Corrective Dentistry for Rodents

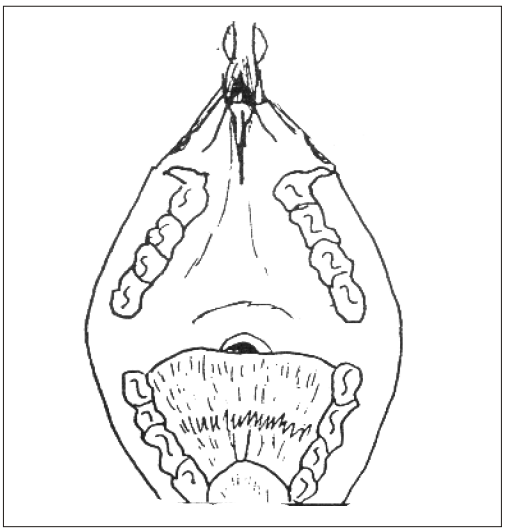
Because a herbivore's diet includes abrasive substances, in particular silicone which wears down the teeth during mastication, it is necessary for these species to possess constantly erupting teeth.

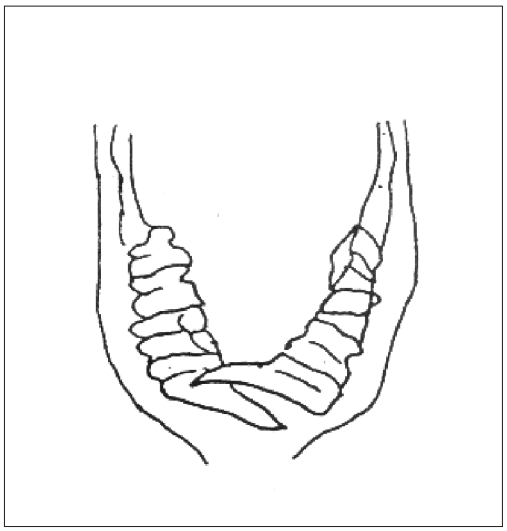
To improve the efficiency of mastication and maintain correct occlusion, the rodent's mandible moves both vertically and horizontally, thus keeping the occlusal surfaces of both the incisors and molars maintained at the correct height by the constant grinding action.

Problems occur when the teeth are not correctly aligned often due to the mandible either being too short or too narrow. This problem is often of genetic origin. Overgrown superior incisors will eventually curve into the mouth and pierce the palate, whilst overgrowth of the inferior incisors usually results in either reverse occlusion, fractured superior incisors or secondary superior incisor malocclusion into the palate as a result of abnormal pressure.

Problems resulting from malocclusion of the molars may arise from genetic abnormalities relating to the angle of the teeth. Maxillary molar problems result in the teeth curving outwards towards the cheek and cutting into the flesh. Mandibular molars will grow inwards across the mouth trapping the down the pyramidal portion of the tongue making it impossible for the animal to eat at all.

Diagram 1 (left) shows overgrown maxillary molars growing outwards towards the cheeks and 1a (right) shows mandibular pre-molars bridging the tongue.





Prevention being better than cure, never breed a pair of animals together without first checking out their dentition. A rodent with misaligned teeth will have problems throughout its life if the problem is of genetic origin, however, many problems occurs as a result of accidents or illness and are thus transient in nature.

Do not be too hasty in arriving at a diagnosis. Dental overgrowth often poses a 'chicken and egg' situation. It will, for instance, be a waste of time just clipping the teeth back if you have failed to diagnose an oral thrush infection which has caused the overgrowth. Similarly, it is absolute folly to clip obviously overgrown incisor teeth before examining the molars, as the clip gags which hold the mouth open to facilitate access to the rear molars are held in position by the incisors. Please also note that when you do clip the incisor teeth, you must make sure that they still touch against the opposing teeth. If they do not meet, then the animal will be unable to bite off pieces of food. Should this be the case, then the owner will have to be given instructions on how to syringe feed and/or cube the vegetables into bite

sized pieces. It will be no good grating the food or cutting into flat strips or fine pieces, if the teeth do not meet, then the animal will not be able to pick them up. If, however, both of either the superior or inferior incisors have been broken off, it is best to clip the remaining teeth in the opposing position, level with the gum. This way, no further remedial action should be necessary as both sets of teeth will be growing at the same rate and should meet up again in perfect occlusion, providing that the original break was due to an accident. Guinea pigs often fracture teeth themselves biting on or getting them woven between the wire on the cage fronts.

