

KNEE JOINT ALIGNMENT IN THE INDIGINOUS PEOPLE OF SRI LANKA

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Introduction

The alignment of the knee joint has generated much interest in the recent past due to its link with osteoarthritis (OA). It is described as the angle formed by the femoral shaft and the tibial shaft, at the knee. The exact factors that influence the alignment of the knee have not been elucidated to date. However it is postulated that genetic factors, body mass index (BMI), laxity of the joint and the life style among others may play a role.

The indigenous populations of Sri Lanka, commonly known as the "veddas" live in a relatively closed community, with many inter marriages. They have a way of life which causes them to squat climb trees, carry heavy weights and walk long distances. This type of life style leads to strain on the knee joints. Due to this life style and the high fiber content of their food, obesity is relatively uncommon in their population. OA appears to be minimal in their population. Therefore the objective of this study was to measure the knee joint alignment of the indigenous people and compare with a group of urban Sinhalese individuals.

Materials and Methods

Hundred adult volunteers above the age of 25, from the population of "veddas" living in Dambana were

included in the study. Their weight and height were measured in kilograms and meters using standard measuring scales and BMI calculated (Garrow and Webster, 1985). The knee joint alignment was measured using the goniometer (Kraus *et al.*, 2005). The other group consisted of 60 adult Sinhalese volunteers from the University population.

Results

Sample from the veddas consisted of 100 individuals which included 46 females and 54 males with an age range of 26 to 75 years. The control sample consisted of 50 females and 50 males with an age range of 25 to 65 years. The mean BMI of the indigenous people was 21.2 (± 3.95) and that of the control group was 23 (± 3.2). The observed difference in the mean BMI was statistically significant. Indigenous people had a mean knee alignment angle of 182.4° (± 3.45) and the Sinhalese sample had a mean of 180.9° (± 4.7) (Figure 1 and 2) and no significant difference between the means was observed. In the indigenous people highest number of knees were in the 181° to 185° range while in the control the highest number was seen in the range of 176 to 180°. The variance was lower than the Sinhalese in the indigenous population. None of the over 50 population had clinical evidence of

OA in the indigenous group while in the Sinhalese group, all females above 50 had mild knee pain and 2 had clinically detectable OA.

Discussion

In studies done in the West the normal range for knee joint alignment angle as measured by the

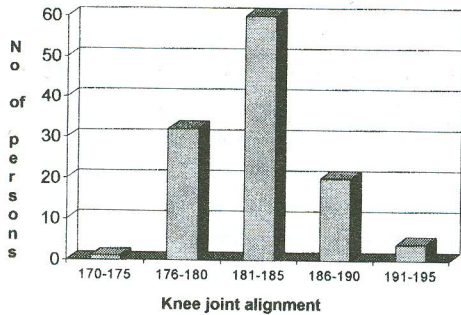


Figure 1. Knee joint alignment in the indigenous people

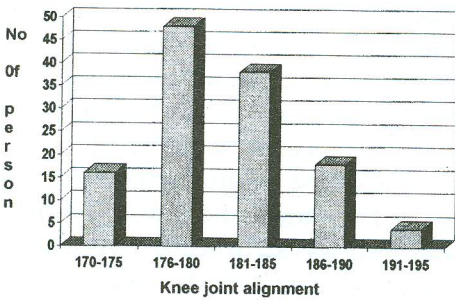


Figure 2. Knee joint alignment in Sinhalese people

goniometer is considered as 182 to 184°. It was observed that the knee angle range in the indigenous people was very close to this. However in the

control population the range was several degrees less. The active life style of the indigenous people maybe resulting in increased strength in the ligaments and muscle in the lower limbs, thereby maintaining the angle within the normal range. The lower BMI of the indigenous people by reducing the load on the knees maybe maintaining the alignment closer to the normal range. The fact that the knee alignment angle is concentrated to a narrower range with low variance in the indigenous people could be due to closeness of the community and inter marriages leading to restricted gene pool.

Conclusions

Knee joint alignment in the indigenous population is closer to the normal range than in the control sample. There is no difference between the mean knee alignments in the two groups. Clinically detectable OA appears to be minimal among the indigenous people.

References

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Kraus, V.B., Vail, T.P., Worrell, T. and McDaniel, G. (2005). A comparative assessment of alignment angle of the knee by radiographic and physical examination methods, *Arthritis Rheum.*, 52(6):1730-5.