



Solutions for better hearing **CROS/BICROS**

Cutting the Wire

What's New in CROS/BICROS Technology?


Dr. Martin Kinkel






Agenda


- Introduction
- Binaural hearing and single sided deafness
- The CROS concept
- CROS indications
- The patient's perspective: Fitting goals
- CROS solutions and alternatives
- Wireless solutions
- Benefits of digital wireless solutions
- Fitting CROS/BICROS devices



Binaural hearing

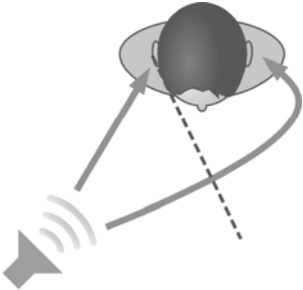


Binaural hearing



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Binaural hearing



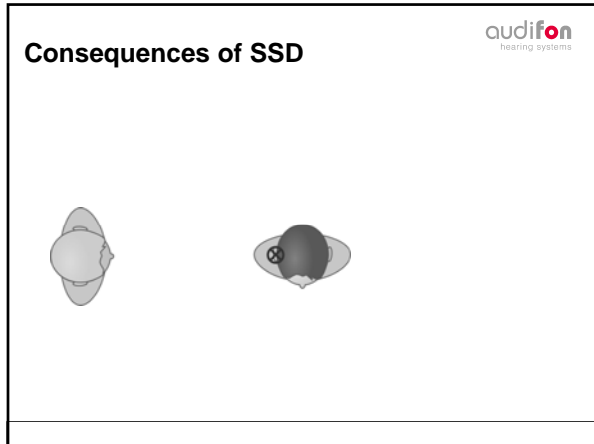
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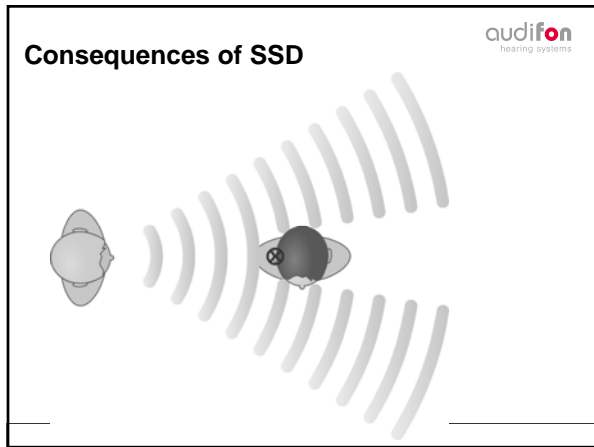
Interaural differences
 Δt , ΔL , ΔS

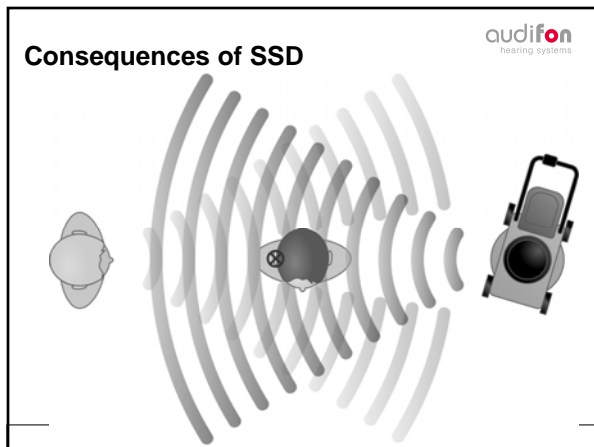
Single sided deafness (SSD)




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Consequences of SSD audifon
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Consequences of SSD audifon
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Confusion

- Some listening situations create little difficulties, other create extreme difficulties

Embarrassment

- Invisible impairment (as is „normal“ hearing loss)

