

JOINT TRAUMA SYSTEM CLINICAL PRACTICE GUIDELINE



Aural Blast Injury/Acoustic Trauma and Hearing Loss

This CPG will help the reader to quickly identify and treat aural trauma and hearing loss, to prevent morbidity, and to preserve as much function as possible – even while in the combat theater.

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Summary of Changes

- 1 Addition of desk-top knowledge products “Aural Blast Injury: A Physician’s Guide to Acoustic Trauma” and “Aural Blast Injury: An Emergency Management Professional’s Guide to Acoustic Trauma”. These documents provide an overview of acoustic and physical symptoms, immediate duty restriction guidance, and evaluation and treatment recommendations appropriate for level of care.
- 2 Updated Veteran’s Affairs and Department of Defense acoustic trauma and auditory injury statistics.
- 3 Reduced the timing of transtympanic dexamethasone injections to three injections within a 10-day period as a salvage to oral steroids.
- 4 Deleted the requirement to taper oral steroid regimen of prednisone 60mg daily for 10 days.
- 5 Updated Appendix A: Dix-Hallpike Test to include graphics for both left and right maneuvers.
- 6 Updated Appendix B: Epley Maneuver to include both left and right clinician assisted positioning. Added graphics for both an exam table or the use of pillow or another object for positioning, if an exam table is not available.
- 7 Added Appendix D: DOTMLPF-P Considerations.
- 8 Added Appendix E: Class VIII and Additional Medical Material.

Aural Blast Injury: A Physician's Guide to Acoustic Trauma

The goal of this CPG is to provide medical providers the tools necessary to identify, assess, and treat acoustic trauma. Early referral and reporting allows medical staff to evaluate, diagnose, and treat injuries in a timely manner, within therapeutic windows to mitigate injury progression. *Note: A Service Member with hearing loss is less effective during missions and can negatively impact mission performance.*



Acoustic Symptoms

- Hearing loss
- Tinnitus (ringing in the ear)
- Aural fullness
- Sensitivity to loud noise
- Difficulty localizing sounds
- Difficulty hearing in background noise
- Vertigo / dizziness



Physical Symptoms

- Tympanic Membrane Perforation
- Middle Ear Injury
- Temporal Bone Fracture
- Facial Nerve Injury
- Otorrhea
- Otalgia

Suspected hearing loss, awaiting treatment, or during treatment protocol:



- Individuals should be restricted from hazardous noise environments for the duration of treatment.
- Restrict from operations requiring good hearing, if possible, for the duration of treatment.

Evaluation & Treatment

TM perforation or drainage:

- If debris is present, DO NOT irrigate the ear as it may provoke pain and vertigo, move debris medially, and promote infection.
- Removal of debris should only be done by trained medical personnel to avoid further injury.
- DO NOT use any topical drops containing aminoglycosides (i.e., the neomycin in Cortisporin) since these are ototoxic.
- Treat with a fluoroquinolone and steroid containing topical antibiotic (e.g., 4 drops of ciprofloxacin/ dexamethasone or ofloxacin 3 times a day for 7 days).
- Observe strict dry ear precautions until the TM perforation has healed or is repaired.

Positive Dix-Hallpike or other vertigo:

- Epley or canalith repositioning maneuver if Dix-Hallpike is positive for benign paroxysmal positional vertigo.
- If vertigo or dizziness does not resolve, refer to ENT.

Acute acoustic trauma:

- Service Members with a shift in hearing > than 25 dBHL at 3 consecutive frequencies, relative to DOEHRs-HC baseline results, if available, or the contralateral ear thresholds, are candidates for high dose oral and/or transtympanic steroid injections when not otherwise contraindicated.
- An oral steroid regimen of prednisone (60 mg daily for 10 days followed by a 2-week taper) and Transtympanic dexamethasone (24 mg/ml, up to 3 injections over 10- to 14- day intervals).
 - Repeat audiometric evaluations to follow response to treatment.
 - Additional injections should be guided by response to steroid, based on audiometric results.

Patients should be referred to ENT for evaluation and further testing. If ENT is not available, patients should be evacuated to a higher level of care.



- ✓ Patients of interest have a documented tympanic membrane exam.
- ✓ Patients with subjective hearing loss or tinnitus persisting >72h have a hearing test or audiogram.
- ✓ Patients with absolute indications for ENT referral have a documented ENT examination.



This information is pulled from the evidence-based Joint Trauma System (JTS) Aural Blast Injury Clinical Practice Guideline (CPG). JTS CPGs can be found at the [JTS CPG website](#) or the [JTS Deployed Medicine site](#).

Aural Blast Injury: An Emergency Management Professional's Guide to Acoustic Trauma

The goal of this CPG is to provide medical providers the tools necessary to identify, assess, and treat acoustic trauma. Early referral and reporting allows medical staff to evaluate, diagnose, and treat injuries in a timely manner, within therapeutic windows to mitigate injury progression. *Note: A Service Member with hearing loss is less effective during missions and can negatively impact mission performance.*



Acoustic Symptoms

- Hearing loss
- Tinnitus (ringing in the ear)
- Aural fullness
- Sensitivity to loud noise
- Difficulty localizing sounds
- Difficulty hearing in background noise
- Vertigo / dizziness



Physical Symptoms

- Tympanic Membrane Perforation
- Middle Ear Injury
- Temporal Bone Fracture
- Facial Nerve Injury
- Ear discharge
- Ear pain



Suspected hearing loss, awaiting treatment, or during treatment protocol:

- Individuals should be restricted from hazardous noise environments for the duration of treatment.
- Restrict from operations requiring good hearing, if possible, for the duration of treatment.

Evaluation

If patient is experiencing:



Treatment

Follow this treatment protocol:

More severe

- Blood or other discharge draining from the ear canal
- Dizziness or balance issues

- Refer to ENT or Audiology for further evaluation and testing.
- If ENT is not available, evacuate patient to a higher level of care.
- Refer to PT for balance assessment.

