Short Communication

The Judd-Persaud Test: A Simple Office-Based Tuning Fork Test for Unilateral Feigned Hearing Loss

O Judd1* and R Persaud2

1Department of Otolaryngology, Royal Derby Hospital, UK
2Department of Otolaryngology, Al Zahra Hospital, UAE

Abstract

In the current litigious society, separating malingerers from true hearing loss patients is ever more important, especially when compensation for industrial hearing loss is claimed. We present a novel test for feigned hearing loss which is very quick and precise, and utilises equipment readily available in the Otolaryngology office.

The test is based on the well established physiological phenomenon of bone conduction and exploits the fact that there is very little (0-12dB) attenuation of sound across the skull.

Step 1: A 256Hz or 512Hz tuning fork is placed on the Mastoid process of the “Good Ear” (Left).

Result – The patient reports hearing the sound.

Step 2: The same 256Hz or 512Hz fork is placed on the Mastoid bone of the “Bad Ear” (Right).

Result – The patient reports inability to hear the sound.

Step 3: The test can be repeated as above as desired to confirm the results.

The Judd-Persaud test is a simple, easy to perform, quick and accurate test for unilateral feigned hearing loss in the malingerer.

INTRODUCTION

Hearing loss is mostly subjective, but objectivity exists. In some cases the patient may be unaware of a hearing loss, whereas family and friends can often be objectively aware, noticing difficulties in communication. Audiometric tests therefore exist that can measure both subjective and objective hearing loss [1]. These range from simple free-field voice tests to sophisticated cortical evoked response testing.

Problems can occur with subjective testing, as they rely greatly on the integrity and cooperation of the patient. Malingering has been reported frequently, with some patients feigning hearing loss in one or both ears [1]. In the current litigious society, separating malingerers from true hearing loss patients is ever more important, especially when compensation for industrial hearing loss is claimed.

Due to certain physiological phenomenon, tests exist which can spot and refute these malingers claims. Tuning Fork tests such as Stenger and Chimani-Moos allow detection of malingering. Audiometric tests such as the automated Stenger, Lombard, Erhardt, Delayed speech feedback test and the Hummel double conversation test can also be used [2]. However, these tests require equipment not always easily obtainable and can be time consuming.

We present a novel test for unilateral feigned hearing loss which is very quick and precise, and utilises equipment readily available in the Otolaryngology office.

Method - The Judd-Persaud Test

The test is based on the well established physiological phenomenon of bone conduction and exploits the fact that there is very little (0-12dB) attenuation of sound across the skull [3].

Example;

A 40 year old man complains of complete hearing loss in the right ear secondary to sudden noise exposure in the work place. He intends to pursue a claim against his employer.

Step 1:
A 256Hz or 512Hz tuning fork is placed on the Mastoid
process of the "Good Ear" (Left).

Result – The patient reports hearing the sound.

Step 2:  
The same 256Hz or 512Hz fork is placed on the Mastoid bone of the “Bad Ear” (Right).

Result – The patient reports inability to hear the sound.

Step 3:  
The test can be repeated as above as desired to confirm the results.

The test can be performed in the Otolaryngology office and does not require masking of the non-test ear or occlusion of the test ear.

RESULTS

True versus Malingering

True Right-sided sensorineural hearing loss – The patient would report hearing the sound in their Left side only, with the Tuning fork at any point on the skull.

Feigned Right-sided sensorineural hearing loss (malingerer) – The patient would claim not to hear the sound when the tuning fork is placed on the claimed bad ear. Despite the fact that if he genuinely had a unilateral loss, the sound would still be heard in the good ear.

Test Analysis

The test relies on the phenomenon that with bone conduction of sound, there is minimal attenuation of sound across the skull [3]. In other words, a sound delivered by bone conduction at any point on the skull will be heard virtually equally by both cochlea, as sound travels across the skull from one side to the other with very little attenuation (reduction in intensity) [4].

Therefore if the patient truly had a complete hearing loss in the right ear, when the tuning fork is placed on the mastoid of the right ear, he would still report hearing it in his left ear, as the cochlea on the left would receive the sound efficiently. In feigned hearing loss, the sound will be heard by the right cochlea, and so the patient will report being unable to hear it, despite being heard both sides. This is due to the side nearest the tuning fork position appearing louder [4].

