Back to Basics-: Supervisors Guidelines

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Knowledge Base

- Developing an understanding of theory and its application is critical- get the foundations right

- It is possible to just “press the buttons” but great outcomes need more- thinking clinicians!

- Time under supervision is an opportunity to develop the new clinician- they do not get the opportunity after that

Supervisors

- Usually haven’t had training in how to be a supervisor
- Train the way that they were taught
- Train on what they do…but is that Best Practice?
- Sometimes forget the basic theory because it has been a long time
- Requires continuous revision and review
- START OFF as you intend to do long term

Teaching and Training

- Involves you talking to them but then repeating back to you what they heard

- Adult learning needs hands on training as well. They needs to show you that they can do it

- Have a clarity of learning objectives, expectations and competency sign-off

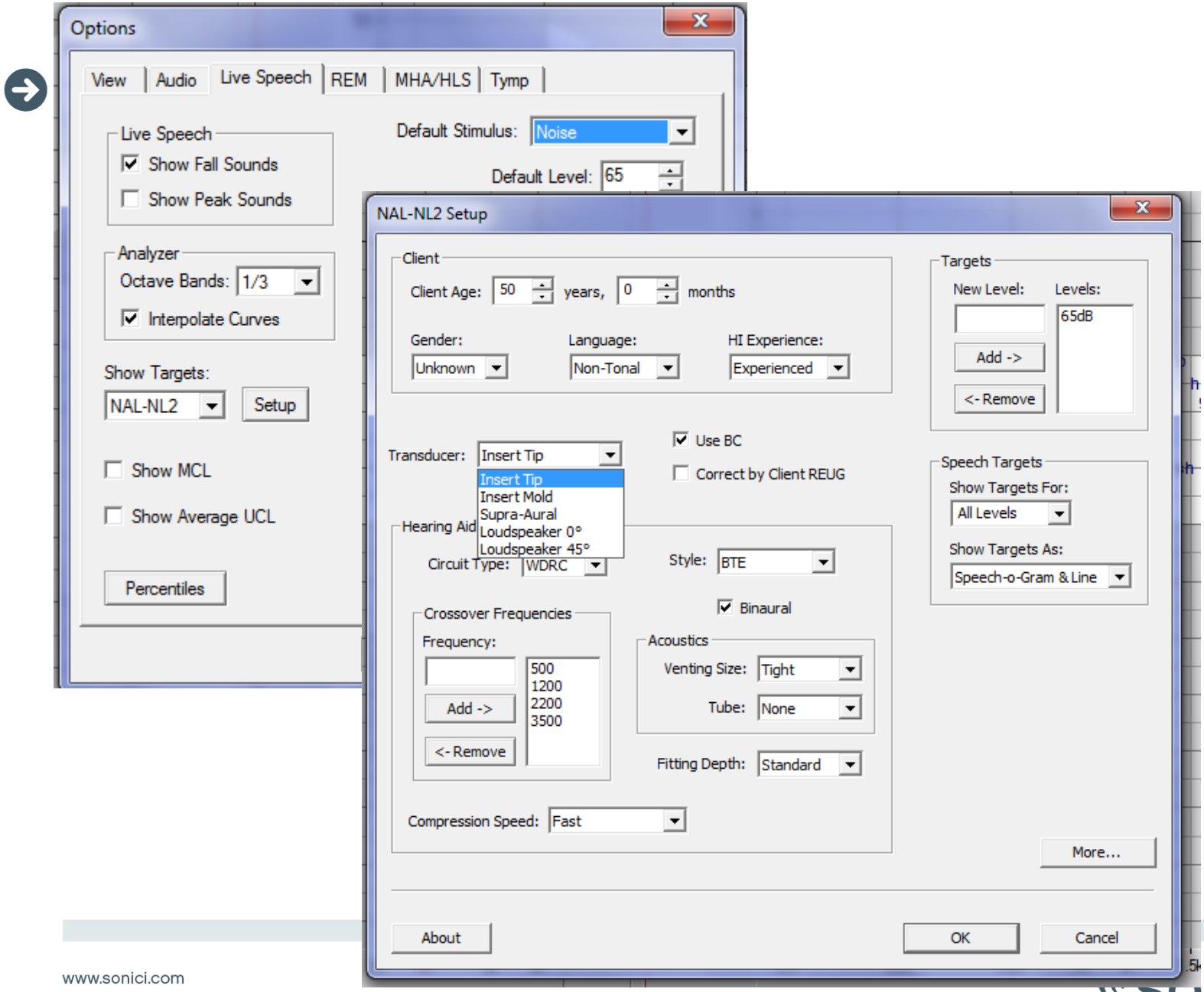
Audiometry- basics

- Masking (of course)- inserts & BC masking
- BC placement
- Inserts vs Headphones- Why/When/How
- Cochlear dead regions

