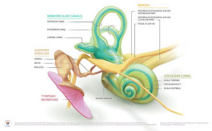

Vestibular Rehabilitation for Peripheral Vestibular Hypofunction: Updated Clinical Practice Guideline

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Guideline Development Group

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Academy of Neurologic Physical Therapy

East Tennessee State University

Army-Baylor University Physical Therapy Doctoral Program

Veterans Health Administration R&D www.research.va.gov

University of Rochester Medical Center

Michigan Medicine University of Michigan

Emory University School of Medicine

University of Pittsburgh

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Objectives

- Brief overview of the clinical practice guideline process
- Highlight differences in the update from the 2016 guidelines
- Describe action statements (AS) from updated vestibular rehabilitation clinical practice guideline
- Present clinical scenarios to assist in the application and integration of the action statements into clinical practice
- Discuss dosage guidelines for gaze stabilization and balance exercises
- Identify gaps in the evidence and future research directions in vestibular rehabilitation
- Provide clinical pearls and strategies for implementing the CPG

3

Background

- Vestibular hypofunction is estimated to affect 53-95 million adults in Europe and U.S.
  - 6.7% unilateral loss; 2.5% bilateral loss
- Uncompensated vestibular hypofunction results in postural instability/falls, visual blurring with head movement, and subjective complaints of dizziness and/or imbalance.
- Significant economic burden of vertigo associated with lost work due to decreased productivity.

(Grill et al., 2018; Kovacs et al., 2019)

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External Advisory Board

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5

Clinical Practice Guideline Steps: Identification of the Evidence

PICO Question → Systematic Literature Search → Identification of Relevant Studies

PICO Question: "Is exercise effective at enhancing recovery of function in people with peripheral vestibular hypofunction?"

6

Clinical Practice Guideline Steps

Critical Appraisal of the Evidence

Data extraction of study characteristics

Grades of recommendation based on level of evidence

7

How many papers were reviewed?

67 articles were critically appraised after reviewing 1,580 abstracts

8

2016 Critical Appraisal Team (C.A.T.)

Carmen Abbott, Eric Anson, Kathryn Brown, Lisa Brown, Janet Callahan, Diron Cassidy, Jennifer Braswell Christy, Pam Cornwell, Renee Crumley, Elizabeth Dannenbaum, Pamela Dunlap, Lisa Farrell, Julie Grove, John Heick, Janet Helminski, Lisa Heusel-Gillig, Janene Holmberg, Jennifer Kelly, Brooke Klatt, Jodi Krause, Karen Lambert, Rob Landel, Lara Martin, Joann Moriarty-Baron, Laura Morris, Charles Plishka, Nora Riley, Britta Smith, Debbie Struiksma, Derek Steele, Brady Whetten, Wendy Wood

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Grades of Recommendations

GRADE	RECOMMENDATION	STRENGTH OF RECOMMENDATION
A	Strong evidence ("should" or "should not")	A preponderance of Level I and/or Level II studies supports the recommendation. This must include at least one Level I study.
B	Moderate evidence ("may")	A single high quality RCT or a preponderance of Level II evidence supports the recommendation.
C	Weak evidence ("may")	A single Level II Study or a preponderance of Level III and IV studies supports the recommendation.
D	Expert opinion	Best practice based on the clinical experience of the guideline development team and guided by the evidence.

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WHAT'S NEW?

- Current evidence supports that vestibular physical therapy (VPT) provides clear and substantial benefit to individuals with UVH and BVH
  - **NEW**: 18 RCTs, 9 prospective and 8 retrospective cohort studies
- Support for a variety of balance training modalities
  - low technology, virtual reality, optokinetic stimulation, platform perturbations, and vibrotactile feedback.
- Earlier initiation of VPT (<2 weeks of acute onset of UVH) may optimize rehabilitation outcomes
- Dosage recommendations for balance and gaze stability exercises
- Expanded recommendations on factors that may impact outcomes
  - medications and mild cognitive impairment

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Integrating the Updated Vestibular Hypofunction CPG into Clinical Practice

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Components of vestibular rehabilitation

- Gaze stabilization exercises based on concepts of VOR adaptation and substitution
- Habituation exercises
- Balance and gait training
- Walking for endurance

