

The relationship of fusion of various component of shoulder joint to eruption of third molar teeth for age estimation by x-rays in Jaipur region

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Abstract

The scientific determination of age of an individual is a necessity for law enforcing agency in both civil and criminal matters. Growth changes of skeleton provide the most reliable basis for the estimation of age, and indeed, when mutilated remains are in question, no other line or investigation may be available. The principle means, which enable one to form a fairly accurate opinion about age of an individual, are general physical development, dentition, secondary sexual characters and ossification of bones. The present study has been undertaken to explore the pattern of diaphysis-epiphyseal union in the bones of shoulder joint to relation of eruption of third molar tooth in growing population in Jaipur region.

Keywords: Ageing, Fusion, Shoulder joint, Third Molar, Epiphysis

Introduction

An estimation of reasonably accurate age, plays a pivotal role in civil/criminal cases like personal identification, fixing of criminal responsibility, judicial punishment etc. The age of adolescent period to adulthood is considered most useful, as this age group is related to issues of consent, juvenile delinquency, demarcation of particular age is required legally to decide whether the juvenile court or journal court will take up the case¹.

During life span various features of development and growth are seen in a definite series. During growth of a normal individual a set of definite events occurs In children, we call them milestones, which takes place in particular sequences².

The principle means, which enable one to form a fairly accurate opinion about age of an individual, are general physical development, dentition, secondary sexual characters and ossification of bones².

Thus before puberty, when the skeleton begins to consolidate, so many active growth changes are going on, including the development of the growing (Epiphysis) ends of the limb bones, and the progressive calcification and the eruption of the teeth that it is relatively easy to determine probable age within \pm one year or so².

The present study has been undertaken to explore the pattern of diaphysis-epiphyseal union in the bones of shoulder joint to relation of eruption of third molar tooth in growing population in Jaipur region.

Materials and methods

This study is carried out in Department of Forensic Medicine & Toxicology of S.M.S. Medical College and Hospital, Jaipur. Total number of cases 130 (65 boys and 65 girls) both sexes, bearing age group between 13-21 years.

The subjects are selected randomly from various schools, from neighborhood of various faculty members and staff as well as cases attending the outdoor of the Forensic Medicine Department of S.M.S. Hospital, Jaipur. Age, as stated by them is further confirmed by birth certificate or entry in their school record. The persons selected for study were grouped as per their stated age, viz: 13-14 years, 14-15 years, 15-16 years, 16-17 years, 17-18 years, 18-19 years, 19-20 years and 20-21 years.

After obtaining informed expressed verbal consent for their radiological and clinical examination each person is x-rays for shoulder joint and subsequently the

skigrams are studied in detail in reference to various ossification centers, their appearance, process of fusion and post fusion scarring.

The dental examination of the subjects were done with the aid of mirror, probe and counting of teeth were recorded by palmer's notation. The intraoral periapical radiograph of upper and lower third molar region of all subjects were taken and recorded space present or not for eruption of third molar.

Results and observation

Table no. 1 shows fusion of epiphysis of head of humerus, Acromian process and Coracoid process starting from 14-15 years (14.28%), and complete fusion in shoulder joint in 18-19 years (100%) in boys. In table no. 2 represent the fusion of epiphysis of head of humerus, Acromian process and Coracoid process starting from 13-14 years (12.25%), and complete fusion in shoulder joint in 17-18 years (100%) in Girls.

Table 1: Progress of epiphyseal union in different bony components of shoulder joint in boys.

Name of the epiphysis	Different age groups showing % fusion							
	13-14 years	14-15 years	15-16 years	16-17 years	17-18 years	18-19 years	19-20 years	20-21 years
Head of humerus	-	14.28	30.00	50.00	78.57	100	100	100
Acromian process	-	14.28	40.00	71.42	78.57	100	100	100
Coracoid process	-	14.28	40.00	64.78	78.57	100	100	100

Table 2: Progress of epiphyseal union in different bony components of shoulder joint in girls.

