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# Surveillance and examination of dental problems in captive sloth bears

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### Abstract

Sloth Bear is classified as vulnerable species in the International Union for Conservation of Nature (IUCN) red list data of threatened species under vulnerable animal in 1990 and is a protected wild animal, under the Schedule I of Indian Wildlife Protection Act, 1972 (IWPA,1972). Sloth bears (*Melursus ursinus*) are omnivorous in general. This retrospective study period (from 2006 to 2015) was carried out to survey the dental problems and management measures adopted, in rescued sloth bears in rescued sloth bear from Agra Bear Rescue Facility, Agra, Uttar Pradesh. Out of 224 rescued sloth bears, 11 sloth bears were noticed with dental problems during the study period and the common dental problems of sloth bears were found to be broken canine and incisor, broken canine and incisor with peri-apical abscess, and over-grown gums/tissue lesions. During examinations of oral cavities of bears under study, some of the animals had infected root canals, peri-apical abscesses, and overgrown gums tissues with evidence of infections. From this area, swabs were obtained and subjected to bacterial culture. The bacterial culture revealed Beta hemolytic Streptococci and Anaerobic Bacteroides, Coagulase positive *Staphylococci*, *Pseudomonas* species, beta-hemolytic *Streptococci*, *Pseudomonas profuse*, *Klebsiella*, etc. Antibiotic sensitivity tests using 40 antibiotics were used in this study and management-related measures concerning the dental problems encountered and studied in the rescued Sloth bears were revealed in this study.

**Keywords:** Dental lesions, peri-apical abscess, sloth bears, teeth

### 1. Introduction

Sloth Bear is classified as vulnerable species in the International Union for Conservation of Nature (IUCN) red list data of threatened species under vulnerable animal in 1990 and protected under Schedule I of the Indian Wildlife Protection Act, 1972 (IWPA,1972). Sloth bears (*Melursus ursinus*) are omnivorous in general, specifically, it is frugivorous, myrmecophagy (feeding on ants and termites) and fond of honey [7, 13, 17]. Their food is rich in natural flavonoids, acids, protein, and low in fat. The oral flora of the animal can be influenced by the microbiome of the ingested prey and other food.

For more than 400 years, these bears are used for the entertainment of people by a community of Kalandar gypsies. Because of improper care, unconventional feeding of the animal leads to metabolic insult thus resulting in severe stress, low level of immunity to the animal, and make them more prone to a variety of infectious and non-infectious diseases. Agra Bear Rescue Facility is a unique facility for rescued dancing sloth bears managed by an NGO Wildlife SOS in India which rescued above more than 500 dancing Sloth bears (*Melursus ursinus*) throughout India and is located at (27° 0'N;77° 45'E) Agra, Uttar Pradesh.

Hence, for better understanding and to evaluate and necessary treatment, a study was undertaken in rescued dancing sloth bear in Agra Bear Rescue Facility and the objectives of this study were furnished below;

1. Retrospective surveillance of the dental problems in rescued sloth bears in Agra Bear Rescue Facility.
2. Screening of bacterial infections during the occurrence of tooth problems and conducting antibiotic sensitivity tests.
3. To suggest management related measures