The guinea pig has 20 teeth in total:

2 superior incisors
2 inferior incisors
2 mandibular pre-molars
6 mandibular molars
8 maxillary molars

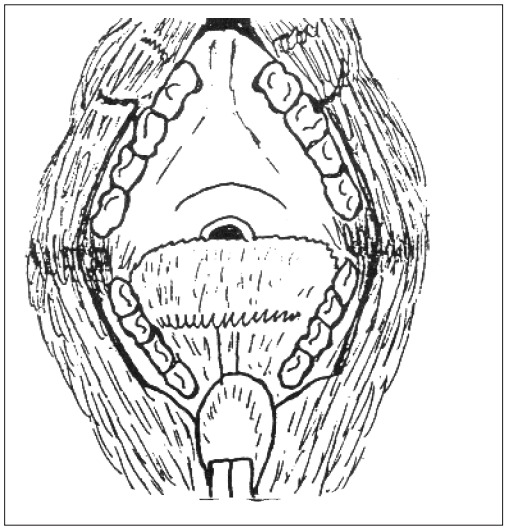


Diagram 2: Arrangement of guinea pig teeth and correct dentition.

When overgrown incisors are due to a misalignment of the jaw, the teeth may require corrective attention at 10 to 14 day intervals. Such frequent attention may pose a problem to the owner, however, it is easy to teach them to do the job themselves. The use of nail clippers is more likely to cause a long axis fracture to the apex, allowing infection to enter and set up a dental root abscess. Incisor roots extend to mid way along the jaw, hence an abscess in this area is often mistaken for a molar root infection. If the owner is going to have to cope with the problem on a long term basis, it will be better for them purchase a dental file and to learn how to reduce the height of the teeth at regular intervals (eg every 3rd day) to eliminate the need for clipping. It is essential to teach the client to hold and support the jaw whilst filing the inferior incisors to reduce the risk of dislocating or fracturing the jaw during the procedure. An abscess which progresses undetected, may result in osteomyelitis.

The ideal way to reduce the height of overgrown incisors is to use a small, high-speed dental drill. The teeth can be filed with a small tapered fissure bur. It goes without saying that it is never necessary to administer a general anaesthetic for this procedure on guinea pigs, hamsters, chinchillas, gerbils or tame rats. An experienced person will also be able to do most rabbits' incisors without resorting to the use of a general anaesthetic. Chipmunks, however, do not like being restrained and are by far the most difficult to deal with.

If a dental drill is not available, the next best option is to use bone rongeurs which produce far better results than nail clippers. Please see the Directory at the back of these notes for stockist.

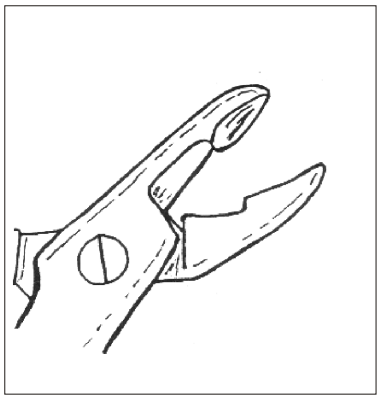


Diagram 3 shows the scooped out surface of bone rongeurs. These not only reduce the chance of splitting the tooth but also contain the pieces which have trimmed off.

The diagnosis and correction of molar malocclusion in rodents is often regarded as a difficult problem by inexperienced clinicians. In reality, there is no need to administer a general anaesthetic to either examine or correct the overgrowth, providing that the clinician has learned the proper methods of handling the particular species (chipmunks are excluded, except perhaps the very tame).

There are several methods of examining the interior of the mouth. You can purchase an otoscope through which each tooth can be viewed individually, or alternatively you can use an oral speculum. Another easy method involves making a balsa wood template by cutting a piece to the measurement of the lower jaw; insert it into the mouth, clamp the jaws together for a moment and then remove the wood. The indentations imprinted into the balsa wood will at least provide a visual aid to the problem. Articulating paper (available from the dentist) can also be used in the same way, after which examination with the otoscope will identify which teeth need filing down.

