Vestibular Edge Outcome Measures Taskforce

Instrument name: Dix-Hallpike Maneuver	
Reviewer: Karen H Lambert PT, DPT, NCS **Linda Bernadette Horn, PT, DscPT, MHS, NCS**	**Date of review: 4 July 13**
ICF domain (check all that apply): __x__ Body function/structure _____ Activity _____ Participation	

Construct/s measured (check all that apply):		
Body structure and Function	**Activity**	**Participation**
__x_Dizziness ___Dual Tasks ___Muscle performance __Sensory integration _ __Somatosensation ___ Spatial Orientation _x__ Vertigo __ VOR/ Gaze stability ___Other: ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks	**x**				
Chronic = > 6 Weeks	**x**				
Overall Comments:	This test has excellent psychometric properties when performed correctly; is the current gold standard for assessment of BPPV in any patient (acute or chronic) and must be included in the evaluation of patients with complaints of positional vertigo				

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction			**x**			The Dix-Hallpike Maneuver should be performed to rule out BPPV
II-Central Dysfunction			**x**			The Dix-Hallpike Maneuver should be performed to rule out BPPV
III-BPPV						The Dix-Hallpike Maneuver must

						be performed when BPPV is suspected due to the high occurrence of postierior canal BPPV – if this test cannot be performed as described due to cervical range of motion issues (of other complications), an adaptation to the test (such as the side-lying test) must be performed
IV-Other			**x**			The Dix-Hallpike Maneuver should be performed to rule out BPPV
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		• Due to the frequency of BPPV that has been detected in individuals who had not previously reported symptoms, the VEDGE task force recommends performing positional testing to rule out positional vertigo when assessing any patient that complaints of dizziness and balance impairments. • The Dix-Hallpike test is relatively quick and easy to perform • Some training is recommended (through coursework or article review) to assist with technique and interpretation (as improper positioning could result in a false negative test) • • If a patient is unable to attain proper positioning for the Dix-Hallpike test, an alternative test (such as the sidelying test) should be performed.				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	Vertigo is very common in patients of any age. The entry level clinician should be able to perform a Dix-Hallpike to test for BPPV.
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				

Is there a need for additional research on this measure? If so, where are the gaps?		x		This may be the most researched component of our entire vestibular eval and we certainly have answered more questions about posterior canal BPPV than we have about other aspects of the vestibular world. Future research may focus on: • Central positional nystagmus in dix-hallpike positioning • Silent BPPV/ BPPV without nystagmus
Alternate outcome measures for consideration to assess like constructs			**Link**	
1. Side-lying Test				
2.				
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).				

References

Alvarenga G.A., Barbosa, M.A. (2011). “Benign paroxysmal positional vertigo without nystagmus: diagnosis and treatment.” Braz J Otorhinolaryngol. 77(6): 799-804.

Burston, A., Mossman, S., et al. (2012). "Are there diurnal variations in the results of the Dix-Hallpike manoeuvre?" J Clin Neurosci 19(3): 415-417. Find it on PubMed

Cohen, H. S. (2004). "Side-lying as an alternative to the Dix-Hallpike test of the posterior canal." Otol Neurotol 25(2): 130-134. Find it on PubMed

Dix, M. and Hallpike, C. (1952). "The pathology, symptomatology and diagnosis of certain common disorders of the vestibular system." Proceedings of the Royal Society of Medicine 45(6): 341. Find it on PubMed

Gordon, C. R., Levite, R., et al. (2004). "Is posttraumatic benign paroxysmal positional vertigo different from the idiopathic form?" Arch Neurol 61(10): 1590. Find it on PubMed

Halker, R. B., Barrs, D. M., et al. (2008). "Establishing a diagnosis of benign paroxysmal positional vertigo through the dix-hallpike and side-lying maneuvers: a critically appraised topic." Neurologist 14(3): 201-204. Find it on PubMed

Kerrigan MA, Costigan MF, Blatt KJ, Mathiason MA, Domroese ME. “Prevalence of Benign Paroxysmal Positional Vertigo in the young adult population.” PMR Epub anead of print 26June2013.

Noda, K., Ikusaka, M., et al. (2011). "Predictors for benign paroxysmal positional vertigo with positive Dix-Hallpike test." Int J Gen Med 4: 809-814. Find it on PubMed

Oghalai JS, Manolidis S, Barth JL, Stewart MG, Jenkins HA. (2000) “Unrecognized benign paroxysmal positional vertigo in elderly patients.” Otol Head Neck Surg 122 (630)

Pollak, L., Davies, R. A., et al. (2002). "Effectiveness of the particle repositioning maneuver in benign paroxysmal positional vertigo with and without additional vestibular pathology." Otology & neurotology 23(1): 79. Find it on PubMed

Vestibular Edge Outcome Measures Taskforce

Instrument name: Side-lying Test for BPPV	
Reviewer: Karen Lambert, PT, DPT, NCS and Linda B. Horn, PT, DScPT, MHS, NCS	**Date of review: 2/17/13**
ICF domain (check all that apply): ___X__ Body function/structure _____ Activity _____ Participation	

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
_X_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation _X_ Vertigo ___ VOR/ Gaze stability ___Other: ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			**X**		
Chronic = > 6 Weeks			**x**		
Overall Comments:	This measure is an appropriate substitution for a Dix-Hallpike Maneuver when cervical ROM restrictions prevent performing a Dix-Hallpike				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction				**x**		
II-Central Dysfunction				**x**		
III-BPPV			**x**			
IV-Other				**x**		
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		The side-lying test can be used as an alternative to the Dix-Hallpike maneuver when the patient cannot tolerate the latter due to				

		postural restrictions, medical precautions, or discomfort. There have been very few studies looking specifically at the Side-Lying Test. As with any positional test, true BPPV may be missed due to the transient nature of this diagnosis among other reasons				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
		X		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				
Is there a need for additional research on this measure? If so, where are the gaps?		x				Only one study (Cohen 2004) looking at the validity of this measure. A critical appraisal (Halker 2008) found many threats to the validity within the article.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.Dix Hallpike Maneuver						
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Cohen HS (2004). “Side-Lying as an Alternative to the Dix-Hallpike Test of the Posterior Canal.” Otology and Neurology 25:130-134.

Halker RB, Barrs DM, et al (2008). “Establishing a Diagnosis of Benign Paroxysmal Positional Vertigo Through the Dix-Hallpike and Side-Lying Maeuvers: A Critically Appraised Topic.” The Neurologist 14(3): 201-204.

Helminski JO, Janssen I, et al (2008). “Daily Exercise Does Not Prevent Recurrence of Benign Paroxysmal Positional Vertigo.”Otology and Neurology 29: 976-981

Helminski JO, Zee DS, et al (2010). “Effectiveness of Particle Repositioning Maneuvers in the Treatment of Benign Paroxysmal Positional Vertigo: A Systematic Review.” Physical Therapy 90(5): 663-678.

Lee S, Kim JS (2010). “Benign Paroxysmal Positional Vertigo.” J Clin Neurol 6:51-63

Noda K, Ikusaka M, et al (2011). “Predictors for benign paroxysmal positional vertigo with positive Dix-Hallpike test.” International Journal of General Medicine 4:809-814

Vestibular Edge Outcome Measures Taskforce

Instrument name: Activities Specific Balance Confidence Scale	
Reviewer: Jennifer Fay, PT, DPT, NCS and Tracy Rice, PT, MPH, NCS	**Date of review: July 8, 2013**

ICF domain (check all that apply):

_____ Body function/structure ____x_ Activity __x___ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: ___Other:	_x_Balance/falls _x__Gait (include stairs) ___ High Level Mobility _x_ Transfers ___Other:	_x_Community function ___Driving ___Health and wellness _x_Home management _x_Leisure/Recreational activities ___Life satisfaction ___Quality of life _x_Role function _x_Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks		**x**			
Chronic = > 6 Weeks		**x**			
Overall Comments:	Measure has good psychometric properties for vestibular population, is free to use and reasonably accessible to providers.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			**x**			
II-Central Dysfunction			**x**			
III-BPPV			**x**			
IV-Other			**x**			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Measure has been studied in variety of diagnostic populations other than vestibular and has demonstrated good psychometric properties. This measure has good clinical utility however limited				

		research in the vestibular population.				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				
Is there a need for additional research on this measure? If so, where are the gaps?		x				Additional research into reliability and responsiveness with the vestibular population.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.Falls Efficacy Scale (FES)						
2. Turkish Version				Karapolat et al., 2010		
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Alghwiri, A. A., Marchetti, G. F., & Whitney, S. L. (2011). Content comparison of self-report measures used in vestibular rehabilitation based on the international classification of functioning, disability and health. *Physical Therapy*, *91*(3), 346-357.

Beninato, M., Portney, L. G., et al. (2009). "Using the International Classification of Functioning, Disability and Health as a framework to examine the association between falls and clinical assessment tools in people with stroke." Physical Therapy 89(8): 816-825. Find it on PubMed

Botner, E. M., Miller, W. C., et al. (2005). "Measurement properties of the Activities-specific Balance Confidence Scale among individuals with stroke." Disability and Rehabilitation 27(4): 156-163. Find it on PubMed

Clendaniel, R. A. (2000). Outcome measures for assessment of treatment of the dizzy and balance disorder patient. *Otolaryngologic Clinics of North America*, *33*(3), 519-533.

Dal Bello-Haas, V., Klassen, L., et al. (2011). "Psychometric Properties of Activity, Self-Efficacy, and Quality-of-Life Measures in Individuals with Parkinson Disease." Physiotherapy Canada 63(1): 47-57. Find it on PubMed

Duracinsky, M., Mosnier, I., Bouccara, D., Sterkers, O., & Chassany, O. (2007). Literature review of questionnaires assessing vertigo and dizziness, and their impact on patients' quality of life. *Value in health*, *10*(4), 273-284.

Filiatrault, J., Gauvin, L., et al. (2007). "Evidence of the psychometric qualities of a simplified version of the Activities-specific Balance Confidence scale for community-dwelling seniors." Archives of Physical Medicine and Rehabilitation 88(5): 664-672. Find it on PubMed

Hatch, J., Gill-Body, K. M., et al. (2003). "Determinants of balance confidence in community-dwelling elderly people." Physical Therapy 83(12): 1072-1079. Find it on PubMed

Horak, F. B., Wrisley, D. M., et al. (2009). "The Balance Evaluation Systems Test (BESTest) to differentiate balance deficits." Physical Therapy 89(5): 484-498. Find it on PubMed

Huang, T. T. and Wang, W. S. (2009). "Comparison of three established measures of fear of falling in community-dwelling older adults: psychometric testing." International Journal of Nursing Studies 46(10): 1313-1319. Find it on PubMed

Inness, E. L., Howe, J. A., et al. (2011). "Measuring Balance and Mobility after Traumatic Brain Injury: Validation of the Community Balance and Mobility Scale (CB&M)." Physiotherapy Canada 63(2): 199-208. Find it on PubMed

Karapolat, H., Eyigor, S., Kirazli, Y., Celebisoy, N., Bilgen, C., & Kirazli, T. (2010). Reliability, validity, and sensitivity to change of Turkish Activities-specific Balance Confidence Scale in patients with unilateral peripheral vestibular disease. *International Journal of Rehabilitation Research*, *33*(1), 12-18.

Lajoie, Y. and Gallagher, S. P. (2004). "Predicting falls within the elderly community: comparison of postural sway, reaction time, the Berg balance scale and the Activities-specific Balance Confidence (ABC) scale for comparing fallers and non-fallers." Archives of Gerontology and Geriatrics 38(1): 11-26. Find it on PubMed

Landers, M. R., Durand, C., et al. (2011). "Development of a scale to assess avoidance behavior due to a fear of falling: the Fear of Falling Avoidance Behavior Questionnaire." Physical Therapy 91(8): 1253-1265. Find it on PubMed

Legters K., Whitney SL, Porter R, Buczek F. "The relationship between the Activities-specific Balance Confidence Scale and the Dynamic Gait Index in peripheral vestibular dysfunction." Physiotherapy Research International 10(1):10-22.

Marchetti, G. F., Whitney, S. L., Redfern, M. S., & Furman, J. M. (2011). Factors associated with balance confidence in older adults with health conditions affecting the balance and vestibular system. *Archives of physical medicine and rehabilitation*, *92*(11), 1884-1891.

Morgan, M. T., Friscia, L. A., Whitney, S. L., Furman, J. M., & Sparto, P. J. (2013). Reliability and validity of the Falls Efficacy Scale-International (FES-I) in individuals with dizziness and imbalance. *Otology and Neurotology*.

Nemmers, T. M. and Miller, J. W. (2008). "Factors influencing balance in healthy community-dwelling women age 60 and older." J Geriatr Phys Ther 31(3): 93-100. Find it on PubMed

Powell, L. E. and Myers, A. M. (1995). "The Activities-specific Balance Confidence (ABC) Scale." Journals of Gerontology. Series A, Biological Sciences and Medical Sciences 50A(1): M28-34. Find it on PubMed

Salbach, N. M., Mayo, N. E., et al. (2006). "Psychometric evaluation of the original and Canadian French version of the activities-specific balance confidence scale among people with stroke." Archives of Physical Medicine and Rehabilitation 87(12): 1597-1604. Find it on PubMed

Steffen, T. and Seney, M. (2008). "Test-retest reliability and minimal detectable change on balance and ambulation tests, the 36-item short-form health survey, and the unified Parkinson disease rating scale in people with parkinsonism." Physical Therapy 88(6): 733-746. Find it on PubMed

Talley, K. M., Wyman, J. F., et al. (2008). "Psychometric properties of the activities-specific balance confidence scale and the survey of activities and fear of falling in older women." Journal of the American Geriatrics Society 56(2): 328-333. Find it on PubMed

Whitney, S.L., Hudak M.T., and Marchetti G.F. (1999). “The activities-specific balance confidence scale and the dizziness handicap inventory: a comparison.” Journal of Vestibular Research 9:253-259.

Wrisley, D. M. and Kumar, N. A. (2010). "Functional gait assessment: concurrent, discriminative, and predictive validity in community-dwelling older adults." Physical Therapy 90(5): 761-773. Find it on PubMed

Vestibular Edge Outcome Measures Taskforce

Instrument name: Dizziness Handicap Inventory	
Reviewer: Tracy Rice, PT, MPH, NCS and Jenny Fay, PT, DPT, NCS	**Date of review:** June 20, 2013
ICF domain (check all that apply): ___X__ Body function/structure __X___ Activity ___X__ Participation	

Construct/s measured (check all that apply):		
Body structure and Function	**Activity**	**Participation**
_X Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: ___Other:	___Balance/falls _X_Gait (include stairs) ___ High Level Mobility ___ Transfers _X_Other: Bed mobility	_X_Community function ___Driving ___Health and wellness _X_Home management _X_Leisure/Recreational activities ___Life satisfaction ___Quality of life _X_Role function _X_Shopping _X_Social function _X_Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks	**X**				
Chronic = > 6 Weeks	**X**				
Overall Comments:	Excellent tool for pre-intervention and post-intervention measures, establishing objective goals and for use in gauging efficacy of treatment.				

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction	X					
II-Central Dysfunction	X					
III-BPPV	X					**Five-item BPPV subscale (Whitney et al., 2005)**
IV-Other	X					
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Excellent psychometric properties to the tool and the tool has been successfully translated and validated in several languages.				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
		X		X		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		X				
Is there a need for additional research on this measure? If so, where are the gaps?		X Responsiveness and MCID in various populations are gaps in the research				

Alternate outcome measures for consideration to assess like constructs	**Link**
1. DHI-S	Jacobson & Calder, 1998
2.Five-item BPPV subscale	Whitney et al., 2005
3. Spanish version DHI	Perez et al., 2000
4. Dutch Version	Vereeck et al., 2007
5.Swedish Version	Jarlsäter, S., & Mattsson, E. (2003)
6. Chinese Version	Poon et al., 2004
7. German Version	Kurre et al., 2009
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).	

