

## A pilot study on pupillary response to hearing in noise in CI patients compared to normal hearing.

-A future objective measurement of listening effort

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### **Introduction:**

Objective measurement of listening effort is a field in hearing science which is rapidly growing. It is expected to achieve objective measures of listening effort with “Pupillometry”. Pupillometry is the recording of pupillary response to hearing in noise with outcomes as Peak Pupil Dilation(PPD) and peak-time.

One of the explanations behind this interest is that listening effort is suggested and partly proven to be associated with the development of mental fatigue among hearing impaired (HI) patients compared to normal hearing (NH) individuals.

Objective is to investigate pupillary response to hearing in noise using the Danish hearing in noise test (HINT).

### **Methods:**

The study enrolled 6 experienced CI users and 8 participants with normal hearing as control group. With pupillometry goggles the participants were presented with 20 sentences with 5 words each in noise with fixed SNR at +10 dB.

### **Results:**

Data of the right eye was processed by Pupil Trace Analyser with hardware called Pupil-Labs provided by Oticon. Data showed that CI-users had a higher mean PPD = 0.09 (9% change in pupil dilation (SD: 0.02)) compared to NH with mean PPD = 0.06 (6% change (SD:0.03)) and as expected the mean peak-time in CI-users was longer (9.67s (SD:0.86)) compared to NH (5.82s (SD:0.77)).

### **Discussion:**

The analysis of pupillometric measurements with HINT confirmed our objective.

Though the sample size is very little, this pilot study paves the way to further research of pupillometry becoming a promising tool to improve objective quantification of CI performance in clinical settings.

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