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## To assess age with ossification center of pisiform bone

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### Abstract

**Background:** The appearance of ossification centers for carpal bones especially for pisiform bone is one of the vital evidence for estimating age. The present study was conducted to assess age with ossification center of pisiform bone.

**Materials & methods:** The present study was conducted on 40 adult patients. The subjects are selected among the children attending the radiology department either on outpatient basis or inpatients for various surgical and orthopedic problems of the hand. Hand wrist radiograph was taken in all subjects.

**Results:** At age group 8-9 pisiform not appeared, at 9-10 years not appeared in 9, at 10-11 appeared in 8 and at 11-12 appeared in 10. At age group 8-9 pisiform not appeared, at 9-10 years not appeared in 8, at 10-11 appeared in 7 and at 11-12 appeared in 9. The mean age of appearance of pisiform in males was 9.86 years and in females was 9.12 years. The difference was significant ( $P < 0.05$ ).

**Conclusion:** Authors found that pisiform bone ossification centre appeared earlier in females than males.

**Keywords:** Pisiform bone, ossification, age

### Introduction

There are various criteria for age determination of an individual, of which eruption of teeth and ossification activities of bones are important. Nevertheless age can usually be assessed more accurately in younger age group by dentition and ossification along with epiphyseal fusion. A careful examination of teeth and ossification at wrist joint provide valuable data for age estimation in children. Studies on ossification of the carpal bone are very few in India and abroad [1].

Identification means the determination of the individuality of a person based on certain physical characteristics unique to that individual [2]. There are several criteria used for identification and one such essential criterion is the estimation of age of an individual. Height, weight, eruption of teeth, appearance of secondary sexual characteristics, appearance and fusion of ossification centers are the principle means used in assessment of age with fair accuracy [3]. Approximate age of an individual can be estimated by correlation of physical, dental and skeletal developmental parameters. The ability to age an individual with a degree of objectivity and certainty is important in many medico-legal circumstances involving both civil and criminal cases [4].

The appearance of ossification centers for carpal bones especially for pisiform bone is one of the vital evidence for estimating age in young children between 9 and 13 years. Many authors have quoted different opinion on the range of age at which ossification center for pisiform bone appears, this scenario encouraged to take up this radiographic study [5]. The present study was conducted to assess age with ossification center of pisiform bone.

### Materials & methods

The present study was conducted in the department of Forensic Medicine. It comprised of 40 adult patients. Institutional ethical approval was taken prior to the study. Written consent was obtained from all subjects.

General information such as name, age, gender etc. was recorded. Patients were divided into 4 groups based on age. The subjects are selected among the children attending the radiology department either on outpatient basis or inpatients for various surgical and orthopedic problems of the hand. Hand wrist radiograph was taken in all subjects. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

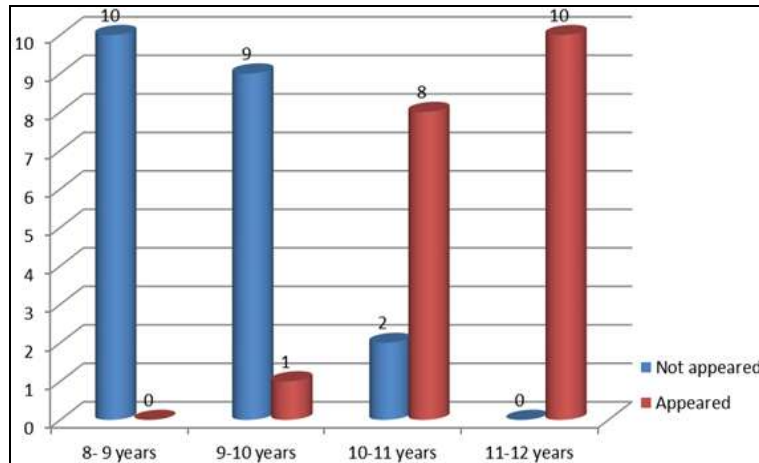
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**Results**

**Table 1:** Pisiform on wrists in males

Age group (Years)	Not appeared	Appeared	Total
8-9	10	0	10
9-10	9	1	10
10-11	2	8	10
11-12	0	10	10

Table 1, graph 1 shows that at age group 8-9 pisiform not appeared, at 9-10 years not appeared in 9, at 10-11 appeared in 8 and at 11-12 appeared in 10.

