



# Life and behaviour of wolves

## Wolf Teeth: Dentition and Disease

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Torak yawning: M Readings

**I must confess wolves' teeth are not something I'd thought much about, but recently a homeopathic vet asked me about dental problems in wolves.**

He was discussing with conventional vets, feeding a natural diet to domestic dogs, but kept being told that wolves die in the wild due to dental problems through sustaining molar slab fractures from eating bones. The UKWCT wolves' teeth are all in good condition and only have normal wear and tear; even the older wolves have never had dental problems. With my curiosity fired I set out to find out more.

The response I received from many colleagues around the world was interesting and thought provoking. Predictably data is limited due to the normal life span of wild wolves; Zanete Andersone-Lilley, who works for WWF Norway, says 'All I can say is that in my numerous autopsies of wolves in Latvia I never came across one whose cause of death was broken teeth. It was usually bullets'. Other organisations with captive wolves, like the International Wolf Centre

(IWC), have also not encountered problems. 'The Wolf Centre and other captive wolves that I work with eat deer carcasses for the natural food and bones. It has been my experience with captive wolves that natural bones are fine' says Nancy Gibson who co-founded the centre with David Mech.

So where were the vets getting their information from? Josip Kusak from the Department of Biology, Faculty of Veterinary Medicine University of Zagreb, in Croatia may have the answer. A paper written by Josip and his colleagues in 2007 called 'Prevalence of Dental Pathology in Wolves in Croatia' did provide some credible data regarding dental issues with wild wolves. 34 skulls were examined for dental changes. The skulls originated from wolves which had died due to various reasons in Croatia between 1997 and 2006. Age of examined animals ranged from seven months to eight and half years. Only three skulls had changes to teeth or the alveolar bone (the sockets of the teeth in the jaw bone). Periodontitis, with changes in the alveolar bone, was determined on the alveolus of the lower fourth premolar in two individuals and on the alveolus of the mandibular first molar

in one specimen. Complicated crown-root fractures were found in two individuals. All caries lesions (tooth decay) were found on premolars and molars, (except on one incisor). Caries were also found on the upper jaw in one animal and on the lower jaw of another animal, while a third animal had decay in both jaws. None of the animals died because of dental issues and of all the skulls examined the pathological changes belonged to females older than two years. Out of all the skulls studied 8.9% had dental changes. Dental disease is rare in wild canids and evidence shows that they seem to cope by changing sides for chewing. Fractures of teeth also seem to be rare but not unheard of. Possibly lesser fractures where the tooth crown is lost but the pulp is not exposed would be quite common.

Wolves have the same number of teeth as domestic dogs. The permanent dentition is 42 teeth; cubs have a few less until their adult teeth come through. Canid teeth are different from feline as cats tend to deliver one killing bite and hold on with their teeth and claws, whereas wolves prefer to deliver a number of bites which are shallower and designed to injure and weaken the prey animal. This enables



them to track it or return later to bring it down safely once its strength deteriorates. The dental formula for one side of the jaw is Incisors 3/3, Canines 1/1, Premolars 4/4, and Molars 2/3. The incisors initial role is to grasp and hold the prey, but they are also used to nip or pull at live prey and nibble meat from bones, or delicately take berries from bushes. The canine teeth initially slash at the hide and muscle causing bleeding and large wounds. Later these teeth will be used for stabbing and holding on to the prey. They can be up to 560mm in length including the portion imbedded in the jaw bone. Once the incisors and canines have brought down the prey, the specialist molars and premolars called carnassials are employed for cutting and shearing the flesh. These teeth also aid the molars to crush bone.

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It is the incisors and canines which are predominantly used to bring down prey. The jaw strength is phenomenal and can exert around 1,500 pounds per square inch in pressure, which equals approximately twice that of a pit bull terrier. All the force of holding onto and the movement of the fleeing prey are borne by the front teeth. Wolves in the wild have been seen lifted off the ground and dragged for metres or even flung against tree trunks by their prey whilst hunting. Research has shown that only wolves who predominantly bring down large prey like moose suffer from broken canines.

Spiral fractures to canines can be caused by the extreme pressure from an incomplete hold on a thrashing prey animal. Cornelia Hutt from the International Wolf Centre and Red Wolf Coalition says 'If wild wolves live long enough, of

course they are going to have tooth wear and injury. But the wolf is superbly adapted to be a carnivore with muscles that convey powerful mechanical advantage to the jaw. Despite that, asymmetrical loading within the skull can be severe when the wolf locks onto a bite with just one canine tooth for instance. This can result in spiral fractures, but this is lessened by the buttressing of bone along the jaw and also by the limited length of the wolf's skull. The post-carnassial molars are designed for crushing and grinding. Indeed, they fracture and break in some wolves and maybe the wolf dies but maybe that wolf is compromised in other ways as well. A few wild wolves live to be very old - eight or nine and occasionally older. One old red wolf in North Carolina lived to be about 13. He had nothing but stubs for teeth when he died. His canines were short and blunt, his incisors were gone, and the carnassials and molars were good for nothing but helping him gum his food. For some reason, the pack (he had been the breeding male) not only tolerated him, they took care of him. One biologist says he observed the old wolf's family regurgitating food to him'.

Nancy Gibson from the IWC says, 'Wolf teeth get worn in the wild. Wolves have to chase down prey running at 40 mph, they get kicked by their prey and then wolves have to fiercely defend their food, territory, breeding partners and rank. All of this wears their teeth down and most wild wolves and prey have worn teeth at an early age in comparison to captive wolves'.

So the biggest problem for wild wolves - if they live long enough - seems to be wear and decay. As captive wolves fed a raw food diet comprising of a large proportion of bone don't seem to suffer from fractures, then it would appear it is more likely the pressure and stresses of bringing down their prey rather than the eating of it.

## WOLF TEETH

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