

# Rabbit Dentistry

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Our understanding of dental problems in rabbits has greatly increased in recent years, but there are still many questions without answers. The massive increase in the number of pet rabbits in the UK means that dental treatment is a growing part of veterinary practice.

Keeping a functional dentition is essential in herbivores. Inability to eat due to dental problems, if unresolved it leads to rapid deterioration in health and then death.

It has been proposed that some dental problems result from a nutritional deficiency (Calcium and Vit. D), however there is a better alternate hypothesis that states these problems result from a diet that has the wrong physical properties. Rabbits are being feed soft, non abrasive (& nutritionally concentrated) processed foods but their dentition is designed to grind low value, tough foodstuffs – that is GRASS.

## Rabbit Incisor tooth malocclusion and its treatment (tooth extraction)

### Malocclusion

Incisor malocclusion fall into 2 groups according to the cause;

- 1) malocclusion caused by a long mandible relative to the maxilla (mandibular prognathism). This skeletal base abnormality is a genetic defect. This group usually present considerably younger than a year of age. Initially the incisor relationship can be normal but then is changed by further growth of the mandible. This is common in Dwarf lops.
- 2) Incisor malocclusion secondary to elongation and changes in the cheek teeth. This is an acquired defect which takes several years to develop. There is often no history of dental problems with the condition usually first presenting around the age of three.

### Complications of incisor malocclusion.

Once the incisors do not make contact with the teeth of the opposite jaw, they erupt and grow at maximum rate which is 5-6mm per week.

The teeth can no longer perform their normal function of cutting (cropping), biting & prehending grass and other food. The overgrown teeth are physical impediments that interfere with the ability to groom and perform coprophagia normally (resulting in a claggy bottom).

When the incisors become long they are easily fractured. At about 2cm of length, they then begin to cause soft tissue contact and traumatic injury. This is usually associated with the sudden onset of virtual anorexia.

With incisor malocclusion the upper incisor teeth can intrude into the maxilla and lead to constriction of the naso-lacrimal duct. The reduced tear flow can present as epiphora or dacryocystitis.

### Treatment options

- 1) Regular trimming - at least every 4 weeks. The overgrown teeth are problematic sooner than 4 weeks but not so long that they cause trauma. This means 13 treatments a year which is a lot of time and expense for the owner.
- 2) Extraction of all 6 incisor teeth. Usually a single treatment but regrowth of one or more teeth can occur. This treatment requires general anaesthetic – best performed when the rabbit has optimal health.

Additional treatment of the cheek teeth will be required in group 2. It may be needed in group 1 if the incisor malocclusion has existed for some time and then caused cheek teeth abnormalities secondary to interference with jaw closure and movement.

Group 1 cases should be neutered if the genetic defect is not to be passed on.

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### **Incisor trimming - the neat and accurate way**

The best technique to trim incisors is to use a highspeed dental handpiece with a diamond grit fissure bur (approx 1.2mm diameter i.e. 012 size). The next best way is using the same type of bur in a contra-angle (latch grip) slow handpiece (driven by a micromotor unit). Both are used without any water cooling. These methods can be performed on a fully conscious or sedated rabbit.

When trimming due to incisor malocclusion the teeth are reduced to a level close to the top of the gum line. It is not important to re-create the normal bevel edge.

When trimming the incisors for length reduction after cheek teeth treatment;

- The upper incisors are trimmed to make a bevel where the palatal aspect is at gum level and the incisal edge is horizontal.
- The peg teeth are reduced to gum level.
- Lower incisors are reduced to normal length or shorter with a bevel

### **General points**

- rabbit restrained in sternal recumbency
- retract lips with left hand (covering the eyes with your palm)
- cut teeth horizontally at estimated desired length
- grind edges to shorten further is required
- use bur to remove sharp edges and do any further reduction or shaping
- use the drill at full speed with a light contact pressure
- make sure you have a finger rest for support and control of the drill.
- Keep the bur moving on the tooth using a “woodpecker” action.

Other techniques such as clipping the teeth or using cutting discs have a much higher risk of iatrogenic damage to the teeth, the rabbit's soft tissues or operator.

The gentle technique of using a high speed bur is recognised by the rabbits which then become more co-operative at repeat treatments in contrast to decreased co-operation in tooth clipping. Clipping incisor teeth is now considered an unacceptable technique.

Caution; When lower incisors erupt quickly (in malocclusion cases) their pulp may extend above the gumline. This can be seen as a pink triangle using trans-illumination. Trim 1mm above the pulp. Pulp exposures will repair with further growth but will be painful until healed.