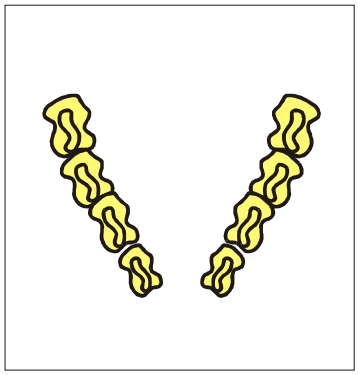
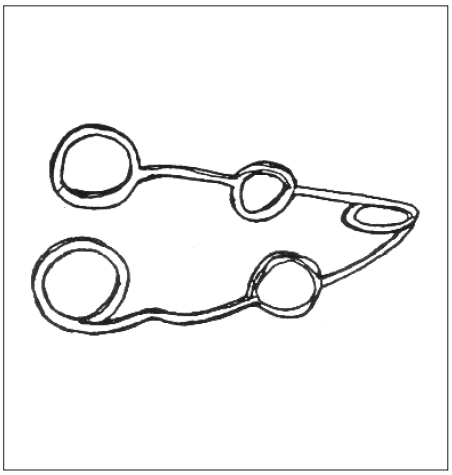
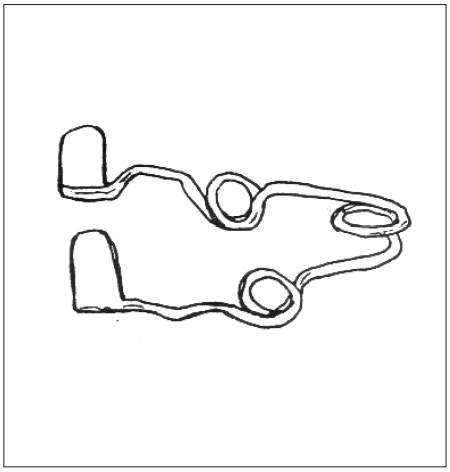


Diagram 4 Typical indentation marks using balsa wood strip for intra-oral test, showing correct markings.

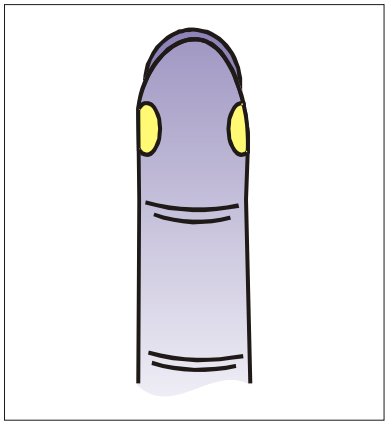
The most common method of examining teeth involves using buccal pad separators to hold the mouth open and a careful visual inspection of both the upper and lower arcades. This must be done using, at the very least a bright light; a magnifying light is preferable. It is also useful sometime to insert the little finger into the mouth and just run it over the grinding surfaces of the molars. This method quite effectively picks up small, sharp spurs in need of filing down.



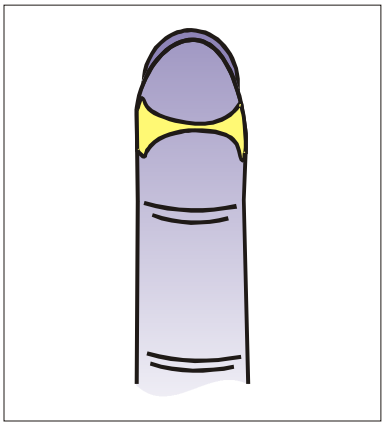
Diagrams 5 and 5a shows a hollow pad buccal separator (left) and a solid pad (right) buccal pad separator.



Without any tools at all, an experienced Rodentologist, should be able to carry out a dental inspection of a guinea pig without any risk of being bitten:
Wrap the animal firmly in a towel encasing the forelimbs, and place the animal in dorsal recumbancy on a soft pillow. With your thumb pointing vertically upward and your index finger pointing down, wedge the superior incisors against the edge of your thumb nail and press firmly down behind the inferior incisors with the index finger. If you hold your finger and thumb in the opposite position, this will allow the jaw to close too easily and you will get bitten. The remaining three fingers of your left hand are placed over the skull to prevent any sideways movement of the head which might result in your finger or thumb slipping. Inserting the little finger of your right hand into the animal's mouth, press down firmly on the mandibular teeth and withdraw your finger quickly.



Diagrams 6 and 6a
The indentation marks will clearly show the gap between the pre-molars and any abnormal dental pattern. A little practice to master this technique and it becomes easy to check the back teeth as a matter of routine during the cage cleaning session.



Anyone dealing with rodents by profession or hobby would be well advised to obtain a working knowledge of their dental anatomy.

Sadly, many hundreds of UK rodents are bred these days with varying degrees of malocclusion and until breeders learn to recognise the need to check the teeth before pairing animals, the situation is unlikely to improve. Whereas 10 years ago, most CCT patient problems were skin related, by far the highest percentage of daily problems seen at the hospital are dental. Breeder education relating to the routine use of Ivomec to prevent parasitic infestation has thankfully reduced the amount of suffering these little creatures have had to endure. Mycotic (fungal) problems are now gaining recognition, which is as well, since once mycosis becomes established in an animal or stud, it can be very difficult and expensive to control. Note that mycosis is controlled rather than eradicated; control is about the best you can hope to achieve once the problem has become systemic.