Less severe

- Debris present in the ear canal
- Damage to the ear drum (perforation or tear)

- DO NOT irrigate the ear because it can cause pain, dizziness, or infection.
- Debris removal should be done by trained personnel to avoid further injury.
- Refer patient to PCM for steroid treatment.

- A change in hearing
- Tinnitus or ringing in the ear

- Examine ear to determine if there is damage to the ear drum or debris present.
- If no debris is present, conduct or refer for a hearing test.



- ✓ Patients of interest have a documented tympanic membrane exam.
- ✓ Patients with subjective hearing loss or tinnitus persisting >72h have a hearing test or audiogram.
- ✓ Patients with absolute indications for ENT referral have a documented ENT examination.



This information is pulled from the evidence-based Joint Trauma System (JTS) Aural Blast Injury Clinical Practice Guideline (CPG). JTS CPGs can be found at the [JTS CPG website](#) or the [JTS Deployed Medicine site](#).

INTRODUCTION

Acoustic trauma continues to amass as the most prevalent Service-connected disability for Veterans. Of the top 10 VA disabilities in 2024, almost one-third were auditory related (273,502 new claims for tinnitus and 108,105 for hearing loss). From 2023 to 2024, new compensation claims for auditory injury increased from 315,637 to 398,163 or 26.1%. Tinnitus and hearing loss are the two most prevalent disabilities in peace time service periods due to noise exposure in training.¹ In 2023, Department of Defense (DoD) hearing surveillance data shows that 5.1% of the active-duty force has permanent auditory injury, and 8.6% developed unique episodes of temporary shifts in hearing.² Historically, auditory injuries that are invisible, and not life or limb threatening, are not brought to the attention of medical personnel, unless they are associated with other severe injuries, or are disabling in severity.³

The goal of this CPG is to elevate awareness of noise threats, the prevalence of hazardous noise exposure, and the symptoms of acoustic trauma for the purpose of facilitating early identification and intervention of acoustic trauma. Improving outcomes for hearing requires developing trusted and functional prevention practices and technologies, as well as a surveillance and early referral and reporting system. This facilitates timely evaluation and diagnosis within therapeutic windows when intervention may mitigate injury progression. Improving the outcomes from acoustic trauma will preserve hearing capabilities in ranges conducive to continued high-level function and performance.

INJURY OVERVIEW

For the purposes of this CPG, hazardous noise is defined as impact noise or impulse noise greater than (140dB, ex small caliber gunfire).⁴ At these levels, Service Members are at elevated risk for acoustic trauma and subsequent hearing loss (HL). Patients exposed to blasts are at risk for both aural and acoustic trauma.⁵⁻⁷ Here we outline acoustic and aural injuries and provide further clinical guidance and importance of treatment and timing.

Hazardous noise may cause injury to the hearing mechanisms in the inner ear. Symptoms of acoustic trauma may include hearing loss, tinnitus (ringing in the ear), aural fullness, recruitment (ear pain with loud noise), difficulty understanding speech, difficulty localizing or finding sound sources, difficulty hearing in a noisy background, and vertigo. Acoustic trauma may result in sensorineural hearing loss (SNHL) that is either temporary (temporary threshold shift, TTS) or permanent (permanent threshold shift, PTS). A TTS resolves over time; audiometric testing should be completed to monitor and confirm whether this was partial or complete resolution of thresholds. While the time frame for hearing recovery is unique in every case, any SNHL that persists beyond eight weeks after injury is most likely permanent and should be considered a PTS. There are no clinical predictors for which patients with TTS will persist, and develop PTS.

The ear, specifically the tympanic membrane (TM), is the most sensitive organ to primary blast injury (PBI). Blast exposures can perforate the TM. Risk of injury is determined by the intensity of the blast, proximity to the source of the blast, as well as factors related to secondary, tertiary, and quaternary blast effects.⁸ The signs and symptoms of a TM perforation include the signs and symptoms of acoustic trauma listed above as well as pain, bloody ear discharge, dizziness, and conductive hearing loss (CHL) which is the result of a decrease of sound energy transmission through the middle ear to the inner ear. TM perforations heal spontaneously in 80 to 94% of cases.⁹ The smaller the size of the TM perforation, the greater the likelihood is of spontaneous closure. Most TM perforations that close spontaneously do so within the first eight weeks after injury.^{10,11} For these reasons, perforation rates in mass casualty situations may be under-reported when limited resources are utilized for more significant polytraumatic cases. TM perforation may likely be included in the non-immediate injuries deferred for later evaluation during which interval spontaneous healing may occur.¹²

The ossicular chain may be injured because of PBI, with fracture of the ossicles or disarticulation of the chain, both of which can result in CHL with or without SNHL. TM perforations and middle ear injuries may heal with scarring that stiffen the TM or ossicular chain, also resulting in CHL. The combination of a CHL with a SNHL is called a mixed hearing loss.

The temporal bone may also be fractured as a result of higher order blast injury, often associated with secondary or tertiary blast effects.¹³ Patients with temporal bone fractures may have lacerations in the ear canal, along the TM, or within the

middle ear resulting in either bloody otorrhea or hemotympanum (blood behind the TM).¹² They may also have SNHL or CHL, depending on the orientation of the fracture. A small number of these fractures (15%) will have an associated cerebral spinal fluid (CSF) leak.¹⁴ CSF leaks to the middle ear, mastoid cavity, and/or external auditory canal can become symptomatic as CSF otorrhea (a leak of fluid from the ear canal), CSF rhinorrhea (leak of fluid from the nose, typically unilateral and on the side of the temporal bone fracture), or as CHL from a middle ear CSF effusion. The risk of meningitis within the first seven days post injury ranges from 5-11% but increases to as high as 88% if a persistent leak is left untreated over time; therefore broad spectrum antibiotic prophylaxis and expert consultation are recommended.¹⁵⁻¹⁸ Testing otorrhea or rhinorrhea to distinguish between patients with bloody drainage containing CSF from those who have bloody drainage without CSF is insensitive, unless an assay for β 2-transferrin (a protein unique to CSF) is obtained. This is unlikely to be available in the deployed setting. There are other, less sensitive, and specific bed-side techniques that can assess for CSF drainage, but assessment for β 2-transferrin is considered the gold standard. Spontaneous closure of CSF leaks occurs in greater than 90% of cases and is facilitated by bed rest with the head of bed elevated, anti-strain precautions, and stool softeners. Leaks that fail to spontaneously recover should be considered for lumbar drainage of CSF. Surgical management of CSF leaks should be considered in cases of CSF otorrhea or rhinorrhea that does not close with other measures.¹⁹

