusal interference is often noted.	• The horizontal fracture line to the apices of the primary teeth and their permanent successors will be disclosed. • A lateral radiograph may give information about the relation between the two dentitions and if the segment is displaced in labial direction.	• Reposition any displaced segment and then splint. • General anaesthesia is often indicated. • Stabilise the segment for 4 weeks. • Monitor teeth in fracture line.	• 1 week for clinical examination. • 3-4 weeks for splint removal. • 6-8 weeks and 1 year for clinical and radiographic examination. • Annually until eruption of the permanent successor with clinical and radiographic examination.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Concussion	• Tender tooth. • Normal mobility. • No sulcular bleeding.	• No radiographical abnormalities are noted. • Normal periodontal space.	• No treatment required.	• Review the patient at 1 week and 6-8 weeks for a repeat clinical examination.
Subluxation	• Tender tooth. • Increased mobility but not displaced. • Bleeding from gingival crevice may be noted.	• Radiographic abnormalities usually not found. • Normal periodontal space. • An occlusal exposure is recommended in order to screen for possible signs of displacement or the presence of a root fracture. • The radiograph can be used as a reference point in case of future complications.	• No treatment is needed. • Encourage brushing with a soft brush and use of chlorhexidine 0.12% alcohol-free topically to the affected area with cotton swabs twice a day for one week.	• 1 week and 6-8 weeks for clinical examination. • Crown discoloration may occur. • No treatment is needed unless a fistula develops. • Dark discoloured teeth should be followed carefully to detect signs of infection as soon as possible.
Extrusive Luxation	• Partial displacement of the tooth from the socket. • The tooth appears elongated and is excessively mobile.	• Widened periodontal ligament space apically.	• Treatment decisions are based on the degree of displacement, mobility, root formation and the ability of the child to cope with the emergency situation. • For minor extrusion (< 3mm) in an immature developing tooth, careful repositioning or leaving the tooth for spontaneous alignment can be treatment options. • For severe extrusion in a fully formed primary tooth, extraction is the treatment of choice.	• 1 week for clinical examination. • 6-8 weeks, 6 months, and 1 year for clinical and radiographic examination. • Discolouration may occur. • Dark discoloured teeth should be followed carefully to detect signs of infection as soon as possible.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up

Lateral Luxation	• The tooth is displaced, usually in a palatal/lingual or labial direction and is immobile.	• Increased periodontal ligament space apically is best seen on the occlusal exposure.
		• An occlusal exposure can also show the position of the displaced tooth and its relation to the permanent successor.
			• If there is no occlusal interference, (e.g. in anterior open bite), the tooth is allowed to reposition spontaneously.
			• If minor occlusal interference, slight grinding is indicated.
			• In more severe occlusal interference:
			  ○ The tooth can be gently repositioned by combined labial and palatal pressure under local anaesthesia.
			  ○ If the crown is dislocated in a labial direction, extraction is the treatment of choice.
				• 1 week for clinical examination.
				• 2-3 weeks for clinical examination.
				• 6-8 weeks and 1 year for clinical and radiographic examination.

Intrusive Luxation	• The tooth is usually displaced through the labial bone plate or can be impinging upon the succedaneous tooth bud.
	• When the apex is displaced toward or through the labial bone plate:
	  ○ The apical tip can be seen and appears shorter than its contra lateral.
	• When the apex is displaced towards the permanent tooth germ:
	  ○ The apical tip cannot be seen, and the tooth appears elongated.
		• The periodontal ligament space may be absent from all or part of the root on radiographic examination.
		• The cemento-enamel junction is located more apically in the intruded tooth than in adjacent non-injured teeth.
		• It may at times be even apical to the marginal bone level.
			• If the apex is displaced toward or through the labial bone plate:
			• The tooth is left for spontaneous repositioning.
			• If the apex is displaced into the developing tooth germ, extract the tooth.
				• 1 week for clinical examination.
				• 3-4 weeks, 6-8 weeks, 6 months, and 1 years for clinical and radiographic examination.
				• Continue annual clinical and radiographic monitoring until eruption of the permanent successor.

Type of Injury	Clinical Characteristics	Radiographic Findings	Management	Follow-Up
Avulsion	• Complete loss of a tooth.	• Radiographic examination is essential to ensure the tooth has not been intruded.	• Assess potential trauma to the developing permanent teeth. Further management includes, providing advice on: ○ Adherence to a soft food diet for at least 7 days. ○ Maintenance of good oral hygiene. ○ Local child protection procedures if non-accidental injury (NAI) is suspected.	• 1 week for clinical examination. • 6 months, and 1 years for clinical and radiographic examination.

Fig. 6.3.2: Management of Injuries to Primary Teeth[20].

6.3.3 Recommended Instructions to Patients with Dental Trauma.

Patient compliance with follow-up visits and home care contributes to satisfactory healing following any injury.

Both patients and guardians of young children, should be advised regarding the following [**R-GDG**]:

- Care should be taken for a replanted tooth for better healing.
- Avoid participation in any contact sports.
- Patients should consider a soft diet for up to 2 weeks.
- Patients should perform good and effective daily personal oral hygiene.
    - Brush the teeth with a soft toothbrush after each meal.
    - Consider the use of chlorhexidine mouth rinse (0.1%) twice a day for one week.
- If smoking, patients need to stop:
    - Smokers do not show as good a response to periodontal or dental treatment.
- Patients should inform their dentist of any areas of persistent, recurrent, refractory, or new periodontal oral diseases.
- Patients should inform their dentist of other oral health problems noted, such as caries, defective restorations, periodontal diseases, and non-periodontal mucosal diseases or conditions.

6.4 Non-Traumatic Dental Emergencies

The flowcharts in this section illustrate the pathways to care providers for patients who present with one of the following key presenting symptoms:

- Pain.
- Swelling.
- Bleeding.
- Ulceration.
- Altered Sensation / Abnormal Appearance.

It is recognised that a patient may present with more than one of these symptoms. In this case, the predominant symptom is used to determine which pathway to follow [**R-GDG**].

6.4.1 Oral Pain

Pain in the mouth or jaw is most commonly related to the teeth. However, myocardial infarction may also present with referred pain to the jaw[7,12].

Pain can be evaluated using the acronym SOCRATES [5] [**L1, RGA**]:

- **S**ite of pain: soft or hard tissue.
- **O**nset of pain: time, sudden or gradual, worsening or improving or same.
- **C**haracter of pain: shooting, dull, electric, sharp, stabbing, etc.
- **R**adiation of pain.
- **A**ssociated symptoms such as fever, dizziness or other pains.
- **T**iming of pain, for example, all the time, in the morning, evening or while eating.
- **E**xacerbating/relieving factors such as heat, cold or analgesics.
- **S**everity of pain on a visual analogue scale of 0 to 10.

In paediatric patients, pain scores should be calculated by using a pain assessment tool appropriate to the patient's age, developmental level and clinical state. Tools include [**R-GDG**]:

- *FLACC Scale* for infants and toddlers and non-verbal children
- *Wong-Baker Faces Scale* for children 5 -17 years (may be used for some children from 3 years)
- Numeric rating scale for children >8 years.

If the patient has been on analgesic medication prior to presentation, consider assessing whether the patient has exceeded the recommended dose of pain-relief medication[1]. If the patient is a child or elderly and has not been eating normally, the index of suspicion for overdose should be increased [**R-GDG**].

