

# WSSCC MEDICAL BULLETIN – JANUARY 2022

## TINNITUS

Tinnitus is defined as a sensation of noise that seems to be in the ear or head when no external sound is actually present.

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Head noise, or tinnitus, occurs in nearly everyone, but is usually masked by outside sounds. Occasional periods of high-pitched tinnitus lasting several minutes are common in normal-hearing individuals, but prolonged or frequent high-pitched tinnitus may be associated with sensorineural hearing loss, or injury to the inner ear.

### There are two types of tinnitus:

- 1) **Objective Tinnitus:** Can be heard by the individual, as well as the health care provider (through a stethoscope).
- 2) **Subjective Tinnitus:** Most common; can only be heard by the individual.

### TO DIAGNOSE TINNITUS:

Diagnosis relies on a thorough medical evaluation, including examination of the ear to reveal signs of current or treated ear disease, as well as an assessment of the individual’s general mood, as depression and anxiety are common before/after the onset of tinnitus.

An audiometric evaluation is completed to identify associated hearing loss or other diseases and conditions of the hearing mechanism. Brain stem auditory evoked potentials help evaluate the auditory nerve that may be affected in structural causes of tinnitus, associated with sensorineural hearing loss. MRI or CT may also be useful in documenting structural causes of tinnitus.

Other potential causes include cardiovascular, metabolic, neurological, pharmacological, dental and psychological conditions, therefore other investigations or referrals may be required.

The Tinnitus Handicap Inventory (THI), validated in 1996, is helpful in the quantification of tinnitus and how it affects daily living.

### Causes may include:

#### Objective Tinnitus:

A common example is a heart murmur, which can be experienced as pulsatile tinnitus. This type of tinnitus is more common in the elderly due to stiffening of the arteries and more turbulent blood flow. This can often be heard by the clinician with a stethoscope applied to the neck.

## Subjective Tinnitus:

The more common causes are listed below;

- Hearing loss – hair cells located in the cochlea move when sound waves are received. This movement triggers electrical signals along the auditory nerve from the ear to the brain. Changes in the hairs, which can occur with natural aging or with noise exposure, can result in random electrical impulses to the brain, resulting in the sensation of tinnitus.
- Mechanical blockage of the ear canal – this may cause a change in the pressure in the ear, resulting in tinnitus.
- Head and neck trauma – either may affect the inner ear, the auditory nerves, or brain function related to hearing. These injuries usually result in unilateral tinnitus.
- Medication – a number of medications have been shown to cause or worsen tinnitus, including nonsteroidal anti-inflammatories, some antibiotics, cancer chemotherapeutic drugs, diuretics, antimalarial drugs, and some antidepressants.

Less common causes include Ménière's disease, eustachian tube dysfunction, otosclerosis (stiffening of the bones in the middle ear), temporomandibular joint disorder, acoustic neuroma or other head and neck tumors, vascular disease (as well as other chronic medical conditions including diabetes), thyroid disorder, migraines, anemia, and autoimmune disorders such as rheumatoid arthritis and lupus.

## TREATMENT

As an individual's general health may affect the severity and the impact of tinnitus, it is important to identify any underlying medical disorders, structural abnormalities, medications, or psychological conditions that may be causing the sensation of tinnitus. Once these are diagnosed and treated, tinnitus may improve/resolve.

If tinnitus is as a result of sensorineural hearing loss, a hearing aid may be of value. In addition, there are specialized hearing aids that include a sound therapy tool, for example the WidexZen sound therapy tool.

Cognitive behavioral therapy assists in building coping skills, and while it may not decrease the sound of tinnitus, it has been shown to improve quality of life.

Tinnitus retraining therapy (TRT) can help to habituate the auditory system to the tinnitus signals making them less noticeable and less bothersome. The main components of TRT are individual counseling, and sound therapy.

### Other treatment options:

- Masking devices such as white noise machine, pillow speakers, etc.
- Biofeedback and stress management helps to control the impact of tinnitus, given stress can be caused by tinnitus, and in turn can increase tinnitus.
- Tinnitus support groups.
- Pharmacologic therapy – while many drugs have been shown to cause or worsen tinnitus, some antidepressants (including tricyclics like nortriptyline or SSRIs like Paroxetine) have been shown to provide benefit.

The above is not meant to be an exhaustive list of available treatments, but rather notes more common treatments.

Successful treatment or management of tinnitus is important given the comorbidities and sequelae of tinnitus in adults. Studies have shown a close association between tinnitus and anxiety, depression, few hours of sleep, and a higher number of missed work days.

Research has also shown that tinnitus can cause cognitive difficulties in adults by affecting executive control of attention.

## Prognosis

Unfortunately, in many instances tinnitus resists all forms of therapy. Approximately 25% of individuals with tinnitus experience progression in severity over time. However if hearing loss occurs, tinnitus may become less noticeable. In the case of underlying medical causes of tinnitus, reversal of the disease process may improve the sensation of tinnitus.

## RETURN TO WORK

The individual's symptoms, job duties, and work environment should be reviewed to determine safety. The following restrictions may be required:

- Restrict working in noisy environments.
- Restrict or limit working at heights, using ladders, or tasks that require balance (some workers experience difficulties with balance, and restrictions may need to be imposed to ensure safety).

Accommodations that employers could implement to assist the worker in returning to work, or to continue to work safely include:

- Provision of white noise in the work area to help block out inner noise.
- Phone system accommodations for hearing loss.
- Hearing protection.
- Alternative warning systems during emergencies, such as flashing lights, vibrating pagers, etc. This is especially useful when working around machinery.

If insomnia is experienced as a result of tinnitus, the effects of fatigue should be considered when determining limitations and restrictions of tasks, and must be communicated to the employer to ensure worker and co-worker safety.

## WSCC Assistance

The WSCC has a [Return to Work Specialist](#) that can assist in working with the employer to make appropriate work modifications for workers diagnosed with tinnitus.

If you have any questions about how WSCC can assist you in treating patients with workplace injuries or illnesses, or would like to discuss the above information with WSCC's Medical Unit, contact them [here](#).

## REFERENCES

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