Oral ulceration (Part 2)

Michael A. O. Lewis*[1] and Philip-John Lamey[2]

Key points

- Oral ulceration may be due to viral or bacterial infection, immune-mediated disease or the presence of malignancy.
- The presence of mouth cancer needs to be suspected for any ulcer persisting longer than three weeks and such a case should be referred urgently for specialist assessment.
- The initial management of oral ulceration involves identifying the cause and provision of topical anti-inflammatory or antiseptic agents.

Abstract

Ulceration is probably the oral mucosal condition seen most frequently by general dental practitioners. It is almost always painful and therefore sufferers are prompt to seek advice. An important exception to this generalisation is the occurrence of oral squamous cell carcinoma, which is often painless in its early stages. Definitive diagnosis, which requires mucosal biopsy, is mandatory for any persistent area of oral ulceration.

Necrotising gingivitis

Necrotising gingivitis (NG) has a characteristic presentation comprising the rapid development of painful ulceration affecting the gingival margins and inter-dental papillae (Fig. 1) in particular the lower anterior region. There is a marked halitosis. The aetiology of NG is not fully understood but strictly anaerobic bacteria, in particular spirochetes and Fusobacterium species, are likely to be involved since high numbers of these microorganisms can be demonstrated in a smear from affected tissues (Fig. 2). Precipitating factors that enable proliferation of these bacteria include tobacco smoking, stress and immune deficiency, including infection with HIV. Diagnosis can be made from the clinical history and symptoms.

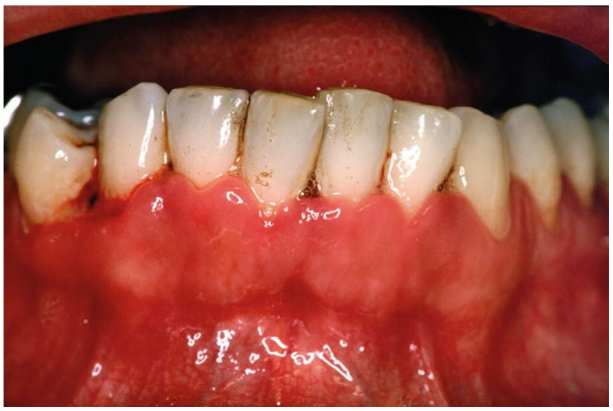

Fig. 1 Necrotising gingivitis affecting lower anterior gingivae

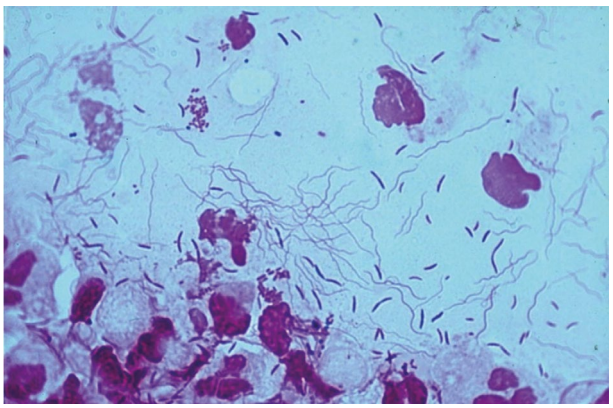

Fig. 2 Gram-stained smear taken from NG demonstrating numerous fusobacteria, medium-sized spirochetes and acute inflammatory cells

Book chapter originally published in Michael A. O. Lewis and Philip-John Lamey. Oral Medicine in Primary Dental Care, BDJ Clinician's Guides, https://doi.org/10.1007/978-3-030-15432-5_2

[1]School of Dentistry, Cardiff University School of Dentistry, Cardiff, UK; [2]Edinburgh Dental Institute, University of Edinburgh, Edinburgh, Dental Institute, Edinburgh, UK.
*Correspondence to: Michael A. O. Lewis
Email address: LewisMAO@cardiff.ac.uk

https://doi.org/10.1038/s41415-023-6549-3

Initial management should involve thorough mechanical cleaning and debridement of the teeth in the affected area. Symptoms will improve more rapidly if the patient is also given a systemic antimicrobial agent. Metronidazole taken at a dose of 400 mg three times daily is the antimicrobial treatment of choice and usually produces a dramatic improvement within 48 h. Amoxicillin, 500 mg three times daily, is an alternative agent. Either antimicrobial should be prescribed for three days.

