



Jaw metastases and the general dental practitioner

Sarah Jadun,¹ Lara Zebic² and Vinod Patel³ educate dental practitioners on appropriate recognition of oral metastatic pathology and referral to secondary care.

Abstract

Metastatic spread to the oral cavity is a rare entity, comprising 1% of oral malignancies. However, 25% of oral metastases are found to be the initial sign of metastatic spread;

therefore, initial presentation in the oral cavity may indicate significant underlying disease. Common primary sites for men include the prostate, lung, kidney and liver. For women, it is the breast, kidney, colon and genital organs. General dental practitioners are in a unique position to identify and instigate rapid referrals as gatekeepers of primary care whereby patients commonly present to them with symptoms. This clinical review article aims to educate dental practitioners on appropriate recognition of oral metastatic pathology and referral to secondary care.

and the formation of secondary and tertiary sites.

The oral and maxillofacial region is noted to be an exceptional site for metastatic deposits with approximately 1% of oral malignancies caused by metastases,² although it has been suggested that the actual incidence of metastatic spread to the jaws may be higher. A study conducted by Hashimoto *et al.*³ found that despite any indicative radiographic findings, histologically proven micrometastatic foci in the jaws were found in 16% of autopsied carcinoma cases.³ Hence, early detection and incorporation into differential diagnoses of certain oral lesions is important.

As the gatekeepers of primary care, general dental practitioners (GDPs) are in a unique position to first encounter oral metastatic lesions as patients will commonly present to them with symptoms.⁴ Hence, appropriate recognition of pathology, further investigations and timely referral are key elements for GDPs to appreciate.

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Introduction

Cancer is the result of abnormal proliferation of different cells in the body.¹ It is a multistage process which involves the mutation and rapid reproduction of cells with increased scope for survival, proliferation and invasion. Metastases involve the spread of cancer cells to sites beyond where the tumour originated

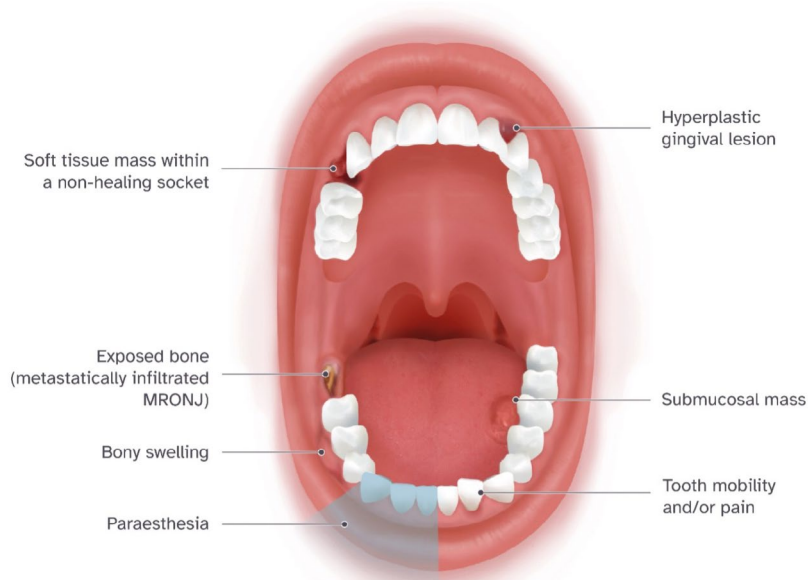


Fig. 1 Different clinical presentations of jaw metastases, adapted from AndreaDanti/Shutterstock.com

(38%) and the angle of the mandible (29%).⁵ It is hypothesised that the haematopoietic marrow in the posterior aspect of the mandible serves as a favourable niche of metastatic tumour cells. Considering soft tissue, the gingivae rank highly for oral metastatic spread.⁸

Carcinoma of unknown primary

The term carcinoma of unknown primary (CUP) is denoted following the diagnosis of a metastasis in which the primary tumour cannot be identified following extensive investigations. This can present in the oral cavity. There are variations in the literature regarding the strict definition of the CUP, subsequently leading to an incidence range of 0.3–2%.^{9,10} With advancing techniques in cell and molecular biology, it is possible to determine the primary tumour site of a CUP if it has retained the signature cancer molecules.

