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FIXATION OF 16 YEARS OF AGE BY RADIOLOGICAL STUDY OF SHOULDER JOINT (A JAIPUR BASED STUDY)

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ABSTRACT

Estimation of reasonably accurate age, plays a pivotal role in civil/criminal cases like personal identification, fixing of criminal responsibility, judicial punishment. The present study has been undertaken to explore the pattern of diaphysis-epiphyseal union in the bones of shoulder joint in growing population of Jaipur region.

Keywords :- Age Estimation

INTRODUCTION

There is variation in the timing of union of the epiphysis of bones & it has been attributed to factors like climate, heredity, race, nutrition, dietary habits, gender and socio-economic status of population for study. Survey Committee appointed by Central Government recommended for a Zone wise Study. (1) Keeping in view the above statement and great medicolegal importance of 16 years of age along with difficulty in estimating the 16 years age particularly in girls and also that no study what so ever done in Rajasthan where mixed population resides. The present study has been undertaken to explore the pattern of diaphysis-epiphyseal union in the bones of shoulder joint in growing population of Jaipur region.

AIMS AND OBJECTIVES

(1) To assess the general maturity for a known chronological age in either gender. (2) Study of average age of appearance of ossification centers around shoulder joint. (3) Comparative study of appearance and fusion of ossification centers on shoulder joint in boys and girls. (4) Comparative study of appearance and fusion of ossification centers in boys and girls with available data of previous work carried out in India. (5) Comparative study of appearance and fusion in boys and girls of present study with previously available foreign data. (6) Comparative study of appearance of third molar, secondary sexual characters and various demographical determinants with radiological process of fusion around shoulder joint.

MATERIAL AND METHODS

This study is carried out in the Department of Forensic Medicine and Toxicology of S.M.S. Medical College and Hospital, Jaipur. 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 S.M.S. Hospital, Jaipur.

Selection Criteria for inclusion of person in present study.

For selection of subjects, following facts were recorded and considered:

(1) They should be living in Jaipur region for more than 5 years.(2) They should be free from any physical disability or endocrinal anomaly.(3) Person should have accurate record of their date of birth.(4) Informed expressed verbal consent of the subjects was taken before proceeding to their physical! dental and radiological examinations.

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.

Age, as stated by them is further confirmed by birth certificate or entry in their school record.

The persons belonging to the age group selected for the study of either gender are included in the study irrespective of their socioeconomic, religious and educational status, each person so chosen on the basis of criteria as mentioned above are evaluated clinically in details as per performa annexed.

After obtaining informed expressed verbal consent for their radiological and clinical examination each person is x-rayed for shoulder joint and subsequently the skiagrams are studied in detail in reference to various ossification centers, their appearance, process of fusion and post fusion scarring.

Radiological Criteria for epiphyseal fusion

The union is taken as complete when the: .

a) Diaphyseo-apiphyseal space is cornpletely 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.

In the present study, the following points were noted with reference to each epiphysis in either of the gender separately:

* Age of the youngest subjects showing fusion of epiphysis with diaphysis.
* Age of oldest subject not showing fusion of epiphysis with diaphysis.
* The range of fusion with its relation to each epiphysis covering the upper and lower ages.
* Age at which at least 75% or more of the cases have shown fusion.

Data Collection

Radiological data of appearance and fusion of various ossification centers were reduced to tables of various age groups along with other physical data noted previously. These data were once again, examined and tallied by experts in Forensic Medicine and Radio-diagnosis. Data thus obtained finally, were analyzed and compared with the published work of various Indian and foreign works.

OBSERVATION & DISCUSSION

The present study has been conducted on 130 subjects (65 girls and 65 boys). In school going

Table -1

Progress of epiphyseal union in different bony components of shoulder joint in boys

Name of	Different age groups Showing % Fusion							
Epiphysis	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
Head of humerus	-	14.28	30.00	50.00	78.57	100	100	100
Acromion 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	Different age groups Showing % Fusion							
Epiphysis	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
Head of humerus	12.5	41.66	83.33	90.00	100	100	100	100
Acromion 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

subjects, date of birth was confirmed from the verbal statement, record of school, secondary school certificates etc. all the subjectswere bonafied residents of Rajasthan and are residing in Jaipur for more than 5 years and were free from physical and mental illness, disability and long lasting disease.

Physical including dental and radiological examination was conducted in the Department of Forensic Medicine and Toxicology of S.M.S. Medical College Hospital, Jaipur. Informations and parameters thus deduced are recorded in the Master Chart.

In Case of boys findings of Head of humerus in present study are in accordance with the L.A. Waddel [2], Galastaun [3], T.A. Gonzales [4], J.V. Basmajian [5] and not in accordance with Lall and Nat [6], Pillai [7], S.N. Sahana [8], K.S. Narayan Reddy [9], Chaurassia B.D. [10], F.E. Camps [11], Peter L. Williams [12], S. Cochrane Shanks [13], Flecker [14], Davies and Parson [15], Bernard Knight [16] and Kragman [17].

In case of girls above cited findings of present study are in accordance with Galastaun, Pillai and Basu & Basu [18].

In the study conducted by Lall and Nut, S.N .Sharma, Chaurasia B.D., K.S. Narayan Reddy and T.A. Gonzales, Peter L. Williams and Flecker fusion occurs in later age group than the present study (15-16 years).

In case of boys findings of present study for Acromian Process corresponds with Pillai, Galastaun, KS Narayan Reddy, JV. Basmajian, Flecker, Bernard Knight and Krogman and not in accordance with C.K. parikh" Chaurassia B.D., T.A. Gonzales, F.E. Camps, Peter L. Williams, S.C. Shanks.

In case of girls the findings of present study are consistent with Galastaun and F.E. Camps and not consistent With Pillai, C.K. Parikh, K.S.N. Reddy, Chaurassia B.D., T.A. Gonzalis, Peter L. Williams, J.V. Basmarijians, S.C. Shanks, Bernard Knight and Krogman.

In case of boys findings of present stuydy for coracoid process are consistent with Galastaun, Chaurassia B.D., T.A. Gonzales, Peter L. Williams and SC Shanks and in consistent with L.A. Waddae, C.K. Parikh, K.S. Narayan Reddy, F.E. Camps, J.V. Basmajian and Krogman.

In case of girls the findings of present study corresponds with L.A. Waddale, Galastaun, KS Narayan Reddy, Chaurassia B.D., F.E. Camps, J.V. Basmajian, S.C. Shanks and Krogman and not corresponds with T.A. Gonzales and Peter L. Williams.

In the study conducted by T.A. Gonzales fusion of coracoid process occurs at a later age that present study and in the study by Peter L. Williams fusion occurs at an earlier age that present study 15-16 years.

DEVELOPMENT OF SECONDARY SEXUAL CHARACTER

It is observed that in boys of present series pubic, axillary and facial hair grow at the age of 14,15,16 year respectively in majority of the cases in their age group respectively. The voice of the majority of cases in boys was found to be man like or low pitched at the age of 16-17 years onwards and the adams apple become prominent at the age of 16 years onwards.

These findings are consistent with reported findings of Modi (Textbook of Medical Jurisprudence and Toxicology, 1988).

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