

HORIZONTAL CANAL BPPV AND ATYPICAL POSITIONAL VERTIGO

Terry D. Fife, MD, FAAN
Barrow Neurological Institute
University of Arizona

Horizontal Canal BPPV

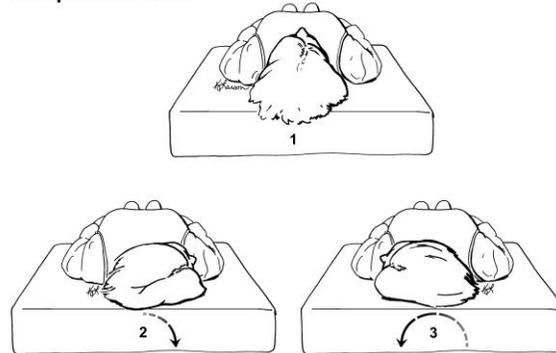
Clinical History: Usually indistinguishable from history of other types of BPPV

Frequency: 10-20% of BPPV cases, depending on time between symptom onset and clinic visit (1-4)

Examination:

- hcBPPV can sometimes be provoked by Dix Hallpike or Sidelying test but it depends how one does the maneuver and how severe the BPPV
- A better test for presence with supine head turning test:

Lempert Roll Test



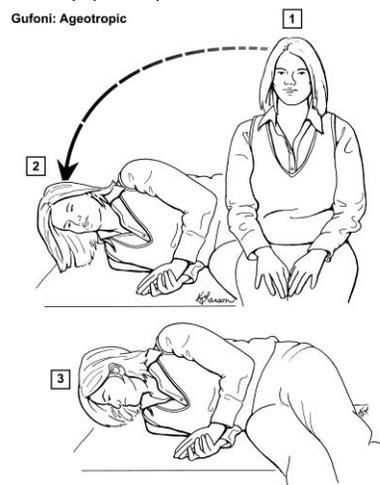
- What do you look for? Horizontal-direction changing nystagmus, either geotropic or apogeotropic
- What does that mean?
 - Direction-changing nystagmus is a form of positional nystagmus that changes direction with changes in head position
 - *Geotropic* = nystagmus with fast phase beating toward the ground. That is, when supine and the head is turned to the right nystagmus beats toward the right (toward the ground) and when head is turned to the left, the nystagmus changes to become left beating (also toward the ground).
 - *Apogeotropic* = nystagmus with fast phase beating away from the ground. That is, when supine and the head is turned to the right nystagmus beat toward the patient's left (away from the ground) and when head is turned to the left, the nystagmus changes to beat to the patient's right (also away from the ground).
- How is this different from the nystagmus of the more common posterior canal BPPV? Posterior canal BPPV causes torsional/upbeating nystagmus and only on the side affected whereas hcBPPV causes horizontal nystagmus that can change direction when the head is turned from one side to the next while supine.

Treatment

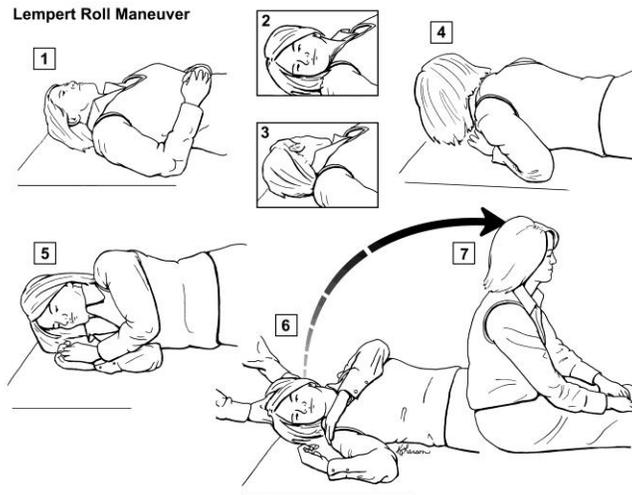
- Epley or Semont maneuvers for posterior canal BPPV are unlikely to be effective (5, 6).
- There are many reported maneuvers but are the ones that seem best:
 - Gufoni for geotropic (right ear affected) (11, 12):



- Gufoni for apogeotropic (right ear affected) (9, 12):



- Roll maneuver (aka, Lempert roll maneuver, Barbecue roll)(9), (Right ear affected, geotropic type):



- Treatment maneuvers for hcBPPV are predicated on knowing the affected side. How does one tell the affected side?
 1. Geotropic the side affected is the side with the most intense nystagmus on the supine roll test
 2. If BPPV started as posterior canal BPPV and converted (so-called canal switch) it is the same side
 3. Apogeotropic: the side with the less intense nystagmus is the affected side (7).
 4. Sit-to-supine maneuver – take the patient rapidly from seated to straight supine, then nystagmus is away from the affected side in geotropic and toward the affected side in apogeotropic (3,4, 8)
 5. Sometimes you will not know
- **Evidence of effectiveness:**
 - Both Gufoni and Roll are better than sham. In a class III study of 60 patients, Gufoni was better than single iteration of roll maneuver (10).
 - Another Class II study of 103 geotropic and 44 apogeotropic hcBPPV patients 44/54 (81%) treated with BBQ roll + forced prolonged positioning symptom free whereas Gufoni 54/58 (93%) symptom-free (13).
 - A class II study of 157 patients found Gufoni 80% effective and better than a sham maneuver (20)
- **Prognosis** – 90% of cases of apogeotropic type resolved within 7 days and all resolved by 28 days (14, 15).

