

Periodontal abscess in a wild Amazon tapir *Tapirus terrestris*

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Editado por/Edited by: D. F. Cisneros-Heredia, Ph.D.(c)

Recibido/Received: 11/02/2012. Aceptado/Accepted: 11/22/2012.

Publicado en línea/Published on Web: 12/28/2012. Impreso/Printed: 12/28/2012.

Abstract

Based on osteological evidence, we report an example of extensive bone erosion in association with advanced dental wear and molar loss in a wild tapir from eastern Ecuador. It is suspected that this situation may have very well led to the death of this animal.

Keywords. tapir, dental wear, periodontal abscess, *Tapirus terrestris*

Resumen

Basado en evidencia osteológica, se reporta un ejemplo de erosión ósea extensiva vinculada con el desgaste dental avanzado y la atrición de un molar en un tapir silvestre del Ecuador oriental. Se supone que esta situación habrá conllevado a la muerte del individuo.

Palabras Clave. tapir, desgaste dental, osteomielitis, *Tapirus terrestris*



Figure 1: Ventro-lateral perspective of the upper right dentition of a wild tapir cranium, showing extensive osteological erosion at the abscess site

Historically it was thought that wild animals rarely suffer from the kinds of problems that humans regularly experience in association with dental health [1]. Through increasing contact with the natural world and greater documentation of the reality of wild animals' lives, it has been noted that complications related to acute damage to teeth and gums as well as chronic wear may present life-threatening risks. It has been observed that most

wild animals avoid major dental problems simply by dying before their teeth go completely bad [2].

The cranium (field number: CKS-Tt-2003, 42 cm in total length) of an adult Amazon tapir, *Tapirus terrestris*, salvaged from the lands of the Tiputini Biodiversity Station in eastern Ecuador in 2003 exhibits signs of advanced age accompanied by indications of deteriorating dental health (Fig. 1). Extensive wear of all the teeth remaining in this specimen is quite evident. In all teeth, crowns (enameled surfaces) have been reduced to a height of less than 4 mm and in some cases on posterior premolars and molars, completely broken away subsequent to deep "cupping" (differential wear leaving the central softer portions of teeth highly depressed in relation to the harder surrounding resistant enamel covering). In contrast, specimens of younger animals typically have the enameled crown height exceeding 9mm; one specimen (CKS-Tt-2006) with total cranial length of only 33 cm (categorized as an adolescent or young adult) had crown heights on maxillary molar III reaching nearly 11mm. While neither total body size nor cranium dimensions are a completely reliable proxy for age, conventional wisdom suggests a general, positive relationship between these variables; a third cranium (CKS-Tt-2010) of intermediate size (38.7 cm total length)

with a maximum crown height of 9 mm can be used as support for the argument within a very small sample size. Loss of molar II from the right maxilla is accompanied by bone loss encompassing a volume of approximately 8 cc.

It should be noted that upon death in natural settings, the teeth of these animals generally disappear from skeletal material very quickly due to their somewhat weak connections to the maxillae and apparently, even weaker connections in the case of the mandibles. The subject of this study was recovered early enough to retain all but several incisors. These anterior teeth in particular, due to their structure, including only one conical root, are typically removed within hours of death through the aggressive feeding of scavengers, especially Greater Yellow-headed Vultures (*Cathartes melambrotus*). Based on observations of several other fresh tapir carcasses in Yasuní since 1995, even molars and premolars, with their much greater size and a tetrad of roots may also be removed and consumed within short periods, especially from the lower jaws by the larger, more powerful King Vulture (*Sarcoramphus papa*).

For all vertebrates, cumulative tooth wear is a standard part of life. For many domesticated animals, the process is sufficiently well documented so that age may be readily estimated from general dental condition [3, 4]. For well-studied species of large herbivores that have been extensively hunted and managed in the wild (e.g. White-tailed deer, *Odocoileus virginianus*, in the U.S.), approximate age at death may also be estimated through cursory examination of the teeth [5]. In conjunction with information about known eruption patterns, estimates of relative age may be quite reliable but absolute age determination is often more difficult. Due to myriad complications, such details are not well known for most species in the wild, especially in the tropics where the sheer number of species makes the task more challenging. In any case, overall cranial size [6], reduced tooth structure remaining above the gum line, combined with deep cupping of all molars confirm that this individual was relatively old, likely approaching maximum longevity for the species in the wild [7].

The previously mentioned extensive bone loss in the region of molar attrition from the right maxilla was likely provoked through a series of events beginning with plant stems or leafy material becoming embedded between tooth and gum during typical browsing activity. Infection and abscess would have followed. Subsequent tooth loss would have led to substantial food impaction and maxillary troughing as has been observed in elephants [8]. The process of erosion of the surrounding bony substrate (osteomyelitis) [9] accompanied by ever increasing inflammation would have been exasperated due to the constant presence of decomposing plant matter being compacted into the site of infection with every feeding bout. Undoubtedly, as this abscess developed, pain would have increased concomitantly. Due to the extent of bone loss, it must be assumed that the entire process

manifest in this specimen would have extended minimally over a period of months if not years. Pain would have escalated to a degree that would make chewing difficult or impossible [9]. Although no tooth loss occurred in a symmetrical position on the left side of the upper jaw, considerable tooth wear is evident there as well; the surrounding bony matrix in this region has deteriorated to the point of leaving an open spongy lattice and the roots of these teeth are eroded at a level far below the gum line as well, all indicating an earlier stage of abscess development. Death through improper nourishment accompanied by severe infection would have been probable [8, 9].

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