

## Prevalence of surgical affections with their clinical management in crocodiles (*Crocodylus porosus*) in Bangladesh

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### Abstract

This study was conducted in the saltwater crocodile (*Crocodylus porosus*) for the occurrence of various surgical affections with their clinical management. During the period of January 2006 to June 2008, a total of 68 adult crocodiles were considered as reference population from the Reptiles Farm Ltd. at Bhaluka, Mymensingh. The occurrence of surgical affections of adult female (88.9%) was significantly ( $P < 0.01$ ) higher than male (11.1%). Prevalence of common surgical affections were wound: 72.2%, fibroma: 11.1% abscess: 5.6%, fracture: 5.6%, tail necrosis: 2.8%, myiasis: 2.8%. Wound was the highest among the affections. Among the identified wounds, biting wound was higher. In summer (57.7%) the occurrence of wound was higher compared to other seasons. In winter season (7.7%) the occurrence of abscess, myiasis, fibroma were higher compared to other seasons. Wounds and fibroma are the major surgical affections in salt water crocodile. The most common site of surgical affection was recorded in crocodile's tail (30.6%). It was suggested that minimal stress, allowing constant and easy access to water, removal of roots of the tree in the basking land of crocodiles pen, basking land of the pen is better filling up by sand, clinical surgical managements are essential for better health and production.

**Key words** : Saltwater crocodile (*Crocodylus porosus*), Surgical affections, Clinical management

### INTRODUCTION

Crocodiles are quite fascinating animals and the more that people know about them, the better they can understand them. Farming of crocodiles is a relatively new form of "wildlife entrepreneur development in Bangladesh". It involves captive breeding and the raising of juveniles for the production of both skins and flesh. Hopefully, this appreciation will lead to rational decisions being made about their long-term conservation

and management. The majorities of saltwater crocodiles are found throughout Africa and Asia especially in India and adjacent countries (Ortega and Romero, 2006). Three crocodile species naturally inhabitant in Bangladesh. The marsh crocodile has disappeared from the Sundarban a decade ago, but the last three or four live in a pond near Bagerhat not far from the Sundarban (Messel and Floris, 2002). Crocodiles are prone to injuries through intraspecies aggression in the wild and in captive and farming system. In juvenile farmed Nile crocodiles, aggression was related to body size, stocking density and food preference, and directed mainly by

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larger towards smaller individuals (Van der Merwe and Kotze, 1993). Sexually mature crocodiles may fight for territory, the possession of a female or over a nesting site. Injuries sustained may be series of skin punctures, raking wounds across an area of the skin, deep gashes, amputation of toes, of part of the tail and even whole limbs. Part of the upper or lower jaw may be broken or severed and deep penetrating bite wounds may injure the internal organs, leading to further complication, e.g. intestinal occlusion or peritonitis (Schoeb, 1999). So a comprehensive study of their surgical affections is important. Therefore, the present study was carried out to find out the occurrences and the nature of surgical affections with various factors in the farm and animal level and to establish proper surgical procedure in crocodile.

## MATERIALS AND METHODS

### Reference and target population

The study was conducted on all crocodiles of the Reptiles Farm Ltd. at Bhaluka, Mymensingh during the period from January 2006 to June 2008. The farm contained 209 crocodiles. Among them, 68 were adult and 141 were young. There were no surgical affections found in the young. So, finally the adult crocodiles were used as reference population.

### Clinical management of various surgical affections in crocodiles

#### Restraining

The sick crocodile was identified on the basis of their locomotion, feeding behaviour and hydrophobia. Then the sick one was driven on a suitable land on which we could examine and treat the reptile with ease. A snare of rope was passed along its jaw and passed down the throat with a knot was tightened and held strongly restricting the movement of the crocodile. Care had been taken to minimize stress on the crocodile while capturing.

#### Removal of fibroma

A tourniquet applied above the affected part. The stalk is hold by curved artery forceps and anchoring it with chromic catgut. A circumferential incision was made at the base of mass and excised it. Simple interrupted suture was used to close the skin. A gauze dressing covered by elastic adhesive tape was applied over the affected region, leaving the digits exposed.

#### Evacuation of abscess

After removal of the crust from the upper part of the abscess, the area was properly explored by the thumb forceps to make the opening of the abscess bigger, in order to remove the sero-fibrinous clear fluid. The abscess was thoroughly cleaned by the gauge soaked into povidone iodine.



Fig. 1. Antiseptic dressing of crocodile after restraining.



Fig. 2. Surgical operation for removal of fibroma in a restrained crocodile.



Fig. 3. Immobilization of a fractured fore-limb in a crocodile after restraining.

