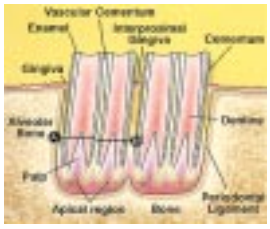
Promoting the Well-Being of Small Animals

Rabbit Dentition

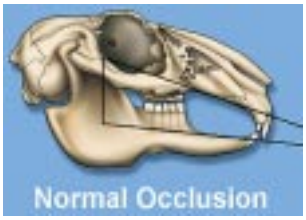
Rabbits fall into the order 'lagomorpha' and include Hares and Pika.
They have an additional set of upper incisors (peg teeth) that separate them anatomically from rodents.
Rabbits have aradicular hypsodont teeth (including the incisors, pre molars and molars) which continue to erupt and grow through out life. They grow on average 8-12 cm per year (1cm per month) and do not have true roots. Rodents have permanently growing incisors only.

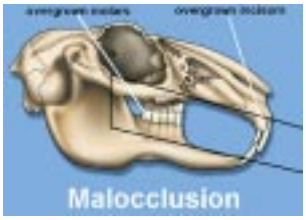
During gnawing and grinding actions the teeth are in different positions. To gnaw on the incisors the lower jaw moves forward so the upper and lower incisors are in position, this results in the molars being out of occlusion during this time.
When chewing the mandible is retracted, parting the incisor surface and bringing the cheek teeth surfaces together.

Malocclusion in these animals is not observed due to gnawing or the substrate involved but directly connected to occlusion of the surface, direction or change in growth.
Root eruption at the jaw line is observed due to backpressure from the top surface of the teeth forcing the tooth down through the mandible and maxilla.
All rabbits in captivity viewed will have some form of dental problem.



Malocclusion may occur due to inappropriate nutrition acquired due to lack of wear. Overfeeding of concentrated feeds, rather than high levels of forage material, can cause overgrowth of molars resulting in excessive enamel spurs developing on the crowns causing soft tissue damage and pain. The extending root may penetrate the jaw perforating the alveolar bulla and causing chronic pain.





In overgrowth the spurs will form on the lateral edges of the teeth. Normally the spurs on the lower arcade will penetrate the tongue whist the upper arcade curl outwards, penetrating the cheeks.

Normal occlusion

Malocclusion & spurs

The nasolacrimal duct in rabbits is a poor design for the function. It is very narrow and runs over the roots of the premolars and incisors.
Elongated roots in this area will lead to bone proliferation resulting in lacrimation, inflammation and an obstructed duct with accompanying infection (dacrocystitis). This can then lead to periodontal infection, tooth root abscesses and osteomyelitis.

Check for infection by gently pulling away the lower lid and putting pressure on the duct against the cheekbone, presence of purulent discharge from the duct will be observed.
Flush the duct with saline (20-30ml), using a 22g/24g catheter, until runs clear, twice a day for 2-3 days. Gently pulling apart the eyelids will cause the third eyelid to move across the eye, giving protection to the conjunctiva and cornea during this procedure.
These factors are self-limiting and will often clear up within 7-10 days.

Gastrointestinal tract and function

The GI tract makes up 20% of the animals body weight. The stomach is thin walled and has a well developed cardia and pylorus. The vomit reflex in rodents and lagomophs is absent. The stomach will tolerate gastric foreign bodies and obstruction of the gut by furballs will be due to stasis and dehydration of the gut rather than a true blockage.
The pancreas is diffuse and undefined; the liver has 4 lobes.
The duodenum and the jejunum are narrow, at the end of the ileum is the sacculus rotundus, also known as the ampulla ilei or ileocaecal tonsil, which is rich in lymphoid follicles.

The caecum is large, thin walled and coiled, lying on the right side of the abdomen. The caecum should appear as a large organ, as food should be permanently present, it is semi-fluid and is soft on palpation. It terminates in the vermiform appendix, rich in lymphatic tissue.