### **Incisor tooth extraction**

Routinely, all 6 incisors (4 main and 2 upper peg) are extracted.

- General anaesthetic (intubation) and analgesia required
- Shorten the crowns to normal length using a high speed handpiece (see above)
- Cut epithelial attachment (there is none on buccal enamel surface).
- Luxate in left and right direction – avoid any significant force in buccal or lingual direction. Use 18 gauge x 1 ½" hypodermic needle. May also use SuperSlim elevator and rabbit incisor luxator (Crossley).
- When very loose, grip across tooth with artery forceps & firmly but gently push the tooth into socket. It will move up by 1-2mm.
- Gently apply upwards pressure and wiggle before drawing the tooth out of socket – this will help ensure the pulp is detached and comes out with the tooth.
- Check that tooth is entire with the pulp still inside.
- If the tooth breaks below bone level; leave it in place and extract later once re-grows.
- Extract peg teeth after the main incisors have been removed as this gives easier access. The peg teeth are at risk of breakage whilst extracting main incisors if inadvertently touched. Do not push in the peg teeth prior to removal
- Remove interdental bone if protruding – bone rongeurs or dental drill
- Suture only if gingival loose or bone exposed – not necessary to get complete closure but want to ensure that the bone at the perimeter of the socket has a soft tissue coverage.

### **Regrowth**

Any teeth may re-grow even when removed entire. Re-growth is more likely when the pulp is not extracted with the tooth. A second extraction procedure is then required. If pulp remains in the socket – do not attempt to disrupt it or “fish” it out.

### **Follow up**

Consider further analgesia and medical support to recover from anaesthetic.

Do not use antibiotics.

Monitor until the rabbit eats and drinks unaided.

Syringe feed – in practice or at home – if delay in recommencing normal eating.

## Reducing and balancing the cheek teeth in rabbits (Chinchilla & Guinea Pig).

Overgrown cheek teeth is a common occurrence in the lagomorphs and the rodent which have constantly erupting cheek teeth. There is also tipping and spur development which causes oral soft tissue trauma. This results in a variety of problems including sudden onset anorexia.

### Access

Sedation and use of a gag & cheek dilator are needed to properly access all the cheek teeth. There are a variety of gags available. Most rely on the incisors to keep them in position. When the incisors are absent, they perform poorly. A challenge would be to design and manufacture a gag that does not need incisors.

### Cheek teeth reduction

The cheek teeth should be reduced to at least normal length (but preferably further so they are almost level with the gum line) and all the occlusal surfaces needs to be even. It is important to avoid soft tissue trauma or dental damage (loosening, fractures or excessive heat to pulp). Access becomes more difficult when the mouth size is smaller. Instruments obscure vision to the back of the mouth.

### Methods

Current methods (such as use of molar cutters, hand files (blade and diamond grit) and HP burs in a straight dental hand-piece with an integral guard) can be either very labourious or way too risky in terms of iatrogenic damage.

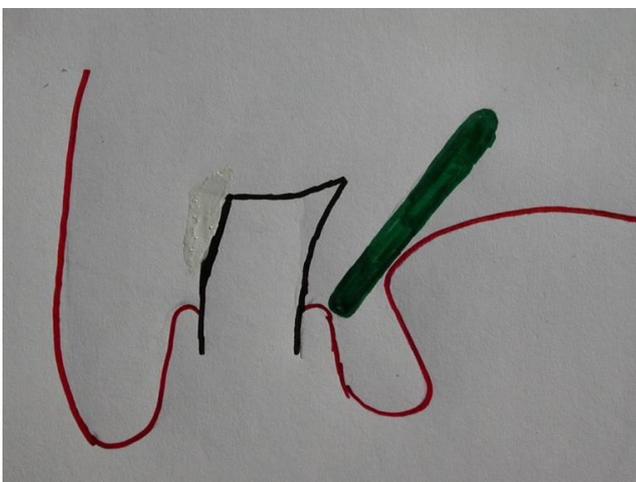
A better technique is to use a specific, large HP “acrylic trimmer” bur (6mm diameter). The fine cross cut tungsten carbide blades grind efficiently and smoothly. Spatulas (preferably wooden) are used to retract and guard the soft tissues and also to guide the bur and control its positioning. If there were accidental, light soft tissue contact only grazing results rather than tissue “wrapping” and ripping large defects.



