

THE ABCS OF VETERINARY DENTISTRY: B IS FOR BURS AND ‘BUNNY RABBITS’ INCISOR TEETH PROBLEMS

DR DAVID E CLARKE REGISTERED SPECIALIST, VETERINARY DENTISTRY AND ORAL SURGERY

IN OUR PREVIOUS ARTICLE WE STARTED OUR ALPHABETIC JOURNEY LOOKING AT OUR VETERINARY PATIENTS’ ORAL PROBLEMS BEGINNING WITH AN ‘A’, WHICH INCLUDED ANAESTHESIA MONITORING, ATTRITION AND ABRASION. I INVITE YOU TO CONTINUE THE JOURNEY THROUGH THE ALPHABET ON OUR QUEST TO DO THE BEST DENTISTRY FOR OUR VETERINARY PATIENTS AND LOOK AT ‘B’ FOR BURS AND BUNNY RABBITS.

BURS

Dental burs are small rotary instruments with cutting blades used in an operative head, such as a high-speed or slow-speed contra-angle handpiece.

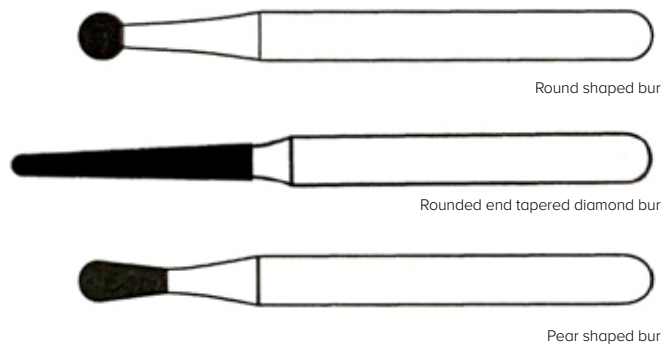
Dental burs are used for excavation of dental tissues, cutting/sectioning teeth prior to extraction, bone removal, crown preparation, shaping and finishing restorations and gingivoplasty. Although carbon steel burs are available, the most common materials used to manufacture veterinary dental burs are tungsten carbide and diamond. Tungsten carbide hold up well to cutting enamel, are cost effective and maintain their sharpness, compared to diamonds which are more expensive and quickly dull. A tungsten carbide bur is ideal for cutting/sectioning teeth prior to extraction and bone removal, whereas a diamond is better for excavation of dental tissues, crown preparation, shaping and finishing restorations and gingivoplasty. A white stone can also be used for shaping and finishing restorations.

The choice of burs can be overwhelming on initial inspection, as there are literally thousands of different burs when one opens a human dental catalogue. There are hundreds of shapes, sizes and diamond grades available to select for each procedure. To make life easier, they can be classified into a few basic shapes and shank types, but it is up to the individual to find what works for them. The most common burs I use are:

Shape	Size	Use
Round	½, 1, 2, 4, 6	Cavity preparation and under cuts for restoratives
Tapered Fissure - crosscut	699, 700, 701L	Tooth sectioning and bone removal
Pear	330 - 333	Endodontic access
Tapered diamond round end	850, 856 fine grit	Crown preparation, cavity preparation, cutting inclines in orthodontic appliances, gingivoplasty, composite finishing
White stone bur		Composite finishing

The shank types are dependent on the handpiece they are used in. There are three shank types: friction grip (FG), contra angle (CA) and (HP) handpiece. A friction grip bur is 1.6mm diameter, available in standard or longer surgical length, and used in a high speed handpiece. The majority of procedures can be managed well with the standard length, but a large carnassial tooth extraction will benefit from the extra surgery length bur. All bur shapes are available in friction grip. The advantage a friction grip bur provides

is the speed of 400,000 rpm and water-cooling of the high speed handpiece. The contra-angle bur is 2.35mm diameter and used in a slow speed handpiece, which operates at 1,000 - 20,000 rpm. These are ideal for dentine or bone recontouring, but often the veterinary handpiece does not have water-cooling, so care must be taken. The end of the CA bur has a flat section which locks it



BUNNY RABBITS AND THEIR INCISOR TEETH PROBLEMS

Bunnies have a different oral and dental anatomical and physiological make up compared to dogs and cats. They also have a high incidence of oral problems that can be treated and managed by the veterinary surgeon.