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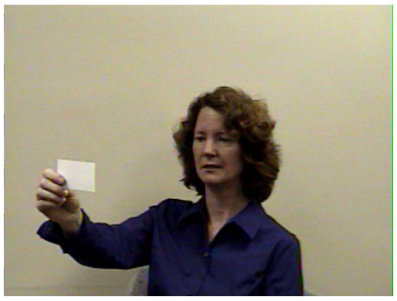
Gaze stabilization exercises based on adaptation



VORx1 (yaw)

VORx2, yaw

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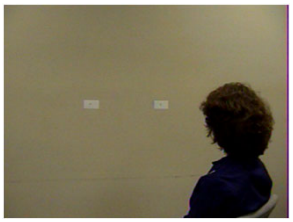
Gaze stabilization exercises based on substitution



Eye->head movement between targets

Remembered target

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Alternative gaze stabilization exercises based on evolving literature

Impulse VOR x1,
Ipsilesional only

Migliaccio and Schubert 2014; Rinaudo et al. 2019

Convergence VOR x1,
Sinusoidal

Lewis et al. 2003; Migliaccio et al. 2004, 2008; Chang and Schubert 2021

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Case 1: Acute Unilateral Vestibular Hypofunction

- 53-year-old male presented to primary care with sudden onset of right hearing loss and tinnitus
  - MRI revealed a right vestibular schwannoma
  - VNG testing demonstrated 26% right caloric weakness
  - Translabyrinthine approach for tumor resection scheduled in 2 weeks
- Presents to vestibular PT for pre-op evaluation, education and instruction in post-op vestibular exercise program
  - Past Medical History: back pain, hypertension
  - Social: married, works for UPS delivery, lives 3 hours away

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Initial Thoughts as a Clinician

AS 1: EFFECTIVENESS OF VESTIBULAR REHABILITATION IN INDIVIDUALS WITH ACUTE AND SUBACUTE UNILATERAL VESTIBULAR HYPOFUNCTION

- Clinicians **should** offer vestibular physical therapy (VPT) to individuals with acute or subacute unilateral vestibular hypofunction. (Evidence quality: I; Recommendation strength: Strong)
- New evidence supports earlier initiation of VPT, within the first two weeks of acute onset of unilateral vestibular hypofunction (Lacour et al., 2020)
- VPT especially important for those over age 50 (Ismail et al., 2018; Tokle et al., 2020)

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Earlier initiation of VPT

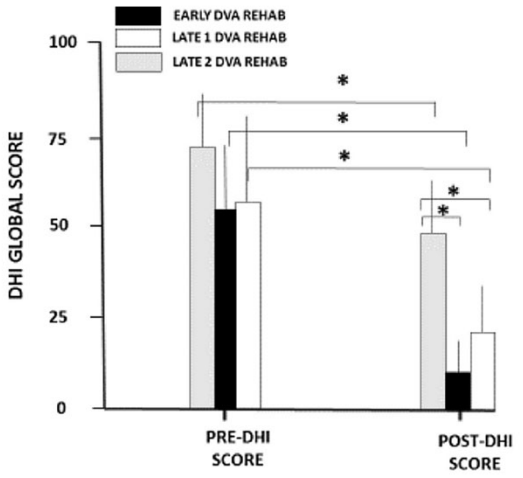

Fig. 2 Dizziness Handicap Inventory scores before and after vestibular rehabilitation with the Dynamic Visual Acuity Protocol.

(Lacour et al., 2019)

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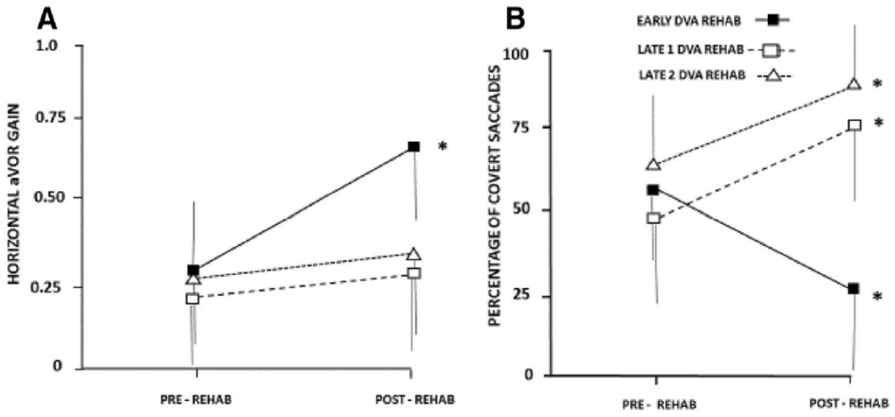
Mechanisms underlying change may differ…



