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Anthropometric Measurement of Caucasian and Asian Knees, Mismatch with Knee Systems?

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Summary:

Anthropometric of Caucasian and Asian knees is different and it may implicate in choosing the prosthesis for knee arthroplasty

Abstract:

Background

Positioning and fit of the knee prostheses in patients determines functional outcome. For that matter anthropometric differences between knee joints of patients, will affect function. Since most total knees implant systems are designed for Caucasians, discrepancies in matching to Asian patients might exits, with consequently less optimal fit. The aim of this study was to evaluate differences in anthropometric dimensions between Caucasian and Asian knees of patients eligible for total knee arthroplasty..

Materials And Methods

Radiographic anthropometric data on distal femurs, proximal tibia and patellar dimension were measured of 69 Caucasian and 69 Asian patients. All radiographs were obtained preoperatively prior to total knee arthroplasty. The radiographic measurements at standing anteroposterior (AP) and mediolateral (ML), aspect ratio, patellar length and patellar tendon length knees were obtained at two different centers, both in Asia and Europe. Patient groups were age and gender matched. Sizes of several knee implant designs (Vanguard, Genesis II, Persona, Medacta GK Sphere, LINK Gemini, and Sigma PFC and Nexgen) were fitted to anatomical dimensions

Results

The mean age of the Caucasian group were 67 ± 7.3 years and the Asian patients were 67 ± 7.8 years. Both groups included 15,9% males and 84,1% females. In AP and ML the Caucasian femur is longer than the Asian femur (male-AP 12%, female-AP 15%, male-ML 6%, female-ML 9%) with AP is significantly longer in Caucasian than in Asian. The Caucasian tibia is also longer in AP and ML than the Asian tibia (male-AP 12%, female-AP 16%, male-ML 5%, female-ML 7%) with AP is also significantly longer in Caucasian than in Asian.

Conclusion

Absolute and relative differences of knee dimensions exit between Caucasian and Asian knees. prosthesis in TKA systems cannot accommodate properly knees for Asian groups. Tibial component of the selected knee systems fitted better than femoral components.