The facial nerve can be injured in temporal bone fractures.²⁰ Acute management of intratemporal facial nerve injury is to provide objective documentation of facial movement using a standardized grading scale, such as the House-Brackmann grading scale, the Sunnybrook Facial Grading Scale, or another facial nerve standardized grading scale.^{21,22} Complete immediate paralysis of the face portends more significant injury to the nerve and should be referred for evaluation and possible surgical decompression to optimize outcomes for facial function. If indicated, decompression should occur within two weeks of injury for optimal results -this short window necessitates expedited consultation. Delayed onset of facial paralysis after trauma is typically the result of an inflammatory cascade and may result in significant weakness of the motor function approaching complete paralysis; however, this will often recover completely without surgical intervention. Incomplete or complete facial paralysis that preclude eyelid closure should be managed with measures that include eye protection (eye lid taping to ensure complete closure, ophthalmic tear substitutes and protective ointment). For significant facial paresis/paralysis, early administration of steroids should be provided, if not contraindicated, and expeditious referral to an otolaryngologist for management is indicated.²³

Dizziness expressed as unsteadiness or vertigo (spinning sensation) following a blast injury can be a result of traumatic brain injury, but is also often caused by injury to the inner ear - specifically benign paroxysmal positional vertigo (BPPV), damage to sensitive neuroepithelial receptors within the inner ear, and perilymphatic fistula.²⁴ Other inner ear abnormalities may cause vertigo such as otic capsule violating temporal bone fractures, secondary infections of the inner ear or vestibular nerves, trauma induced endolymphatic hydrops, and activation of subclinical superior semicircular canal dehiscence.

EVALUATION & TREATMENT

All Service Members that develop symptoms consistent with noise trauma (acute tinnitus, muffled hearing, fullness in the ear, vertigo) should be educated and directed to self-report for evaluation and treatment as soon as practicable. Patients exposed to hazardous noise occurring from exposure to battle (improvised explosive devices, rockets, and small arms fire) and all patients exposed to a blast should be asked specifically about hearing loss and tinnitus during their initial trauma evaluation, unless other more urgent treatment or mental status conditions do not allow. This should be documented as soon as safe evaluation permits. All patients presenting to concussion care centers should be evaluated for hearing loss and tinnitus.

If there is debris in the External Auditory Canal (EAC) or in the middle ear (as seen through a TM perforation), treat the patient with a fluoroquinolone and steroid containing topical antibiotic (e.g., four (4) drops of ciprofloxacin/dexamethasone or ofloxacin in the affected ear three (3) times a day for seven (7) days). **Do NOT** irrigate the ear as it may provoke pain and vertigo and move the debris medially in the ear canal and middle ear, as well as promote infection. Also, do not use any topical drops containing aminoglycosides (i.e., the neomycin in Cortisporin) since these are ototoxic. Patients should observe strict dry ear precautions and keep ALL water out of the EAC until the TM perforation has healed or is repaired. A trained medical professional or ENT surgeon should only remove debris to avoid further injury to the EAC or the middle ear.

Hearing loss that persists 72 hours after acoustic trauma warrants a hearing test or audiogram. If available, test hearing as soon as possible after acoustic injury to document TTS (before 72 hours). When hearing loss is present, individuals should be restricted from continuous noise greater than 85dB or weapon firing period. This is important to allow time for healing since the inner ear is more susceptible to additional noise-induced damage while it is under the oxidative stress and glutamate toxicity of an acute injury. A Service Member with hearing loss is less effective during missions and can negatively impact mission performance.²⁵

Vestibular trauma may manifest dizziness, unsteadiness, or vertigo. Please refer to the Veteran Affairs/DoD vestibular clinical recommendations for a detailed review of traumatic dizziness patients with positional vertigo and without other contraindicating injuries should undergo Dix-Hallpike testing. An Epley maneuver or canalith repositioning should be performed if Dix-Hallpike testing was positive. (See Appendix A and Appendix B.) There is evidence between BPPV recurrence and low serum vitamin D levels. In patients with BPPV, we recommend vitamin D serum testing and supplementation in patients when levels are deficient.^{26,27}

ABSOLUTE INDICATIONS FOR AUDIOGRAM (HEARING TEST)

All patients with subjective hearing loss and tinnitus following blast exposure should have the exposure documented and should be evaluated by hearing testing as soon as possible. Hearing loss and associated acoustic trauma symptoms are detrimental to the patient's personal safety, quality of life, and medical readiness. Patients should be referred to ENT for evaluation and further testing. If audiometry or ENT care is not available, patients should be evacuated to a higher level of care.

Hearing loss (either subjective or documented through an air conduction audiogram) that persists for more than 72 hours after an acoustic trauma or blast injury warrants a comprehensive hearing test or audiogram (including tympanometry, bone conducted thresholds, speech discrimination, and acoustic reflexes). A screening audiogram is not sufficient. Patients with temporary threshold shift (TTS) greater than 25 dB losses in three consecutive frequencies should be considered candidates for high dose oral and/or transtympanic steroid injections when not otherwise contraindicated. An oral steroid regimen of prednisone 60mg daily for 10 days could be considered for TTS less than 25 dB loss in three consecutive frequencies at the discretion of the treating provider, as the risks associated with oral steroids are low and not otherwise contraindicated. Within 2-6 weeks of hearing loss, initiate 3 injections within a 10-day period of transtympanic dexamethasone (10mg/ml or 24mg/ml) as a salvage to oral steroids. Hyperbaric oxygen therapy is also an option if available and not contraindicated. Hearing response to treatment should be followed by audiometry within 2 weeks of completing therapy and 6 months following therapy.²⁸ Patients with threshold shift greater than 60 dB on three consecutive frequencies for ten or more days after noise exposure are not likely to resolve spontaneously and the hearing loss is likely permanent.