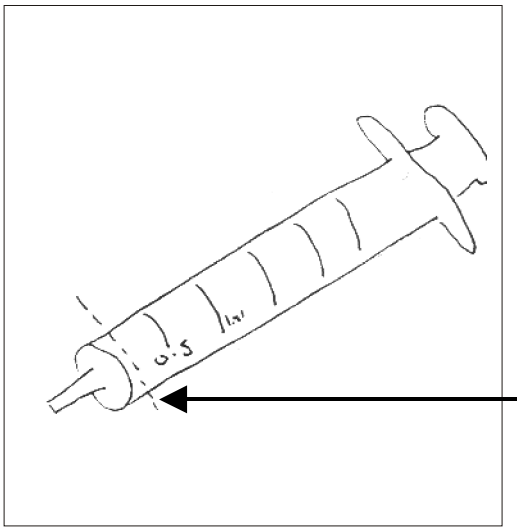
Fungal infections of the mouth (oral thrush) can cause dental problems as the sore condition of the mouth and throat puts the patient off eating any hard food which would otherwise help to keep the teeth ground down and under control. Any rodent not eating and found on examination to be free of malocclusion should be suspected of having a fungal infection. The treatment for this is a minimum three week course of Daktarin Oral Gel. This is available from the pharmacy. This dose is as follows:

0.5ml (measured in a 1ml syringe)

- 3 times per day for the first week
- twice per day for the second week
- once per day for the third week.

It may well be necessary to syringe feed the animal until feeding habits have returned to normal.

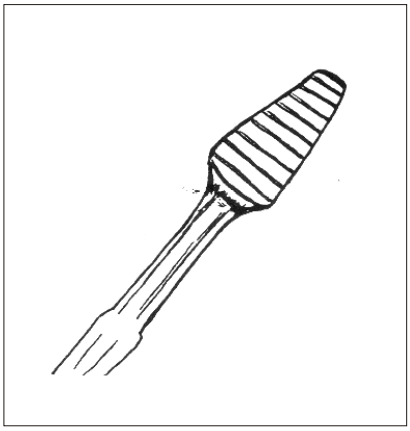
Diagram 7



Use an intact 1ml syringe to carefully administer rehydration fluids (either orally or sub-cut) and then cut off at point shown to syringe feed mash.

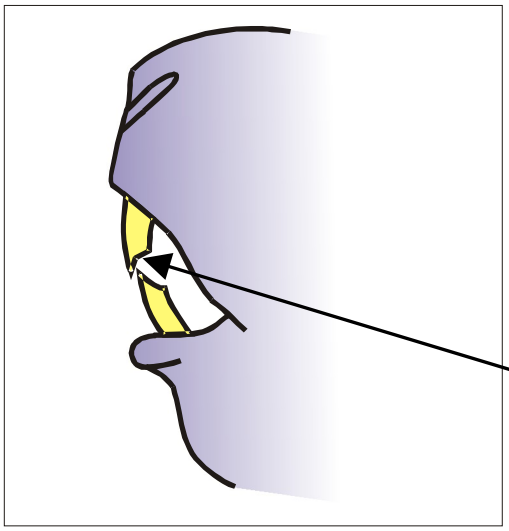
Cut off here with a sharp Stanley or craft knife.

Diagrams 8 Dental Rasp (left). Diagram 9, firmly towel wrap patient before beginning dental inspection.



Dental Profiles

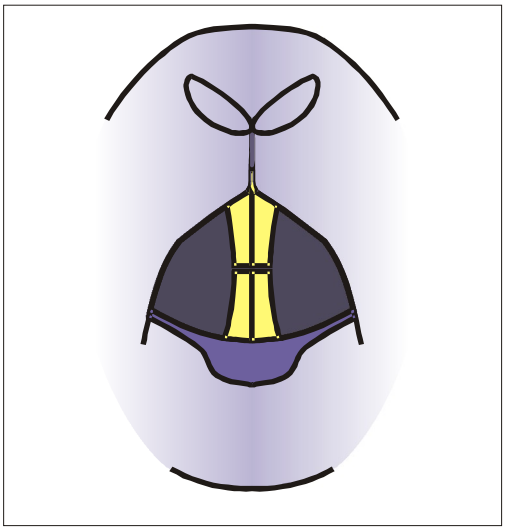
Diagram 10

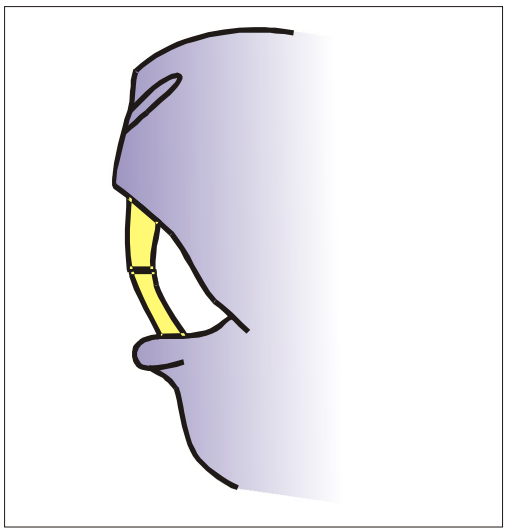


Correct dentition in profile:
Look out for this ridge, the caudal notch.

