

SOUNDSOFTENER - LISTENING COMFORT IN TRANSIENT NOISE

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TRANSIENT NOISE SOUNDS

- TruSound Softener improves the handling of sounds that are:
 - Very brief in duration
 - Very sudden
 - Annoying when amplified through a HA
 - Difficult to handle

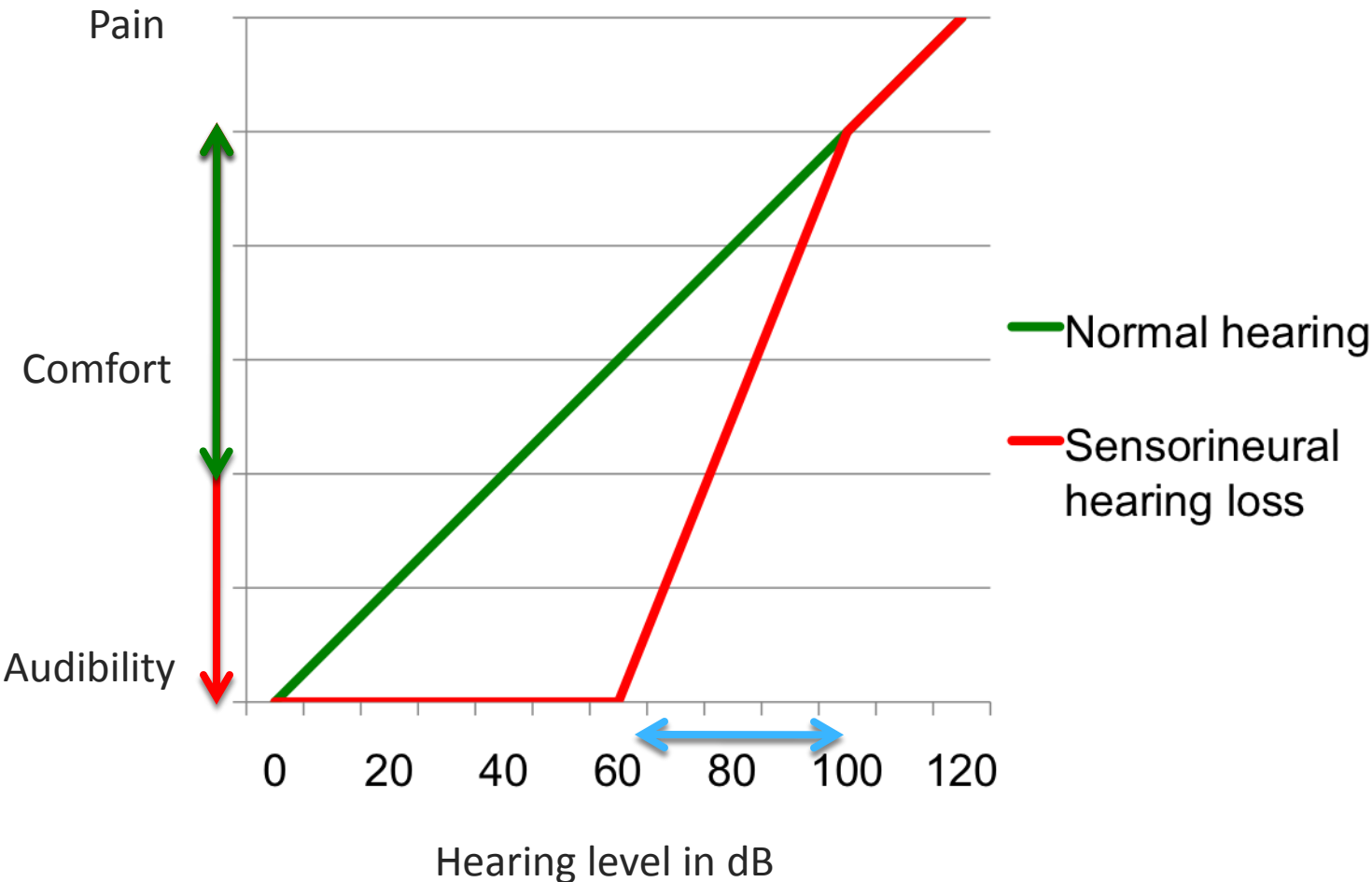


LOUDNESS RECRUITMENT

- Extreme growth in loudness perception
- Loudness perception may move from comfortable to uncomfortably loud with a very small increase in dB



