

Radiological Study of Appearance and Fusion of Iliac Crest in hip bone in Bikaner Region in 14-22 Years Age Group

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Abstract

Correct age determination has of great importance in legal prosecution. The principle means, which enable one to form a fairly accurate opinion about age of an individual are general physical development, dentition, secondary sex characters and ossification of bones. Among them Radiological examination of ossification process is most accurate than any other method up to 25 years of age.

This study involves radiological examination of Pelvis (AP view) of 169 individuals for the study of age related appearance and fusion of ossification center of Iliac Crest in the individuals of age group of 14-22 years of both male and female in S P Medical college, Bikaner, Rajasthan.

Keywords: Age Estimation, Iliac Crest, X- Rays.

Introduction

Estimation of reasonably accurate age, plays an important role in civil/criminal cases like personal identification, fixing of criminal responsibility, judicial punishment i.e. in cases of rape, kidnapping, criminal abortion, attempted or evident murder, theft, burglary, dacoity and in various schemes of Social Welfare department i.e. Employment, attainment of majority, marriage contract etc.

Various workers suggest that there is a variation in age estimation, not only in country to country but also in different states of India, so Survey Committee¹² (1964) while reporting on medico legal practice in India has recommended to the government to encourage Zone wise study for the problem of determination of age.

Material and Method

This study is carried out in the Department of Forensic-Medicine and Toxicology in association with radio- diagnosis department of S.P. Medical College and Hospital, Bikaner. The subjects are selected randomly from various schools, from neighborhood of various faculty members and staff as well as cases attending the

OPD of the Forensic-Medicine Department of P.B.M. Hospital, Bikaner. The persons selected for study were grouped as per their stated age, viz.:- 14-15years, 15-16 years, 16-17 years, 17-18 years, 18-19years, 19-20 years, 20-21years and 21-22 years. Here age 14-15 years means person of 13 years or more but below 14 years. Age, as stated by them is further confirmed by secondary school certificate, any document reflecting their exact age or entry in their school record.

Selection Criteria for inclusion of person in present study:

C) They should be living in Bikaner region for more than 5 years.

D) They should be free from any physical disability or endocrinal anomaly.

E) Person should have accurate record of their date of birth.

F) Informed expressed verbal consent of the subjects was taken before proceeding to their physical, dental and radiological examination.

Radiological Criteria for epiphyseal fusion –

The union is taken as complete when the:

- a) Diaphyseo-epiphyseal space is completely obliterated and become bony in architecture and density.
- b) There is continuity of the periosteum between epiphysis and diaphysis with no notching at the periphery of epiphyseal line.
- c) Presence or absence of epiphyseal scar (a white, transverse line) has been disregarded in this connection and considered as recent complete union.

For generalization, fusion in more than 75% cases is relied upon as complete fusion. Radiological data of appearance and fusion of ossification center of Iliac Crest were reduced to table, of various age groups. Data thus obtained finally, were analyzed and compared with

published work of various Indian and foreign workers.

Observation

In Boys - The appearance of the ossification centre of iliac crest was observed earliest at the age of 14 year, 4 months and 4 days in our study. The appearance of the ossification centre of iliac crest was observed in 90% of cases in age group 15-16 years, in 100% of cases in age group 19-20 years and above. Average age of appearance of iliac crest is 15-16 years in our study. Complete fusion of iliac crest was observed earliest at the age of 16 year, 2 months and 10 days in our study. Complete fusion of iliac crest was observed in 90.91% of cases in age group of 20-21 years. Average age of fusion of iliac crest was 20-21 years in boys in our study. Age of oldest subject not showing complete fusion of iliac crest was 21 years, 8 months and 19 days in our study.