This diagram clearly shows the ridge at the back of the superior incisors which has occurred as a result of the inferior incisors striking against their inner surface. This is the caudal notch and is represents the correct occlusion. Note that the use of any animal in a breeding program, which deviates in any way from this can result in youngsters with life long eating problems. Babies in the litter who appear normal are often carriers of the defective gene. Whilst animals with minor degrees of malocclusion may themselves survive, two individuals mated together with this problem often results in a fatal degree of malocclusion in their offspring. The solution is to check the teeth (in profile) before using any animal in a breeding program.

Diagrams 11, 11a and 11b





The ends of the teeth sit on top of each other due to the mandible being a fraction too short. Both inferior and superior incisors have blunt solid ends, aligned exactly on top of each other. This is end-to-end occlusion. Diagram 11b will occur if this problem continues unrecognised for a period of time.

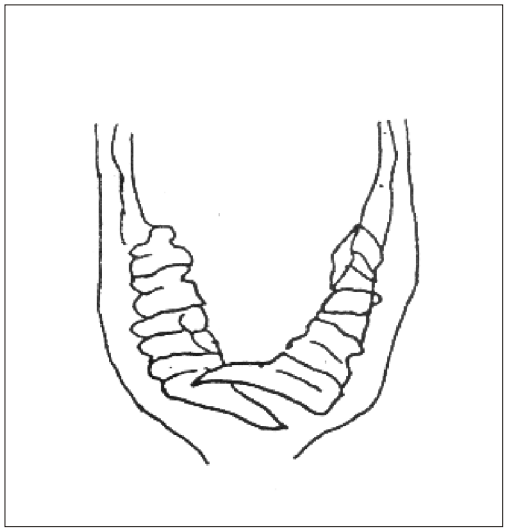
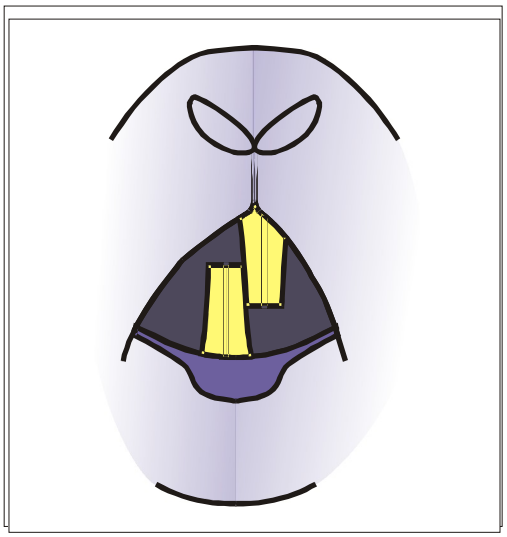


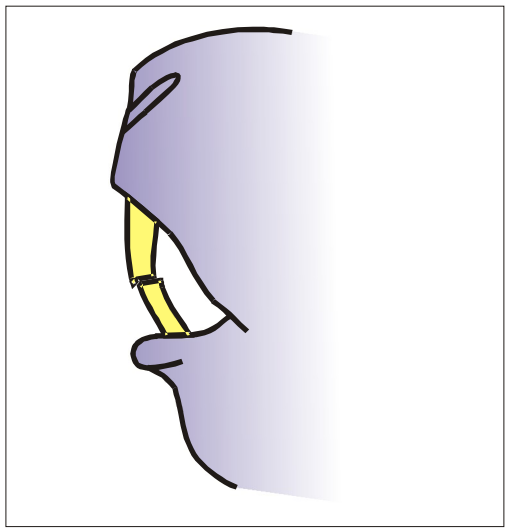
Diagram 11b Overgrowth of inferior molars and premolars.

The situation in diagram 11b seldom occurs if once end-to-end occlusion is recognised, both sets of incisors are kept rasped to the correct height (rasp with a dental tool or diamond ground nail file twice weekly for the life of the animal).

Diagrams 12, 12a and 12b

The ends of the teeth are slanting off to an angle as a result of the molars becoming overgrown to an unequal height on either of one or both sides of the lower or upper arcades.

