Assessment findings

in common peripheral vestibular disorders

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Assesment findings

This resource is a tool based on the needs of medical professionals and students that allows quick access to the typical assessment findings in a range of common vestibular disorders. The resource was developed to provide fast, easy-to-use, and always available information which can aid in reaching the correct diagnosis. The information contained within is provided as an information resource only, and should not be used as a substitute for professional diagnosis and management.

Assessment findings

Inferior Vestibular Neuritis (acute)

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Normal / not changed	• Nystagmus present • Direction fixed with fast phases towards the good ear • Suppresses or vanishes with fixation	• Gaze Evoked Nystagmus following Alexander's law • Direction fixed • Suppresses or vanishes with fixation • Linear slow phases	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits • Evidence of spontaneous nystagmus may be present on tracings	• Gain: within normal limits • Symmetry: within normal limits • Evidence of spontaneous nystagmus may be present on tracings
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: enhanced when the stimulus moves in the same direction of the spontaneous fast phases	Negative	Negative	• Total response: within normal limits • Unilateral Weakness: < 25% • Directional Preponderance: <30% • Fixation index: <50%	• Amplitude: reduced on affected ear or absent cVEMP • Latency: within normal limits • Ratio: >36%
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Amplitude: within normal limits • Latency: within normal limits • Ratio: <33%	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain < typically reduced outside of the normative range • Phase: Increased phase lead above normal range • Symmetry: Asymmetry towards affect ear	• Time constant: <10 seconds • Gain < typically reduced outside of the normative range • Symmetry: Asymmetry towards affect ear

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Assessment findings

Inferior Vestibular Neuritis (compensated)

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Normal / not changed	• Nystagmus absent or present only at subclinical slow phase velocities	• Gaze Evoked Nystagmus absent or present only at subclinical slow phase velocities	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: within normal limits	Negative	Negative	• Total response: within normal limits • Unilateral Weakness: < 25% • Directional Preponderance: <30% • Fixation index: <50%	• Ratio: >36% or <36% if resolved • Amplitude: Reduced amplitude on affected ear or resolved • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: <33% • Amplitude: within normal limits • Latency: within normal limits	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain within normal limits • Phase : within normal limits • Symmetry: within normal limits	• Time constant: > 10 seconds but < 60 seconds • Gain within normal limits • Symmetry: within normal limits

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Assessment findings

Superior Vestibular Neuritis (acute)

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Normal / not changed	• Nystagmus present • Direction fixed with fast phases towards the good ear • Suppresses or vanishes with fixation	• Gaze Evoked Nystagmus following Alexander's law • Direction fixed • Suppresses or vanishes with fixation • Linear slow phases	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits • Evidence of spontaneous nystagmus may be present on tracings	• Gain: within normal limits • Symmetry: within normal limits • Evidence of spontaneous nystagmus may be present on tracings
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: enhanced when the stimulus moves in the same direction of the spontaneous fast phases	Negative	Negative	• Total response: reduced Unilateral Weakness: > 25% towards affected side • Directional Preponderance: >30% towards unaffected side • Fixation index: <50%	• Ratio: <36% • Amplitude: within normal limits • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: >33% • Amplitude: reduced on affected ear or absent oVEMP • Latency: within normal limits	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain < typically reduced outside of the normative range • Phase : Increased phase lead above normal range • Symmetry: Asymmetry towards affect ear	• Time constant: <10 seconds • Gain < typically reduced outside of the normative range • Symmetry: Asymmetry towards affect ear

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Assessment findings

Superior Vestibular Neuritis (compensated)

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Normal / not changed	• Nystagmus absent or present only at subclinical slow phase velocities	• Gaze Evoked Nystagmus absent or present only at subclinical slow phase velocities	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: within normal limits	Negative	Negative	• Total response: reduced • Unilateral Weakness: > 25% towards affected side or resolved • Directional Preponderance: <30% • Fixation index: <50%	• Ratio: <36% • Amplitude: within normal limits • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: >33% or <36% if resolved • Amplitude: Reduced amplitude on affected ear or resolved • Latency: within normal limits	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain within normal limits • Phase : within normal limits • Symmetry: within normal limits	• Time constant: > 10 seconds but < 60 seconds • Gain within normal limits • Symmetry: within normal limits

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Assessment findings

Labyrinthitis (acute)

