Care Path for Patients with Tinnitus
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Objectives
• Describe components of a care path for management of tinnitus
• Discuss which healthcare providers should be included in the multi-disciplinary team
• Create a PowerPoint interactive presentation to educate patients about tinnitus.

Reasons why you may feel uncomfortable in providing services to patients with tinnitus
• Lack of educational/clinical preparation
• Unknown neurophysiologic origins
• Many alternative treatment options
• Minimal evidence-based literature
• Difficult population to work with and feelings of inability to help

Definition of Tinnitus:
Perceived sound without an external source
Occurrence must be distressing and impact quality of life

Review of Etiology of Tinnitus
Generated:
Inner ear  Auditory Pathway  Thalamus  Head and Neck muscles
Hypothalamic PVN  Auditory Cortex  Limbic system  Hippocampus
Possible Integrated Model Theory:
Disorder at hair cells leads to abnormal firing pattern of auditory nerve leading to
involvement of CANS and dysfunctional thalamocortical signal and/or somato-otic
interactions leading to cortical involvement with influence of emotional and/or cognitive
processing from the limbic system.

Interprofessional Team
• Tinnitus can be generated by:
  o Poor posture and head control
  o Neck musculature
  o Dental problems
  o Ear injury/insults
  o Stress

General Goals for Managing Patients with Tinnitus
• Return control to patient
• Promote acceptance
• Manage emotional reactions
• Make tinnitus a neutral sound
• Have realistic expectations
• There is hope!
Care Coordination/Interprofessional Collaborative Practice

Care coordination will:

- improve access to and coordination of health services;
- facilitate use of specialty clinical resources;
- improve care quality and patient transition;
- improve efficacy;
- reduce duplication of care and gaps in care; and
- reduce cost.

Cleveland Clinic Tinnitus Management Clinical Pathway

Why Group Sessions?

- Group interchanges
- Share and learn from each other
- Encouragement from others to take responsibility
- More cost-effective and time-efficient
- Highly practical for busy practices

TMC Group Sessions

- Approximately 90 minutes
- Significant others encouraged to attend
- Limited to 6 patients

Goals of the TMC Group Education Session

- Clarify misconceptions
- Provide reassurance
- Offer practical suggestions and techniques to provide immediate relief
- Empower patient to take control of tinnitus rather than being controlled by tinnitus
- Demystify tinnitus through education
Establish trust and rapport helping to promote compliance
Not a “sounding board” for individual problems
Provide hope for tinnitus relief

**Development of Counseling Program**
- Guides counseling session
- Organizes complex information into logical sequence and format
- Keeps group discussions focused
- Provides visual interest to patient and SOP

**Components of Counseling Program**
- Prevalence of tinnitus
- Anatomy and physiology of hearing/tinnitus
- Potential generator sites/models of tinnitus
- Role of each specialty in tinnitus management
- Functional consequences of tinnitus
- Mechanisms underlying emotional reaction to tinnitus
- Management options and program philosophy
- Description of TMC phases, scheduling future appointments, costs, and expectations

**Sample Slides from Cleveland Clinic TMC PowerPoint Presentation as an example of what can be created for patient education**

**MULTIDISCIPLINARY SCREENING**
15 min session with audiology, dentistry, neurology, physical therapy, and psychology

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**SOMATIC-MODULATED TINNITUS**

- Ability to alter the psychoacoustic attributes (loudness/pitch) of tinnitus:
  - Masticatory muscle contraction (clenching jaw)
  - Head, neck, or upper limb movements
  - Eye movements in horizontal/vertical planes
  - Myofascial trigger points
  - Cutaneous stimulation of hand/fingertip
  - Electrical stimulation of median nerve
  - Orofacial movements

- Is the neck contributing?
  - Neck pain? Tightness/stiffness
  - *Pain is not the sole indicator!*
  - Any arm or hand symptoms? Weakness, Tingling/numbness
  - Headaches? Location, Frequency/intensity
  - Dizziness? Related symptoms, nausea, palpitations, blurry vision