(Lacour et al., 2019)

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Risk, Harm, Cost, Benefit

- Risk of provoking temporary dizziness, nausea and emesis, and fall risk when exercises are performed during the most acute stages
- May delay exercises during early post-operative stage because of risk of bleeding or cerebrospinal fluid leak
- Increased cost and time spent traveling associated with supervised VPT
- Preponderance of benefit: Improved outcomes in individuals receiving VPT when compared with controls given either no exercise or sham exercise

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Vestibular PT Initial Exam Pre-op

Outcome Measure	Pre-op	Significance
*Activities-specific Balance Confidence scale (ABC)	92%	Fall risk < 67%; MDC > 10 points (Brown et al., 2001; Lajoie & Gallagher, 2004)
Dizziness Handicap Inventory (DHI)	6/100	0-30 mild, 31-60 moderate, 61-100 severe self-perceived handicap due to dizziness (Whitney et al., 2004)
Dynamic Visual Acuity (DVA)	1 line	Normal ≤ 2 lines
modified Clinical Test of Sensory Interaction on Balance (mCTSIB)	30/30 Firm, 30/30 Foam	30 s EO/30 s EC on firm (normal); 30 s EO/30 s EC on foam (normal)

MDC: minimal detectable change; EO: eyes open; EC: eyes closed

*www.neuropt.org/practice-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg (Moore et al., 2018); www.neuropt.org/practice-resources/neurology-section-outcome-measures-recommendations/vestibular-disorders

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Vestibular PT Initial Exam Pre-op

Outcome Measure	Pre-op	Significance
*Functional Gait Assessment (FGA)	29/30	< 22/30 indicates fall risk; MDC: 6 points (Marchetti et al., 2014; Wrisley & Kumar, 2010)
Timed Up and Go (TUG)	10.5 sec	> 11.1 sec correlate with higher falls risk (Whitney et al., 2004)
*10-meter Walk Test (10-MWT)	1.25 m/sec	Scores < 1.0 m/sec indicate need intervention for fall risk (Montero-Odasso et al., 2005)

MDC: minimal detectable change

*www.neuropt.org/practice-resources/anpt-clinical-practice-guidelines/core-outcome-measures-cpg (Moore et al., 2018); www.neuropt.org/practice-resources/neurology-section-outcome-measures-recommendations/vestibular-disorders

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What kind of exercises should be included in the treatment plan for this patient post-surgery?

A) VOR x 1
B) Eye-head movements between targets
C) Balance
D) Walking program
E) A and D
F) All of the above

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AS 4: EFFECTIVENESS OF SACCADIC OR SMOOTH-PURSUIT EXERCISES IN INDIVIDUALS WITH PERIPHERAL VESTIBULAR HYPOFUNCTION (UNILATERAL OR BILATERAL)

Clinicians should not offer saccadic or smooth-pursuit exercises for gaze stability to individuals with unilateral or bilateral vestibular hypofunction. (Evidence quality: I; Recommendation strength: Strong)

- No benefit to motion-provoked dizziness, imbalance or dynamic visual acuity for saccadic or smooth-pursuit eye movements without head movements compared to gaze stabilization exercises (Herdman et al.,1995, 2003, 2007; Lehnen et al., 2018).

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Patient Education- Home Exercise Program

AS 6b. optimal Gaze Stabilization EXERCISE DOSAGE of treatment In individuals with peripheral vestibular hypofunction

- Clinicians may prescribe weekly clinic visits plus a home program of gaze stabilization exercises including at a minimum: 3 times per day for a total of at least 12 minutes daily for individuals with acute/subacute unilateral vestibular hypofunction (Evidence quality II; Recommendation strength: Weak)

Home exercise Program

- Gaze stabilization exercises (VOR x 1, Eye-head movements between targets) in sitting
- Habituation exercises (yaw/pitch head movements) in sitting
- Walking program (graded)

