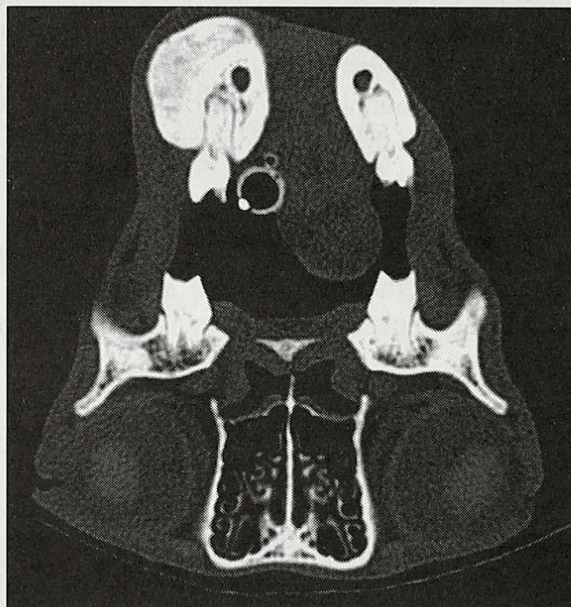


## ASK THE VET

### HEY DOC! What exactly is “lumpy jaw” and what can I do about it as a keeper?

— *Animal Keeper, Great Lakes Region*



(Left) “Lumpy jaw” is primarily found in macropods. *Photo by Lynn Tunmer.* (Right) A CT scan of a Bennett’s wallaby with a tooth root abscess in the lower right of the jaw (upper left of image). *Photo courtesy of Cleveland Metroparks Zoo.*

“Lumpy Jaw” is a complex, infectious process that often results in debilitation and death. It is primarily encountered in macropods and antelope. There are multiple factors involved in its genesis; if there were only one or two, it surely would have been eliminated long ago. Despite significant work on it over the last 40 years, it remains one of the most common problems of macropods and certain antelope in captivity. It is by no means an easy problem to conquer.

“Lumpy Jaw” gets its name from its gross, physical appearance of jaw swelling, specifically either nodular or multi-nodular bony and/or soft tissue growth (as opposed to “bottle jaw” which denotes sub-mandibular edema, which also causes swelling but has entirely different causes and treatments) which contain numbers of heavily encapsulated, necrotic areas.<sup>6,7,14</sup> It is also sometimes called necrobacillosis, because of the common involvement of *Fusobacterium necrophorum* (formerly *Sphaerophorus necrophorus*) and *Bacteriodes* sp. bacteria in the lesions.<sup>4,6,14</sup>

This syndrome (a constellation of clinical signs which can have multiple different causes) can develop secondary to several different inciting events. Clinical signs often begin before the classic “lumpy jaw” swellings are even noticeable. Often an observant animal keeper will notice a decrease in feeding, dropping of feed, chewing only on one side of the mouth, or excessive salivation.<sup>13</sup> Closer examination of the mouth by either the animal keepers or the veterinarian may reveal the typical foul aroma of necrotic tissue.

There are multiple bacteria that commonly infect both the soft-tissue and the bone of animals with “lumpy jaw.” Although any common oral bacteria may infect the tissue, most frequently there are anaerobes, or micro-aerophilic bacteria such as *Fusobacterium necrophorum*, *Bacteriodes* sp., *Nocardia asteroides*, *Actinomyces bovis*, and *Nocardia macropodidarum*,<sup>2,6,7,8, 10, 14</sup> In hoofed animals, *Actinomyces pyogenes* (formerly *Corynebacterium pyogenes*) is the most common organism. Secondary invaders are often *Pseudomonas* sp., *Proteus* sp., and *Staph.* sp.<sup>7</sup> These organisms vary widely in their antibiotic susceptibility; often combinations of two antibiotics are necessary to provide

coverage against the different species causing the infection. However, despite the most sophisticated and proactive clinical therapy, treatment failures and eventual euthanasia are common.

Clinically, a thorough physical exam and dental radiographs (often lateral oblique films are most informative) will often indicate the exact type of “lumpy jaw” and possibly its origin. It can present in many forms. Often, in kangaroos and wallabies, apical abscess will develop at the tip of the root of the lower incisors. This is usually, but not always, the result of wear or breakage of the distal tips of the incisors, leading to pulp exposure, infection, and subsequent abscessation. However, sometimes dental calculus buildup on the incisors will lead to periodontal disease and infection of the soft tissues surrounding the teeth, eventually spreading into the bone of the mandible as well.

Sometimes, on oral exam it will be obvious that there was a puncture wound of the gingiva, leading to local abscess formation, and eventually infection of the bone. Indeed, sometimes plant matter is found impacted in them.<sup>6</sup> On other occasions, dental calculus building up around the gumline will be the obvious cause of periodontal disease, and subsequent infection of the soft tissues and eventually osteomyelitis of the jaw. Indeed, in most cases “lumpy jaw” usually begins periodontally.<sup>14</sup> Draining tracts can be cultured to determine the organisms involved, and both an aerobic and anaerobic culture should be performed. Often, the pre-molars are the first to become infected. Indeed, clinically, it often appears that the infection is secondary to the pre-molars not being shed normally with age, as is seen in nature.<sup>3,9</sup> These infections surrounding loose pre-molars are the easiest to treat, responding well to extraction and broad-spectrum antibiotic therapy.

