(Hoe) werkt het in de audiologische praktijk?

(How) does it work in audiological practice?

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History: first digital hearing aids
Advanced Compression techniques

![Diagram showing time and frequency plots for Linear and WBC4 modes.](image)
Effects of compression

Only slight improvements maximum speech score

WDRC: Improved audibility and less problems with loud sounds

Hearing-aid users: relatively high level of satisfaction compared to old situation!
→ not only comfort, but real improved auditory functioning?
Effects of compression


Comparison APHAB 1995 and 2005 (main difference: WDRC):

- Less “aversiveness to sounds” (AV)
- No difference in communication subscales

successful adjustment to hearing aids: 82% in 2005 vs. 43% in 1995
What users profit from what new features?

Users:
• Hearing loss
• Age
• Life style
• Money

Features:
• Compression
• Noise suppression
• Directionality
• Anti-feedback
• FM-connectivity

Audiologist and dispenser: find the right match!
Severe hearing losses

- Improved audibility: compression and anti-feedback
- Improved maximum speech score: incidentally.
- Improved comfort in noisy conditions: noise-reduction and compression
Speech understanding in noise

Still limited benefits noise-reduction algorithms

• Directionality: few dB’s SNR improvement is often not enough, only useful in limited conditions.

• General noise reduction: improvement comfort rather than speech intelligibility

Improved connectivity to fm-microphone, telephone, tv, etc.: very effective but not always practical
Noise reduction

Luts et al. HEARCOM
Multicenter evaluation of signal enhancement algorithms for hearing aids

Zakis JA, Hau J, Blamey PJ
Environmental noise reduction configuration: Effects on preferences, satisfaction, and speech understanding

Stelmachowicz P, Lewis D, Hoover B, Nishi K, McCreery R. Woods W
Effects of digital noise reduction on speech perception for children with hearing loss.

- No statistical significant effect on Speech perception (SNR)
- Improved listening effort, noise reduction preferred to control
Light and mild hearing losses

Open fitting: clear practical and acoustical benefit
Improved fine-tuning frequency characteristic
Extended high frequency band

Fitting and fixation may be problematic
Thin tubes easily damaged or blocked
Steep high-frequency losses

- Anti-feedback: ventilation possible
- Accurate fine-tuning slope in gain characteristics (many frequency bands)
- Frequency compression/transposition?
Steep high-frequency losses


Effects of Frequency compression on speech perception
Young children, infants

Improved audibility: compression, anti-feedback!
Role frequency compression?
School Children

Adaptation to environment improves listening comfort
Directionality hardly any benefit.
Improved quality and connectivity FM-devices!

Small hearing aids = less visible.
However: often no connection solo, limited gain. Fixation open fitting often problematic.
Elderly

Compression: no volume control needed!

Noise suppression: listening comfort, better acceptation.

One user program often sufficient.
Money

The hearing aid user often pays for extra features.

Trial: compare simple hearing aid with more advanced.
Life style and environment

Dynamic: benefit advanced features
Inventory specific needs
How to fine-tune features to needs?

Clinical experience in combination with solid audiological background.

Advanced evaluation tools, still in development
Evaluation: in-situ gain can still be used?

Yes!!!
Evaluation: spatial hearing

Important!!!
Conclusion

Many new features in hearing aids last decade
Reason to be sceptical (‘good’ Dutch tradition)?

Yes, limited evidence for benefit.
No, many practical advantages and improved listening comfort, leads to improved auditory functioning