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Dental and Periodontal Health in Free-Ranging Swedish Brown Bears (*Ursus arctos*)

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Summary

Dental data from 22 Swedish brown bears (*Ursus arctos*) were collected during April and May 2008, during the annual capture of free-ranging brown bears in Dalarna County, Sweden by the Scandinavian Brown Bear Research Project. The bears were of different genders and ages. All animals were weighed and subjected to physical examination and all were found to be in good condition. The oral cavity was inspected and photographed and abnormalities were recorded on a dental chart. One bear had mild class II malocclusion. All yearlings had varying numbers of incompletely erupted permanent teeth. All adult bears were missing one or more premolars. Tooth wear increased with age; the most affected teeth were the incisors followed by the canines, premolars and molars. Complicated fractures most commonly affected the canines. Fifteen animals had gross evidence of enamel defects, but the aetiology of these was not determined. There was a low prevalence of calculus and periodontal disease and none of the bears had caries infections. The mean pH of saliva collected from these animals was 9.75. Further studies, based on a larger sample size followed over time, will be required in order to evaluate the progression of dental disease in brown bears.

Keywords: dental disease; enamel defects; periodontal; Swedish brown bear

Introduction

Pathology of the oral cavity frequently occurs in domestic and wild animals (Hungerford *et al*., 1999; Wenker *et al*., 1999; Cuozzo and Sauther, 2006); however, there have been few studies of dental and periodontal disease in wild animal species (Robinson, 1979a, b; Hungerford *et al*., 1999).

The normal dentition of bears (family Ursidae) includes incisor (I), canine (C), premolar (P) and molar (M) teeth and the dental formula of these animals is: (2*(I3 C1 P4 M3))/(2*(I3 C1 P4 M2)) = 42 (Wenker *et al*., 1998). Previous studies of oral health in bears have reported that these animals may have missing premolars (Miles and Grigson, 1990), malocclusion (Wenker *et al*., 1999) and caries (Hall, 1940; Manville, 1992). These studies have generally been based on examination of skulls (Hall, 1940; Miles and Grigson, 1990; Wenker *et al*., 1999; Sonne *et al*., 2007) or the dentition of live captive bears (Wenker *et al*., 1998). To our knowledge there has been no investigation of the oral health of free-ranging brown bears (*Ursus arctos*).

As part of the Scandinavian Brown Bear Research Project, free-ranging brown bears have been captured for study since 1984. During anaesthesia, the bears have been radio-marked and biological samples have been collected for demographic, genetic and ecological studies. During the captures, lesions of the teeth have been noted, but not investigated further. The aim of this study was to evaluate the dental and periodontal status of free-ranging brown bears in Sweden.

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Materials and Methods

During April and May 2008, dental data were collected from 22 brown bears during the annual capture of free-ranging bears by the Scandinavian Brown Bear Research Project. All captures took place in the county of Dalarna, Sweden. Approval was given by the Ethical Committee on Animal Experiments in Uppsala, Sweden.

The animals were immobilized from a helicopter using a remote drug delivery system (Dan-Inject®, Børkop, Denmark) involving the use of 1.5 ml darts with 1.5 × 25 mm barbed needles for yearlings and 3 ml darts with 2.0 × 40 mm barbed needles for adults. The bears were immobilized with tiletamine–zolazepam (Zoletil Forte Vet®, Virbac S.A., Cedex, France) in combination with medetomidine (Domitor® Vet, 1 mg/ml or Zalopine®, 10 mg/ml; Orion Pharma Animal Health, Espoo, Finland) according to body size (Fahlman, 2008). The total duration of anaesthesia was approximately 60 min. The time allowed for oral examination was limited to 15 min.

Seven of the bears were yearlings (one female and six males) and 15 were adults (10 females and five males). In three bears, age was estimated to be <10 years based on tooth wear. The ages of 12 adults were known due to earlier captures and ranged between 4 and 18 years. In two of these bears, age was known because they had been followed since they were yearlings. In the remaining 10 animals age had been determined based on cementum annuli in one premolar extracted during capture (Matson, 1981).

All animals were weighed and subjected to physical examination. Oral examination was performed independently by two persons after they had examined the first six bears together. The oral cavity was inspected and photographed and abnormalities were recorded on a dental chart modified for bears (Fig. 1). Teeth were counted and occlusion status was documented. In order to assess oral health, four indices were used: the calculus index (CI), gingival index (GI), periodontal index (PDI) (Kesel, 2000) and tooth

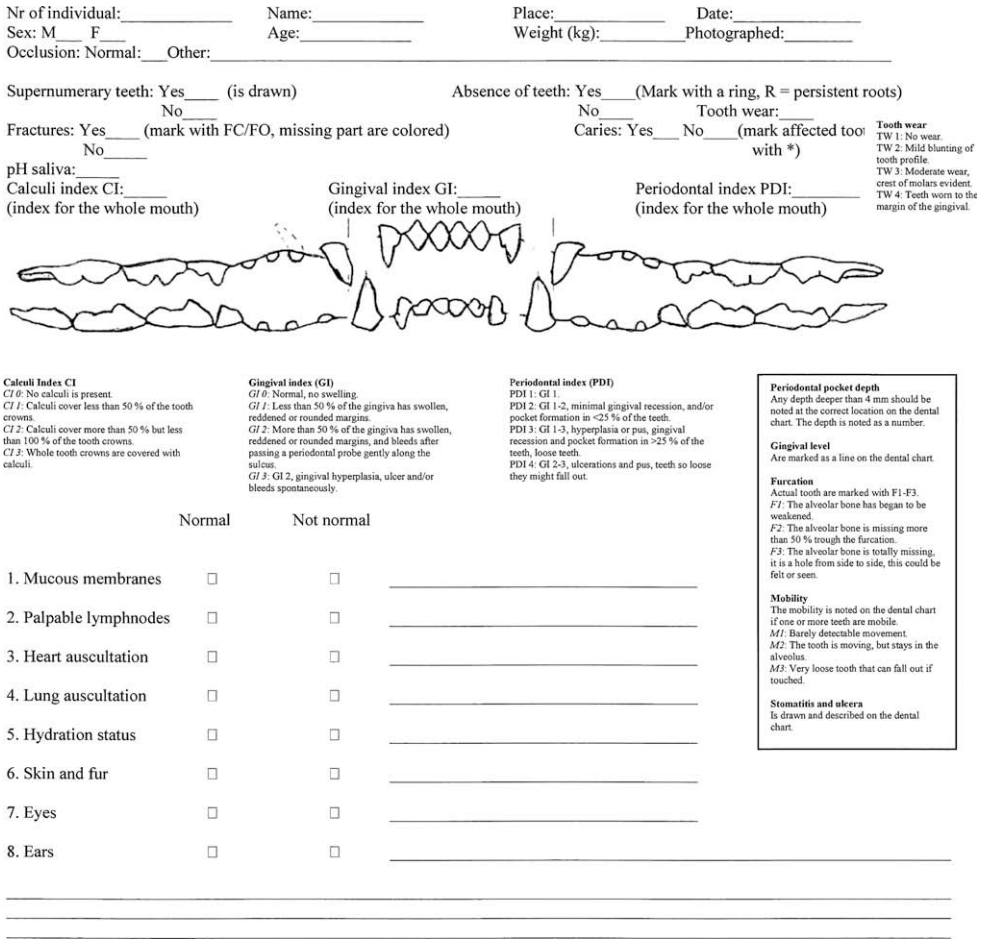

Fig. 1. Dental examination chart used in this study.