References

Alghwiri, A. A., Marchetti, G. F., & Whitney, S. L. (2011). Content comparison of self-report measures used in vestibular rehabilitation based on the international classification of functioning, disability and health. *Physical Therapy*, *91*(3), 346-357.

Cowand, J. L., Wrisley, D. M., Walker, M., Strasnick, B., & Jacobson, J. T. (1998). Efficacy of vestibular rehabilitation. *Otolaryngology--Head and Neck Surgery*, *118*(1), 49-54.

Cohen, H. S., & Kimball, K. T. (2003). Increased independence and decreased vertigo after vestibular rehabilitation. *Otolaryngology--Head and Neck Surgery*, *128*(1), 60-70.

Duracinsky, M., Mosnier, I., Bouccara, D., Sterkers, O., & Chassany, O. (2007). Literature review of questionnaires assessing vertigo and dizziness, and their impact on patients' quality of life. *Value in health*, *10*(4), 273-284.

Fielder, H., Denholm, S. W., Lyons, R. A., & Fielder, C. P. (1996). Measurement of health status in patients with vertigo. *Clinical Otolaryngology & Allied Sciences*, *21*(2), 124-126.

Gámiz, M. J., & Lopez-Escamez, J. A. (2004). Health-related quality of life in patients over sixty years old with benign paroxysmal positional vertigo. *Gerontology*, *50*(2), 82-86.

Jacobson, G. P. & Newman, C. W. (1990). The development of the Dizziness Handicap Inventory. *Archives of Otolaryngology - Head and Neck Surgery* 116(4): 424-427.

Jacobson, G. P., Newman, C. W., Hunter, L., & Balzer, G. K. (1991). Balance function test correlates of the Dizziness Handicap Inventory. *Journal of the American Academy of Audiology*, *2*(4), 253-260.

Jacobson, G. P., & Calder, J. H. (1998). A screening version of the Dizziness Handicap Inventory (DHI-S). *Otology & Neurotology*, *19*(6), 804.

Jacobson, G. P., & Calder, J. H. (2000). Self-perceived balance disability/handicap in the presence of bilateral peripheral vestibular system impairment. *Journal of the American Academy of Audiology*, *11*(2), 76.

Jarlsäter, S., & Mattsson, E. (2003). Test of reliability of the Dizziness Handicap Inventory and the Activities-specific Balance Confidence Scale for use in Sweden. *Advances in Physiotherapy*, *5*(3), 137-144.

Krebs, D. E., Gill-Body, K. M., Riley, P. O., & Parker, S. W. (1993). Double-blind, placebo-controlled trial of rehabilitation for bilateral vestibular hypofunction: preliminary

report. *Otolaryngology--head and neck surgery: official journal of American Academy of Otolaryngology-Head and Neck Surgery*, *109*(4), 735-741.

Kurre, A., van Gool, C. J., Bastiaenen, C. H., Gloor-Juzi, T., Straumann, D., & de Bruin, E. D. (2009). Translation, cross-cultural adaptation and reliability of the German version of the Dizziness Handicap Inventory. *Otology & Neurotology*, *30*(3), 359-367.

Lim, H. W., Kim, K. M., Jun, H. J., Chang, J., Jung, H. H., & Chae, S. W. (2012). Correlating the Head Shake–Sensory Organizing Test with Dizziness Handicap Inventory in Compensation After Vestibular Neuritis. *Otology & Neurotology*, *33*(2), 211-214.

Lopez-Escamez, J. A., Gamiz, M. J., Fernandez-Perez, A., Gomez-Fiñana, M., & Sanchez-Canet, I. (2003). Impact of treatment on health-related quality of life in patients with posterior canal benign paroxysmal positional vertigo. *Otology & neurotology*, *24*(4), 637-641.

Mruzek, M., Barin, K., Nichols, D. S., Burnett, C. N., & Welling, D. B. (1995). Effects of vestibular rehabilitation and social reinforcement on recovery following ablative vestibular surgery. *The Laryngoscope*, *105*(7), 686-692.

Perez, Itziar Garmendia, Marta García-Granero, Eduardo Martin, Rafael García-Tapia, N. (2001). Factor analysis and correlation between Dizziness Handicap Inventory and Dizziness Characteristics and Impact on Quality of Life scales. *Acta oto-laryngologica*, *121*(545), 145-154.

Pérez, N., Martin, E., & Garcia-Tapia, R. (2003). Dizziness: relating the severity of vertigo to the degree of handicap by measuring vestibular impairment. *Otolaryngology--Head and Neck Surgery*, *128*(3), 372-381.

Poon, D. M., Chow, L. C., Au, D. K., Hui, Y., & Leung, M. C. (2004). Translation of the dizziness handicap inventory into Chinese, validation of it, and evaluation of the quality of life of patients with chronic dizziness. *The Annals of otology, rhinology, and laryngology*, *113*(12), 1006-1011.

Robertson, D. D., & Ireland, D. J. (1995). Dizziness Handicap Inventory correlates of computerized dynamic posturography. *The Journal of otolaryngology*, *24*(2), 118-124.

Tamber, A. L., Wilhelmsen, K. T., & Strand, L. I. (2009). Measurement properties of the Dizziness Handicap Inventory by cross-sectional and longitudinal designs. *Health Qual Life Outcomes*, *7*(2), 101-5.

Vereeck, L., Truijen, S., Wuyts, F. L., & Van De Heyning, P. H. (2007). Internal consistency and factor analysis of the Dutch version of the Dizziness Handicap Inventory. *Acta oto-laryngologica*, *127*(8), 788-795.

Wackym, P. A., Hannley, M. T., Runge-Samuelson, C. L., Jensen, J., & Zhu, Y. R. (2008). Gamma Knife surgery of vestibular schwannomas: longitudinal changes in vestibular function and measurement of the Dizziness Handicap Inventory.

Whitney, S. L., Hudak, M. T., et al. (1999). The activities-specific balance confidence scale and the dizziness handicap inventory: a comparison. *Journal of Vestibular Research* 9(4): 253-259.

Whitney, S. L., Wrisley, D. M., Brown, K. E., & Furman, J. M. (2000). Physical Therapy for Migraine-Related Vestibulopathy and Vestibular Dysfunction With History of Migraine. *The Laryngoscope*, *110*(9), 1528-1534.

Whitney, S. L., Marchetti, G. F., et al. (2005). Usefulness of the dizziness handicap inventory in the screening for benign paroxysmal positional vertigo." Otol Neurotol 26(5): 1027-1033. Find it on PubMed

Whitney, S. L., Wrisley, D. M., et al. (2004). "Is perception of handicap related to functional performance in persons with vestibular dysfunction?" Otol Neurotol 25(2): 139-143. Find it on PubMed

Vestibular Edge Outcome Measures Taskforce

Instrument name: Dynamic Visual Acuity Test_ Instrumented (DVAT_I)	
Reviewer: Matthew Scherer, PT, PhD, NCS **Jennifer L. Stoskus, PT, MSPT, DPT**	**Date of review: 1 June 13**
ICF domain (check all that apply): __x__ Body function/structure _____ Activity _____ Participation	

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo _x_ VOR/ Gaze stability ___Other: ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function _?__Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks		**x**			*May not be well tolerated immediately post insult
Chronic = > 6 Weeks		**x**			Serial measurements may be useful to quantify degree of central compensation/ rehabilitation response
Overall Comments:	A versatile measure that is appropriate at all stages of recovery.				

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction		x				
II-Central Dysfunction		x				
III-BPPV					**X**	Measure may be useful during

						initial evaluation as a screening tool to rule out co-morbid vestibular dysfunction
IV-Other					**X**	Measure may be useful during initial evaluation as a screening tool to rule out co-morbid vestibular dysfunction
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		• The DVAT_ I provides impairment information specific to the axis of head rotation and the acuity of gaze at or above a specified velocity threshold. • DVAT_I may provide a useful metric of central compensation following rehabilitation. • The versatility of some versions of the DVAT_I allow assessment of both predictable (active DVA) and unpredictable (passive DVA) gaze stability provides the examiner versatility to assess peripheral and central contributions to gaze stability. • Evidence base to assess gaze stability in cardinal planes of movement yaw, pitch, RALP, and LARP under stationary conditions, and locomotor conditions provides broad insight into patient gaze stability under a broad range of functional conditions. • Cost of some DVA_I systems may be prohibitive for small clinics or academic programs to support. Feasibility for cost may thus limit the broadest use of this testing platform.				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	- Students should learn to administer the tool if feasible for the Instructional program or clinical affiliation. -System cost varies significantly from NIH toolbox to more established commercial
		x		x		

						versions of the test. - Strong test psychometrics, well established evidence base, ease of use and overall utility of the measure for capturing aVOR function support a strong recommendation for this measure.
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				- The DVAT_I provides complementary data to the GST; it is feasible (with respect to test administration time) and is non-invasive. Measure has strong test psychometrics and has been used under a wide variety of clinical and experimental conditions.
Is there a need for additional research on this measure? If so, where are the gaps?		x				Key research gaps include: - Use of this measure to assess the reliability of gaze stability in patient populations with co-morbid vestibular deficits (e.g., mTBI). - Convergent validity studies with measures of dynamic stability (e.g., DGI, FGA) or postural stability

				(e.g., SOT, CTSIB), Convergent validity between DVA-Instrumented and DVA- Instrumented.
Alternate outcome measures for consideration to assess like constructs			**Link**	
1. Dynamic Visual Acuity (Non-instrumented)			***To be established***	
2. Gaze Stabilization Test			***To be established***	
3. Head Impulse Test			***To be established***	
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).				

References

Hall CD, Schubert MC, Herdman SJ (2003). Prediction of Fall Risk Reduction in Individuals with Unilateral Vestibular Hypofunction. Otology & Neurotology, pending publication.

Herdman SJ, et al (1998). Computerized Dynamic Visual Acuity Test in the Assessment of Vestibular Deficits. American J Otology, 19:790-796

Herdman, S. J., Schubert, M. C., et al. (2001). "Role of central preprogramming in dynamic visual acuity with vestibular loss." Arch Otolaryngol Head Neck Surg 127(10): 1205-1210.

Rine, R M, Roberts D, Corbin B, McKean-Cowdin R, Varma R, Beaumont J, Slotkin J, Schubert MC, (2012). New portable tool to screen vestibular and visual function—National Institutes of Health Toolbox initiative. JRRD; 49 (2): 209—220 http://www.rehab.research.va.gov/jour/2012/492/rine492.html

Schubert, M. C., Herdman, S. J., et al. (2002). "Vertical dynamic visual acuity in normal subjects and patients with vestibular hypofunction." Otol Neurotol 23(3): 372-377.

Schubert M.C., Migliaccio A., Della Santina C., (2006). “Dynamic Visual Acuity during Passive Head Thrusts in Canal Planes” JARO 7: 329–338

Schubert M.C., Migliaccio A., et al (2008). “Mechanisms of Dynamic Visual Acuity Recovery with Vestibular Rehabilitation. “Arch Phys Med Rehabil 2008;89:500-7.

Tian J., Shubayev I, Demer J., (2001) “Dynamic Visual Acuity during Yaw

Rotation in Normal and Unilaterally Vestibulopathic Humans” Ann N Y Acad Sci. Oct;942:501-4

Vital D, Hegemann S et al. (2010) “A New Dynamic Visual Acuity Test to Assess” Arch Otolaryngol Head Neck Surg. 2010;136(7):686-691

Peripheral Vestibular Function”

Ward, B. K., Mohammad, M. T., et al. (2010). "The reliability, stability, and concurrent validity of a test of gaze stabilization." J Vestib Res 20(5): 363-372.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Dynamic Visual Acuity_ Non-Instrumented	
Reviewer: Matthew Scherer, PT, PhD, NCS **Jennifer L. Stoskus, PT, MSPT, DPT**	**Date of review: 18 August 13**

ICF domain (check all that apply):

__x__ Body function/structure _____ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	**Activity**	**Participation**
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo _x_ VOR/ Gaze stability ___Other: ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks			**x**		*May not be well tolerated immediately post insult
Chronic = > 6 Weeks			**x**		Serial measurements may be useful to quantify degree of central compensation/ rehabilitation response

Overall Comments:	A versatile measure that is appropriate at all stages of recovery. Very little published research on this measure to substantiate a “Level 3” or “Level 4” strength recommendation.

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction			**x**			**Measure may be useful during initial bedside clinical evaluation**

						to corroborate other "low tech" measures of aVOR function such as the HIT and the HSN test.
II-Central Dysfunction			**x**			
III-BPPV					**x**	Not diagnostic but may be useful to rule out co-morbid vestibular hypofunction with positional vertigo (BPPV)
IV-Other					**x**	Measure may be useful during initial evaluation as a screening tool to rule out co-morbid vestibular dysfunction
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		• The DVAT_non- I provides impairment information specific to the axis of head rotation and the acuity of gaze at a specified frequency of head movement (if used in conjunction with metronome) • The low cost of materials (i.e., an eye chart), ease of administration and scoring, and quick testing time make this a good clinical measure of behavioral VOR function. • The general dearth of evidence for this measure accounts for the "Reasonable to recommend" rating vs. a stronger recommendation.				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	-Feasibility and low cost for the non-instrumented DVAT makes it a good option for entry level programs.
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				- The DVAT_NI has good test properties however there is limited study on

				this measure.
Is there a need for additional research on this measure? If so, where are the gaps?		x		Key research gaps include: - Validity studies in a broader cross section of patients with vestibular dysfunction. - Correlational analysis of DVAT_NI with instrumented measures of gaze stability (e.g., GST, DVAT-I) - Convergent validity studies with other measures of VOR performance (e.g., HIT, HSN), postural stability (e.g., SOT, CTSIB), or dynamic stability (e.g., DGI, FGA)
Alternate outcome measures for consideration to assess like constructs			**Link**	
1. Dynamic Visual Acuity (non-instrumented)			***To be established***	
2. Gaze Stabilization Test			***To be established***	
3. Head Impulse Test			***To be established***	
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).				

References

Rine RM, Braswell J. A clinical test of dynamic visual acuity for children. (2003) Int J Pediatr Otorhinolaryngol. Nov;67(11):1195-201.

Dannenbaum E, Paquet N, Chilingaryan G, Fung J. (2009) Clinical Evaluation of Dynamic Visual Acuity in Subjects With Unilateral Vestibular Hypofunction. Otol Neurotol (30):368-372.

Dannenbaum E, Paquet N, Hakim-Zadeh R, Feldman A. (2005) Optimal parameters for the clinical test of dynamic visual acuity in patients with a unilateral vestibular deficit. J Otolaryngol Feb; 34(1):13-9

Herdman, SJ. Vestibular Rehabilitation, 3rd Edition (2007)

Longridge NS, Mallinson AI. A discussion of the dynamic illegible "E" test: a new method of screening for aminoglycoside vestibulotoxicity. Otolaryngol Head Neck Surg. 1984;92:671-677.