LOUDNESS RECRUITMENT



EXAMPLES OF TRANSIENT NOISE SOUNDS

Loud

- Hammer blows
- Slamming doors



Medium

- Porcelain clinks
- Rattling cutlery



Soft

- Computer keystrokes
- Ticking clock



Tapping a pen against
a table

-17 dB

Amplitude

< 1 ms

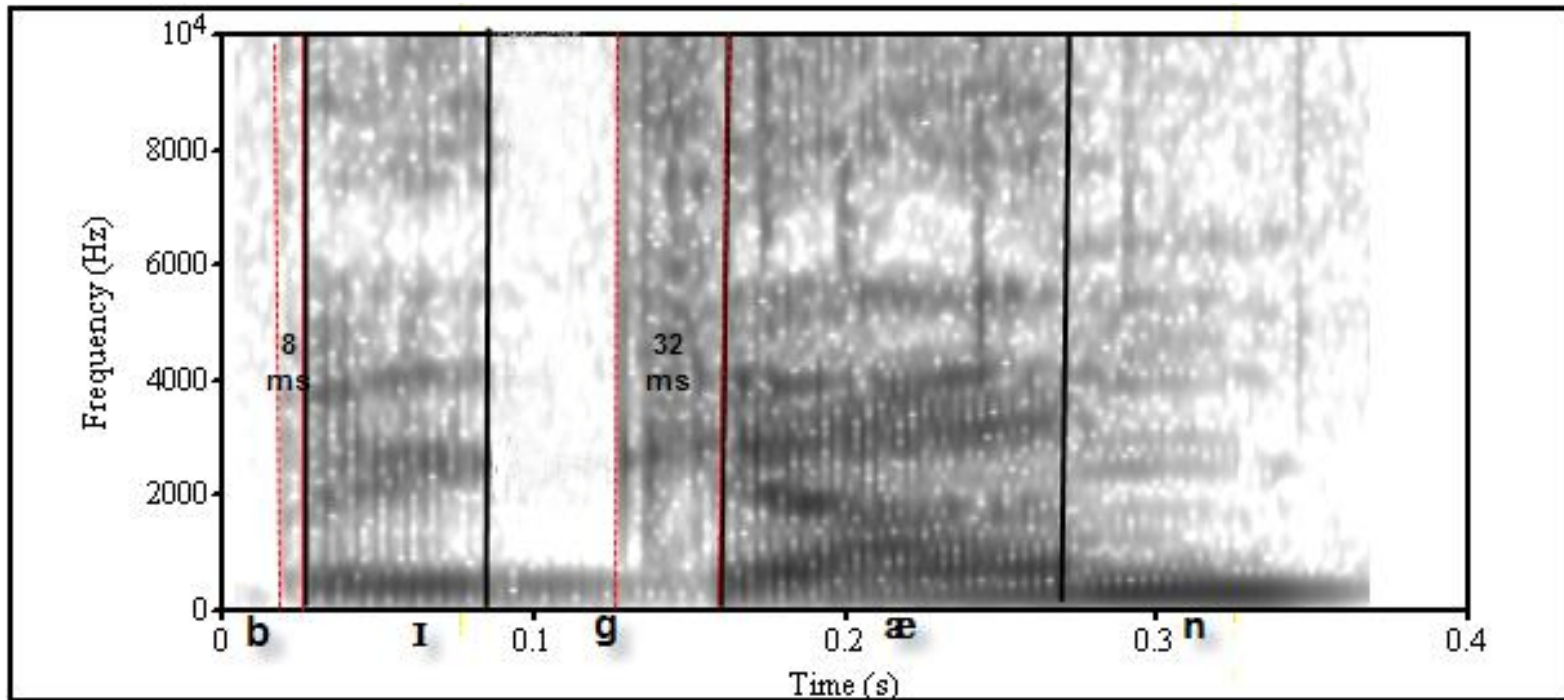
5 ms

Time [ms]

TRANSIENT SPEECH SOUNDS

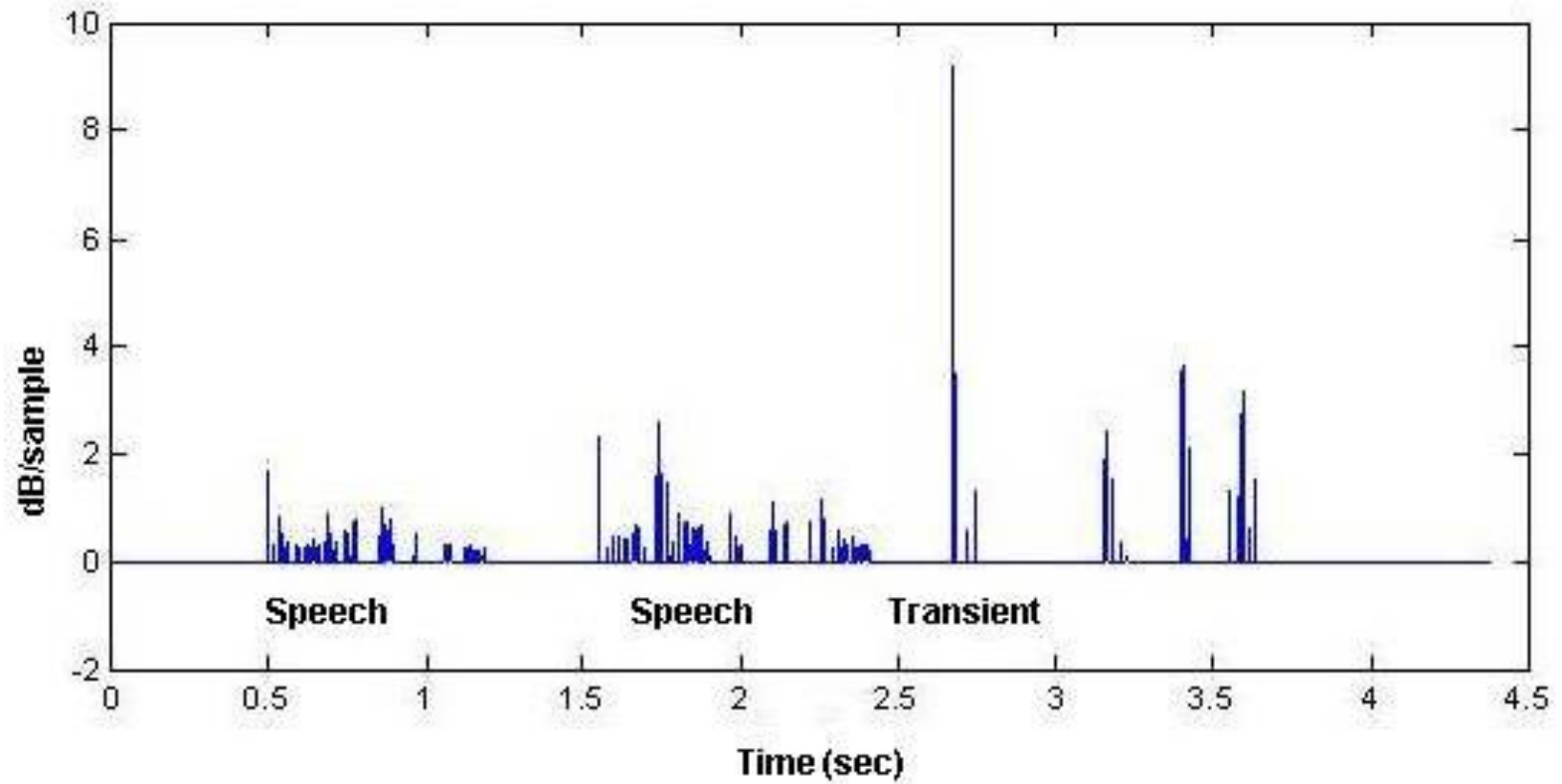
- The stop consonants /p,b/, /t,d/, and /k,g/ have transient release bursts