Bacterial infection

Syphilis is caused by infection with the spirochete Treponema pallidum. Although the primary body site involved in this sexually transmitted disease is the genitalia, the lips and oral mucosa can be involved as a result of orogenital contact. Syphilis occurs in three stages: primary, secondary and tertiary forms. Initial infection is characterised by the development of a firm nodule at the site of inoculation, which breaks down after a few days to leave a painless ulcer with indurated margins. Primary syphilis usually resolves within 3–12 weeks without scarring. Secondary syphilis appears clinically approximately six weeks later and is characterised by a macular or papular rash, febrile illness, malaise, headache, generalised lymphadenopathy and sore throat. The oral mucosa is involved in approximately one-third of patients. Oral ulceration, described as 'snail track ulcers', develops and resolves within 2–6 weeks. Suspected cases require referral to specialist for serologic investigation to confirm infection. The incidence of syphilis is increasing in many parts of the world and suspected cases require referral to specialist genitourinary medicine clinic or sexual health clinic. Oral ulceration or pharyngitis may develop in gonorrhoea, another sexually transmitted disease, caused by infection with Neisseria gonorrhoea. Gonorrhoea is increasing in incidence.

Tuberculosis is one of the most prevalent infectious diseases in the world, particularly in developing countries. Infection is spread in droplets of sputum containing Mycobacterium tuberculosis from a patient with active pulmonary tuberculosis. The classical clinical features of tuberculosis are blood-tinged sputum, night sweats, fever and weight loss. Within the oral cavity, the characteristic presentation is of an ulcer on