Appearance and Fusion of the Centre of Iliac Crest in Boys

S.No.	Age (Yrs)	No. of cases	Appearance		Partial Fusion		Fusion	
			No	%	No	%	No	%
1	12-13	12	-	-	-	-	-	-
2	13-14	9	-	-	-	-	-	-
3	14-15	7	1	14.28	-	-	-	-
4	15-16	10	9	90	-	-	-	-
5	16-17	17	17	100	3	17.65	1	5.88
6	17-18	25	20	80	2	8	4	16
7	18-19	19	18	94.73	7	36.84	6	31.57
8	19-20	10	10	100	2	20	6	60
9	20-21	11	11	100	1	9.09	10	90.19
10	21-22	12	12	100	1	8.33	11	91.67

In Girls - The appearance of the ossification centre of iliac crest was observed earliest at the age of 15 year, 1 month and 1 day. The appearance of the ossification centre of iliac crest was observed in 100% of cases in age group 15-16 years and above. Average age of appearance

of iliac crest was 15-16 years in girls in our study. Complete fusion of iliac crest was observed earliest at the age of 15 year, 1 month and 1 day in present study. Complete fusion of iliac crest was observed in 100% of cases in 19-20 years of age group and above in girls.

Average age of fusion of iliac crest in girls was 19-20 years in our study. Age of oldest subject not showing complete fusion of iliac crest was 18 years, 5 months and 10 days in present study.

Appearance and Fusion of the Centre of Iliac Crest in Girls

S.No.	Age (Yrs)	No. of cases	Appearance		Partial Fusion		Fusion	
			No	%	No	%	No	%
1	12-13	8	-	-	-	-	-	-
2	13-14	2	-	-	-	-	-	-
3	14-15	2	-	-	-	-	-	-
4	15-16	4	4	100	-	-	3	75
5	16-17	6	6	100	2	33.33	3	50
6	17-18	19	19	100	11	57.89	4	21.05
7	18-19	10	10	100	7	70	1	10
8	19-20	5	5	100	-	-	5	100
9	20-21	4	4	100	-	-	4	100
10	21-22	8	8	100	-	-	8	100

Discussion

In Female: In our study we observed the average age of appearance of ossification centre of iliac crest in female at 15-16 years of age, which is consistent with the observation of the study of Nagi Abdul Wahab Abdulla1 et al (Yemen), Alok Kumar4 et al (Kanpur) and Yatiraj Singi¹⁵.

In our study we observed the average age of fusion of the ossification centre of iliac crest in females at 19-20 years, which is consistent with the observation of the study of Nagi Abdul Wahab Abdulla1 et al (Yemen) also with observation of Chandresh Tailor¹³ (Surat) and as stated by RK Sharma¹⁰, Nagesh Kumar Rao⁸, Krishan Vij¹⁴ and VV Pillay⁷ in their textbooks .

In Male: In our study we observed the average age of appearance of ossification centre of iliac crest in male at 15-16 years of age. The finding in our study is consistent with the observation of the study of Alok Kumar4 et al

(Kanpur) and Apurba Nandy⁶ they observed that it is 16 years of age and also consistent with Grant's Anatomy², a standard textbook of anatomy, who stated that it is 16 years of age.

In our study we found the average age of fusion of the ossification centre of iliac crest in males is 20-21 years, which is consistent with the observation of the study of Pardeep Singh, RK Gorea¹¹ who conducted study at Patiala, Punjab and also as stated by N.Reddy⁹ in his textbook, that it is 20-21 years of age also is consistent with the observation of Memchoubi Ph.⁵ who observed that it is 20 years of age and it is also consistent with the age as stated by PC Dikshit³ in his textbooks.

Conclusion

Average age of appearance of the ossification centre of iliac crest observed at 15-16 years in boys in our study in Bikaner region.

Average age of fusion of iliac crest observed at 20-21 years in boys in our study in Bikaner region.

Average age of appearance of the ossification centre of iliac crest observed at 15-16 years in girls in our study in Bikaner region.

Average age of fusion of iliac crest in girls observed at 19-20 years in our study in Bikaner region.

Findings of our study are again giving the strength to the workers and Survey Committee¹² report, as they suggest to the government to encourage Zone wise study for the problem of determination of age. This study is an attempt which may be a valuable aid to a forensic practitioner to give the approximate age certificate in medicolegal cases.

Ethical Clearance- Taken from Ethical committee of S.P. Medical College and Group of Hospitals, Bikaner Rajasthan.

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Conflict of Interest - Nil

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