## 1.2 Review of Literature

### 1.2.1 Dental problem in bears

Wallach and Boever quoted that tooth injuries were common among the ursids and cracks or break off a tooth always necessitated the repair or extraction because of the occurrences of abscessation or periodontitis and repair of the ursid canine teeth with an exposed pulp cavity might be accomplished by standard root canal techniques that were used for canids [22]. Fowler (1986) quoted that bears are omnivores and consume any food material available [5]. Bears have the dental formula as Ursidae I 3/3, C 1/1, P 4/4, M 2/3 = 42. Dental carries were most prevalent and the associated predisposing factors were found to be a fracture, malpositioned teeth that create areas of impaction, and improper diet, particularly the carbohydrates. Wenker *et al.* did the retrospective study of dental conditions of captive brown bears with radiographic techniques and compared them with free-ranging Alaskan grizzlies [23]. Radiographic evaluation of per alveolar osteolytic process revealed the greater frequency of dental problems in zoo bears 10 years old. Stereotypical behavior like cage chewing is a suspected cause of canine tooth and secondary alveolar lesions. The bear with the dental problem will always like to prefer a liquid diet like milk, a watery portion of the porridge, and just suck the juice from the fruits after crushing it. The bear is always in an aggressive mood due to the pain from the affected tooth. The bears always try to be away from the fellow bear and not showing any interest in the enrichment items. The painful dental conditions can considerably influence social behavior and breeding success in zoo animals. Lisa Milella conducted the study on 'Dental disease in rescued dancing sloth bear' and did necessary treatment such as tooth extraction, root canal treatment, excision of overgrown gum tissue etc [14]. When the canines teeth first erupt, many gypsies deliberately smash the teeth without using any kind of anesthesia to disarm the bear and make them look less aggressive for tourists and also not to get any bite from the bear. It is not known at what age their teeth had been fractured, but mostly all four canines and most incisors were fractured and had necrotic pulps. The sloth bear was fed a combination of soft dietary ingredients that are taken in by a sucking action. The traumatic condition caused by the Kalandars by brutally breaking the teeth with iron chisels or stones to avoid biting while make them perform is the main reason for the oro-dentic disorder in captive sloth bears. Stromquist *et al.*, reported that dental and pre-dental health in free-ranging Swedish brown bears (*Ursus arctos*). In oral cavity examination, the bears have a low prevalence of calculus and periodontal disease and they don't have any caries infection [19].

Fleming and Burn revealed that the captive bears were prone to developing dental pathology due to various reasons, including longevity in captivity, inappropriate diet, trauma, and stereotypical bar-biting. If not detected, this could lead to pain and suffering, with negative welfare-related consequences [4]. Behavioral indices measured included general activity, social behaviors, stereotypic activities, eating-related behaviors, and oro-facial behaviors which were hypothesized to be associated with dental pain.

### 1.2.2 Dental problems in other wild animals

Valkenburgh stated that the number and position of teeth broken in large carnivores such as African lion, leopard, jaguar, cheetah, puma, spotted hyena, striped hyena, wolf,

and African wild dog [21]. Clauss *et al.*, carried out the study on "Tooth wear in captive giraffes (*Giraffa camelopardalis*)" and during the study, it was revealed that captive giraffe (*Giraffa camelopardalis*) mostly did not attain the remarkable longevity in captive conditions and frequently had problems associated with low energy intake and fat storage mobilization [2]. Abnormal tooth wear was found as one of the causes suggested as an underlying problem. Jurado *et al.*, stated that tooth structures were often suggested as important factors that were found to be limiting the life span of free-ranging wildlife [12]. Given the frequent occurrence of poor dental health in captive animals reported, one could generally expect tooth health to be the limiting factor in captivity as well. Additionally, it could be assumed that brachydont (browsing) animals were more susceptible to dental health problems than the case with hypsodont (grazing) animals, and systematically increased tooth wear occurred in some browsing species. Jeki and Redrobe opined that poor calcification of the teeth and the bones of the skull predisposed pet rabbits to the occurrence of various types of dental diseases. To achieve the periodical oral cavity examination, there was a need for knowledge on dental problems and proper way of treatment was more important [11].

### 1.2.3 Restraining of sloth bear for clinical examination

Fowler reported that bears are immobilized with the combination of xylazine hydrochloride and ketamine at the ratio of either 1:2 or 1:1 and the dosages are 5-9 mg/kg of ketamine and 2-2.5 mg/kg of xylazine. Chemical methods of immobilization were used to complete stress-free restraining for effective clinical examination [6]. Injection Xylazine hydrochloride @ 2mg/kg body weight and ketamine hydrochloride @ 5-7 mg/kg body weight was delivered with the help of blow dart by using blowpipe on an unsuspected animal. After the sedation, the bear was shifted to Operation Theater for further clinical examinations and providing general anesthesia after intubation with a size 16-18 mm intratracheal tube based on the size of the bear. Isoflurane 2-3% with oxygen @8lits per minute flow rate was used to maintain the general anesthesia. Local infiltration anesthesia and regional nerve block were also performed with 2% lignocaine solution in order to achieve complete pain management while performing the dental procedure [16]. Fowler coated about bear restraining, that the immature small cubs can be restraint by using a handheld or controlled by nets or snares and mature bears should be handled only by using squeeze cage or by chemical restraining [6].