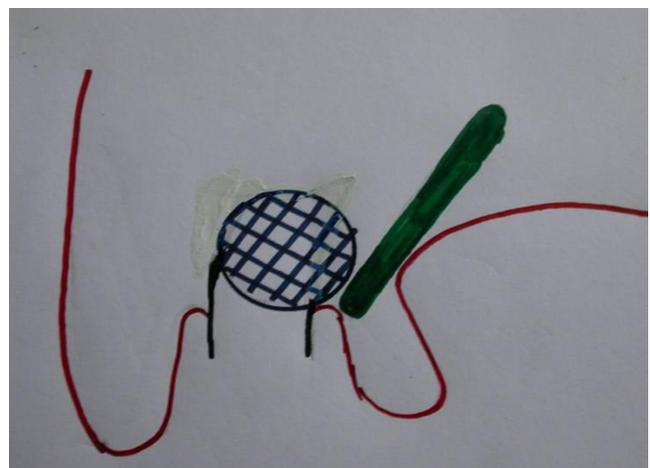
6mm diameter HP acrylic trimmer bur

Whilst grinding down the cheek teeth, the mouth is periodically swabbed with wet cotton buds to remove the tooth powder and allow clear vision of the teeth. The tissues are kept damp to trap the tooth powder. The acrylic bur had to be periodically unclogged using a brass bur brush.

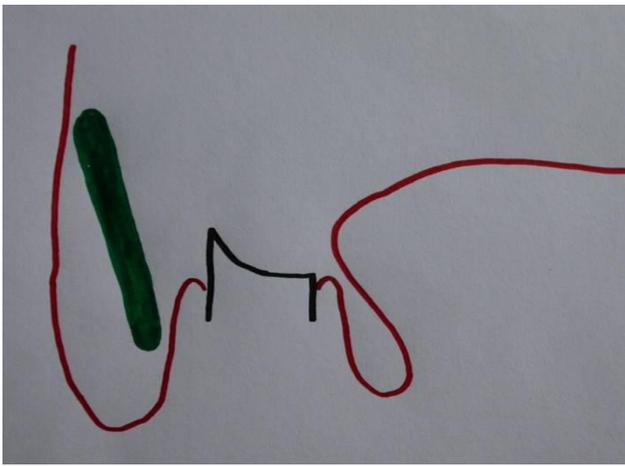
The large bur may not be suitable to grind the most caudal cheek teeth and a smaller bur may have to be employed especially to finish off as the tooth is near gum level. A surgical round (No. 8) HP bur can be used. Extreme care is needed to prevent the bur being thrown off and causing soft tissue damage.



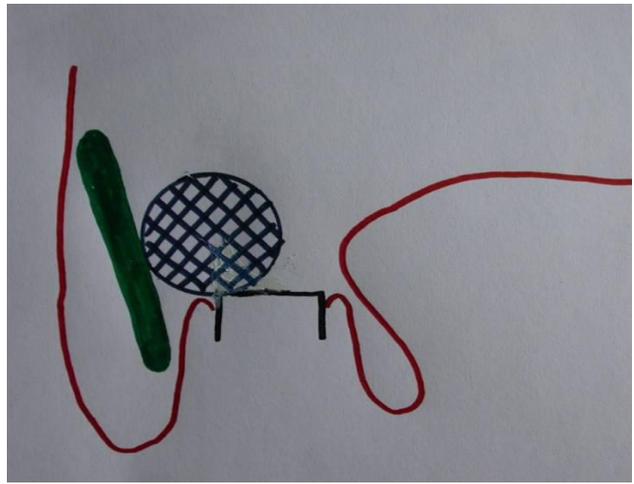
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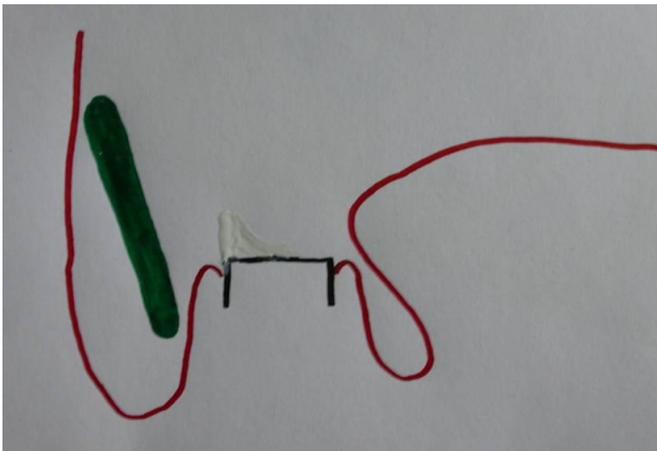
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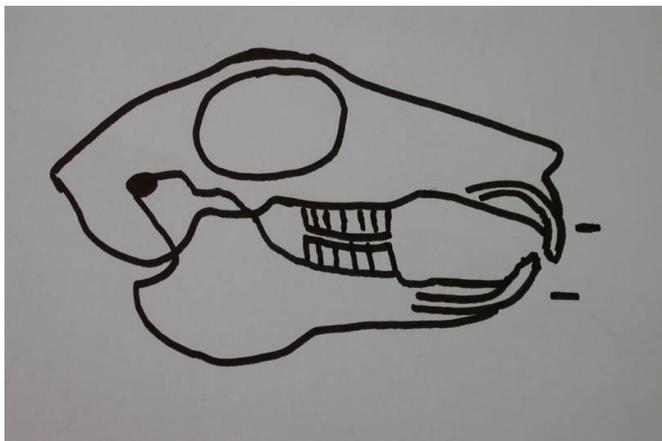
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Stages of reducing mandibular cheek tooth shoing bur and tongue spatula positioning

