

Efficiency and Reproducibility of Intra-aural 3D Scans at Different Scan Durations, and a Comparison Between Manual Impression-Taking and Ear Canal Scanning

Introduction

The digitization of the impression-taking process for earmolds and hearing aids represents a significant advancement in audiological care. The aim of this study is to evaluate the reproducibility of digital ear canal scanning and to derive practice-relevant parameters for routine use by hearing care professionals.

Materials and Methods

For each protocol, consecutive scans were performed on a dedicated test specimen. In addition, the artificial ear canals were molded using traditional impression materials and scanned. The evaluation was conducted by comparing the digital geometries to a reference using the Geomagic Design X software and the free CloudCompare software.

Results

For all three scan protocols, a high level of internal consistency in the measurements was observed. In a direct comparison of the scans, only minor differences were observed in the resulting geometries. A challenge in the software-based analysis remains the precise digital delineation of relevant areas for the impression.

Conclusion

The study demonstrates that the level of detail captured has only a minor impact on the precision of digital ear canal models required for clinical practice.