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**Neurology**

**What might a neurologist find?**
- Pertinent history
- Deficits on exam
- Gross abnormalities on imaging
- Tumors, cysts, cerebral infarcts, MS lesions
  - If there is no obvious pathology or abnormal exam findings, less specific medications/treatment to be used
Tinnitus – Pitfalls

No unifying theory on what it is – short of the description
Many different causes – ear, brain, ear-brain
Many potential pathomechanisms - ear injury, head trauma
No consistent audiometric findings or other marker
No consistent treatment response

Commonly Associated Disorders

Vestibular Disorders       Neurolabyrinthis
Vestibular Neuronitis       Meniere’s Disease
Acoustic Neuroma            TMJ Dysfunction
Headache Disorders          Passing Out (Pre/Syncope)
Migraine (part of the diagnosis criteria for basilar migraine)

Medical Approaches

Testing: head MRI/CT, temporal bone CT, audiogram, blood work
Treat the underlying disorder
Medication: antidepressants, anticonvulsants, anxiolytics
Dietary supplements
Referrals: Audiology, Otolaryngology, Psychology/Psychiatry

Neurology Screening Summary

determines need for full neurologic evaluation through observation and brief screening
looking at neurologic symptoms/findings (exam or imaging), cervical symptoms or
findings, whether tinnitus can be somatically modulated
Consider need for neck/jaw PT if there is an abnormal neck exam with modulation
Presence of somatic modulation combined with a mechanical problems with the
neck/jaw suggests (30 – 50% of the time, estimate), that mechanical interventions may
improve the intensity and/or temporal pattern of the tinnitus

Dentistry

Tinnitus and Myogenic TMD

Occlusal Discrepancies: Malocclusion, Lack of Anterior Guidance, Interferences to
a Stable Joint Position
Parafunional Bruxism: Diurnal Clenching, Nocturnal Grinding/Clenching
Trismus: Sustained Limited Mandibular Closure, Fibrotic Contracture
TMJ Arthralgia: Protective Co-Contraction of Masticatory Muscles

15 Minute TMD Screening

Past Dental History

Trauma
Orthotics
Parafunional Habits
Oral Habits: Gum Chewing, Cheek Biting, Pencil Holding
Fractured Teeth/Severe Wear
Headaches: Onset, Frequency
Ergonomics: Computer Usage, Musicians, Weight Lifting, Job

Clinical Screening

MROM Normal: 40-55mm
Auscultation: clicking/crepitus
Palpation of masticatory and cervical muscles
Soft tissue examination
Occlusal wear patterns
Load testing of TMJ with elevator muscle contraction
Modulation of tinnitus with masticatory muscle movement restriction
Dental Management of TMD Related Tinnitus
Self Help Therapy: decrease diurnal clenching and other parafunctional habits
Dental Orthotics: reduce muscle hypercontraction during nocturnal bruxism and masticatory function
Occlusal Corrective Procedures: achieve harmonious neuromusculature of the masticatory system
Physical Therapy Modalities: improve posture, resolve myofascial trigger points improve cervical and masticatory range of motion
Referral: appropriate medical specialists for stress reduction, cognitive behavioral therapy, pain management and pharmacotherapy

Physical Therapy
The Connection
Levine 1999 found that tinnitus can be modulated somatically with face, head, and neck movements; that tinnitus has been associated with two somatic disorders, temporomandibular joint syndrome and whiplash. 5 out of 6 case study patients had some form of orthopedic diagnosis- neck, jaw or shoulder.
Sanchez et al 2007 used repetitive head and neck contractions to assess for modulation and found that the head and neck contractions produced more modulation in tinnitus than any limb maneuver

Posture:
Good: Sitting up straight will reduce the amount of stress on your joints & muscles; Begins at lumbar spine and can effect everything above if poorly positioned
Bad: Chronic forward head posture
   Adaptive shortening of deep cervical fascia and muscles
   Decreased activation of deep neck flexor (anterior muscles)
   Increased tension of posterior cervical muscles
   Aggravates functional malocclusion of jaw

Physical Therapy Screening
Observations: Mobility of neck, mid back, shoulders and jaw; looking for lack of mobility and pain, or reproduction of symptoms
Overall posture in sitting, standing, sleeping
Strength of UE, neck
Complete testing checking for change in symptoms