### 1.2.4 Oral cavity examination in bears

The sloth bear having only 40 teeth as they lack the upper-middle pair of the incisor like other bear species, the dental formula is I 2/3, C 1/1, P 4/4, M 2/3 = 40. Due to improper care and brutal method of removal of canine and incisor tooth, without the benefit of anesthesia in dancing sloth bear by the kalandar gypsies; the bears always suffered due to different kinds of oro-dentic disorders [14]. Hence, the careful examination of the oral cavity is more important to rule out the oro-dental disorders and provides a suitable treatment measure. The bear might have minor soft tissue injuries like gingivitis or even have lemon-sized gigantic forms of cementoma, partially broken canines and incisors, completely broken canines with infected root canal with or with peri-apical abscess. Sometimes, the premolar teeth also

got damaged, while they were breaking the canine. Hence, for evaluation of the dental damage, subjecting all infected teeth to dental radiographic examination is most essential to make decisions to provide suitable treatment measures such as root canal treatment or tooth extraction. The intraoral, occlusal dental films were used for taking dental radiographs with bisecting angle technique by using a dental x-ray machine. The tooth which was showing an intact root canal was selected for the RCT procedure and the tooth which was not having an intact root canal and exposed pulp cavity with a black spot on the apical region suggesting developing periapical abscess were selected for complete extraction.

### 1.2.5 Bacterial load in dental problems

Woods *et al.*, stated that salivary proteases played a role in the adherence of gram-negative bacilli to mammalian buccal epithelial cells, during the occurrence of tooth infections [24]. Isogai *et al.*, carried out an epidemiological study on periodontal diseases and some other dental disorders in dogs and found that periodontitis was prevalent among the animals, regardless of their sources and its incidence was found to be increased with age [10]. The lesions were observed to be more severe and more frequent in the premolar and molar regions than in the maxillary and mandibular incisor regions. Missing of teeth was observed at a high and increasing incidence with age and the tooth most commonly lost was the first premolar, followed by the other premolars and molars, where severe periodontitis was frequently found. Calculus was seen on many teeth, and aging aggravated its prevalence and severity. Dental caries were observed in stray animals but not to a serious degree or a significant level. Bacteria recovered from the infected bite wounds were most often reflective of the microbiome of their ingested prey and other food. The mouth was colonized by 200 to 300 bacterial species, but only a limited number of these species participate in dental decay or periodontal disease. Dental decay was due to the irreversible solubilization of tooth minerals by acid produced by certain bacteria that adhere to the tooth surface in bacterial communities known as dental plaque [15]. The new definition of a biofilm is a microbial-derived sessile community characterized by cells that are irreversibly attached to a substratum or interface (biotic, non-biotic) or each other, are embedded in a matrix of extracellular polymeric substances (EPS) that they have produced, and exhibit an altered phenotype with respect to growth rate and gene transcription. Biofilm can form on various surfaces, including biotic surfaces (e.g., teeth, mucosal membranes), medical devices, and household surfaces. In the oral cavity, teeth provide constant humidity and adherent surfaces causing the attachment of extensive deposits of microorganisms. In dogs and cats, mouth normal bacterial microflora was structured in a variety of aerobic, facultative or strictly anaerobic bacteria [25].

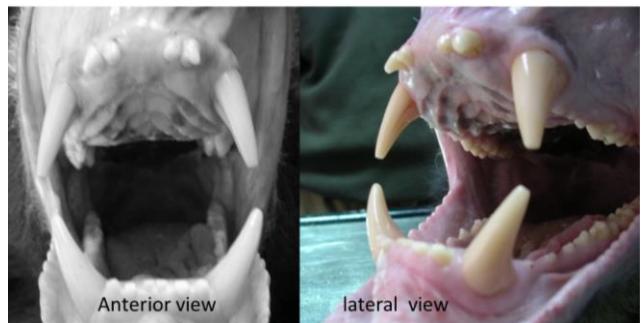
### 1.2.6 Managemental measures against dental problems in bears

Periodontal disease is the most common infectious disease in humans and animals. 75% to 80% of cats and dogs over 2 years of age exhibit signs of periodontal infection. In animals, the upper premolar teeth (generally the fourth premolar tooth) whose roots are located near the eye socket are mostly affected. These animals are generally presented

with swollen eyes and fistula. Treatment includes extraction of the tooth and flushing of the infected site with an antibacterial solution. A drain is required in severely infected cases. so extra-oral and intra-oral extraction of the involved teeth is the successful way to manage the dental problems in animal [1]. Wenker *et al.*, stated that stereotypical behavior like cage chewing, nutritionally inappropriate diet, and inadequate opportunities for tooth-cleaning activities were responsible for the lack of natural cleaning and the extensive calculus formation resulted in dental problems in zoo bears [23]. Hence, the implementation of species-specific enrichments to prevent stereotypic behavior and to provide the periodical dental checkup, and provide good nutrition was more important in the prevention of multiple dental diseases.