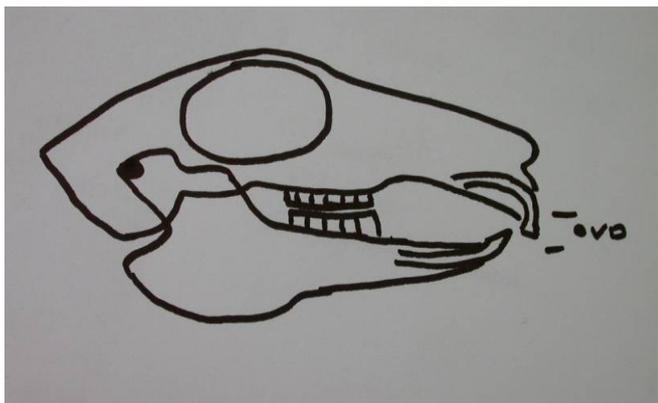
If the acrylic trimmer bur is used on extremely long teeth then the vibration can rapidly loosen the tooth. Very long teeth could first be “debulked” using molar cutters. Cutters should to be sturdy and sharp. This is now regarded as unacceptable and certainly cutters should not be used close to the gumline or when the tooth has a large cross sectional area. It is better to cut through the cheek tooth in the same manner as cutting incisor teeth (diamond fissure bur in highspeed handpiece)

#### Incisor reduction

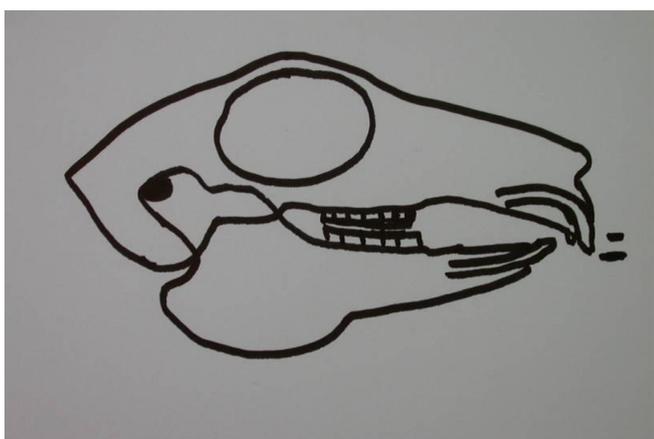
The incisors will have become overlong as a secondary effect of the tall cheek teeth. Reducing the crown height of the cheek teeth will reduce the occlusal vertical dimension (OVD). The incisors will need to be reduced in length to normal for the upper incisors and shorter than normal for the lowers. With the mandible fully retruded the lower incisors should not make contact with the gingival of the palate behind the upper incisors. To shorten the incisors a highspeed hand-piece with diamond fissure bur is used. Circular cutting discs are not advised.



tall cheek teeth with increased vertical dimension (OVD)



normal OVD and incisor length



overshortened cheek teeth - overclosure (reduced OVD)

#### Final checks

Before the gag and dilator is removed, the lateral aspect of all upper cheek should be checked by retracting the cheeks and running a probe across the buccal aspect of the teeth. Sometimes a maxillary tooth that is penetrating the cheek is undetected especially in a Chinchilla or very small rabbit. This means that the dental problem has not been resolved.

After the mouth is finally cleaned, all instruments removed and the incisors reduced the final step is manual checking of lateral excursions. The mandible is fully retracted and then moved left and right to feel the occlusal slide or grind. Initially there may be slight resistance but after several cycles the teeth should pass smoothly. If not, there is bigger interference and then teeth need to be re-examined to find the remaining problem and further grinding will be needed.

## **Sedation & GA protocols for rabbits and rodents.**

### Incisor trimming

Incisors can usually be trimmed with the pet fully conscious with an assistant providing good restraint - no sedation or drugs are required.