Longridge NS. Mallinson AI. The dynamic illegible E-test: a technique for assessing the vestibulo-ocular reflex. Acta Otolaryngol. 1987;103:273-279.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Gaze Stabilization Test	
Reviewer: Matthew Scherer, PT, PhD, NCS **Jennifer L. Stoskus PT, MSPT, DPT**	**Date of review: 16 February 13**

ICF domain (check all that apply):

__x__ Body function/structure _____ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	**Activity**	**Participation**
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo _x_ VOR/ Gaze stability ___Other: ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks			**x**		*May not be well tolerated immediately post insult
Chronic = > 6 Weeks			**x**		Serial measurements may be useful to quantify degree of central compensation/ rehabilitation response
Overall Comments:					

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction			**X**			
II-Central Dysfunction			**X**			
III-BPPV					**X**	Measure may be useful during

						initial evaluation as a screening tool to rule out co-morbid vestibular dysfunction
IV-Other					**X**	Measure may be useful during initial evaluation as a screening tool to rule out co-morbid vestibular dysfunction
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		• The GST provides impairment information specific to the axis of head rotation and the velocity of head movement. • GST may provide a useful metric of central compensation following rehabilitation. • Given the fixed optotype size presented during testing, the GST may be preferable to other behavioral measures of VOR function (e.g. DVA) among patients with significant co-morbid *visual* deficits. • The unpredictable nature of the visual stimulus in the GST paradigm theoretically controls against augmented gaze stability from compensatory saccades/ vestibular catch up saccades known to be present in persons with vestibular disease during active DVA testing. • Cost of the GST system may be prohibitive for small clinics or academic programs to support. Limiting broadest use and application.				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	- System cost, size (of the Smart EquiTest System with InVision), and broad range psychometric strength characteristics (i.e., excellent to poor) limit widespread use of this measure outside of specialized clinical or research settings.
			x		x	

Research Use		YES	NO	Comments
Is this tool appropriate for use in intervention research studies?		x		- The GST provides complementary data to the DVA in a timely and non-invasive manner.
Is there a need for additional research on this measure? If so, where are the gaps?		x		Key research gaps include: -Absence of studies to establish content validity using high energy head movement stimuli (e.g. using vHIT or scleral search coil as gold standards). - Externally validated normative values by epoch in healthy control subjects. - Incomplete characterization of performance across the spectrum of vestibular disease and severity.
Alternate outcome measures for consideration to assess like constructs			**Link**	
1. Dynamic Visual Acuity (non-instrumented)			***To be established***	
2. Dynamic Visual Acuity (Active/ Passive)			***To be established***	
3. Head Impulse Test			***To be established***	
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).				

References

Carmody, J. (2005). "Comparative study of the Gaze Stabilization Test (GST) and the Dynamic Visual Acuity Test (DVAT) for detecting patients with unilateral vestibular dysfunction."

Goebel J, Tungsiripat N,Sinks B, Carmody J (2006) Gaze Stabilization Test: A New Clinical Test of Unilateral Vestibular Dysfunction. Otology & Neurotology 28:68-73

Mohammad, M. T., Whitney, S. L., et al. (2011). "The reliability and response stability of dynamic testing of the vestibulo-ocular reflex in patients with vestibular disease." J Vestib Res 21(5): 277-288.

NeuroCom Clinical Integration Seminar Lab Manual, Clackamas OR.

Pritcher, M. R., Whitney, S. L., et al. (2008). "The influence of age and vestibular disorders on gaze stabilization: a pilot study." Otol Neurotol 29(7): 982-988.

Ward B, Mohammed M, Brach J, Studenski S, Whitney S,Furman J. (2009) Physical Performance and a Test of Gaze Stabilization in Older Adults. Otology & Neurotology 31:168-172.

Ward, B. K., Mohammad, M. T., et al. (2010). "The reliability, stability, and concurrent validity of a test of gaze stabilization." J Vestib Res 20(5): 363-372.

Whitney S, Marchetti G, Pritcher M, Furman J. (2009). Gaze stabilization and gait performance in vestibular dysfunction. Gait & Posture; 29: 194–198

Vestibular Edge Outcome Measures Taskforce

Instrument name: Head Impulse Test	
Reviewer: Matthew Scherer, PT, PhD, NCS **Jennifer L. Stoskus, PT, MSPT, DPT**	**Date of review: 6 June 13**

ICF domain (check all that apply):

__x__ Body function/structure _____ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	**Activity**	**Participation**
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo _x_ VOR/ Gaze stability ___Other: ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	__?_Community function _?__Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks		**x**			Clinical HIT generally has ***good*** diagnostic psychometric properties (Sn, Sp, Likliood ratios) and ***excellent*** clinical utility /feasibility. Interpretation of the non-instrumented HIT is more challenging during acute phase of recovery. Test psychometrics improve to ***excellent*** when the HIT is administered with scleral search coil (SSC) or video measurement

					techniques (vHIT). With improved resolution comes ***poor*** feasibility (SSC) and increased cost (SSC and vHIT).
Chronic = > 6 Weeks		**x**			-HIT known to elicit CS response to a rapid ipsilesional head movements even years following the insult. -Binary (+/-) findings from the clinical HIT do not provide a measure of central compensation however instrumented approaches may provide visibility of recovery as measured by aVOR gain on the ipsilesional side. (Palla and Strauman 2004)
Overall Comments:	• The HIT is Sn, Sp and feasible when performed as a clinical bedside test. Instrumentation improves test psychometrics though there may be an associated feasibility cost. • Scleral search coil technique has been the gold standard for HIT measurements for the last 25 years providing quantifiable data on the presence and degree of VOR deficits however; coils are invasive, expensive and impractical for clinical use (Aw 1996 a, b, Robinson 1963). • Recent improvements in VOR measurement using high speed video represent a significant development for enhancing the sensitivity and specificity of the HIT without the risks associated with more invasive measurement techniques (MacDougall et al 2009).				

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction		**x**				Numerous well -designed studies validating use of HIT in patients with peripheral dysfunction.
II-Central Dysfunction			**x**			Isolated studies demonstrate sensitivity of the HIT to floccular/ central dysfunction and brainstem strokes (Kremmyda et al 2012; Cnyrim et al 2008; Newman-Toker et al 2008).
III-BPPV					**x**	Should be included as a component of a comprehensive evaluation to rule out co-morbid vestibular

						dysfunction
IV-Other					**x**	Should be included as a component of a comprehensive evaluation to rule out co-morbid vestibular dysfunction
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		• Clinical HIT has been validated using calorics, SSC and vHIT measurement techniques in patients with peripheral dysfunction (vestibular neuritis). • HIT should be used as a component of a comprehensive vestibular evaluation to reduce the risk of a false positive in cases of central pathology.				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	-Feasibility and excellent specificity of the clinical HIT make it a strong measure for inclusion in entry-level curricula.
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				- The clinical HIT is a Sn, Sp and feasible test commonly used to confirm vestibular diagnosis in a study sample. - Augmentation of test measurement with SSC or vHIT technology is appropriate and advantageous for improved characterization of aVOR study sample.
Is there a need for additional research on this measure? If so,		x				Key research gaps: - With emerging vHIT technology there

where are the gaps?				will be a need for convergent validity studies with behavioral measures of VOR function including DVAT and GST.
Alternate outcome measures for consideration to assess like constructs			**Link**	
1. Dynamic Visual Acuity (non-instrumented)			***To be established***	
2. Dynamic Visual Acuity			***To be established***	
3. Gaze Stabilization Test			***To be established***	
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).				

References

Aw ST, Haslwanter T, Halmagyi GM, Curthoys IS, Yavor RA, Todd MJ. (1996) Three-dimensional vector analysis of the human vestibuloocular reflex in response to high acceleration head rotations, I: responses in normal subjects. J Neurophysiol 76:4009–4020.

Aw ST, Halmagyi GM, Haslwanter T, Curthoys IS, Yavor RA, Todd MJ. (1996) Three-dimensional vector analysis of the human vestibuloocular reflex in response to high acceleration head rotations, II: responses in subjects with unilateral vestibular loss and selective semicircular canal occlusion. J Neurophysiol;76:4021– 4030.

Cnyrim CD, Newman-Toker D, Karch C, Brandt T, Strupp M. (2008) Bedside differentiation of vestibular neuritis from central "vestibular pseudoneuritis." J Neurol Neurosurg Psychiatry;79:458–460.

Goldberg JM, Ferandez C. Physiology of peripheral neurons innervating semicircular canals of the squirrel monkey: I. Resting discharge and response to constant angular accelerations. J Neurophysiol 1971; 34: 635-660.

Hain, T.C. Head-Impulse Test (HIT) and Head Heave test (HHT).

Hammond, SL, & Harro, C. (2005). Vestibular Evaluation in Individuals With Mild Brain Injury. Journal of Neurologic Physical Therapy, 29(4), 209.

Halmagyi GM, Curthoys IS: A Clinical Sign of Canal Paresis. Arch Neurol 45: 1988.

Harvey, S. A., Wood, D. J., & Feroah, T. R. (1997). Relationship of the head impulse test and head-shake nystagmus in reference to caloric testing. Am J Otol, 18(2), 207-213.

Jorns-Ha¨derli M, Straumann D, Palla A. (2007). Accuracy of the bedside head impulse test in detecting vestibular hypofunction J Neurol Neurosurg Psychiatry;78:1113–1118

Kremmyda, O., Kirchner, H., Glasauer, S., Brandt, T., Jahn, K., & Strupp, M. (2012). False-positive head-impulse test in cerebellar ataxia. Front Neurol, 3, 162.

Leigh RJ, Zee DS: The Neurology of Eye Movements. New York, Oxford University Press, 2006.

MacDougall, H. G., Weber, K. P., McGarvie, L. A., Halmagyi, G. M., & Curthoys, I. S. (2009). The video head impulse test: diagnostic accuracy in peripheral vestibulopathy. Neurology, 73(14), 1134-1141. doi: 10.1212/WNL.0b013e3181bacf85

Newman-Toker DE, Kattah JC, Alvernia JE, Wang DZ. (2008) Normal head impulse test differentiates acute cerebellar strokes from vestibular neuritis. Neurology;70(pt 2):2378–2385.

A. Palla and D. Straumann. (2004) Recovery of the High-Acceleration
Vestibulo-ocular Reflex After Vestibular Neuritis, JARO 5 427–435.

Robinson DA. (1963) A method of measuring eye movement using
a scleral search coil in a magnetic field. IEEE Trans Biomed Eng; 10:137–145.

Weber, K.P., MacDougall, H.G., Halmagyi, G.M., & Curthoys, I.S. (2009). Impulsive Testing of Semicircular-Canal Function Using Video-oculography. Annals of the New York Academy of Sciences, 1164(1), 486-491.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Head Shaking Nystagmus Test	
Primary Reviewer: Jennifer L. Stoskus PT, MSPT, DPT **Secondary Reviewer: Matthew R Scherer PT, PhD, NCS**	**Date of review: 12 NOV 2013**
ICF domain (check all that apply): __x__ Body function/structure _____ Activity _____ Participation	

Construct/s measured (check all that apply):

Body structure and Function	**Activity**	**Participation**
_x_ Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability _x_ Other: Vestibular system balance/imbalance ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:				
	Recommendation Categories				
Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks			**x**		
Chronic = > 6 Weeks			**x**		
Overall Comments:					

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			**X**			Limited by strength of statistics and access to specialized assessment equipment
II-Central Dysfunction			**x**			Measure may be useful during initial evaluation as a screening tool to rule out co-morbid unilateral peripheral vestibular dysfunction, however, the overall sensitivity of this test is not high. - Vincini et al found HSN to be sensitive in 22.5% in those with central vestibular dysfunction, however this data is not strong enough to provide recommendation in this population.
III-BPPV				**x**		Measure may be useful during initial evaluation as a screening tool to rule out co-morbid unilateral peripheral vestibular dysfunction
IV-Other				**x**		Measure may be useful during initial evaluation as a screening tool to rule out unilateral peripheral co-morbid vestibular dysfunction
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		• The HSN test provides information regarding peripheral vestibular system imbalance • Sensitivity of the HSN test improves as vestibular imbalance increases between R/L sides (as indicated with caloric testing) • Many studies of HSN use ENG equipment or a scleral search coil, which is not utilized in most clinical settings; few studies look at psychometrics using infrared lenses or Frenzel glasses, however this equipment is most commonly used in current clinical practice. • Methods used in older studies included the patient actively shaking his/her head, while common current practice, it is recommended that the clinician perform a passive head shake in order to ensure appropriate head position, velocity				

<table>
<tr><td></td><td></td><td colspan="4">of headshaking, and stillness of the head after headshaking.
• Overall Recommendations: The HSN test is a brief test that can be added to a clinicians testing battery, however should not be used as a stand alone test; there is higher likelihood of vestibular dysfunction when both the HSN test and Head Impulse Test are both abnormal.</td></tr>
<tr><td>Entry-Level Criteria</td><td></td><td colspan="2">Students should learn to administer tool</td><td colspan="2">Students should be exposed to tool (e.g. to read literature)</td><td>Comments</td></tr>
<tr><td rowspan="2">Should this tool be required for entry level curricula?</td><td></td><td>YES</td><td>NO</td><td>YES</td><td>NO</td><td rowspan="2">- Students would benefit from learning about vestibular testing battery, however use of this measure may require advanced training to ensure appropriate administration and valid interpretation of findings.</td></tr>
<tr><td></td><td></td><td>x</td><td>x</td><td></td></tr>
<tr><td>Research Use</td><td></td><td colspan="2">YES</td><td colspan="2">NO</td><td>Comments</td></tr>
<tr><td>Is this tool appropriate for use in intervention research studies?</td><td></td><td colspan="2"></td><td colspan="2">x</td><td></td></tr>
<tr><td>Is there a need for additional research on this measure? If so, where are the gaps?</td><td></td><td colspan="2">x</td><td colspan="2"></td><td>Key research gaps include:

-Absence of studies to establish clinical utility; most studies looked at scleral search coil or ENG, while clinicians commonly use Frenzel glasses or infrared lenses.

-Absence of studies to establish reliability</td></tr>
</table>

Alternate outcome measures for consideration to assess like constructs	**Link**
1. Head Impulse Test	***To be established***
2. Dynamic Visual Acuity (Active/ Passive)	***To be established***
3. Dynamic Visual Acuity (non-instrumented)	***To be established***
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).	

References

Asawavichianda S, Fujimoto M, Mai M, Rutka J. Prevalence of head-shaking nystagmus in patients according to their diagnosis classification in a dizziness unit. *Acta Otolaryngol.* 1997; 26(1). 20-25. Find it on PubMed

Asawavichiangianda S, Fujimoto M, Mai M, Desroches H, Rutka J. Significance of head-shaking nystagmus in the evaluation of the dizzy patient. *Acta Otolaryngol Suppl.* 1999;540:27-33. Find it on PubMed

Burgio DL, Blakely BW, Myers SF. An evaluation of the head-shaking nystagmus test. *Otolaryngol Head Neck Surg.* 1991;105:708–13. Find it on PubMed

Fujimoto M, Rutka J, Mai M. A study into the phenomenon of head-shaking nystagmus: its presence in a dizzy population. *Am J Otol.* 1993; 22(5):376-379. Find it on PubMed

Goebel JA, Garcia P. Prevalence of post-headshake nystagmus in patients with caloric deficits and vertigo. *Otolaryngol Head Neck Surg.* 1992;106:121–7. Find it on PubMed

Hain TC, Fetter M, Zee DS. Head-shaking nystagmus in patients with unilateral peripheral vestibular lesions. *Am J Otolaryngol.* 1987 Jan-Feb;8(1):36-47. Find it on PubMed

Hall SF, Laird ME. Is head-shaking nystagmus a sign of vestibular dysfunction? *J Otolaryngal*. 1992; s21(3):209-212. Find it on PubMed.

Harvey SA, Wood DJ, Feroah TR. Relationship of the head impulse test and head-shake nystagmus in reference to caloric testing. *Am J Otol.* 1997; 18:207–13. Find it on PubMed

Jacobson G, Newman C, Safadi I. Sensitivity and specificity of the head-shaking test for detecting vestibular system abnormalities. *Ann Otol Rhinol Laryngol*. 1990:99:539-542. Find it on PubMed.

