

# Short Increment Sensitivity Index (SISI)

PRODUCT INSIGHTS

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## INTRODUCTION

Short Increment Sensitivity Index (SISI) is based on the phenomenon of abnormal growth in loudness perception often seen in cochlear pathologies. Jerger, Shedd, and Harford [1] observed that many ears with a hearing loss due to abnormal cochlear function appear to have extremely keen discrimination for small changes in tonal intensity. They defined a simple task, the SISI, to help in differentiating cochlear from retrocochlear disorders.

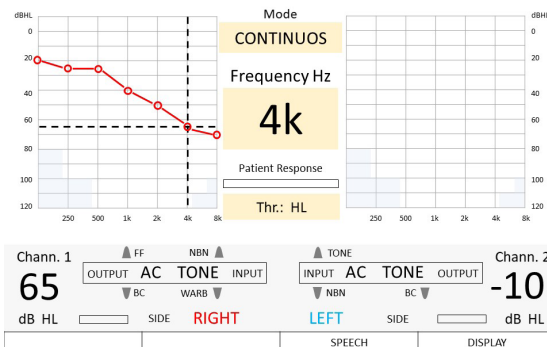
A continuous tone is presented to the patient, usually at 20 dB SL (Sensitivity Level), with an occasional 1 dB intensity increment. The patient is asked to respond each time he or she hears the very small increase. Patients with a cochlear pathology, who experience abnormal loudness growth, are more likely to perceive the small, 1 dB loudness increment, whereas patients with retrocochlear or central pathology will likely not hear the change.

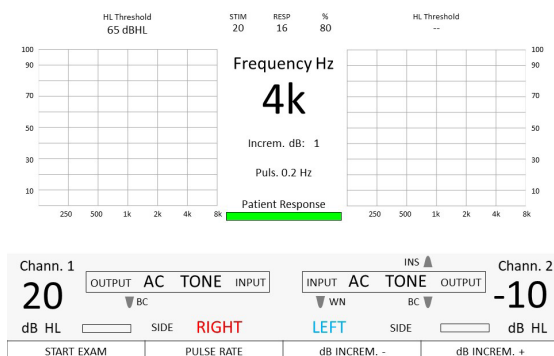
With the SISI, a training session is conducted prior to test administration.

## HOW TO PERFORM A SISI TEST WITH INVENTIS DEVICES

The SISI test can be performed with different Inventis devices, either PC-based (Cello and Cello Aero, controlled by Inventis Maestro software) or stand-alone (Harp Plus, Piano Basic, Piano Plus, either directly on the device, or connecting it via USB to a pc and using the Inventis Maestro software), using headphones, insert earphones, or bone vibrator. To perform the test, the patient's pure-tone threshold must be established.

Stand-alone devices (Harp Plus, Piano Basic, Piano Plus): enter the SISI item from the main menu. The patient's threshold at the chosen frequency will be displayed on the top of the panel.





To familiarize the patient with the exam, select an increment of 4 (only for Piano) or 5 dB clicking the corresponding button on the right bottom part of the screen. Select the tone frequency and intensity (suggested value: 20 dB SL), and the pulse rate, i.e. the frequency of presentation of the occasional “jump in loudness”.

The patient is instructed to respond by button-pushing on hearing the loudness increment. Once this task is mastered, start the actual test by clicking the START EXAM button: the continuous tone will be presented, with 20 interspersed increments in loudness of 1 dB. Inventis Piano allows choosing increments different from 1 dB. The patient is asked to respond each time he or she hears the very small increase. Two different counters on the top central part of the display are increased, respectively, each time an increase in loudness is presented or each time the patient recognizes it by pushing the response button. Besides, a percentage score is updated. At the end of the task, click the STORE button on the device keyboard: a marker will be stored on the graph, in the point corresponding to the tested frequency (x-axis) and to the percentage of recognized increases (y-axis).

Pc-based devices (Cello and Cello Aero), or stand-alone devices used in hybrid mode (Harp Plus and Piano): connect the device to the PC and launch Inventis Maestro software. From the Test selection bar choose SISI.



Before starting the exam, associate the patient’s pure tone threshold by dragging it from the exam management panel to the main window of the application. The associated PTA will appear on the right panel, and

the patient’s threshold at the chosen frequency will be displayed.

To start with the familiarization step, select an increment of 4 or 5 dB from the corresponding menu on the left panel.



Set the tone frequency and intensity (suggested value: 20 dB SL), and the frequency of presentation of the occasional “jump in loudness”.

The patient is instructed to respond by button-pushing on hearing the loudness increment. Once this task is mastered, start the test by selecting an increment in loudness of 1 dB and pressing the START button: the continuous tone will be presented, with 20 interspersed increments in loudness of 1 dB. The patient is asked to respond each time he or she hears the very small increase. Two different counters are increased, respectively, each time an increase in loudness is presented or each time the patient recognizes it by pushing the response button. Besides, a percentage score is updated. At the end of the task, click the STORE button: a marker will be stored on the graph, in the point corresponding to the tested frequency (x-axis) and to the percentage of recognized increases (y-axis).

### RESULTS

As may be expected, patients with a cochlear pathology who experience abnormal loudness growth are more likely to perceive the small loudness increment. Positive responses out of the 20 presentations are stored, with each positive response contributing 5% to a total possible score of 100%. Patients with recruitment achieve higher scores, whereas patients with retro cochlear or central pathology will likely not hear the small increment resulting in a low score.

### BIBLIOGRAPHY

[1] Jerger, J., Shedd, J.I., Harford, E. On the detection of extremely small changes in sound intensity. A.M.A. Arch Otolaryngol. 1959;69(2):200-11.



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