

# **Oral surgery**

# **Osteomyelitis**

## **Acute Pyogenic Osteomyelitis of the Jaws**

Acute pyogenic osteomyelitis of the jaws is an inflammatory condition of bone which can involve the medullary cavity and the Haversian systems of the adjacent bone. The osteogenic connective tissue dies when deprived of its blood-supply as a result of pus in the cancellous spaces and/or beneath the periosteum and eventually extensive destruction of the affected part of the jaw may occur. In the adult the mandible is more often and extensively involved than the maxilla which is rarely affected. This disparity may be due to the fact that the mandible derives its central blood-supply from a single artery while the maxilla has an extensive vascular network. However, the mandible is not wholly dependent on the mandibular artery (the inferior alveolar artery), for its nutrition, for if the artery is severed during surgery or following trauma an adequate vascular supply will be maintained via the periosteum. Furthermore, there are anastomotic connexions via the mental branches, the median lingual branch, and interdental branches. The presence of these anastomoses can affect the spread of the disease resulting in a number of clinical distributions.

### **etiology**

The most common cause of pyogenic osteomyelitis of the jaws is odontogenic infection and the culpable organism is primarily *Staphylococcus aureus*, but occasionally *Streptococcus pneumococcus*, or the typhoid bacillus may be incriminated. Once the sinus formation develops a mixed infection is usually found. Osteomyelitis can also occur by direct extension from a pre-existing source of infection, such as middle ear disease or a boil on the chin. More rarely the jaw infection is due to hematogenous spread from a distant focus; this usually occurs in children. As elsewhere in the body, osteomyelitis is brought about by a combination of thrombosis and sepsis following the ingress of a virulent organism and from the thrombosed vessels septic thrombi may form abscesses elsewhere in the body. Metastatic osteomyelitis can therefore occur and, although rare, cases have been reported where the jaws form the primary or secondary site.

It is obvious that osteomyelitis of the jaws is more likely to occur when either the general resistance of the patient or the local resistance of the bone is lowered. Predisposing causes in which the patient's resistance to infection is diminished include diabetes, syphilis, tuberculosis, agranulocytosis, severe exanthemata such as typhoid fever, and extreme malnutrition; while conditions in which the vascularity of the jaws is

impaired and, therefore, its ability to withstand infection include marble bone disease, long-standing Paget's disease, and obliterative endocarditis following, for example, irradiation.

Nevertheless, osteomyelitis can occur in the mandible of an apparently normal healthy individual, and it is perhaps surprising that its incidence is not higher, for apical abscess formation is common and it would seem logical that pus from such a source should track along the medullary spaces of the cancellous bone rather than bore directly through the comparatively resistant barrier presented by the dense buccal and lingual cortical plates. Yet, in the great majority of cases periapical pus forces its way externally. Obviously there must be a critical period when the pus from an apical abscess which is walled off by a protecting pyogenic membrane is under pressure in immediate area, and ill-advised surgical interference at this time could lead, spread of infection through an extensive area of the cancellous bone. This does not, of course, mean that the causative tooth should not be extracted. Where this is a straightforward procedure it is the simplest way to both remove the cause and decompress and drain the pus.

Theoretically, pus under tension in an apical abscess may be penetrate into the mandibular canal and disseminate over a wide area, but it usually discharges through the Volkmann canals in the buccal or lingual cortical plate and breaches the periosteum and enters the soft tissues. If the pus fails to burst through the periosteal layer it will track along the surface of the jaw and if allowed to remain will interfere with the periosteal vascular supply to the cortical plate. This, in turn, leads to subperiosteal osteomyelitis, which is exemplified by the submasseteric abscess in which pus tracks backwards from an infective focus (pericoronar or periapical) in the lower molar area and collects beneath the masseter muscle.

With reference to the lower jaw it is evident that two clinically distinct varieties of osteomyelitis occur, depending upon whether the pus track into the cancellous spaces or beneath the periosteum, and these are respectively known as Intramedullary osteomyelitis and subperiosteal osteomyelitis.

### **Clinical features of intramedullary osteomyelitis**

Following an odontogenic infection with or without surgical intervention the patient experiences a severe deep-seated pain and a moderate indurated swelling of the face occurs over the affected area. Loss of sensation occurs in the lower lip over the area supplied by the mental branch of the inferior alveolar nerve. The relationship of loss of conduction in this nerve to the onset of the osteomyelitis process could be

explained by the simple proposition that the same rise in pressure within the canal that affects the nerve also involves the vessels. In consequence, the local defense mechanisms are impaired, indirectly facilitating the spread of the infection. Anesthesia of the lip caused by an infection close to the mental foramen does not carry the same implication of a risk of osteomyelitis. Teeth may become loose and tender on percussion in the affected area and pus discharges through multiple sinuses in the alveolar process, up the periodontal membranes of adjacent teeth, and also externally on the face. The lymph-nodes draining the area are enlarged and tender. There is moderate pyrexia, but the adult patient does not feel particularly ill. If the condition is untreated a protracted chronic state ensues characterized by acute exacerbation at irregular intervals.

### **Clinical feature of subperiosteal osteomyelitis**

When pus is confined between the cortical plate and the overlying periosteum the patient experiences a severe, boring pain and this is the commonest presenting symptom. Along the body of the mandible a swelling will be present in the sulcus adjacent to the affected area, and if pus extends as far as the mental foramen there will be anesthesia or parasthesia of the lower lip due to a pressure neuritis. Normal sensation will be restored when the pus has drained. The face is usually swollen, with accompanying painful lymphadenopathy. In the posterior part of the mandible distension of the periosteum with pus or inflammatory exudate may cause restriction in mouth-opening, and discomfort or difficulty in swallowing.

### **Treatment**

A full course of an appropriate antibiotic should be given. The dose must be sufficient to insure adequate blood concentrations. The affected bone should be removed surgically from either a submandibular or intra-oral surgical approach. The bone cavity is then saucerized so that when the wound is closed the periosteum impinges on normal bleeding bone, so eliminating dead space.

Primary closure of the wound is carried out and a suitable antibiotic is administered for about 5-10 days postoperatively.

Surgical drainage of the pus beneath the periosteum should be carried out as soon as possible, for the pus may spread and strip up the periosteum over a wide area, so increasing the extent of the cortical destruction. A horizontal incision in the sulcus taken down through the periosteum to bone is all that is required.

## **Chronic Osteomyelitis**

Chronic osteomyelitis is usually the consequence of inadequately treated acute Intramedullary or subperiosteal osteomyelitis, but it may arise as a “primary condition” if the patient is debilitated or the bone infected with attenuated strains of organisms of low-grade virulence