Annoyance

- SSD creates continuing difficulties in every-day-life


Helplessness

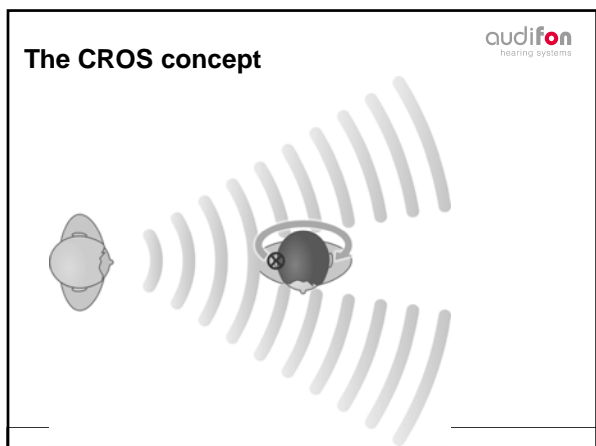
- Important signals might be missed without second chance

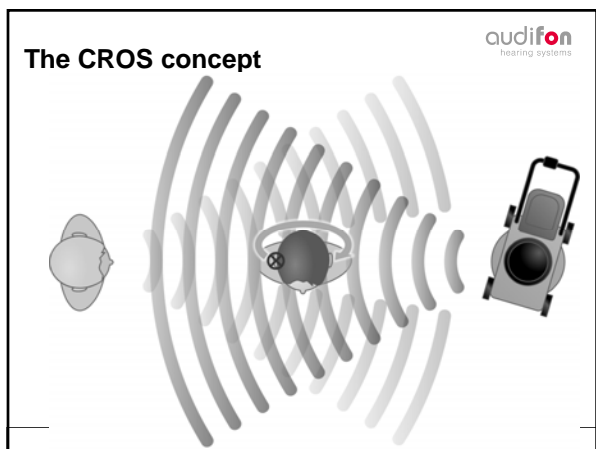
Frustration

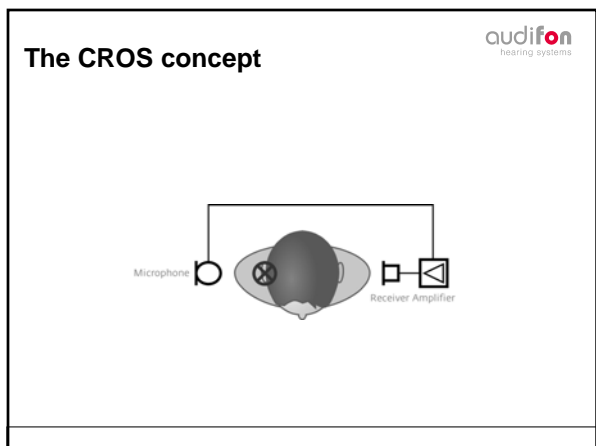
- Client recognizes difficulties but might see himself not a candidate for a fitting

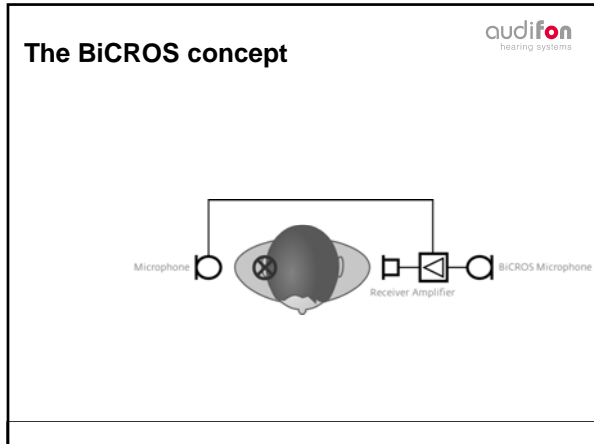
The CROS concept audifon
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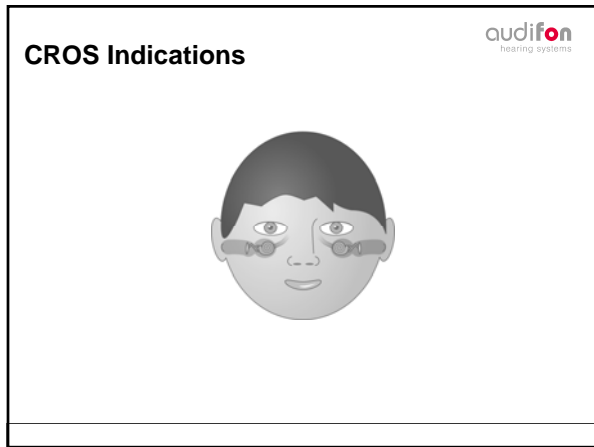


