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One Size in No Way Fits All

Quantifying Hip Variations by Automatic Morphometric Measurements from CT

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Femur and hip measurements have strong clinical and anthropological value. Variability among individuals however makes consistently reproducible measurements non-trivial and time consuming. Automatic CT image segmentation and meshing allow objective measurements to be taken as part of an automated pipeline.

A 16-row MDCT was used to acquire images of 55 human cadavers (24 M, 31 F).

The right femur and pelvis are automatically segmented and parameterized using a mesh [1].

Surface measurements are automatically calculated on the mesh, taking advantage of correspondent landmark positions.

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References

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Results

Automatic measurements are within 2.4% to 7.6% of manual measurements. All measurements show statistically significant differences between sexes.

Conclusions

The automated system is sufficiently accurate and sensitive to discern sex variations in hip morphometry. The system will be used to create a bank of detailed hip models and morphometric assessments which can support the development of prosthetic devices and assist in diagnosing complex hip-based disorders.