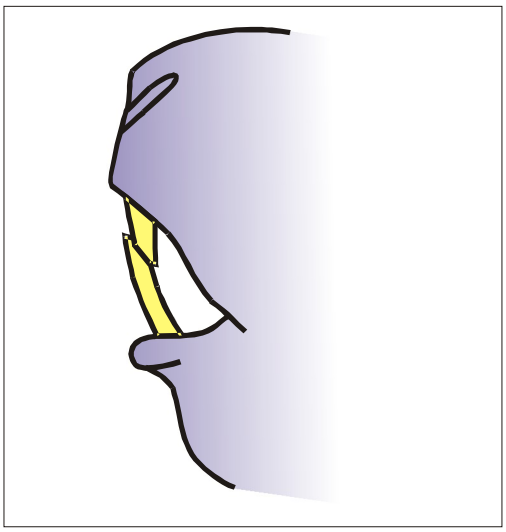


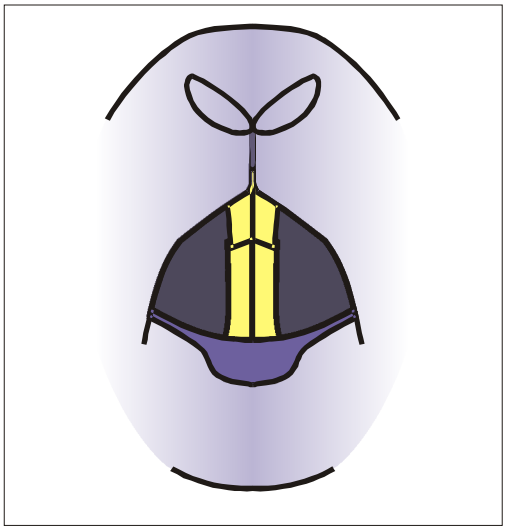


Very severe long term overgrowth left uncorrected may result in the entire jaw becoming twisted such that the incisor teeth become set at an angle beside each other.

Action: reduce the height of the molars until they are all even and short, clip and rasp the incisors straight and to a length where they still occlude. If 12b (left) has occurred, the incisors must be reduced to gum level top and bottom and all vegetables cut to small cubes. At this size the animal will be able to pick up the food with the gums and can still grind the vegetables with the molars. Bearing in mind it will be impossible for him to pick up flat objects, it is a good idea to oven bake cubes of bread, at a similar size to the vegetables, to encourage mastication. Alternatively, puppy sized dog rusk can be included in the diet, or a mixture of potato and grass pellets mixed together with hot water can be made into a firm paste, tolled out onto a lightly floured board, cut into cubes and then oven baked.

Diagrams 13 and 13a

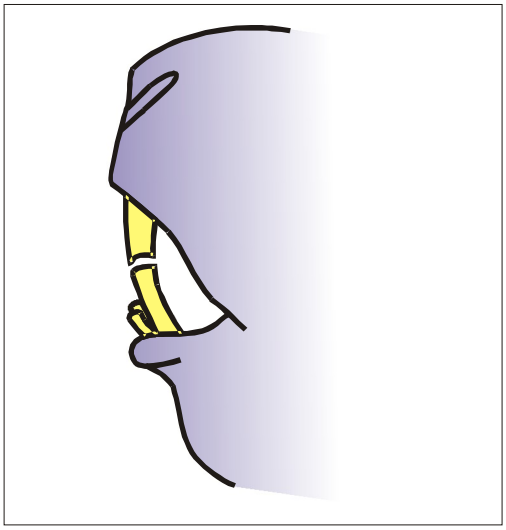


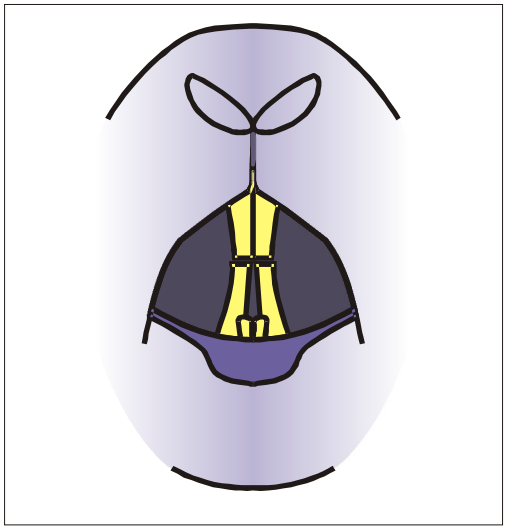


This is reverse occlusion. The inferior incisors overlap on the outside of the superior incisors due to an overshot mandible. With this problem, any attempt to pick up or bite off a piece of food will become impossible. The lower teeth will in effect push the food away from the mouth. The required course of action will depend on how much time the owner or clinician can spend helping the patient. The options are:

1. Clip both upper and lower incisors off level with the gum and dice the patient's food up into small squares.
2. Clip both sets to obtain the result show in diagrams 11 and 11a.
3. Clip off any excessive curve on the superior incisors but still leave a small length of overlap. Drill or file a proper ridge (as in diagram 10) on the inner surface of the upper incisors – this reduces the thickness making it possible to apply careful digital pressure on the inferior incisors and using a sideways movement force them behind the superior incisors. This will in effect lock the teeth together in the correct occlusion and the pressure which will now occur at the roots should correct the defect, providing that this alignment is maintained for 2-3 weeks. During this time the patient must be syringe fed at an angle via the diastema. To ensure that this position is maintained for the required period, it is necessary to either drill or file a notch and use orthodontic wire to hold the teeth together. This procedure can be carried out without a general anaesthetic. Lignocaine can be injected into the gums using a 23G needle.

