

# ABSTRACTS

## KURZ IMPLANTS, PRECISION INSTRUMENTS, VENTILATION TUBES

### MIDDLE EAR SURGERY

#### CLIP PISTON MVP

##### **A New Self-Fixing and Articulated Malleus Grip Stapedectomy Prosthesis**

Häusler R., Steinhardt U.

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A new prosthesis for malleus-grip stapedectomy is presented: the Clip® Piston MVP according to Häusler. The titanium piston is equipped with a self-fixing clip mechanism for automatic fixation of the prosthesis on the proximal malleus handle as well as a ball and socket articulation allowing easy introduction of the piston at an optimal angle into the oval window as well as adjustment of the insertion depth. A first series of malleus-grip stapedectomies performed with the Clip® Piston MVP shows a hearing gain of 20 to 50 dB and a residual air-bone gap of  $\geq 20$  dB in all cases. In one patient, revision surgery was necessary because of piston ejection from the oval window. It appears that with the new Clip® Piston MVP the previously difficult surgery of malleus-grip stapedectomy has become straight forward and technically simpler.

##### **Initial Experience with Titanium MVP Clip Prosthesis**

Singh P. P.

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**Introduction:** After introduction of stapes surgery malleovestibulopexy (MVP) was the natural extension of this procedure. Although the hearing results of stapes surgery were usually excellent, the hearing results of MVP were quite variable. This probably resulted from poor understanding of middle ear mechanics and usage of the same prosthesis as used for stapes surgery. Modification of prosthesis design and technique has resulted in improved hearing outcomes after this procedure.

**Purpose:** To evaluate the hearing outcomes of malleovestibulopexy using titanium MVP clip prosthesis which has recently been introduced.

**Material and Methods:** Six patients undergoing exploratory tympanotomy for congenital conductive hearing loss or failed stapes surgery and requiring malleovestibulopexy are included in this study. Extended tympanomeatal flap was employed for exposure of middle ear and upper malleus handle. The prosthesis was introduced and the clip was slipped on malleus handle. Minor adjustments were required to attain the perpendicularity of the shaft and shaft insertion in the vestibule. Drilling of handle with diamond burr was required in half the cases to better adapt the clip on malleus handle.

**Results:** The mean of air-bone gap averaged over speech frequencies was within 20 dB in all six cases and within 10 dB in four cases. No deterioration of bone conduction threshold was observed.

**Conclusions:** The hearing results of malleovestibulopexy using newly introduced titanium MVP clip prosthesis have been encouraging and almost equal results of stapes surgery. The improved results seem to be consequent to the unique design of the prosthesis which factors in two key variables of this procedure viz anchorage of prosthesis on malleus handle and perpendicularity of the prosthesis shaft in relation to stapes footplate.

#### **Laser doppler vibrometry data of the Clip piston MVP**

Arnold A., Stieger CH., Häusler R.

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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.