



# Validity of the Hum Test in Predicting Hearing Loss

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## ABSTRACT

**Objectives:** To evaluate the efficacy of hum test and determine its validity in detecting various types of hearing loss.

**Study Design:** In this prospective study, 67 patients aged 18 to 70 years old with a chief complaint of hearing loss presented to a neurotology clinic at an academic institution and were evaluated over a two month period.

**Methods:** Patients were asked to hum and report which side they heard the hum the loudest. The frequency and loudness of the hum produced by the patients was assessed using a digital sound meter. Weber and Rinne and audiometric testing was performed to confirm the true hearing loss pattern. Two neurotologists independently reviewed hum test results and determined if hearing loss was conductive or sensorineural. Audiometry was used as a gold standard for determining true hearing loss pattern.

**Results:** Of the 67 patients, 34 were identified to have hearing loss. The hum test had sensitivity of 74% and 70% for identifying conductive and sensorineural hearing loss respectively.

**Conclusions:** The hum test can be used as a screening tool to decipher between conductive or sensorineural over the phone. This is especially relevant in the case of post-stapedotomy in which post operative hearing loss is expected. It can also be used for patients calling with sudden hearing loss to roughly distinguish conductive from sensorineural loss.

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## INTRODUCTION

- Hearing loss is cited as one of the top chronic health concerns affecting older Americans.<sup>1</sup>
- Approximately 15% of American adults (37.5 million) aged 18 and over report difficulty hearing.<sup>2</sup>
- If detected early, sudden sensorineural hearing loss (SSNHL) can be treated and lead to significant improvement.<sup>4</sup>
- Post-operative stapedectomy patients often call with decreased hearing due to canal plugging which can be misinterpreted as SSNHL.
- SSNHL can present as ear fullness or pressure, and might be confused with a URI<sup>5</sup>
- The purpose of this project is to assess the validity of hum test in the initial diagnosis of hearing loss for patients with any type of hearing loss.

## MATERIALS AND METHODS

- A total of 67 patients with a chief complaint of hearing loss were evaluated over a 2 month period at an academic neurotology outpatient office.
- Patients were asked to hum at any frequency and report whether it is heard equally in both ears or louder on one side.
- The frequency and intensity of the hum produced by the patients were assessed using a digital sound meter (Sound Level Meter 2238 Mediator; Bruel & Kjaer, Narum, Denmark) [Figure 1].
- Tuning fork Weber, Rinne and audiometric testing was performed with a 512 Hz and 256 Hz tuning fork respectively.

## MATERIALS AND METHODS CONT.

- The senior authors independently reviewed hum test examinations and determined if the hearing was normal, conductive HL or sensorineural HL. The diagnosis was then compared to Weber, Rinne, and audiometry to determine accuracy of the hum test in determining the type of hearing loss.

## RESULTS

- Of the 67 patients tested, 34 (50%) had abnormal findings on audiometry.
- Mean age of subjects included was 52± 13 year old.
- Two patients (6%) had conductive hearing loss from canal plugging in the first week after stapedotomy. In both cases, the hum test accurately determined conductive hearing loss.
- Hum test had a sensitivity of 74% and 70% for identifying conductive hearing loss and sensorineural hearing respectively.
- Mean frequency and intensity of hum generated by patient was 250.61 ± 92.94 Hz (range: 100-630 Hz) and 69.18 ± 7.20 dB (range: 55-85 dB).

**Table 1.**

Hum test vs Weber and audiometric tests.

		Hum Test	Weber Test	Audiometry
CHL	R	15	17	18
	L	7	10	12
*SNHL	R	5	6	7
	L	2	3	3

**CHL:** Conductive Hearing Loss

**SNHL:** Sensorineural Hearing Loss

\*Hum test was positive in the contralateral ear

## DISCUSSION

- The hum test requires no instrumentation or equipment and takes only a few seconds to perform. This test can provide useful information to the clinician in the evaluation of hearing loss especially when the patient calls the office with a complaint of hearing loss or when in a remote setting.
- With conductive hearing loss, the humming noise generated by the patient is heard louder in affected ear. Thus, the mechanism is similar to the Weber test at 250 Hz. As such, this test cannot distinguish between CHL and SNHL when the loss is mild and involves higher frequencies.
- In selected cases such as a post-stapedectomy patient with unilateral otosclerosis, this can help reduce the need for an office visit.

**Figure 1.**  
Sound Level Meter 2238 Mediator



## CONCLUSIONS

- The hum test could be a valuable screening tool to remotely and quickly distinguish conductive from sensorineural hearing loss for some patients.
- The hum test may also provide value in distinguishing SNHL from conductive hearing loss for patients calling with sudden hearing loss.

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