Device for Peroperative Monitoring of Ossicular Mobility During Middle Ear Surgery

vibration sensor, ossicle mobility, acoustic diagnosis, peroperative, ear surgery

COMPETITIVE ADVANTAGES

- Rapid and cost efficient
- Handheld device
- Generates objective Yes/No results
- Safety (sterile disposable sensor, soft sensor tip)
- High sensitivity on the entire hearing frequency range
- Filtering of environmental parasitic vibrations (tremor movement of the surgeon,..)

VALIDATION

- Numerous testing at the laboratory with different probes at different amplitudes and frequencies
- Testing in animals in progress

APPLICATIONS/MARKETS

- Ear surgery / Medical device market
- All applications for measurement of very low vibration of light objects

INTELLECTUAL PROPERTY

- Patent filed on 25.3.2015 in France
- PCT filing on 25.3.2016

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PRESENTATION

At present, middle ear surgeries lead to a significant number of reoperations. We have developed a device that gives the surgeon an objective assessment of success of the surgical procedure during the procedure itself, thereby limiting the number of reoperations.

The mobility of the ossicles is one of the most critical factors affecting postoperative hearing (1). Current technologies to measure mobility of the ossicles are based on expensive and difficult to use devices, moreover these devices may present safety issues (1). Therefore surgeons usually rely only on their own experience to assess functionality of the acoustic ossicular chain during surgery.

Our device is designed as a light and handy tool which resembles a pen. During surgery, the tip of the pen is applied directly to the vibrating parts of the ear to test the performance of the acoustic transmission. The measured signals are processed by a dedicated software that will give the surgeon a clear objective answer as to the success of the surgical procedure.

The device consists of two components:
- a reusable main body
- a disposable sensitive head including the sensor (vibrating piezoelectric membrane).

The use of a proprietary piezoelectric polymer membrane allows rapid measurements (about 1 second) within the entire hearing frequency range with high sensitivity.

The concept has been validated by numerous tests in the laboratory

(1) Hato, Otology & Neurology, 27: 592-595, 2006