

# ABSTRACTS

## KURZ IMPLANTS, PRECISION INSTRUMENTS, VENTILATION TUBES

### MIDDLE EAR SURGERY

#### OMEGA CONNECTOR

##### Results of chain reconstruction with missing stapes superstructure using a jointed coupling module (Omega connector) with titanium total prostheses

Fischer M.

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**Introduction:** The Omega connector, a jointed coupling module for chain reconstruction with missing stapes superstructure, has been available for some years. The literature contains only two studies reporting the results of the implantation with 14 and 17 patients.

**Methods:** Retrospective evaluation of audiological results with 56 consecutive operations conducted by the author using the Omega connector. The Omega connector has always been placed where it could be securely positioned on the footplate when used with chain reconstruction in the presence of a defect of the stapes superstructure.

**Results:** 56 operations using the Omega connector have been registered since 2009. The data of preoperative and postoperative audiograms for 48 patients were available for analysis. They covered mostly male patients (68%) and left ears (62%). The preoperative conductive hearing loss (air-bone-gap, average of distances between air and bone conduction threshold at 500 Hz, 1kHz, 2 kHz and 3 kHz) was on average (SD) 35.36 dB (13.24), after the operation the residual conductive hearing loss was on average 24.54 dB (8.67). 41.67% of patients reach the „criterion for success“ of a residual conductive hearing loss of a maximum of 20 dB. The postoperative results were analyzed with reference to different influence factors.

**Conclusions:** The Omega connector in combination with titanium total prostheses shows promising results, even in the absence of stapes superstructure. Ventilation malfunctions are often the cause of lack of success. A two-stage procedure should be considered in the case of CWD operations with cholesteatoma.

##### Ossiculoplasty with Total Ossicular Replacement Prosthesis and Omega connector: Early Clinical Results and Functional Measurements

Mantei T., Chatzimichalis M., Sim J. H., Schrepfer T., Vorburger M., Huber A. M.

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**Objective:** Among other difficulties, achieving a stable position of a total ossicular replacement prosthesis (TORP) is demanding because of a limited view on the TORP-footplate interface and individual angles between the footplate and tympanic membrane. The Kurz Omega Connector aims at a simplified insertion of the TORP. The performance of total ossicular

reconstruction using the Omega Connector was evaluated.

**Study Design:** Prospective cohort study and experimental measurements with a fresh human temporal bone. **Setting:** Tertiary referral center.

**Patients:** Seventeen consecutive patients receiving total ossicular reconstruction were included. Historical control group composed of 36 patients. **Interventions:** Total ossicular reconstruction using the Omega Connector.

**Main outcome Measures:** (a) Handling of the TORP and Omega Connector intraoperatively, (b) functional short-term results compared with a historical control group, (c) sound transmission properties with 3 different connective positions between the TORP and the Omega Connector.

**Results:** Placing the Omega Connector on the footplate and coupling the Omega Connector to the TORP was straightforward in 65% of cases. A stable final position of the TORP was obtained in 88% of cases. Mean (SD) preoperative and postoperative air-bone gaps were 36.00 (11.05) and 25.29 (12.25) dB and were almost identical with those in the historical control group ( $p = 0.9$ ). In the experimental measurements, functional outcomes with "partial connection" showed almost the same results as those with "full connection."

**Conclusions:** The Omega Connector provides easy handling of the TORP. The short-term functional results were comparable to those achieved previously without the Omega Connector. The temporal bone measurement supports tolerance in connective position between the TORP and the Omega Connector.

##### The $\Omega$ Connector – A Module for Jointed Coupling of Titanium Total Prostheses in the Middle Ear

Schmid G., Steinhart U., Heckmann W.

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**Background:** Hearing improvement after reconstruction of a defect ossicular chain depends on material, design and - crucially - coupling of the prosthesis. Coupling a total ossicular replacement prosthesis to the stapes footplate can be problematic and lead to prosthesis instability. In order to solve this problem, the  $\Omega$  Connector was developed, a module allowing the middle ear surgeon to couple a titanium total prosthesis to the stapes footplate in a flexible, angle-variable manner.

**Material and Method:** The  $\Omega$  Connector is made of pure titanium and consists of three components: head, neck and base plate. The head allows a jointed coupling to the stem of a titanium total prosthesis. Positioned between the remnants of the stapes crura, the base plate proves for a stable connection with the stapes footplate.

**Results:** The  $\Omega$  Connector was implanted during 14 revision surgeries. In 10 of these surgeries a total ossicular replacement prosthesis was removed which was implanted at an earlier date and which was fixed and no longer functioning. In all 14 cases it was possible intraoperatively to position the  $\Omega$  Connector correctly and to couple it to a titanium total prosthesis. The postoperative hearing gain was between 10 to 25 dB, with an average of 18 dB.

**Conclusion:** For the first time, the  $\Omega$  Connector offers to the surgeon the option to couple a titanium total prosthesis via a micro ball joint. Hearing results achieved so far are satisfying. The results confirm the advantages of the  $\Omega$  Connector during implantation of a titanium total prosthesis. For a final evaluation, long-term studies have yet to be made.