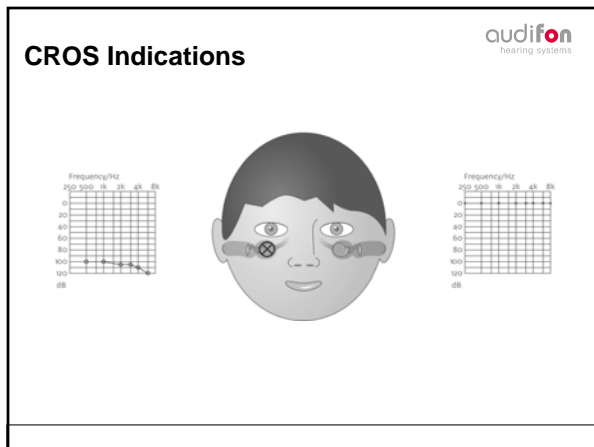












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CROS Indications at a glance

Poorer ear (right)

- deaf, severe to profound loss, conductive or mixed hearing loss
- Not suitable for conventional hearing instruments
- Medical contraindications against conventional hearing instruments
- No acceptance of conventional hearing instruments
- No usable hearing in this ear
- No or very poor speech intelligibility

Better ear (left)

- Normal hearing
- No or mild hearing loss not meeting the indication criteria for a hearing aid fitting

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BiCROS Indications

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BiCROS Indications at a glance


Poorer ear (right)

- deaf, severe to profound loss, conductive or mixed hearing loss
- Not suitable for conventional hearing instruments
- Medical contraindications against conventional hearing instruments
- No acceptance of conventional hearing instruments
- No usable hearing in this ear
- No or very poor speech intelligibility

Better ear (left)

- mild to moderate hearing loss
- Hearing loss meets criteria for hearing instrument fitting
- Can be fitted with conventional hearing instruments


Fitting goals



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A black and white photograph of a man sitting cross-legged on a light-colored floor in a bright room. He is wearing a light-colored shirt and trousers, and is looking down at an open book or document he is holding in his lap. Large windows in the background let in natural light, creating a bright and airy atmosphere.


Fitting goals



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A black and white photograph showing a group of people, including men and women of various ages, sitting around a dining table. They appear to be in a restaurant or cafe, engaged in conversation and holding glasses, possibly wine or water. The scene is social and relaxed.


Fitting goals



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A black and white photograph of a busy city street at night. Several cars are visible, their headlights and taillights blurred due to motion, suggesting a fast-paced urban environment. Buildings and streetlights are visible in the background, creating a sense of depth and activity.


Fitting goals audifon
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Benefits of CROS/BiCROS solutions audifon
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Eliminates headshadow effect by amplifying signals on unaidable side:

- Meetings
- Walking side by side
- Driving a car
- Listening in restaurants



CROS/BiCROS-Benefits at a glance audifon
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- Better SNR if the signal comes from the poorer side and the predominant noise from the better side
 - Head acts as a baffle for the higher frequencies
 - Transmitter microphone boosts higher frequencies from the poorer side and transmits them to the better ear
- Addressability from both sides
 - Signals from the poorer side will be heard slightly amplified on better ear. Subtle sound differences can create "pseudo stereophony"
- Improved speech intelligibility in noisy listening situations, if speech comes from poorer ear

Signal transmission to better ear **audifon**
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Transcranial

- High-Power-HA in deaf ear
- Bone anchored hearing aids (BAHA, Ponto)

