



FUSION OF XIPHISTERNAL JOINT: ROLE IN ESTIMATION OF AGE

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ABSTRACT Estimation of age of an individual from skeletal remains is a crucial step. Present work is an effort to study the sternum for estimation of age based on the fusion of xiphisternal joint. The sterna were obtained from the fifty one cadavers. The age and sex of the deceased were obtained. The collected specimens were cleaned and dried properly. For the estimation of age the sterna were examined for the presence or absence of fusion at Xiphisternal joint. The degree of fusion of the xiphisternal joint in the different age group of male and female were variable. Hence correct estimation of age based on fusion of xiphisternal joint alone is not a much reliable criterion.

KEYWORDS : Sternum, Xiphisternal joint, Fusion, Estimation of age

INTRODUCTION

Estimation of age at the death of an individual from unidentified skeletal remains is a crucial step in osteological analysis. If the entire skeleton is presented for age estimation then almost 100% accuracy can be obtained but with help of only skull or pelvis it is up to 90%. But without skull or pelvis it becomes fairly difficult to judge the age accurately. As complete skeletons are rarely recovered or preserved and skeletal remains get easily fragmented. For this reason, developing ageing criteria from various skeletal elements have been a primary research focus.

The correct determination of skeletal age is a critical requirement for medico-legal cases, and the accuracy with which ageing can be done depends on the nature of the materials and methods applied.

AIM OF THE STUDY:

As such, in the present work an effort is being made to study the role of fusion of xiphisternal joint of sternum for estimation of age of an individual.

NUMBER OF CASES:

Total fifty one sterna were observed, out of which thirty three were from male cadavers while eighteen were from female cadavers.

PLACE OF WORK:

This study was carried out in the Department of F.M.T and the Department of Anatomy, R.I.M.S, Ranchi and P.M.C Palamu.

INCLUSION CRITERIA:

Only those cases with age more than 15 years were considered because the age related changes are prominent after puberty.

EXCLUSION CRITERIA:

Deformed, diseased and fractured sterna were not included in the study.

MATERIALS:

The materials for the present study consists of - Sterna obtained from the cadavers and water bath for washing and cleaning the obtained sterna.

METHOD:

The sterna were obtained from the cadavers in all the cases by careful dissection using a standard linear midline incision. The clavicles were disarticulated from the sternum.

The age of the deceased was obtained from the nearest relatives and police and was verified by the necessary documents. The age of the deceased was rounded off to full figures.

The sterna thus collected were put in a water bath for a week for maceration. These were cleaned and examined intermittently. After maceration and cleaning all the remains of the muscle and ligaments from the sterna, these were dried at room temperature.

For the estimation of age the elements of each sternum i.e. manubrium and body were examined for the presence or absence and degree of fusion at the Xiphisternal articulation.

OBSERVATION:

In male, partial fusion of xiphoid process with the body of sternum was first seen in the age group of 31 to 35 years, while the complete fusion was seen first in the age group of 41 to 45 years. Fusion of the xiphoid process with the body of sternum was completed by the age of 51 to 55 years. But even in this age group and further higher age groups xiphoid process was still in the stage of partial fusion and in some cases it was not fused at all with the body of sternum.

In female, partial fusion of xiphoid process with the body of sternum was first seen in the age group of 31 to 35 years while the complete fusion was seen first in the age group of 41 to 45 years. Fusion of the xiphoid process with the body of sternum was completed by the age of 50 years. But even in this age group and further higher age groups xiphoid process was still in the stage of partial fusion and in some cases it was not fused at all with the body of sternum.

Table 1: Fusion of xiphoid process with the body of sternum in different age group of male:

Age Group	No. of specimen	Male		
		Complete Fusion	Partial Fusion	No fusion
15-20	2	0	0	2
21-25	1	0	0	1
26-30	2	0	0	2
31-35	2	0	1	1
36-40	3	0	2	1
41-45	5	2	2	1
46-50	5	1	4	0
51-55	5	4	1	0
56-60	3	3	0	0
61 onwards	5	2	3	0

Table 2: Fusion of xiphoid process with the body of sternum in different age group of female:

Age Group	No. of specimen	Female		
		Complete Fusion	Partial Fusion	No fusion
15-20	1	0	0	1
21-25	1	0	0	1
26-30	1	0	0	1
31-35	2	0	1	1
36-40	3	0	2	1
41-45	3	1	1	1
46-50	2	2	0	0
51-55	1	1	0	0
56-60	1	1	0	0
61 onwards	3	3	0	0

DISCUSSION:

Mathiharan and Patnaik opined that the xiphoid process unites with the body of sternum around forty years of age.

Glaister mentioned that xiphoid process usually fuses with the body of sternum at the age of about forty years.

Jit and Bakshi observed that the xiphoid process does not fuse with the body of sternum in males below 18 years and female below 21 years. Non fusion of the xiphoid process was seen in 11.4% of males above 66 years and 37.5% females above 40 years.

Reddy mentioned that xiphoid process unites with the body of sternum at about forty years of age.

Krogmann mentioned, "The xiphoid process with body of sternum after forty years of age.

Gatzoulis et al in Gray's Anatomy edited that the xiphisternal joint is also symphysis, which ossifies in fortieth year but sometimes remain unchanged even in old age.

According to Dr. Anil Agarwal the xiphoid process unites with the body of sternum after the age of 40 years.

Gautam R.S, Shah G.V Jadhav H.R and Gohil B.J, observed that the fusion of xiphoid process with body of sternum gets completed by the age of 50 years.

Wadhawan M, Murari A and Murali G summarized their findings regarding fusion of xiphoid process with the body of sternum in relation to age as: Mean age for onset of fusion of xiphisternal joint in males was 35.12 ± 0.64 years while in females was 35.83 ± 1.47 years. Mean age for complete fusion of xiphisternal joint in males was 58 ± 12.48 years while in females was 53.10 ± 7.27 years.

CONCLUSION:

In male, partial fusion of xiphoid process with the body of sternum was first seen in the age group of 31 to 35 years, while the complete fusion was seen first in the age group of 41 to 45 years. Fusion of the xiphoid process with the body of sternum was completed by the age of 51 to 55 years.

In female, partial fusion of xiphoid process with the body of sternum was first seen in the age group of 31 to 35 years while the complete fusion was seen first in the age group of 41 to 45 years. Fusion of the xiphoid process with the body of sternum was completed by the age of 50 years.

But even in this age group and further higher age groups xiphoid process was still in the stage of partial fusion and in some cases it was not fused at all with the body of sternum.

So we must be cautious while assigning a particular age to an individual based on the state of fusion of xiphoid process with the body of sternum.

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