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Hearing loss associated with onset of vertigo	• Nystagmus present • Direction fixed with fast phases towards the good ear • Suppresses or vanishes with fixation	• Gaze Evoked Nystagmus following Alexander's law • Direction fixed • Suppresses or vanishes with fixation • Linear slow phases	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits • Evidence of spontaneous nystagmus may be present on tracings	• Gain: within normal limits • Symmetry: within normal limits • Evidence of spontaneous nystagmus may be present on tracings
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: enhanced when the stimulus moves in the same direction of the spontaneous fast phases	Negative	Negative	• Total response: reduced • Unilateral Weakness: > 25% towards affected side • Directional Preponderance: >30% towards unaffected side • Fixation index: <50%	• Ratio: >36% • Amplitude: reduced on affected ear or absent cVEMP • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: >33% • Amplitude: reduced on affected ear or absent oVEMP • Latency: within normal limits	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain <0.7 on affected side • Asymmetry >7% towards • affected side • Catch up saccades: present • >50%	• Gain < typically reduced outside of the normative range • Phase: Increased phase lead above normal range • Symmetry: Asymmetry towards affect ear	• Time constant: <10 seconds • Gain < typically reduced outside of the normative range • Symmetry: Asymmetry towards affect ear

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Assessment findings

Labyrinthitis (compensated)

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Hearing loss resolved either partially or completely	• Nystagmus absent or present only at subclinical slow phase velocities	• Gaze Evoked Nystagmus absent or present only at subclinical slow phase velocities	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: within normal limits Symmetry: within normal limits	Negative	Negative	• Total response: reduced • Unilateral Weakness: > 25% towards affected side or resolved • Directional Preponderance: <30% • Fixation index: <50%	• Ratio: >36% or <36% if resolved • Amplitude: Reduced amplitude on affected ear or resolved • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: >33% or <36% if resolved • Amplitude: Reduced amplitude on affected ear or resolved • Latency: within normal limits	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain within normal limits • Phase : within normal limits • Symmetry: within normal limits	• Time constant: > 10 seconds but < 60 seconds • Gain within normal limits • Symmetry: within normal limits

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Assessment findings

Meniere's Disease (early stage)

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Characterized by a episodic hearing loss affecting the low frequencies	• Not present during remission stage • Present if seen during an attack • Nystagmus can reverse immediately after an attack	• Not present during remission stage • Present if seen during an attack	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: within normal limits	Negative	Negative	• Total response: reduced • Unilateral Weakness: > 25% towards affected side or <25% • Directional Preponderance: <30% • Fixation index: <50%	• Ratio: >36% • Amplitude: reduced on affected ear or absent cVEMP • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: >36% • Amplitude: reduced on affected ear or absent oVEMP • Latency: within normal limits	• Gain >0.7 maybe higher than 1.2 • Asymmetry <7% or >7% if increased gain • Catch up saccades: not present or <50%	• Gain >0.7 sometimes > 1.2 • Asymmetry <7% or >7% if increased gain • Catch up saccades: not present or <50%	• Gain within normal limits • Phase : within normal limits • Symmetry: within normal limits	• Time constant: > 10 seconds but < 60 seconds • Gain within normal limits • Symmetry: within normal limits

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Assessment findings

Meniere's Disease (late stage)

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Persistent hearing loss affecting the low frequencies	• Nystagmus absent or present only at subclinical slow phase velocities	• Gaze Evoked Nystagmus absent or present only at subclinical slow phase velocities	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: within normal limits	Negative	Negative	• Total response: reduced • Unilateral Weakness: > 25% towards affected side • Directional Preponderance: <30% within normal limits • Fixation index: <50%	• Ratio: ------ • Amplitude: cVEMP absent • Latency: ------
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: ------ • Amplitude: oVEMP absent • Latency: ------	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain < typically reduced outside of the normative range • Phase : Increased phase lead above normal range • Symmetry: Asymmetry towards affect ear	• Time constant: <10 seconds • Gain < typically reduced outside of the normative range • Symmetry: Asymmetry towards affect ear