“Began”



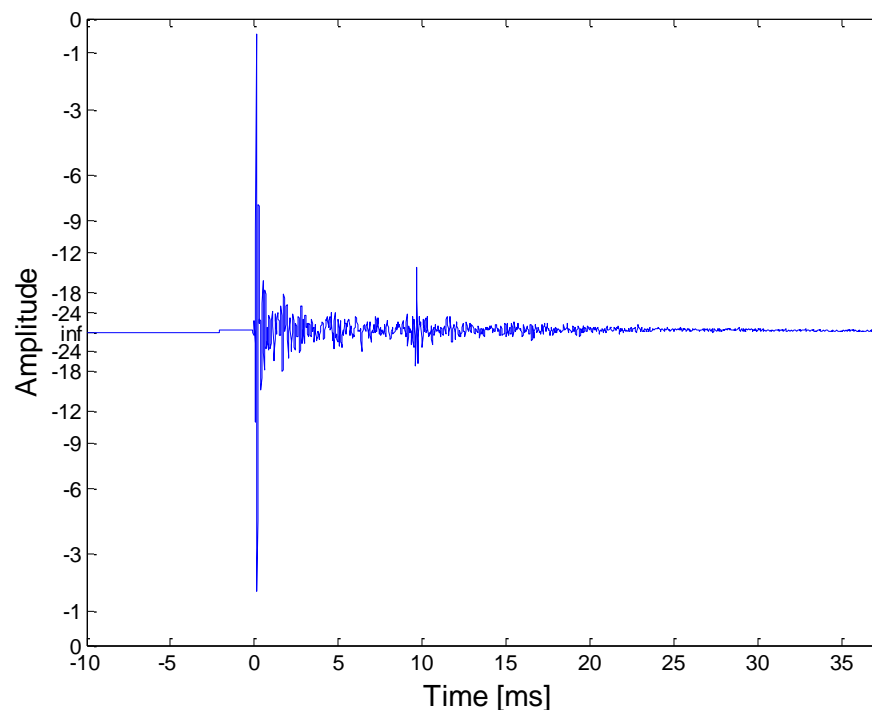
NO ATTENUATION OF TRANSIENT SPEECH SOUNDS

