

Original Research Paper

Age Estimation from Medial End of Clavicle by X- Ray Examination

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Abstract

Fixing up of the individuality of a person, no matter if it is new born baby in the hospital or in criminal cases and in civil cases like marriage, inheritance of property, passport, insurance claims, disputed sex and missing persons etc. has got its own importance. In the present study 100 individuals are studied between the age group of 16 to 25 years in male and female (separately), whose X- ray examination is done at Rajindra Hospital ; Patiala, Punjab. Male and female individuals were studied with age interval of two years and ten cases from each age interval were taken. The study is undertaken to know the fusion of medial end of clavicle to know the fusion of epiphysis. In this study, every individual's X-ray chest AP view is taken to know fusion of epiphysis at medial end of clavicle.

Key words: Epiphyseal Fusion, X-ray, Criminal, Civil, Insurance, Passport

Introduction:

If proper age is not given it is injustice to the patient and the profession. There are many agencies for fixing the identity of a person from village panchayat to police and usually it is the police which help the most in this job. But when all other agencies fail then the medical jurist comes into picture and he is able to do this job by virtue of his knowledge and experience. So he is able to supply to the police certain facts about an individual, dead body or fragmentary remains which will enable them to complete the identification. [1, 4, 6, 9] To narrow the wide age range union of epiphysis of bones in present study is done with the help of fusion of epiphysis in medial end of clavicle.

Age of each individual studied was confirmed from birth certificate, service record, driving license, passport, ration card or voter's card etc.

Material and Methods:

In present study, 100 cases were studied including Male and female differently. The cases studied were between age group of 16-25 years that were exposed to x-ray at Rajindra Hospital Patiala.

Male and Female individuals were studied with age interval of two years and ten cases from each age interval were taken. The cases were studied with the help of X-ray Chest- antero-posterior view for medial end of clavicle.

Status of epiphyseal union was divided into following four stages:

Stage	Appearance and fusion	Grade
I	Centre not appeared	A
II	Centre appeared but no union	+
III	Union started but incomplete	++
IV	Complete union	+++

Method for X- Ray examination: Study has been carried out by Roentgenographic technique.

The technique included standardization of -

1. Time of exposure
2. Positioning of the part
3. Distance of film from X- Ray tube and
4. Processing and time of developing the films.

Positioning of the Epiphysis during X- Ray:

Clark's radiographic technique has been followed in this investigation.

AP View for clavicle: Positioning of Patient and film: The patient was lying supine on the X-Ray table with the centre of the clavicle being examined over the midline of the table. A small sand-bag is placed under the opposite shoulder to rotate the patient slightly towards the affected side to make sure that the medial end of the clavicle is not superimposed on the vertebral column. The arm of the side being examined is in a relaxed position by the side of the trunk. The film is placed transversely in the Bucky tray centred to the clavicle and should be large enough to include the whole of the clavicle and its medial and lateral articulations.

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Direction and Centring of the X-ray Beam: The vertical central ray is directed to the middle of the clavicle. Exposure taken on arrested respiration.

Observations:

Table No. 1 shows in eight cases (80%) centre not appeared & in two cases (20%) centre appeared but no union occurred in age group 16-17 years.

In age group 18-19 years, in eight cases (80%) centre not appeared & in two cases (20%) centre appeared but no union occurred.

In age group 20-21 years, in two cases (20%) centre not appeared, in three cases (20%) centre appeared but no union occurred, in three cases (30%) union started but incomplete & in two cases (20%) complete union occurred.

In age group 22-23 years, in one case (10%) centre not appeared, in one cases (10%) centre appeared but no union occurred, in two cases (20%) union started but incomplete & in six cases (60%) complete union occurred.

In age group 24-25 years, in two cases (20%) union started but incomplete and in eight cases (80%) complete union occurred.

Table no. 2 shows in age group 16-17 years, in one case (10%) centre not appeared, in four cases (40%) centre appeared but no union occurred and in five cases (50%) union started but incomplete.

In age group 18-19 years, in six cases (60%) centre appeared but no union, in three cases (30%) union started but incomplete & in one case (10%) complete union occurred.