ABSOLUTE INDICATIONS FOR OTOLARYNGOLOGY (ENT) REFERRAL

- Temporal bone fractures with or without ear drainage.
- Persistent HL > 72 hours after acoustic trauma, or inability to perform duties due to perceived HL.
- TM perforation that has not resolved 8 weeks after injury.
- Vertigo that does not resolve within 7 days after injury, even if episodic.
- Clear ear drainage.
- Persistent discolored ear drainage that does not resolve after 3 days of topical antibiotic steroid combination drop therapy.
- Facial nerve paralysis.
- On screening audiogram if ANY of these conditions are met:

- Pure tone threshold average across 500, 1000, and 2000 Hz that is greater than 30 dB
- Or any absolute hearing threshold greater than 35 dB at 500, 1000, and 2000 Hz*
- Or any absolute hearing threshold greater than 45 dB at 3000 Hz or 55dB at 4000 Hz*

*Interpretation of the post-traumatic audiogram is facilitated by review of a baseline audiogram, if available.

RELATIVE INDICATIONS FOR OTOLARYNGOLOGY (ENT) REFERRAL

- Debris in the EAC that does not clear with topical ear drops.
- Inability to visualize the TM despite treatment with topical ear drops.
- Persistent dizziness or dysequilibrium, even if not true vertigo.
- Significant communication problems regardless of the hearing test results.
- Persistent and/or distracting tinnitus that interferes with the patient's duty performance or quality of life, regardless of hearing test results.

PERFORMANCE IMPROVEMENT (PI) MONITORING

POPULATION OF INTEREST

All patients exposed to a blast, and patients who develop symptoms consistent with noise trauma.

INTENT (EXPECTED OUTCOMES)

- 1 All patients exposed to blast, with symptoms of acoustic trauma (e.g., tinnitus, vertigo, muffled hearing, drainage from ear, fullness in the ear, blast injury or documented noise trauma) have documented tympanic membrane examination and objective hearing evaluation if available.
- 2 All patients exposed to blast, with subjective hearing loss or tinnitus persisting greater than 72 hours have a documented hearing test or audiogram.
- 3 All patients in the population of interest with absolute indications for ENT referral (per CPG) have a documented ENT evaluation.

PERFORMANCE/ADHERENCE METRICS

- 1 Patients of interest have a documented tympanic membrane exam.
- 2 Patients with subjective hearing loss or tinnitus persisting >72h have a hearing test or audiogram.
- 3 Patients with absolute indications for ENT referral have a documented ENT examination.

DATA SOURCE

- Patient Record
- Department of Defense Trauma Registry (DoDTR)
- Joint Hearing Loss and Auditory System Injury Registry (JHASIR)

SYSTEM REPORTING & FREQUENCY

The above constitutes the minimum criteria for PI monitoring of this CPG. System reporting will be performed annually; additional PI monitoring and system reporting may be performed as needed.

The system review and data analysis will be performed by the JTS Chief and the JTS PI Branch.

RESPONSIBILITIES

It is the trauma team leader's responsibility to ensure familiarity, appropriate compliance, and PI monitoring at the local level with this CPG.

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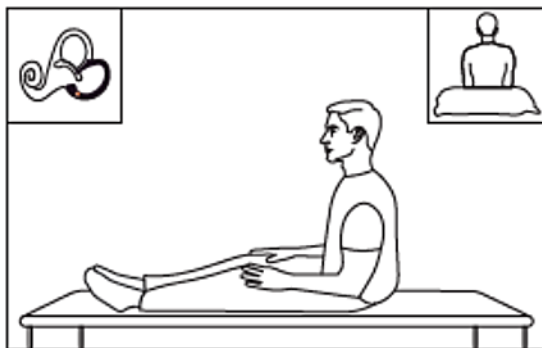
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APPENDIX A: DIX-HALLPIKE TEST - LEFT AND RIGHT

LEFT DIX-HALLPIKE

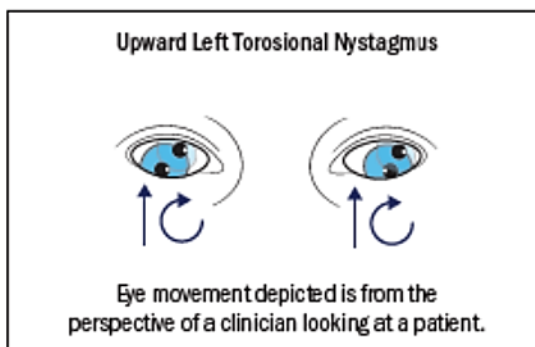
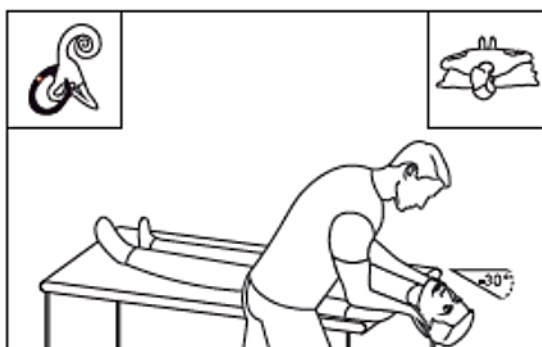
Step 1

For evaluating the left posterior semicircular canal, the patient sits on the exam table and turns his head to the left 45 degrees. This places the posterior semicircular canal in the plane of movement. The examiner may stand facing the patient on the patient's left side or behind the patient.