- Loud noise transients rise much more quickly than speech transients

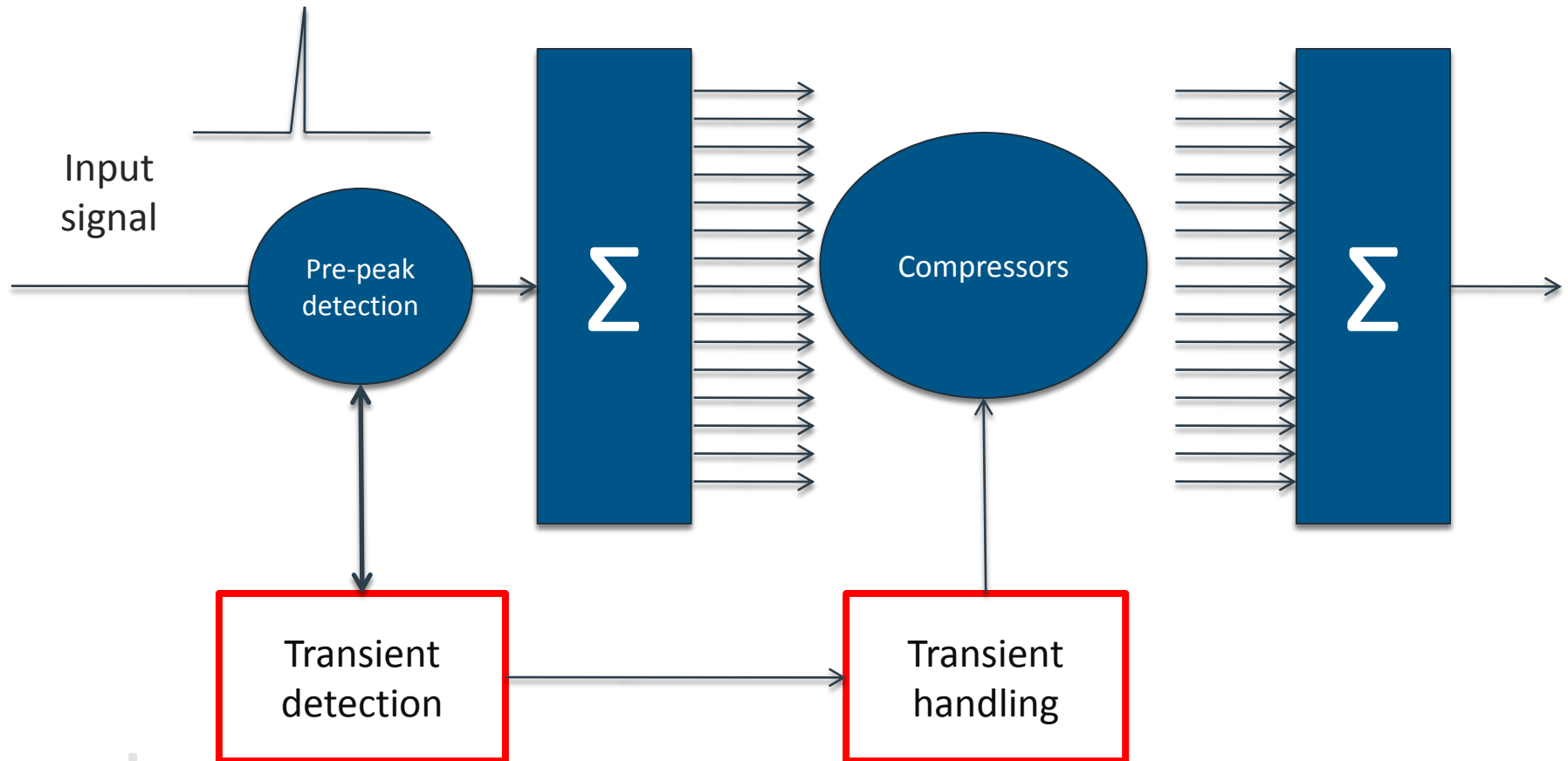


NEED FOR SPEED

- Transient noise sounds measured in milliseconds
- Attack time of DNR or WDRC exceeds the rise time and duration of transient noise sounds
- Faster detection needed

