

INTERMALLEOLAR DISTANCE IN NORMAL ADULTS AND ADULTS WITH GENU VALGUM

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ABSTRACT

Intermalleolar distance (IMD) that is the distance between the medial malleoli is one of the ways of assessing the degree of tibiofemoral angulation of the knee. Thus, ascertaining mean values of the IMD and determining normal limits for these values among Nigerians could be an important tool for orthopedic surgery and related practice. The IMD for eighty (80) subjects was measured, these included fifty (50) normal adults (22 males and 28 females), 30 adults with genu valgum (10 males and 20 females). All subjects were between the ages of 18-35 years and all residents of Port Harcourt. The mean IMD obtained for normal adults was 1.79 ± 0.42 cm and 4.56 ± 1.71 cm for males and females respectively and the mean IMD values for adults with genu valgum were 9.75 ± 3.45 cm and 13.92 ± 8.64 for males and females respectively ($P < 0.05$) for both groups. Therefore, mean IMD values between $\leq 4 - \leq 8$ cm maybe considered to be the lower normal limits for adult males and females respectively.

KEYWORDS: tibiofemoral angle, genu valgum, medial malleolar distance.

INTRODUCTION

Genu valgum is the Latin-derived term used to describe "knock-knee" deformity. It is a combination of femoral neck anteversion and lateral tibia torsion (Stevens et al 1999). It is a structural deviation that causes abnormal lateral stress on the patella such that the legs are bowed inwards in the standing position (Bruce 1996). This knocking of the knee usually occurs such that on standing the knees are closely apposed while the medial malleoli are visibly separated instead of just touching.

While many otherwise normal children have knock-knee deformity as a passing trait, some individuals retain or develop this deformity due to hereditary, or genetic disorders or metabolic bone disease such as Paget's disease (Stevens 1999). Genu valgum maybe physiologic or pathologic, while the former occurs in children below the age of 6-7 years and is usually resolved within this time, the later occurs in adolescents and adults and most often requires medical treatment. Recently, weight has also been reported to affect the angular status of the lower limbs Bonnet (2003) reported an intermalleolar distance of more than 10cm in about 50% of overweight children.

Tibiofemoral angle, intercondylar and intermalleolar distances are all values used in assessing angular status of the lower extremities (Arazi 2000). There is however very scanty documentation of the values of intermalleolar distance in normal adults and adult with genu valgum, it is therefore one of the reasons for carrying out this study.

MATERIALS AND METHODS

A total of eighty (80) adult subjects were included in the study. Fifty (50) normal adults (22 males and 28 females), and thirty (30) adults (10 males and 20 females): certified to have the Genu valgum. The subjects ages ranged between 18-35 years and were all resident in Port Harcourt.

Measurement of the intermalleolar distance was done using a spreading caliper for measuring the distance between the medial malleoli of the limbs. Distance taken was then read

off a transparent calibrated rule. Before each measurement was taken, the subject was told to stand in the anatomical position on a flat surface with the back against a wall with both feet touching. A spreading caliper was then placed between the medial malleoli of the ankles, adjusted until both pointed tips were touching both malleoli. The distance in centimeter was then read off on a calibrated rule and recorded. The data collected was analysed using analysis of variance (ANOVA).

RESULTS

The mean and standard deviation of the intermalleolar distance (IMD) for normal adults and adults with genu valgum are presented in table 1.

Test for statistical significance indicated that the mean IMD value was statistically significant between males and females in the normal group ($P < 0.05$), but was not significant between males and females in the group with genu valgum ($P > 0.05$). However, mean IMD for females was statistically significant for both groups ($P < 0.05$).

Table 1: Mean and Standard deviation of IMD in normal adults and adults with genu valgum

Sex	Sample Size		Mean IMD \pm SD (cm)	
	Normal	Genu Valgum	Normal	Genu Valgus
Male	22	10	*1.79 \pm 0.42	9.57 \pm 3.45
Female	28	20	*4.56 \pm 2.92	*13.93 \pm 8.64

* - Significance at $p = 0.05$
 S.D. - Standard Deviation
 IMD - Intermalleolar Distance

DISCUSSION

The mean intermalleolar distance in normal male and female adults and males and females with genu valgum in Rivers

State has been documented in this study. Higher mean intermalleolar distance for females than males in both groups was observed. This is in agreement with the mean intermalleolar distance of ≤ 4 cm for normal males and ≤ 8 cm for normal females as reported by Cahuzac et al (1995) in a study of normal Europeans in France. The higher intermalleolar distance in females obtained in this study could be due to wider pelvis in females.

Volpon (1997) however reported a higher intermalleolar distance for males with idiopathic genu valgum than in females with the condition. This report is contrary to our finding, which observed a higher intermalleolar distance in females than males with the condition. It could be suggested that the observation made among Brazillian in South America as reported by Volpon (1992) that the distance might have been influenced by racial differences in the length, shape and thickness of ossified adult bones.

In conclusion, establishing a range of normal values of intermalleolar distance is of clinical importance as this information provides physicians the means of determining which case is normal or not. Observations in this study conclude that females have a higher intermalleolar distance than males whether they possess genu valgum. This is due to the fact that women have higher pubiofemoral angle (Shaffer et al 1994) and consequently higher intermalleolar distance due to wider hips.

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