The pain can be either biological or mechanical [9].

- Non-odontogenic pain, involving:
    - Soft tissues.
    - Temporomandibular joint (TMJ).
    - Sinuses.
    - Neurologic (e.g. trigeminal neuralgia).
    - Salivary glands (e.g. acute/chronic bacterial sialadenitis).
    - Vascular (e.g. migraine).
- Odontogenic pain, involving:
    - Dental pulp (e.g. symptomatic irreversible pulpitis.)
    - Periodontium (e.g. Periodontal abscess).
    - Peri-radicular tissues in case of caries or infections, e.g. acute periapical abscess.

Possible causes of oral pain include[1] (see also *Section 7* for management of specific dental conditions):

- Dental trauma.
- Acute apical abscess.
- Acute pericoronitis (including Erupting Teeth in Children).
- Acute periodontal conditions:
    - Necrotising gingivitis and necrotising periodontitis.
    - Periodontal abscess.
    - Perio-endo lesions.
- Dentine hypersensitivity.
- Pulpitis.
- Alveolar osteitis (dry socket).
- Oral ulceration.
- Cracked, fractured, loose, or displaced tooth fragments and restorations.
- Ill-fitting or loose dentures.
- Orthodontic problems.
- Sinusitis.
- Acute temporomandibular joint conditions.
- Salivary gland obstruction or infection.
- Candidal infection.
- Osteonecrosis.
- Peri-implantitis.
- Temporal arteritis.
- Trigeminal neuralgia.

The Oral Pain Pathway in *Figure 6.4.1* applies to patients who present with oral or facial pain[1].

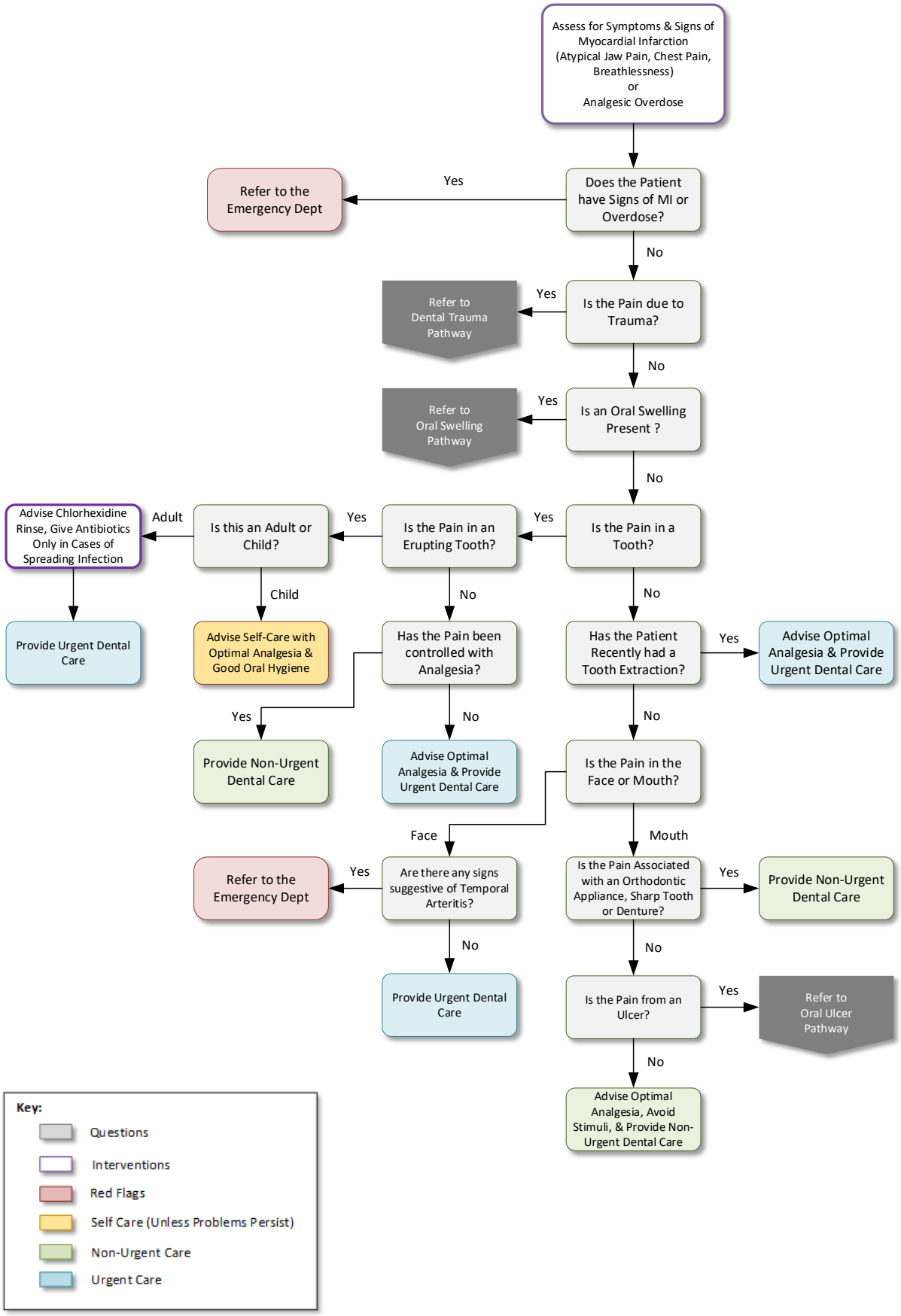

Fig. 6.4.1: Oral Pain Pathway[1].

6.4.2 Oral Swellings

Oral swellings vary in their rate of onset, location, size, and extent. More common are the small lumps and these are almost always benign, especially in patients <50 years old[1,6,7,12] [**L1, RGA**].

Patients may present with the following key signs and symptoms [**R-GDG**]:

- A firm or soft swelling which may be static or increase over hours.
- Swelling or oedema around or in the tongue or pharynx.
- Ulcerated swelling.
- Alterations in normal appearance to a red, white, or a mixed red and white patch.
- A pigmented area on the soft tissues or tongue e.g. black/grey/blue.
- Fluctuant buccal or palatal swelling, with or without a draining fistula.

In patients presenting with rapidly increasing oral swelling, determine whether there are features of airway compromise such as [1,6,7,12] [**L1, RGA**]:

- Restriction in speech, swallowing or breathing.
- Inability to push the tongue forward out of the mouth.

If the airway is not compromised, the duration of the altered appearance or swelling in the patient should be assessed [1,6,7,12] [**L1, RGA**].

Ulcerated lesions in the mouth or on the lips are usually, but not always, painful [**R-GDG**].

- Common signs and symptoms include:
    - Pain (lips and/or oral cavity).
    - Inflammation.
    - Ulcers.
    - Abnormal appearance.
- If the ulceration is severe, some patients (e.g. children, elderly, infirm) may present with:
    - Listlessness or agitation.
    - Dehydrated.

The Oral Swelling Pathway in *Figure 6.4.2* should be used to determine which patients require referral to emergency medical care and which can be safely treated in a dental setting[1].