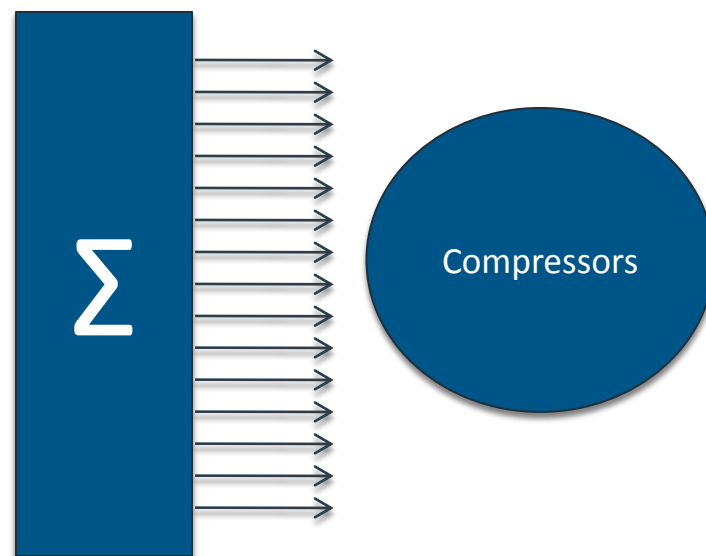


TRANSIENT NOISE DETECTION AND HANDLING

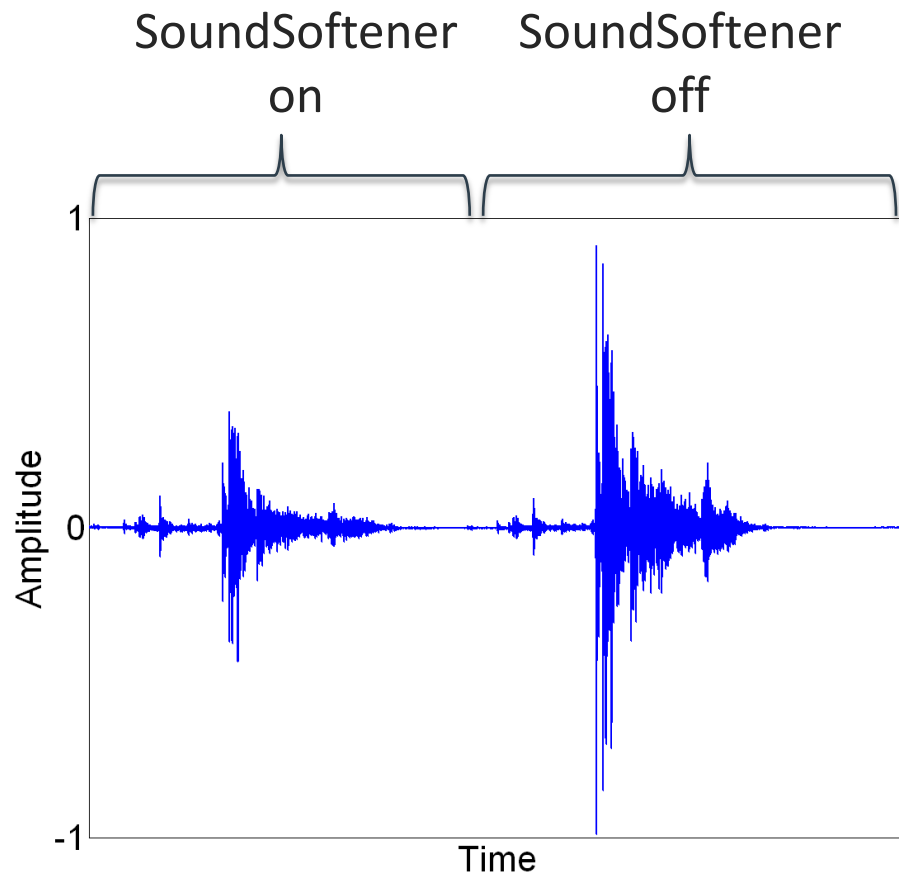


INDIVIDUAL GAIN ADJUSTMENTS

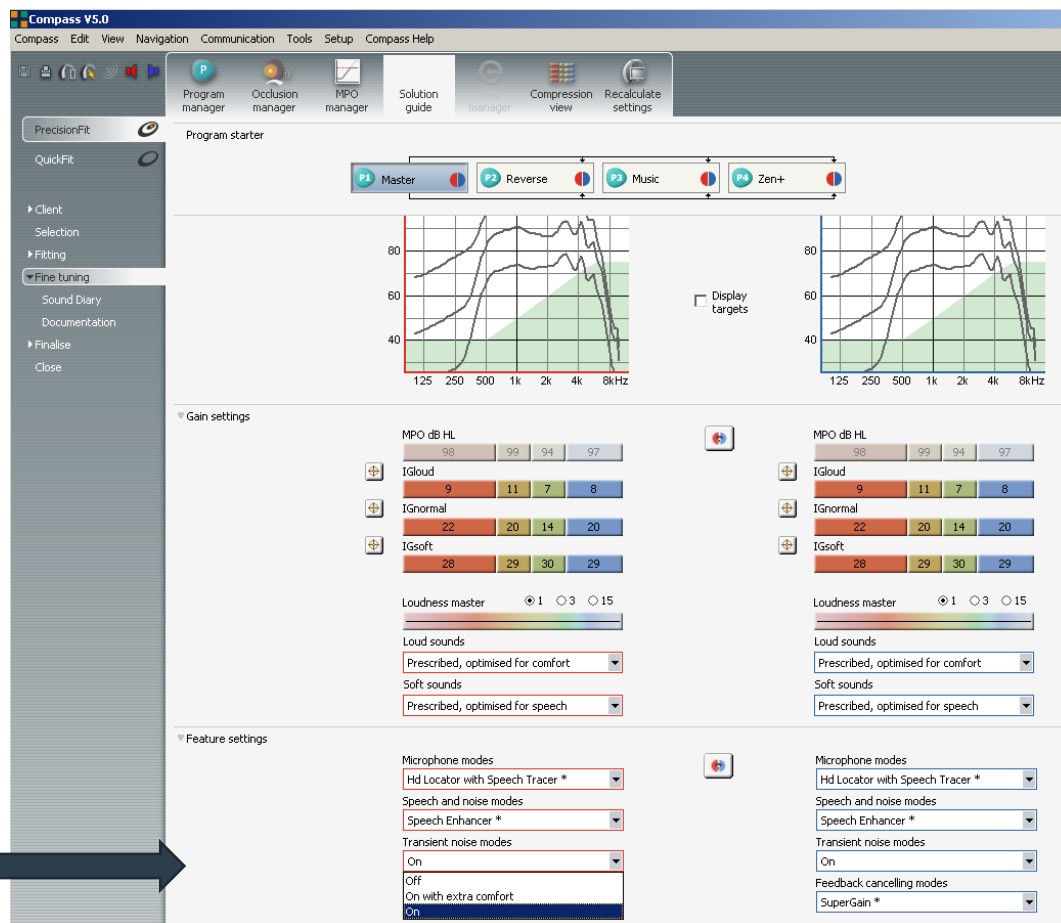
- Gain is reduced in the relevant channels.
- Gain is reduced according to the individual hearing loss.



