STUDY REPORTS

1. Title: Growth & Development of the Gibbon

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OBJECTIVE

The objective of this study is to chronologically measure the growth and development of the gibbon so that it will be possible to determine the age of animals with unknown birthdates.

DESCRIPTION

The production of gibbons from the gibbon breeding program offers a unique opportunity to measure certain parameters of growth and development in animals where birthdates are known. Growth and development is measured in the following ways:

1. Body weights are taken weekly on each of the gibbons that have been born in the colony.
2. The time of eruption and notable characteristics of wear on the teeth are observed and recorded quarterly.
3. Skeletal development is evaluated radiographically at quarterly intervals following birth. In measuring skeletal development, emphasis is placed on development of the hands, wrists, ankles, and feet.
4. The time that obvious signs of sexual development occur, such as descension of the testicles in the male and the onset of the menstruation in the female, are observed and recorded.

PROGRESS

Body Weights: Body weights for each of the three animals presently in the study are indicated on Table 1.

The time of eruption of teeth and the radiographic assessment of skeletal development are summarized in Table 2. Data accumulated on the basis of the three animals show that the following characteristics of skeletal development are useful in age determinations in gibbons up to the age of fifteen months.

a. By the age of six months the proximal radial epiphysis is present.
b. By nine months there is a distinct styloid process present on the distal ulnar epiphysis, the width of the distal end of the third metacarpal epiphysis is equal to the width of its diaphysis, and the number of carpal bones at this time may vary from seven to eight.
c. By fifteen months the distal radial epiphysis is equal in width to the distal diaphysis, and the radial styloid process is present. Also the proximal end of the first metacarpal epiphysis is present, and the proximal epiphysis of the radius also reaches a width equal to that of its diaphysis.

Due to lack of information it is not possible at the present time to distinguish a gibbon of age three months from one of age six months nor is it possible to distinguish a gibbon of age twelve months from one of nine months. A female gibbon is approaching full term pregnancy and it may possible soon to determine what radiographic skeletal characteristics distinguish a new born gibbon from one that is three months old.

None of the three female gibbons currently in the study has shown any evidence of sexual development.

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Table 1 Growth in Infant Gibbons

Age (weeks)	No. of Animal (Weight in Grams)		
	PC 1	PC 2	PC 3
12			
16			447
17			855
18			905
19			980
20			1011
21			1040
22			1050
23			1080
24			1170
25			1167
26			1135
27		838	1266
28		840	1265
29		885	1345
30		—	1403
31		830	1460
32		908	1450
33		850	1500
34		870	1525
35		940	1650
36		980	1620
37		900	1680
38		940	1650
39		980	1610
40	1133	1000	1700
41	1190	1050	1710
42	1193	1030	1820
43	1149	1100	1740
44	1200	1110	1820
45	1178	1215	
46	1170	1200	
47	1140	1220	
48	1210	1150	
49	1365	1200	
50	1215		
51	1235		
52	1380		
53	1300		
54	1220		
55	1300		
56	1280		
57	1400		
58	1400		
59	1500		
60	1400		
61	1300		
62	1400		
63	1400		
64	1500		
65	1320		
66	1370		

Table 2 Gibbon Skeletal and Dental Development

Age (Mos)	Proximal Epiphysis Proximal 1st Phalanx, hand	Proximal Epiphysis Proximal 3rd Phalanx, hand	Ossification of Sesamoid Process, metacarpo-phalangeal joint	Distal Epiphysis 3rd metacarpal, hand	Proximal Epiphysis 1st Metacarpal	Number of Carpal bones	Proximal Epiphysis Proximal 3rd phalanx, foot	Fusion, of Distal Radial Epiphysis	Proximal Radial Epiphysis	Ulnar Epiphysis: Fusion of Distal Ulnar epiphysis	Ulnar Epiphysis: Styloid Process Present	Dental Formula
3 (1)*	—	Unk	—	Unk	—	7	Unk	2** — 3/1	—	1/3 —	—	i 1/1 c 1/1 p 0/1 m 0/0
6 (2)	—	2/3 +	—	Round unfused 3/4 +	—	7	Unk	3/4 —	3/4 +	1/2 —	in-distinct	2/2 1/1 2/2 0/0
9 (3)	—	3/4 +	—	Round unfused 1/1 +	—	7–8	Unk	3/4 —	3/4 +	1/2 —	distinct 1/2 +	2/2 1/1 2/2 0/0
12 (1)	—	3/4 +	—	Round unfused 1/1 +	Unk	Unk	Unk	3/4 —	3/4 +	Unk —	3/4 +	2/2 1/1 2/2 0/0
15 (1)	—	3/4 +	—	1/1 +	1/2 +	8	+	Radial Styloid present 1/1 —	1/1 +	Unk —	1 +	2/2 1/1 2/2 0/0

*Number in parenthesis indicates the number of animals observed.
**Fractions listed are epiphysis to diaphysis width ratios.