Inserts vs Headphones: Why/When/How

- Avoid canal collapse
- Larger inter-aural attenuation- less masking
- Need to be properly inserted

- Need to ensure Fitting software option is correct
- Need to ensure Targets set up in REM



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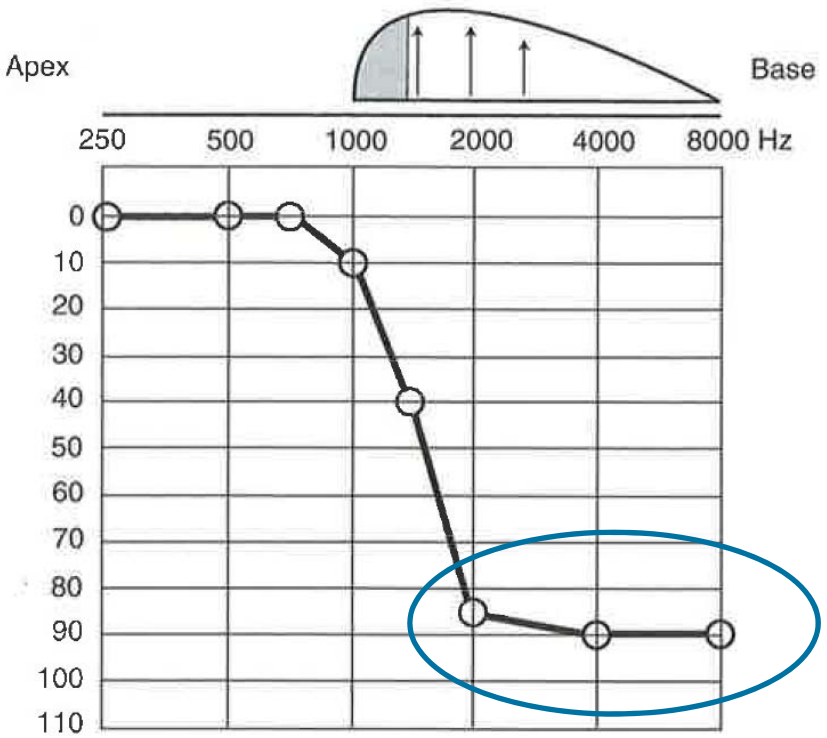
RED flags for Cochlea Dead Zones

* hearing loss > 70dB
* a steeply sloping, pronounced high-frequency hearing loss
* a reverse curve hearing loss
* a cookie bite audiogram
* a patient report of a non-tonal, scratchy type of sound quality
* a word-understanding score that is much worse than the audiogram suggests it should be.

