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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

G. WEBSTER AND G. S. W. DE SARAM

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. 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:

Lower end of radius Lower end of ulna

Ossific centres of carpal bones

Epiphyses of: Metacarpals

Phalanges

Elbow: Epiphyses of:

Trochlea of humerus Medial epicondyle Head of radius Olecranon of ulna Foot: Epiphyses of:

Distal end of tibia Distal end of fibula Ossific centres of: Calcaneal epiphysis

Navicular

Intermediate cuneiform Medial cuneiform

Epiphyses of:

Metatarsals Phalanges

Knee: Ossific centre of patella

Epiphyses of: Head of tibia 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

	,		1		1	•					
		Foot	Ossific centre of calcaneal epiphysis		Advanced ossification	0	<u> </u>	•	0	ນ	
					Езгју арреатапсе	0	0	0	Ŋ	7	
					Absent	30	31	30	25	26	
		Elbow	Epiphysis of	Olecranon of ulna	Advanced ossification	0	0	0	0	0	
					Early appearance	0	0	0	0	0	
					Absent	30	31	30	30	33	
				Trochles of cpicondyle of humerus	Advanced ossification	0	0	0	0	6	
					Early appearance	0	0	4	ю	7	
					Absent	30	31	26	27	22	
	Appearance of Ossific Centres and Epiphyses				Advanced ossification	0	0	0	0	0	
					Early appearance	0	0	0	0	0	
				Pro	Absent	30	31	30	30	33	
		Hand		Trapezoid	Advanced ossification	0	0	10	21	25	
	ific C				Early appearance	0	0		8	2	
	Appearance of Oss				Absent	30	31	19	7	9	
			ones	g	Advanced ossification	0	4	10	77	20	
			Ossific centres of carpal bones	Trapezium	Estly appearance	0	7		-	4	
				Tra	Absent	30	25	19	∞	6	
				-	Advanced ossification	0	0	0	0	0	
				Pisiform	Early appearance	0	0	0	0	0	
					Absent	30	31	30	30	33	
				75	Advanced ossification	0	7	9	20	25	
					Scaphoid	Estly appearance	0	7	9	7	
				ြိ	JusedA.	30	27	18	∞	7	
			,,	. ·	Advanced ossification	0	0	0	0	9	
			hvaja	lower end of ulna	Early appearance	0	0	.0	7	6	
			Epip low of		Absent	30	31	30	23	18	
	Age					4-5	5-6	6-7	2-8	6-8	
	No. of Gases in Each Age Group					30	31	30	30	33	
	Total Consess Examined					154					

TABLE II Girls

		Ossific centre of calcaneal epiphysis		Advanced ossification	0	33	17	27	27
	Foot			Estly appearance	1	7	ß	ω	n
				Absent	62	70	10	-	0
	Elbow		Olecranon of ulna	Advanced ossification	0	0	0	Ŋ	12
		Epiphysis of		Езгіу арреатапсе	0	0	7	0	0
				Absent	30	30	30	26	18
			Trochlea of epicondyle humerus of humerus	Advanced ossification	12	16	22	25	16
				Early appearance	က	7	-	0	0
				Absent	15	12	6	9	14
hyses				noitsailisso beansvbA	0	0	0	0	<u>د</u>
Epip				Estly appearance	0	0	0	0	-
s and				JusedA	30	30	32	31	26
Centre	Hand	Ossific centres of carpal bones	Trapezoid	Advanced ossification	3	16	50	30	30
ific (Early appearance	-	2	0	0	0
Appearance of Ossific Centres and Epiphyses				JussdA	78	12	8	-	0
arance			Scaphoid Pisiform Trapezium	Advanced ossification	∞	19	78	53	30
Appea				Estly appearance	3	-		—	0
,				Absent	19	10	3	-	0
				Advanced ossification	0	0	0	0	7
				Estly appearance	0	0	0	0	3
				зпэгdА	30	30	32	31	20
				Advanced ossification	6	15	26	30	30
				Early appearance	2		0	0	0
				Absent	25	14	9	-	0
			P .	Advanced ossification	0	-	1	19	27
		hveis	lower end of ulna	Early appearance	2	S	10	7	1
_		Eninhysis of	<u></u>	JasedA	28	24	15	r.	7
	Age					2-6	2-9	7-8	8-9
	No. of Gases in Each Age Group					30	32	31	30
	Total C. Cases Examined C						153		

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 Ossific centres of carpal bones:	7	1	4	4	4	20
	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		<u> </u>	- ‡	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.

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.

[†] 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.