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Trans-sinus Pinning to Correct Lateral Deviation of the Maxilla in Juvenile Macaws

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Introduction

Wry or scissor beak is a beak abnormality where the maxillary beak is deviated laterally from the level of the cere or beak tip. The side of the mandibular tomia is no longer in wear and overgrows while the contralateral maxilla tomia also overgrows. This condition is most common in macaws up to two months of age, but acquired scissor beak can occur in any species at any age. (Doneley, 2016)

Conservative treatment may be effective in very young chicks. Applying gentle digital pressure for ten minutes two to three times daily may straighten a deviated maxilla. Cases that do not respond to this treatment, or older birds with calcified beaks, will need more aggressive therapy.

Mild cases may respond to regular beak trimming, involving grinding the overgrown gnathotheca on the side contralateral to the maxillary deviation and the overgrown tomia on the maxilla, allowing the maxilla to move back into a normal position. At the same time the occlusal ledge inside the maxilla has to be reshaped so that it is perpendicular to the lateral walls of the rhinotheca. The bird should then be encouraged to chew hard objects (e.g. branches) frequently and the beak reshaped every two weeks until normal.

Acrylic ramps or prostheses have been used to augment the trimming described above. An acrylic ramp is built up on the gnathotheca on the same side as the maxillary deviation, forcing the maxilla into a normal position. The ramp needs to be high enough so that the bird cannot open its mouth wide enough to get its maxilla over the top of the ramp. This technique frequently fails due to damage to the gnathotheca during the attachment of the ramp, and to the difficulty in maintaining the bond between the beak and the ramp. The use of dental epoxy following etching is improving the latter.

Trans-sinus pinning is an 'orthodontic' procedure, designed to provide constant lateral tension on the deviated maxilla to guide it into a more anatomically normal position. It offers a somewhat simpler, and often more effective, treatment for this condition.

Case reports

Between 2013 and 2016 a total of 49 macaw chicks (aged 8-16 weeks) were presented to the UQ Veterinary Medical Centre for health checks. These chicks represented the production of two major breeders, as well as a few smaller breeders. Of these 49 chicks, 12 (24.5%) were presented for correction of scissor beak. The average age of these chicks was 9.9 weeks. (One chick was 7 months old at the time of presentation, and is excluded from this calculation of average age.) The beak was turned to the left in 6 cases and to the right in the remaining 6 chicks. Each of these chicks was anaesthetised and treated with trans-sinus pinning.

In each chick an appropriate-sized K-wire (usually 0.045in; 1.1mm) was placed through the frontal sinuses perpendicular to the skull, just caudal to the craniofacial hinge joint on a line between the lateral canthus of the eye and the cere (see Figure 1). The pin should be of a size that maintains tension on the beak: too thin, and it will bend to the shape of the beak; too thick and it makes the device heavy and uncomfortable. Care was taken not to position this pin too caudally or too low. (In macaws, a small bony protuberance marks the point where the pin is introduced on one side and exits on the other.) On the side of beak contralateral to the direction of the deviation, the pin was bent 90° as it left the skin and was cut so that it was 1-2cm longer than the maxilla.

The end (level with the beak tip) was then folded laterally back on itself twice to form a hook. A rubber stopper (the lid from a vacutainer) was placed over the other end of the pin and flush with the skin so the pin could not be pulled through the skull (Figure 2). This end of the pin is then bent to an angle of 90° to prevent it pulling through. The tip of the beak was then placed under tension by means of a rubber band around the beak and the distal end of the wire. Various means of securing the rubber band to the beak tip were experimented with (e.g. adhesive tape, dental acrylic), but no uniformly successful technique has been developed to date. The tension on the beak tip was adjusted by loosening or tightening the wire/rubber band as required. (Figure 3)

The tension was maintained until the beak had straightened. Table 1 shows the time taken to straighten the beak. The younger birds respond, on average, in 13 days; the older chicks required a further seven days to straighten. The beak of the seven month old chick took eight months to straighten, largely due to non-compliance on the part of the owner. The pins were removed when the beak was assessed as being in normal alignment, and no recurrence was noted in any chick. No post-implant infections were noted, but in some chicks it proved difficult to maintain the tension as these chicks attempt to dislodge the rubber band with their tongue or foot, or by wiping their beak on the side of their enclosure. Vigilance on the part of the owner and replacement of the band when dislodged is therefore required.

