International Journal of Medical and Health Research
ISSN: 2454-9142
Impact Factor: RJIF 5.54
www.medicalsciencejournal.com
Volume 3; Issue 9; September 2017; Page No. 119-120

Anatomy of distal end of radius: A radiological study done on adult population of Jharkhand state of India

[1] Dr. Harsh Vardhan, [2] Dr. Rashmi Kumari, [3] Dr. SK Chouhan
[1] MBBS, MS (Anatomy) Tutor, Department of Anatomy, MGM Medical College, Jamshedpur, Jharkhand, India
[2] MBBS, Junior Resident, MGM Medical College, Jamshedpur, Jharkhand, India
[3] MBBS MS (Anatomy), Assoc. Prof., MGM Medical College, Jamshedpur, Jharkhand, India

Abstract
The morphometry of distal end of radius comprises radial inclination, palmar tilt and radial height. It is important for the management of fracture around wrist in distal end of radius. The goal of our study was to obtain the value of these parameters in adult population in Jharkhand region of India.
Materials and Methods: An Observational Cross Sectional prospective study was done between May 2017 to August 2017 at MGM Medical College Jamshedpur. Total 215 normal X rays were examined AP and Lateral view were used. AP view was used to measure radial inclination and radial height while lateral view was used to measure palmar tilt.
Result: Two hundred and fifteen (n= 215) normal X rays were examined the mean value of radial inclination, palmar tilt and radial height were 23.29±7.4, 10.09±5.23, 11.33±4.7 mm respectively.
Conclusion: Data may be helpful to conduct similar study in other parts of India. Data may be of help during restoration of normal anatomical alignment of distal radial fracture for good functional outcome.

Keywords: anatomy, adult population, inclination, palmar

Introduction
Fracture of distal radius accounts for 20% of fracture seen in accident and are common in elderly population with osteoporosis typically caused by a fall on out stretched hand. Most of these cases are managed by close reduction and plaster cast application. Reduction of digital radius fracture is evaluated by the restoration of pre fracture value of radial incarnation and volartilt and radial height. Restoration of redial height palmar tilt influences the grip straight of the palm. Study of distal end of radius inclued the measurement of radial inclination, palmer tilt and radial height. The goal of our study was to determine these value of amoung the adult population of Jharkhand region of India.

Material and Methods
An ovservational cross sectional procpective study was carried out between May 2017 to August 20117. For the morphometric evaluation of digital radius radial inclination, Palmer tilt and radial height were used parameters. Xray of normal wrist with fused epiphysis were included in the study. Xray of the wrist showing structural deformity were excluded from the study.
True xray AP and latral view were considered in the study and the film with rotation were discarded. Radial inclination and radial height were measured on AP view. Palmer tilt was measured on laterlal view.
Radial inclinaton is measured as an angle made by tangent line connecting the radial styloyde to the medial age of distal radius and the horizontal line perpediculler to the axis of radius at the level of lunate fossa.
Palmer tilt is the angle formed by the meeting point of two lines one line tangential connecting the dorsal and palmer edge of the articular surface of distal end of radius and second line perpendicular to the long axis of radius at the level of radial styloid.
Radial height is the distance between two parallel lines perpendicular to the long axis of radius at the level of radial styloid and one at the level of lunate fossa.
Ulnar variance is the distance measured between the two horizontal lines. One perpendicular to the axis of ulna at the distal cortical margin and the second line perpendicular to the axis of radius at the distal cortical margin.

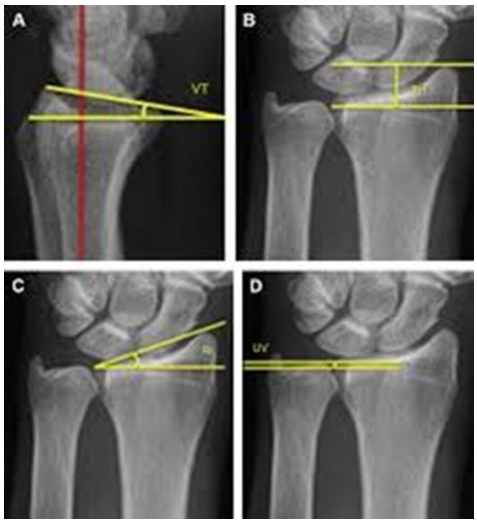

Fig 1: A= Palmer Tilt, B= Radial Height, C= Radial Inclination, D= Ulnar Variance

Result

Two hundred and fifteen (215) xray were included in the study the Male – Female ratio was 69% male (148) 31% Female (67). Right and left side distribution was seventy five left (34 females & 41 Male). 140 right (37 female & 103 male) Age of the patient range from 15 to 65 Years with an average of 33.5 years.

