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ESTIMATION OF AGE FROM BONE DEVELOPMENT

Observations on a Study of 307 Ceylonese School Children of the Ages 4–8 Years

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Both authors are members of the Department of Forensic Medicine, University of Ceylon—Mr. Webster, a Research Technician, and Mr. de Saram, Professor of Forensic Medicine. This is the second article to appear in this Journal reporting on the authors' research on age determination from bone development.—EDITOR.

This study has been made as an extension to our previous investigation on the state of ossification and epiphyseal union in 567 Ceylonese school children of the age groups 9–16 years.[1] The conditions under which the present investigation was conducted, and the safeguards adopted to ensure accuracy of dates of births, etc. were similar to those of the previous one.

The children for this survey and the certified dates of their birth as recorded in the birth-certificates were provided by the respective Principals of three primary schools in Colombo.[2] The actual age of each child on the date of our examination was estimated in years, months, and days. Our remarks about the type of children examined on the previous occasion applies equally to the present report.

The following limbs were x-rayed with special reference to the ossific centres described against each head.

Hand:	Epiphyses of:	*Foot:*	Epiphyses of:
	Lower end of radius		Distal end of tibia
	Lower end of ulna		Distal end of fibula
	Ossific centres of carpal bones		Ossific centres of:
	Epiphyses of:		Calcaneal epiphysis
	Metacarpals		Navicular
	Phalanges		Intermediate cuneiform
			Medial cuneiform
			Epiphyses of:
			Metatarsals
Elbow:	Epiphyses of:		Phalanges
	Trochlea of humerus	*Knee:*	Ossific centre of patella
	Medial epicondyle		Epiphyses of:
	Head of radius		Head of tibia
	Olecranon of ulna		Head of fibula

[1] This Journal, Vol. 45, No. 1 (May–June, 1954)., pp. 96–101.

[2] We are grateful to the following Principals of Schools for providing us with the children and data from their birth-certificates: 1. Mrs. K. M. Kalenberg, Presbyterian Girls' School, Colombo. 2. Miss M. E. Van Den Driesen, Lindsay School, Colombo. 3. Mr. B. A. Kuruppu, Greenlands College, Colombo.

We are also grateful to Mr. C. P. D. W. Jayasinha of our Department for much secretarial assistance.

TABLE I

Boys

Total No. of Cases Examined	No. of Cases in Each Age Group	Age Group	Appearance of Ossific Centres and Epiphyses																							
			Hand												Elbow								Foot			
			Epiphysis of lower end of ulna			Ossific centres of carpal bones									Epiphysis of								Ossific centre of calcaneal epiphysis			
						Scaphoid			Pisiform			Trapezium			Trapezoid			Trochlea of humerus			Medial epicondyle of humerus			Olecranon of ulna		
			Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification
154	30	4–5	30	0	0	30	0	0	30	0	0	30	0	0	30	0	0	30	0	0	30	0	0	30	0	0	30	0	0
	31	5–6	31	0	0	27	2	2	31	0	0	25	2	4	31	0	0	31	0	0	31	0	0	31	0	0	31	0	0
	30	6–7	30	0	0	18	6	6	30	0	0	19	1	10	19	1	10	30	0	0	26	4	0	30	0	0	30	0	0
	30	7–8	23	7	0	8	2	20	30	0	0	8	1	21	7	2	21	30	0	0	27	3	0	30	0	0	25	5	0
	33	8–9	18	9	6	7	1	25	33	0	0	9	4	20	6	2	25	33	0	0	22	2	9	33	0	0	26	2	5

TABLE II

GIRLS

Total No. of Cases Examined	No. of Cases in Each Age Group	Age Group	Appearance of Ossific Centres and Epiphyses																									
			Hand															Elbow									Foot		
			Epiphysis of lower end of ulna			Ossific centres of carpal bones												Epiphysis of									Ossific centre of calcaneal epiphysis		
						Scaphoid			Pisiform			Trapezium			Trapezoid			Trochlea of humerus			Medial epicondyle of humerus			Olecranon of ulna					
			Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification	Absent	Early appearance	Advanced ossification
153	30	4–5	28	2	0	25	2	3	30	0	0	19	3	8	28	1	3	30	0	0	15	3	12	30	0	0	29	1	0
	30	5–6	24	5	1	14	1	15	30	0	0	10	1	19	12	2	16	30	0	0	12	2	16	30	0	0	20	7	3
	32	6–7	15	10	7	6	0	26	32	0	0	3	1	28	3	0	29	32	0	0	9	1	22	30	2	0	10	5	17
	31	7–8	5	7	19	1	0	30	31	0	0	1	1	29	1	0	30	31	0	0	6	0	25	26	0	5	1	3	27
	30	8–9	2	1	27	0	0	30	20	3	7	0	0	30	0	0	30	26	1	3	14	0	16	18	0	12	0	3	27

TABLE III

OSSIFIC CENTRES AND EPIPHYSES: EARLIEST AGES AT WHICH APPEARANCE WAS NOTED

		Boys			Girls		
		Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.
Hand	Epiphysis of lower end of ulna	7	1	4	4	4	20
	Ossific centres of carpal bones:						
	Scaphoid	5	3	16	4	1	13
	Pisiform	—	—	—*	8	0	6
	Trapezium	5	1	10	4	0	7
	Trapezoid	6	1	17	4	6	24
Elbow	Trochlea of humerus	—	—	—†	8	3	8
	Medial epicondyle of humerus	6	2	29	4	0	20
	Olecranon of ulna	—	—	—‡	6	8	23
Foot	Ossific centre of calcaneal epiphysis	7	1	4	4	4	20

* Please see Table III of results of previous survey published in this Journal to which we refer. In that survey the pisiform was first seen in the boys at 9 yrs. 10 mos. 16 dys.

† In our previous survey of children of the age-groups 9–16, the earliest age at which the trochlea of humerus was seen in the boys was 10 yrs. 0 mos. 7 dys.

‡ In our previous survey, the earliest age at which the olecranon was seen in the boys was 9 yrs. 5 mos. 26 dys.

We have found that some of the ossific centres and epiphyses examined by us appear before the age of 4 years. These have been excluded from this report as they have no bearing on the assessment of age for the age groups 4–8 years.

Tables I, II, and III therefore include only such results as we consider have a bearing on the assessment of age of these specific age groups.

CONCLUSIONS

(1) Our conclusions in respect of our previous survey to which we refer applies almost in every detail to the present study.

(2) We hope to be able to submit in due course a further report on the age groups Birth to 4 years.