

Unilateral centrifugation

F. Wuyts and P. Van de Heyning

Antwerp University Research centre for Equilibrium and Aerospace (AUREA), Antwerp University Hospital, University of Antwerp, Antwerp, Belgium

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In this test, subjects are rotated about an earth vertical axis at a velocity that is relatively high, e.g., 400 degrees per second. After rotating at a constant velocity for several seconds, the subject is gradually moved 4 cm first to the right, and then to the left, along an interaural axis, to a position at which one utricle and then the other becomes aligned with the axis of rotation. At these points, one utricle is exposed to the combination of gravity and a centrifugal acceleration of 0.4 g, corresponding to an apparent roll-tilt of 21.7 degrees. The other utricle is only exposed to gravity. This stimulus induces ocular counter-rolling, *i.e.*, ocular torsion, which is measured using three-dimensional video-oculography (VOG). This test dates from the early

1990s, as described by Wetzig *et al.*,¹ and was further developed by Clarke *et al.*² The amount of ocular counter-rolling is a linear function of the apparent gravito-inertial tilt of the head during the lateral translation.³ Using this method, utricular sensitivity and the preponderance of the right or left utricle can be assessed separately. This method is much more powerful than the simple lateroflexion test because it permits the localisation of the side of utricular dysfunction.⁴

References

1. Wetzig J, Reiser M, Martin E, Bregenzer N, von Baumgarten RJ. Unilateral centrifugation of the otoliths as a new method to determine bilateral asymmetries of the otolith apparatus in

man. *Acta Astronaut.* 1990;21:519-525.

2. Clarke AH, Engelhorn A. Unilateral testing of utricular function. *Exp Brain Res.* 1998;121:457-464.
3. Wuyts FL, Hoppenbrouwers M, Pauwels G, Van de Heyning PH. Utricular sensitivity and preponderance assessed by the unilateral centrifugation test. *J Vestib Res.* 2003;13:227-234.
4. Wuyts FL, Van der Stappen A, Hoppenbrouwers M, *et al.* Otolith function after acoustic neuroma surgery. *Acta Otolaryngol Suppl.* 2001;545:170-173.

Prof. Floris Wuyts
Head of the Antwerp University Research
Centre for Equilibrium and Aerospace
Department of ENT
Antwerp University Hospital
University of Antwerp
Wilrijkstraat 10
2650 Edegem, Belgium
E-mail: floris.wuyts@ua.ac.be