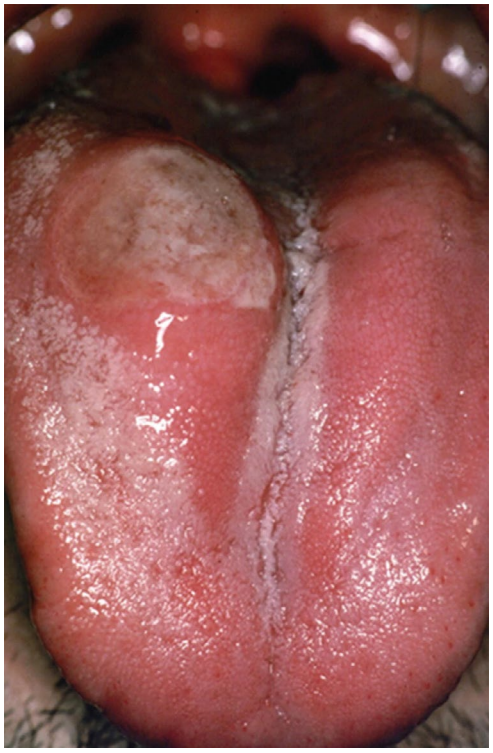

Fig. 3 Tuberculosis on the dorsum of the tongue

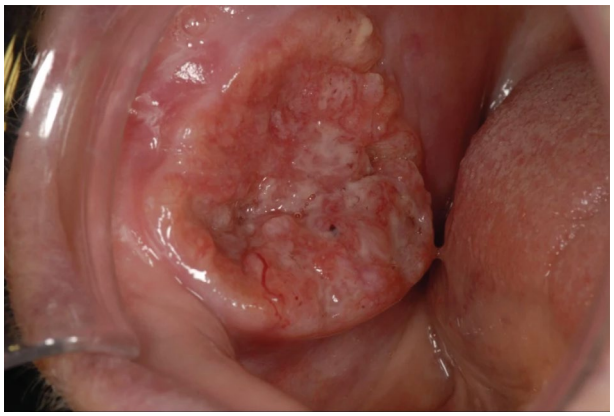

Fig. 4 Squamous cell carcinoma

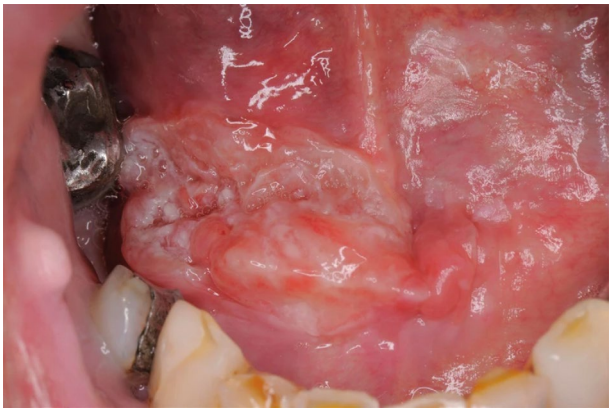

Fig. 5 Squamous cell carcinoma

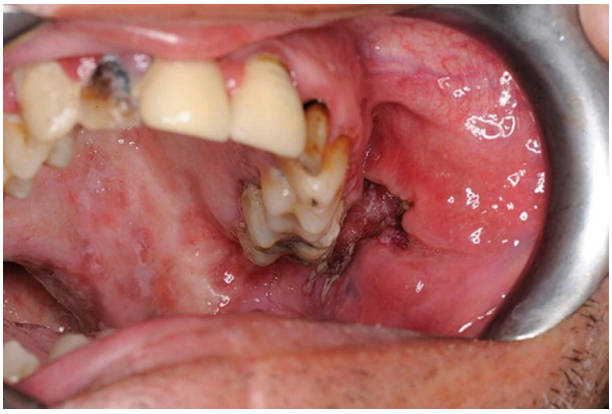

Fig. 6 Squamous cell carcinoma

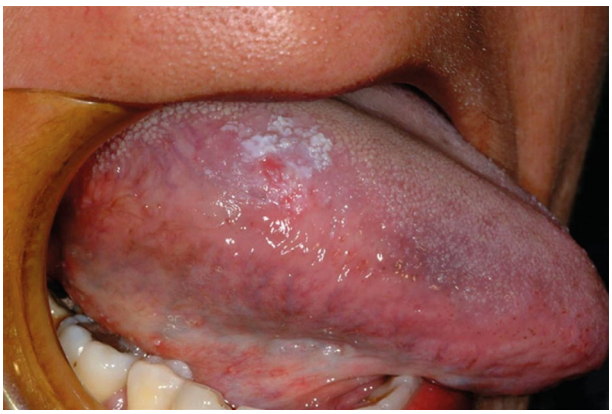

Fig. 7 Squamous cell carcinoma <2 cm in diameter

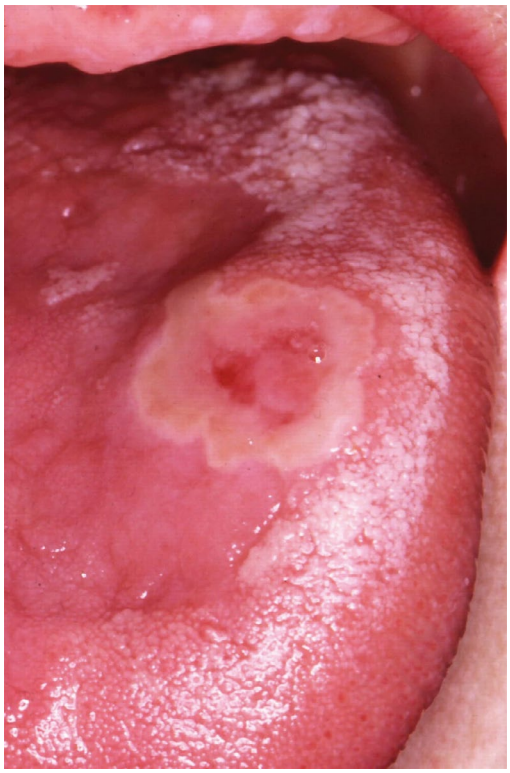

Fig. 8 Ulceration caused by herpes simplex virus in a patient with leukaemia

the dorsal surface of the tongue although any oral site may be affected (Fig. 3). Molecular microbiological methods are used to establish the diagnosis. Worryingly, strains of M. tuberculosis that are resistant to many of the drugs that have traditionally been used to treat this infection are now being encountered. Tuberculosis is spread by aerosols, including those created by handpieces in the dental surgery.