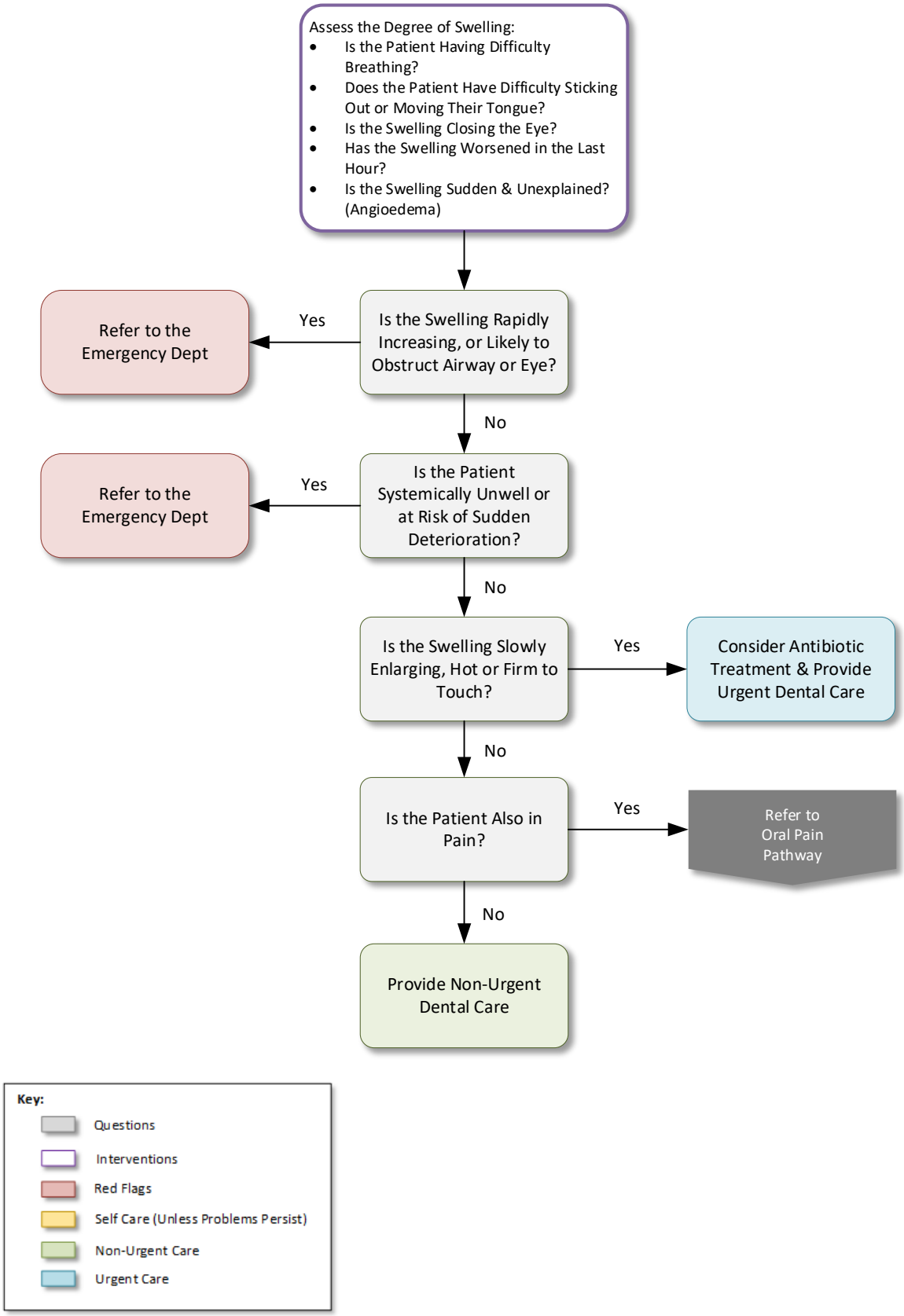

Fig. 6.4.2: Oral Swelling Pathway[1].

6.4.3 Dental Bleeding

Bleeding following an extraction is fairly common[3]. Other causes of bleeding are less common but need to be considered to determine whether emergency medical care is required[1].

Types of dental bleeding[3]:

- Primary haemorrhage:
    - Bleeding occurs during surgery.
- Reactionary haemorrhage:
    - Bleeding occurs within a few hours to days following surgery and is usually due to failure to secure adequate initial haemostasis.
- Secondary haemorrhage:
    - Bleeding occurs within 14 days after surgery and is likely to be due to an infection.

Classify the bleed according to its location[3], i.e.:

- Vascular.
- Bone.
- Soft tissue.

Assess for potential risk factors for bleeding in any patient presenting with uncontrolled post-surgical bleeding[21]. These include[21]:

- Family history of a bleeding diathesis.
- Previous bleeding problems after dental surgery or trauma.
- Medications, such as aspirin, anticoagulants, and/or long-term antibiotics.
- Systemic illnesses associated with bleeding problems e.g. liver disease, haemophilia.
- Individuals presenting with advanced periodontal disease are also considered to have a higher risk of bleeding.

Consider performing an international normalised ratio (INR) test in patients at high risk of bleeding[14] [**L1, RGB**].

The Dental Bleeding Pathway in *Figure 6.4.3* should be used to determine which patients require referral to emergency medical care and which can be safely treated in a dental setting[1].