Travelling Wave Overlap

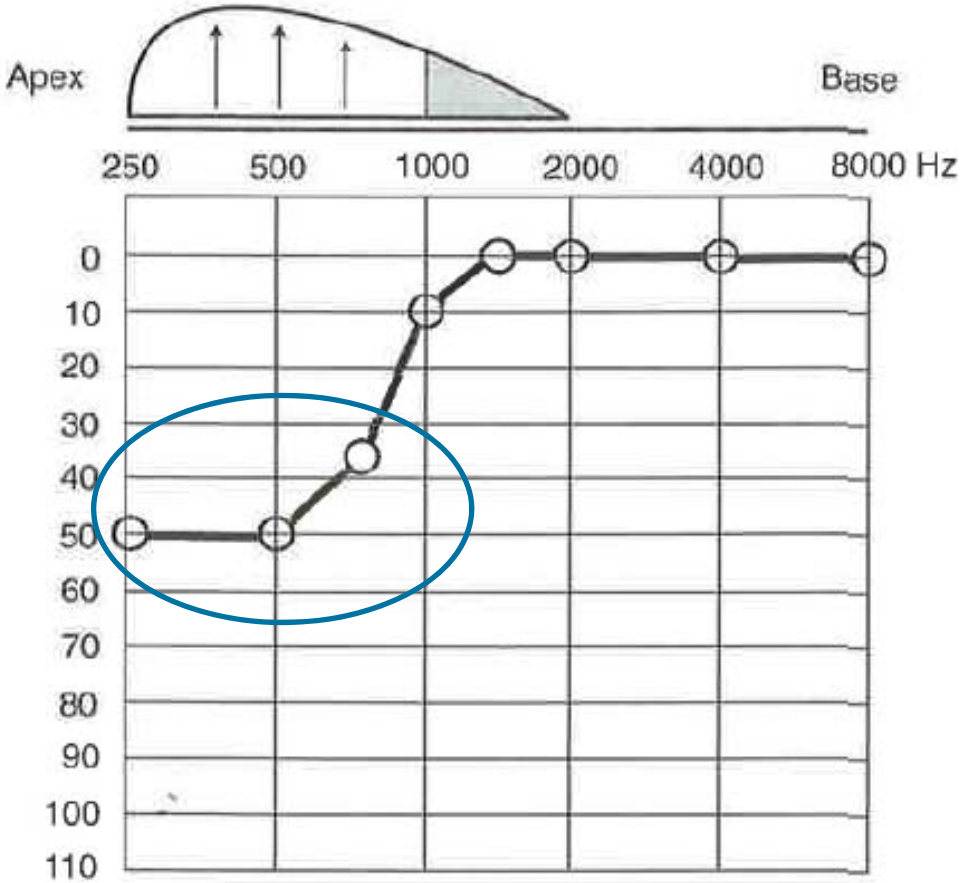
'Off frequency' hearing



Do these sound like tones or are they scratchy noise?

Reverse Slope Loss- hard to fit

Do these sound like tones or are they scratchy noise?