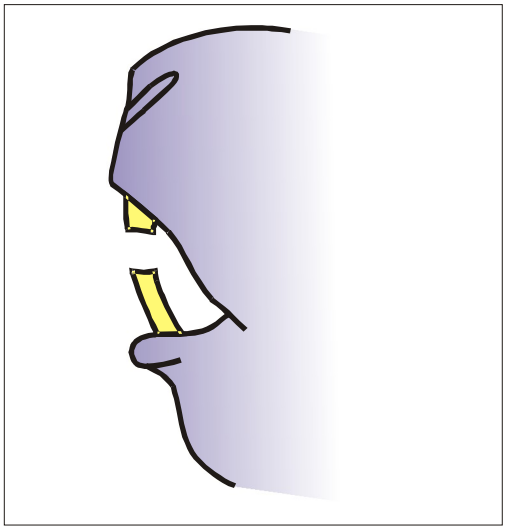
Diagrams 14 and 14a

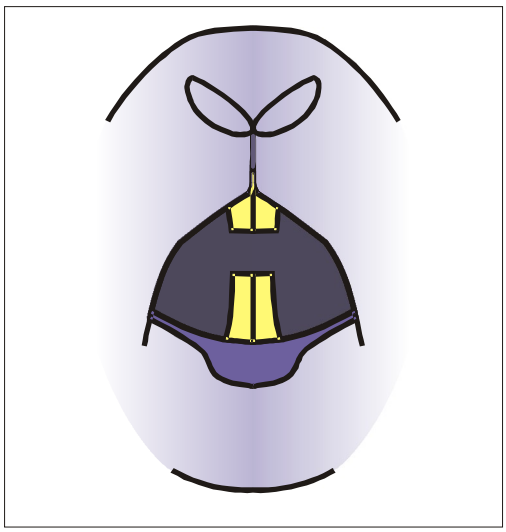




This shows an additional pair of inferior incisors which had remained dormant in the gums until the animal matured. These rogue teeth have displaced the roots of the true teeth causing them to spread apart and begin to cross over. It was necessary to remove the rogue pair, drill a groove on the outer edge of both true teeth and pull the roots back together with the use of orthodontic wire. The hole left after extraction must be packed with antibiotic (flush out and fill the cavity with terramycin intramammary fluid initially and then back fill with terramycin powder). A slight turn needs to be made on the wire every other day to complete the correction.

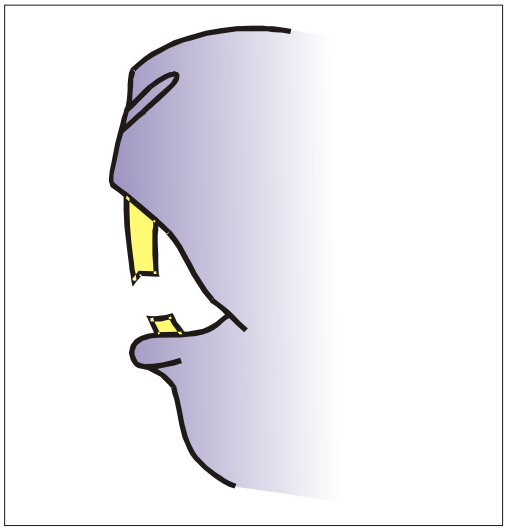
Diagrams 15, 15a and 16, 16a

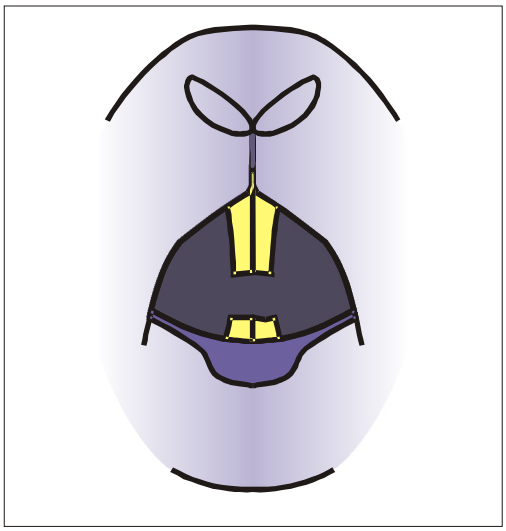




Shows what happens when the animal has sustained an injury resulting in either both the lower or upper incisors being broken off. Failure to reduce the remaining opposing teeth will result in the unbroken teeth continuing to grow unchecked. They will thus exceed their normal length before the injured teeth grow back to their normal position. This will cause either the superior incisors to remain too short (resulting in a misalignment of the rear molars) or unnatural pressure on the superior incisors at the growing stage where they curve slightly. This will resulting the teeth curving into the mouth and producing a reverse occlusion as per diagrams 13 and 13a.