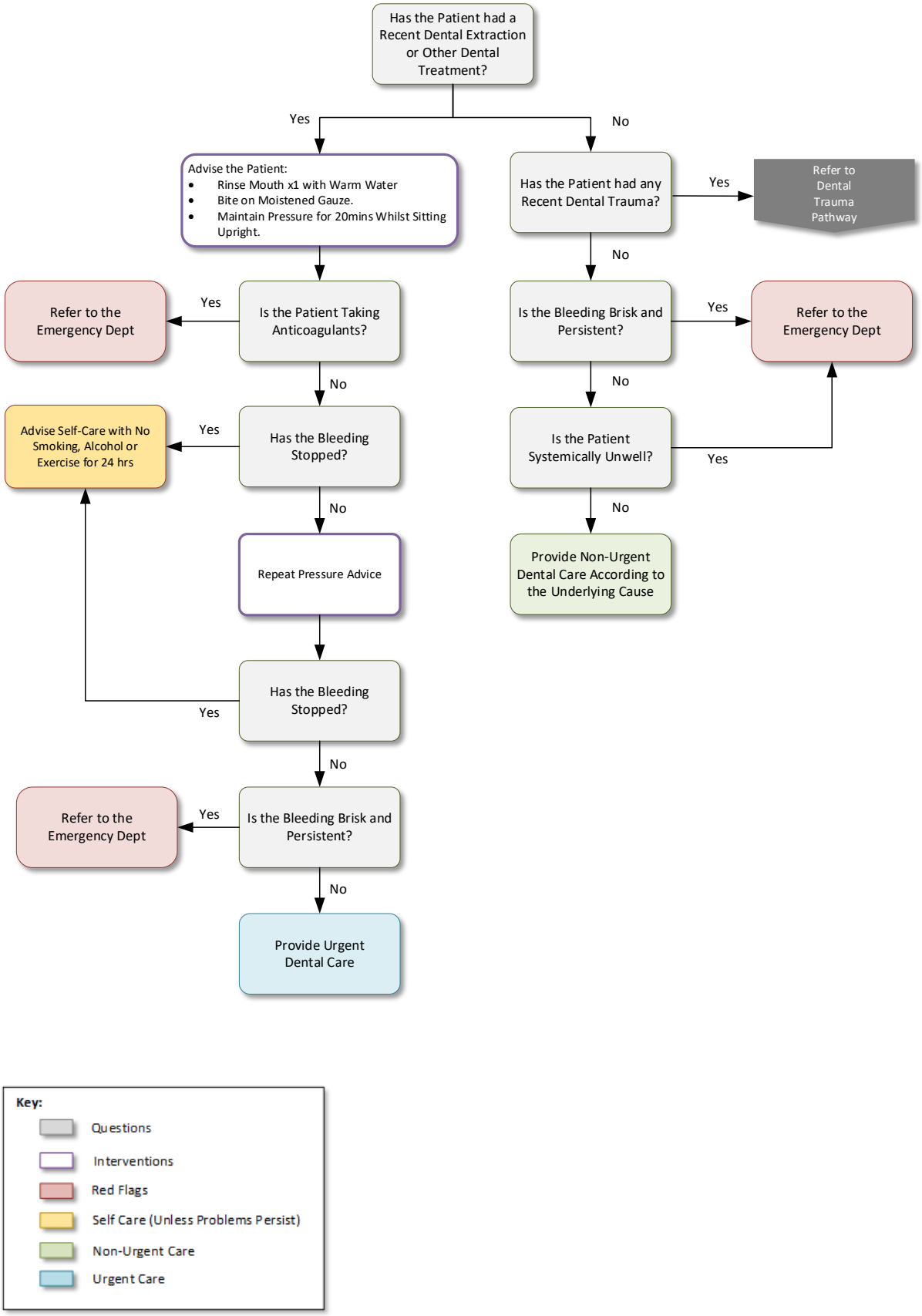

Fig. 6.4.3: Dental Bleeding Pathway[1].

6.4.4 Oral Ulcerations

Ulcers are caused by a number of conditions, the majority of which are benign (e.g. recurrent aphthous stomatitis, hand foot and mouth disease)[1]. Other causes include adverse reactions to drugs, nutritional deficiencies, some gastrointestinal diseases and, more seriously, oral cancer[1].

The Oral Ulceration Pathway in *Figure 6.4.4* should be followed to determine which patients require referral to medical care and which can be safely managed in a dental setting.

Fig. 6.4.4: Oral Ulceration Pathway[1].

6.4.5 Altered Sensation or Abnormal Appearance of the Head and Neck

In addition to pain, swelling, bleeding and trauma caused by injury, patients may present with are altered sensation or abnormal appearance of the head and neck[1]. In these cases, the pathway in *Figure 6.4.5* should be followed to determine which patients require emergency referral to medical care.

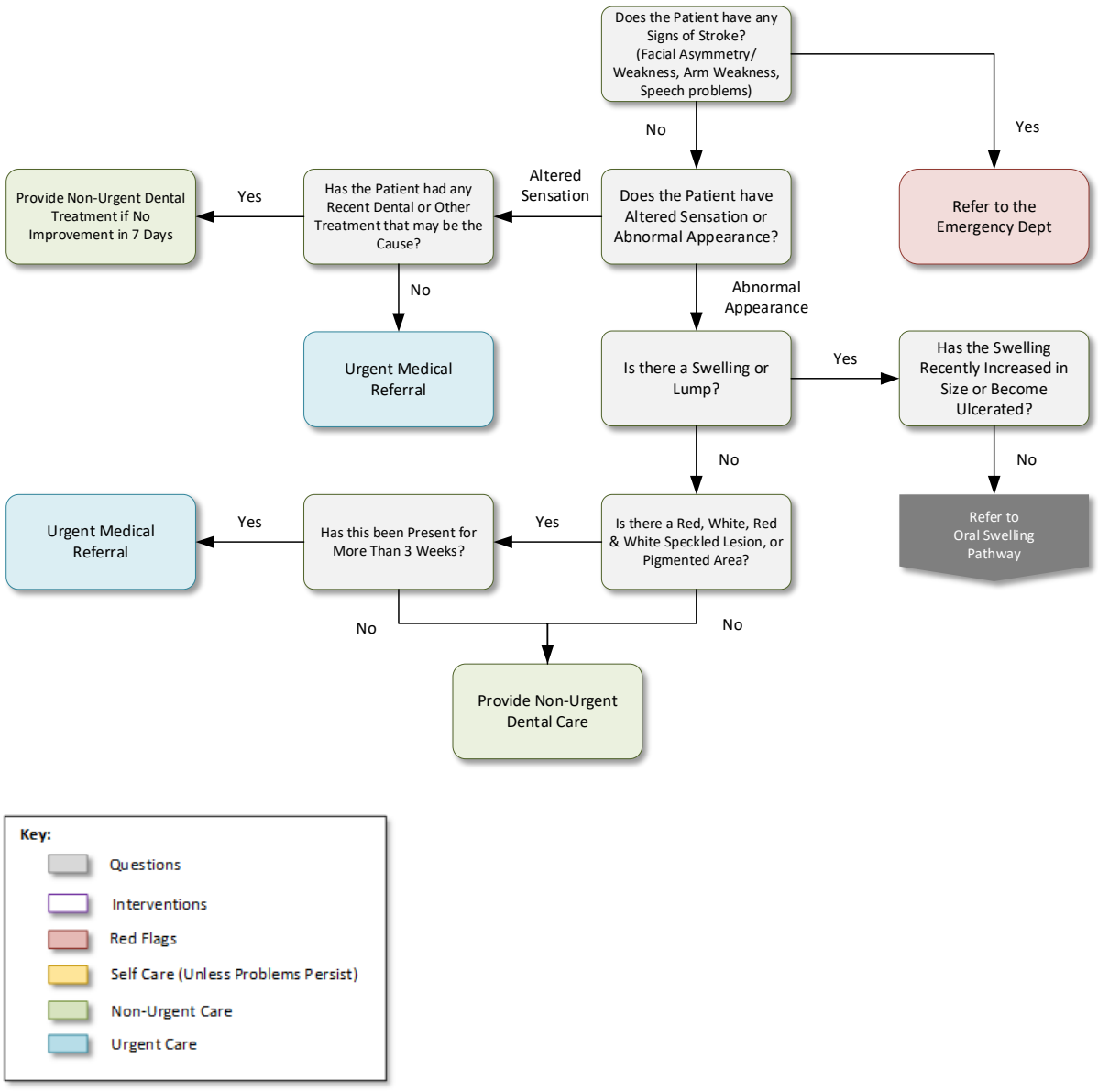

Fig. 6.4.5: Altered Senation or Abnormal Appearance Pathway[1].

7 Management of Dental Conditions

The following conditions are addressed in further detail in the subsequent sections[1]:

- Acute Apical Abscess.
- Acute Pericoronitis.
- Necrotising Periodontal Disease.
- Periodontal Abscess.
- Perio-Endo Abscess.
- Pulpitis.
- Alveolar Osteitis.
- Post-Extraction Haemorrhage.
- Cracked, Fractured, Loose or Displaced tooth Fragments and Restorations.
- Trauma from an Orthodontic Appliance.
- Acute Temporomandibular Joint Conditions.
- Salivary Gland Obstruction or Infection.
- Osteonecrosis.
- Peri-Implantitis.