### Cheek teeth examination and treatment

Only sedation (as chemical restraint) is required as no pain or significant stimulation will occur. General anaesthetic is not necessary and analgesia may not be indicated.

The published (many text books and articles), recommended doses are something like 0.5mg /kg Domitor & 35mg /kg Ketamine but this is really intended for full surgery (i.e. more like GA).

After years of using different reduced doses a minimal amount has been found that gives adequate yet predictable results. That is;

0.2 mg /kg Domitor (Medetomidine, Pfizer) & 10mg /kg Ketamine – combined and given intramuscularly. Some people would prefer to give them separately and give the ketamine subcutaneously. The principle is less is safer. With this Dom / Ket combination dose we have not had a problem (several hundred done) - touch wood. The Domitor is reversed immediately post treatment using Antisedan (Atipamezole, Pfizer).

For Chinchillas, I use 0.1mg /kg Domitor and 7mg/kg Ketamine - we have had one death but this chinchilla was very sick (too sick to force feed and too sick to treat)

Guinea Pigs - same as rabbits

### Incisor extraction in rabbits

Incisor extraction involves significant pain and so requires both analgesics and deeper sedation to general anaesthetic.

Initially sedation is given using the same doses of Domitor and Ketamine but with the addition of an analgesic such as Butorphanol (Torbugesic) ( 0.5 mg/kg) or Buprenorphine (Vetergesic). Adding a 3rd drug to the cocktail may affect the pharmacodynamics. However, on a smaller number of cases it has proved problem free.

The rabbits are then intubated and given Isoflurane at required concentration (with or without reversal of the Domitor after intubation).

When intubation can not be achieved, the triple drug sedation can be given with an increase in the Ketamine dose to 15mg / kg

I understand that after giving Domitor there is a transient drop in blood pressure (returned by peripheral vasoconstriction). To increase safety and get over this initial post injection issue, it is helpful to have the rabbit well hydrated. 20 - 40 mls of subcutaneous fluid is routinely given one hour before treatment. They can be given a lot more up to 10% body weight. If the patient was not in good clinical condition - weight and hydration, I would postpone treatment to have a period to improve their condition by syringe feeding. If not, I would give more fluids. Fluids can also be given i.v. or orally.

Disclaimer. This is purely a suggested approach from the combined experience of myself working with many veterinary surgeons. Many drugs are not fully trialled or licensed for use in Lagomorphs and rodents. New regimes are being proposed and tested all the time. It may not be long before we have a better and safer approach.

## Equipment required for rabbit (& rodent) dentistry

1. Mouth gag (screw calliper type) - possibly also a lightweight version
2. Large cheek pouch dilators (with wire or solid ends)
3. Small cheek pouch dilators (with wire or solid ends)- small rabbits, chinchillas & G. pigs
4. Straight dental handpiece – for all cheek teeth trimming
5. Large acrylic trimmer bur (HP) – 6mm diameter Tungsten Carbide bur (dome ended fissure shape) – for trimming cheek teeth
6. Surgical round bur (No. 8- HP)
7. Tongue spatula (split lengthwise) or lollipop stick, or metal spatula  
– as a guard and retractor of s/tissue & guide for burs
8. 1 ½ “ x 18 g hypodermic needles – for luxation of incisor teeth
9. Old curved artery forceps – for extraction of incisor teeth
10. Air turbine or contra-angle (slow, latch grip) handpiece – for trimming incisors
11. FG diamond fissure bur (012 or 014) to go with item 11

Optional extras:

½ Hollenbach carver – to extract cheek teeth (from any dental wholesaler)

? Rabbit Incisor Luxator

? rabbit molar (cheek teeth) forceps

Where to get things;

**Items 1,2,3 & 5** are available from the Big-O Veterinary Dental Supplies Co.  
(e-mail enquiries@big-o.co.uk for an order form or information)

### Items 4 & 11

4. - The handpiece is a straight handpiece with an e-fitting (standard interchangeable connection which fits all electric (micromotor) units & air driven dental units).

It may be that the polishing handpiece that you have is a Doriot type and then you can remove the last 4 cm portion and insert the bur down the middle. If so there will be a twist release half way down the handpiece.

Otherwise you can buy a dedicated straight handpiece from Wright Dental(UK) - 0800 668899  
You want an NSK (manufacturers name) EX6 1:1 straight handpiece. This will cost about £90 plus VAT. Wright will supply all types of NSK handpieces.

### Items 6, 10 & 11

From a good veterinary dental supply company or a dental company