Anterior Canal BPPV

- Usually transitory down-beating positional nystagmus (15)
- Most commonly encountered treated posterior canal BPPV
- Persistent forms are rare
- Of all positional vertigo types, this is the one most likely to be misdiagnosed as peripheral when it is in fact central. One study reported 75% of positional downbeat nystagmus due to CNS causes (17).
- Determining side affected can be difficult unless it started out as posterior canal BPPV
- Nystagmus is downbeat but torsional element is small and not so helpful in lateralizing (13)
- May treat with posterior canal canalith repositioning on both sides if in doubt (18).

Multiple Canal BPPV

- When more than one canal is affected at the same time (16)

Atypical Positional Vertigo

- **Vestibular Causes, some central causes to think about:**
 - Atlanto-axial subluxation
 - Cerebellar degeneration
 - Structural lesions: foramen magnum, cerebellum, medulla, cerebellar peduncles, dorsal pons, 4th ventricle
 - Vertebrobasilar insufficiency: vertebral narrowing or dissection
 - Migraine positional vertigo (19, 21)
- **Non-vestibular Causes of Positional Dizziness**
 - Postural hypotension
 - POTS
 - Ventricular plug

References

1. Imai T, Ito M, Takeda N, et al. Natural course of the remission of vertigo in patients with benign paroxysmal positional vertigo. *Neurology* 2005;64:920-1.
2. Prokopakis EP, Cimona T, Tsagourmisakis M, et al. Benign paroxysmal positional vertigo: 10-year experience in treating 592 patients with canalith repositioning procedure. *Laryngoscope* 2005;115:1667-71.
3. Asprella-Libonati G, Pseudo-spontaneous nystagmus: a new sign to diagnose the affected side in lateral semicircular canal benign paroxysmal positional vertigo. *Acta Otolaryngol Ital* 2008;28:73-8.
4. Pagnini P, Nuti D, Vannucchi P. Benign paroxysmal positional vertigo of the horizontal canal. *ORL J Otorhinolaryngol Relat Spec* 1989;51:161-70.
5. Lempert T, Tiel-Wilck K. A positional maneuver for treatment of horizontal-canal benign paroxysmal positional vertigo 1996;106:476-8.
6. Herdman SJ, Tusa RJ. Complications of the canalith repositioning procedure. *Arch Otolaryngol Head Neck Surg* 1996;122:281-86.
7. Nuti D, Vannucchi P, Pagnini PI. Lateral canal BPPV: which is the affected side? *Audiol Med* 2005;3:16-20.
8. Fife TD. Positional dizziness. *Continuum Lifelong Learning Neurol* 2012;18(5): 1060-85.
9. Kim JS, Oh SY, Lee SH, et al. Randomized clinical trial for apogeotropic horizontal canal benign paroxysmal positional vertigo. *Neurology* 2012;78:159-66.
10. Korres S, Riga MG, Xenellis J, et al. Treatment of the horizontal semicircular canal canalithiasis: pros and cons of the repositioning maneuvers in a clinical study and critical review of the literature. *Otol Neurotol* 2011;32:1302-8.
11. Kim JS, Oh SY, Lee SH, et al. Randomized clinical trial for geotropic horizontal canal benign paroxysmal positional vertigo. *Neurology* 2012;79:700-707.
12. Gufoni M, Mastro Simone L, di Nasso F. Trattamento con manovra di riposizionamento per la canaolithasi orozzontale. *Act Otolaryngol Itla* 1998;18:363-7.
13. Casani AP, Nacci A, Dallan I, et al. Horizontal semicircular canal benign paroxysmal positional vertigo: effectiveness of two different methods of treatment. *Audiol Neurotol* 2011;16:175-84.
14. Oh SY, Kim JS, Jeong SH, et al. Treatment of apogeotropic benign positional vertigo: comparison of therapeutic head-shaking and modified Semont maneuver. *J Neurol* 2009;256:1330-6.
15. Imai T, Takeda N, Ito M, Inohara H. Natural course of positional vertigo in patients with apogeotropic variant of horizontal canal benign paroxysmal positional vertigo. *Auris Nasus Larynx* 2011;38:2-5.
16. Lopez-Escamez JA, Molina MI, Gamiz M, et al. Multiple positional nystagmus suggests multiple canal involvement in benign paroxysmal vertigo. *Acta Otolaryngol* 2005;125:954-61.
17. Bertholon P, Bronstein AM, Davies RA, et al. Positional down beating nystagmus in 50 patients: cerebellar disorders and possible anterior semicircular canalithiasis. *J Neurol Neurosurg Psychiatry* 2002;72:366-72.
18. Kim YK, Shin JE, Chung JW. CRT can be used to treat anterior canal BPPV in essentially the same as for posterior canal BPPV. The effect of canalolith repositioning for anterior semicircular canal canalolithiasis. *ORL J Otorhinolaryngol Relat Spec* 2005;67:56-60.
19. von Brevem, Radtke A, Clarke AH, Lempert T. Migrainous vertigo presenting as episodic positional vertigo. *Neurology* 2004;62:469-72.

20. Riggio F, Dispenza F, Gallina S, et al. Management of benign paroxysmal positional vertigo of lateral semicircular canal by Gufoni's manoeuvre. *Am J Otolaryngol* 2009;30:106-111.
21. Fife TD, Steenerson K. Chapter 11. Benign paroxysmal positional vertigo and migraine-associated vertigo. In: DeStefano A, Dispenza F, eds. *Understanding Benign Paroxysmal Positional Vertigo*. Jaypee Brothers Medical Publishers, Ltd, New Delhi, India, pp 212-220.