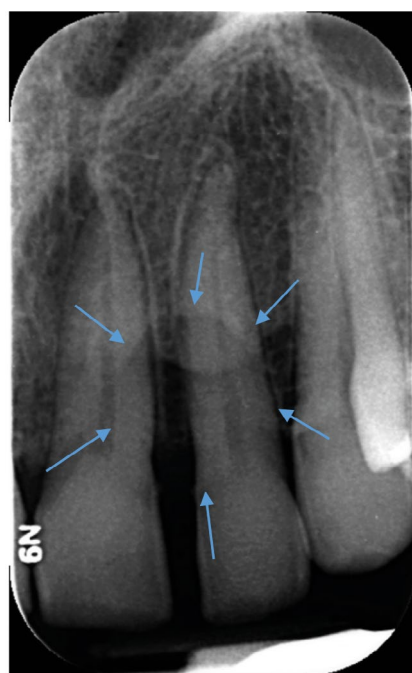


Fig. 2 Periapical of the 22. Patient presented with a gingival swelling similar to a periodontal abscess and associated mobility of the tooth. Periapical shows no obvious horizontal bone loss or dental pathology. A faint soft tissue outline is evident (blue arrows) corresponding to the clinical swelling. Biopsy of the site confirmed a renal cell carcinoma metastasis

‘Hard tissue metastatic presentation exhibiting in the jaws may present with toothache and tooth mobility.’

often seen between those who are 40–70 years old.⁶ The male-to-female ratio of metastases to the jaw bones is equal, however, in soft tissues at 2:1.⁶

Origin of the primary tumour

Oral metastases can be caused by almost any malignant tumour. However, the origin of the metastatic lesion can differ between sexes. For men, common primary sites include the prostate, lung, kidney and liver.⁶ For women, metastatic spread is commonly from the breast, kidney, colon and genital organs. In men, the lung and prostate primary sites have an affinity for jawbones while in women, breast cancer is the most common primary tumour.⁵ Interestingly, prevalence of the primary tumour is not always consistent with the frequency of metastases to the oral cavity. This is attributed to the different biologic behaviours of the tumours and their affinity for tissues in the oral cavity.⁷ An example of such is pancreatic cancer, a highly aggressive tumour that is rarely reported to spread to the oral cavity.⁵

Although metastatic lesions can be found anywhere in the head and neck region, the mandible appears to be the dominant site. In particular, the molar region accounts for over 50% of cases followed by the premolar region

Clinical presentation

The clinical presentation of metastatic tumours varies depending on the site affected (Fig. 1). The attached gingivae, followed by the tongue, are the most frequent soft tissue sites involved. Gingival metastases may resemble hyperplastic or reactive lesions or present similarly to pyogenic granuloma, fibrous epulis, peripheral giant cell granuloma or a periodontal abscess in the early stages.¹¹ Hence, they exhibit clinical signs such as exophytic lesions which are highly vascularised and therefore bleed easily or even spontaneously.¹² Equally, these lesions could present as a submucosal mass⁵ and are therefore not easily visible but digitally palpable. Patient complaints include pain, ulceration, bleeding and swelling; symptoms already well recognised in primary oral cancer.

Hard tissue metastatic presentation exhibiting in the jaws may present with toothache and tooth mobility, mimicking dental or periodontal disease¹³ (Fig. 2). In some cases, metastases may only be discovered after dental extraction at the problematic site. It is assumed the tumour was present in the site before extraction, causing symptoms of pain, swelling and mobility of teeth. The clinician may then extract the teeth based on these symptoms, with the tooth extraction promoting the metastatic process and the tumour presenting as a painful

soft tissue mass in the site of the extraction.⁶ Metastatic disease can mimic odontogenic infections thereby leading to a delayed diagnosis. It must be noted that in 23% of cases, metastatic lesions in the oral cavity may be the first indication of malignancy not yet discovered at a distant site.¹⁴