THE TRUSOUND SOFTENER



DISPENSER DECIDES



COMFORT SETTING FOR HIGHLY SENSITIVE CLIENTS

▼ Feature settings

Microphone modes

Hd Locator with Speech Tracer *

Speech and noise modes

Speech Enhancer *

Transient noise modes

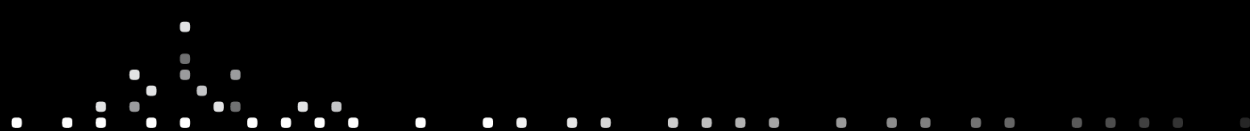
On

Off

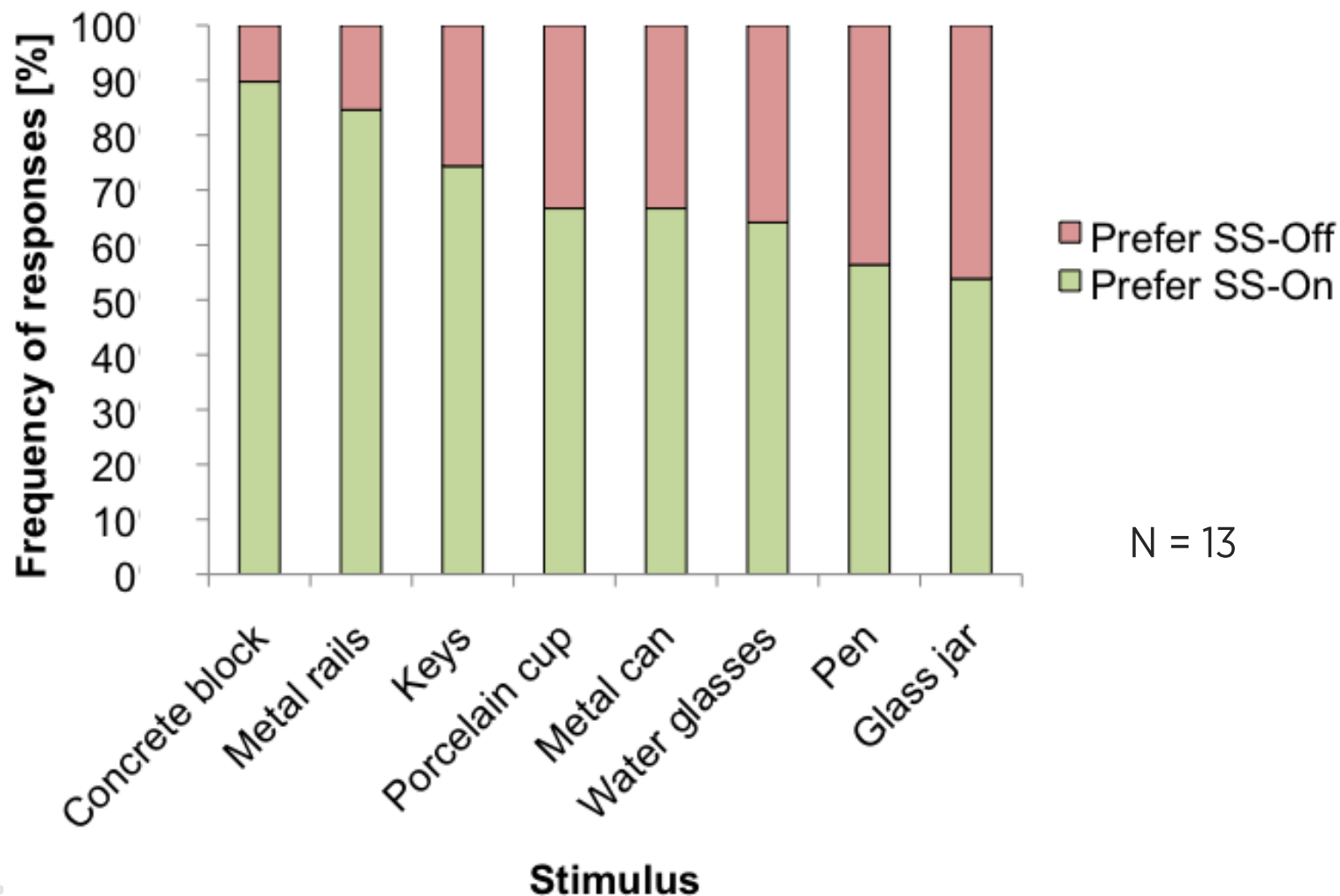