Kamei T. Two types of head-shaking tests in vestibular examination. *Acta Otolaryngol Suppl.*

1988;458:108-12. Find it on PubMed

Takahashi S,Fetter M,Koenig E,et al. The clinical significance of head-shaking nystagmus in the dizzy patient. *Acta Otolaryngol.* 1990;109:8–14. Find it on PubMed

Tseng HZ, Chao WY. Head-shaking nystagmus: a sensitive indicator of vestibular dysfunction. *Clin Otolaryngol.* 1997;22:549-552. Find it on PubMed

Vincini C, Casani A, Ghilardi P. Assessment of head shaking test in neuro-otological practice. *ORL J Otorhinolaryngol Relat Spec*. 1989;51:8-13. Find it on PubMed

Wei D, Hain TC, Proctor LR. Head shaking nystagmus: associations with canal paresis and hearing loss. *Acta Otolaryngol.* 1989;108:362–7. Find it on PubMed

Vestibular Edge Outcome Measures Taskforce

Instrument name: Cervical Joint Position Error Test	
Primary Reviewer: Jennifer L. Stoskus PT, MSPT, DPT **Secondary Reviewer: Matthew R Scherer PT, PhD, NCS**	**Date of review: 12 NOV 2013**
ICF domain (check all that apply): __x__ Body function/structure _____ Activity _____ Participation	

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x_Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: Vestibular system balance/imbalance ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	4	3	2	1	N/A*	Comments
Acute= 0-6 Weeks			X			
Chronic = > 6 Weeks			X			
Overall Comments:	Most studies look at whiplash associated disorders with and without dizziness and with chronic neck pain, however it is reasonable to recommend this test after an acute neck injury (as cleared by the physician)					

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction					X	
II-Central Dysfunction					X	
III-BPPV					X	
IV-Other			X			Measure may be useful in those with cervicogenic dizziness, with

						neck pain, or with postural abnormality
*Not applicable: Outcome measure not related to specified Diagnostic Categories						
Overall Comments:		• The cervical JPET assesses one's ability to relocate the head back to center after maximal or submaximal rotation in the transverse and sagittal planes. • Strong connections have been demonstrated between the cervical dorsal roots and the vestibular nuclei with the neck receptors (such as proprioceptors and joint receptors) playing a role in eye-hand coordination, perception of balance, and postural adjustments (Wrisley et al 2000). • Evidence of redistribution of activity between neck muscles during cervical rotation and increased interaction between eye and neck muscle activity exists in people with WAD (Bexander 2012); however the precise mechanism for cervicogenic dizziness and the possible role of the Cervico-ocular reflex in human subjects is not yet definitive. • Common clinical practice uses a laser beam fixed to a helmet or headband and a target that is able to be mobile. Common targets are 40 cm in diameter with concentric circles in 1 cm increments, divided into 4 quadrants intersecting at the zero. Research commonly utilizes highly technical devices such as 3 dimensional electromagnetic or ultrasound. • The cervical JPET can be assessed on return from all active cervical movements or to pre-set targets; this test may reproduce dizziness or unsteadiness with the task. A computerized method is currently being developed for use in the clinical setting. (Kristjansson and Treleaven, 2009). • The cervical JPET has limited psychometric utility, however, may be useful to add to a battery of tests in order to identify the impact of cervicocephalic kinesthesia in patients.				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
			X		X	

Research Use		YES	NO	Comments
Is this tool appropriate for use in intervention research studies?		X		Revel et al, 1994 demonstrated improvement in JPET after a cervical proprioceptive program in patients with neck pain.
Is there a need for additional research on this measure? If so, where are the gaps?		X		Limited studies in those with dizziness, no studies to date testing those with vestibular loss. Many studies lack consistency in instrumentation and methods.
Alternate outcome measures for consideration to assess like constructs			**Link**	
1. Seated Cervical Rotation Test (SCRT)				
2.				
3.				
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).				

References

Bexander CS, Hodges PW. Cervico-ocular coordination during neck rotation is distorted in people with whiplash-associated disorders. Exp Brain Res. 2012 Mar;217(1):67-77.

Heikkila H, Astrom P-G. Cervicocephalic kinesthetic sensibility in patients with whiplash injury. *Scan J Rehab Med*. 1996;28:133-138.

Heikkila HV, Wenngren B-I. Cervicocephalic kinesthetic sensibility, active range of cervical motion, and oculomotor function in patients with whiplash injury. *Arch Phys Med Rehabil*. 1998;79:1089-94.

Kristjansson E, Dall'alba P, Jull G. Cervicocephalic kinaesthesia: reliability of a new test approach. *Physiotherapy Research International*. 2001;6(4):224-235.

Kristjansson E, Treleaven J. Dizziness in neck pain: implications for assessment and management. *J Orthop Sports Phys Ther*. 2009;39(5):364-377.

Lee HY, Ten CC, Chai HM, Wang SF. Test-retest reliability of Cervicocephalic kinesthetic sensibility in three cardinal planes. *Manual Therapy*. 2006;11:61-68.

Loudon JK, Ruhl M, Field E. Ability to reproduce head position after whiplash injury. *Spine*. 1997;22:865-868.

Revel M, Minguet M, Gergoy P, Vaillant J, Manual JL. Cervicocephalic kinesthetic sensibility in patients with cervical pain. *Arch Phys Med Rehabil*. 1991;72:288-91.

Revel M, Andre-Deshays C, Minguet M. Changes in cervicocephalic kinesthetia after a proprioceptive rehabilitation program in patients with neck pain: a randomized controlled study. *Arch Phys Med Rehabil*. 1994;75:895-99.

Sterling M, Jull G, Vicenzino B, Kenardy K, Darnell R. Development of motor system dysfunction following whiplash injury. *Pain.* 2003;103:65-73.

Strimpakos N, Sakellari V, Gioftsos G, Kapreli E, Oldham J. Cervical joint position sense: an intra- and inter-examiner reliability study. *Gait and Posture*. 2006;12:22-31.

Treleaven J, Jull G, Sterling M. Dizziness and unsteadiness following whiplash injury: characteristic features and relationship with cervical joint position error. *J Rehabil Med.* 2003;35:36-43.

Tseng CC, Chai H, Lai DM, Wang SF. Cervicocephalic kinesthetic sensibility in young and middle-aged adults with or without a history of mild neck pain. *Manual Therapy*. 2007;12:22-28.

Wrisley DM, Sparto PJ, Whitney SL, Furman JM. Cervicogenic Dizziness: A Review of Diagnosis and Treatment. Journal of Orthopaedic & Sports Physical Therapy. 2000; 30(12) :755-766

Vestibular Edge Outcome Measures Taskforce

Instrument name: Motion Sensitivity Test/Quotient	
Reviewer: Jennifer Fay, PT, DPT, NCS and Tracy Rice, PT, MPH, NCS	**Date of review: May 14, 2013**

ICF domain (check all that apply):

__x___ Body function/structure __x___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x_Somatosensation _x_Spatial Orientation _x_Vertigo ___ VOR/ Gaze stability ___Other: Mental health _x_Other: Autonomic symptoms	___Balance/falls ___Gait (include stairs) __x_ High Level Mobility __x_ Transfers __x_Other: bed mobility	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			**x**		
Chronic = > 6 Weeks			**x**		
Overall Comments:	Measure has been tested in patients with motion provoked dizziness during routine movements associated with daily living. Measure has excellent reliability data.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			**x**			
II-Central Dysfunction			**x**			
III-BPPV			**x**			
IV-Other			**x**			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:						

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
			x	x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				
Is there a need for additional research on this measure? If so, where are the gaps?		x				There should be more research validating this measure with specific populations (i.e central vestibular dysfunction). The authors do not specify what the origin of the subjects' motion provoked dizziness.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.						
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Akin F, Davenport MJ. Validity and reliability of the Motion Sensitivity Test. *Journal of Rehabilitation Research and Development* 2003; 40: 415-422.

Smith-Wheelock M, Shephard NT, Telian SA. Physical therapy program for vestibular rehabilitation. Am J Otology 1991;12:218-25.

Sharon, J. D., & Hullar, T. E. (2013). Motion sensitivity and caloric responsiveness in vestibular migraine and meniere's disease. *The Laryngoscope*.

Norre, M. E., & Beckers, A. M. (1988). Vestibular habituation training: specificity of adequate exercise. *Archives of Otolaryngology—Head & Neck Surgery*, *114*(8), 883.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Seated Cervical Rotation Test	
Reviewer: Jennifer L. Stoskus, PT, MSPT, DPT **Matthew R. Scherer PT, PhD, NCS**	**Date of review: 12 NOV 2013**
ICF domain (check all that apply): __x__ Body function/structure _____ Activity _____ Participation	

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x_Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: __x_Other: neck pain	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks				**x**	In persons with Whiplash Associated Dizziness (WAD)
Chronic = > 6 Weeks				**x**	
Overall Comments:					

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction					**x**	
II-Central Dysfunction					**x**	
III-BPPV					**x**	
IV-Other				**x**		**This test has only been studied in those with cervical trauma/whiplash associated**

						disorders
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		• In general, this test is inadequately described in the available literature leaving the examiner without specific guidance on how the test ought to be administered. • This assessment lacks an objective outcome with which to determine if the test is "positive" or "negative" relying only on an ill-defined report of patient symptoms (i.e., vertigo) to document test findings. • Test interpretation is further confounded by the possibility that a symptomatic patient may elicit symptoms during the first phase of the assessment (Part 1) with vigorous head shaking making it difficult to distinguish between vestibular dizziness and dizziness of a cervicogenic etiology. • Though no psychometrics are available due to the absence of a gold standard with which to confirm a diagnosis of cervicogenic dizziness, this procedure will yield poor specificity for reasons stated above limiting its utility as a diagnostic test.				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
			x		x	

Research Use		**YES**	**NO**	**Comments**
Is this tool appropriate for use in intervention research studies?			x	Limited research on this test. [1,]
Is there a need for additional research on this measure? If so, where are the gaps?		x		Limited research on this test. [1,]

Alternate outcome measures for consideration to assess like constructs	**Link**

1. JPET	Link TBD
2.	
3.	
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).	

References:

1. Fitz-Ritson D. Assessment of Cervicogenic Vertigo. *J Manipulative Physiol Ther.* 1991;14(3)193-198.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Subjective Visual Vertical Test (Bucket Test)	
Reviewer: Jennifer L. Stoskus, PT, MSPT, DPT **Matthew R Scherer PT, PhD, NCS**	**Date of review: 12 NOV 2013**

ICF domain (check all that apply):

___x__ Body function/structure _____ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
__Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation _x_ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: ___Other:	____Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:				
	Recommendation Categories				
Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks			**x**		SVV likely to be most sensitive to peripheral dysfunction in acute phase.
Chronic = > 6 Weeks				**x**	SVV deficits typically improve in persons with ***peripheral dysfunction*** within 2-6 weeks making SVV a poor diagnostic test choice in this patient group (Kim et al 2008). ***Severe* central deficits** may persist weeks post insult however perception of verticality does improve significantly within 2-4

					weeks for most patients making SVV a weaker assessment choice for patients with chronic symptoms (Dietrich and Brandt 1993)
Overall Comments:	A person's subjective visual vertical is most pronounced or abnormal when tested in the acute phase of diagnosis (Kim et al 2008)				

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction			**x**			**Diagnostically most useful < 10 days post insult.**
II-Central Dysfunction			**x**			**Good evidence for use in patients with brainstem infarctions, (i.e., Wallenberg syndrome)**
III-BPPV			**x**			**Research is not conclusive. If SVV is abnormal, it will be toward the side of canalithiasis, may reverse in some patients immediately following a repositioning maneuver, and may resolve within one week after resolution of symptoms.**
IV-Other				**x**		**Cervicogenic headache/dizziness, single study- no reproducible evidence for diagnostic utility**

*Not applicable: Outcome measure not related to Diagnostic Categories

Overall Comments:		Most abnormalities in SVV are seen in those with acute central lesions and dramatic vestibular tone imbalance.

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
			x		x	
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				x		SVV may be useful for characterizing spatial orientation deficits however it lacks Sn for

				diagnostic purposes (Cohen et al 2012)
Is there a need for additional research on this measure? If so, where are the gaps?		x		Zwergal, et al (2009) tested the reliability of using the bucket method. This is a quick and reliable test that can be performed in the clinic. More clinical research on this test would be beneficial to clinicians working in acute care or ER settings.
Alternate outcome measures for consideration to assess like constructs			**Link**	
1.				
2.				
3.				
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).				

References:

Bohmer A, Rickenmann J. The subjective visual vertical as a clinical parameter of vestibular function in peripheral vestibular diseases. Journal of vestibular research. 1994;5(1):35-45.

Brandt Th, Dieterich M, Danek A. Vestibular cortex lesions affect the perception of verticality. Ann Neurol. 1994;35:403-412.

Cohen HS, Sangi-Haghpeykar H. Subjective visual vertical in vestibular disorders measures with the bucket test. Acta Oto-Laryngologica. 2012; 132:850-854.

Dieterich M, Brandt T. Wallenberg's syndrome: lateropulsion, cyclorotation, and subjective visual vertical in thirty-six patients. Ann Neurol. 1992;31:399-408.

Dieterich M, Brandt T. Ocular torsion and tilt of subjective visual vertical are sensitive brainstem signs. Ann Neurol. 1993;33:292-299.

Dieterich M, Pollmann W, Pfaffenrath V. Cervicogenic headache: electronystagmography, perception of verticality and posturography in patients before and after C2-blockade. Cephalgia. 1993;13:285-288.

Faralli, et al. Subjective visual vertical before and after treatment of a BPPV episode. Auris Nasus Larynx. 2011;38:307-311.

Friedmann G. The influence of unilateral labyrinthectomy on orientation in space. Acta Otolaryng. 1971;71:289-298.

Gomez Garcia A, Jaurgui-Renaud K. Subjective assessment of visual verticality in follow-up of patients with acute vestibular disease. ENT J. 2003; 442-446.

Kim H-A, et al. Otolith dysfunction in vestibular neuritis: recovery pattern and a predictor of symptom recovery. Neurology. 2008;70:449-453.

Zwergal A, et al. A bucket of static vestibular function. Neurology. 2009;72:1689-1692.

Vestibular Edge Outcome Measures Taskforce

Instrument name: The University of California Los Angeles Dizziness Questionnaire (UCLA-DQ)	
Reviewer: Tracy Rice, PT, MPH, NCS; Jennifer Fay, PT, DPT, NCS	**Date of review:** 5-17-13
ICF domain (check all that apply): ____X_ Body function/structure __X___ Activity __X___ Participation	

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
_X_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability __X_Other: Fear ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers _X_Other: ADL's	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities _X_Life satisfaction _X_Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary: link to original article containing measure
	Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			**X**		
Chronic = > 6 Weeks			**X**		
Overall Comments:					

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			**X**			
II-Central Dysfunction			**X**			
III-BPPV			**X**			
IV-Other			**X**			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Recommended for use by clinicians to gain insight into the contributions of dizziness and its impact on frequency, severity, fear, activities of daily living and quality of life. The self report subjective questionnaire is quickly				

		administered making it a good tool for obtaining information on the patient's perception of dizziness and its impacts. The tool is difficult to obtain and currently is accessed through the original article of reference. While the tool is free, there is limited psychometric information including test-retest reliability and normative data.				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
			X	X		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		X				
Is there a need for additional research on this measure? If so, where are the gaps?		X				Additional research required to establish cut-off scores and normative data

Alternate outcome measures for consideration to assess like constructs	**Link**
1.Vestibular Handicap Questionnaire (VHQ)	Yardley, L., & Putman, J. (1992). Quantitative analysis of factors contributing to handicap and distress in vertiginous patients: a questionnaire study. *Clinical Otolaryngology & Allied Sciences*, *17*(3), 231-236
2.VRBQ	http://www.isvr.soton.ac.uk/audiology/vrbq.htm
3.DHI	Jacobson, G. P. and Newman, C. W. (1990). "The development of the Dizziness Handicap Inventory." Archives of Otolaryngology - Head and Neck Surgery 116(4): 424-427.
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).	