Oral examination

Bunnies have small mouth openings, so a complete examination in a conscious animal can be difficult. Palpate the ventral mandibular borders, the mandibular rami and the maxillary arches for swellings, pain, inflammation, tenderness and discomfort. Next check the incisor teeth for conformation, malocclusions and normal length. Then try to examine the premolar and molar teeth. Using an otoscope can give you an idea of what is happening in the caudal oral cavity.

Dental Anatomy

Bunnies do not have canine teeth and their incisor, premolar and molar teeth are continuously growing. They are termed aradicular hypsodont, meaning no true root structure and continuously growing. The permanent dental formula is $2 \times (I \ 2/1, C \ 0/0, P \ 3/2, M \ 3/3) = 28$ teeth in total.

Bunnies have two rows of incisor teeth in the maxilla, comprising 4 maxillary incisors in total. In the front row there are two large incisor teeth and positioned palatal to these are two smaller incisor teeth (or peg teeth). There are two mandibular incisors. The cusps of the mandibular incisor teeth are positioned and occlude between the large and peg incisor teeth.



Normal bunny incisor occlusion. Note the two maxillary incisor teeth and two mandibular incisor teeth. The smaller maxillary incisor 'peg' teeth are hidden behind the large incisors.

into the handpiece. The handpiece, or HP bur, is 2.35mm diameter and used in a straight nose cone handpiece. These are ideal for bunny dentistry for shortening overgrown premolar and molar teeth or in the laboratory. They operate at 100 - 20,000 rpm, generally without water-cooling.



The bunny has three premolar and three molar teeth in the maxilla and two premolar and three molar teeth in the mandible bilaterally. Enamel is much thicker on the mesial (front) surface of the incisors and on the buccal (lateral) surfaces of the premolar and molar teeth, essentially forming a cutting blade. When the bunny's mouth is at rest, it is held in the midpoint of its forwards - backwards movement. The cutting surface of the premolar and molar teeth do not occlude at rest. In order to eat, the bunny must bite off food into small pieces, which is performed by the incisor teeth. The sharp edges of the mandibular incisor teeth are drawn across the occlusal surfaces of the maxillary incisors in a slicing action. This action, due to the enamel edge acting as a blade, maintains the length of the incisor teeth, as the sharp enamel edge abrades the tooth and shortens it.



A bunny skull showing the position of the teeth and relationship of the occlusion.

Both the premolar and molar teeth are maintained by the lateral chewing action, which brings the edges of the occlusal surfaces into contact. The left side mandibular and maxillary teeth work together, whilst the right side work together. During normal mastication, the bunny chews on both sides of its mouth. As the bunny chews the lingual edge of the mandibular premolar and molar teeth contacts the buccal edges of the maxillary premolar and molar teeth. The teeth are then moved across each other to the point where the palatal edge of the maxillary premolar and molar teeth contacts the buccal edge of the mandibular teeth. This action is repeated twice a second, depending on the type and nature of the food. If the bunny eats commercially available food, such as pellets, the jaw movements are significantly shortened and the action produces less contact of the teeth, which in turn results in wear of the lingual side of the maxillary teeth and the buccal surface of the mandibular teeth. In turn this produces spurs and hooks on the buccal surface of the maxillary teeth and the lingual surface of the mandibular teeth.

SIGNS OF DENTAL DISEASE

Common clinical signs associated with dental disease:

- Decreased food intake
- Weight loss
- Poor coat condition
- Change in defecation
- Salivation, wet dewlap
- Ocular and nasal discharge
- Mandibular swelling
- Difficulty closing the mouth
- Elongated incisor teeth
- Facial swelling
- Systemic disease
- Death

INCISOR MALOCCLUSIONS

Primary incisor malocclusion

Primary malocclusions occur in bunnies under 12 months of age. Bunnies as young as three weeks of age may show brachygnathism of genetic origin resulting in a malocclusion and overgrowth of the mandible. An autosomal recessive gene for a shortened maxillary diastema is the probable cause. It is commonly seen in dwarf bunnies. This causes a longer mandible and an incisor malocclusion. The incisors continue to grow and with no attrition or wear, the maxillary incisors tend to curl and twist in the oral cavity, and the mandibular incisors grow laterally, appearing similar to an elephant or pig tusk. This often results in an inability of the bunny to eat and prehend food so they slowly lose body condition, slobber, drop food from the mouth and suffer moist dermatitis of the skin around the mouth and on the chest.

In bunnies with continuously growing premolar and molar teeth, incisor malocclusions may lead to secondary premolar and molar issues. When the incisors are unable to section food into bite size pieces, the bunny does not chew on the premolar and molar teeth properly and therefore they do not wear adequately. The overgrowth of these teeth force the mouth open and present the previously described clinical signs. If the maxillary premolar and molar teeth overgrow, they grow laterally, lacerating the buccal mucosa, whilst the mandibular premolar and molar teeth grow lingually, entrapping the tongue.