On with extra comfort

On

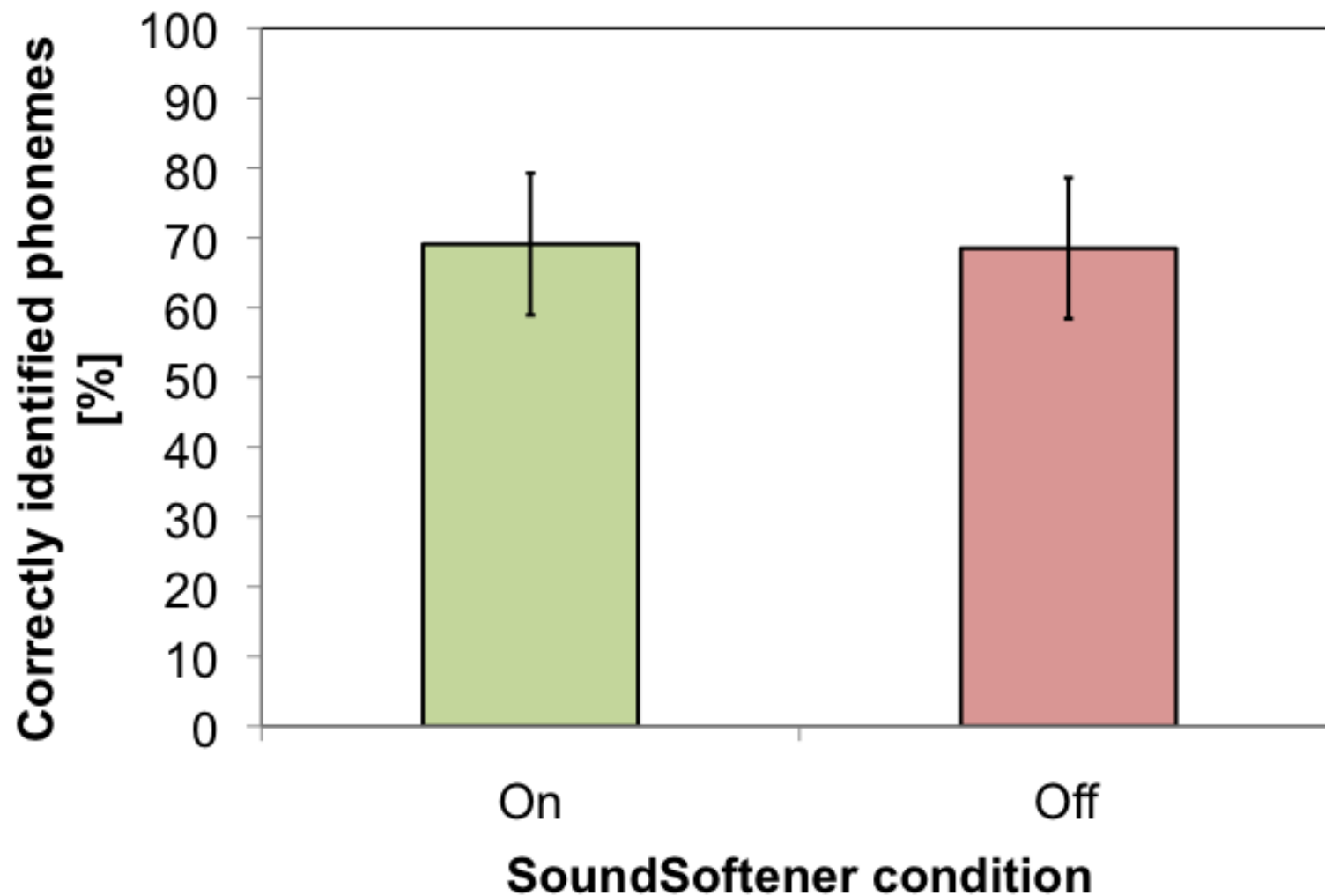
CLINICAL EVIDENCE



LISTENER PREFERENCE



DOES NOT DEGRADE SPEECH



REAL-LIFE USER ACTIONS IN TRANSIENT NOISE

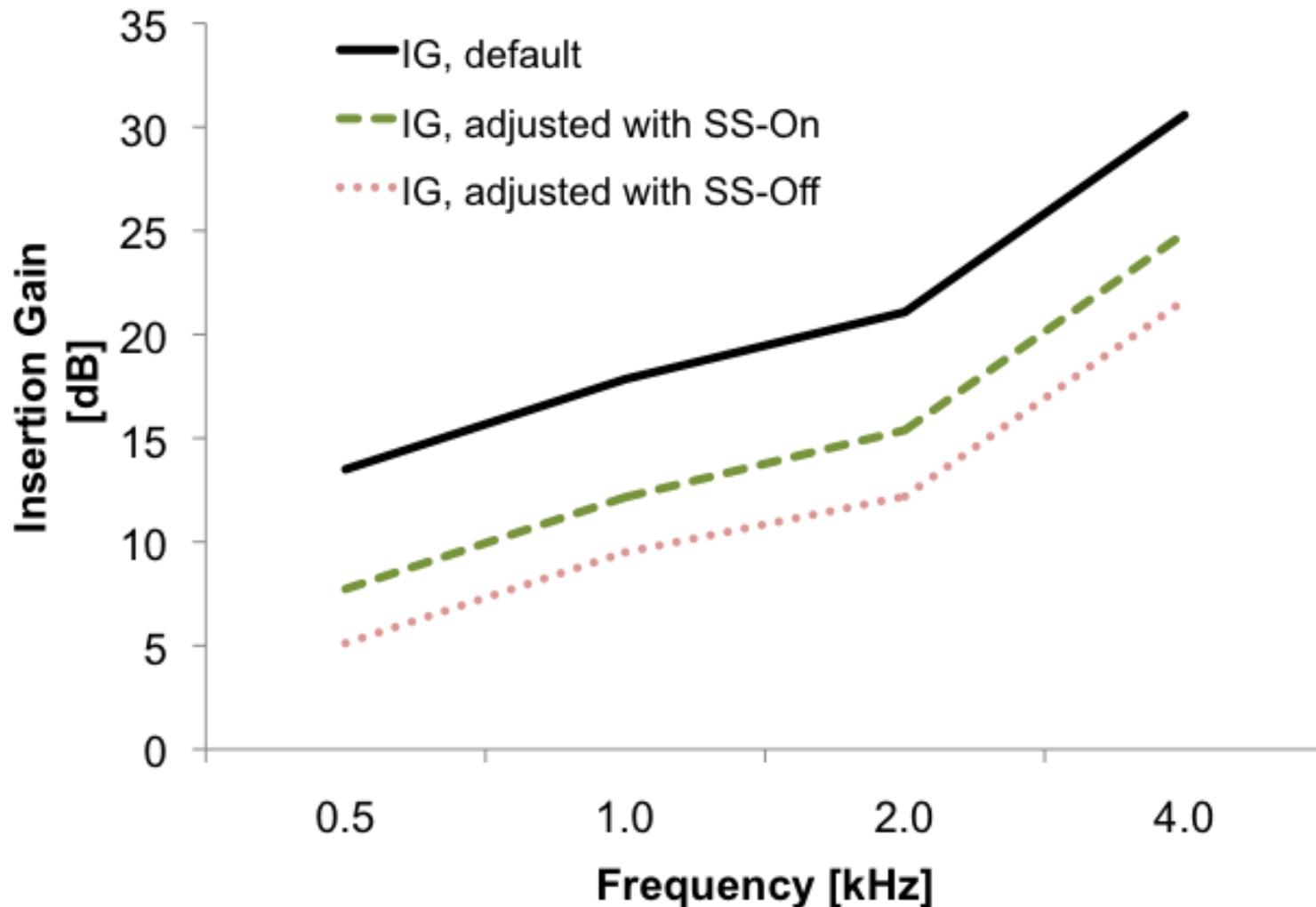
Lower the overall gain on the hearing aid with volume control (VC)