Squamous cell carcinoma

The presentation of squamous cell carcinoma in the mouth is highly variable but often involves 'ulceration' (Fig. 4, Fig. 5, Fig. 6). Since the stage of mouth cancer, in particular size, at the time of initial diagnosis strongly influences the long-term success of treatment, it is essential that any suspected lesions are detected while small, preferably <2 cm in diameter (Fig. 7). This factor emphasises the importance of a regular inspection of the oral soft tissues for any mucosal abnormality during dental examination. In addition, a persistent oral ulcer which fails to respond to initial treatment within 2–3 weeks requires biopsy to exclude the presence of malignancy. Squamous cell carcinoma is considered in full detail in Chap. 4.

Myeloproliferative disorders

Oral ulceration may be a feature of either acute or chronic leukaemia. In these individuals, the associated neutropenia can cause unusual forms of persistent oral ulceration, often involving members of the herpes group of viruses (Fig. 8) or gram-negative bacteria. Epstein–Barr virus ulceration in immune-suppression (Fig. 9). Oral ulceration has also been reported in non-Hodgkin's lymphoma (Fig. 10).

Adverse drug reaction

Systemic drug therapy can produce a range of unwanted and unexpected effects which are referred to as adverse drug reactions. These reactions can vary widely in their presentation and can range in severity from death to minor signs or symptoms. A number of drugs can produce adverse reactions in the mouth, including oral ulceration. An example of this is the ulceration associated with the use of nicorandil, a potassium channel

activator prescribed for long-term prevention of angina (Fig. 11). The ulceration will resolve within a few weeks of discontinuation of the drug.

Medication-related osteonecrosis of the jaw

Medication-related osteonecrosis of the jaw (MRONJ) is a rare adverse drug reaction that is usually a consequence of dental treatment involving bone, in particular tooth extraction. First recognised in patients taking bisphosphonates but subsequently reported in association with other antiresorptive and anti-angiogenic drugs. These agents are used in the management of diseases where there is an imbalance in bone metabolism, such as osteoporosis or Paget's disease and malignancies that metastasise to bone. The presenting symptom is pain in a region of exposed bone (Fig. 12) and diagnosis made by the drug history and clinical findings.

Osteoradionecrosis

Whenever radiotherapy is given as part of medical treatment there is potential subsequent osteoradionecrosis in the field exposed. This may develop in the mandible and maxilla following extraction of a tooth or the presence of periodontal infection. There is often ulceration and necrosis of the soft tissues, leaving areas of exposed bone. Small areas of necrosis, typically in the mandible, become larger and portions of necrotic bone are then lost (Fig. 13). The diagnosis is made from the clinical history and appearance. Prevention is the key and as such a patient due to undergo radiotherapy in the head neck region should have a dental assessment before the commencement of treatment. Any tooth with large or poor restoration, periapical infection or periodontal disease should be extracted before the radiotherapy.

Necrotising sialometaplasia

This benign salivary condition occurs almost exclusively in the hard palate and is thought to be caused by local ischaemia secondary to altered local blood supply, which in turn causes infarction of the salivary glands. Necrotising sialometaplasia is characterised by the development of a painless swelling with dusky erythema in the hard palate, which ulcerates (Fig. 14). Interestingly, there is often anaesthesia in the affected area. The clinical presentation can resemble squamous cell carcinoma. A biopsy is required to make the diagnosis. Specialist interpretation is essential since cases of necrotising sialometaplasia have

