What Is Your Diagnosis?

A 2.5-year-old primiparous Holstein cow, at 200 days of lactation, with a milk production rate of 36.4 kg/d (80 lb/d), was evaluated because of a swelling of unknown duration ventral to the right mandible. Milk production had remained consistent throughout lactation, and the cow was apparently otherwise healthy.

Direct palpation of the swelling revealed an approximately 8-cm-diameter, firm, immobile mass along the ventrolateral aspect of the horizontal ramus of the right mandible. The integument surrounding the mass was unaffected. An oral examination revealed hyperemic, swollen gingival tissue adjacent to the right third premolar tooth (P3) and fourth premolar tooth (P4). In addition, P3 was loosely embedded within the alveolus. Remaining findings on physical examination were unremarkable. Measurement of serum fibrinogen concentration revealed hyperfibrinogenemia (1,232 mg/dL; reference range, 350 to 775 mg/dL). An oblique radiograph of the right mandible was obtained (Figure 1).

The affected premolar teeth (P3 and P4) were manually extracted under sedation, with no evidence of exudative discharge. Fine-needle aspiration of the mandibular mass was performed, and purulent material was obtained. The mass was lanced to allow for drainage. The purulent material was submitted for microbial culture, and *Arcanobacterium pyogenes* was isolated. Additional radiographs of the right mandible were obtained following manual teeth extraction and surgical drainage of the mass (Figure 1).

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →
There is a large osteolytic lesion with surrounding sclerosis and mild irregular periosteal reaction in the right mandible (Figure 2). A large adjacent soft tissue swelling is present. The osteolytic lesion extends into the periapical bone of P3, where erosion of the lamina dura is seen. There is also periapical lucency and erosion of the lamina dura associated with P4, although direct communication with the large lytic lesion is not seen. In addition, a fractured root remnant of P3 is evident. These findings are indicative of tooth root abscesses of P3 and P4 and regional osteomyelitis.

Further exploration of the alveoli with a malleable probe did not reveal an apparent communication between the affected tooth roots and the ventral mandibular abscess. Intraoperative digital radiography confirmed removal of all tooth fragments. Procaine penicillin G (22,000 U/kg [10,000 U/lb], IM, q 24 h) was administered to the cow before surgery and after surgery for 10 days. This resulted in a 21-day milk withdrawal period following the last treatment, as determined by an on-farm β-lactam residue testing kit. Two months later, the mandibular mass had resolved and the cow had returned to its previous milk production.

Firm, immobile, mandibular masses in cattle could be of dental or mandibular origin. Radiography is an effective diagnostic modality to differentiate these disease processes. Oblique projections, in addition to standard lateral and dorsoventral views, are useful to accentuate any lesions without the superimposition of the contralateral mandibular arcade. In the patient of the present report, a diagnosis of tooth root abscesses of the right mandibular cheek teeth (ie, P3 and P4) and osteomyelitis was determined on the basis of radiographic findings.
Other differential diagnoses for an external mandibular mass in cattle include osteomyelitis caused by *Actinomyces bovis* (ie, lumpy jaw) or other pathogenic organisms, mandibular fracture, sequestrum, and neoplasia.

Dental disease has been frequently described in other large animal food and fiber species, most notably llamas and alpacas, but rarely documented in cattle, although multiple abnormalities have been detailed in an abattoir survey of culled dairy cows. Tooth root abscesses in ruminants are thought to occur by ingestion of rough or stem-filled forages during the eruption of the permanent premolar and molar teeth, thus causing lesions in the gingiva. With a break in gingival integrity, commensal organisms can proliferate before the permanent tooth has fully matured and hardened. Eruption of permanent premolar teeth occurs between 1.5 and 3 years of age in cattle. Other proposed causes of tooth root abscesses in ruminants include fractured teeth, decay of the infundibulum, and trapped feed between teeth and the gingival margin, resulting in entry of infection through penetration of the alveolus.

Successful treatment of tooth root abscesses in other large animal species includes medical management with antimicrobials to which the causative agent is susceptible, surgical tooth extraction, or a combination of both. The cow of the present report was effectively treated with both treatment modalities. Findings in this cow emphasize that tooth root abscess should be included in the differential diagnoses for a mandibular mass in cattle. Furthermore, radiography may be used to facilitate accurate diagnosis.