Discussion

The beak is composed of the upper beak (maxilla) and the lower beak (mandible). Each beak consists of a skeletal frame covered in dermis, and then a layer of keratin. The maxilla adjoins the frontal bone via a kinetic joint (the craniofacial hinge joint).

The keratin covering the upper beak is known as the rhinotheca; that covering the lower beak is the gnathotheca. This keratin is produced by the dermis of the beak with varying contributions from the cere. A thin layer of 'covering-type' keratin is located on the lateral surfaces of the upper and lower beak. Harder 'pressure-bearing' keratin is found on the under-surface and the point of the rhinotheca, and at the shearing edges of the gnathotheca (tomia). Keratin normally migrates rostrally along the surface of the beak and laterally from the vascular bed in the cere. (Speer, 2012)

There is much speculation to the aetiology of scissor beak. Theories include parental nutrition and/or genetics; malposition within the egg; incubation difficulties; and trauma during hand-feeding. There is a variant of the disorder seen in non-macaw parrots where the frontal bone on one side appears to have collapsed, twisting the beak to one side. This structural change does not appear to the case in the classical presentation seen in macaws. Rather, it appears to be a differential growth rate between opposite sides of the keratin and/or maxillary bone, the cause of which has not been determined.

Acrylic ramps and prostheses were proposed as a treatment for this condition but it is the author's experience that they are difficult to maintain and may cause damage to the mandible to which they are attached. Trans-sinus pinning offers an alternative, simpler solution. The procedure can be performed on an outpatient basis and straightening of the beak takes 2-3 weeks. Post-implant complications are uncommon, but vigilance on the part of the owner (in maintaining the tension by the device) is required.

References

Doneley B (2016) Disorders of the beak and cere. In Avian medicine and surgery in practice (2nd Ed) CRC Press, Taylor and Francis Group, UK pp 187-188

Speer BS (2012) Surgical Procedures of the Psittacine Skull. Proceedings Annual Conference, Association of Avian Veterinarians, Louisville. Session #1335. Pp. 181-191.
Accessed on line, 9/6/16
http://www.vin.com/members/cms/project/defaultadv1.aspx?id=6347756&pid=11360&