### Immobilization of fractured limb

The correction of the fracture was done by immobilization, bandaging with gauze and thick leucoplast after using bamboo splint. The position of the fragments was determined by palpation and the reduction was achieved by direct pressure. Sufficient padding (cotton) was used to prevent further damage to soft tissue, nerve

Table 1. Frequency of surgical affections in adult male and female crocodile (n=68)

Sex	Frequency
Male	11.1
Female	88.9*

\* $P < 0.01$

Table 2. Surgical affections found in crocodiles (n=36)

Name of affection	No. and occurrence rate of crocodile affected	Sex (%)	
		Male	Female
Wound	26 (72.2)	11.5	88.5*
Fibroma	4 (11.1)	0	100
Abscess	2 (5.6)	50	50
Fracture	2 (5.6)	0	100
Tail necrosis	1 (2.8)	0	100
Myiasis	1 (2.8)	0	100

\* $P < 0.01$

Table 3. Effects of seasons on surgical affections (%) of crocodiles at the farm

Season	Wound	Fibroma	Abscess	Fracture	Tail necrosis	Myiasis
Summer	57.7*	25	0	50	0	0
Rainy	34.6	0	0	50	100	0
Winter	7.7**	75	100	0	0	100

\* $P < 0.05$ , \*\* $P < 0.01$



Fig. 4. Amputation of tail in a crocodile.

and circulatory system. All bony prominences were well padded. The bamboo splint fit reasonably well with the configuration of the limb.

### Removal of gangrenous part of tail

A 'U' shaped incision made on each side of the tail and then incising the tissue until observing bone. The coccygeal joint then be disarticulated and excised the gangrenous part of the tail. Close the open part by gauze with roller bandage. Antibiotic powder applied before closing the open part.

### Post operative care

After the operation, the animal was housed for 4 weeks in a clean, dry enclosure on sand. The affected region was wash with 4% copper sulphate. Oxy-tetracycline LA (Renamycin LA<sup>®</sup>, Renata, Bangladesh) was injected as antibiotic every 3 days interval on the neck region for three times.

### Statistical analysis

Overall incidence rate of the most common surgical

**Table 4.** Frequency of different types of wounds (n=26)

Type of wound	Frequency (%)
Biting wound	17 (65.4)
Punctured wound	7 (26.9)
Lacerated wound	2 (7.7)

**Table 5.** Frequency of surgical affections in different parts of crocodile body (n=36)

Site of affections	Frequency (%)
Tail	11 (30.6)
Fore limb	8 (22.2)
Hind limb	7 (19.4)
Flank region	6 (16.7)
Neck	4 (11.1)

affections were calculated by the following formula:

$$\text{Overall occurrence rate} = \frac{\text{Total individual affections}}{\text{Total surgical affections}} \times 100$$

A chisquare test was performed to find out the significance of the occurrence of the surgical affections.

## RESULTS AND DISCUSSION

There was a significant difference between the occurrences of the affections in male and female which is presented in Table 1.

The overall incidence rate of most common surgical affections is presented in Table 2. The occurrence of wound was lower (11.5%) in male and significantly ( $P < 0.01$ ) higher (88.5%) in female. The high incidence of wound in adult female crocodile may be related to the territory, perform breeding activity with male among them and during feeding of the crocodile. Saltwater crocodiles seem to be territorial, to judge from the behavior of animals in crocodile's farms, priority being established on a size basis: this behavior is apparent all the year round, but intensifies during the breeding season (Steel, 1989).

The occurrences of surgical affections in crocodiles in various seasons are presented in Table 3. The occurrence of wound was significantly ( $P < 0.05$ ) highest in summer season and significantly ( $P < 0.01$ ) lower in winter season. The occurrence of wound was found high in

the summer season followed by rainy season because crocodiles start to perform their breeding activity from summer to rainy season. The incidence of wound was very much lower during winter season because the crocodiles are very much quite and calm in this time. Feeding is totally off in this period particularly December to February because metabolism is very much slower in this period. This may be compared to the hibernation period in other reptiles e.g. snakes. The occurrence of fibroma was found highest in the winter season followed by summer season. While crocodiles walk out of the water, they always slide back into the water. This sliding on rough concrete may cause abrasions which become infected by fungi, causing granulomatous swelling (Ensley et al, 1979).

Frequency of different types of wounds and surgical affections in different parts of crocodile body are shown in the Table 4 and Table 5, respectively. In this study, biting wound was occurred mainly during acquiring of feed or for territory and uneven bank of the pond. Punctured wound was caused by sharp pointed object particularly root of the tree inside the crocodile pen. Fracture might be associated with the fighting among the crocodile and this type of incidence was found particularly in the multiple colonies.

It is suggested that the crocodile needs to be restrained properly for the easy and safety of the clinician, but any kind of drug administration and surgery has to be done promptly to minimize stress. Most of the wounds on the body are from intra-specific aggression and the wounds on the soles of the feet are due to lack of access to water. The basking land of the crocodile pen is well filled by sand, which minimizes the chance of punctured wound and other wounds.

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