CORRECTION OF BEAK MALFORMATIONS IN JUVENILE PSITTACINE BIRDS

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SUMMARY

Beak malformations in juvenile psittacines, both lateral deviations of the maxillary beak and maxillary bradygnathism, occur frequently in juvenile psittacines. These malformations may be associated with feeding techniques, malnutrition, trauma or genetics. Early cases can be usually be corrected by a combination of trimming and physical therapy. After the beak becomes calcified correction can be accomplished by application of an acrylic device.

INTRODUCTION

Rhamphorthotics, or correction of developmental abnormalities of the beak of juvenile psittacines has been well described by Clipsham and others. 1 2,3 Techniques are described for correction of "Scissors beak" or lateral deviation of the premaxilla or maxillary beak and for bradygnathism of the maxillary beak. A simplified, and more practical technique will be described here utilizing many of the same materials. More invasive techniques has also been described utilizing a pin placed through the frontal bone and rubber bands to pull the beak into alignment. 4

Developmental abnormalities of the beak are frequently seen in hand fed psittacines. They may result from improper handling or feeding techniques and malnutrition may increase the incidence. 5,6 Their occurrence however often cannot always be explained.

LATERAL DEVIATIONS OF THE MAXILLARY BEAK

Lateral deviations of the maxillary beak may on occasion be present at the time of hatching but more frequently become apparent at 2-4 weeks of age. If detected early they can usually be corrected by physical therapy in which finger pressure is used to push the beak back into a normal position. Self correction may occur. The deviation may be to the right or the left. In the majority of cases the deviation affects only the keratin of the maxillary tip. In some cases the entire maxillary beak (*rostrum maxillaris*) is deviated. Rarely the frontal hinge and possibly the frontal bone may be affected. These deviations will result in uneven wear and overgrowth of the beak due to poor opposition of the occlusal surface of the mandibular beak and the serrated surface of the occlusal surface of the maxillary beak.

Very young chicks should be monitored closely for signs of development of lateral deviations. A number of factors may be contributory. The occlusal surface of the mandible may be uneven. A frenulum-like thickening of keratin is often present in chicks and is often off center. This area of thicker keratin will wear more slowly and cause a high point which can contribute to pushing the soft beak to one side.

Handling or beak cleaning techniques may also be contributory. Care takers often wipe the beak from the lateral commisures to the tip putting slight but repeated pressure on the soft beak. In feeding if the caretaker holds the head with finger pressure on the lateral commisures of the beak this can also be contributory to compression of the tip of the beak. This compression makes the occlusal surface more pointed and more narrow. As the beak grows and becomes calcified, the malformation becomes self perpetuating as the uneven wear of occlusal surfaces contributes to continued or even potentiated lateral deviation.

MAXILLARY BRADYGNATHISM

Maxillary bradygnathism or mandibular brachygnathism is often seen in cockatoo chicks. In small chicks the defect may be obvious from hatching or may be apparent at 2-4 weeks of age. The mandible in the cockatoo hatchling is longer than the maxilla and that the growth of both jaws occurs in spurts. 6 It is possible that the adult cockatoo aids in extension of the maxilla by hooking its beak inside that of the chick when feeding. Maxillary bradygnathism has been seen in chicks in the nest but is not known to occur in wild caught or parent raised birds (Authors observation). If left uncorrected the defect can be permanent and result in a "lazy beak" bird which holds the maxilla inside the mandible when resting but can hold normally, or a bird which cannot hold the beak normally. Both will require frequent trimming for maintenance.

CORRECTION OF BEAK MALFORMATIONS BY PHYSICAL THERAPY

Physical manipulation should always be the first option and can be successful up until the time that the beak becomes so calcified that it is not movable by finger pressure. Prior to beak therapy the beak must be trimmed with a grinding wheel (Dremel, Racine, WI) so that the occlusal surfaces of both the maxillary and mandibular beaks are normal. Repeated trimming may be necessary. In very small chicks the occlusal surface of the mandible is trimmed with cuticle nippers. For physical therapy in very young chicks, the beak is manipulated with the thumb and fore finger bending the tip of the maxilla toward the center and over correcting slightly. To be effective the therapy will be somewhat painful to the chicks. Soothing the chick following therapy will prevent fear of approach. If possible the chick should also be fed after therapy. Therapy can be once daily or more often if needed.

Mild cases of both disorders may be resolved by grinding. A conical, wood grinding tip is used. In cases of lateral deviation of the maxillary beak tip, grinding of the lateral side of the beak may resolve the problem. In very mild cases of maxillary bradygnathism, the occlusal surfaces of both the maxillary and mandibular beaks are ground. If the beak can be closed with the tip of the grinding wheel between the surfaces, both can be ground into a shape simultaneously which will allow the beak to close properly after trimming. If bleeding occurs grinding should be discontinued. The beak can be ground weekly as needed to correct mild cases.

Maxillary bradygnathism can be corrected by physical therapy in very young chicks. There is a soft, cartilaginous flange present on the lateral occlusal surfaces of the maxillary beak in hatchling cockatoos. As they become older, this flange may pull the tip of the maxilla inward. This flange can be trimmed with cuticle scissors and should be trimmed in any abnormal chick. Perhaps it would be worn off by the parents in chicks in the nest. After trimming the flange, pull the tip of the maxilla over the front of the mandible and hold for a short time in place. If it will not easily extend over the mandible the tip should be gently pulled forward taking care not to crease the cranial aspect of the maxilla. In cockatoo chicks the mandible is also often compressed laterally causing it to become pointed and elongated. This contributes to the early disparity in length of the beaks and may aggravate mild cases of bradygnathism. If compressed the mandible should be ground with a grinding wheel and the cranial aspect widened by pressing the thumb inside the mandible and spreading it laterally.