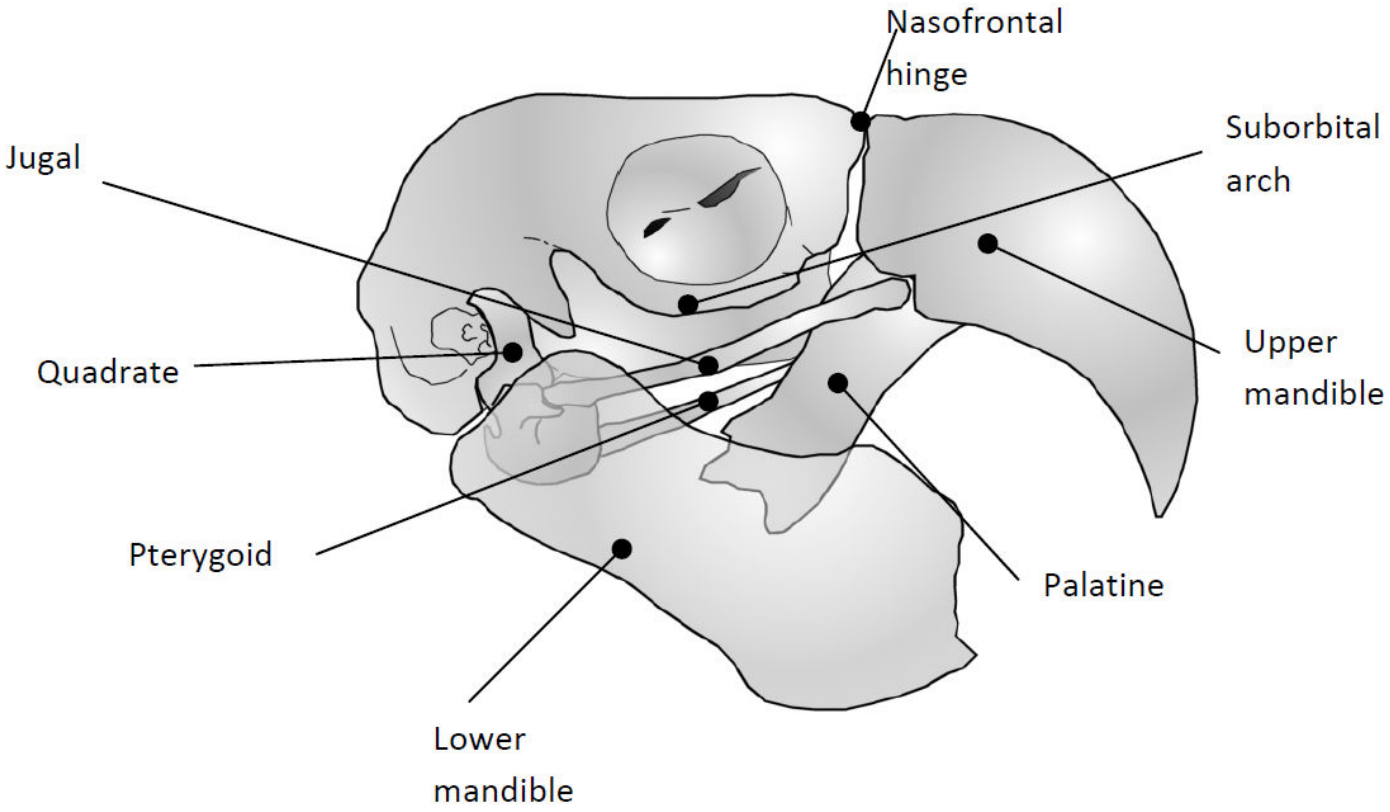

Figure 1. Lateral view of a macaw skull. X marks the point of insertion of the trans-sinus pin. (Adapted from Speer, 2012)

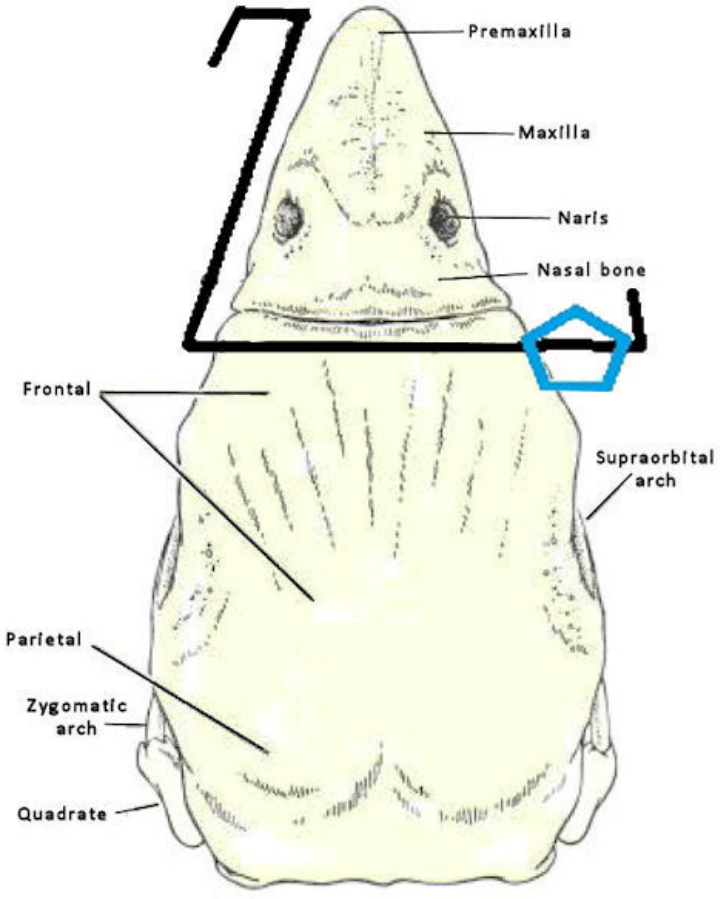

Figure 2. Dorsoventral view of a macaw skull showing the placement of a trans-sinus pin for right deviation (Adapted from Speer, 2012)

Figure 3. Completed Trans-sinus pin device.

	Species (Macaw)	Age (weeks)	Duration of treatment (days)
1	Blue and Gold	16	19
2	Blue and Gold	10	14
3	Scarlet	11	14
4	Blue and Gold	12	14
5	Scarlet	8	14
6	Blue and Gold	14	13
7	Blue and Gold	8	12
8	Blue and Gold	9	13
9	Blue and Gold	9	13
10	Greenwing	12	21
11	Blue and Gold	12	25
12	Greenwing	28	210

Table 1. Length of treatment for trans-sinus pinning