Secondary incisor malocclusion

Secondary incisor malocclusion occurs in older bunnies, usually over 12 months of age. This is more commonly diagnosed than primary incisor malocclusions. Secondary malocclusion may result from lack of attrition and wear of both the incisor teeth or the premolar and molar teeth. This may be due to general illness, lack of chewing, a change of diet, oral infections, temporomandibular joint dysplasia or tooth fractures.

The first step in treatment of incisor malocclusion is to determine whether you have a primary or a secondary incisor malocclusion.

Diagnosis

In the consulting room in the awake bunny, a general intra-oral examination can be performed using an otoscope. If the 5mm diameter scope is used, the height of the premolar and molar teeth can be estimated quite easily. On oral examination, in the bunny, the teeth should have a flat occlusal surface. The maxillary premolar and molar teeth are almost level with the gingiva and the mandibular premolar and molar teeth should be 1-2mm above the gingiva. Once overgrowth occurs, the teeth become longer, the maxillary premolar and molar teeth grow laterally, flare buccally, produce spurs and hooks and ulcerate the mucosa, whereas the mandibular premolar and molar teeth grow lingually over the tongue. A complete examination though must be performed under general anaesthesia.



An oral examination using gauze and a cheek pouch dilator allows visualisation of the overgrown right sided mandibular premolar and molar teeth.

Treatment of dental problems

The primary role of treatment is to remove the malocclusion, provide occlusal adjustment (odontoplasty), extract affected teeth and complete abscess debridement.

Odontoplasty

Trimming of the incisors with nail clippers designed for cutting dogs' toe nails should be avoided to prevent fracturing the tooth and exposing the pulp. A high speed diamond bur can be used to reduce the tooth height. The correct angle of occlusion should be maintained. To protect the surrounding soft tissues, a tongue depressor can be placed behind the incisor to protect the tongue.

If the incisor tooth fractures during trimming or the height is reduced too severely, the pulp may be inadvertently exposed. The pulp should be treated by direct pulp capping immediately the pulp is exposed. Approximately 2mm of coronal pulp is removed with a # 1 round diamond bur in a water cooled high speed handpiece. Haemorrhage is controlled with a sterile paper point, followed by sealing of the pulp, which requires placement calcium hydroxide cement followed by an intermediate restorative material. The opposing teeth may need to be trimmed. The hard setting composites should not be used as they do not wear like a normal tooth.

Extractions

An alternative to tooth trimming is extraction. Specialised instruments are required to perform extraction cleanly. A luxator, curved root elevator, molar extraction forceps, Crossley luxators, Molt #2 (EX-9) periosteal elevator are a good start. A closed technique can be used to extract the incisor teeth. A Crossley luxator and Molt #2 (EX-9) elevator can be used. The portion of the tooth located subgingivally is exceptionally long in both the maxillary and mandibular incisor teeth. The maxillary incisor has a tight curve on the subgingival portion of the tooth, similar to a circle with a 5cm diameter, whereas the mandibular tooth has a milder curve, similar to a circle with a 10cm diameter.

The first step is to sever the epithelial attachment using a Molt #2/#4 periosteal elevator or a #11 scalpel blade. The blade is inserted into the gingival sulcus and the attachment is severed from the underlying alveolar bone ridge from around the entire circumference of the tooth. The instrument is inserted into the space between the tooth and the bone occupied by the periodontal ligament.



A Crossley incisor elevator.



A Molt #2 (Cislak EX-9) periosteal elevator.

A curved deciduous tooth elevator can be used on the rostral and palatal/lingual surfaces, whereas the Molt #2/#4 or Crossley can be used on the buccal or mesial surfaces. After the instrument is placed, a slight twisting motion parallel to the tooth is used to break down the periodontal ligament. The elevator is slowly advanced apically and around the circumference of the tooth. Once loose the tooth can be grasped with molar extraction forceps and removed.



A curved deciduous elevator.

The use of early traction, leverage or torque in excess of what is needed, may break the tooth. If the tooth breaks, the remains should be removed. If left, the tooth will regrow and you will have another opportunity to remove it. Once the tooth is removed, the socket should be flushed and curetted of debris and granulation tissue, and any bony spicules smoothed. The sulcus is closed by suturing the gingiva with an absorbable suture.



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