Fibre moves rapidly through the caecum for excretion as pellets. Muscular contractions separate fibrous from non-fibrous material for retention in the caecum for fermentation.
The fusis coli acts as a pacemaker regulating the contractions and production of the two pellet types.
This food is then formed into caecotrophs which are expelled from the anus and eaten whole, a reflex taking place on arrival at the anus. This process is called caecotrophy.
The caecotrophs are covered in a layer of mucous to protect them from stomach acid (pH 2-3) following ingestion where they may remain for upto 6 hours.
Caecotrophy allows absorption of nutrients gaining essential amino acids, volatile fatty acids & vitamins B&K. Long term lack of caecotrophs results in malnutrition and deficiency of B vitamins, such as thiamine.

Caecal bacteria mainly consist of anaerobic gram-negative bacteroides with a variety of other bacteria, ciliated protozoa and yeast's.

Calcium metabolism in rabbits is unusual and is directly proportional to dietary calcium.
Most mammals excrete 2% of excess calcium in the urine, rabbits absorb 45-60% of dietary calcium in response to being fed low quality herbage in the wild, and excess is then excreted through the kidneys and urine.
Excess calcium can lead to formation of crystals in the urine, cystitis and urolithiasis. Deficiency can lead to thinning of the bones resulting in deformity and bone and teeth abnormalities.

Dental disease is the most common reason for presentation of rabbits to veterinary practice.

Indications of dental problems can be:

Slobbers – salivation around the mouth, front limbs and chest
Matted coat, due to inability to groom
Innapetance and reduction of food intake
Weight loss and anorexia
Lack of caecotrophy
Nasolacrimal duct infection
Halitosis
Flystrike, as result of inability to clean
GI disturbance due to disruption of caecal flora or reduction in fibre intake.

The main causes of dental problems are:

Congenital deformity, especially in dwarf (brachecephalic) breeds.
Dietary problems, such as calcium deficiency
Trauma
Fracture of mandibles affecting occlusion
Infections of root, jaw and pulp
Neoplasia affecting normal occlusion

Examination of a conscious rabbit can be carried out using an otoscope or small speculum. However a full oral examination to inspect teeth and oral structures will require deep sedation or general anaesthetic.
Check teeth for spurs that may be imbedding on internal surfaces of the tongue. Check tongue and cheek surfaces for signs of rubbing or laceration.
Check both inner and outer surfaces of both upper and lower arcade, on both sides, for any signs or irregularity, often you will be able to feel this rather than see it. Check all teeth for any sign of excess mobility, inflammation or infection.

Clipping versus burring

The use of clippers is not generally recommended as can cause inaccurate reshaping of the chisel shape and irregular sharp edges, which can cause discomfort and possible lacerations to the tongue.
Clipping can also create microfractures to the teeth, unnoticeable to the eye, that nay result in periodontal problems and pulp infection, leading to malocclusion or osteomyelitis. Excessive force to the tooth may also result in damage to the germinal tissues affecting future tooth growth.

Burring allows accurate and humane reshaping of the incisors and will be tolerated by most animals without sedation.
A general anaesthetic will be required for molar burring to gain adequate access and control reflex chewing. A mouth gag with hold open the area and ensure soft tissue is secured away from the sight. A tongue depressor should be placed behind the teeth to protect soft tissue during the process.
An endotracheal tube is advisable to prevent debris from entering the back of the throat and trachea. Trimming and reshaping should not expose pulp cavity.

Radiography

Skull radiography is essential to evaluate dental problems and associated bone disease. Dental

radiography should also be carried out prior to extraction to diagnose infection and complications present.
A dorso-ventral view will enable assessment of spurs on the cheek teeth and root disease. The lateral view will allow assessment of skull shape, such as elongated mandibles or maxilla, that would ultimately affect occlusion of incisors as seen in dwarf breeds.
Radiography can also assess poor bone quality, obstruction of roots erupting into the maxillae, mandibles and orbits.
Infection, patency and obstruction by root overgrowth of the nasolacrimal duct may also be obvious using contrast radiography.
On x-ray of the molars the crown should not extend into the zygomatic arch, any evidence or irregularity of the surface may indicate root eruption.