## 2. Materials and Method

This study was undertaken in rescued sloth bears from all over India and kept in Agra Bear Rescue Facility, Agra, Uttar Pradesh. Samples were collected from 11 rescued sloth bears. The oral cavity with the normal dentition of sloth bear was shown in (figure 1). Retrospective surveillance study data involving the dental problems from 2006 to 2015 concerning the encountered dental problems in the rescued sloth bears reared at Agra Bear Rescue Facility were collected from January 2015 to May 2015 and a total of 233 cases were documented in this regard.



**Fig 1:** Oral cavity with normal dentition in sloth bear

### 2.1. Parameters studied

- Model dental records (figure 2).
- Collection of swabs from suspected cases encountered tooth problems during clinical examination of rescued sloth bears.
- Bacterial culture-related works and antibiotic sensitivity tests were carried out for samples collected from the rescued sloth bears.
- Treatment and management measures adapted to the sloth bears who have tooth problems.

All bears are restrained chemically with the combination of xylazine @ 2mg/kg body weight and Ketamine @ 5-7mg/kg body weight after sedation animal was shifted to Operation Theater for radiography. For the treatment, the animal was intubated with a suitable endotracheal tube (Size 16/18) and maintained with general anesthesia isoflurane 2-3% along with oxygen 6-7 ltr/min were shown in figure 3

Throughout this study program, buckle swab samples were obtained from the rescued sloth bears with the oro-dental problem (figure 4). Samples were collected in a sterile swab (Himedia sterile swab) for bacterial examination and were properly labeled and sealed and sent to the local pathology lab on the same day. On oral examination, the sloth bear

having only 40 teeth as they don't possess the upper-middle pair of the incisor as, like other bear species, the dental formula is I 2/3, C 1/1, P 4/4, M 2/3 = 40. The examination of the oral cavity is more important to rule out the orodental disorder and provide a suitable treatment measure. The bear may have minor soft tissues injury likes gingivitis to lemon size gaigantiform cementoma, partially broken canine and incisors, completely broken canine with infected root canal with or with peri-apical abscess (figure 5-7). Sometimes the premolar teeth also got damaged while they were breaking the canine, so to evaluate the dental damage, subjecting all infected teeths to dental radiographic examination is more essential to decide to provide suitable treatment such as route canal treatment or tooth extraction. The oral finding recorded in the dental chart. The intraoral, occlusal dental film was used for taking dental radiograph with bisecting angle technique by using dental x-ray machine (figure 8). The tooth which was showing intact root canal selected for RCT (root canal treatment) procedure (figure 9- 11) and the tooth which were not having an intact root canal and exposed pulp cavity with a black spot on apical region suggesting developing periapical abscess are selected for complete extraction (figure12).

DENTAL RECORD FOR SLOTH BEARS ( <i>Melursus ursinus ursinus</i> and <i>Melursus ursinus inornatus</i> )	
<u>Name/ID :</u>	
<u>Age:</u>	
<u>M/F:</u>	
<u>Date:</u>	
<u>Weight:</u>	
<u>Sedation/Anaesthetic :</u>	
<u>Oral findings :</u>	
<u>Treatment performed :</u>	
<u>Post op care:</u>	
<u>Behaviour changes post healing :</u>	

