

Dentistry in Hypselodont Small Animals: Rabbits

What does 'hypselodont' mean?

Hypselodont is a term used to describe teeth with short roots and very long crowns. Often animals with these teeth experience continual eruption of the teeth throughout their lifetime, with teeth continuing to grow from a single root. Many of the carnivorous mammals have teeth similar to our own: one set of deciduous (milk) teeth is present in infancy, then a single set of teeth is present during adulthood. These teeth are permanent and once they have grown into place, they do not grow any more.

Many of the smaller mammals, particularly the hind-gut fermenters such as rabbits, guinea-pigs, degus and chinchillas, have a very different system of dental growth. In these species, the teeth grow continuously throughout the life of the animal. It is essential that the teeth continue to be worn down by the rough fibres in the diet so that the natural wearing (occlusal) surfaces of the teeth continue to align correctly. In the wild, the natural diet of these species ensures that the teeth are always worn, but in captivity or as domestic pets, it can be more challenging to provide the correct diet and environment to best promote dental health. If the teeth are not continually worn down, the jaws can become misaligned, teeth can grow into the soft tissues of the mouth, or indeed through the jaw or into the eye sockets. These conditions cause extreme pain and can be severely detrimental to the health of the animal.

Diet and the importance of dental wear

As mentioned above, species with hypselodont teeth require a rough diet to ensure adequate dental wear. In most cases, the diet should be almost exclusively comprised of grasses (or hay) and fibrous weeds. These animals may roam very large distances to find food, so exercise is also essential! The best way to mimic the natural world in our homes is to provide as large a space as possible for your small pet to roam in, and to hide food in a variety of places to encourage natural foraging behaviours. Gnawing is an essential part of the daily routine of these animals – especially for guinea-pigs and chinchillas whose teeth grow during periods of rest, so practical solutions must be found to provide opportunities in the home. Never allow your pet to gnaw on bars or metal meshwork because this can cause dental fractures that are not apparent. Never allow your pet to ingest wallpaper or furniture, which could be toxic or cause obstruction. Never allow your pet to gnaw on any wires that could result in electric shock. Ideally, gnawing materials should include hay provided *ad libitum*, and natural woods such as branches from fruit trees. Treats may be hidden in wooden tubes to encourage gnawing, or hay may be tied up in knots to provide a rougher material for your pet to chew through.

Dental conditions

There is a wide range of dental disease within the small mammal populace. Broadly speaking, these can be divided into congenital (from birth) and acquired diseases (with the latter forming the majority of problems), and into incisor (the front teeth) and molar (the cheek teeth) problems. A brief overview of some of these problems can be found below.

Incisor abnormalities and treatments

The incisors are the front two teeth at the top and the bottom of the jaws. Rabbits have two sets of upper incisors, with one smaller set (the 'peg' teeth) hidden behind the other larger set. Some common incisor conditions include:

- ❖ Congenital malformations such as a shortening of the upper jaw causing the lower incisors to grow out and up without hinderance – this is common in rabbits!
- ❖ Gingivitis and periodontitis

- ❖ Incisor malocclusion (misalignment of the incisors) secondary to a cheek tooth problem – very common in rabbits!
- ❖ Damage from incorrect burring or trimming – incisors should **never** be clipped because this can cause fractures or damage the germinal tissues, causing abnormal growth of the tooth.

Cheek tooth abnormalities

- ❖ By far and away the most common cheek tooth abnormality encountered in rabbits, guinea-pigs and chinchillas is malocclusion, where the surfaces of the teeth that are supposed to rub together (the occlusal surfaces) are misaligned so the teeth do not wear properly. This is normally found in patients over 3 years old and is frequently from incorrect dental wear as a result of a diet poor in rough fibres or in essential nutrients, but many factors are involved.
- ❖ Fractures of the cheek teeth (molars) are common in pets that chew on bars through boredom or lack of gnawing opportunities.
- ❖ Tooth root abscesses may be primary or, more commonly, secondary to another dental condition.

How malocclusion affects the teeth

Most herbivorous species that eat long fibres do not chew their food in the same way that carnivorous mammals do. Instead of using an up-and-down motion of the jaw, these species use a side-to-side action. Therefore, insufficient wearing of the occlusal surfaces of the teeth causes the teeth to become longer on one side as they curve around. This is usually the side next to the tongue for the lower teeth and the side nearest the cheek for the upper teeth, and the elongations are often referred to as 'spurs'. Affected teeth cannot grow in their normal manner so can become pushed backwards, curved, displaced, or a mixture of all three.

