Micro-CT scanning and reconstruction of the human inner ear in search of clinically useful measurements

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In this study, micro-CT scanning was performed on eight human petrous temporal bones. This imaging technique has enabled us to gather very high-resolution (~0.02mm) 2D images of the human inner ear. Using various software and conversion methods, we were able to create 3D reconstructions and models to allow us to make highly accurate measurements of the dimensions of the inner ear, with a particular focus on the cochlea and semi-circular canals.

One of the aims of this project is to discover a proxy measurement for the cochlear spiral length, a clinically relevant measurement which is useful for surgeons performing cochlear implants. By making highly accurate and repeatable measurements, we hope to find a useful set of measurements that a surgeon could make in clinic in order to reliably and accurately estimate a patient's cochlear spiral length prior to implantation. According to the current literature and the preliminary results I have gathered, there is an intraspecific difference in the measurements of the human inner ear. In light of this, I shall also examine what functional implications these differences in the inner ear could have in humans.

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