Step 2

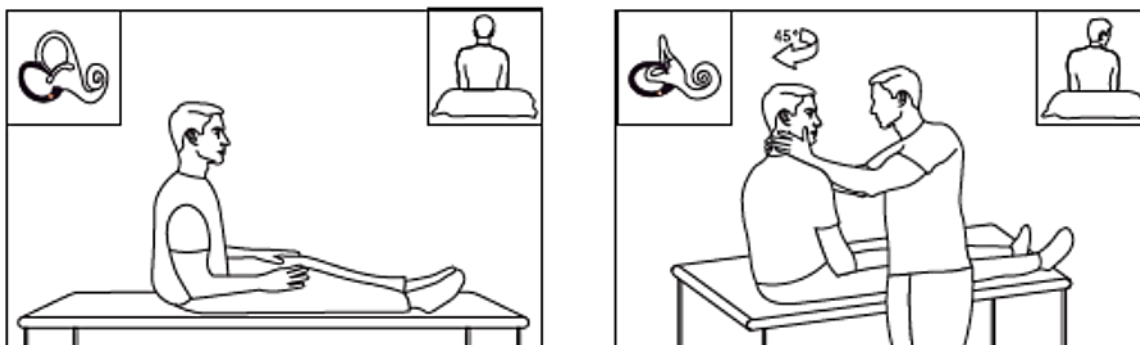
The patient is then moved by the examiner from the seated to the supine position with the head extended over the edge of the table (30 degrees of extension). The eyes are observed for the characteristic nystagmus.



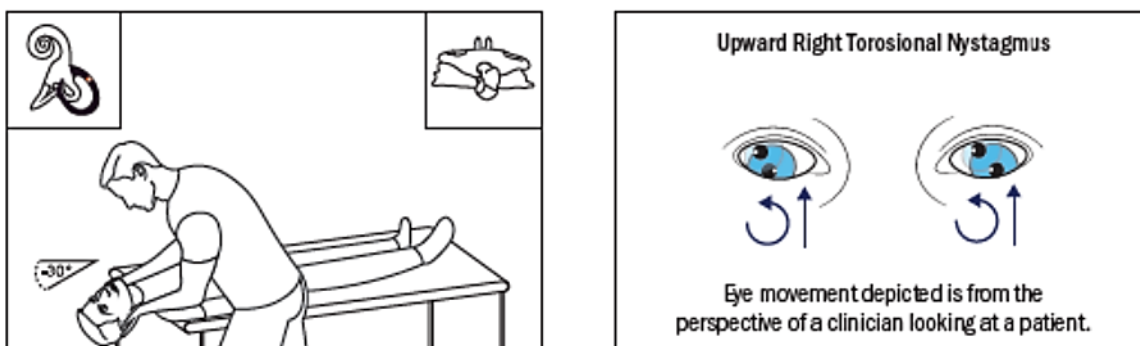
The test can then be repeated for the right side with the patient again sitting on the exam table, this time with the head turned right 45 degrees to place the right semicircular canal in the plane of movement.

RIGHT DIX-HALLPIKE**Step 1**

For evaluating the right posterior semicircular canal, the patient sits on the exam table and turns his or her head to the right 45 degrees. This places the posterior semicircular canal in the plane of movement. The examiner may stand facing the patient on the patient's right side or behind the patient.

**Step 2**

The patient is then moved by the examiner from the seated to the supine position with the head extended over the edge of the table (30 degrees of extension). The eyes are observed for the characteristic nystagmus.



The test can then be repeated for the left side with the patient again sitting on the exam table, this time with the head turned left 45 degrees to place the left semicircular canal in the plane of movement.

APPENDIX B: EPLEY MANEUVER – LEFT AND RIGHT

LEFT EPLEY MANEUVER

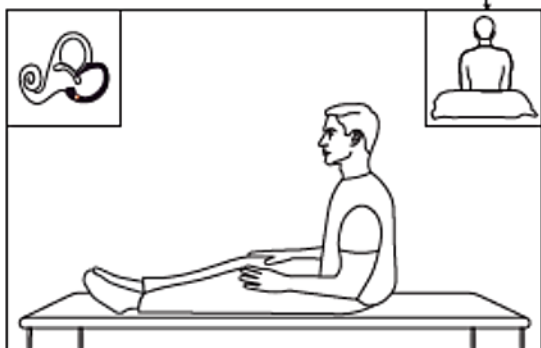
Directions: Performed with clinician assistance for treatment of left posterior canal benign paroxysmal positional vertigo. Each step must be performed in order with at least a 60 second hold to allow for successful resolution of BPPV.

Step 1:

Patient begins sitting in long sitting on a treatment table. The clinician should stand toward the patient's left side.

1a.

If such a treatment table is not available, the required 30 degrees of extension can be achieved by having the patient lie over pillow (or rucksack) at the torso such that the head will be extended to allow for successful treatment. (See inset diagram.)



1b.

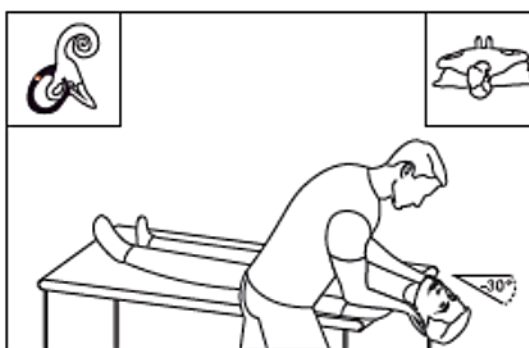
Turn the patient's head 45 degrees toward the left.



1c.

Assist the patient to lie into a supine position with the neck extended 30 degrees beyond horizontal.

- This is typically performed by supporting the patient's neck into extension off of the treatment table or by declining the head of the bed/table if available.
- Maintain this position until nystagmus and dizziness stops plus an additional 60 seconds.