When the teeth become elongated, the gap between the upper and lower gum lines is also extended, stretching the muscles of the jaw. When left for long periods of time, these muscles become permanently stretched and weakened. The increased pressure on the occlusal surfaces of the teeth because of the increased pressure exerted by an over-stretched jaw causes the direction of tooth growth to reverse. Therefore, lower cheek teeth will start to erupt through the lower jaw, whilst upper cheek teeth grow into the sinuses, tear ducts and into the eye sockets.

The increased pressure on the occlusal surfaces also causes pain and inflammation of the centre of the tooth, the pulp. This in turn causes abscessation of the tooth root and weakens the tooth, making it more susceptible to fractures.

Clinical signs (symptoms) of cheek tooth conditions

Patients with dental conditions may find it painful to chew, so may chew on one side only. Unfortunately, this increases the abnormal growth on the affected side, elongating any fractures until the whole crown fractures. Spurs often develop on the teeth, although these frequently cannot be seen without the aid of anaesthesia – the shape of the jaw and the teeth makes it impossible to look at the back teeth without sedation. Affected patients may have cuts to their tongues or cheeks, although again this is not always obvious. The pain may cause them to grind their teeth or dribble more than usual, and they may have difficulty grooming so may present with a matted area of fur, or for no longer keeping themselves clean.

The abnormal tooth growth may also cause obstruction of the tear ducts, causing excessively watery eyes to develop or recurrent eye infections. In severe cases where a tooth root abscess grows into the eye socket, one eye may appear to bulge out from the face.

How to prevent malocclusion

The most common cause of tooth elongation is poor dental wear because of cereal based, high energy mixed foods being fed, particularly to indoor rabbits lacking constant access to highly fibrous gnawing materials. It is interesting to note that outdoor rabbits and guinea-pigs left grazing rarely have malocclusions! However, certain breeds are more likely to be affected than others, and environmental conditions are likely to be involved.

Stress reduces the strength of the periodontal ligaments, which hold the teeth in their sockets. The quality of the ligaments and gums is also affected, with injury occurring more readily in stressed individuals.

The best way to prevent malocclusion from occurring is to feed your pet a diet high in rough fibre. Gnawing materials should be made available at all times and should be of natural substances. Most rabbits, guinea-pigs and chinchillas do not need pellets or cereal feeds at all – they are designed to live on grass and weeds alone! If commercial diets are to be used, they should form no more than 20% of the diet, and ideally less than this: the usual rule is 25g food per 1kg pet (around 1 eggcup of food for every kilo your pet weighs) per day as an absolute maximum. However, in order to need this much energy supplementation in the UK, your pet would probably have to be outdoors in wintery conditions with little bedding for some time! Rabbits should be given as much space as possible to exercise, and should ideally forage for food – these things will help to reduce stress and increase dental strength. Predators should be kept away for the same reasons.

Diagnosis of dental disease

Dental problems can be difficult to diagnose because the structure of the mouths of these small patients obstructs clear vision, even with an otoscope. They are continual eaters, so the mouth is often full of food! Diagnosis is suspected from the clinical signs and the owner's description of the problem but cannot be confirmed without x-rays of the teeth and skull, including the sinuses and the eyes. Occasionally an ultrasound scan of an eye may also be required to ascertain whether a bulging eye has a dental origin.

Treatment

- ❖ Any fractured teeth should be removed. The tooth opposite that tooth being removed will have nothing to wear against (unless a removed incisor grows back) so should be burred on a regular basis thereafter.
- ❖ Abscesses should be treated by removing the tooth or teeth involved and exteriorizing the abscess. Facial surgery is frequently required to facilitate this, and an antibiotic course and or flushing solution will be required.
- ❖ Regular burring of deformed teeth should be performed and removal considered. **Teeth and spurs should never be clipped, but only burred with the correct equipment.** Clipping can cause fractures of the teeth and can affect the germinal layer, causing affected teeth to spiral or become deformed.
- ❖ The overall length of the cheek teeth and incisors should be reduced where appropriate, and the normal architecture of the dental arcades restored.
- ❖ The diet should be corrected.
- ❖ Stress factors should be removed.