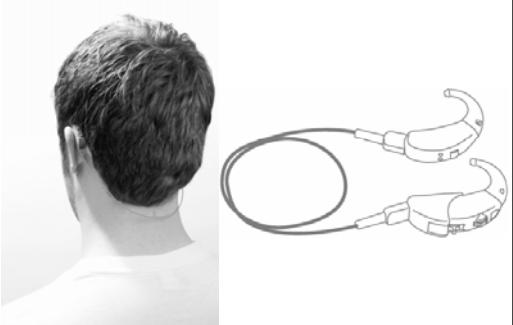
Wired

- „classical“ CROS
- Mounted on glasses

Wireless

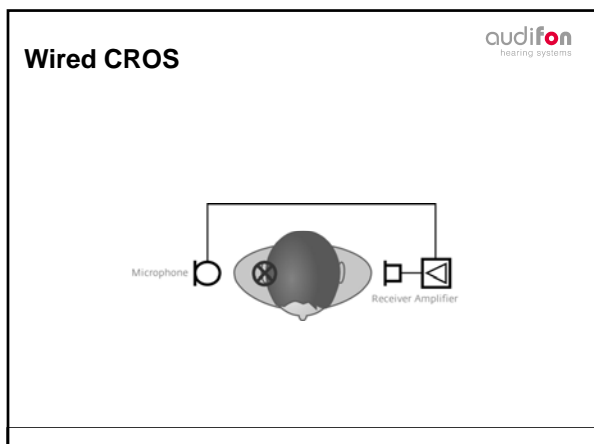
- analog
- digital

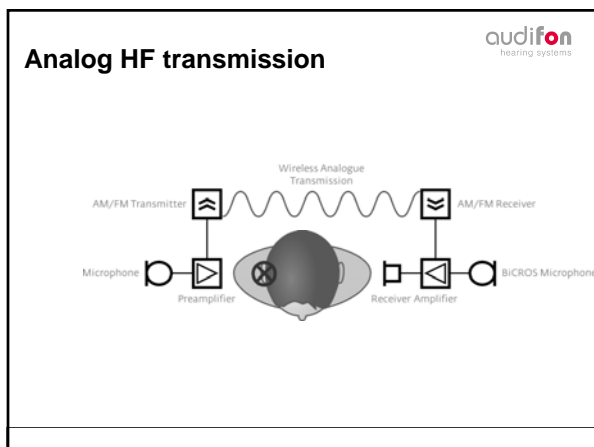
Wired CROS **audifon**
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Wired CROS **audifon**
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Analog HF transmission at a glance

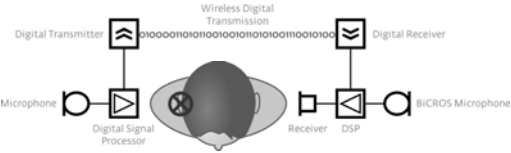
<p>Advantages</p> <ul style="list-style-type: none"> • No cable, no DAI connector no special spectacle necessary • CROS/ BiCROS ITE (Full Shell) is possible 	<p>Disadvantages</p> <ul style="list-style-type: none"> • High risk of interference and distortions by electro magnetic fields in the environment • Strong interferences by using mobile phones or other wireless phones • Slightly higher power consumption • Two systems can interfere with each other
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audifon via: New philosophy




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Digital HF transmission




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Real-time wireless audio-transmission




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CROS/BiCROS features audifon
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audifon via's sound resync feature re-synchronizes the signals on both sides in a BiCROS configuration



audifon via's easyclick feature synchronizes program switching and volume settings on both sides

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Digital HF transmission at a glance audifon
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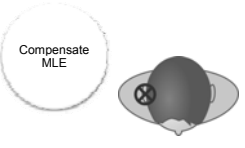
Advantages

- No cable, no DAI connector no special spectacle necessary
- CROS/ BiCROS ITE (Full Shell) is possible
- Superior sound quality
- Synchronized program-switching and volume control (BiCROS)
- Systems can be paired
- Encrypted transmission (no interference with other systems)
- Low radiation power (NFMI)
- NFMI-based systems can be used worldwide

