**Hearing assessment**

**Tunning Fork**

Ideally a 512- or 256- Hz tuning fork should be used. The duration of the stimulus decreases with increasing frequency, and it is difficult to activate forks with a frequency higher than 512 Hz sufficiently for them to be heard by those with a moderate or serve impairment. Fork less than 256 Hz can make it difficult for the patient to distinguish between hearing the sound and feeling it by vibration.

A tuning fork should be set in vibration by affirm strike one-third of the way from the free end of the prong against a firm but elastic object (e.g. elbow or patella). This should produce a relatively pure tone with minimal overtones. It can then be presented by either air or bone conduction. For air conduction it should be held with its acoustic axis (a line joining tow points near the tips of the two prongs) in line with 2-3 cm from the meatus. For bone conduction the base plate should be placed firmly on the skull, either mastoid process or vertex depending on the test.

The tests are based on two main principles ;

1- The inner ear is normally twice as sensitive to sound conducted by air as to that conducted by bone.

2- In the presence of a purely conductive hearing loss, the affected ear is subject to less environmental noise, making it more sensitive to bone – conducted sound.

**Rinne test**

This test examines each ear individually and is based on the principle of improved bone conduction perception with a conductive loss. It can be performed in one of two ways. The subject can be asked to compare either the loudness of the tuning fork when presented by air conduction and bone conduction (placed on the ipsilateral mastoid process) or the duration of the sound when presented by both air and bone conduction.

The normal responses to hear the sound as louder and longer with air conduction and is referred to as a Rinne positive. A positive response will also occur with a sensorineural hearing loss. A negative response (Rinne negative) will occur if ther is a conductive loss of greater than 20 dB or if ther is a severe senserineural hearing loss. The former is referred to as a true-negative Rinne and the latter as a false negative.

The two can be distinguished by using a Barany sound box, in which case the false negative will become positive as the contralateral, minimally attenuated, bone conduction is masked.

**Weber test**

This test is again based on the principle that a conductive loss causes a relative improvement in the ability to hear a bone –conducted sound and the test is of most value in a unilateral hearing loss.

The tuning fork is struck and placed on the vertex.The vertex is used as opposed to the forehead as the reliability of the test is thus improved from 72% to 86% (Further improvement can be achieved by using the upper incisors, if the conductive of 10 dB or more exists, the sound should be heared in the affected ear. If a sensorineural hearing loss is present the sound will generally be heared in the better ear. In the normal subject or some subjects with a long-standing sensorineural hearing loss,the sound will be heard in the midline.