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Assessment findings

Superior semicircular canal dehiscence

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
A 'false' air-bone gap which is greater in the low frequencies	• Nystagmus absent or present only at subclinical slow phase velocities • May be induced if subject to intense noise or pressure change	• Gaze Evoked Nystagmus absent or present only at subclinical slow phase velocities • May be induced if subject to loud noise or pressure change	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: within normal limits	Negative	Negative	• Total response: within normal limits • Unilateral Weakness: < 25% • Directional Preponderance: <30% • Fixation index: <50%	• Ratio: <36% • Amplitude: within normal limits • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: <33% • Amplitude: within normal limits • Latency: within normal limits	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain within normal limits • Phase : within normal limits • Symmetry: within normal limits	• Time constant: > 10 seconds but < 60 seconds • Gain within normal limits • Symmetry: within normal limits

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Assessment findings

Posterior Canal BPPV

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Normal / not changed	• Nystagmus absent or present only at subclinical slow phase velocities.	• No nystagmus present	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: within normal limits	Torsional up beating nystagmus towards the under most ear and may reverse in return-to-sitting (RTS). Down beating for apo-geotropic (non-ampullary) PC and rotation away from affected ear.**	Negative	• Total response: within normal limits • Unilateral Weakness: < 25% • Directional Preponderance: <30% • Fixation index: <50%	• Ratio: <36% • Amplitude: within normal limits • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: <33% • Amplitude: within normal limits • Latency: within normal limits	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain within normal limits • Phase : within normal limits • Symmetry: within normal limits	• Time constant: > 10 seconds but < 60 seconds • Gain within normal limits • Symmetry: within normal limits

**Note: In apogetropic posterior canalithiasis (non-ampullary arm), if the rotary component is present, the nystagmus will be away from the affected ear (e.g., right apo-PC = clockwise and left apo-PC = counter clockwise).
Modified by 360 Neuro Health (w/permission from Interacoustics).

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Assessment findings

Horizontal Canal BPPV

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Normal / not changed	• Nystagmus absent or pseudo spontaneous nystagmus may be present	• None or pseudo spontaneous nystagmus may be present	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits • Evidence of spontaneous nystagmus may be present on tracings	• Gain: within normal limits • Symmetry: within normal limits • Evidence of spontaneous nystagmus may be present on tracings
Optokinetic	**Dix Hallpike**	**Head Roll****	**Caloric Test**	**cVEMP**
Gain: within normal limits	May evoke horizontal nystagmus	Geotropic or Ageotropic nystagmus present. Geotropic: affected side is side w/stronger intensity of nystagmus. Ageotropic: affected side is weaker intensity nystagmus.**	• Total response: within normal limits • Unilateral Weakness: < 25% • Directional Preponderance: <30% • Fixation index: <50%	• Ratio: <36% • Amplitude: within normal limits • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: <33% • Amplitude: within normal limits • Latency: within normal limits	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain within normal limits • Phase : within normal limits • Symmetry: within normal limits	• Time constant: > 10 seconds but < 60 seconds • Gain within normal limits • Symmetry: within normal limits

**Note: In Horizontal Canal (HC) BPPV, the fast phase of the nystagmus beats towards the affected ear -- regardless whether it is geotropic or apogeotropic. Transient geotropic indicates otoconia in the posterior arm of the HC while apogeotropic indicates canalithiasis in the anterior arm or associated with cupulolithiasis. Consider light or heavy cupula or central if nystagmus doesn't fatigue (geo = light cupula; apogeo = heavy cupula).

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Assessment findings

Anterior Canal BPPV

Pure Tone Audiometry 	**Spontaneous Nystagmus** 	**Gaze Testing** 	**Saccades** 	**Smooth Pursuit** 
Normal / not changed	• Nystagmus absent or present only at subclinical slow phase velocities	• Gaze Evoked Nystagmus absent or present only at subclinical slow phase velocities	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits • Evidence of spontaneous nystagmus may be present on tracings
Optokinetic 	**Dix Hallpike**** 	**Head Roll** 	**Caloric Test** 	**cVEMP** 
Gain: within normal limits	Transient down beating nystagmus towards the under most ear. (Rotary component present 50% of the time. Nystagmus doesn't reverse in the RTS)	Negative	• Total response: within normal limits • Unilateral Weakness: < 25% • Directional Preponderance: <30% • Fixation index: <50% 	• Ratio: <36% • Amplitude: within normal limits • Latency: within normal limits 
oVEMP 	**vHIT lateral** 	**vHIT vertical** 	**SHA**	**Step Test**
• Ratio: <33% • Amplitude: within normal limits • Latency: within normal limits	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain within normal limits • Phase : within normal limits • Symmetry: within normal limits	• Time constant: > 10 seconds but < 60 seconds • Gain within normal limits • Symmetry: within normal limits

**Note: The Straight Head Hanging Test (SHHT) is the most reliable test for anterior canal (AC) BPPV. If the rotary component is present, the nystagmus will be towards the affected ear (e.g., right AC = counter clockwise and left AC = clockwise).