In age group 20-21 years, in three cases (30%) centre appeared but no union, in five cases (50%) union started but incomplete & in two cases (20%) complete union occurred.

In age group 22-23 years, in four cases (40%) union started but incomplete & in six cases (60%) complete union occurred. In age group 24-25 years, in ten cases (100%) complete union occurred.

Discussion:

In present study males shows epiphyseal union at 22-23 years age group and earliest union occurred at 20 years. Female shows epiphyseal union at 22-23 years age group and earliest union occurred at 20 years and one month. The present study findings are close to Stevenson, Galstaun, B.D. Chaurassia, Parikh and Krishan Vij. [1, 4, 9, 16]

Table No. 4 shows for males in 20-21 years age group two cases (20%) show complete union, in 22-23 years age group six cases (60%) show complete union and in 24-25 years age group eight cases (80%) show complete union.

For females in 20-21 years age group 2 cases (20%) show complete union, in 22-23 six cases

(60%) show complete union and in 24-25 years age group ten cases (100%) show complete union.

Conclusions:

According to Stevenson (1924) in both male and female earliest union occurred at 18 years but in present study for males, earliest union occurred at 20 years and for females it is 20 years & one month. Present study and Stevenson show different results because they are performed in different races.

In present study, majority of cases show complete union at 22-23 years for male and female both. These findings are in tandem with study carried out by Parikh because both studies are done in India.

From the present study it can be **concluded:** Epiphysis of medial end of clavicle fused in most of the cases at 22-23 years for male and female both. Earliest union occurs at 20 years in males and 20 years and one month in females.

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Table No. 1
Incidence and extent of fusion of the medial end of clavicle in different age groups for Males

Extent of fusion	Age Group 16-17 years	Age Group 18-19 years	Age Group 20-21 years	Age Group 22-23 years	Age Group 24-25 years
	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)
Centre not appeared	8 (80)	8 (80)	2 (20)	1 (10)	0 (0)
Centre appeared but no union	2 (20)	2(20)	3 (30)	1 (10)	0(0)
Union started but incomplete	0 (0)	0(0)	3 (30)	2 (20)	2(20)
Complete union	0 (0)	0(0)	2 (20)	6 (60)	8(80)

Table No. 2
Incidence and extent of fusion of the medial end of clavicle in different age groups for Males

Extent of fusion	Age Group 16-17 years	Age Group 18-19 years	Age Group 20-21 years	Age Group 22-23 years	Age Group 24-25 years
	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)
Centre not appeared	1(10)	0 (0)	0 (0)	0(0)	0(0)
Centre appeared but no union	4(49)	6(60)	3(30)	0(0)	0(0)
Union started but incomplete	5(50)	3(30)	5(50)	4(40)	0(0)
Complete union	0 (0)	1 (10)	2 (20)	6 (60)	10 (100)

Table No. 3
Comparison of time of fusion (in years)

Author	Year	Race	Sex			Earliest Union (years)
			Male	Female	Mixed	Male/Female
Stevenson's	1924	White & Negroes	22-24	22-25	-	18
Davies & Parsons	1927	English	-	-	25	-
Flecker	1932	Australians	21	21	-	-
Galstaun	1937	Bengalis (Indians)	22	20	-	-
Krogman	1962	U.S.A.	-	-	25-28	-
Stewart	1973	U.S.A.	26 or more	-	-	-
Chaurassia	1980	Indian	-	-	21-22	-
Parikh	1990	Indian	-	-	22	-
Inderbir	1993	Indian	-	-	25	-
Krishan Vij	2001	Indian	-	-	20-22	-
Present Study	2001	Punjab (Indian)	22-23	22-23	-	M = 20 F = 20 years & one month

Table No. 4
Age of incidence of complete union

Age Group (Years)	No. of cases examined	For Males		For Females	
		No. of cases with complete union (%)		No. of cases with complete union (%)	
16-17	20	0 (0)		0 (0)	
18-19	20	0(0)		0(0)	
20-21	20	2 (20)		2(20)	
22-23	20	6(60)		6(60)	
24-25	20	8 (80)		10(100)	