**Fig 2:** The model dental record followed in this study



**Fig 3:** Bear on the table after intubation



**Fig 4:** Collecting swab from the Broken and infected tooth



**Fig 5:** Different kinds of dental issues with bears.



**Fig 6:** Malocclusion of Teath



**Fig 7:** The infected molar tooth with swollen gum tissue and enamel dysplasia



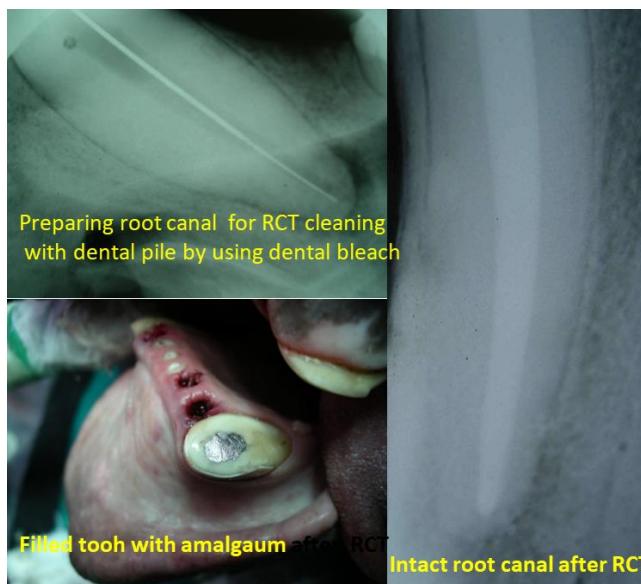
**Fig 8:** Dental Radiographic examination of the bear



**Fig 9:** (A) Overgrown gum mass covered the fractured tooth(B)  
Overgrown gum mass with tooth fragments after removal



**Fig 10:** Periapical abscess due to the infected canine tooth in lower jaw and radiograph showing exposed root canal with developing a periapical abscess.



**Fig 11:** RCT (Root Canal Treatment) procedure



**Fig 12:** Tooth extraction procedure

## 2.2. Analysis of samples for bacterial culture

A Blood Agar is a special and more complex kind of agar that is composed of the requisite rich nutrients along with blood. Blood agar plates are used to culture those bacteria or

microbes that do not grow easily. Such bacteria are called "fastidious" as they demand a special, enriched nutritional environment as compared to the routine bacteria. Blood agar is, predictably, red in color and opaque. Besides being a rich base for the fastidious bacteria to grow, blood agar also has the function to help differentiate and classify bacteria into three types based on their hemolytic activity on the agar. They are alpha, beta, and gamma-hemolytic bacteria. The gamma-hemolytic bacteria leave the RBC and the medium as it is (no hemolysis occurs). The alpha-hemolytic bacteria make the medium green in color because of partial hemolysis. Beta-hemolytic bacteria cause complete hemolysis, which makes the medium clear.

Nutrient agar is a general-purpose medium supporting growth of a wide range of non-fastidious organisms. MacConkey's Agar is a specialized bacterial growth medium that is selective for Gram-negative bacteria and can differentiate those Gram-bacteria that can ferment lactose. For antibiotic sensitivity test, the antibiotic disc-like Amikacin, Amoxicillin, Amoxy-Clavulanic acid, Ampicillin, Azithromycin, Cefdinir, Cefixime, Ceftriaxone, Cefuroxime, Chloramphenicol, Ciprofloxacin, Clarithromycin, Clindamycin, Floxacine, Fosfomycin, Fusidic acid, Gatifloxacine, Gentamicin, Imipenem, Ivanz, Kanamycin, Lenozolid, Levofloxacine, Lincomycin, Linezolid, Meropenem, Methicillin, Nalidixic, Netilmicin, Penicillin G, Piperacillin-tazobactam, Pristinamycin, Rifampicin, Sulfamethoxazole, Teicoplanin, Tetracycline, Ticarcillin-clavulanate, Tigecycline, Tobramycin, and Vancomycin were used and the test is done by Kirby Bauer Method. The results were analyzed scientifically and were documented and statistical analysis was carried out as per the methods given by Snedecor and Cochren [18].

## 3. Results and Discussion

A retrospective study of dental problems in a rescued sloth bear (*Melursus ursinus*) was carried out in Agra Bear Rescue Facility, Agra from 2006 to 2015. Out of 224 rescued sloth bears, 11 sloth bears were noticed with dental problems during the retrospective study period (from 2006 to 2015) and list of problems as given below (Figure 13),

- Broken canine and incisor,
- Broken canine and incisor with peri-apical abscess and
- Overgrown gums/tissue lesions