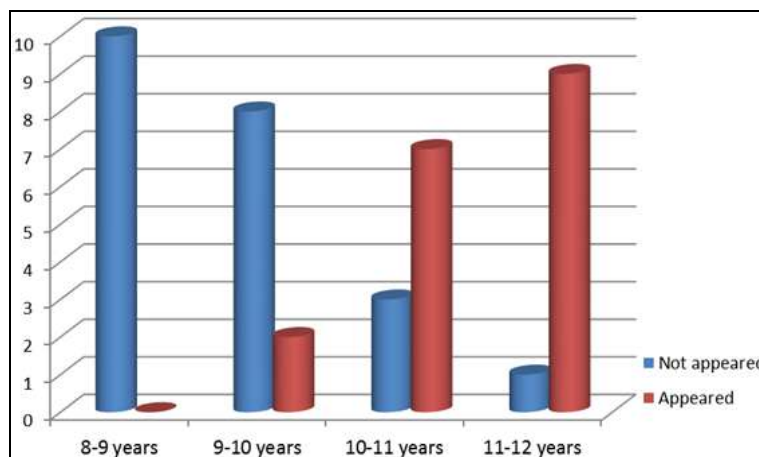


**Graph 1:** Pisiform on wrists in males

**Table 2:** Pisiform on wrists in females

Age group (Years)	Not appeared	Appeared	Total
8-9	10	0	10
9-10	8	2	10
10-11	3	7	10
11-12	1	9	10

Table 2, graph 2 shows that at age group 8-9 pisiform not appeared, at 9-10 years not appeared in 8, at 10-11 appeared in 7 and at 11-12 appeared in 9.



**Graph 2:** Pisiform on wrists in females

**Table 3:** Mean age of appearance of pisiform between male and female patients

Gender	Mean	S.D	P value
Male	9.86	2.37	0.05
Female	9.12	2.16	

Table 3 shows that mean age of appearance of pisiform in males was 9.86 years and in females was 9.12 years. The difference was significant ( $P < 0.05$ ).

## Discussion

Many studies have been conducted by various workers in India and abroad on appearance and fusion of various ossification centers of bones. They found that the appearance and fusion of ossification centers are influenced by various factors such as geographic, racial, environmental, climatic, hereditary, nutritional, endocrinal abnormalities and metabolic disorders [6]. The present study was conducted to assess age with ossification center of pisiform bone.

We found that at age group 8-9 pisiform not appeared, at 9-10 years not appeared in 9, at 10-11 appeared in 8 and at 11-12 appeared in 10. At age group 8-9 pisiform not appeared, at 9-10 years not appeared in 8, at 10-11 appeared in 7 and at 11-12 appeared in 9. Kangne *et al.* [7] study on Bengalis observed that the ossification center of pisiform appears by 9-12 years in females and 12-17 years in males. Hence appearance of ossification center is earlier in south Indians compared to the Bengalis and this study correlates with the literature. It is also observed in the present study that pisiform appears earlier (i.e. about one to two years) in females compared to males, which is consistent with the opinion given by earlier studies.

We found that mean age of appearance of pisiform in males was 9.86 years and in females was 9.12 years. Halasagi *et al.* [8] studied the appearance of pisiform in both male and female subjects and observed that it appears by 11 years in females and by 13 years in males. So the average range of age for appearance of pisiform ossification center in this province is between 9 & 11 years in females and between 10 & 12 years in males.

Ashwani *et al.* [9] included 244 healthy children of both sexes up to 12 years of age. Capitate and Hamate were first (during infancy) and Pisiform (9-12 years) was last to ossify. Ossification of the 8 carpals and 2 centers for lower ends of radius and ulna respectively have a definite relation with age and can be consider as good indicator for age assessment in pediatric age group. S.S. Bhise *et al.* studied the appearance of pisiform bone in both males and females observed that it appeared by 10-11 years in females and 12-13 years in males.

Webster *et al.* [10] conducted a study in which trapezium, trapezoid and Scaphoid ossified between the ages of 5 to 9 years in both the sexes. Ossification of Scaphoid has been also reported earlier in Englanders and Australians than Indians similar to Triquetral. Appearance of last carpal i.e. Pisiform has been reported at the age of 9 to 12 and 10 to 12 years in the males and females respectively. All other studies (Indian and abroad) showed almost similar age of ossification of Pisiform with a difference of  $\pm 1$  year.

## Conclusion

Authors found that pisiform bone ossification centre appeared earlier in females than males.

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