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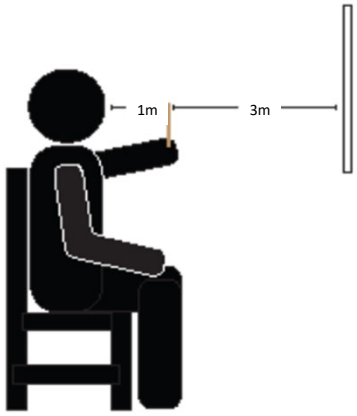
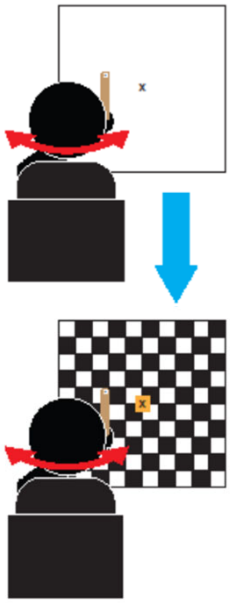
VOR x 1 Sitting Progression





Targets at 1 meter and 3 meters,
Plain progressing to conflicting background
4 minutes, 3 times per day for a total of 12 minutes

28

- Initiate movement early in acute care setting!
  - Don't sit in dark when awake
  - Keep eyes open and face visitors when talking
    - Educate visitors to stand on surgical side

29

PT Exam 2 weeks post-op

Outcome Measure	Pre-op	2 weeks Post-op	Significance
Activities-specific Balance Confidence scale (ABC)	92%	74%	Fall risk < 67%; MDC > 10 points (Brown et al., 2001; Lajoie & Gallagher, 2004)
Dizziness Handicap Inventory (DHI)	6/100	36/100	0-30 mild, 31-60 moderate, 61-100 severe self-perceived handicap due to dizziness (Whitney et al., 2004)
Dynamic Visual Acuity (DVA)	1 line	4 line	Normal ≤ 2 lines
modified Clinical Test of Sensory Interaction on Balance (mCTSIB)	30/30 Firm, 30/30 Foam	30/30 Firm, 30/7 Foam	30 s EO/30 s EC on firm (normal); 30 s EO/30 s EC on foam (normal)

MDC: minimal detectable change; EO: eyes open; EC: eyes closed

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PT Exam 2 weeks post-op

Outcome Measure	Pre-op	2 weeks Post-op	Significance
Functional Gait Assessment (FGA)	29/30	24/30 (tandem, stairs, EC, pivot, head turns)	< 22/30 indicates fall risk; MDC: 6 points (Marchetti et al., 2014; Wrisley & Kumar, 2010)
Timed Up and Go (TUG)	10.5 sec	13.2 sec	> 11.1 sec correlate with higher falls risk (Whitney et al., 2004)
10-meter Walk Test (10-MWT)	1.25 m/sec	1.05 m/sec	Scores < 1.0 m/sec indicate need intervention for fall risk (Montero-Odasso et al., 2005)

MDC: minimal detectable change

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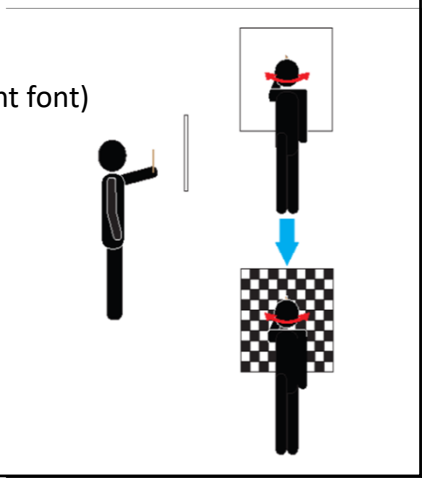
Home Exercise Program: 2-week post-op Update to Gaze Stabilization Exercises

- VOR x1, Eye-head movements between targets, VOR x 2
  - 12 minutes/day (3 sessions, 4 minutes each)
  - 1 meter and 2-3 meters
  - Letter size (near: 14-point font, business card; far: 54-point font)
- Progressions
  - Head movement speed and duration
  - Balance challenge (e.g., stand, firm/foam, or walking)
  - Smaller target font size
  - Background visual conflict



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Home Exercise Program: 2-week post-op Update to Balance Exercises

AS 6a. OPTIMAL BALANCE EXERCISE DOSE IN THE TREATMENT OF INDIVIDUALS WITH PERIPHERAL VESTIBULAR HYPOFUNCTION

- Clinicians may consider prescribing static and dynamic balance exercises for individuals with acute/subacute UVH; however, no specific dose recommendations (Evidence quality II; Recommendation strength: Expert opinion)

- Balance exercises: 20 minutes
  - Progressions: altered foot position, surface, vision, or environment, head movements, cognitive dual-task, dynamic tasks (e.g., weight shifts)