Beware the Upward spread of Masking

Venema, 2006

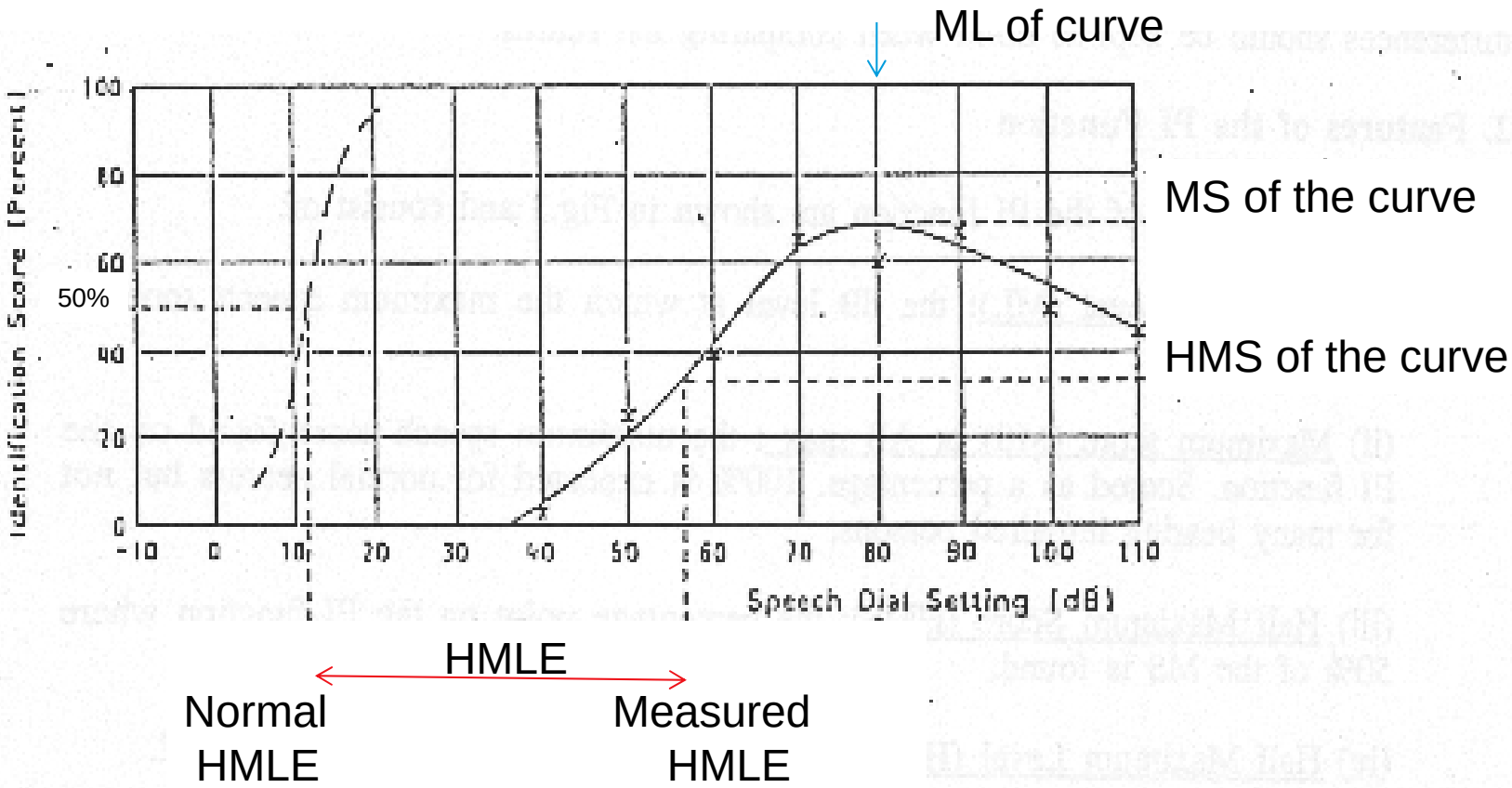
Tympanometry and reflexes

- Otoscopy first
- Tymp- Classification and interpretation
- Expected effects on audiogram- need to look for consistency in the test battery
- Reflexes- ipsi? Contra? When and why
- Interpretation

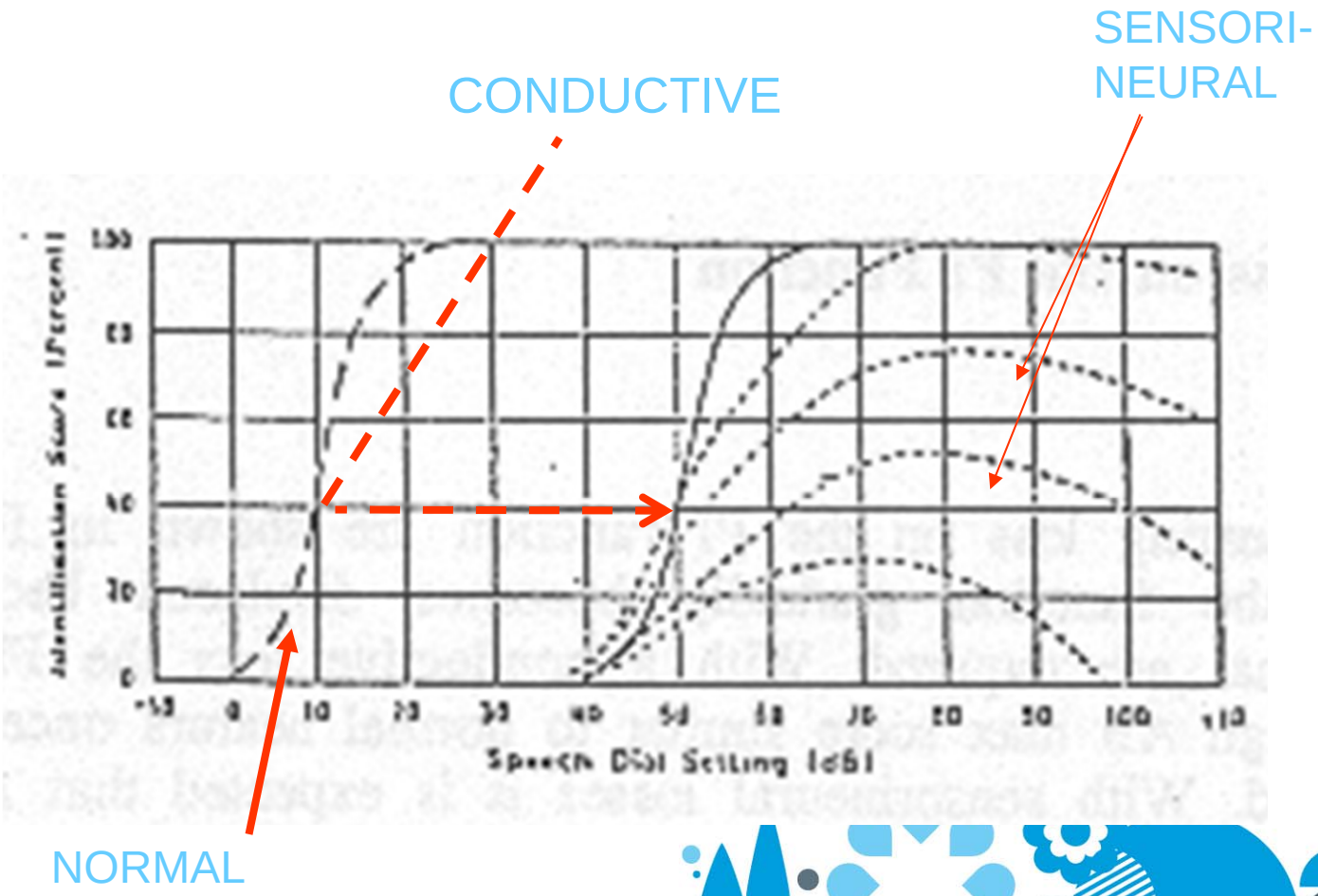
Speech Discrimination

- **What levels to test and why- steeply sloping losses, roll-over, correlation to PTA**
- **Maximum scores re Hearing Loss**

The Performance Intensity function



Typical PI functions



MS scores based on 3FAHL

Conductive		100%
Sensori-neural	Av. Loss up to 40 dB	90- 100%
	41- 50	80%
	51- 60	70%
	61- 70	60%
	71+	50% or less

* OHS 610/810

COSI- SMART goals: WHY?