7.1 Acute Apical Abscess

Acute inflammation of the soft tissues immediately surrounding the tip of the root of a tooth which is often caused by tooth decay and subsequent death of the pulp tissue or as a result of trauma to the tooth[1].

Principal signs and symptoms include[1]:

- Fast onset pain of variable intensity that is usually localised to a single tooth.
- The tooth becomes progressively more sensitive to chewing and touch.
- Swelling of the gingiva, face, or neck. Swelling caused by abscess may push the affected tooth against other teeth, creating discomfort in the lower-upper teeth contact and may sometimes cause the tooth to become mobile.
- Fever.
- Listlessness, lethargy, loss of appetite for children younger than 16 years old

Management:

- Ensure the airway is not compromised or threatened:
    - If compromised or threatened, refer immediately to the ED for treatment.
- If the airway is not compromised, consider[1]:
    - Initiating drainage of the abscess through the affected tooth if possible.
    - If there is an associated fluctuant soft tissue swelling, attempt incisional drainage as soon as possible.
    - If able to drain through the tooth, irrigate the canal with either sodium hypochlorite solution (1–5.25%) or 0.2% chlorhexidine gluconate solution before drying and sealing in non-setting Calcium Hydroxide using a temporary dressing material.
        - Note that drainage is not normally carried out for a primary tooth. If drainage of the abscess through endodontic access is persistent, early recall and repeated cleaning of the canal may be necessary.
    - The tooth should not be left on open drainage.
    - Prescribe appropriate analgesia (NSAIDs) if attempts to drain the infection are inadequate or not possible.
    - Relieve occlusion on the affected tooth, if appropriate.

7.2 Acute Pericoronitis

Infection under the operculum, i.e. the gingival tissue covering a partially erupted tooth. Pain associated with erupting teeth in children (both primary and permanent teeth) [1].

Principal signs and symptoms include[1]:

- Pain (usually well-localised around a partially erupted tooth).
- Swelling (swelling of the gingiva around a partially erupted tooth; can extend to facial swelling, especially with lower molar tooth).
- Discomfort with swallowing.
- Limited mouth opening.
- Unpleasant taste or odour from the affected area.
- Fever.
- Nausea.
- Fatigue.

Management:

- Ensure the airway is not compromised or threatened:
    - If compromised or threatened, refer immediately to the ED for treatment.
- If the airway is not compromised, consider[1]:
    - For children:
        - Advise optimal analgesia, soft tooth brushing around affected area and rinsing the mouth after food.
    - For adults:
        - Ultrasonic scaling and/or debridement to remove any foreign body lodged around the partially erupted tooth, under local anaesthesia, where possible.
        - Irrigating under damaged tissue with 0.2% chlorhexidine.
        - Extracting the tooth if there are repeated episodes of pericoronitis associated with the same tooth.
        - Extracting or adjusting an opposing tooth where there is trauma to the inflamed operculum if the position of the tooth suggests that it is unlikely to achieve function in future.

7.3 Necrotising Periodontal Disease

Necrotising gingivitis and *necrotising periodontitis* are severe inflammatory conditions of the gingiva caused by pathogenic bacteria (fusiform bacteria and *Spirochetes*) and are more common in immunocompromised patients[1]. Both involve the same disease process[1]:

- Necrotising gingivitis relates to lesions limited to gingival tissue.
- Necrotising periodontitis involves loss of attachment.

Principal signs and symptoms, include[1]:

- Pain (general or localised).
- Swelling.
- Bleeding.
- Halitosis.
- Ulcerated gingival tissue.
- Loss of attachment.
- Malaise.
- Fever.

Management:

- Ensure the airway is not compromised or threatened:
  - If compromised or threatened, refer immediately to the ED for treatment[1].
- If the airway is not compromised, consider[1]:
  - Prescribing metronidazole.
  - Arranging appropriate therapy with a hygienist, dentist, or periodontist.
  - Scaling teeth as effectively as symptoms allow. Local anaesthesia may be required.
  - Prescribing chemical plaque control (hydrogen peroxide and 0.2% chlorhexidine mouthwash).

7.4 Periodontal Abscess

A periodontal abscess results from an active period of periodontal breakdown whilst there is occlusion of drainage from a marginal closure of the deep periodontal pocket. These abscesses develop in deep periodontal pockets and are commonly seen in patients with untreated periodontitis or as a recurrent infection during a course of active treatment[1].

Principal signs and symptoms include[1]:

- Pain and tenderness of gingival tissue.
- Increased tooth mobility.
- Fever and swollen or enlarged regional lymph nodes.
- Presence of swelling on gingiva.
- Suppuration from the gingiva.

Management:

- Ensure the airway is not compromised or threatened:
  - If compromised or threatened, refer immediately to the ED for treatment.
- If the airway is not compromised, consider[1]:
  - Arranging appropriate therapy with a hygienist, dentist, or periodontist.
  - Scaling teeth as effectively as symptoms allow. Local anaesthesia may be required.
  - Prescribing chemical plaque control (hydrogen peroxide and 0.2% chlorhexidine mouthwash).
  - Scaling and irrigating the periodontal pocket.
  - Extraction of the affected tooth.

7.5 Pulpitis

Pulpitis refers to inflammation of the dental pulp. Signs and symptoms vary depending on whether the condition is reversible or irreversible[1].

Principal signs and symptoms, include[1]:

- Reversible Pulpitis:
  - Gives a positive or exaggerated response to sensibility test.
  - The tooth is not tender to percussion.
- Irreversible Pulpitis:
  - Pain may be difficult to localise to a single tooth and may last for several hours.
  - Pain may be dull and throbbing.
  - May be worsened by heat and/or alleviated by cold.
  - The pain can occur spontaneously, typically keeping the patient awake.

Initial Management[1]:

- Advise optimal analgesia.
- Do not prescribe antibiotics.
- Advise the patient to seek non-urgent dental care or, if the analgesia ineffective, seek urgent dental care.

Subsequent Management[1]:

- If Reversible Pulpitis:
    - Consider providing a temporary dressing; and
    - Restoring the affected tooth.
- If Irreversible Pulpitis:
    - Consider providing first stage endodontic therapy:
        - Pulpotomy for children's teeth.
        - Pulpectomy for adult's teeth.
            - NB: Note that in some cases, achieving anaesthesia is difficult and a corticosteroid-antibiotic paste may be used to reduce inflammation for extirpation at a later date.
    - Consider extracting the tooth.

7.6 Alveolar Osteitis

Alveolar osteitis refers to inflammation of a tooth socket after a tooth has been extracted. This most commonly occurs after extraction of a molar with smokers most at risk of developing alveolar osteitis.

Principal signs and symptoms, include[1]:

- Onset of pain 24-48 hours after extraction.
- Pain localised to the vicinity of the extraction site with tenderness of alveolar socket wall.
- Unpleasant taste or odour from the affected area.
- Swelling may occasionally occur.

Initial Management[1]:

- Advise optimal analgesia.
- Advise the patient to not smoke and maintain good oral hygiene.
- Advise the patient to seek urgent dental care.

Subsequent Management[1]:

- Consider the following:
    - Irrigation of the socket with saline.
    - Application of a suitable material to dress the socket.
- Do not prescribe antibiotics unless there are signs of spreading infection, systemic infection, or if the patient is immunocompromised.