The average value of radial inclination for n=215 was 23.29±7.4, palmer tilt 10.09±5.23 and radial height 11.33 mm ±4.7 mm.

The value of radial inclination palmer tilt and radial height for male was 2.16 ±7.9, 10.11±5.2, 11.66±5.3 respectively. Value for female gender was 23.44±5.89, 9.7±5.26, 10.4±3.17 respectively. The difference was not significant except for radial height which showed P value < 0.05.

Measurement of parameter on right and left side for radial inclination palmer tilt and radial height were 23.16 ±7.8, 10.44±5.12 and 11.25±3.6 mm for right side respectively for left side values were 23.39±6.7, 9.27±5.21 and 11.34±6.74 mm respectively. Moreover the compression of the parameter on left and right side also did not reveals any significant statistical difference.

Table 1: Values of parameters in total subjects (n=215)

Parameters	Mean+S D
Radial Inclination	23.29±7.4
Palmer tilt	10.09±5.23
Radial Height	11.33±4.7

Table 2: Values in male and females

Parameters	Males	Females	P value
Radial Inclination	23.16±7.9	23.44±5.89	>0.05
Palmer tilt	10.11±5.20	9.7±5.28	>0.05
Radial Height	11.66±5.3	10.4±3.17	<0.05

Table 3: Values for right and left side

Parameters	Right	Left	P Value
Radial Inclination	23.16±7.83	23.39±6.7	>0.05
Palmer tilt	10.44±5.12	9.27±5.21	>0.05
Radial Height	11.25±3.61	11.34±6.74	>0.05

Discussion & Conclusion

The fracture of distal radius accounts for 20% of all the fractures seen in accident and 8 to 15% of all the fractures seen in adults in upper limb. From the above discussion it is evident that morphology of distal radius is important for the evaluation and treatment of the injuries around wrist. Absolute knowledge of morphometric parameters of the distal radius is important for restoration of normal Anatomical alignment. Which is essential for good functional outcome of the treatment.

This data may be used as a reference data for the normal Anatomical alignment during treatment. This data may provide help to prosecute further study in different parts of India.

References

1. Hadi S, Wijiono W. Distal radius morphometry of Indonesian population. Med J Indonesia. 2013; 22:173-7.
2. Chan CY, Vivek AS, Leong WH, Rukmanikanthan S. Distal radius morphometry in the Malaysian population. Malaysian Orthop J. 2008; 22:27-30.
3. Johnson PG, Szabo RM. Angle measurements of the distal radius: A cadaver study. Skeletal Radiol. 1993; 22:243-6.
4. Pennock AT, Phillips CS, Matzon JL, Daley E. The effects of forearm rotation on three wrist measurements: Radial inclination, radial height and palmar tilt. Hand Surg. 2005; 10:17-22.
5. Miyake T, Hashizume H, Inoue H, Shi Q, Nagayama N. Malunited Colles' fracture. Analysis of stress distribution. J Hand Surg Br. 1994; 19:737-42.
6. Pogue DJ, Viegas SF, Patterson RM, Peterson PD, Jenkins DK, Sweo TD, *et al.* Effects of distal radius fracture malunion on wrist joint mechanics. J Hand Surg Am. 1990; 15:721-7.
7. Short WH, Palmer AK, Werner FW, Murphy DJ. A biomechanical study of distal radial fractures. J Hand Surg Am. 1987; 12:529-34.
8. Gelberman RH, Salamon PB, Jurist JM, Posch JL. Ulnar variance in Kienböck's disease. J Bone Joint Surg Am. 1975; 57:674-6.
9. De Smet L. Ulnar variance: Facts and fiction review article. Acta Orthop Belg. 1994; 60:1-9.
10. Adams BD. Effects of radial deformity on distal radioulnar joint mechanics. J Hand Surg Am. 1993; 18:492-8.
11. Austin L, Veillette C. Distal radius fracture. In: Orthopedia-Collaborative Orthopaedic Knowledgebase. 2009; 13-26.
12. Nana AD, Joshi A, Lichtman DM. Plating of the distal radius. J Am Acad Orthop Surg. 2005; 13:159-71.
13. Ando Y, Yasuda M, Goto K. Is ulnar variance suitable for a parameter of Colles' fracture preoperatively? Osaka City Med J. 2006; 52:63-6.
14. Hollevoet N, Verdonk R. The functional importance of malunion in distal radius fractures. Acta Orthop Belg. 2003; 69:239-45.
15. Gupta C, Kalthur SG, Malsawmzuali JC, D'souza AS. A morphological and morphometric study of proximal and distal ends of dry radii with its clinical implications. Biomed J. 2015; 38:323-8