- Lowered gain risks reducing speech audibility when speech and transient noise are together.
- Speech audibility compromised if the VC is not readjusted back to the original position after the transient noise.

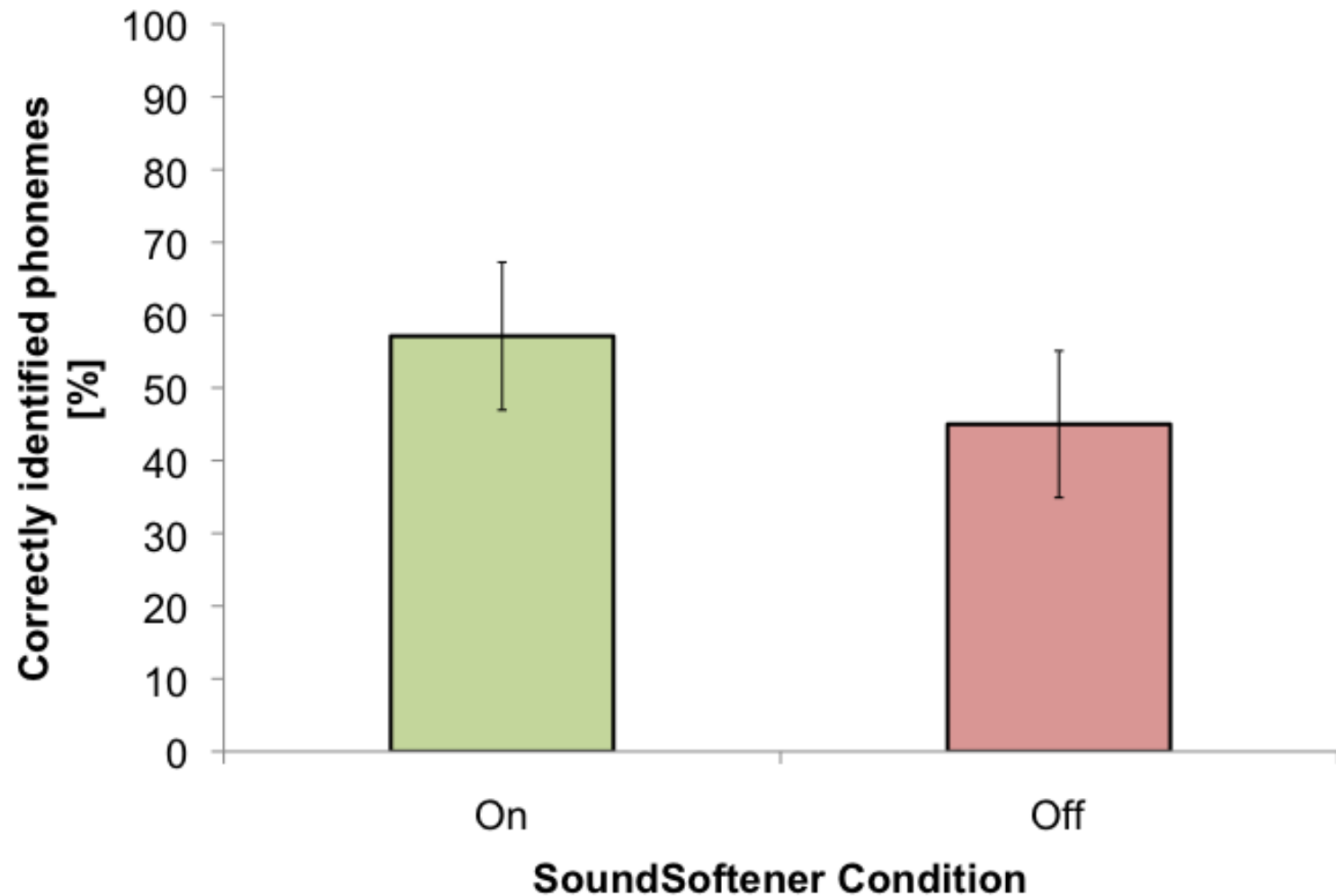
Complain to the dispensing clinician of the transient noise problem

- Clinician can lower the gain for a more comfortable output
- Under-amplification and compromised performance

USER PREFERRED GAIN IN TRANSIENT NOISE BACKGROUND



EFFECT OF PREFERRED GAIN ON SPEECH IDENTIFICATION



SUMMARY

- TruSound Softener was developed to handle transient noise sounds effectively.
- Transient sounds are difficult to handle because they are so brief. The system has little time to react.
- Instantaneous gain reduction is the key.
- Transients detected as part of the signal analysis before compressors.
- Transient noise sounds are attenuated – never removed. Speech sounds are not affected by TruSound Softener.