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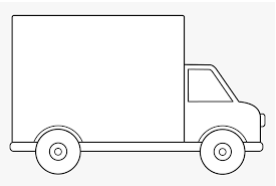
Home Exercise Program: 2-week post-op Update to Endurance Exercise and Education

- Walking program
  - Goal of 30 minutes daily walking
- Education in safe return to driving and daily activities
- Prepare for return to work



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Telehealth visit at 4-weeks post-op

- Subjective: returned to driving, performing light household tasks, walking 30 minutes
- VOR: reported oscillopsia at higher head speeds
- mCTSIB: 30/30 firm, 30/22 foam (in corner, chair in front, spouse present)
- DGI-4: 11/12, mild imbalance when walking with horizontal head turns

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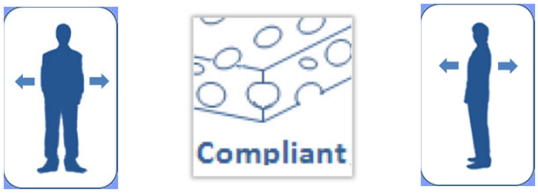
PT Home Exercise Program Update - 4 weeks

- Home exercise program update
  - Progress to performing movement that mimic moving boxes
  - Progress to dynamic VOR x 1 while walking
  - Progress to dynamic sway balance exercises on firm and foam
  - Continue daily walking program adding horizontal head movements



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PT Exam 6 weeks post-op

Subjective: patient reports feeling 85% recovered; ready to return to work in 2 weeks

Outcome Measure	Pre-op	2 weeks Post-op	6 weeks Post-op
Activities-specific Balance Confidence scale (ABC)	92%*	74%	90%*
Dizziness Handicap Inventory (DHI)	6/100*	36/100	10/100*
Dynamic Visual Acuity (DVA)	1 line*	4 line	2 lines*
modified Clinical Test of Sensory Interaction on Balance (mCTSIB)	30/30 Firm, 30/30 Foam*	30/30 Firm, 30/7 Foam	30/30 Firm, 30/30 Foam*

*Normal score

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PT Exam 6 weeks post-op

Outcome Measure	Pre-op	2 weeks Post-op	6 weeks Post-op
Functional Gait Assessment (FGA)	29/30*	24/30 (tandem, stairs, EC, pivot, head turns)*	28/30 (EC, horiz head turns)*
Timed Up and Go (TUG)	10.5 sec*	13.2 sec	11.0*
10-meter Walk Test (10-MWT)	1.25 m/sec*	1.05 m/sec	1.22 m/s*

*Normal score

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Amount of Supervision: Is it adequate in this case?

AS 7: EFFECTIVENESS OF SUPERVISED VESTIBULAR REHABILITATION.

- Clinicians should offer supervised vestibular physical therapy for individuals with unilateral or bilateral peripheral vestibular hypofunction (Evidence quality: I; Recommendation strength: Strong)

- Type and degree/amount of supervision is intentionally vague to allow consideration of clinical judgment and patient values
- Clinicians should explore delivery of PT using technology (telehealth or self-teaching methods) as an alternative for some individuals
  - Provided 1 telehealth visit at 4-weeks post-op since patient lived 3 hours away

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Which CPG criteria best supports discontinuation of treatment for this patient?

A) Patient preference
B) Physical Therapy goals met
C) Resolution of symptoms
D) Plateau in progress
E) All of the above

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AS 8: DECISION RULES FOR STOPPING VESTIBULAR REHABILITATION IN INDIVIDUALS WITH PERIPHERAL VESTIBULAR HYPOFUNCTION (UNILATERAL AND BILATERAL)

- Clinicians may use achievement of primary goals, resolution of symptoms, normalized balance and vestibular function, or plateau in progress as reasons for stopping therapy (Evidence Quality: II; Recommendation strength: Moderate)
- Ultimately, the individual decides whether to participate and when to stop
- Individuals with moderate to severe cognitive or mobility impairments may need additional treatment sessions.
  - These individuals are often excluded in research, so stopping rules may not be appropriate for them

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Case 2: Chronic Unilateral Vestibular Hypofunction

47-year-old single female presents to PT with 9-month history of motion-provoked dizziness, imbalance and nausea

- History of anxiety, depression, migraine (1-2 times/month) and motion sensitivity

Initial episode of severe vertigo with nausea, vomiting and imbalance without hearing loss lasting 2 days

Local ENT performed VNG: 68% left caloric weakness, right beating post-head shaking nystagmus