CORRECTION OF BEAK DEFORMITIES BY ACRYLIC DEVICE.

Simplified and practical techniques of correction of beak malformations provide correction at reduced cost. For best results the repair should be initiated shortly after calcification of the beak makes it non-pliable. If corrected prior to placement of the bird into a cage, the rate of failure is very low and the time required for correction is short.

The bird should be fasted sufficiently to empty the crop of formula, or the procedure should be done prior to the morning feeding. Alternatively the bird can be given a small feeding early in the morning prior to surgery. The bird should be anesthetized with isoflourane or other suitable anesthetic. Application of the device is impossible in an unanesthetized bird as it will bite the acrylic prior to hardening. Endotracheal or abdominal air sac intubation is necessary

Clipsham described a successful technique but it is difficult, time consuming and requires many steps for completion. It is possible that this technique or a modification thereof may be needed in very severe cases. The Visible light curing acrylic is designed for dental use and produces no heat upon curing. (Sunschein restorative, Henry Schein Inc, Port Washington, NY 11050). The acrylic is hardened by application of an intense source of ultra-violet light. The acrylic hardens within 10 seconds to a minute depending on the thickness of the acrylic. For a more durable application the acrylic can be applied in small sections or layers and hardened between applications. Eye protection in the form of a shield or glasses must be utilized to prevent retinal damage. Handling acrylic with gloved or moistened hands helps to prevent sticking of acrylic to the hands. Cooling the acrylic may reduce handling difficulties.

Clipsham's technique of preparation of the beak for application of acrylic includes scoring of the keratin and roughing of the surface. In this simplified technique, a stainless steel intramedullary pin or an appropriately sized hypodermic needle can be placed through the beak to anchor the acrylic and scoring or roughening is not necessary. The pin is driven through the mandibular beak from the cranial surface to the lateral wall on the side to which the maxilla deviates. The pin is placed approximately 1-3 mm below the occlusal surface. An acrylic ramp is then constructed to redirect the maxilla through an inclined plane. In most macaws a ramp of 6-10 mm is sufficient in height. It is not necessary to extend this ramp very high as the force of the maxilla sliding toward center can be achieved with a gently sloping incline. The acrylic ramp must however be extended far enough laterally to the side to which the beak deviates so that the tip of the maxilla cannot be placed lateral to the acrylic as this will aggravate the problem. The steeper the ramp, the move rapidly the beak will correct. Over correction may occur. If the device cannot be monitored closely, or as a routine measure to prevent over correction another usually smaller ramp can be placed on the contra-lateral side. The lowest point between the two ramps should be off center in the direction needed for correction. After construction of the ramp it can be smoothed and the shape and slope refined with the grinding wheel.

The technique described here usually results in correction in 1-3 weeks. Some may require longer and rarely a device may be lost and require replacement. Rate of loss of the device is low in young macaws (6-8 weeks) Failure rate is increased as birds approach weaning. Putting birds into cages with the device in place should be avoided to prevent fracture of the device when biting the wire or bars.

Anesthesia is not required for removal. Grind a line along the occlusal surface and ventrally along the midline through the acrylic. The device can then be easily removed by hand and the pin removed. Covering or sealing the hole is not necessary. After removal, smooth the occlusal surface of the mandibular beak with the grinding

wheel. Occasionally the beak may fracture to the hole. As the hole is close to the occlusal surface it can often be ground down to a smooth surface initially or within a few weeks.

A similar technique is used for correction of mandibular prognathism. An artificial extension of the maxillary beak over the mandibular beak directs the growth of the beak in a proper direction and also prevents contraction of the ligaments of the nasofrontal hinge.

Place the bird under isoflurane anesthesia administered by endotracheal-tracheal intubation or air-sac cannulation. Grind the beak to as close to normal as possible with a grinding wheel. In Clipshams technique 1 or more grooves are cut or ground in the keratin of the maxillary beak and the external keratin is roughened. In this technique a stainless steel intramedullary pin or appropriately sized hypodermic needle is placed through the tip of the maxillary beak from one side to the other which serves to anchor the acrylic. The acrylic is then applied in layers extending over approximately half of the three outer surfaces of the beak, incorporating the pin. Alternatively the acrylics can be rolled into a cone and pushed up onto all three external surfaces of the maxillary beak. Do not apply to the occlusal surface as it will be easily fractured. The acrylic may be light cured in sections or as a unit.

The acrylic tip is extended downward approximately 10-15mm depending on the size of the bird and turned rostrally at approximately a 60 to 80 degree. A long extension on the device is not necessary if the acrylic is formed so that the tip is curved cranially and directed far enough away so that is impossible for the bird to put it inside the mandible. The tip can be widened adding stability and making it more difficult to place inside.

The shape of the occlusal surface should match that of the mandible to prevent lateral deviation. In chicks which also have a lateral deviation or start to develop one secondarily, a device like the one used for correction of lateral deviations can be applied to the center of the mandible to prevent deviation to one side or the other. The appliance must be of uniform thickness with sufficient thickness to prevent fracture but not to add excess weight. The surfaces should be smooth and the edges confluent with the beak to prevent food retention. Smooth rough spots with a grinding wheel. It should be impossible or difficult to place the appliance tip into the mandibular beak while the bird is under anesthesia.

These simple techniques for correction of developmental abnormalities should make correction rapid and economical allowing resolution of the problem early enough to increase the chance of success and avoid interference with weaning.

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