Paraesthesia is often reported when the metastasis is located in the area innervated by the inferior dental or mental nerve, also known as ‘numb chin syndrome’ or ‘mental nerve neuropathy’ (Fig. 3). This sign occurring in a spontaneous manner, without any underlying causes such as trauma, odontogenic infection or pathology, should be considered as needing urgent investigation to eliminate a sinister diagnosis, such as malignancy. Its occurrence in cancer signifies deep invasion of the tumour into the bone involving the neurovascular structures. Physical examination may reveal a bony swelling with tenderness over the affected site. In late cases, pathological fracture can be noted (Fig. 4), with patients presenting with pain, deranged occlusion and mucosal ulceration.

Radiographic presentation

Neoplasms with a favourable affinity to bone in advanced disease include breast, prostate, kidney and lung neoplasms.¹⁵ Bone marrow cells provide a niche environment for metastatic tumour cells.¹⁶ The radiographic appearance of bone metastases can be non-specific; however, suspicion should be raised when lesions present as lytic radiolucent lesions with ill-defined margins with a ‘moth-eaten’ appearance (Fig. 5).¹⁷ Mixed or pure radiopacity is another presentation of some metastatic tumours. Literature shows that 50% of prostate tumours present as pure radiopaque or as mixed lucent and opaque lesions, while 40% as purely radiolucent lesions.¹⁸ Bone metastases from kidney, lung or breast cancers are often more osteolytic.^{19,20,21} They may also occur as a solitary radiolucency, simulating an infected cyst or osteomyelitis. Cortical bone of structures such as the inferior dental canal, maxillary sinus and nasal floor may also be resorbed and present with a periosteal reaction.²² It must be noted that in approximately 5% of cases, no pathological change is noted on radiographic examination.⁵ Metastasis in the jaw can often appear both clinically and radiographically, similarly to those seen in medication-related osteonecrosis of the jaw (MRONJ). Clinically, exposed bone is evident (Fig. 6) while radiographically, findings of osteolytic lesions, cortical erosion, bone sclerosis and sequestration, persisting alveolar sockets and pathological fracture have been reported.²³ In patients with known metastases being prescribed bone targeting

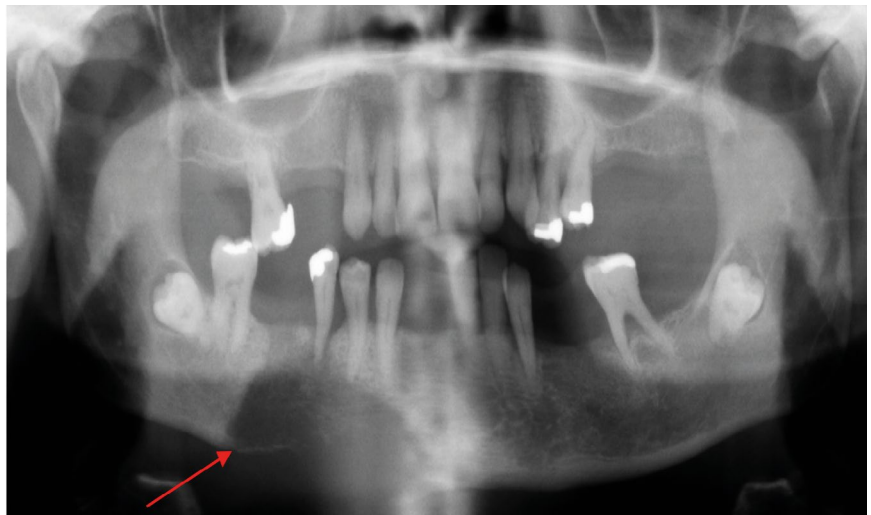


Fig. 3 Osteolytic lesion right body mandible (red arrow), including the mental foramen, causing ‘numb chin syndrome’ as a first presentation of metastatic lung cancer