We have used this test on 28 cases to date and have not found any inaccuracies in the diagnostic pathway when compared to other standard tests. All 28 cases were assessed using an automated audiometric Stengers test and achieved the same results.

DISCUSSION

Synopsis of Findings and Strengths

This test is quick and accurate when compared to other tests. It utilises only one tuning fork of either 256Hz or 512Hz (ideally 512Hz), which are easily available in most Otolaryngology offices (Table 1).

The traditional Stenger’s test requires two identical tuning forks [5]. Two identical forks are often difficult to find in a busy clinic with multiple clinicians working together.

The Chimani-Moos test is a variation on the Weber test [6]. In this test, a standard Weber test is performed first and the malingerer will report hearing the sound only in the good ear (implying either a conductive loss in the good ear or a sensorineural loss in the feigned ear). The ear canal of the good ear is then occluded with a finger and the Weber test repeated. The malingerer may report not hearing any sound at all (whereas a genuine patient would still report hearing the sound in the good ear). This can often fail in malingerers, as producing a conductive loss in the feigned “good ear” will cause the Weber to be heard louder in this ear. Not all malingerers will report an inability to hear anything, as some malingerers will feel that as they can only hear the sound in their “good” ear, it helps them to confirm their feigned loss in the contralateral ear. This test has therefore been found to be unhelpful when compared to other tests [7].

Other tuning fork tests include Teal’s, but this is only useful for Conductive loss. Speech/voice tests also exist, but require specialised sound generating equipment or audiology equipment. In current healthcare with immigration, these would often require interpreters or speech testing equipment in different languages. Therefore speech tests will not be discussed further, as we have compared only with other tuning fork tests.

The Judd-Persaud test however, is repeatable and accurate and takes only a few seconds to perform. An audiometric version of the test can also be performed using the audiometer bone conductor.

The phenomenon of minimal attenuation across the skull is already exploited extensively in bone conduction hearing aid devices for single-sided deafness [8]. It is the principle by which Bone-Anchored Hearing Aids are used in single-sided deafness, when an implant on the side of the hearing loss transfers sound across the skull to the contralateral cochlea [4,8]. The Judd-Persaud test utilises this phenomenon.

Table 1: Comparisons with other studies.

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Hearing loss tested</th>
<th>Equipment Required</th>
<th>Limitation compared to Judd-Persaud test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stenger</td>
<td>Sensorineural</td>
<td>2 identical tuning forks</td>
<td>Equipment required</td>
</tr>
<tr>
<td>Chimani-Moos</td>
<td>Sensorineural</td>
<td>1 tuning fork</td>
<td>Unreliable for testing a unilateral feigned loss</td>
</tr>
<tr>
<td>Teal</td>
<td>Conductive</td>
<td>1 tuning fork</td>
<td>Good but for Conductive loss only</td>
</tr>
<tr>
<td>Lombard</td>
<td>Sensorineural</td>
<td>Barany Box or sound generator</td>
<td>Not a tuning fork test</td>
</tr>
<tr>
<td>Erhardt</td>
<td>Sensorineural</td>
<td>Sound generator or interpreter</td>
<td>Not a tuning fork test</td>
</tr>
</tbody>
</table>
Clinical Applicability

There are a number of more sophisticated and automated audiometric tests available for malingering. The audiometric Stenger test has been shown to be very reliable [9]. However, as mentioned above, the availability of these audiometric tests are not always possible in certain regions. Studies have also found that the more sophisticated the tests, the more likely a malingerer are able to “beat” the test, and successfully feign a hearing loss [10].

It must be born in mind of course, that a medico legal defence cannot rely entirely on office-based tuning fork tests, and in cases such as feigned hearing loss, fully objective tests such as Otoacoustic emissions and Auditory Brainstem Response testing remain the gold standard.

However, as a simple screening test for in office assessment, tuning fork testing remains a sensible option. We therefore feel that the Judd-Persaud Test is accurate and reliable as a direct result of its simplicity.

CONCLUSION

The Judd-Persaud test is a simple, easy to perform, quick and accurate test for unilateral feigned hearing loss in the malingering.

REFERENCES

5. Stenger S. An attempt to objective determination single-sided deafness, respectively. Deafness means tuning forks. Archive for otology. 1900; 50: 197-198.