References

Bamiou, D. E., Davies, R. A., McKee, M., & Luxon, L. M. (1999). The effect of severity of unilateral vestibular dysfunction on symptoms, disabilities αvδ handicap in vertiginous patients. *Clinical Otolaryngology & Allied Sciences*, *24*(1), 31-38.

Bamiou, D. E., Davies, R. A., McKee, M., & Luxon, L. M. (2000). Symptoms, disability and handicap in unilateral peripheral vestibular disorders: Effects of early presentation and initiation of balance exercises. *Scandinavian audiology*, *29*(4), 238-244.

Coelho, D. H., Roland, J. T., Rush, S. A., Narayana, A., Clair, E. S., Chung, W., & Golfinos, J. G. (2008). Small vestibular schwannomas with no hearing: comparison of functional outcomes in stereotactic radiosurgery and microsurgery. *The Laryngoscope*, *118*(11), 1909-1916.

Duracinsky, M., Mosnier, I., Bouccara, D., Sterkers, O., & Chassany, O. (2007). Literature review of questionnaires assessing vertigo and dizziness, and their impact on patients' quality of life. *Value in health*, *10*(4), 273-284.

Honrubia, V., Bell, T. S., Harris, M. R., Baloh, R. W., & Fisher, L. M. (1996). Quantitative evaluation of dizziness characteristics and impact on quality of life. *Otology & Neurotology*, *17*(4), 595-602.

Kammerlind, A. S., Bergquist Larsson, P., Ledin, T., & Skargren, E. (2005). Reliability of clinical balance tests and subjective ratings in dizziness and disequilibrium. *Advances in Physiotherapy*, *7*(3), 96-107.

Kammerlind, A. S. C., Ledin, T. E., Ödkvist, L. M., & Skargren, E. I. (2011). Recovery after acute unilateral vestibular loss and predictors for remaining symptoms. *American journal of otolaryngology*, *32*(5), 366-375.

Kammerlind, A. S. C., Ledin, T. E., Skargren, E. I., & Ödkvist, L. M. (2005). Long-term follow-up after acute unilateral vestibular loss and comparison between subjects with and without remaining symptoms. *Acta oto-laryngologica*, *125*(9), 946-953.

Lynn, S. G., Driscoll, C. L., Harner, S. G., Beatty, C. W., & Atkinson, E. J. (1999). Assessment of dysequilibrium after acoustic neuroma removal. *Otology & Neurotology*, *20*(4), 484-494.

Maskell, F., Chiarelli, P., & Isles, R. (2006). Dizziness after traumatic brain injury: overview and measurement in the clinical setting. *Brain Injury*, *20*(3), 293-305.

Monzani, D., Casolari, L., Guidetti, G., & Rigatelli, M. (2001). Psychological distress and disability in patients with vertigo. *Journal of psychosomatic research*, *50*(6), 319-323.

Perez, Itziar Garmendia, Marta García-Granero, Eduardo Martin, Rafael García-Tapia, N. (2001). Factor analysis and correlation between Dizziness Handicap Inventory and Dizziness Characteristics and Impact on Quality of Life scales. *Acta oto-laryngologica*, *121*(545), 145-154.

Pérez, N., Martin, E., & Garcia-Tapia, R. (2003). Dizziness: relating the severity of vertigo to the degree of handicap by measuring vestibular impairment. *Otolaryngology--Head and Neck Surgery*, *128*(3), 372-381

Vestibular Edge Outcome Measures Taskforce

Instrument name: Visual Analog Scale (Head Movement VAS, Perceived Visual Blurring VAS oVAS, Perceived Dysequilibrium VAS dVAS, Visual Analog Scale vertigo/dizziness)	
Reviewer: Jennifer Fay, PT, DPT, NCS and Tracy Rice, PT, MPH, NCS	**Date of review: April 17, 2012**
ICF domain (check all that apply): __x___ Body function/structure __x___ Activity _____ Participation	

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x_Somatosensation ___ Spatial Orientation _x_Vertigo ___ VOR/ Gaze stability _x_Other: Mental health _x_Other: Autonomic symptoms	_x_Balance/falls _x_Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			**x**		
Chronic = > 6 Weeks			**x**		
Overall Comments:	Measure has been tested in patients with vestibular diagnosis although does not specify level of acuity or type of vestibular dysfunction. Measure has not been validated				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			**x**			
II-Central Dysfunction			**x**			**Has not been validated for central dysfunction.**
III-BPPV			**x**			
IV-Other			**x**			

*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:						
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				
Is there a need for additional research on this measure? If so, where are the gaps?		x				There need to be more research studies validating the measure against other measures of symptom severity. There is only reliability data that has been published.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.						
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Hall, CD. Herdman, SJ. Reliability of Clinical Measures Used to Assess Patients with Peripheral Vestibular Disorders. *J Neurol Phys Ther* 2006;30: 74-81

Herdman SJ, Hall CD, et al. Recovery of Dynamic Visual Acuity in Bilateral Vestibular Hypofunction.*Arch Otolaryngol Head Neck Surg* 2007;133: 383-389.

Toupet M, Ferrary E, Bozorg Grayeli A. Visual analog scale to assess vertigo and dizziness after repositioning maneuvers for benign paroxysmal positional vertigo. *J Vestib Research* 2001;21: 235-241.

Herdman, S. J., Schubert, M. C., Das, V. E., & Tusa, R. J. (2003). Recovery of dynamic visual acuity in unilateral vestibular hypofunction. *Archives of Otolaryngology—Head & Neck Surgery*, *129*(8), 819-824.

Vestibular Edge Outcome Measures Taskforce

Instrument name: The Vestibular Handicap Questionnaire (VHQ)	
Reviewer: Tracy Rice, PT, MPH, NCS; Jennifer Fay, PT, DPT, NCS	**Date of review:** 5-17-13

ICF domain (check all that apply):

____X_ Body function/structure __X___ Activity __X___ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation _X_ Vertigo ___ VOR/ Gaze stability _X_Other: Fear ___Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers _X_Other: ADL's	___Community function ___Driving ___Health and wellness ___Home management _X_Leisure/Recreational activities _X_Life satisfaction _X_Quality of life ___Role function ___Shopping _X_Social function ___Work ___Other:

	Link to rehabmeasures.org summary: link to original article containing measure
	Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			**X**		
Chronic = > 6 Weeks			**X**		
Overall Comments:					

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			**X**			
II-Central Dysfunction			**X**			
III-BPPV			**X**			
IV-Other			**X**			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Recommended for use by clinicians to gain insight into the contributions of vertigo and its impact on severity, fear, restriction of activity, social anxieties and overall quality of life. The self report				

		subjective questionnaire is quickly administered making it a good tool for obtaining information on the patient's perception of vertigo and its impacts. The tool is difficult to obtain and currently is accessed through the original article of reference. The author of the tool recommends its use for assessment of patient-perceived handicap and benefits following therapeutic interventions. Has been stated that the VHQ is a clinically relevant questionnaire ofr assessing the impact of vertigo on quality of life, however, the psychometric properties need to be confirmed with larger sample sizes (Duracinsky et al., 2007).				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
			X	X		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		X				
Is there a need for additional research on this measure? If so, where are the gaps?		X				Additional research required to establish cut-off scores and normative data
Alternate outcome measures for consideration to assess like constructs				**Link**		
1. The University of California Los Angeles Dizziness Questionnaire (UCLA-DQ)				Honrubia, V., Bell, T. S., Harris, M. R., Baloh, R. W., & Fisher, L. M. (1996). Quantitative evaluation of dizziness characteristics and impact on quality of life. *Otology & Neurotology*, *17*(4), 595-602		
2. German Version				Tschan, R., Wiltink, J., Best, C., Beutel, M., Dieterich, M., & Eckhardt-Henn, A. (2010). Validation of the German version of the Vertigo		

	Handicap Questionnaire (VHQ) in patients with vestibular vertigo syndromes or somatoform vertigo and dizziness. *Psychotherapie, Psychosomatik, medizinische Psychologie*, *60*(09/10), e1-e12.
3. DHI	Jacobson, G. P. and Newman, C. W. (1990). "The development of the Dizziness Handicap Inventory." Archives of Otolaryngology - Head and Neck Surgery 116(4): 424-427.
4. VRBQ	http://www.isvr.soton.ac.uk/audiology/vrbq.htm
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).	

References

Alghwiri, A. A., Marchetti, G. F., Whitney, S.L. (2011). Content comparison of self-report measures used in vestibular rehabilitation based on the International Classification of Functioning, Disability and Health. *Physical Therapy 91(3*), 346-357.

Best, C., Tschan, R., Eckhardt-Henn, A., & Dieterich, M. (2009). Who is at risk for ongoing dizziness and psychological strain after a vestibular disorder?. *Neuroscience*, *164*(4), 1579-1587.

Cohen, H. S., & Kimball, K. T. (2003). Increased independence and decreased vertigo after vestibular rehabilitation. *Otolaryngology--Head and Neck Surgery*, *128*(1), 60-70.

Cohen, H. S. (2011). Assessment of functional outcomes in patients with vestibular disorders after rehabilitation. *NeuroRehabilitation 29(2)*, 173-178.

Duracinsky, M., Mosnier, I., Bouccara, D., Sterkers, O., & Chassany, O. (2007). Literature review of questionnaires assessing vertigo and dizziness, and their impact on patients' quality of life. *Value in health*, *10*(4), 273-284.

Hillier, S. L., & McDonnell, M. (2011). Vestibular rehabilitation for unilateral peripheral vestibular dysfunction. *Cochrane Database Syst Rev*, *2*.

Holmberg, J., Karlberg, M., Harlacher, U., & Magnusson, M. (2005). Experience of handicap and anxiety in phobic postural vertigo. *Acta oto-laryngologica*, *125*(3), 270-275.

Holmberg, J., Karlberg, M., Harlacher, U., & Magnusson, M. (2007). One-year follow-up of cognitive behavioral therapy for phobic postural vertigo. *Journal of neurology*, *254*(9), 1189-1192.

Holmberg, J., Karlberg, M., Harlacher, U., Rivano-Fischer, M., & Magnusson, M. (2006). Treatment of phobic postural vertigo. *J Neurol*, *253*, 500-506.

Maskell, F., Chiarelli, P., & Isles, R. (2006). Dizziness after traumatic brain injury: overview and measurement in the clinical setting. *Brain Injury*, *20*(3), 293-305.

Mendel, B., Bergenius, J., & Langius, A. (1999). Dizziness symptom severity and impact on daily living as perceived by patients suffering from peripheral vestibular disorder. *Clinical Otolaryngology & Allied Sciences*, *24*(4), 286-293.

Morris, A.E., Lutman, M.E., & Yardley, L. (2008). Measuring outcome from vestibular rehabilitation, part 1: qualitative development of a new self-report measure. *International Journal of Audiology, 47,* 169-177.

Tschan, R., Wiltink, J., Best, C., Beutel, M., Dieterich, M., & Eckhardt-Henn, A. (2010). Validation of the German version of the Vertigo Handicap Questionnaire (VHQ) in patients with vestibular vertigo syndromes or somatoform vertigo and dizziness. *Psychotherapie, Psychosomatik, medizinische Psychologie*, *60*(09/10), e1-e12.

Yardley, L. (1994). Prediction of handicap and emotional distress in patients with recurrent vertigo: symptoms, coping strategies, control beliefs and reciprocal causation. *Social science & medicine*, *39*(4), 573-581.

Yardley, L., Beech, S., & Weinman, J. (2001). Influence of beliefs about the consequences of dizziness on handicap in people with dizziness, and the effect of therapy on beliefs. *Journal of psychosomatic research*, *50*(1), 1-6.

Yardley, L., Luxon, L. M., & Haacke, N. P. (1994). A longitudinal study of symptoms, anxiety and subjective well-being in patients with vertigo. *Clinical Otolaryngology & Allied Sciences*, *19*(2), 109-116.

Yardley, L., & Putman, J. (1992). Quantitative analysis of factors contributing to handicap and distress in vertiginous patients: a questionnaire study. *Clinical Otolaryngology & Allied Sciences*, *17*(3), 231-236.

Yardley, L., Verschuur, C., Masson, E., Luxon, L., & Haacke, N. (1992). Somatic and psychological factors contributing to handicap in people with vertigo. *British journal of audiology*, *26*(5), 283-290.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Vestibular Rehabilitation Questionnaire (VRBQ)	
Reviewer: Tracy Rice, PT, MPH, NCS; Jennifer Fay, PT, DPT, NCS	**Date of review:** 2-17-13

ICF domain (check all that apply):

____X_ Body function/structure __X___ Activity __X___ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
_X_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability _X_Other: Anxiety _X_Other: motion sensitivity	_X_Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers _X_Other: ADL's	_X_Community function _X_Driving ___Health and wellness ___Home management ___Leisure/Recreational activities _X_Life satisfaction _X_Quality of life ___Role function ___Shopping _X_Social function ___Work ___Other:

	Link to rehabmeasures.org summary: yes
	Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			**X**		
Chronic = > 6 Weeks			**X**		
Overall Comments:					

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			**X**			
II-Central Dysfunction			**X**			
III-BPPV			**X**			
IV-Other			**X**			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		The tool can be utilized with any adult undergoing vestibular rehabilitation. Recommended for use by clinicians to gain insight into the contributions of dizziness and its impact different aspects of				

		the rehabilitation process. It is a multidimensional measure of symptoms related to dizziness and the disabilities and handicaps associated with dizziness. It is a valid, reliable and responsive tool for guiding clinicians in the management and assessing outcome in those individuals undergoing vestibular rehabilitation. The tool was validated against the DHI, VSS-sf, and the SF-36 The tool is responsive to change.				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
			X	X		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		X				
Is there a need for additional research on this measure? If so, where are the gaps?		X				Additional research required to establish cut-off scores and normative data
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.VHQ				Yardley, L., & Putman, J. (1992). Quantitative analysis of factors contributing to handicap and distress in vertiginous patients: a questionnaire study. *Clinical Otolaryngology & Allied Sciences*, *17*(3), 231-236.		
2.DHI						
3.VSS; VSS-sf						
4.SF-36						

Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).

References

Alghwiri, A. A., Marchetti, G. F., Whitney, S.L. (2011). Content comparison of self-report measures used in vestibular rehabilitation based on the International Classification of Functioning, Disability and Health. *Physical Therapy 91(3*), 346-357.

Cohen, H. S. (2011). Assessment of functional outcomes in patients with vestibular disorders after rehabilitation. *NeuroRehabilitation 29(2)*, 173-178.

Meldrum, D., Herdman, S., Moloney, R., Murray, D., Duffy, D., Malone, K., McConn-Walsh, R. (2012). Effectiveness of conventional versus virtual reality based vestibular rehabilitation in the treatment of dizziness, gait and balance impairment in adults with unilateral peripheral vestibular loss: a randomised controlled trial. *BMC Ear, Nose and Throat Disorders 12(30.*

Morris, A.E., Lutman, M.E., & Yardley, L. (2008). Measuring outcome from vestibular rehabilitation, part 1: qualitative development of a new self-report measure. *International Journal of Audiology, 47,* 169-177.

Morris, A. E., Lutman, M. E., Yardley, L. (2009). Measuring outcome from vestibular rehabilitation, part II: refinement and validation of a new self-report measure. *Int J Audiol 48(1)*, 24-37.