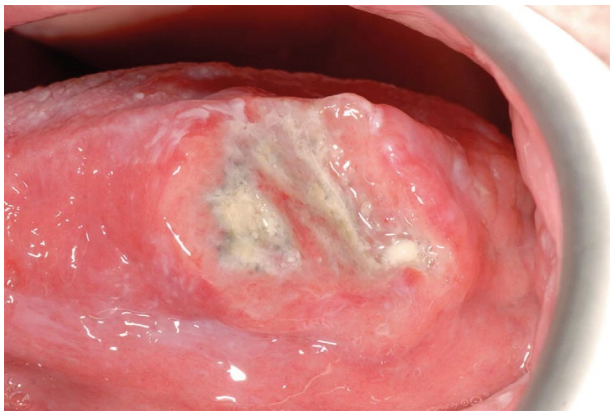

Fig. 9 Ulceration due to Epstein-Barr virus

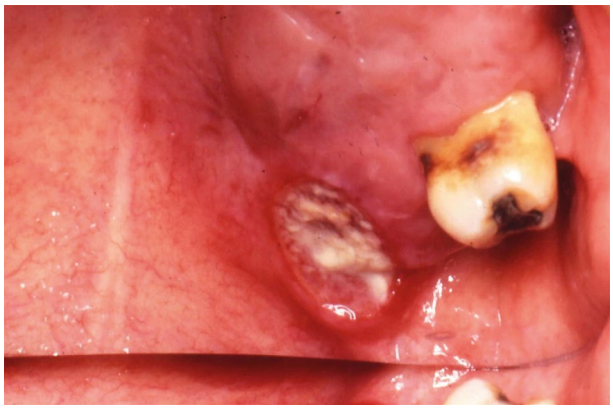

Fig. 10 Ulceration in a patient with non-Hodgkin's lymphoma

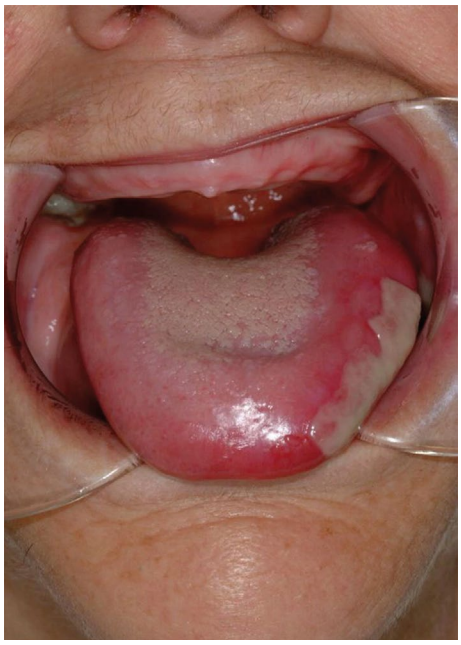

Fig. 11 Superficial ulceration induced by nicorandil

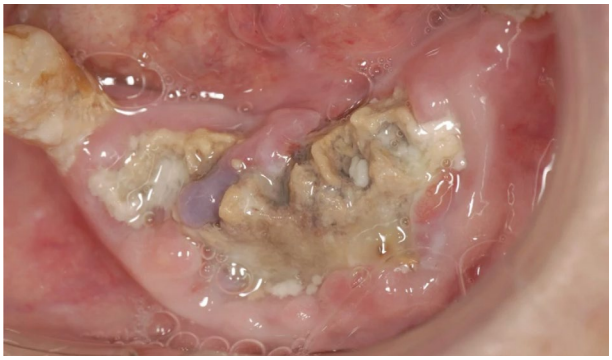

Fig. 12 MRONJ following extraction of lower anterior teeth

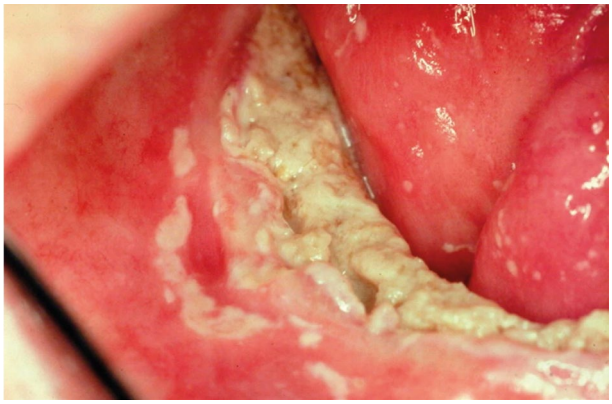

Fig. 13 Osteoradionecrosis in the lower jaw

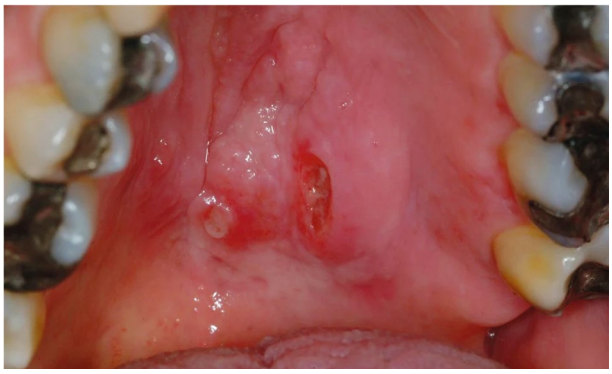

Fig. 14 Necrotising sialometaplasia

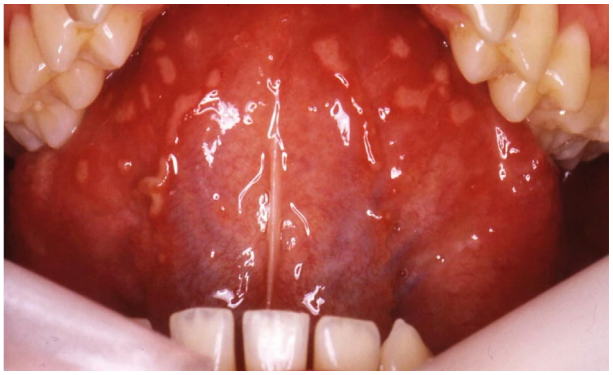

Fig. 15 Widespread multiple small ulcers due to primary herpetic gingivostomatitis

been falsely diagnosed histopathologically as squamous cell carcinoma. The condition is benign and self-limiting. An antiseptic mouthwash or spray should be used to treat the ulceration. Healing will occur within 2–3 weeks.

Viral infection

Infection due to herpes simplex virus Type 1 is a common cause of oral ulceration. This may either involve primary infection, which is characterised by widespread oral ulceration (Fig. 15), or secondary infection due to reactivation of latent virus, which can present intra-orally as a localised crop of small ulcers (Fig. 16). Reactivation of members of the herpes group of viruses is well-recognised as a cause of ulceration in immunocompromised patients.