In artiodactyls, infection of the bone with draining sub-mandibular tracts is often seen. Extraction, in combination with broad-spectrum antibiotic therapy, can be curative, or at least allow for stabilization of the patient while the osteomyelitis is combated with long-term antibiotic therapy. An alternative to dental extraction, establishment of drainage, regular flushing with antimicrobial solutions, antibiotic therapy, and apicoectomy and retrograde endodontics and filling of the tooth roots has been proposed;<sup>6</sup> however, even these sophisticated methods are often unsuccessful. Chronic, inflammation from “lumpy jaw” has been implicated in the development of reactive amyloidosis in some hoofed animals.<sup>12</sup>

Over the last 40 years, there have been at least two different methods of dietary management attempted. The first was to eliminate any sort of tough material in the diet, which might cause gingival puncture and subsequent infection;<sup>11,13,14</sup> These animals were often fed many kinds of soft foods. Another method of dietary management was to increase browse and provide as much good-quality forage (either high quality grass hay or alfalfa) to allow for as much gingival stimulation and natural “flossing” of the teeth as possible, and to contribute to normal shedding of premolars.<sup>2,4,9</sup> As one author put it, “diet should be fibrous enough to maintain good oral health, so that accumulation of dental calculus is minimal, and the gums remain firm, but not so coarse as to damage the oral mucosa.”<sup>4</sup>

My personal clinical experience, as well as epidemiological evidence gathered in the late 1970’s,<sup>11</sup> supports the value of good quality forage and fibrous browse in reducing the incidence of lumpy jaw. While both groups of animals (those on only soft foods and those fed mostly forage and browse) did develop dental infections, my “clinical impression” is that the animals on a strictly “soft food” diet developed it at a younger age. Thus, kangaroos and wallabies on soft diets were developing it at five or six years of age, whereas those on browse and high quality forage would get it at eight or nine years of age.

In addition to diet, many clinicians believe that crowding, and subsequent fecal contamination of the paddock contributes to high bacteria counts on the food, and subsequently a higher incidence of infection.<sup>2,4,10,13</sup> Therefore, many veterinarians recommend reducing crowding and making efforts to reduce fecal contamination of the paddock.<sup>1,2,10</sup> Tractors fitted with commercial vacuum devices to remove fecal pellets from fields, as have been used to facilitate parasite control in other species,

would seem to have utility in this regard, as would feeding from hay-racks or bowls rather than off the ground or floor.

One recent and interesting theory is that diet may contribute to hyper-phosphatemia in these animals.<sup>5</sup> One study sought to determine if offering timothy hay to the animals while on the grassy exhibit would encourage extra foraging, saliva production, and improved calcium to phosphorus ratios.<sup>5</sup> Although intriguing, not enough clinical data has been gathered to support or refute this theory, although it remains an interesting question. This theory does not, however, account for the clinically observed development of periodontal disease prior to the beginning of bone resorption in most cases.

Routine oral examinations, and prophylactic scaling of the teeth would likely help to reduce the incidence of “lumpy jaw” in any herd. Similarly, attention to diet, and provision of a good quality grass hay or alfalfa, and minimizing soft foods such as fruit, which may contribute to dental calculus formation and gingivitis will also help. Similarly, making sure that forage and browse does not contain sharp weeds and stems will diminish the chances of oral punctures inciting lumpy jaw.

In some countries (such as Australia) vaccines are available to protect against *Fusobacterium necrophorum*, and clinicians from those countries report that vaccination does help, too. Finally, routine examinations and dental prophylaxis to remove calculus buildup, as well as to detect and treat this problem in its early stages, can also assist in reducing (although probably not completely eliminating) morbidity and mortality from “lumpy jaw.”

The animal keeper can greatly help with many of these factors, and also assist by being attuned to the subtle clinical signs of early dental disease (drooling, chewing on one side, inappetance, subtle swellings, foul breath, nasal or conjunctival discharge). Similarly, once the diagnosis is made, often the animal keeper’s skill in administration of antibiotics or restraint for examination by the veterinary staff becomes key to recovery. This is a good example of a problem that has dietary, husbandry, and medical components, and one where good cooperative work between animal keepers and veterinarians can significantly benefit the health of the herd. In the case of “lumpy jaw”, as in many diseases, the keeper is at the front line of defense for both prevention and treatment of this disease.

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**Do you have a question for the Vet? Send your questions to the AKF Editor at [shane.good@azzk.org](mailto:shane.good@azzk.org) and he will pass them on to Doc!**



Bonar, Chris. 2012. "Ask the Vet : Hey Doc! What exactly is "lumpy jaw" and what can I do about it as a keeper?" *Animal keepers' forum* 39(10), 476–479.

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