Vestibular Edge Outcome Measures Taskforce

Instrument name: SOT – secondary review	
Reviewer: Diane Wrisley, PhD, PT, NCS, Elizabeth Dannenbaum MscPT	**Date of review: 6/18/13**

ICF domain (check all that apply):

__X___ Body function/structure __X ___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks _X__Muscle performance _X__Sensory integration _X__Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: _X__Other: Vestibulospinal Reflex	_X__Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ _Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			X		
Chronic = > 6 Weeks			X		
Overall Comments:	Minimal research on psychometrics of the test, more performed in healthy controls, only 1 study with people with vestibular dysfunction. Reliability not established in people with vestibular dysfunction. Cost may be prohibitive for many clinicians				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			X			
II-Central Dysfunction			X			
III-BPPV			X			
IV-Other			X			Otolith dysfunction
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Only tested in people with vestibular neuritis				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
			x	X		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		X				More information is needed on psychometrics in patient populations. Reliability is only moderate.
Is there a need for additional research on this measure? If so, where are the gaps?		X				Reliability and validity in persons with vestibular dysfunction
Alternate outcome measures for consideration to assess like constructs				**Link**		
1. Head Shake Sensory Organization test						
2. Clinical Test of Sensory Interaction on Balance						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Basta D, Todt I, Scherer H, Clarke A, Ernst A. Postural control in otolith disorders. Hum Mov Sci. 2005 Apr;24(2):268-79.

Basta D, Clarke A, Ernst A, Todt I. Stance performance under different sensorimotor conditions in patients with post-traumatic otolith disorders. J Vestib Res. 2007;17(1):25-31.

Cohen H, Heaton LG, Congdon SL, Jenkins HA. Changes in sensory organization test scores with age. Age Ageing. 1996 Jan;25(1):39-44.

Cohen HS, Kimball KT. Usefulness of some current balance tests for identifying individuals with disequilibrium due to vestibular impairments. J Vestib Res. 2008;18(5-6):295-303.

Di Fabio RP.Sensitivity and specificity of platform posturography for identifying patients with vestibular dysfunction.Review.Phys Ther. 1995 Apr;75(4):290-305.

Ford-Smith CD, Wyman JF, Elswick RK Jr, Fernandez T, Newton RA. Test-retest reliability of the sensory organization test in noninstitutionalized older adults. Arch Phys Med Rehabil. 1995 Jan;76(1):77-81.

Gill-Body KM, Beninato M, Krebs DE. Relationship among balance impairments, functional performance, and disability in people with peripheral vestibular hypofunction . Phys Ther. 2000 Aug;80(8):748-58.

Gill-Body KM, Beninato M, Krebs DE.Phys Ther. 2000 Aug;80(8):748-58.Relationship among balance impairments, functional performance, and disability in people with peripheral vestibular hypofunction.

Pedalini ME, Cruz OL, Bittar RS, Lorenzi MC, Grasel SS. Sensory organization test in elderly patients with and without vestibular dysfunction Acta Otolaryngol. 2009 Sep;129(9):962-5. doi: 10.1080/00016480802468930.

Whitney SL, Marchetti GF, Schade AI. The relationship between falls history and computerized dynamic posturography in persons with balance and vestibular disorders. Arch Phys Med Rehabil. 2006 Mar;87(3):402-7.

Wrisley DM, Stephens MJ, Mosley S, Wojnowski A, Duffy J, Burkard R. Learning effects of repetitive administrations of the sensory organization test in healthy young adults. Arch Phys Med Rehabil. 2007 Aug;88(8):1049-54.,

Vestibular Edge Outcome Measures Taskforce

Instrument name: Sharpened Romberg Test - secondary review	
Reviewer: Diane Wrisley, PhD, PT, NCS, Elizabeth Dannenbaum MScPT.	**Date of review: 5/22/13**
ICF domain (check all that apply): __X___ Body function/structure __X ___ Activity _____ Participation	

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks _X__Muscle performance _X__Sensory integration _X__Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: _X__Other: Vestibulospinal Reflex	_X__Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			X		
Chronic = > 6 Weeks			X		
Overall Comments:	Reliability established in older females; Fregly and Graybiel found that subjects with unilateral or bilateral hypofunction differed significantly in performance when compared with healthy age matched controls.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			X			
II-Central Dysfunction			X			
III-BPPV			X			
IV-Other			X			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Only tested in persons with unilateral and bilateral vestibular				

		hypofunction				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				X		Although it has been used in multiple studies, there are limited psychometrics to support its use
Is there a need for additional research on this measure? If so, where are the gaps?		X				Reliability in all populations Reliability and validity in persons with vestibular dysfunction
Alternate outcome measures for consideration to assess like constructs				**Link**		
1. Berg Balance Scale						
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Vestibular Edge Outcome Measures Taskforce

Instrument name: Romberg Test	
Reviewer: Diane Wrisley, PhD, PT, NCS, Elizabeth Dannenbaum MScPT	**Date of review: 30/10/13**

ICF domain (check all that apply):

__X___ Body function/structure __X ___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks ___Muscle performance _X__Sensory integration _X__Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: ___Other: Vestibulospinal Reflex	_X__Balance/falls ___Gait (include stairs) ___ High Level Mobility __ _Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks				X	
Chronic = > 6 Weeks				X	
Overall Comments:	Reliability and Validity have not been tested. Evidence does not support that people with vestibular dysfunction have difficulty on the test.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			2			
II-Central Dysfunction			2			
III-BPPV			2			
IV-Other			2			

*Not applicable: Outcome measure not related to Diagnostic Categories

Overall Comments:		Not tested in relation to diagnostic categories

Entry-Level Criteria		Students should learn to administer tool		Students should be exposed to tool (e.g. to read literature)		Comments
Should this tool be required for entry level curricula?		YES	NO	YES	NO	
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				X		Although it has been used in multiple studies there are no psychometrics to support its use
Is there a need for additional research on this measure? If so, where are the gaps?		X				Reliability in all populations Reliability and validity in persons with vestibular dysfunction

Alternate outcome measures for consideration to assess like constructs	Link
1. CTSIB, mCTSIB	
2. Berg Balance Scale	
3.	

Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).

References

Bohannon RW, Larkin PA, Cook AC, Gear J, Singer J. Decrease in timed balance test scores with aging. Phys Ther. 1984;64:1067-1070

Vestibular Edge Outcome Measures Taskforce

Instrument name: Head Shake SOT – secondary review	
Reviewer: Elizabeth Dannenbaum MScPT, Diane Wrisley, PhD, PT, NCS	**Date of review: 30/10/13**

ICF domain (check all that apply):

__X___ Body function/structure __X___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks _X__Muscle performance _X__Sensory integration _X__Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: _X__Other: Vestibulospinal Reflex	_X__Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ _ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			X		
Chronic = > 6 Weeks			X		
Overall Comments:	Minimal research on psychometrics of the test, more performed in healthy controls, only 1 study with people with vestibular dysfunction. Cost may be prohibitive for many clinicians				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			X			
II-Central Dysfunction			X			
III-BPPV			X			
IV-Other			X			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Only tested in people with vestibular neuritis				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	The test is more for specialty practice
			x		x	
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				X		More information is needed on psychometrics in patient populations. Reliability is only moderate.
Is there a need for additional research on this measure? If so, where are the gaps?		X				Reliability and validity in persons with vestibular dysfunction
Alternate outcome measures for consideration to assess like constructs				**Link**		
1. Sensory Organization test						
2. Clinical Test of Sensory Interaction on Balance						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Honaker JA, Converse CM, Shepard NT., Modified head shake computerized dynamic posturography Am J Audiol. 2009:18(2Dec):108-13.

Lim HW, Kim KM, Jun HJ, Chang J, Jung HH, Chae SW.,Correlating the head shake-sensory organizing test with dizziness handicap inventory in compensation after vestibular neuritis.,Otol Neurotol. 2012;33(2 Feb):211-4.

Mishra A, Davis S, Speers R, Shepard NT.,Head shake computerized dynamic posturography in peripheral vestibular lesions.,Am J Audiol. 2009;18(1 Jun):53-9

Pang MY, Lam FM, Wong GH, Au IH, Chow DL.,Balance performance in head-shake computerized dynamic posturography: aging effects and test-retest reliability.,Phys Ther. 2011 Feb;91(2):246-53. doi: 10.2522/ptj.20100221. Epub 2010 Dec 9

Park MK, Lim HW, Cho JG, Choi CJ, Hwang SJ, Chae SW.,Park MK, Lim HW, Cho JG, Choi CJ, Hwang SJ, Chae SW.,Otol Neurotol. 2012 Jan;33(1):67-71.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Unipedal stance – secondary review	
Reviewer: Diane Wrisley, PhD, PT, NCS, Elizabeth Dannenbaum MScPT.	**Date of review: 30/10/2013**
ICF domain (check all that apply): __X___ Body function/structure __X___ Activity _____ Participation	

Construct/s measured (check all that apply):		
Body structure and Function	**Activity**	**Participation**
___Dizziness ___Dual Tasks _X__Muscle performance _X__Sensory integration _X__Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: _X__Other: Vestibulospinal Reflex	_X__Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ _ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			X		
Chronic = > 6 Weeks			X		
Overall Comments:	Minimal research on psychometrics of the test, only 1 study with people with vestibular dysfunction.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			X			
II-Central Dysfunction			X			
III-BPPV			X			
IV-Other			X			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Only tested in people with peripheral vestibular loss				

Entry-Level Criteria		Students should learn to administer tool		Students should be exposed to tool (e.g. to read literature)		Comments
Should this tool be required for entry level curricula?		YES	NO	YES	NO	This test is included in other multi-item tests (i.e. Berg Balance test)
		X		X		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				X		More information is needed on psychometrics in patient populations. Reliability no tested in people with vestibular dysfunction.
Is there a need for additional research on this measure? If so, where are the gaps?		X				Reliability and validity in persons with vestibular dysfunction
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.						
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

El-Kashlan HK, Shepard NT, Asher AM, Smith-Wheelock M, Telian SA. Evaluation of clinical measures of equilibrium. Laryngoscope. 1998 Mar;108(3):311-9.

Franchignoni F, Tesio L, Martino MT, Ricupero C. Reliability of four simple, quantitative tests of balance and mobility in healthy elderly females. Aging (Milano). 1998 Feb;10(1):26-31

Gill-Body KM, Beninato M, Krebs DE. Relationship among balance impairments, functional performance, and disability in people with peripheral vestibular hypofunction. Phys Ther. 2000 Aug;80(8):748-58

Mann GC, Whitney SL, Redfern MS, Borello-France DF, Furman JM. Functional reach and single leg stance in patients with peripheral vestibular disorders. J Vestib Res. 1996 Sep-Oct;6(5):343-53.

Springer BA, Marin R, Cyhan T, Roberts H, Gill NW. Normative values for the unipedal stance test with eyes open and closed. J Geriatr Phys Ther. 2007;30(1):8-15.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Timed Up and Go (TUG)	
Reviewer: Elizabeth Dannenbaum MScPT, Diane Wrisley, PhD, PT, NCS	**Date of review: 30/10/13**
ICF domain (check all that apply): _____ Body function/structure __X_ Activity _____ Participation	

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks ___Muscle performance X__Sensory integration ___Somatosensation X _ Spatial Orientation X__ Vertigo ___ VOR/ Gaze stability ___Other: ___Other:	X__Balance/falls X__Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories: 3: recommended to use in combination with other tests

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			X		Not studied
Chronic = > 6 Weeks			X		
Overall Comments:					

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction		X				
II-Central Dysfunction		X				
III-BPPV			X			
IV-Other			X			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:						

Entry-Level Criteria		Students should learn to administer tool		Students should be exposed to tool (e.g. to read literature)		Comments
Should this tool be required for entry level curricula?		YES	NO	YES	NO	
		X		X		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		X, a high tech version. See reference in comments				McGrath D, Greene BR, Doheny EP, McKeown DJ, De Vito G, Caulfield B.,Reliability of quantitative TUG measures of mobility for use in falls risk assessment., Conf Proc IEEE Eng Med Biol Soc. 2011;2011:466-9. doi:
						10.1109/IEMBS.2011.6090066.PMID:22254349[PubMed - indexed for MEDLINE]
Is there a need for additional research on this measure? If so, where are the gaps?		X				-standardizing the gait speed and turning instructions

Alternate outcome measures for consideration to assess like constructs	Link
1. Functional Gait Assessment	
2. Dynamic Gait Index	
3. Gait speed (6meter, 3 meter)	

Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).

References

Vestibular Edge Outcome Measures Taskforce

Instrument name: Activities Specific Balance Confidence Scale	
Reviewer: Jennifer Fay, PT, DPT, NCS and Tracy Rice, PT, MPH, NCS	**Date of review: July 8, 2013**

ICF domain (check all that apply):

_____ Body function/structure ____x_ Activity __x___ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: ___Other:	__x_Balance/falls _x__Gait (include stairs) ___ High Level Mobility __x_ Transfers ___Other:	__x_Community function ___Driving ___Health and wellness _x__Home management __x_Leisure/Recreational activities ___Life satisfaction ___Quality of life __x_Role function __x_Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks		x			
Chronic = > 6 Weeks		x			
Overall Comments:	Measure has good psychometric properties for vestibular population, is free to use and reasonably accessible to providers.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction		x				
II-Central Dysfunction		x				
III-BPPV		x				
IV-Other		x				
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Measure has been studied in variety of diagnostic populations other than vestibular and has demonstrated good psychometric properties. Additional research into reliability and responsiveness				

		with the vestibular population is recommended.				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				
Is there a need for additional research on this measure? If so, where are the gaps?		x				Additional research into reliability and responsiveness with the vestibular population.

Alternate outcome measures for consideration to assess like constructs	**Link**
1.Falls Efficacy Scale (FES)	
2. Turkish Version	Karapolat et al., 2010
3.	
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).	

References

Alghwiri, A. A., Marchetti, G. F., & Whitney, S. L. (2011). Content comparison of self-report measures used in vestibular rehabilitation based on the international classification of functioning, disability and health. *Physical Therapy*, *91*(3), 346-357.

Beninato, M., Portney, L. G., et al. (2009). "Using the International Classification of Functioning, Disability and Health as a framework to examine the association between falls and clinical assessment tools in people with stroke." Physical Therapy 89(8): 816-825. Find it on PubMed

Botner, E. M., Miller, W. C., et al. (2005). "Measurement properties of the Activities-specific Balance Confidence Scale among individuals with stroke." Disability and Rehabilitation 27(4): 156-163. Find it on PubMed

Clendaniel, R. A. (2000). Outcome measures for assessment of treatment of the dizzy and balance disorder patient. *Otolaryngologic Clinics of North America*, *33*(3), 519-533.

Dal Bello-Haas, V., Klassen, L., et al. (2011). "Psychometric Properties of Activity, Self-Efficacy, and Quality-of-Life Measures in Individuals with Parkinson Disease." Physiotherapy Canada 63(1): 47-57. Find it on PubMed

Duracinsky, M., Mosnier, I., Bouccara, D., Sterkers, O., & Chassany, O. (2007). Literature review of questionnaires assessing vertigo and dizziness, and their impact on patients' quality of life. *Value in health*, *10*(4), 273-284.

Filiatrault, J., Gauvin, L., et al. (2007). "Evidence of the psychometric qualities of a simplified version of the Activities-specific Balance Confidence scale for community-dwelling seniors." Archives of Physical Medicine and Rehabilitation 88(5): 664-672. Find it on PubMed

Hatch, J., Gill-Body, K. M., et al. (2003). "Determinants of balance confidence in community-dwelling elderly people." Physical Therapy 83(12): 1072-1079. Find it on PubMed

Horak, F. B., Wrisley, D. M., et al. (2009). "The Balance Evaluation Systems Test (BESTest) to differentiate balance deficits." Physical Therapy 89(5): 484-498. Find it on PubMed

Huang, T. T. and Wang, W. S. (2009). "Comparison of three established measures of fear of falling in community-dwelling older adults: psychometric testing." International Journal of Nursing Studies 46(10): 1313-1319. Find it on PubMed

Inness, E. L., Howe, J. A., et al. (2011). "Measuring Balance and Mobility after Traumatic Brain Injury: Validation of the Community Balance and Mobility Scale (CB&M)." Physiotherapy Canada 63(2): 199-208. Find it on PubMed

Karapolat, H., Eyigor, S., Kirazli, Y., Celebisoy, N., Bilgen, C., & Kirazli, T. (2010). Reliability, validity, and sensitivity to change of Turkish Activities-specific Balance Confidence Scale in patients with unilateral peripheral vestibular disease. *International Journal of Rehabilitation Research, 33*(1), 12-18.