Observe for a characteristic (upward and left torsional) nystagmus and patient complaints of dizziness.

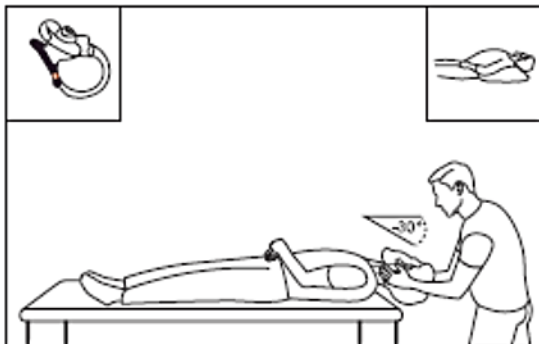
Upward Left Torsional Nystagmus



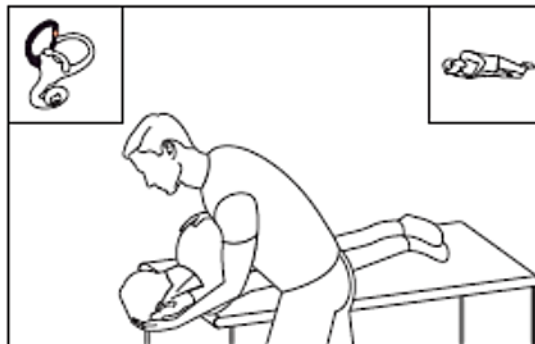
Eye movement depicted is from the perspective of a clinician looking at a patient.

Step 2:

Maintaining 30 degrees of neck extension, turn the patients head so that it is positioned 45 degrees towards the left. (Clinician may move to the head of the bed during this step to support the patient's neck). Maintain this position for 60 seconds.

**Step 3:**

Patient rolls onto the right side. Clinician must maintain support of the head/neck and guide rotation toward the right. Patient will assume a position of lying on the right side looking straight down toward the floor. This position will likely cause vertigo that once again should resolve in approximately 30 seconds. Maintain this position for 60 seconds.

**Step 4:**

Maintain right cervical rotation while assisting the patient back to a seated position on the treatment table. Once the patient has resumed a seated position, the head and neck may be rotated to a neutral position. The clinician should guard the patient for 30 seconds after the maneuver in case the patient becomes imbalanced.



RIGHT EPLEY MANEUVER

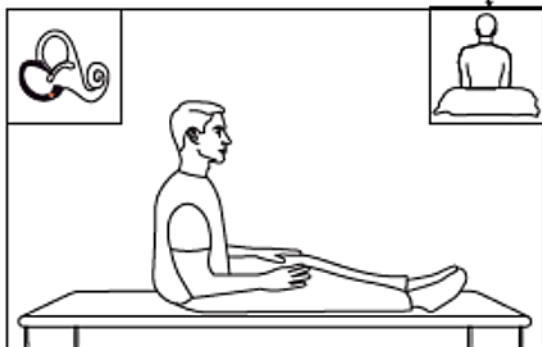
Directions: Performed with clinician assistance for treatment of left posterior canal benign paroxysmal positional vertigo. Each step must be performed in order with at least 60 second hold to allow for successful resolution of BPPV.

Step 1:

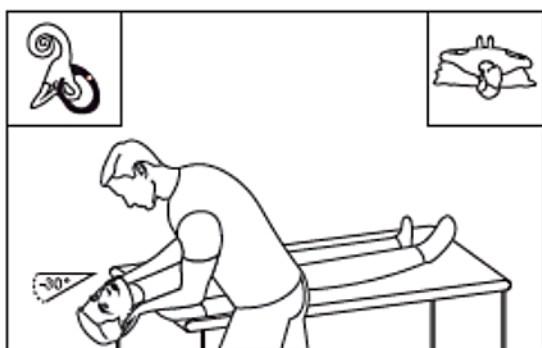
Patient begins sitting in long sitting on a treatment table. The clinician should stand toward the patient's right side.

1a.

If such a treatment table is not available, the required 30 degrees of extension can be achieved by having the patient lie over pillow (or rucksack) at the torso such that the head will be extended to allow for successful treatment. (See inset diagram.)

**1b.**

Turn the patient's head 45 degrees toward the right.

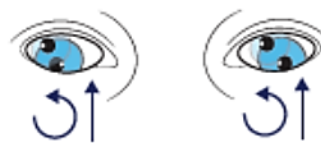
**1c.**

Assist the patient to lie into a supine position with the neck extended 30 degrees beyond horizontal.

- This is typically performed by supporting the patient's neck into extension off of the treatment table or by declining the head of the bed/table if available.
- Maintain this position until nystagmus and dizziness stops plus an additional 60 seconds.



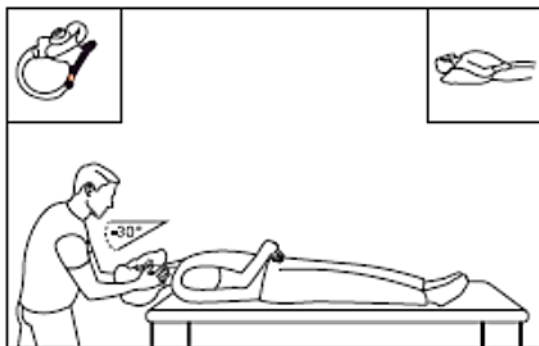
Observe for a characteristic (upward and right torsional) nystagmus and patient complaints of dizziness.

Upward Right Torsional Nystagmus

Eye movement depicted is from the perspective of a clinician looking at a patient.