During oral examinations, some of the animals had infected root canals, periapical abscesses, and overgrown gums tissues with infection. From this area, a swab was taken and subjected to bacterial culture in three different agar plates like blood agar, nutrient agar, and Macconkey's agar. The bacterial culture revealed that Beta hemolytic streptococci and Bacteroides anaerobic were 18.18% respectively, Coagulase positive staphylococci was 36.36% and pseudomonas species, beta-hemolytic streptococci & Pseudomonas profuse, and beta-hemolytic streptococci & klebsiella were 9.09% respectively. The bacterial culture shows a higher rate of infection for Coagulase positive staphylococci in oro-dental problems of sloth bears (figure 14). In the antibiotic sensitivity test, 40 antibiotics were used for the evaluation of antibiotic sensitivity against the cultured bacteria was shown in (Table 1). The antibiotic sensitivity test resulted in 100% of imipenem, 63.64% of ceftriaxone, chloramphenicol, and gentamicin, and 54.55% of amikacin and Amox-clavulanic acid was sensitive against the cultured bacteria. Based upon the bacterial culture and

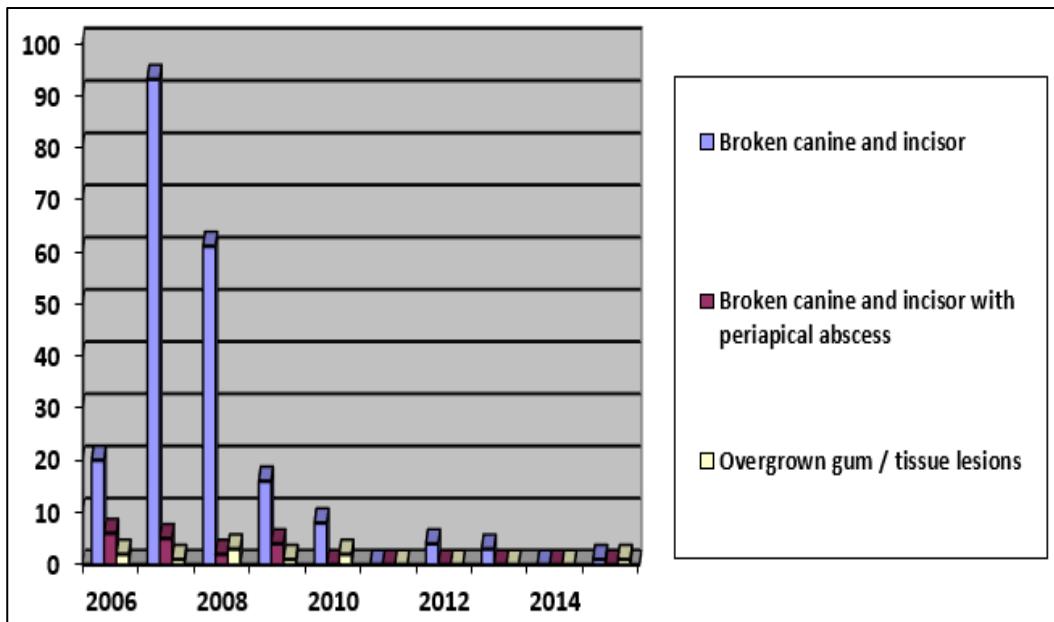
antibiotic sensitivity test findings the decisions were made for the further treatment of the dental problems in sloth bears. Similarly, the sloth bears had (1) broken teeth and infective root canal without periapical abscess (2) Broken teeth with infected root canal with periapical abscess. In this condition, tooth extraction was done under general anesthesia. For the root canal treatment (RCT), the animal was subjected to radiography in both pre and post-treatment, the oral radiography gives a conclusion about the tooth extraction. The other lesion such as overgrown gum tissue and gigantic form cementoma were excised off surgically and the gum flap was opposed with PGA suture material attached with traumatic cutting edge needles. The post-operative care can be carried out as per the antibiotic sensitivity test along with NSAID like meloxicam @ 0.5 mg/kg body weight I/M injection for 3 to 5 days and maintain the animal with a soft liquid diet and kept the animal in an indoor enclosure. During this study with rescued sloth bears, dental problems were noticed in 11 sloth bears. The findings of dental problems during the retrospective study in sloth bears that were rescued were in accordance with the findings furnished by Liza Milella [14] who reported more or less similar types of dental problems in the rescued sloth bears and these comprised broken tooth, infected root canal, per apical abscess, overgrown gums/tissue, etc.