NB: Chlorhexidine has been reported as a very rare but potentially serious cause of allergic reaction when used for dry socket irrigation and is therefore not recommended[1].

7.7 Perio-Endo Abscess

Perio-endo abscesses (endodontic and periodontal lesions) may affect a single tooth leading to abscess formation. Diagnosis requires radiographic examination and vitality tests and treatment of the combined lesion involves both endodontic and periodontal therapy[1].

Principal signs and symptoms, include[1]:

- Generalised periodontal disease may be present with localised pain.
- Swelling with or without suppuration on palpation.
- Deep pocketing to root apex with bleeding on probing.

Management:

- Ensure the airway is not compromised or threatened.
    - If compromised or threatened, refer immediately to the ED for treatment.
- If the airway is not compromised, consider[1]:
    - Arranging appropriate therapy with a hygienist, dentist, or periodontist.
    - Scaling teeth as effectively as symptoms allow. Local anaesthesia may be required.
    - Prescribing chemical plaque control (hydrogen peroxide and 0.2% chlorhexidine mouthwash).
    - Root canal treatment or retreatment.

7.8 Post-Extraction Haemorrhage

Bleeding in the mouth following extraction of a tooth. See also *Section 6.4.3*.

Immediate Management[1]:

- Gently rinse the mouth once with warm (not hot) water to wash out excess blood.
- Advise the patient to place a rolled up piece of cotton or a gauze swab moistened with saline or water over the socket and to bite firmly on it.
- Maintain the pressure for 20 minutes before checking whether the bleeding has stopped.
- If necessary, repeat once.
- After the bleeding has stopped, advise the patient to avoid drinking alcohol, smoking or exercising for 24 hours and to avoid disturbing the blood clot.
- If the patient is taking anticoagulants, the bleeding fails to stop and is brisk and persistent, send the patient immediately to the Emergency Department.

Subsequent Management[1]:

- Consider applying a haemostatic dressing to the socket (e.g. oxidised cellulose such as Surgicell or haemocollagene sponge).
- Consider suturing the wound to achieve good soft-tissue closure and/or to stabilise the socket edges.
- If the patient is a child, consider referral to a specialist to investigate underlying pathology.
- Do not prescribe antibiotics unless there are signs of spreading infection, systemic infection, or for an immunocompromised patient.

7.9 Cracked, Fractured, Loose or Displaced Tooth Fragments and Restorations

Any lost, chipped, fractured, or loose filling. A cracked, chipped, fractured, or split tooth or part of tooth. A loose or displaced crown, bridge, or veneer[1].

Principal signs and symptoms, include[1]:

- Pain (general and localised with tenderness on biting).
- Sensitivity to hot, cold and sweet and chewing of food.
- Open cavity.
- Section of tooth or filling missing.
- Sharp edge on tooth.
- Mobile section of tooth or teeth.
- Mobility or loss of restoration.
- Trauma to the soft tissues of the tongue, lips, or cheek from sharp edges of the fracture site.
- Gingival inflammation.
- Recurrent caries.

Management:

- If it is known or suspected that the patient has inhaled a piece of tooth, filling or restoration, send the patient immediately to the Emergency Department[1].

If tooth fragments or fillings, consider[1]:

- Smoothing any rough edge, removing any loose or displaced tooth fragments or defective fillings.
- Providing a temporary palliative dressing or permanent filling.
- Pulp therapy (direct pulp cap, pulpotomy or root canal treatment) if fracture involves the pulp.
- Extracting if the tooth is not restorable.

If crowns, bridges, and veneers, consider[1]:

- Recementing the restoration with a temporary or permanent cement, depending on the integrity of the tooth beneath and whether a new restoration is needed.
- Providing temporary coverage.
- Making permanent replacements.
- Providing a new crown for a primary tooth.

7.10 Trauma from an Orthodontic Appliance

Trauma from fractured or displaced orthodontic appliances may result in[1]:

- Pain.
- Soft tissue injury.

Management[1]:

- If it is known or suspected that the patient has inhaled or ingested large parts of a fractured appliance or the airway is compromised, send the patient immediately to the Emergency Department.
    - Brackets are frequently swallowed by patients and pass through the bowel without incident.

For fixed appliances[1]:

- Remove any components of the appliance that are loose.
- Apply malleable wax firmly onto any sharp, non-removable parts of the appliance causing trauma to the oral soft tissues.

- This may be orthodontic wax, or as a first-aid measure, either sugar-free chewing gum or the soft wax used to wrap cheeses can be moulded between fingers to form a soft ball (ensure that the patient does not have any allergy to dairy products before doing this).
- Advise the patient to seek non-urgent orthodontic care with their orthodontic provider.

For removable appliances[1]:
- Take the fractured appliance out of the patient's mouth.
- Advise the patient to seek non-urgent orthodontic care with their orthodontic provider.

For patients with headgear[1]:
- Advise the patient not to wear the headgear and to make an orthodontic appointment.
- Consider removing or trimming loose or displaced arch wire of a fixed appliance.
- Advise the patient to arrange a follow up orthodontic appointment.

7.11 Acute Temporomandibular Joint Conditions

Acute disorders of the temporomandibular joint e.g. dislocated or locked jaw or problems involving muscles around the joint[1].

Principal signs and symptoms, include[1]:
- Pain.
- Swelling.
- Joint noises, e.g. pop, clicks and grating associated with movement.
- Limited opening of mouth.
- Headaches.
- Earache or tinnitus.

If the jaw is dislocated:
- The patient is typically unable to move jaw.
- The jaw is displaced in an open position.

Initial Management:
- If the jaw is dislocated send the patient to the Emergency Department[1].

For other temporomandibular joint conditions[1]:
- Recommend optimal analgesic/anti-inflammatory drugs.
- Consider both the benefits and potential harms of prescribing a short course of diazepam to relax muscles (for adults only).
- Advise the patient to use local heat packs or ice packs to relieve the symptoms.
- Advise the patient to have a soft diet, to avoid chewing gum and to rest their jaw.
- Advise the patient to seek non-urgent dental care.

Subsequent Management[1]:
- Consider making an occlusal splint for the patient.
- Monitor symptoms in follow-up appointment(s).
- Consider referring the patient for specialist opinion if the above measures do not improve symptoms.

7.12 Salivary Gland Obstruction of Infection

Blockage of salivary duct due to obstruction or infection.

Principal signs and symptoms, include[1]:

- Pain located in a major salivary gland.
- Swelling.
- History of xerostomia (dry mouth).
- Dehydration.
- Fever.

Initial Management[1]:

- Determine from history and clinical examination whether the patient has a salivary gland obstruction or infection. Infection may be associated with systemic infection. Determine the likelihood of whether the patient may have mumps.

If there is an infection[1]:

- Acute gland pain or acute episode of chronic persistent gland pain, (does not fluctuate with mealtimes), erythema, severe symptoms, systemically unwell, bilateral, or unilateral parotid swelling with fever (this also may be associated with mumps):
- Recommend optimal analgesia.
- Advise the patient to seek urgent medical care.

If mumps is suspected[1]:

- Typically, in a young (e.g. less than 21 years) or unimmunised adult experiencing swelling at the side of the face under the ear(s) swelling, systematically unwell and has a raised temperature.
- Recommend optimal analgesia.
- Advise the patient to avoid spread of infection by staying at home.
- Refer for urgent medical care (mumps is a notifiable disease).