Name of the epiphysis	Different age groups showing % fusion							
	13-14 years	14-15 years	15-16 years	16-17 years	17-18 years	18-19 years	19-20 years	20-21 years
Head of humerus	12.5	41.66	83.33	90.00	100	100	100	100
Acromian process	12.5	41.66	83.33	90.00	100	100	100	100
Coracoid process	12.5	41.66	93.33	100	100	100	100	100

Table 3: Eruption of third molar in boys.

Age group (in years)	total cases	space for third molar		erupted third molar	
		in lower jaws	percent	in lower jaws	Percent
13-14	6	-	-	-	-
14-15	7	-	-	-	-
15-16	10	-	-	-	-
16-17	14	10	71.42	5	35.71
17-18	14	7	50	4	28.57
18-19	6	-	-	6	100
19-20	5	-	-	5	100
20-21	3	-	-	3	100

Table 4: Eruption of third molar in Girls.

Age group (in years)	total cases	space for third molar		erupted third molar	
		in lower jaws	percent	in lower jaws	Percent
13-14	8	-	-	-	-
14-15	12	-	-	-	-
15-16	12	1	8.33	-	-
16-17	10	3	30.00	-	-
17-18	9	1	11.11	7	77.77
18-19	5	-	-	5	100
19-20	5	-	-	5	100
20-21	4	-	-	3	75

Table no. 3 and 4 shows the maximum space present for eruption of third molar (71.42% & 30% respectively) in 16-17 years of age group in boys and girls. Complete eruption of third molar from 18-19 to 20-21 years of age in boys and girls.

Discussion

The present study has been conducted on 130 subjects (65 boys & 65 girls) of known age to understand the time (of age) of appearance of various epiphysis and their fusion with diaphysis at shoulder joint. In this study head of humerus was found completely fused in the majority of boys (78.57%) and girls (83.33%) in the age group of 17-18 years and 15-16 years respectively. The fusion of epiphysis is reported by L.A. Waddell (1928)³ at 15-20 years without any gender differentiation, Lall & Nat (1934)⁴ at 19 years in boys and 18 years in girls at Lucknow and Pillai (1936) at 14-17 years at madras without any gender differentiation.

In this study epiphyseal center for Acromian process of scapula is found fused in majority of boys (78.57%) and girls (83.33%) in the age group of 17-18 years and 15-16 years respectively. As mentioned by C.K. Parikh⁵, Chaurassia B.D.⁶, T. A. Gonzales⁷, Peter L. Williams⁸ and S. Cochrane Shanks⁹ the fusion of acromian process occurs at a later age and observed by F.E. Camps¹⁰ earlier age than the present study.

The present study shows the epiphyseal center for Coracoid process of scapula is found fused in majority of boys (78.57%) and girls (93.33%) in the age group of 17-18 years and 15-16 years respectively. As mentioned by C.K. Parikh⁵, K.S. N. Reddy², and F.E. Camps¹⁰ earlier age than the present study.

Dental examination of the subjects did not show any apparent gender wise variation. The study shows none of the boys or girls of 14-15 years of age manifested space for third molar, behind the second permanent molar teeth. Third molar in lower jaw have

reflected earliest eruption in comparison to the upper jaw. According to Lagan & Kronfeld (1954)¹¹ observed that the crown of lower third molar completely develops between the age of 12 to 16 years. But further observed that the root of this tooth is completed at the age of 18 to 25 years.

The observation of present study shows that the eruption of third molar is seen in age group of 16-17 years. The finding of eruption of third molar are consisted with Modi (1991)¹² but not consisted with observation of Powell (1953)¹³, who while working as police surgeon of Bombay give the upper limit 14 years for third molar teeth in Indian children. As soon as second molar teeth erupts the space for the third molar teeth start to form and it was seen well marked at the age 16-17 years in most of cases in present study.

Conclusion

Eruption of third molar is observed and findings are tabulated. Hence it is in a healthy person, appearance and fusion of epiphysis of shoulder joint has no relation to eruption of third molar in different age groups.

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