Lajoie, Y. and Gallagher, S. P. (2004). "Predicting falls within the elderly community: comparison of postural sway, reaction time, the Berg balance scale and the Activities-specific Balance Confidence (ABC) scale for comparing fallers and non-fallers." Archives of Gerontology and Geriatrics 38(1): 11-26. Find it on PubMed

Landers, M. R., Durand, C., et al. (2011). "Development of a scale to assess avoidance behavior due to a fear of falling: the Fear of Falling Avoidance Behavior Questionnaire." Physical Therapy 91(8): 1253-1265. Find it on PubMed

Legters K., Whitney SL, Porter R, Buczek F. "The relationship between the Activities-specific Balance Confidence Scale and the Dynamic Gait Index in peripheral vestibular dysfunction." Physiotherapy Research International 10(1):10-22.

Marchetti, G. F., Whitney, S. L., Redfern, M. S., & Furman, J. M. (2011). Factors associated with balance confidence in older adults with health conditions affecting the balance and vestibular system. *Archives of physical medicine and rehabilitation*, *92*(11), 1884-1891.

Morgan, M. T., Friscia, L. A., Whitney, S. L., Furman, J. M., & Sparto, P. J. (2013). Reliability and validity of the Falls Efficacy Scale-International (FES-I) in individuals with dizziness and imbalance. *Otology and Neurotology*.

Nemmers, T. M. and Miller, J. W. (2008). "Factors influencing balance in healthy community-dwelling women age 60 and older." J Geriatr Phys Ther 31(3): 93-100. Find it on PubMed

Powell, L. E. and Myers, A. M. (1995). "The Activities-specific Balance Confidence (ABC) Scale." Journals of Gerontology. Series A, Biological Sciences and Medical Sciences 50A(1): M28-34. Find it on PubMed

Salbach, N. M., Mayo, N. E., et al. (2006). "Psychometric evaluation of the original and Canadian French version of the activities-specific balance confidence scale among people with stroke." Archives of Physical Medicine and Rehabilitation 87(12): 1597-1604. Find it on PubMed

Steffen, T. and Seney, M. (2008). "Test-retest reliability and minimal detectable change on balance and ambulation tests, the 36-item short-form health survey, and the unified Parkinson disease rating scale in people with parkinsonism." Physical Therapy 88(6): 733-746. Find it on PubMed

Talley, K. M., Wyman, J. F., et al. (2008). "Psychometric properties of the activities-specific balance confidence scale and the survey of activities and fear of falling in older women." Journal of the American Geriatrics Society 56(2): 328-333. Find it on PubMed

Whitney, S.L., Hudak M.T., and Marchetti G.F. (1999). "The activities-specific balance confidence scale and the dizziness handicap inventory: a comparison." Journal of Vestibular Research 9:253-259.

Wrisley, D. M. and Kumar, N. A. (2010). "Functional gait assessment: concurrent, discriminative, and predictive validity in community-dwelling older adults." Physical Therapy 90(5): 761-773. Find it on PubMed

Vestibular Edge Outcome Measures Taskforce

Instrument name: Motion Sensitivity Test/Quotient	
Reviewer: Jennifer Fay, PT, DPT, NCS and Tracy Rice, PT, MPH, NCS	**Date of review: May 14, 2013**

ICF domain (check all that apply):

__x___ Body function/structure __x___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
__x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x__Somatosensation _x__ Spatial Orientation _x__ Vertigo ___ VOR/ Gaze stability ___Other: Mental health _x__Other: Autonomic symptoms	___Balance/falls ___Gait (include stairs) __x_ High Level Mobility __x_ Transfers __x_Other: bed mobility	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			X		
Chronic = > 6 Weeks			X		
Overall Comments:	Measure has been tested in patients with motion provoked dizziness during routine movements associated with daily living. Measure has excellent reliability data.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			X			
II-Central Dysfunction			X			Has not been validated for central dysfunction, however, Individuals with vestibular migraine and meniere's disease scored significantly higher on the MSQ than controls ($p<0.0001$) Sharon, J. D., & Hullar, T. E. (2013). Motion

						sensitivity and caloric responsiveness in vestibular migraine and meniere's disease. *The Laryngoscope*
III-BPPV			x			
IV-Other			x			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:						

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
			x	x		

Research Use		**YES**	**NO**	**Comments**
Is this tool appropriate for use in intervention research studies?		x		
Is there a need for additional research on this measure? If so, where are the gaps?		x		There should be more research validating this measure with specific populations (i.e central vestibular dysfunction). The authors do not specify what the origin of the subjects' motion provoked dizziness.

Alternate outcome measures for consideration to assess like constructs	**Link**
1.	
2.	

3.	
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).	

References

Akin F, Davenport MJ. Validity and reliability of the Motion Sensitivity Test. *Journal of Rehabilitation Research and Development* 2003; 40: 415-422.

Smith-Wheelock M, Shephard NT, Telian SA. Physical therapy program for vestibular rehabilitation. Am J Otology 1991;12:218-25.

Sharon, J. D., & Hullar, T. E. (2013). Motion sensitivity and caloric responsiveness in vestibular migraine and meniere's disease. *The Laryngoscope*.

Norre, M. E., & Beckers, A. M. (1988). Vestibular habituation training: specificity of adequate exercise. *Archives of Otolaryngology—Head & Neck Surgery*, *114*(8), 883.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Visual Analog Scale (Head Movement VAS, Perceived Visual Blurring VAS oVAS, Perceived Dysequilibrium VAS dVAS, Visual Analog Scale vertigo/dizziness)	
Reviewer: Jennifer Fay, PT, DPT, NCS and Tracy Rice, PT, MPH, NCS	**Date of review: April 17, 2012**

ICF domain (check all that apply):

__x___ Body function/structure __x___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
__x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x__Somatosensation ___ Spatial Orientation _x__ Vertigo ___ VOR/ Gaze stability _x__Other: Mental health _x__Other: Autonomic symptoms	__x_Balance/falls __x_Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			X		
Chronic = > 6 Weeks			X		
Overall Comments:	Measure has been tested in patients with vestibular diagnosis although does not specify level of acuity or type of vestibular dysfunction. Measure has not been validated				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			X			
II-Central Dysfunction			X			**Has not been validated for central dysfunction.**
III-BPPV			X			
IV-Other			X			

*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:						
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				
Is there a need for additional research on this measure? If so, where are the gaps?		x				There need to be more research studies validating the measure against other measures of symptom severity. There is only reliability data that has been published.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.						
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Hall, CD. Herdman, SJ. Reliability of Clinical Measures Used to Assess Patients with Peripheral Vestibular Disorders. *J Neurol Phys Ther* 2006;30: 74-81

Herdman SJ, Hall CD, et al. Recovery of Dynamic Visual Acuity in Bilateral Vestibular Hypofunction.*Arch Otolaryngol Head Neck Surg* 2007;133: 383-389.

Toupet M, Ferrary E, Bozorg Grayeli A. Visual analog scale to assess vertigo and dizziness after repositioning maneuvers for benign paroxysmal positional vertigo. *J Vestib Research* 2001;21: 235-241.

Herdman, S. J., Schubert, M. C., Das, V. E., & Tusa, R. J. (2003). Recovery of dynamic visual acuity in unilateral vestibular hypofunction. *Archives of Otolaryngology—Head & Neck Surgery*, *129*(8), 819-824.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Visual Vertigo Analogue Scale	
Reviewer: Jennifer Fay, PT, DPT; Tracy Rice, PT, MPH, NCS	**Date of review: May 8, 2013**

ICF domain (check all that apply):

__x___ Body function/structure __x___ Activity ___x__ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
__x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x__Somatosensation _x__ Spatial Orientation _x__ Vertigo ___ VOR/ Gaze stability _x__Other: Mental health _x__Other: Autonomic symptoms	__x_Balance/falls __x_Gait (include stairs) __x_ High Level Mobility ___ Transfers ___Other:	__x_Community function __x_Driving ___Health and wellness ___Home management _x__Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function _x__Shopping ___Social function _x__Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			x		
Chronic = > 6 Weeks			x		
Overall Comments:	Measure has been tested in patients with vestibular diagnosis although does not specify level of acuity or type of vestibular dysfunction. Measure has not been validated				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			x			
II-Central Dysfunction			x			**Has not been validated for central dysfunction.**
III-BPPV			x			
IV-Other			x			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:						

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
			x	x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				x		
Is there a need for additional research on this measure? If so, where are the gaps?		x				There need to be more research studies validating the measure against other measures of symptom severity. There is only reliability data that has been published.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1. Situational Characteristics Questionnaire				Pavlou M, Davies RA, Bronstein AM. The assessment of increased sensitivity to visual stimuli in patients with chronic dizziness. J Vestib Res. 2006; 16(4-5): 223-31.		
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Dannenbaum E, Chilingaryan G, Fung J. Visual Vertigo Analogue Scale: An assessment questionnaire for visual vertigo. *J of Vestibular Research* 2011: 153-159

Vestibular Edge Outcome Measures Taskforce

Instrument name: Disability Rating Scale

Reviewer: Jennifer Fay, PT, DPT and Tracy Rice, PT, MPH, NCS	**Date of review: March 29, 2013**

ICF domain (check all that apply):

_____ Body function/structure __x___ Activity __x___ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: ___Other:	__x_Balance/falls _x__Gait (include stairs) __x_ High Level Mobility __x_ Transfers ___Other:	___Community function ___Driving __x_Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life _x__Role function ___Shopping ___Social function _x__Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			x		
Chronic = > 6 Weeks			x		
Overall Comments:	There is limited psychometric research on this measure.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			x			
II-Central Dysfunction			x			
III-BPPV			x			
IV-Other					x	
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		There is limited data on psychometric properties for this measure.				

Entry-Level Criteria		Students should learn to administer tool		Students should be exposed to tool (e.g. to read literature)		Comments
Should this tool be required for entry level curricula?		YES	NO	YES	NO	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
			x	x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				x		
Is there a need for additional research on this measure? If so, where are the gaps?		x				There need to be more research studies done validating this measure compared to other measures of symptom severity.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.						
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Shepard, N. T., Telian, S. A., & Smith-Wheelock, M. (1990). Habituation and balance retraining therapy: a retrospective review. *Neurologic Clinics.*

Clendaniel RA. Outcome Measures for Assessment of Treatment of the Dizzy and Balance Disorder Patient. Otolaryngolic Clinics of North America. 2000: 33; 519-33.

Hall CD, Herdman SJ. Reliability of Clinical Measures Used to Assess Patients with Peripheral Vestibular Disorders. 2006: 30;74-81

Shephard NT, Smith-Wheelock M, Telian SA, Raj A. Vestibular and Balance Rehabilitation Therapy. Acta Otol Rhinol Laryngol 1993:02: 198-205.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Motion Sensitivity Test/Quotient	
Reviewer: Jennifer Fay, PT, DPT, NCS and Tracy Rice, PT, MPH, NCS	**Date of review: May 14, 2013**

ICF domain (check all that apply):

__x___ Body function/structure __x___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
__x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x__Somatosensation _x__ Spatial Orientation _x__ Vertigo ___ VOR/ Gaze stability ___Other: Mental health _x__Other: Autonomic symptoms	___Balance/falls ___Gait (include stairs) __x_ High Level Mobility __x_ Transfers __x_Other: bed mobility	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			X		
Chronic = > 6 Weeks			X		
Overall Comments:	Measure has been tested in patients with motion provoked dizziness during routine movements associated with daily living. Measure has excellent reliability data.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			X			
II-Central Dysfunction			X			Has not been validated for central dysfunction, however, Individuals with vestibular migraine and meniere's disease scored significantly higher on the MSQ than controls ($p<0.0001$) Sharon, J. D., & Hullar, T. E. (2013). Motion

						sensitivity and caloric responsiveness in vestibular migraine and meniere's disease. *The Laryngoscope*
III-BPPV			x			
IV-Other			x			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:						

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
			x	x		

Research Use		**YES**	**NO**	**Comments**
Is this tool appropriate for use in intervention research studies?		x		
Is there a need for additional research on this measure? If so, where are the gaps?		x		There should be more research validating this measure with specific populations (i.e central vestibular dysfunction). The authors do not specify what the origin of the subjects' motion provoked dizziness.

Alternate outcome measures for consideration to assess like constructs	**Link**
1.	
2.	

3.	
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).	

References

Akin F, Davenport MJ. Validity and reliability of the Motion Sensitivity Test. *Journal of Rehabilitation Research and Development* 2003; 40: 415-422.

Smith-Wheelock M, Shephard NT, Telian SA. Physical therapy program for vestibular rehabilitation. Am J Otology 1991;12:218-25.

Sharon, J. D., & Hullar, T. E. (2013). Motion sensitivity and caloric responsiveness in vestibular migraine and meniere's disease. *The Laryngoscope*.

Norre, M. E., & Beckers, A. M. (1988). Vestibular habituation training: specificity of adequate exercise. *Archives of Otolaryngology—Head & Neck Surgery*, *114*(8), 883.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Visual Analog Scale (Head Movement VAS, Perceived Visual Blurring VAS oVAS, Perceived Dysequilibrium VAS dVAS, Visual Analog Scale vertigo/dizziness)	
Reviewer: Jennifer Fay, PT, DPT, NCS and Tracy Rice, PT, MPH, NCS	**Date of review: April 17, 2012**

ICF domain (check all that apply):

__x___ Body function/structure __x___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
__x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x__Somatosensation ___ Spatial Orientation _x__ Vertigo ___ VOR/ Gaze stability _x__Other: Mental health _x__Other: Autonomic symptoms	__x_Balance/falls __x_Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			X		
Chronic = > 6 Weeks			X		
Overall Comments:	Measure has been tested in patients with vestibular diagnosis although does not specify level of acuity or type of vestibular dysfunction. Measure has not been validated				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			X			
II-Central Dysfunction			X			**Has not been validated for central dysfunction.**
III-BPPV			X			
IV-Other			X			

*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:						
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
		x		x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		x				
Is there a need for additional research on this measure? If so, where are the gaps?		x				There need to be more research studies validating the measure against other measures of symptom severity. There is only reliability data that has been published.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.						
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Hall, CD. Herdman, SJ. Reliability of Clinical Measures Used to Assess Patients with Peripheral Vestibular Disorders. *J Neurol Phys Ther* 2006;30: 74-81

Herdman SJ, Hall CD, et al. Recovery of Dynamic Visual Acuity in Bilateral Vestibular Hypofunction.*Arch Otolaryngol Head Neck Surg* 2007;133: 383-389.

Toupet M, Ferrary E, Bozorg Grayeli A. Visual analog scale to assess vertigo and dizziness after repositioning maneuvers for benign paroxysmal positional vertigo. *J Vestib Research* 2001;21: 235-241.