Step 2:

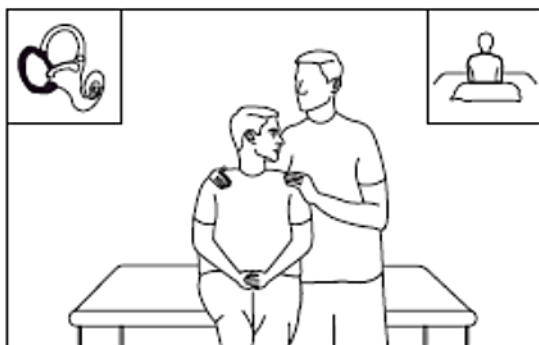
Maintaining 30 degrees of neck extension, turn the patient's head so that it is positioned 45 degrees towards the right. (Clinician may move to the head of the bed during this step to support the patient's neck). Maintain this position for 60 seconds.

**Step 3:**

Patient rolls onto the left side. Clinician must maintain support of the head/neck and guide rotation toward the left. Patient will assume a position of **lying on the left side looking straight down toward the floor**. This position will likely cause vertigo that once again should resolve in approximately 30 seconds. Maintain this position for 60 seconds.

**Step 4:**

Maintain right cervical rotation while assisting the patient back to a seated position on the treatment table. Once the patient has resumed a seated position, the head and neck may be rotated to a neutral position. The clinician should guard the patient for 30 seconds after the maneuver in case the patient becomes imbalanced.



APPENDIX C: CLASS VIII AND ADDITIONAL MEDICAL MATERIEL

The Joint Trauma System (JTS) Clinical Practice Guideline (CPG) for Aural Blast Injury and Acoustic Trauma provides comprehensive guidance on the evaluation and management of blast-induced hearing loss.

1. Topical Medications

Fluoroquinolone and Steroid Combination Ear Drops: For cases with debris in the external auditory canal or middle ear.

Note: Debris should not be removed, and the ear should not be irrigated to prevent further complications.

2. Systemic Medications

- Corticosteroids:
 - Oral Prednisone: 1 mg/kg daily, up to 60 mg, for 7-10 days. Ensure to assess for co-morbidities (diabetes, gastric ulcers)
 - Transtympanic Dexamethasone: 24 mg/mL concentration, administered within 10 days for up to 3 doses. This should only be performed by an ENT specialist with a microscope; and there are other formulations and durations that could be considered.
- N-Acetylcysteine (NAC): An antioxidant that may offer protective effects against hair cell damage.
- Fluoroquinolone
 - Ciprofloxacin
 - Ofloxacin

3. Diagnostic and Monitoring Equipment

- Otoscope: For visual examination of the ear canal and tympanic membrane.
- Portable Boothless Audiometer: To assess hearing thresholds.
- Tuning Forks: For bedside evaluation of hearing loss type.
- Vital Signs Monitor: To monitor patient stability.

4. Durable medical equipment

- Hearing aids
- Hearing aid batteries
- Other portable amplification devices such as a pocket talker or similar device.

5. Referral and Follow-Up Tools

- ENT Consultation Protocols: For patients with persistent symptoms such as hearing loss beyond 72 hours, tympanic membrane perforation not resolved in 3 months, or vertigo lasting more than 7 days.

6. Personal Protective Equipment (PPE)

- Gloves, Masks, Eye Protection: Standard PPE to ensure safety during examination and treatment.

For a comprehensive and standardized list of medical supplies, including National Stock Numbers (NSNs), it is advisable to consult the Joint Trauma System's official resources or contact the Logistics Plans & Readiness office.

For additional information including National Stock Number (NSN), refer to [Logistics Plans & Readiness \(sharepoint-mil.us\)](https://sharepoint-mil.us/LogisticsPlans&Readiness)

DISCLAIMER: This is not an exhaustive list. These are items identified to be important for the care of combat casualties.

APPENDIX D: DOTMLPF-P CONSIDERATIONS

Timely management of acoustic trauma requires recognition of the symptoms by the injured service member and training for everyone in the medical chain on appropriate assessment, referral, and treatment methods. Training on the symptoms and management may be conducted as part of a formal course for Prolonged Casualty Care. Further, information from this CPG may be incorporated into relevant field manuals and pocket guides. Without training, the symptoms may go unreported and untreated, leading to longer term hearing loss and downstream effects on operational performance.

Doctrine	Foundational: Department of Defense Instruction (DODI) 6055.12, Hearing Conservation Program; DODI 6030.03, Medical Standards for Military Service: Appointment, Enlistment, or Induction <i>Doctrine requiring updates based on guidance herein: Battlefield and Disaster Nursing Pocket Guide; JTS Prolonged Casualty Care Guideline (CPG ID:70);</i>
Organization	All roles of care are organized to support applicable hearing and balance health services, to include the addition of an audiologist within role 3 care via direct billet or telemedicine.
Training	All service members should be trained in prevention and hearing readiness topics. They should be trained to recognize signs and symptoms of acoustic trauma and vestibular impairment. Prolonged Casualty Care training should cover signs and symptoms, screening, assessment, and treatment techniques.
Materiel	All equipment/supplies as required (See Appendix E). Systems should include MC4 Platform and have store-and-forward capability/tele-audiology for remote consultation.
Leadership	Medical and PCC leadership must understand hearing and balance are critical to safety and mission effectiveness. Leaders must support the training and preparedness of deployed units in the management of acoustic trauma.
Personnel	Qualified personnel for screening, assessment and treatment of acoustic trauma and vestibular impairment, to include audiologists.
Facilities	Where hearing testing is required, facilities must be reasonably quiet for time periods long enough to allow for the use of testing equipment. For vestibular impairment, a table or bed should be available to conduct testing and treatment techniques.
Policy	Policies should support the inclusion of hearing health in settings where acoustic trauma is likely to occur. Specific policies that should be addressed include: DoDI 6055.05, Occupational Medical Examinations: Medical Surveillance and Medical Qualification, 5 APR 24; DODD 6200.04, Force Health Protection, Preventive Medicine; DODI 6040.47, Joint Trauma System; DODI 1322.31, Common Military Training; DODI 6055.05, Occupational and Environmental Health