- Vestibular Neuritis suspected
- Meclizine prescribed

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Case 2: Chronic Unilateral Vestibular Hypofunction

PT at local clinic: minimal improvement with oculomotor, VOR x 1, walking exercises

Participation limited by head-motion induced nausea

Symptoms limit ability to drive on the busy highway, work in retail and participate in recreational activities (jogging, tennis)

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Initial Thoughts as a Clinician

AS 2: EFFECTIVENESS OF VESTIBULAR REHABILITATION IN INDIVIDUALS WITH CHRONIC UNILATERAL VESTIBULAR HYPOFUNCTION

- Clinicians should offer PT to individuals with chronic unilateral vestibular hypofunction (Evidence quality: I; Recommendation strength: Strong)
  - Except for selected circumstances (e.g., no symptoms, significantly impaired cognition or mobility, very active Meniere's disease)

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PT Initial Exam

Outcome Measure	Initial	Significance
Activities-specific Balance Confidence scale (ABC)	71%	Fall risk < 67%; MDC > 10 points
Dizziness Handicap Inventory (DHI)	76/100	0-30 mild, 31-60 moderate, 61-100 severe self-perceived handicap
Visual Analog Scale (VAS) Horizontal head turns Vertical head turns 360° turn	 5/10 4/10 6/10 (+nausea)	Dizziness VAS: MDC > 4.3/10 points (Hall & Herdman, 2006)
Dynamic Visual Acuity (DVA)	3 lines	Normal ≤ 2 lines difference (static-dynamic)
modified Clinical Test of Sensory Interaction on Balance (mCTSIB)	30/30 Firm, 30/12 Foam	30 s EO/30s EC on firm; 30 s EO/30s EC on foam

MDC: minimal detectable change; EO: eyes open; EC: eyes closed

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PT Initial Exam

Outcome Measure	Initial	Significance
Functional Gait Assessment (FGA)	25/30	< 22/30 indicates fall risk; MDC: 6 points
Timed Up and Go (TUG)	12.3 sec	> 11.1 sec correlate with higher falls risk
10-meter Walk Test (10-MWT)	1.1 m/sec	Scores < 1.0 m/sec indicate need intervention for fall risk

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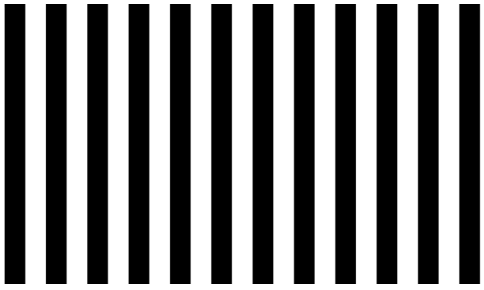
What kind of exercises could be included in the treatment plan for this patient?

A) Gaze Stabilization
B) Habituation exercises
C) Balance exercises
D) Virtual Reality
E) Optokinetics
F) All except virtual reality
G) All of the above



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AS 5: COMPARATIVE EFFECTIVENESS OF DIFFERENT VESTIBULAR REHABILITATION MODALITIES IN INDIVIDUALS WITH VESTIBULAR HYPOFUNCTION

01

Clinicians may provide targeted exercise techniques to accomplish specific goals appropriate to address identified impairments and functional limitations. (Evidence quality: II; Recommendation strength: Moderate)

02

Support for a **variety** of balance training modalities

- low technology, virtual reality, optokinetic stimulation, platform perturbations, and vibrotactile feedback

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Balance training with vibrotactile belt improved balance in adults who had not achieved good outcomes with VPT (Brugnera et al., 2015).

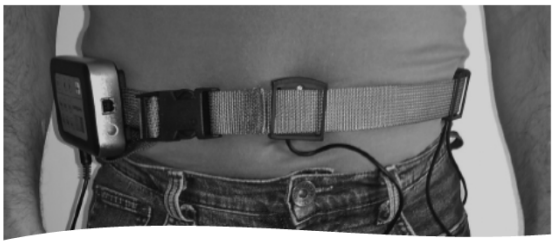

Fig. 2

(a, b) A participant wearing the head-mounted display and first point of view of gaming task in upright position, respectively. (c, d) A participant wearing the head-mounted display and first point of view of gaming task in rightward head-tilted position.

Coupling immersive virtual reality with head movement may provide additional benefit, including reduced symptoms and improved balance (Micarelli et al., 2017).