Herdman, S. J., Schubert, M. C., Das, V. E., & Tusa, R. J. (2003). Recovery of dynamic visual acuity in unilateral vestibular hypofunction. *Archives of Otolaryngology—Head & Neck Surgery*, *129*(8), 819-824.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Visual Vertigo Analogue Scale	
Reviewer: Jennifer Fay, PT, DPT; Tracy Rice, PT, MPH, NCS	**Date of review: May 8, 2013**

ICF domain (check all that apply):

__x___ Body function/structure __x___ Activity ___x__ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
__x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration _x__Somatosensation _x__ Spatial Orientation _x__ Vertigo ___ VOR/ Gaze stability _x__Other: Mental health _x__Other: Autonomic symptoms	__x_Balance/falls __x_Gait (include stairs) __x_ High Level Mobility ___ Transfers ___Other:	__x_Community function __x_Driving ___Health and wellness ___Home management _x__Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function _x__Shopping ___Social function _x__Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			x		
Chronic = > 6 Weeks			x		
Overall Comments:	Measure has been tested in patients with vestibular diagnosis although does not specify level of acuity or type of vestibular dysfunction. Measure has not been validated				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			x			
II-Central Dysfunction			x			**Has not been validated for central dysfunction.**
III-BPPV			x			
IV-Other			x			
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:						

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
			x	x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				x		
Is there a need for additional research on this measure? If so, where are the gaps?		x				There need to be more research studies validating the measure against other measures of symptom severity. There is only reliability data that has been published.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1. Situational Characteristics Questionnaire				Pavlou M, Davies RA, Bronstein AM. The assessment of increased sensitivity to visual stimuli in patients with chronic dizziness. J Vestib Res. 2006; 16(4-5): 223-31.		
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Dannenbaum E, Chilingaryan G, Fung J. Visual Vertigo Analogue Scale: An assessment questionnaire for visual vertigo. *J of Vestibular Research* 2011: 153-159

Vestibular Edge Outcome Measures Taskforce

Instrument name: Disability Rating Scale

Reviewer: Jennifer Fay, PT, DPT and Tracy Rice, PT, MPH, NCS	**Date of review: March 29, 2013**

ICF domain (check all that apply):

_____ Body function/structure __x___ Activity __x___ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: ___Other:	__x_Balance/falls _x__Gait (include stairs) __x_ High Level Mobility __x_ Transfers ___Other:	___Community function ___Driving __x_Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life _x__Role function ___Shopping ___Social function _x__Work ___Other:

Link to rehabmeasures.org summary:

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			x		
Chronic = > 6 Weeks			x		
Overall Comments:	There is limited psychometric research on this measure.				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			x			
II-Central Dysfunction			x			
III-BPPV			x			
IV-Other					x	
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		There is limited data on psychometric properties for this measure.				

Entry-Level Criteria		Students should learn to administer tool		Students should be exposed to tool (e.g. to read literature)		Comments
Should this tool be required for entry level curricula?		YES	NO	YES	NO	Students should be exposed to this tool once they have a firm background knowledge of vestibular dysfunction.
			x	x		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				x		
Is there a need for additional research on this measure? If so, where are the gaps?		x				There need to be more research studies done validating this measure compared to other measures of symptom severity.
Alternate outcome measures for consideration to assess like constructs				**Link**		
1.						
2.						
3.						
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).						

References

Shepard, N. T., Telian, S. A., & Smith-Wheelock, M. (1990). Habituation and balance retraining therapy: a retrospective review. *Neurologic Clinics.*

Clendaniel RA. Outcome Measures for Assessment of Treatment of the Dizzy and Balance Disorder Patient. Otolaryngolic Clinics of North America. 2000: 33; 519-33.

Hall CD, Herdman SJ. Reliability of Clinical Measures Used to Assess Patients with Peripheral Vestibular Disorders. 2006: 30;74-81

Shephard NT, Smith-Wheelock M, Telian SA, Raj A. Vestibular and Balance Rehabilitation Therapy. Acta Otol Rhinol Laryngol 1993:02: 198-205.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Berg Balance Scale	
Reviewer: Linda B. Horn, PT, DScPT, MHS, NCS; Karen H. Lambert, PT, MPT, NCS	**Date of review: 6/19/13**

ICF domain (check all that apply):

____ Body function/structure __X___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	Activity	Participation
___Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: ___Other:	_X_Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

Link to rehabmeasures.org summary: Berg Balance Scale

Recommendation Categories

Acuity	4	3	2	1	Comments
Acute= 0-6 Weeks			**X**		
Chronic = > 6 Weeks			**X**		
Overall Comments:	Studies do not indicate if subjects were in the acute or chronic phase				

Diagnostic Categories	4	3	2	1	N/A*	Comments
I- Peripheral Dysfunction			**X**			
II-Central Dysfunction			**X**			
III-BPPV			**X**			
IV-Other			**X**			Multisensory disequilibrium, unknown vestibular dysfunction

*Not applicable: Outcome measure not related to Diagnostic Categories

Overall Comments:		For vestibular dysfunction, the Berg Balance Scale may not be the best measure to identify individuals at risk of falling (Whitney et al, 2003). There was 63% (44/70) agreement for risk of falling between the Berg Balance Scale (BBS) and the Dynamic Gait Index (DGI); 25 of the remaining 26 were identified as having an increased fall risk with the DGI but not the BBS. The BBS has been tested in many populations including community dwelling elderly, MS, PD, SCI & TBI.				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
		x		**x**		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		**x**				
Is there a need for additional research on this measure? If so, where are the gaps?		**x**				Research needed to establish reliability when using the BBS to test individuals with vestibular dysfunction. Also need to determine the usefulness of the BBS in different types of vestibular diagnoses as well as chronicity (acute vs chronic).
Alternate outcome measures for consideration to assess like constructs				**Link**		
Dynamic Gait Index				DGI		

Additional information on this measure can be found at www.rehabmeasures.org.

References

Berg, K. O., Maki, B. E., et al. (1992). "Clinical and laboratory measures of postural balance in an elderly population." Arch Phys Med Rehabil 73(11): 1073-1080. Find it on PubMed

Berg, K. O., Wood-Dauphinee, S. L., et al. (1992). "Measuring balance in the elderly: validation of an instrument." Can J Public Health 83 Suppl 2: S7-11. Find it on PubMed

Cohen, H. S. & Kimball, K. T. (2008). “Usefulness of some current balance tests for identifying individuals with disequilibrium due to vestibular impairment.” J Vest Rehabil 18:295-303.

Whitney, S., Wrisley, D., & Furman, J. (2003). “Concurrent validity of the Berg Balance Scale and the Dynamic Gait Index in people with vestibular dysfunction.” Physiotherapy Research International 8(4): 178-186.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Bow and Lean Test	
Reviewer: Linda B. Horn, PT, DScPT, MHS, NCS; Karen H. Lambert, PT, MPT, NCS	**Date of review: 2/17/13**

ICF domain (check all that apply):

__x__ Body function/structure _____ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	**Activity**	**Participation**
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation _x_ Vertigo ___ VOR/ Gaze stability ___Other: __Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks			**X**		
Chronic = > 6 Weeks			**X**		
Overall Comments:					

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction				**X**		Not used for differential diagnosis
II-Central Dysfunction				**X**		Not used for differential diagnosis
III-BPPV			**X**			May need electronystagmography, videonystagmography, video recorder, infrared video goggles, or Frenzel goggles to view nystagmus

						Roll Test is performed first to determine the presence of horizontal canal BPPV; if Roll Test is positive, Bow and Lean Test can help identify the involved side
IV-Other				**X**		Not used for differential diagnosis
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		This is not a stand-alone test – the Roll Test must be performed prior to the Bow and Lean Test.				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	This test is beyond entry-level practice.
			x		**x**	

Research Use		**YES**	**NO**	**Comments**
Is this tool appropriate for use in intervention research studies?		**x**		Can assist in determining side of the involvement
Is there a need for additional research on this measure? If so, where are the gaps?		**x**		Need to determine reliability and validity of this measure

Alternate outcome measures for consideration to assess like constructs	**Link**
1. Roll Test	

Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).

References

Choung, Y. H., et al. (2006). "'Bow and Lean test' to determine the affected ear of horizontal canal benign paroxysmal positional vertigo. Laryngoscope (116): 1776-1781.

Lee, J. B., et al. (2010). "Efficacy of the "Bow and Lean Test" for the management of horizontal canal benign paroxysmal positional vertigo." Laryngoscope (120): 2339-2346.

Vestibular Edge Outcome Measures Taskforce

Instrument name: Four Square Step Test	
Reviewer: Linda B. Horn, PT, DScPT, MHS, NCS; Karen H. Lambert, PT, MPT, NCS	**Date of review: 6/16/13**

ICF domain (check all that apply):

_____ Body function/structure __**X**___ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	**Activity**	**Participation**
___Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: ___Other: Oculomotor	_**X**__Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary: Four Square Step Test
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks		**X**			
Chronic = > 6 Weeks		**X**			
Overall Comments:					

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction		**X**				
II-Central Dysfunction		**X**				
III-BPPV		**X**				May be useful if balance impairment persists after successful canalith repositioning maneuver
IV-Other		**X**				Multisensory disequilibrium,

						unknown vestibular dysfunction
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		The Four Square Step Test may be helpful in identifying individuals (older adults ≥ 65 y/o and younger adults < 65 y/o) with vestibular disorders who have difficulty changing directions (Whitney, 2007). A cut-off score of > 12 sec identified individuals with vestibular dysfunction who had multiple risk factors for falls.				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
		x		**x**		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		**x**				
Is there a need for additional research on this measure? If so, where are the gaps?		**x**				Inter- and intra-rater reliability not established in this population. SEM, MCD, & MCID not established.
Alternate outcome measures for consideration to assess like constructs				**Link**		
Additional information on this measure can be found at www.rehabmeasures.org. Four Square Step Test Instructions						

References

Dite, W., Connor, H. J., et al. (2007). "Clinical identification of multiple fall risk early after unilateral transtibial amputation." Arch Phys Med Rehabil 88(1): 109-114. Find it on PubMed

Dite, W. and Temple, V. A. (2002). "A clinical test of stepping and change of direction to identify multiple falling older adults." Arch Phys Med Rehabil 83(11): 1566-1571. Find it on PubMed

Whitney, S. L., Marchetti, G. F., et al. (2007). "The reliability and validity of the Four Square Step Test for people with balance deficits secondary to a vestibular disorder." Arch Phys Med Rehabil 88(1): 99-104. Find it on PubMed

Vestibular Edge Outcome Measures Taskforce

Instrument name: Functional Reach Test	
Reviewer: Linda B. Horn, PT, DScPT, MHS, NCS; Karen H. Lambert, PT, MPT, NCS	**Date of review: 7/1/13**
ICF domain (check all that apply): ____ Body function/structure __X___ Activity _____ Participation	

Construct/s measured (check all that apply):		
Body structure and Function	**Activity**	**Participation**
__Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation ___ Vertigo ___ VOR/ Gaze stability ___Other: __Other: Oculomotor	_X__Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary: Functional Reach Test/Modified Functional Reach Test
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks			**X**		
Chronic = > 6 Weeks			**X**		
Overall Comments:					

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction			**X**			
II-Central Dysfunction			**X**			
III-BPPV			**X**			May be useful if balance impairment persists after successful canalith repositioning maneuver
IV-Other			**X**			Multisensory disequilibrium,

						unknown vestibular dysfunction
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Individuals with peripheral vestibular disorders and c/o dizziness (Dizziness Handicap Inventory ≥ 50) don't reach as far as individuals with vestibular disorders and less c/o dizziness (Dizziness Handicap Inventory ≤ 49).				
Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	
		X		**X**		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?				**X**		There are other tools that are better to measure balance in individuals with vestibular disorders.
Is there a need for additional research on this measure? If so, where are the gaps?		**X**				Need to determine reliability and validity of measure for this population.
Alternate outcome measures for consideration to assess like constructs				**Link**		
Additional information on this measure can be found at www.rehabmeasures.org.						

References

Duncan, P. W., Weiner, D. K., et al. (1990). "Functional reach: a new clinical measure of balance." J Gerontol 45(6): M192-197. Find it on PubMed

Mann, G. C., Whitney, S.L., et al. (1996). “Functional reach and single leg stance in patients with peripheral vestibular disorders.” J Vestib Res 6(5); 343-353. Find it on PubMed

Weiner, D. K., Duncan, P. W., et al. (1992). "Functional reach: a marker of physical frailty." J Am Geriatr Soc 40(3): 203-207. Find it on PubMed

Vestibular Edge Outcome Measures Taskforce

Instrument name: Roll Test	
Reviewer: Linda B. Horn, PT, DScPT, MHS, NCS; Karen H. Lambert, PT, MPT, NCS	**Date of review: 6/2/13**

ICF domain (check all that apply):

__x__ Body function/structure _____ Activity _____ Participation

Construct/s measured (check all that apply):

Body structure and Function	**Activity**	**Participation**
_x_Dizziness ___Dual Tasks ___Muscle performance ___Sensory integration ___Somatosensation ___ Spatial Orientation _x_ Vertigo ___ VOR/ Gaze stability ___Other: __Other:	___Balance/falls ___Gait (include stairs) ___ High Level Mobility ___ Transfers ___Other:	___Community function ___Driving ___Health and wellness ___Home management ___Leisure/Recreational activities ___Life satisfaction ___Quality of life ___Role function ___Shopping ___Social function ___Work ___Other:

	Link to rehabmeasures.org summary:
	Recommendation Categories

Acuity	**4**	**3**	**2**	**1**	**Comments**
Acute= 0-6 Weeks			**X**		
Chronic = > 6 Weeks			**X**		
Overall Comments:					

Diagnostic Categories	**4**	**3**	**2**	**1**	**N/A***	**Comments**
I- Peripheral Dysfunction			**X**			To determine presence/absence of BPPV
II-Central Dysfunction			**X**			To determine presence/absence of BPPV
III-BPPV			**X**			May need electronystagmography, videonystagmography, video recorder, infrared video goggles, or

						Frenzel goggles to view nystagmus
IV-Other			**X**			To determine presence/absence of BPPV
*Not applicable: Outcome measure not related to Diagnostic Categories						
Overall Comments:		Variations to test procedure: • 30^{o} neck flexion • No neck flexion • 180-degree Supine Roll Test (Lim, 2013) o Starting from the end position of the Roll Test, the head is rotated 180^{o} to the opposite side o Electronystagmography and a video eye movement recorder were used to measure SPV (slow phase velocity) and determine which side was the affected side. o No statistically significant difference was noted between the Roll Test and the 180-degree Supine Roll Test in the rate of positive findings. o Success rate for determining the affected side when using the Roll Test, 180-degree Supine Roll Test and the Bow and Lean Test was 84.4% (91% for geotropic and 76.3% for apogeotropic)				

Entry-Level Criteria		**Students should learn to administer tool**		**Students should be exposed to tool (e.g. to read literature)**		**Comments**
Should this tool be required for entry level curricula?		**YES**	**NO**	**YES**	**NO**	May need electronystagmography, videonystagmography, video recorder, infrared video goggles, or Frenzel goggles to view nystagmus
		x		**x**		
Research Use		**YES**		**NO**		**Comments**
Is this tool appropriate for use in intervention research studies?		**x**				Can assist in determining side and/or type of horizontal canal BPPV
Is there a need for additional research on		**x**				Need to determine reliability and validity of

this measure? If so, where are the gaps?				this measure & the variations
Alternate outcome measures for consideration to assess like constructs			**Link**	
Additional information on this measure can be found at www.rehabmeasures.org (insert specific link to measure).				

References

Baloh, R. W., Jacobson, K., & Honrubia, V. (1993). Horizontal semicircular canal variant of benign positional vertigo. Neurology;43:2542-2549.

Fife, T. D. (1998). Recognition and management of horizontal canal benign positional vertigo. Amer J Otol 19:345-351.

Herdman, S. J. & Tusa, R. J. Physical therapy management of benign positional vertigo. In: Herdamn, S. J, ed. (2007). Vestibular Rehabilitation. 3rd ed. Philadelphia: F. A. Davis.

Lim, H. J., Park, K., Park, H. Y., & Chong, Y. (2013). The significance of 180-degree head rotation in supine roll test for horizontal canal benign paroxysmal positional vertigo. Otol Neurotol; 34(4):736-742