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Assessment findings

Bilateral Vestibular Loss

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Normal / not changed	• Nystagmus absent or present only at subclinical slow phase velocities	• Gaze Evoked Nystagmus absent or present only at subclinical slow phase velocities	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits • Evidence of spontaneous nystagmus may be present on tracings
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: within normal limits	Negative	Negative	• Total response: < 22 degrees per second • Ignore all other parameters	• Ratio: ------ • Amplitude: cVEMP absent • Latency: ------
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: ------ • Amplitude: oVEMP absent • Latency: ------	• Gain <0.7 bilaterally • Asymmetry either >7% or <7% • Catch up saccades: present >50% in each direction	• Gain <0.7 bilaterally • Asymmetry either >7% or <7% • Catch up saccades: present >50% in each direction	• Gain < reduced outside of the normative range • Phase : Increased phase lead above normal range • Symmetry: within normal limits	• Time constant: <10 seconds • Gain < typically reduced outside of the normative range • Symmetry: none

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Assessment findings

Vestibular Schwannoma (early stage)

Pure Tone Audiometry	Spontaneous Nystagmus	Gaze Testing	Saccades	Smooth Pursuit
Unilateral sensorineural hearing loss	• Nystagmus absent or present only at subclinical slow phase velocities	• Gaze Evoked Nystagmus absent or present only at subclinical slow phase velocities	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits • Evidence of spontaneous nystagmus may be present on tracings
Optokinetic	**Dix Hallpike**	**Head Roll**	**Caloric Test**	**cVEMP**
Gain: within normal limits	Negative	Negative	• Total response: within normal limits • Unilateral Weakness: < 25% • Directional Preponderance: <30% • Fixation index: <50%	• Ratio: >36% • Amplitude: reduced on affected ear or absent cVEMP • Latency: within normal limits
oVEMP	**vHIT lateral**	**vHIT vertical**	**SHA**	**Step Test**
• Ratio: >33% or <36% if resolved • Amplitude: Reduced amplitude on affected ear or resolved • Latency: within normal limits	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain >0.7 • Asymmetry <7% • Catch up saccades: not present or <50%	• Gain within normal limits • Phase : within normal limits • Symmetry: within normal limits	• Time constant: > 10 seconds but < 60 seconds • Gain within normal limits • Symmetry: within normal limits

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Assessment findings

Vestibular Schwannoma (late stage)

Pure Tone Audiometry 	**Spontaneous Nystagmus** 	**Gaze Testing** 	**Saccades** 	**Smooth Pursuit** 
Progressive unilateral sensorineural hearing loss	• Nystagmus absent or present only at subclinical slow phase velocities	• Gaze Evoked Nystagmus absent or present only at subclinical slow phase velocities	• Latency: within normal limits • Accuracy: within normal limits • Velocity: within normal limits	• Gain: within normal limits • Symmetry: within normal limits • Evidence of spontaneous nystagmus may be present on tracings
Optokinetic 	**Dix Hallpike** 	**Head Roll** 	**Caloric Test** 	**cVEMP** 
Gain: within normal limits	Negative	Negative	• Total response: within normal limits • Unilateral Weakness: < 25% • Directional Preponderance: <30% • Fixation index: <50%	• Ratio: >36% • Amplitude: reduced on affected ear or absent cVEMP • Latency: within normal limits
oVEMP 	**vHIT lateral** 	**vHIT vertical** 	**SHA** 	**Step Test** 
• Ratio: >36% • Amplitude: reduced on affected ear or absent oVEMP • Latency: within normal limits	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain <0.7 on affected side • Asymmetry >7% towards affected side • Catch up saccades: present >50%	• Gain < typically reduced outside of the normative range • Phase: Increased phase lead above normal range • Symmetry: Asymmetry towards affect ear	• Time constant: <10 seconds • Gain < typically reduced outside of the normative range • Symmetry: Asymmetry towards affect ear

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