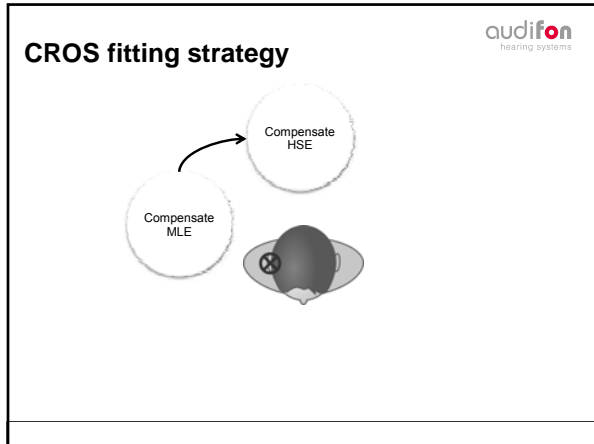
Disadvantages

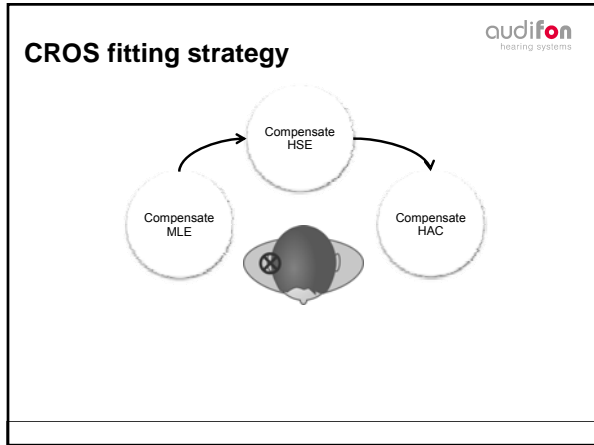
- Time delay (can be compensated using audifon's sound resync feature)
- Higher power consumption (2.4 GHz technology)

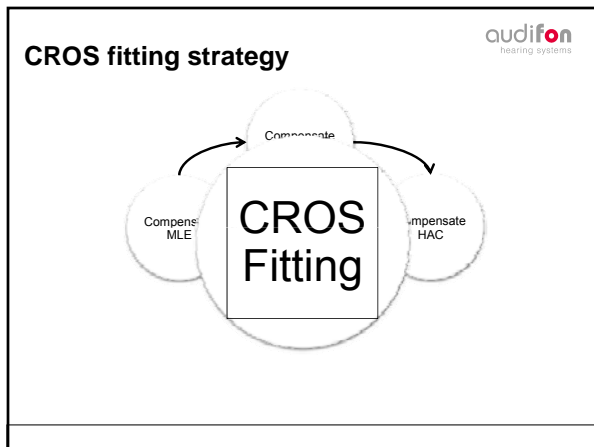
CROS fitting strategy audifon
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Compensate
MLE







BiCROS fitting strategy

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Compensate MLE

BiCROS fitting strategy

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Compensate MLE

Compensate HSE

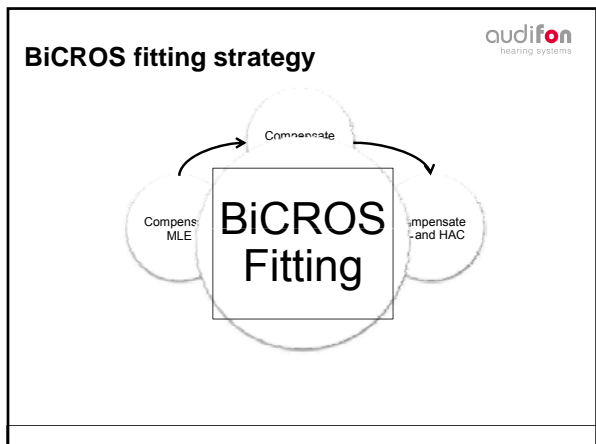
BiCROS fitting strategy

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Compensate MLE

Compensate HSE

Compensate HL and HAC



Summary

CROS/BiCROS fittings are convenient solutions esp. for SSD

Wireless solutions can solve many of the issues with wired CROS/BiCROS solutions

Digital wireless solutions can further improve the performance of CROS/BiCROS solutions

audifon via's sound resync feature can re-synchronize signals on both sides in a BiCROS configuration

Fitting CROS/BiCROS devices can easily be done considering a few steps

- More on this topic later

Thank you very much
for your participation and attention

See you in Fall 2011

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References and further readings



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