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NIH Toolbox Dynamic Visual Acuity Test (DVA)

Availability:	**Please visit this website for more information about this instrument:** **NIH Toolbox website**
Classification:	**Supplemental:** Acute Hospitalized, Concussion/Mild TBI, Epidemiology, Moderate/Severe TBI: Rehabilitation Traumatic Brain Injury (TBI)
Short Description of Instrument:	This NIH Toolbox Dynamic Visual Acuity (DVA) test is a measure of gaze stability, which helps identify individuals who may have a deficit of the vestibular system (which regulates internal balance). The NIH Toolbox Visual Acuity Test must be administered followed by the DVA Test. Participants are seated 12.5 feet from a computer monitor at eye level. For the DVA Test, participants wear lightweight headgear that contains a rate sensor, and are asked to move the head back and forth, as if saying "no." Once the head is measured to be moving at greater than 180 degrees per second, an optotype flashes on the monitor, and the participant is asked to identify it. Smaller optotypes are displayed as the participant correctly identifies letters, and larger ones are displayed if the participant cannot correctly identify the letter shown, until the computer has calculated the smallest size that the participant can see with the head moving. This is calculated separately for head rotation leftward and rightward from center (though the participant continues shaking the head both ways), and this performance is compared to the participant's visual acuity when the head was stationary (the NIH Toolbox Visual Acuity Test score, sometimes referred to as "static" visual acuity in the context of the DVA test). The difference between "static" and dynamic visual acuity represents the vestibular contribution to gaze stability. The DVA Test takes approximately six minutes to administer and is recommended for ages 3–85.
Scoring:	Please visit this website for more information about scoring and interpretation of the DVA: NIH Toolbox Scoring and Interpretation Guide

References:	Grossman, G. E., & Leigh, R. J. (1990). Instability of gaze during locomotion in patients with deficient vestibular function. *Ann Neurol*, 27(5), 528–532. Grossman, G. E., Leigh, R. J., Bruce, E. N., Huebner, W. P., & Lanska, D. J. (1989). Performance of the human vestibuloocular reflex during locomotion. *J Neurophysiol*, 62(1), 264–272. Herdman, S. J., Tusa, R. J., Blatt, P., Suzuki, A., Venuto, P. J., & Roberts, D. (1998). Computerized dynamic visual acuity test in the assessment of vestibular deficits. *Am J Otol*, 19(6), 790–796. Hillman, E. J., Bloomberg, J. J., McDonald, P. V., & Cohen, H. S. (1999). Dynamic visual acuity while walking in normals and labyrinthine-deficient patients. *J Vestib Res*, 9(1), 49–57. Li, C., Beuamont, J. L., Rine, R. M., Slotkin, J., & Schubert, M. C. (2014). Normative scores for the NIH Toolbox Dynamic Visual Acuity Test from 3 to 85 years. *Front Neurol*, 5, 223. Reuben, D. B., Magasi, S., McCreath, H. E., Bohannon, R. W., Wang, Y. C., Bubela, D. J., . . . Gershon, R. C. (2013). Motor assessment using the NIH Toolbox. *Neurology, 80*(11 Suppl 3), S65–S75. Rine, R. M., Roberts, D., Corbin, B. A., McKean-Cowdin, R., Varma, R., Beaumont, J., . . . Schubert, M. C. (2012). New portable tool to screen vestibular and visual function--National Institutes of Health Toolbox initiative. *J Rehabil Res Dev, 49*(2), 209–220. Rine, R. M., Schubert, M. C., Whitney, S. L., Roberts, D., Redfern, M. S., Musolino, M. C., . . . Slotkin, J. (2013). Vestibular function assessment using the NIH Toolbox. *Neurology, 80*(11 Suppl 3), S25–S31. Schubert, M. C., Herdman, S. J., & Tusa, R. J. (2001). Functional measure of gaze stability in patients with vestibular hypofunction. *Ann N Y Acad Sci*, 942, 490–491. Schubert, M. C., Migliaccio, A. A., Clendaniel, R. A., Allak, A., & Carey, J. P. (2008). Mechanism of dynamic visual acuity recovery with vestibular rehabilitation. *Arch Phys Med Rehabil*, 89(3), 500–507. Shumway-Cook, A., & Horak, F. B. (1986). Assessing the influence of sensory interaction of balance. Suggestion from the field. *Phys Ther, 66*(10), 1548–1550.