- Most important part of the consultation, usually the worst done
- SMART goals
- What does the CLIENT want to achieve- not problems

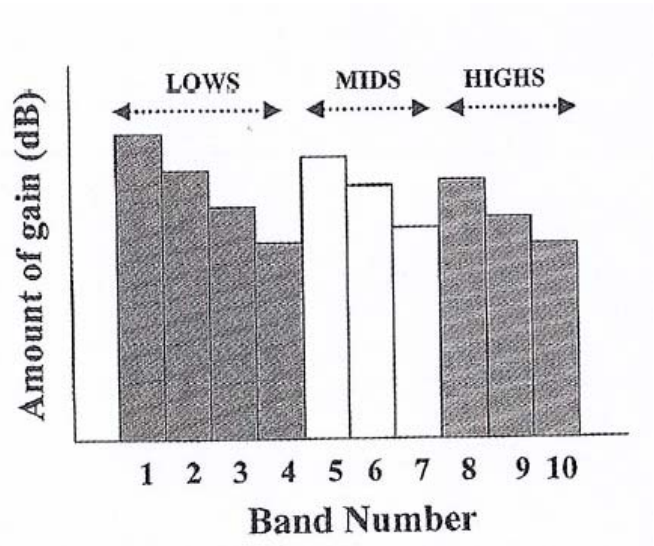
Hearing Aids

- Channels vs Bands
- Loudness vs Clarity
- Compression
- Gain/Frequency Response – prescription, venting, NR, FBC, Adaptive
- Real Ear Verification- Open Fit

Channels vs Bands-always confused

BAND

Frequency region where gain adjustment is made



CHANNEL

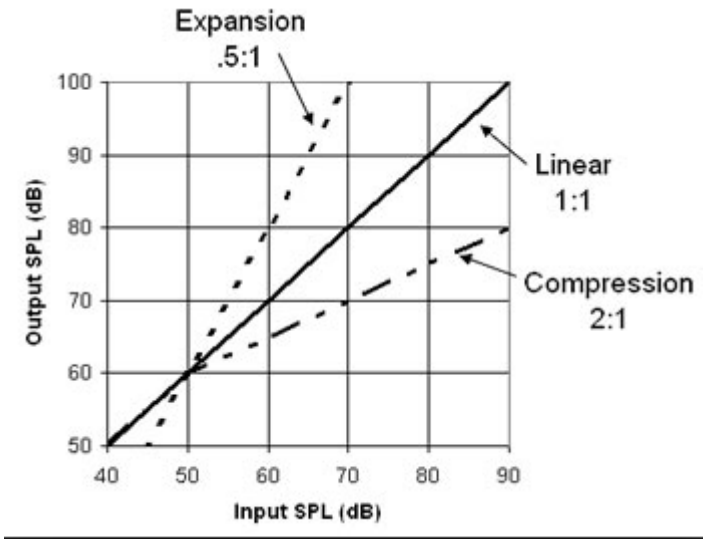
Frequency region where the same signal processing takes place

