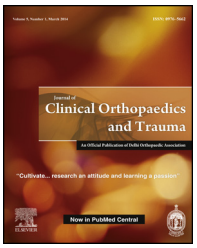
Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/jcot



Original Article

# Functional anthropometric measurements of Indian pelvis

*Shailendra Singh MBBS MS Orthopaedics*[a], *Santosh Kumar MBBS*[b], *Surabhi Rohilla BPO*[c], *Lalit Maini MBBS MS Orthopaedics*[c,d,*]

[a] *Department of Orthopaedics, Chitra Medical Centre, Lakhimpur, India*
[b] *PG Orthopaedics Student, Department of Orthopaedics, Maulana Azad Medical College & LNJP Hospital, New Delhi, India*
[c] *Project Fellow-UGC, Department of Orthopaedics, Maulana Azad Medical College & LNJP Hospital, New Delhi, India*
[d] *Professor, Department of Orthopaedics, Maulana Azad Medical College & LNJP Hospital, New Delhi, India*

ARTICLE INFO

*Article history:*
Received 6 April 2014
Accepted 3 May 2014
Available online 18 June 2014

*Keywords:*
Anthropometry
Indian
Pelvis

ABSTRACT

*Purpose:* To determine the normal values of several radiographic measurements of hip and pelvis in individuals of Indian population.

*Material and methods:* We conducted a cross-sectional study of Indian population and calculated mean and variation seen in different parameters in Indian pelvis. We took the plain X-ray of randomly selected hundred patients in identical position with 20% magnification factor. Different parameters including acetabular inclination angle, cup size, tear drop position, neck shaft angle, neck offset, abductor lever arm and head size were drawn on the X-rays and values measured.

*Results:* 100 subjects were taken (63 male and 37 female). The mean of acetabular inclination angle was 37.70 ± 3.82° (30–47°). The mean neck shaft angle was131.53 ± 7.70° (114–158) the most commonly occurring value was 131°. The mean abductor lever arm was 38.48 mm ± 5.77 (23–54) with the mode of 40. The mean cup size was 48.9 ± 3.67 mm (34–58) with the most commonly occurring value as 50. The mean angle from tip of trochanter to center of head was 80.2 ± 9.1 (62–110). Among all the seven parameters correlations were drawn. There were in all 22 correlations out of which 14 were statistically significant.

*Conclusion:* Since there is significant difference between the neck shaft angles and other measurements of Indian population than to the European population, an evaluation in the design of the implant by the Indian manufacturers is recommended. Also this study proposes that the normal values of our own population be used as reference values in interpreting standard radiographs of pelvis with both hips.

Copyright © 2014, Delhi Orthopaedic Association. All rights reserved.

* *Corresponding author*. 22, Samachar Apartment, Mayur Vihar Phase I, Delhi 110091, India. Tel.: +91 (0) 9811604224.
E-mail address: lalit_maini@rediffmail.com (L. Maini).

http://dx.doi.org/10.1016/j.jcot.2014.05.001

0976-5662/Copyright © 2014, Delhi Orthopaedic Association. All rights reserved.

## 1. Introduction

In total hip replacement, accurate implantation of the components is critical to the stability of the prosthesis. Knowing the normal and variation in the different anatomical parameters is of utmost importance in the preoperative planning and templating the type of implant to be used. Although world references are available and the methods of calculating these are also available, no X-ray based study has been done for Indian population in relation to anthropometry of pelvis.[1,2] We conducted a cross-sectional study of the Indian population regarding the anthropometric measurements on plain X-rays of pelvis with both hip.

## 2. Material and method

The study is a cross-sectional study of a randomly selected adult Indian population. The subjects were selected randomly with otherwise normal hips. Every third person coming to the department of radiology for barium meal X-ray was subjected to X-ray pelvis with both hip, after informed consent. All the X-rays considered for study were of skeletally mature persons. The X-rays were taken in the identical position with subject supine and both the lower limbs parallel and knee in full extension. The medial border of both the feet were rested over the 15–15° preformed frame (Figs. 1 and 2) to produce the 15° internal rotation at hip. The beam was centered over the symphysis pubis. Magnification was 20%. Hundred such X-rays were collected. The X-rays were marked regarding various parameters and values calculated. The parameters were acetabular inclination angle, neck shaft angle, abductor lever arm, cup size, neck offset, trochanteric tip to center of head angle, head size and level of lesser trochanter in relation to inter-ischial tuberosity line (Fig. 3). Acetabular inclination angle is the angle formed between the horizontal formed by joining the two tear drops and the line joining the inferior tear drop with the superolateral edge of the acetabulam.[3] Neck shaft angle was the angle between the central axis of the femur and the axis of the femoral neck.[4] Abductor lever arm was the perpendicular distance from the center of rotation of head to the line between the anterior superior and posterior superior iliac spine at the point one third of the way from the posterior to anterior superior spine.[5] Cup size was taken by using the Zimmer THR templates. The acetabular template was placed just lateral to the lateral edge of the tear drop at a 45° angle. The cup size completely covering the bone was taken. Head size was also taken using the same template and the center of the head was marked. The neck offset is the perpendicular distance from the neutral long axis of the femur and the center of rotation of hip. The tip to center of head angle was taken as the angle between the anatomical axis at the level of trochanteric tip to the line joining the center of head. The parameters were marked and measured on both right and left side.

The data collected was statistically analyzed using the *t* test for significances and Pearson's method for correlation. The mean, median, mode and standard deviation were calculated for all the seven parameters. The correlation between all the seven parameters was drawn from Pearson's correlation coefficient.

**Fig. 2 – 15–15° frame being used to place the hips in identical position.**

**Fig. 1 – 15–15° frame being used to place the hips in identical position.**

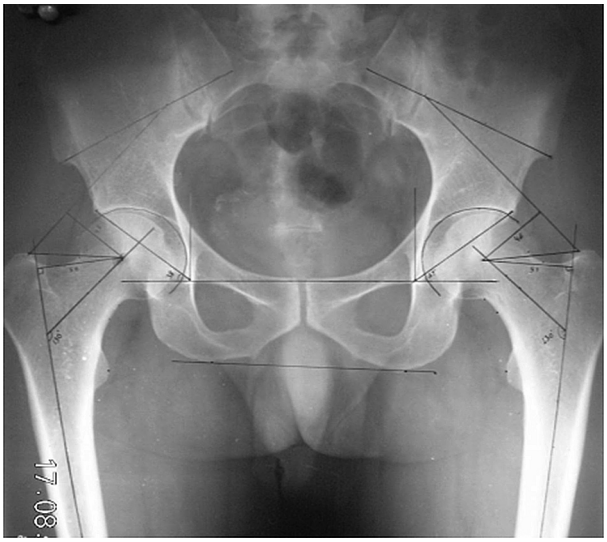


**Fig. 3 – X-ray showing the various markings.**

Download English Version:

https://daneshyari.com/en/article/3245397

Download Persian Version:

https://daneshyari.com/article/3245397

Daneshyari.com