Balance exercises may be more enjoyable and less tiring using virtual reality (Meldrum et al., 2015).

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Patient Education: Home Exercise Program

Recommend working with physician to discontinue Meclizine	**AS 6b**. Optimal Gaze Stabilization EXERCISE DOSAGE of treatment In individuals with peripheral vestibular hypofunction	Gaze stabilization exercise home program
	• 3-5 times per day for a total of at least 20 minutes daily for 4-6 weeks for individuals with chronic unilateral vestibular hypofunction (Evidence quality: II; Recommendation strength: Weak)	• Progression: sitting, standing, balance challenge, or walking • Conflicting background, VOR x 2

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Home Exercise Program: Balance exercises

AS 6a. OPTIMAL BALANCE EXERCISE DOSE IN THE TREATMENT OF INDIVIDUALS WITH PERIPHERAL UNILATERAL VESTIBULAR HYPOFUNCTION

- Clinicians may prescribe static and dynamic balance exercises for a minimum of 20 minutes daily for at least 4-6 weeks for individuals with chronic unilateral vestibular hypofunction (Evidence Quality II; Recommendation Strength: Weak)

- Balance exercises 2 x/day x 10 minutes
  - Progressions: Alter foot position, surface, vision, environment (optokinetics, VR), head movement, cognitive dual-task, dynamic tasks (e.g., weight-shifting, walking)
- Habituation exercises: horizontal and vertical head turns
- Graded Walking Program: Goal = 30 minutes/day

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VPT Exam 2 weeks later

Subjective: Head movement exercise compliance limited by moderate nausea and increased anxiety

Outcome Measure	Initial	2 weeks	Significance
Activities-specific Balance Confidence scale (ABC)	74%	79%	Fall risk < 67%; MDC > 10 points
Dizziness Handicap Inventory (DHI)	78/100	68/100	0-30 mild, 31-60 moderate, 61-100 severe self-perceived handicap
Dynamic Visual Acuity (DVA)	3 lines	3 lines	Normal ≤ 2 lines
modified Clinical Test of Sensory Interaction on Balance (mCTSIB)	30/30 Firm, 30/12 Foam	30/30 Firm, 30/20 Foam	30 s eyes open (EO) on firm, 30 s EO on foam 30 s eyes closed (EC) on firm, 30 s EC on foam

MDC: minimal detectable change; EO: eyes open; EC: eyes closed

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VPT Exam 2 weeks later

Outcome Measure	Initial	2 weeks	Significance
Functional Gait Assessment (FGA)	25/30 (tandem, stairs, EC, pivot, head turns)	26/30	< 22/30 indicates fall risk; MDC: 6 points
Timed Up and Go (TUG)	12.3 sec	12.0 sec	> 11.1 sec correlates with fall risk
10-meter Walk Test (10-MWT)	1.1 m/sec	1.2 m/sec	Scores < 1.0 m/sec indicate need intervention for fall risk

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Should you recommend that this patient continue with PT?

Individual's decision to participate in PT and when to stop

AS 10: THE HARM/BENEFIT RATIO FOR VESTIBULAR REHABILITATION IN TERMS OF QUALITY OF LIFE

- Clinicians <u>should</u> offer vestibular physical therapy to persons with peripheral vestibular hypofunction with the intention of improving quality of life. (Evidence quality: Level I; Recommendation strength: Strong)

No significant harm to individuals

- Most common side effects include vertigo, dizziness and nausea

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AS 9: FACTORS THAT MODIFY REHABILITATION OUTCOMES

- Clinicians may evaluate factors that could modify rehabilitation outcomes. (**Age**: Evidence quality: I; Recommendation strength: Strong; **Other Factors**: Evidence quality: II; Recommendation strength: Moderate)
- Age and gender do not affect rehabilitation potential for improvement
- Vestibular exercises improved outcomes regardless of time from onset
  - ❖Potential harm of delaying intervention warrants initiating rehabilitation as soon as possible