If there is obstruction without an infection in the major salivary glands[1]:

- Intermittent pain and swelling, typically within an hour of mealtimes, then subsiding without erythema or fever.
- Recommend optimal analgesia.
- Advise the patient to drink plenty of fluids if experiencing dry mouth.

If there is an obstruction without infection in the minor salivary glands[1]:

- Usually a small, localised swelling as a result of trauma (mucocele) that often discharges spontaneously.
- In all of the above cases, if the patient is systemically unwell or there is a history of diabetes, advise the patient to seek urgent medical care.

7.13 Osteonecrosis

Exposed avascular bone. Patients taking a bisphosphonate drug (e.g. for osteoporosis) or who have had radiotherapy to the head and neck may be at increased risk of developing osteonecrosis of the jaw[1].

Principal signs and symptoms, include[1]:

- Pain.
- Exposed intra oral bone, with failure to heal in the absence of malignancy.

Initial Management[1]:

- Recommend optimal analgesia.
- Advise the patient to rinse their mouth with 0.2% chlorhexidine mouthwash.
- If of recent onset, advise the patient to seek urgent care. If chronic, advise the patient to seek non-urgent care.
- Do not prescribe antibiotics unless there is a discharge.
- Minimise the need for extractions and avoid minor oral surgery.
- Refer to an oral surgeon or oral and maxillofacial surgeon to establish the diagnosis.

7.14 Peri-Implantitis

Inflammation affecting the soft and hard tissues around implants, leading to loss of bone support[1].

Principal signs and symptoms, include[1]:

- Pain (around the implants).
- Swelling.
- Bleeding.
- Suppuration on applying pressure.
- Radiographic evidence of peri-implant bone loss.

Management[1]:

- Recommend optimal analgesia.
- Do not prescribe antibiotics unless there are signs of spreading infection, systemic infection, or for an immunocompromised patient.
- Recommend good oral hygiene.
- Assess the patient's progress including radiographic assessment to evaluate bone loss and monitor the outcome of treatment.
- Give appropriate oral hygiene instruction.
- Consider non-surgical debridement with carbon fibre or plastic curettes and irrigate the pocket with 0.2% chlorhexidine.
- Consider surgical debridement and implant decontamination with saline or 0.2% chlorhexidine.
- In severe cases, consider regenerative surgery with barrier membranes with or without autogenous bone
- grafts or bone substitute or surgical removal of the implant.

8 Referral Criteria to Specialist Dentistry

The general dentist is the first point of contact for most dental emergencies and will manage most problems. They are expected to refer patients to specialist dentistry when specialist assessment is required or if the patient cannot be managed appropriately within their care setting, or within the scope of their privileges [**R-GDG**].

8.1 Endodontist

Patients should be referred to endodontics if they need [22,23] [**L1, RGA**]:

- Apexification or apexogenesis.
- Conventional root canal therapy on multi rooted teeth.
- Non-surgical retreatment on multi rooted teeth.
- Root amputation or hemisection.
- Peri-radicular surgery.
- Intentional reimplantation.
- Treatment of obstructed canals.
- Removal of broken appliances.
- Repair of internal perforations.
- Follow up of trauma to teeth.

8.2 Paedodontist

Children should be referred to a paedodontic specialist if the child is[22] [**L1, RGA**]:

- Unable to cooperate, due to:
    - Very young age (preschool)
    - A mental or physical disability.
- Medically compromised (e.g. receiving chemo- or radiotherapy).
- Required to undertake a procedure that is out of the general dentist's scope of privileges.

8.3 Oral and Maxillofacial Surgeon

Patients should be referred to oral and maxillofacial surgeons if they require, or present with[22,23] [**L1, RGA**]:

- Removal of impacted teeth.
- Removal of remaining roots.
- Removal of oral cavity cysts.
- Transplantations of teeth.
- Removal of palatal/alveolar exostoses.
- Removal of foreign bodies in soft tissue and hard tissue
- Vestibuloplasty prosthetic surgery (e.g. alveoplasty, alveolar bone augmentation, sinus lifting etc.
- Closure of oroantral fistulas.
- Intraoral hard tissue biopsy sampling
- Palatal tissue hyperplasia reduction.
- Suspected oral cancer.
- Facial swelling affecting respiration.
- Severe uncontrolled bleeding.
- Jaw fractures.

8.4 Periodontist

Patients should be referred to periodontics if they require [22,23] [**L1, RGA**]:

- Periodontal flap surgery.
- Mucogingival Surgery (gingivoplasty, gingivectomy, frenectomy, free gingival/mucosal grafting, root coverage).
- Osseous surgery e.g. multiple crown lengthening or involving bone removal.
- Guided tissue regeneration.
- Guided bone augmentation.

8.5 Orthodontist and Prosthodontist

Patients should be referred to orthodontics if they present with [22] [**L1, RGA**]:

- Severe maxillary or mandibular malocclusion.

Patients should be referred to prosthodontics if they present with [22] [**L1, RGA**]:

- Broken or loose implant restoration.
- A missing anterior tooth due to recent trauma.

9 Prevention of Dental Emergencies

To maintain healthy oral tissues and prevent the re-occurrence of dental emergencies, the following preventative measures should be considered[24–29] [**L1, RGA**]:

- **Focused Counselling About Diet**:
  - Patients should be advised to reduce the intake of acidic and high sugar containing food and drinks to prevent dental caries and periodontal disease.

- **Oral Hygiene:**
  - Patients should be advised to brush their teeth and gums at least twice daily for no less than two minutes using a toothbrush and fluoride toothpaste.
  - Fluoride varnish should be applied when the first primary tooth erupts, then twice yearly in all infants and young children.

- **Screening for Dental Disease**:
  - Patients should be advised to have regular dental examinations, at least once every year and early treatment of carious lesions to reduce the risk of serious complications.

- **Encouraging Smoking Cessation:**
  - Smoking and smokeless tobacco have a negative effect on oral health and should be discouraged.

- **Use of Mouthguards in Sports:**
  - The use of appropriate customised mouthguards and face shields should be recommended in organised contact sports to reduce the frequency of dental trauma, especially among children.

- **Preoperative Bleeding Assessment:**
  - The bleeding risk of patient and of the planned surgical intervention should be assessed prior to surgery.
  - The INR should be evaluated in patients who have previous reports of an increased risk of bleeding prior to dental surgery or extraction.
  - Dental surgery appointments should be scheduled for early morning to allow patients enough time to return to the dental office in case of post-surgical haemorrhage.

10 Key Considerations for Patient Preferences

Patient preferences refer to patient perspectives, beliefs, expectations, and goals for health and life, and to the steps employed by individuals in assessing the potential benefits, harms, costs, and limitations of the management options in relation to one another. Patients may have preferences when it comes to defining their problems, identifying the range of management options and selecting or ranking the outcomes used to compare these options.

It is important for healthcare professionals to develop an understanding of the patient as an individual and the unique way in which each person experiences a condition and its impact on their life.

The following recommendations are therefore made for dentists and other healthcare professionals regarding general principles of patient care in Qatar:

- **Respect Patients:** Treat patients with respect, kindness, dignity, courtesy, and honesty. Ensure that the environment is conducive to discussion and that the patient's privacy is respected, particularly when discussing sensitive, personal issues. Ask the patient how they wish to be addressed and ensure that their choice is respected and used.