Physical Therapy Treatment Options
Education:
   Posture
   Ergonomics- (fix your posture at work)
   Benefit of exercises
   How the spine works, and problems that may occur
   Correct sleeping positions - support for the neck
   Improve technique of breathing (if needed) to decrease overuse of neck muscles

Physical Therapy Referral for patients who:
   Have neck pain, tightness, abnormalities of movement, tenderness of muscles
   Have jaw deficits of movement, tenderness of muscles, crepitus, clicking
   Have additional symptoms of HA, dizziness
   Have tinnitus related to neck trauma, MVA
   Have history of additional spine, orthopedic problems
   Can modulate tinnitus
Psychology Helps Manage Distress
- Assessing patient’s distress
- Instilling hope for a better future
- Developing a plan to facilitate adjustment
- Cognitive-behavioral psychotherapy
- Referrals to local practitioners
- Use of self-help guides/workbooks
- Collaborating with the team

Psychological Assessment
Prior to the educational session and screenings:

**Depression symptoms**: PHQ-9 (minimal to severe depression)

Suicidality

**Anxiety**: GAD-7 (minimal to severe anxiety)

**Patient Health Questionnaire – Nine Symptom Checklist (PHQ-9)**
- 9 items
- Second overall question
- Scores ≥ 10 had sensitivity of 88%; specificity of 88% for major depression
- Scores of 5 represent mild: 10 moderate; 15 moderately severe; & 20 severe depression

**General Anxiety Disorders – 7**
- Good reliability and validity
- Sensitivity of 89%; specificity of 82%
- Increasing scores associated with multiple domains of functional impairment
- Anxiety and depression are independent effects on functional impairment and disability

Screening Interview
Aided by patient introductions/assessment tools
Communicate the results of the assessment devices and address suicidality.
Assess:
- Previous psychiatric history & substance abuse, Coping resources, Social supports
- Problematic behaviors (checking, reassurance-seeking)
- Premorbid personality factors

Treatment Recommendations
Self-help resources: Relaxation CD’s, Cognitive-behavioral workbooks to promote mindfulness and acceptance
- Psychiatry referrals for medications
- Cognitive-behavioral therapy (CBT)

Cognitive Behavioral Therapy (CBT)
- Psychologic treatment that focuses on ideas and thoughts.
- Goal is to identify and change negative thoughts AND to modify problematic behaviors to facilitate dealing with stressful conditions such as tinnitus
- Helps to control the irrational thoughts related with the condition – thus easing patient’s coping process
- Originally developed for anxiety and depression so can apply to tinnitus
- Most validated treatment for tinnitus
Audiology

- Benefits of Sound Therapy
  - Decreases the perception of tinnitus by increasing the level of background sound, making the tinnitus less noticeable
  - Provides immediate relief, reducing emotional consequences
  - Promotes patient control over tinnitus rather than tinnitus control over patient
  - Promotes habituation to the tinnitus by neutralizing the threatening quality of the tinnitus

- Categories of Sound Therapy Options
  - Environmental Enrichment Devices
  - Sound Generators
  - Hearing Aids
  - Combination Units
  - Music devices

- Ongoing Counseling
  - Lifestyle changes
  - Stress management
  - Sleep
  - Diet
  - Engagement in activities/hobbies
  - Reassurance about lack of serious underlying cause
  - Realistic expectations about treatment outcome
  - Promotion of relaxation
  - Actively listen to patient
  - Provide patient a sense of hope
TMC Process
Group session
Individual screening session
Team meeting
Recommendations
Report generated and sent to patient
Patient self-selects next step

Cost Effectiveness of TMC Model
Group sessions cost and time efficient
Majority (96%) found GES and Screening beneficial
Patients willing to pay for services

Searchfield et al 2013 quote:

*Presence of tinnitus is a sensory experience, how individuals respond to their tinnitus tends to be more multidimensional – involving their perceptual attentional and emotional aspects. It is, after all, the person’s perceived disability that is going to have the greatest impact on their life.*