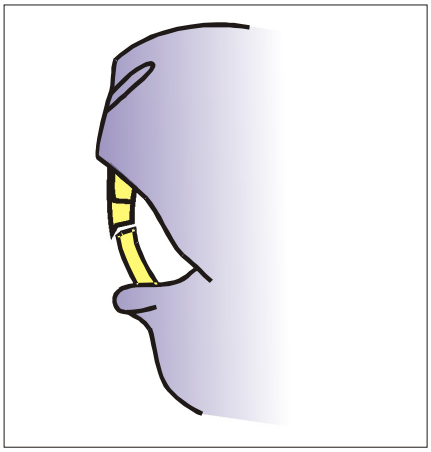
(Diagrams 16 and 16a)

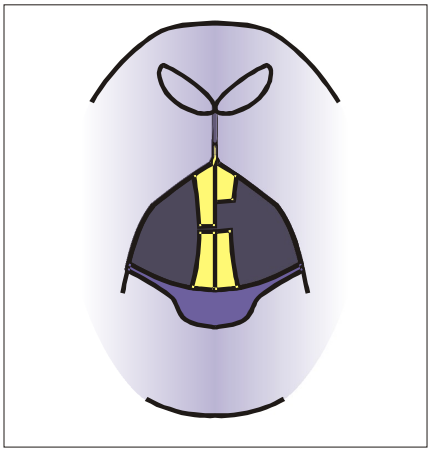


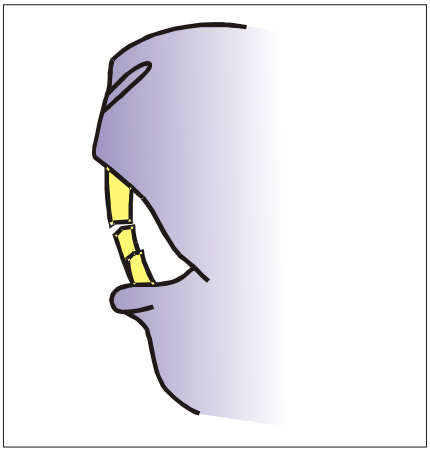


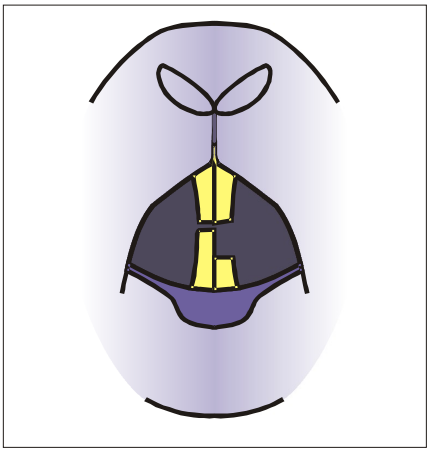
The correct course of action is to clip the remaining undamaged teeth left on the opposing arcade to a length equal to the damaged ones. No further dental correction should now be necessary, but please remember to instruct the client on how to either syringe feed and/or cube vegetables.

Diagrams 17, 17a and 18, 18a









These diagrams show a broken superior and inferior incisor respectively. In either case, no further action would be required as the single unbroken tooth will successfully wear and be worn by the two opposing teeth. This will remain the case until the broken tooth regains its correct length when normal occlusion will be resumed.

Directory:

Bone Rongeurs are available from:

Timesco of London
Timesco House,
1 Knights Road,
London E16 2AT.

Telephone: +44 (0) 20 7511 1234
Facsimile: +44 (0) 20 7511 7888
Email: info@timesco.com
Web: www.timesco.com

They come in three sizes:

- **Daniel** are the smallest, best for accessing the rear of the mouth to trim the molar teeth
- **Cairn** are the next size up and can be used for trimming pre-molars and small amounts off incisor teeth.
- **Glasgow** are the largest of the 3 sizes suitable for rodents, and are the best for trimming incisors.

These bone rongeurs are expensive and you can choose to only purchase two pairs; Daniel and Glasgow are the best in this case.

The buccal pad separators which are used to hold the mouth open and the cheek flesh apart, are available from the CCT, as are dental rasps.