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Laser doppler vibrometry data of the Clip piston MVP

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Background: A new malleus handle prosthesis for malleo-vestibulopexy and revision stapedotomy has been developed at our department and successfully used during the last five years. The piston prosthesis bears the CliP[®]-mechanism to facilitate attachment to the malleus handle and length and position can easily be adjusted intraoperatively with a movable hinge.

Objective: The study was devised to determine if the special developed hinge of the CliP Piston MVP causes a loss of sound transfer from the malleus grip to the vestibulum. Methods: A middle ear model was set up, consisting of a vibrator normally used in an active implantable hearing device with a metal arm in shape and dimension of an actual malleus handle, where the CliP Piston MVP was attached with the hinge bend to an angle of about 120°. The piston end of the prosthesis dipped in a hole of a plastic container filled with water simulating a piston hole in the footplate. The excitation level corresponded to more than 110 dB SPL for frequencies between 100 Hz – 10000 Hz. With a laser doppler vibrometer the movements were picked up at different spots in the area of the clip, the hinge and the piston.

Results: The overall characteristics of the transferfunction was practically identical (difference < 3dB). Additionally biphasic resonance peaks (5-10 dB) were observed around 1000 Hz. Discussion: Our results show very stable transfer properties over the frequency band. The noticed resonance peaks of 5-10 dB are very probably below significance level in clinical pure tone audiometry. This is in accordance with our experience from clinical practice.

Conclusion: The CliP Piston MVP provides good transfer characteristics from the malleus handle to the vestibulum