Compression

EXPANSION/SQUELCH- increasing gain with increasing input

LINEAR- a 1:1 compression ratio

WDRC- decreasing gain with increasing input

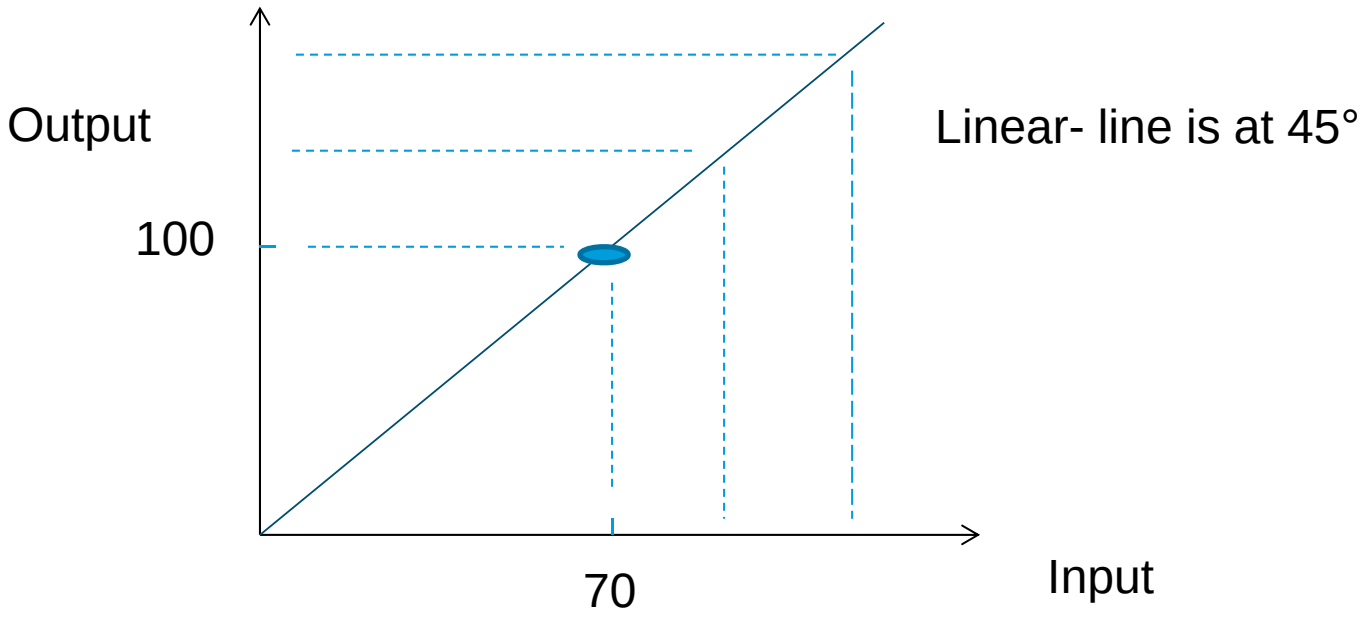


Linear amplification

- **The gain stays the same as the input increases**
- **Eg Gain = 30 dB**
  - Input 70 dB Output 100 dB
  - Input 80 dB Output 110 dB
  - Input 90 dB Output 120 dB