When to extract incisors?

Damage
Overgrowth – congenital and physical
Missing occclusal tooth
Malocclusion caused by trauma
Mandibular prognathism, fractures, overgrowth or neoplasia.

Maloccluded incisors are usually non-functional and obstruct feeding. In most cases a normal diet can be fed following removal.
Radiograph teeth prior to removal to check for associated pathology and evaluate the degree of dental disease.
Teeth should be removed using gentle traction to prevent fracture of the teeth in the socket. Breaking teeth may result in eruption of new teeth in the following weeks.
Gently pressing the tooth into the socket, prior to removal, may assist in destroying germinal tissue and preventing further growth.
An absorbent sponge with anticoagulant, for haemostasis (e.g. Lysostypt) can be placed in the socket to control postoperative bleeding.

Analgesia must be provided post operatively to encourage eating as soon as possible. Syringe feeding of **Supreme Science - Recovery** or use through a nasogastric tube may be required. Keep a close eye on weight and food intake as reduction may result in molar overgrowth during this period and GI disturbance or stasis.

Molar extraction

Removal of molars is often the last resort. Size of the oral cavity is limited so access to the teeth in the cavity is difficult making manipulation awkward. Curvature of the teeth should be considered and followed when removing. It may be necessary to elevate the teeth followed by burring of small amount and the process repeated until tooth removed.
The opposing tooth may require regular trimming due to lack of occlusal surface.

Anaesthesia

Rabbits can pose problems for anaesthetic due to their low tolerance of stress and often underlying respiratory problems.
Rabbits are unable to vomit therefore withdrawal of food prior to anaesthetic is unnecessary. Food should not be withheld as stress and reduction in food intake may result in gut stasis or ileus.
Radiography prior to anaesthesia will ascertain any underlying chest infections due to Pasturella.

Premedication (fentanyl/fluanisone, medetomidine, xylazine, acepromazine, diazepam or midazolam) will assist in reduction of stress and decrease hypersensitivity during induction. Masking patients is stressful and should not be undertaken without premed.

Rabbits are obligate nose breathers and under no circumstances should the nostrils be obstructed as can result in suffocation.

An injectable combination can be used as an alternative to gaseous induction. Fentyl/fluanisone plus midazolam will provide 30 minutes surgical anaesthesia. Partial reversal and analgesia can be achieved using buprenorphine or butorphanol.
Anaesthesia can be maintained using the facemask following induction.
Rabbits can be intubated and maintained on an Ayres T piece.

Hypnorm is licensed for use in rabbits plus benzodiazepine:
0.3ml/kg hypnorm I/M, wait 15 minutes
1-2mg/kg medazalan
Reverse with naloxone.

A pre-emptive approach to analgesia should be taken. Local anaesthesia should be used with general anaesthetic rather than increase the levels of GA.

During anaesthesia always ensure animal is positioned with thorax slightly elevated. The digestive tract is an extremely large part of the total body weight and can put immense pressure on the diaphragm restricting breathing.

Reflexes to ascertain depth of anaesthesia can be misleading. Palpebral reflex is only lost during very deep anaesthesia and eye positions is misleading. The ear pinch is the most useful method of assessment.

Postoperative care is essential to ensure no complications. Warmth and fluids should be provided to prevent dehydration of the gut and subsequent stasis, cisepride / propulcid can be used as a motility enhancer.
Food should be provided as soon as recovered and following extractions syringe feeding should be carried out.

Signs of pain include tooth grinding, self-trauma at the site of pain, inactivity, hiding and aggression. Analgesia will assist in encouraging the animal to eat using metacam or zenecarp.