APPENDIX E: TELEMEDICINE/TELECONSULTATION

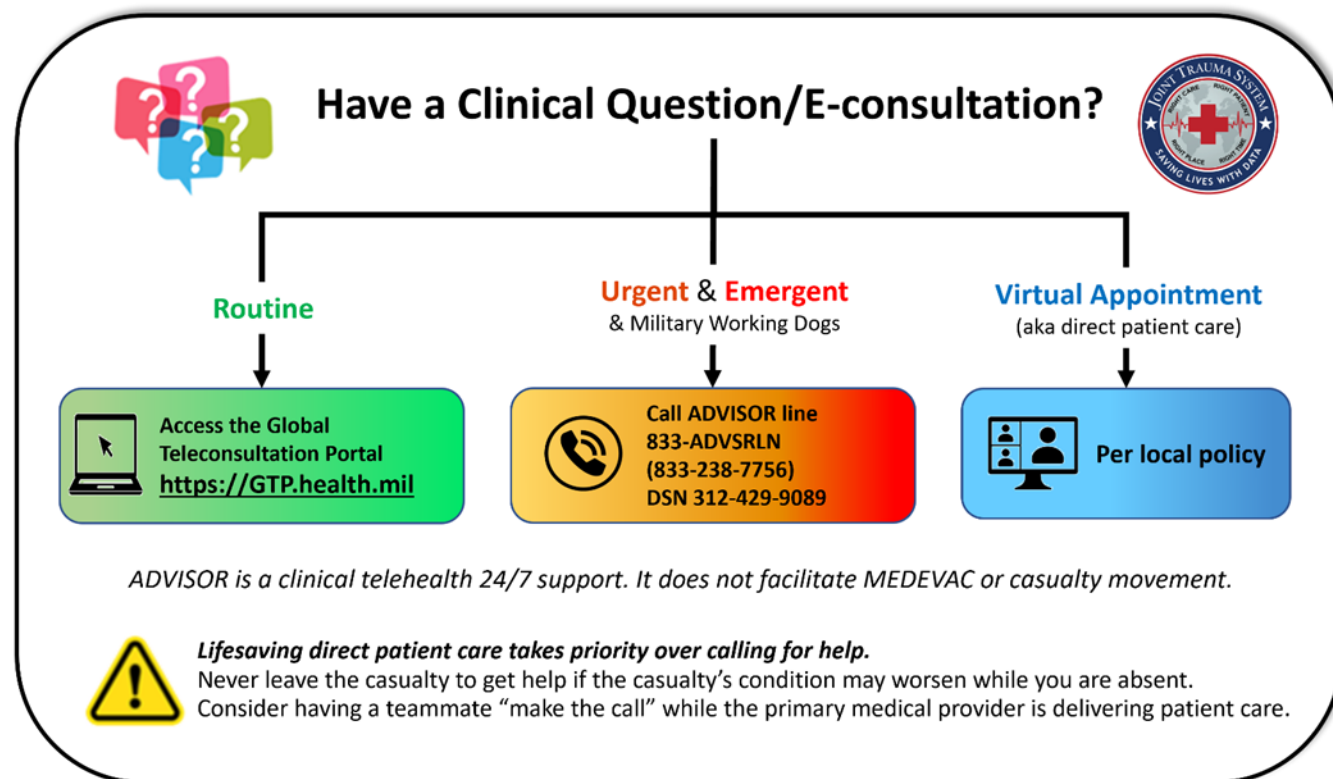


Illustration by Raymond Samonte

GTP: <https://GTP.health.mil>

Theater Patient Movement Requirements Center (TPMRC) to coordinate evacuation:

- TPMRC-Americas (NORTHCOM & SOUTHCOM), 618-817-4200
- TPMRC- East (EUCOM, AFRICOM, CENTCOM), DSN 314-480-8040
- TPMRC- West (INDOPACOM), DSN 315-448-1062

APPENDIX F: INFORMATION REGARDING OFF-LABEL USES IN CPGs

Purpose

The purpose of this Appendix is to ensure an understanding of DoD policy and practice regarding inclusion in CPGs of “off-label” uses of U.S. Food and Drug Administration (FDA)–approved products. This applies to off-label uses with patients who are armed forces members.

Background

Unapproved (i.e. “off-label”) uses of FDA-approved products are extremely common in American medicine and are usually not subject to any special regulations. However, under Federal law, in some circumstances, unapproved uses of approved drugs are subject to FDA regulations governing “investigational new drugs.” These circumstances include such uses as part of clinical trials, and in the military context, command required, unapproved uses. Some command requested unapproved uses may also be subject to special regulations.

Information Regarding Off-Label Uses in CPGs

The inclusion in CPGs of off-label uses is not a clinical trial, nor is it a command request or requirement. Further, it does not imply that the Military Health System requires that use by DoD health care practitioners or considers it to be the “standard of care.” Rather, the inclusion in CPGs of off-label uses is to inform the clinical judgment of the responsible health care practitioner by providing information regarding potential risks and benefits of treatment alternatives. The decision is for the clinical judgment of the responsible health care practitioner within the practitioner-patient relationship.

Additional Procedures**Balanced Discussion**

Consistent with this purpose, CPG discussions of off-label uses specifically state that they are uses not approved by the FDA. Further, such discussions are balanced in the presentation of appropriate clinical study data, including any such data that suggest caution in the use of the product and specifically including any FDA-issued warnings.

Quality Assurance Monitoring

With respect to such off-label uses, DoD procedure is to maintain a regular system of quality assurance monitoring of outcomes and known potential adverse events. For this reason, the importance of accurate clinical records is underscored.

Information to Patients

Good clinical practice includes the provision of appropriate information to patients. Each CPG discussing an unusual off-label use will address the issue of information to patients. When practicable, consideration will be given to including in an appendix an appropriate information sheet for distribution to patients, whether before or after use of the product. Information to patients should address in plain language: a) that the use is not approved by the FDA; b) the reasons why a DoD health care practitioner would decide to use the product for this purpose; and c) the potential risks associated with such use.