Input- Output Curves

- **A graph that shows us how much sounds are turned up**

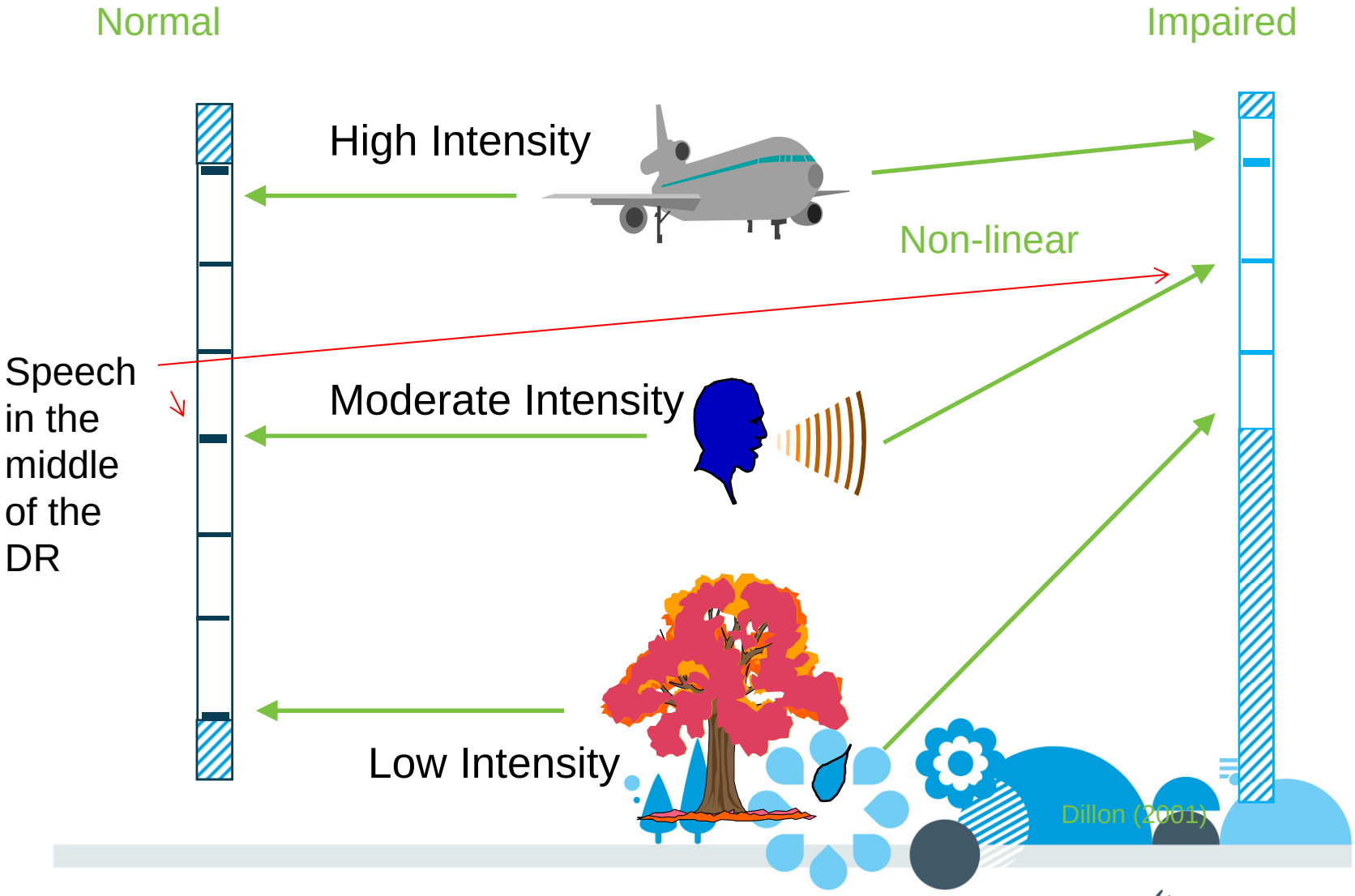


Output - Input = GAIN

What is Compression

- the range of input sound intensities is “squashed” into a smaller range of output intensities
- Normal hearing people have a wide Dynamic Range, and as hearing loss gets worse this becomes more and more reduced
- e.g. a range of input intensities from 0 to 120 dB SPL may be compressed into an output range of 50 to 100 dB SPL
- Wide Dynamic Range Compression WDRC is compression that occurs for a wide range of inputs

Compression- 1 dB impact



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Linear

Peak Clipping

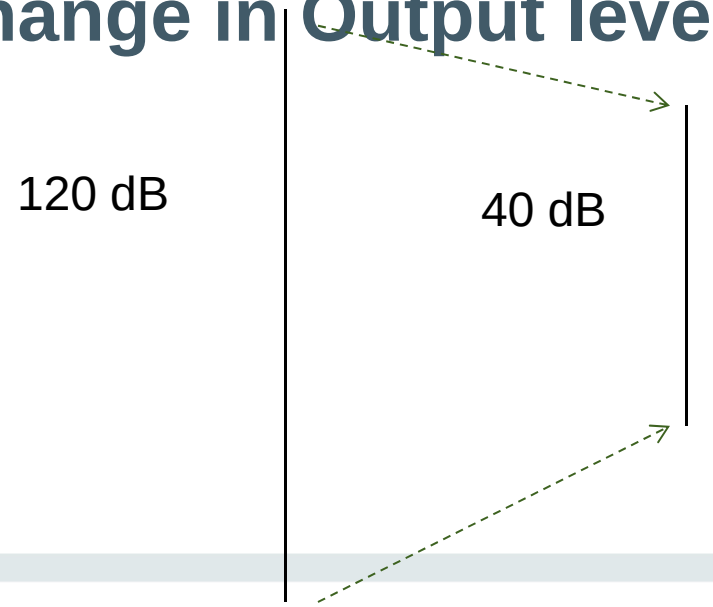
Compression

If too compressed you get distortion

Compression Ratio- Gain change

It tells us how squashed up we are making the input

$$\frac{\text{Change in Input level}}{\text{Change in Output level}} = \text{Compression ratio}$$