Fig. 4 Progression of the lung metastatic lesion (Figure 3) leading to a pathological fracture (red arrow) in the right body of the mandible

agents who develop MRONJ, it is worth remembering that this could in fact be oral metastases. Such an event is estimated in approximately 5% of patients with MRONJ.²⁴

Secondary care referral

The National Institute for Health and Care Excellence guidance for suspected head and neck cancer outlines the two-week wait referral pathway to secondary care regarding suspected oral cancer for primary care practitioners.²⁵ An urgent referral, commonly known as a ‘two-week wait’ should be considered for patients presenting with an unexplained lump in the oral cavity or neck, red and white patches consistent with erythroplakia, erythroleukoplakia or ulceration.²⁵

GDPs should also have a high index of suspicion regarding oral lesions when reviewing patients who have either previously had cancer or are currently undergoing

cancer therapy due to the risk of oral metastases. Though oral metastases have a wide spectrum of clinical presentation, the literature demonstrates that dentists are able to confidently recognise abnormalities in the mucosa.²⁶

Management and prognosis

The treatment of metastatic disease primarily depends on the origin and degree of metastatic spread.²⁷ The identification of oral metastatic spread may signify a poor overall prognosis for the patient. Management of the metastatic lesion may include surgical resection, targeted radiation, chemotherapy, bone-targeting medication such as bisphosphonates, or a combination of such techniques.⁶ If bone-targeting agents or radiation is used, the dental team should be aware of the potential risk of MRONJ and osteoradionecrosis as possible complications from this approach. The

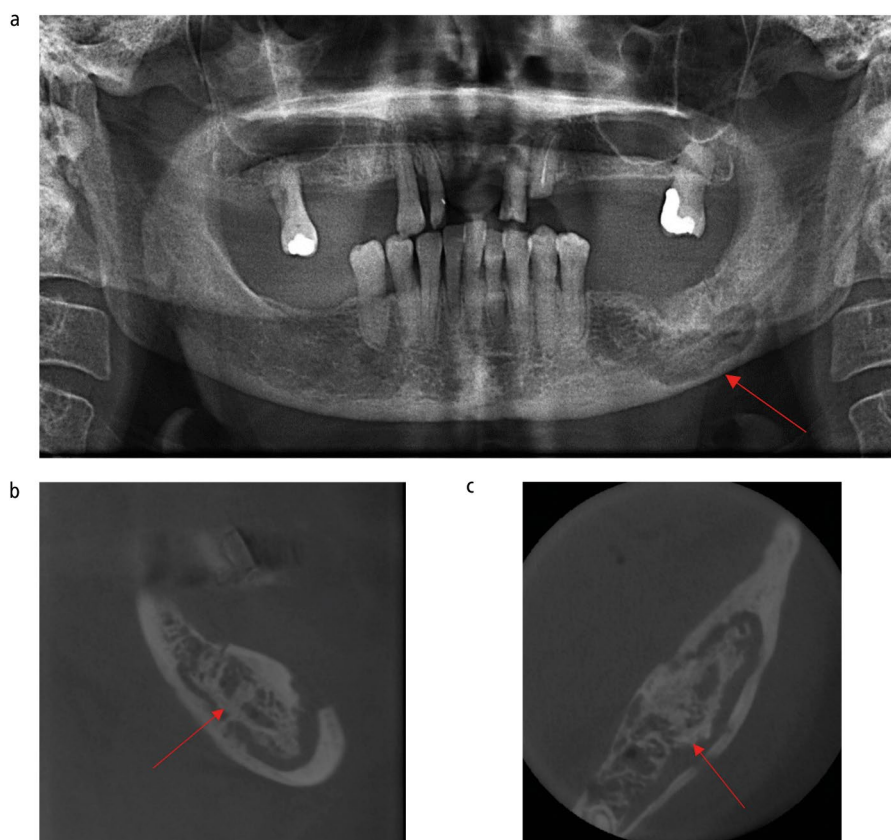


Fig. 5 a) Dental panoramic tomograph demonstrating bone sclerosis and cortical erosion in the edentulous left posterior mandible. b, c) CBCT still images of the sagittal and axial plane, respectively, showing a mixed lucent and opaque area mirroring MRONJ with the lesion in fact being a breast metastatic deposit