However, during this study, it was found out that the identical dental problems were found to comprise broken incisors, fractured canine, infected root canal, overgrown gum, and peri-apical abscess and these findings agreed with the reports presented by Fowler as well as Wallach and Boever [5, 22]. In this regard, it was important to mention the report of Stranquist *et al.*, revealing the existence of low prevalence of calculus and periodontal diseases, and further, caries were absent in them [19]. Additionally, Wenker *et al.*, quoted that the bears with dental problems preferred to take liquid diet like milk and the watery portion of the porridge and just sucked the juice from the fruits and did not reveal any interest in the enrichment items under the captive conditions [23], as noticed during the study and the reasons for this might be assigned to the presence of painful dental conditions due to the affected tooth and the affected bears always revealed aggressive behavior. Further, Fleming and Burn indicated the development of dental pathology due to various reasons and the different behavioral changes [4]. Encountering of dental problems in this study was in agreement with the report furnished by Wallach and Boever [22], who stated that tooth injuries were common among the bears and reported on the usage of standard root canal techniques. Isogi *et al.*, found that periodontitis was prevalent among the animals regardless of the sources and the incidences were found to be increased with the age of the animals [10]. Zambori *et al.*, stated that in oral cavity teeth provides constant humidity and adherent surfaces causing the attachment of extensive deposit of microorganism [25]. It is noteworthy to mention that the

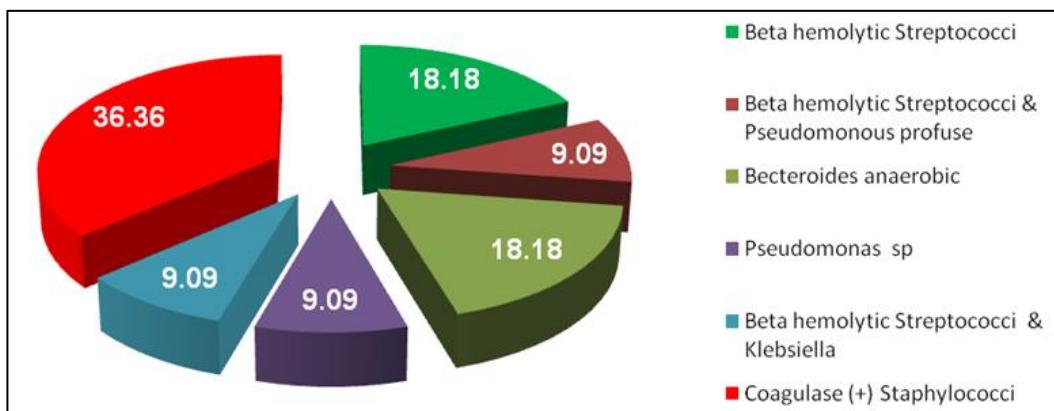
study of dental problems in dancing sloth bears report furnished by Liza Milella about the correcting of dental problems by using dental radiographic examination. It is more essential to decide to provide suitable treatment such as Root Canal Treatment (RCT) or tooth extraction under general anaesthesia [14]. Encountering the different bacterial fauna in the swabs from the oral cavity in this study was in agreement with the findings of Traub and Leohard [20], who also encountered bacterial organisms like beta-hemolytic streptococci, which was found to be more susceptible to teicoplanin and vancomycin. None of the isolates revealed high-level gentamicin resistance. Hayes (2001) reported about the use of different drugs as done in this study after the carrying out of antibiotic sensitivity tests and it was stated that the oral penicillin remained the drug of choice in most clinical situations, although the more expensive cephalosporins and, perhaps, amoxicillin-clavulanate potassium provided the superior bacteriologic and clinical cure rates [8]. Encountering of different bacterial organisms in this study with swabs from dental regions of captive sloth bears was in agreement with the reports furnished by Finland *et al.*, who opined about the 69 strains tested and revealed their moderate or high susceptibility to all the antibiotics used, except those belonging to the aminoglycoside and polymyxin groups [3].

### 3.1 Management measures

In this study on dental diseases, it was found that if rescued sloth bears had tooth problems, it was very difficult to maintain the animal in normal health condition. Due to the dental problems, the sloth bears would not take the normal food. To correct this problem necessary treatments such as tooth extraction, Root canal treatment (RCT), excision of overgrown tissue, etc, needed to be carried out immediately, as supported by Milella (2007) [14]. Since the animals were having severe oro-dental problems for a long time, they might be prone to any kind of infections in the future. However, the endodontic procedures and extraction of the infected tooth were to be carried out in time. Findings revealed the need for continuous care and monitoring to evaluate the overall health status of the bears and successful implementation of endodontic procedures were highly required in related teeth-disease affected cases. Hosey (2013) also reported about the lack of canine and incisor they have not been undergoing the omnivorous diet as like the wild bear and not fit to release into the wild [9]. So the animals are needed to be kept in lifetime care at rehabilitation centers and advice to provide with a semisolid/soft nutritious diet and fruits. Provision of a soft diet and also a palatable diet needed to be considered in the case of bears with dental diseases. Health-related measures needed to be taken care of whenever a newly rescued sloth bear enters the Bear Rescue Facility at Agra in an intensified manner with careful ruling out of dental problems and this was because of the earlier maintenance of them with poor health status, often.