The coxsackie group A viruses, named after a district in New York State, can occasionally produce oral ulceration, particularly in children. A characteristic feature of coxsackie viral infection is the involvement of the posterior part of the mouth. If a patient presents with oral ulceration in this region, in addition to cutaneous lesions on extremities, then hand, foot and mouth disease may be suspected. Coxsackie infection rarely produces severe pain or systemic upset and treatment is therefore based on symptomatic relief of oral ulceration using an antiseptic mouthwash. Ulceration due to viral infection is discussed in more detail in Chap. 5.

Erythema multiforme

The clinical presentation of erythema multiforme is characterised by the rapid onset of extensive oral ulceration (Fig. 17), with blood-crusted lips, possibly in association with cutaneous, ocular and genital lesions. (see Chap. 5).

Lichen planus and lichenoid reaction

Lichen planus (Fig. 18) and lichenoid reaction (Fig. 19) both principally present within the mouth as white patches but can also involve ulceration (see Chap. 4).

Summary

There are many causes of oral ulceration although recurrent aphthous stomatitis is

by far the most frequent. Diagnosis of most forms of oral ulceration should be relatively straightforward, following an adequate history, examination and investigation. If ulceration fails to respond to routine treatment or has an unusual appearance, then the presence of an underlying systemic disorder has to be considered. In addition, mouth cancer has to be suspected for any solitary ulcer that persists for longer than three weeks.