Fig. 6 Shows the socket of an upper right second molar 12 weeks following extraction on the background of bisphosphonates for metastatic breast cancer suggesting a clinical diagnosis of MRONJ. Surgical resection and histopathological analysis of the region diagnosed the exposed necrotic bone in line with a metastatic breast cancer deposit

oncology team may therefore request a dental assessment before the prescription of these as per the Royal College of Surgeons guidance.²⁸ The dental team should take a holistic approach in such cases and may consider a 'palliative dentistry' approach to match their oncology care,²⁹ especially as the average survival time of

a patient with oral metastases is approximately seven months.¹⁷ As seen in the literature, oral metastases are secondary to widespread disease, therefore treatment options are limited to the treatment for the primary tumour, with many being palliative in nature. Hence, in order to maintain a functioning dentition for such

patients, it is important to take into account the type and stage of malignancy, oncology treatment regime and overall patient prognosis.

In patients with malignancy of poor prognosis such as pancreatic cancer, the focus of the dental practitioner should be on providing dental stability through an approach inclined towards palliative dentistry. Dental stability aims to resolve acute problems when presented and provide appropriate reparative work while the patient is undergoing oncology treatment (Fig. 7) striking a balance of dental health versus treatment burden for an active oncology patient. This allows dental practitioners to tailor patient treatment plans depending on the tumour group and patient prognosis. Those with better prognosis can be prescribed more definitive treatment plans to achieve dental fitness.

Conclusion

Oral metastases comprise 1% of all malignant neoplasms with 90% located in the mandible.⁶ Primary malignancies such as breast, prostate, lung and kidney can produce oral metastases with most presenting as bone metastases. The clinical presentation of oral metastases can present as dental pain, oral ulceration, oral pain or paraesthesia, thereby making diagnosis challenging. If dentists are suspicious of such lesions, a low threshold should be considered for referral onwards for further assessment and investigation.

Ethics declaration

There are no conflicts of interest to declare by any of the authors for this submitted work.

Author contributions

Sarah Jadun: project administration, writing – original draft, writing – review and editing. Lara Zebic: figure construction, writing – review and editing. Vinod Patel: conceptualisation, supervision, validation, writing – original draft, writing – review and editing.

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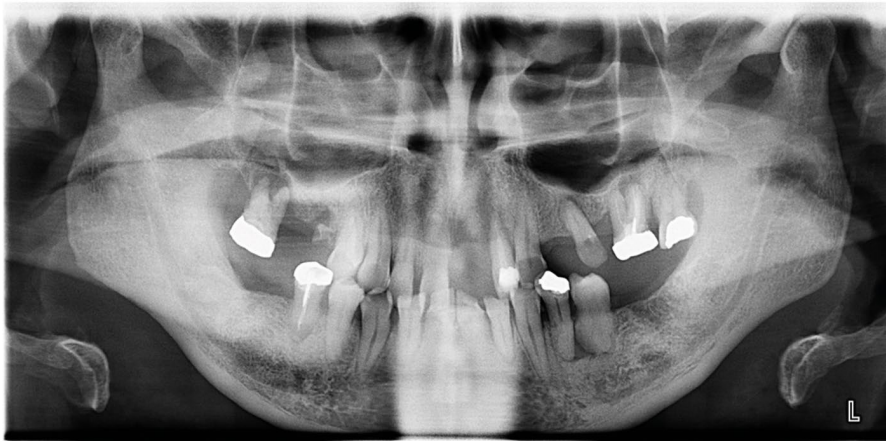


Fig. 7 Shows a dental panoramic tomograph of a stage IV lung cancer patient with metastases to the spine, brain and adrenal gland currently under active oncology with monthly pembrolizumab and monthly intravenous bisphosphonates. The radiograph highlights extensive chronic dental disease and a failing dentition though the patient remains asymptomatic. A palliative dentistry approach is adopted to avoid disruption of his oncology regimen

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