The following stages of tinnitus emergence are proposed:
- source (cochlea, auditory nerve)
- detection and enhancement of the signal (subcortical)
- activation of limbic and autonomic nervous systems
- perception and evaluation
- development of negative associations
- feedback loop principle causing the following cascade:
  1. enhancement of detection of tinnitus signal
  2. activation of the limbic system
  3. increased reactions of the autonomic nervous system
  4. sustained activation of emotional (limbic) and autonomic nervous systems

Tinnitus acquires a negative association through prolonged continuous exposure.

Patients end up feeling despondent - they get quite depressed
and think that they will feel this way forever
BUT this "REFLEX" from the over-activation of the
sympathetic portion can be relieved
they will often do a lot of introspection of their actions that
they attribute will lessen or worsen their own tinnitus

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Tinnitus Retraining Therapy (TRT)
Neurophysiological Model of Tinnitus (Jastreboff & Hazel, 1990)

Tinnitus is a phantom auditory perception or hallucination that is referred to as ‘phantom limb’ of the ear.

It is an abnormal neurological feedback loop that occurs as a 2nd symptom to hearing loss due to the loss of a critical mass of outer hair cells of the cochlea (accounts for >90% of cases). Examined using Otoacoustic Emissions. Exception to this rule: TBI, PCS, or whiplash injuries (accounts for <10% of patients due to the RCPM muscle).

Clinical research, documented for over 25 years on TRT, has demonstrated an ~86-92% effectiveness rate when treated with amplification and coupled with appropriate counselling and/or TRT counselling.

Tinnitus is one of the top 5 complaints reported to family physicians and occurs in ~17% of world population.
33% of elderly population report tinnitus to their M.D.
20% of patients report that it is occasionally disturbing (~44 million)
8% of patients are bothered by their tinnitus (~20 million)
1% of patients are significantly affected (~2 million – these patients usually have pre-existing anxiety or depression)

Many associated medical conditions are correlated with, or may trigger the symptom, but are not the cause.

Tinnitus is a symptom that is highly correlated with and affected by: stress, anxiety and lack of sleep.
(Common complaints: annoyance, sleep disturbance, anxiety, depression, irritability, decreased quality of life, impaired concentration)

It is a chronic fluctuating Sx that waxes and wanes with stress, and acquires a negative association through:

‘Negative counselling’ from medical personnel including specialists (“nothing can be done”, “learn to live with it!”)
Search for ‘brain tumour’: (MD orders MRI/CT querying acoustic neuroma/vestibular schwannoma BUT occurs in 1/200,000).
Fear of new and unknown danger: (MDs are often concerned and search out the ‘unknown cause’ of the symptom)

Negative Counselling by healthcare, including family physicians and otoaryngologists is the worst counselling possible and exacerbates the problem due to the sense of helplessness and hopelessness it provides the patient, and the ultimately end up treating with anti-anxiety medications that do not reduce nor remit the tinnitus.

Tinnitus has no effective medical or surgical treatment (all have <40%, the documented placebo rate):
(Past Surgical procedures: Cochlear Nerve Resection, VIII CN Vascular Compression, Intra-Cochlear Stimulation, Cochlear Implant.
(Other treatments: Transcranial Magnetic Stimulation, Biofeedback, Hypnotherapy, Acupuncture, TMJ Tx, Hypobaric Of Therapies)

Review of pharmaceutical & OTC treatments all have <40% documented placebo, some with adverse reaction
Sedatives: most commonly Benzodiazepines, Antidepressants: (including popular but non-replicated Xanax study by Johnson’93),
Local Anaesthetics (oral: Tocainide and Flecainide), Anticonvulsants: (including Carbamazepine), Prostaglandin Agonist (Misoprostol – to get away from NSAIDs which were once thought to cause tinnitus), Antiseizure and pain medications (including Gabapentin/Neurontin), Calcium Channel Blockers, and ginkgo biloba.

However, 86-92% effectiveness rate (replicated >25 yrs of research) when treated with amplification & TRT.

Psychiatrists and Psychologists are often critical for patient care for those who report that it causes anxiety or distress (especially for pts with pre-existing dx of anxiety and/or depression). Proper audiological exam, treatment and co-management with mental health (and physician) are crucial for patient care.