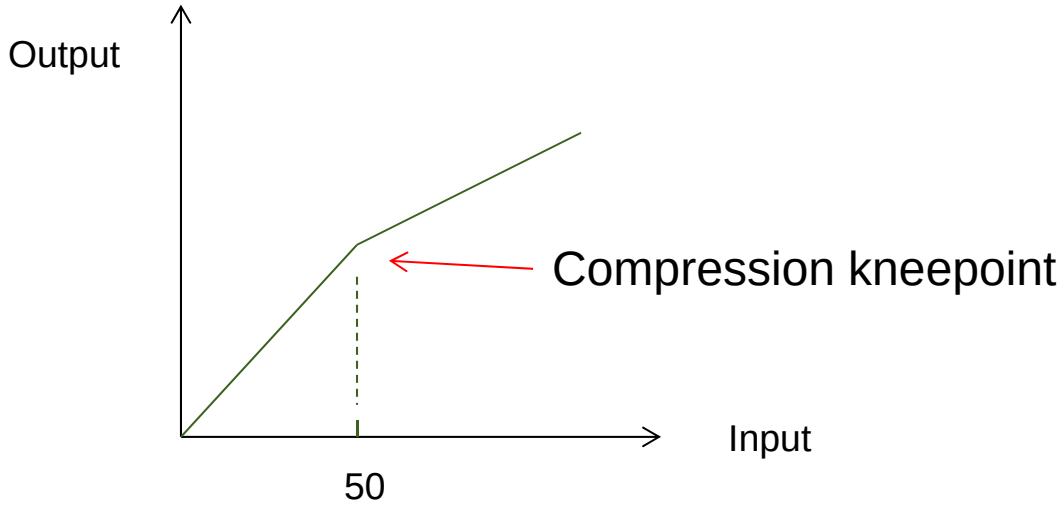


120/ 40 = 3:1

So, every 3dB squashes into 1 dB

Compression Kneepoint

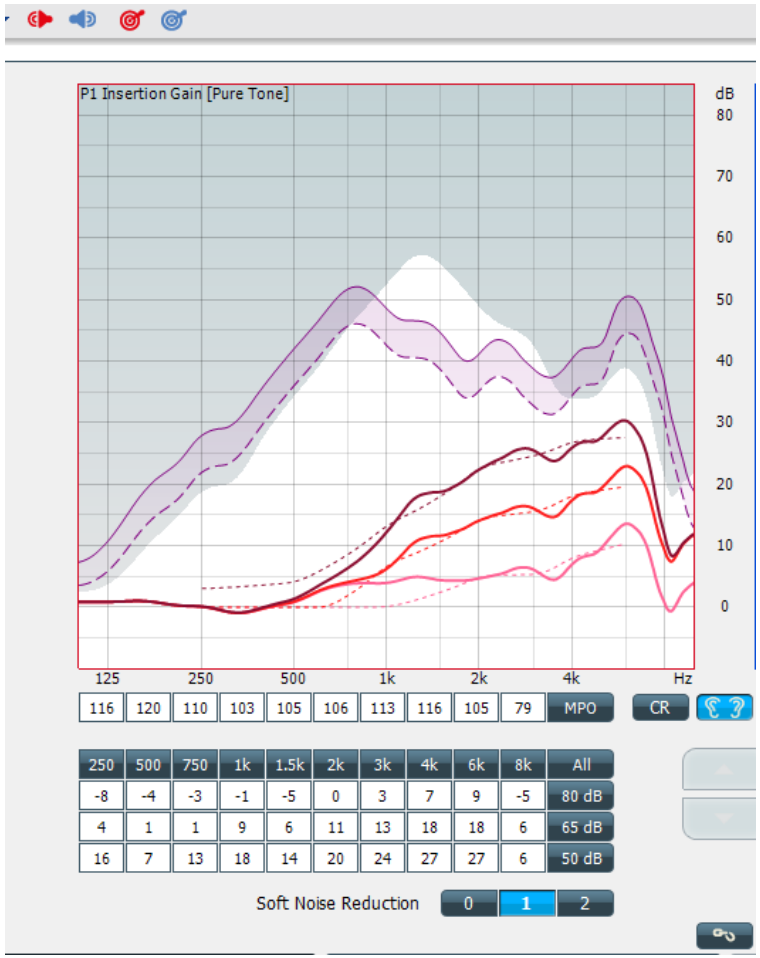
- **The input level after which compression starts- this may just be moving from one compression ratio to another**
- **It is the bend in the Input/Output curve**



Below a certain signal intensity the amplifier behaves linearly, above this intensity the compression operates

Definitions

- **Gain**
  - A difference measure
    eg REUG, REAG



- **Response**
  - An output (total) measure eg REUR, REAR

How much Gain?

- Lybarger (1944, cited in Byrne 1983) developed the "half-gain rule", in which recommended gain levels equalled half the amount of hearing loss at each frequency. This procedure resulted in more comfortable listening levels than did the "mirroring" method, and has since been used as the basis for many of the prescriptive fitting formulas that were introduced in the late 1970s and early 1980s.

NAL-NL1/2

- The aim of the original NAL prescriptive formula, which has remained constant through a number of revisions, was to maximize speech intelligibility at a listening level that is preferred by the hearing aid user
- Intelligibility is assumed to be maximized when all bands of speech are perceived by the listener to have the same loudness; that is, when the goal of loudness equalization for speech bands has been achieved

Things that affect GAIN

- Venting, tubing size, dome- need to set this properly in the Fitting software
- Directivity
- Feedback cancellation FBC
- Noise Reduction
- Automatic Environmental programs

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