- **Maintain Confidentiality:** Respect the patient's right to confidentiality and do not disclose or share patients' information without their informed consent. In this context, dental students and anyone not directly involved in the delivery of care should first be introduced to the patient before starting consultations or meetings, and let the patient decide if they want them to stay.

- **Clarify Third-Party Involvement:** Clarify with the patient at the first point of contact whether and how they like their partner, family members or carers to be involved in key decisions about their care or management and review this regularly. If the patient agrees, share information with their partner, family members or carers.

- **Obtain Informed Consent:** Obtain and document informed consent from patients, in accordance with MOPH policy and guidance.

- **Encourage Shared Decision Making:** Ensure that patients are involved in decision making about their own care, or their dependent's care. Ensure that factors that may impact the patient's participation in their own consultation, including physical or learning disabilities, sight, speech or hearing impairments, and language problems are addressed.

- **Disclose Medical Errors:** Disclose errors when they occur and show transparency and empathy to patients. Errors should be documented in the medical record and incidents managed in accordance with clinical governance policies and procedures.

- **Ensure Effective Communication:** Explore ways to improve communication including using pictures, symbols or involving an interpreter or family members. Avoid using medical jargon. Use words the patient will understand and confirm the patient's understanding by asking questions.

- **Ensure Continuity of Care:** Provide clear and timely sharing of patient information between healthcare professionals, especially at the point of any transitions in care. Dental professionals should explore ways to minimise the need for travel to multiple sites to see different healthcare professionals involved in their care. This is especially true for patients with special needs who will have more difficulty travelling to different providers.

11 Performance Measures

A list of performance measures is given in the table below. Healthcare organisations are encouraged to monitor service performance using the indicator definitions below[2].

Number	Numerator	Denominator
DE01	Number in the denominator who were assessed by a clinician within 1 hour of presentation.	Total number of patients presenting with a dental emergency.
DE02	Number in the denominator who were treated within 24 hours.	Total number of patients presenting with a dental urgency.

Table 11.1: Performance measures[2].

12 References

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Appendix A: Detailed Description of the Literature Search

A systematic search for existing literature on dental emergencies was performed in the period February 2nd – February 27th, 2020.

The search for clinical practice guidelines on management of dental emergencies was performed in the *PubMed* database and websites of relevant organisations and societies including the Scottish National Dental Advisory Committee and the *Primary Health Care Corporation Dentistry Department*. The present guideline is primarily based on the *International Association of Dental Traumatology*, and the Scottish Dental Clinical Effectiveness Programme guidelines and is supplemented with other relevant studies.

Peer-reviewed scientific publications were found in PubMed and via *Google Scholar* Internet search engine. Non-peer reviewed studies were identified in *bioRxiv*. Books were checked on *Amazon* and via *Google* and *Google Scholar* search engines. Personal opinions of healthcare professionals, information published on medical websites, and drug prescribing information sheets were found via Google search engine.

The included publications were identified using the terms "dental emergency" and specified with the following terms in combinations:

Guideline, definition, prevalence, emergency, urgency, routine care, trauma, assessment, injury, dental, tooth, orofacial, soft tissue, hard tissue, laceration, infraction, fracture, concussion, luxation, avulsion, permanent, primary, screening, diagnosis, pain, management, treatment, cone beam radiography, medication, referral, follow-up.

Figure A.1 below outlines graphically the results of the search and application of exclusion criteria.

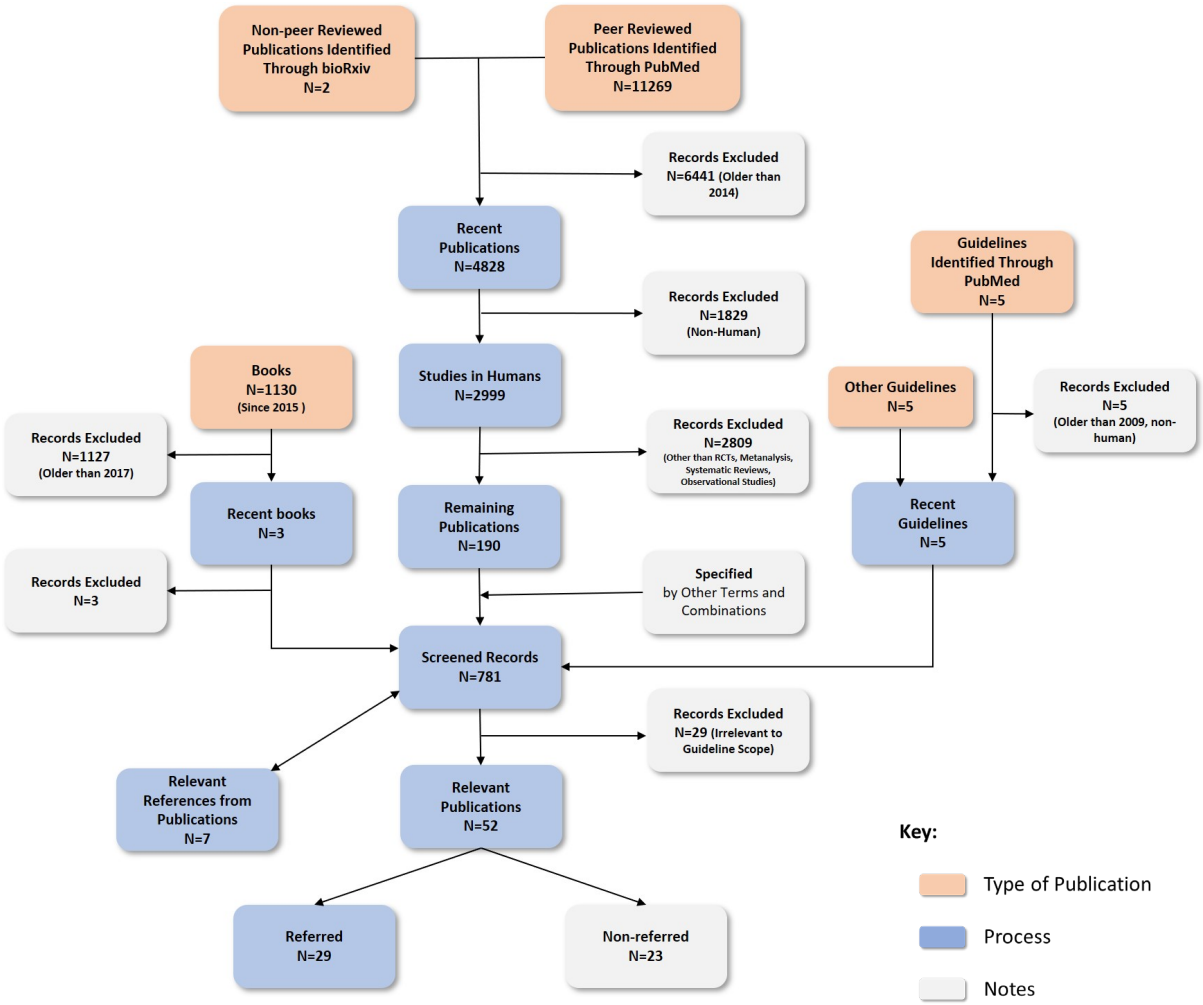

Fig. A1: Literature search results and application of exclusion criteria.

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