**Fig 13:** Retrospective surveillance of the dental problems in rescued sloth bears in Agra Bear Rescue Facility



**Fig 14:** Percentage of bacterial load in the oro-dental problem of rescued sloth bear (n=11)

**Table 1:** Antibiotic Sensitivity Tests of the dental problems in rescued sloth bears n=11

Sl. No.	Antibiotic used	No. of sensitive samples	%
1	Amikacin	6	54.55
2	Amoxicillin	3	27.27
3	Amoxy-Clavulanic acid	6	54.55
4	Azithromycin	3	54.55
5	Ampicillin	1	9.09
6	Cefdinirin	3	27.27
7	Cefixime	3	27.27
8	Ceftriaxone	7	63.64
9	Cefuroxime	2	18.18
10	Clindamycin	3	27.27
11	Chloramphenicol	7	63.64
12	Ciprofloxacin	3	27.27
13	Fosfomycin	1	9.09
14	Gatifloxacin	3	27.27
15	Gentamicin	7	63.64
16	Imipenem	11	100.00
17	Ivanz	2	18.18
18	Kanamycin	2	18.18
19	Methicillin	3	27.27
20	Nalidixic	1	9.09
21	Netilmicin	2	18.18
22	Levofloxacin	3	27.27
23	Lincomycin	3	27.27

24	Linezolid	3	27.27
25	Pristinamycin	1	9.09
26	Ofloxacin	3	27.27
27	Rifampicin	4	36.36
28	Tigecycline	5	45.45
29	Teicoplanin	4	36.36
30	Tetracycline	4	36.36
31	Tobramycin	5	45.45
32	Penicillin G	4	36.36
33	Vancomycin	5	45.45
34	Fusidic acid	1	9.09
35	Sulfamethoxazole	1	9.09
36	Clathritromycin	2	18.18
37	Meropenem	4	36.36
38	Ticarcillin-clavulanate	1	9.09
39	Piperacillin-tazobactam	3	27.27
40	Lenozolid	1	9.09

#### 4. Conclusion

A retrospective study period (from 2006 to 2015) was carried out to survey the dental problems and management measures adopted, in rescued sloth bears in rescued sloth bear from Agra Bear Rescue Facility, Agra, Uttar Pradesh. A retrospective study of dental problems in ten years period revealed the existence of multiple dental problems in captive bears that were rescued. Out of 224 rescued sloth bears, 11 sloth bears were noticed with dental problems during the

study period, and the list of problems documented as follows;

- Broken canine and incisor,
- Broken canine and incisor with periapical abscess and
- Overgrown gums/tissue lesions

During oral examinations, some of the animals had infected root canals, periapical abscesses, and overgrown gums tissues with infection. The bacterial culture revealed organisms like Beta hemolytic *streptococci*, Coagulase positive *Staphylococci*, *Pseudomonas* species, beta-hemolytic *streptococci*, *Pseudomonas profuse*, beta-hemolytic *Streptococci*, *Klebsiella* sp., etc. in dental lesions. In the antibiotic sensitivity test, 40 antibiotics were used for the evaluation of antibiotic sensitivity against the bacteria. The antibiotic sensitivity test results were also revealed in this study. Management measures pertaining to the findings on dental problems in captive bears were detailed.

From this study, the following conclusions were obtained:

- The common dental problems of sloth bears were broken canine and incisor, broken canine and incisor with periapical abscess, and overgrown gums/tissue lesions.
- The swabs from the oral cavity have different bacterial loads.
- Antibiotics like imipenem, ceftriaxone, chloramphenicol, gentamicin, amikacin, and Amoxiclavulanic acid had more effects in bears affected by dental problems.
- The post-operative care could be carried out as per the antibiotic sensitivity tests, along with administration of NSAID like meloxicam @ 0.5 mg/kg body weight by I/M injection, daily for 3 to 5 days.

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