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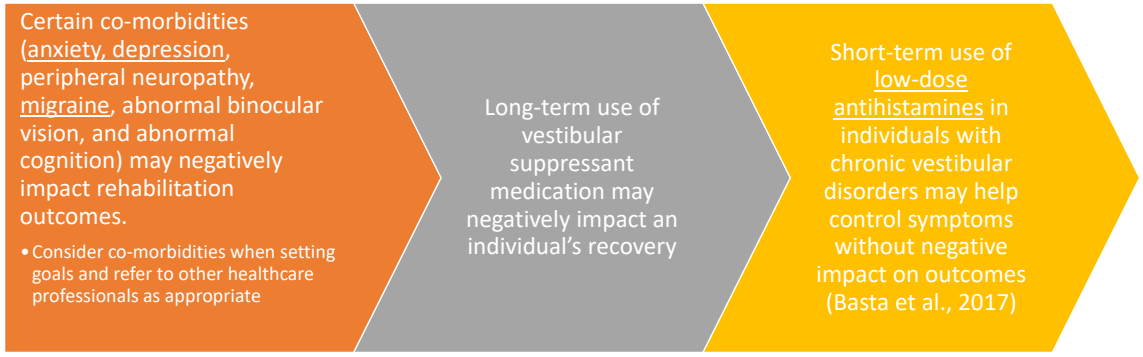
AS 9: FACTORS THAT MODIFY REHABILITATION OUTCOMES



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Possible next steps

- Education: Literature supports potential for additional improvement
- Nausea Management
  - Consider prescription for anti-emetic or low-dose antihistamine
  - Small frequent bland meals; ginger tea
  - Cold pack on neck for nausea control
  - Increase time between reps of exercises to allow symptoms return to baseline prior to next exercise
- Anxiety Management
  - Incorporate deep breathing and grounding exercises
  - Weekly PT visits to modify HEP
    - Consider telehealth as an adjunct
  - Consider referral for counseling: Cognitive Behavioral Therapy

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Possible Next Steps

- Use subjective rating scale (0-10) to educate patients
  - Goal: provoke no more than moderate symptoms (4-6/10) and symptoms return to baseline in minutes
  - Adjust the intensity of the exercise to avoid overstimulation
- Use of metronome to pace gaze stability exercises
- Grounding exercises
  - Attention to sensation from feet and noticing (without judgment) body sway with eyes open/closed

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Outcome

- Counseling implemented
  - Patient able to gradually apply learned strategies in daily life
- VPT continued over 3 months
  - gradually decreased frequency of supervised visits
- DHI improved to 32/100 with reported improved quality of life
- Made adjustments at work
  - acquired additional staff
- Returned to light jogging and tennis
- Limits driving on highway
- Educate about potential decompensation

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Quality Improvement Opportunities

- VPT for individuals with chronic UVH may differ based on patient-related factors, clinician-related factors, setting, and treatment protocol (e.g., timing, dosage)
  - Difficult to compare data from different patient populations and facilities unless the protocol is specified
- Standardizing reporting of these factors and treatment protocols within and across clinical settings will enable comparative outcomes research
- Data could be used to study clinician performance relative to patient outcomes and internal and external benchmarks; improve health care processes; and generate new knowledge

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AS 7: EFFECTIVENESS OF SUPERVISED VESTIBULAR REHABILITATION

- Clinicians <u>should</u> offer supervised vestibular physical therapy in individuals with unilateral or bilateral peripheral vestibular hypofunction (Evidence Quality: I; Recommendation Strength: Strong)
- Evidence suggests that:
  - Individuals drop out at higher rates when unsupervised
  - Individuals older than **50 years of age** may benefit more from supervision
  - Individuals who are **fearful of falling** may not do well in an unsupervised program
  - Regular in-person monitoring may be more beneficial than a remotely monitored HEP for individuals with UVH/BVH plus cognitive impairment

Pavlou et al 2013; Hsu et al 2017; Itani et al 2017; Muller et al 2015; Hondebrink et al 2017; van Vugt et al 2019; Varriano et al., 2019)

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- Evaluation/treatment should include common daily activities
- Fall prevention education is imperative for this population!
- Explore use of technology (e.g., virtual reality or augmented sensory feedback) as adjunct treatment for individuals who do not respond to standard VPT or do not adhere to home exercises
- Rating scale of perceived intensity of balance exercises may assist in appropriate modifications to balance exercises (Alsubaie et al., 2019)
- Educate patients about potential decompensation
- Forever active
- Follow-up (6 months-1 year) for “tune up”

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Strategies for Implementing the CPG

- Build relationships with referral sources to encourage early referral of individuals with vestibular hypofunction
- Build a multidisciplinary clinic or network of health care providers to manage patients with vestibular hypofunction
- Measure outcomes of care using recommended outcome measures across the ICF domains
- Look for more information and resources to come from the Knowledge Translation Vestibular Hypofunction CPG Task Force

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Future Directions

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