Acknowledgements

The BDJ Editorial Team would like to thank the authors of this chapter for granting us permission to republish their chapter within our journal. This chapter was first originally published in Michael A. O. Lewis and Philip-John Lamey, Oral Medicine in Primary Dental Care, BDJ Clinician's Guides, https://doi.org/10.1007/978-3-030-15432-5_2. © Springer Nature Switzerland AG 2019. Further reading is included in the references list.[1,2,3,4,5]

References

1. NICE Clinical Knowledge Summaries. Aphthous ulcer. 2022. Available at https://cks.nice.org.uk/aphthous-ulcer (accessed October 2023).
2. Chavan M, Jain H, Diwan N, Khedkar S, Shete A, Durkar S. Recurrent aphthous stomatitis: a review. *J Oral Pathol Med* 2012; **41:** 577–583.
3. Edgar N R, Saleh D, Miller R A. Recurrent aphthous stomatitis: a review. *J Clin Aesthet Dermatol* 2017; **10:** 26–36.
4. Goel R M, Ormond M, Nayee S, Hullah E A, Sanderson J D, Escudier M. A guide to oral ulceration for the medical physician. *Br J Hosp Med (Lond)* 2015; **76:** 337–342.
5. Talacko A A, Gordon A K, Aldred M J. The patient with recurrent oral ulceration. *Aust Dent J* 2010; **55:** 14–22.

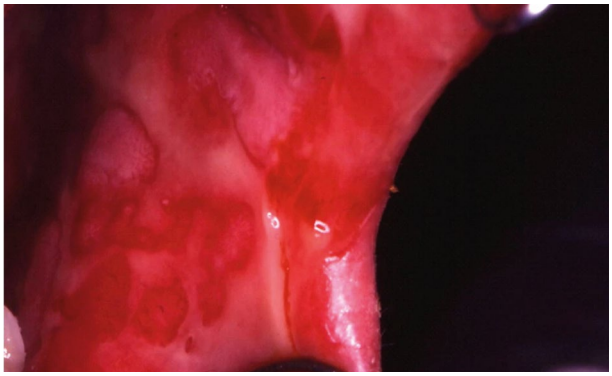

Fig. 16 Localised collection of small ulcers in the palate due to reactivation of latent herpes simplex virus

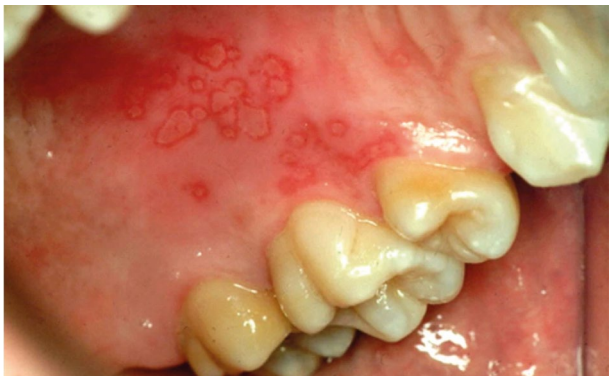

Fig. 17 Extensive oral ulceration of erythema multiforme

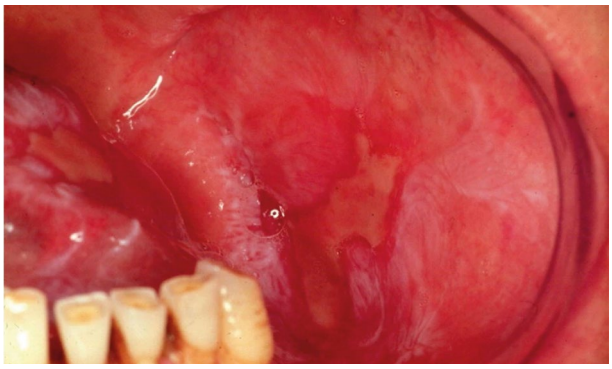

Fig. 18 Ulceration in lichen planus

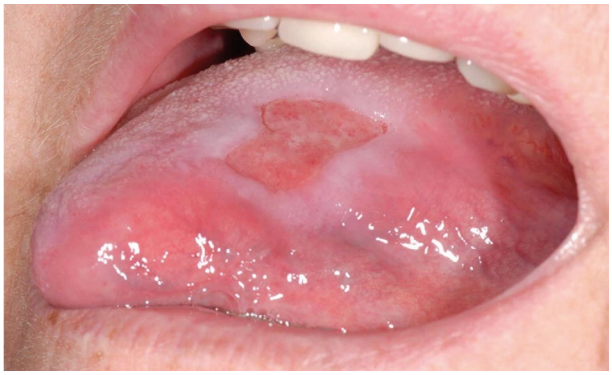

Fig. 19 Ulceration within a lichenoid reaction