

BPPV – latest thoughts and the atypical varieties

Dr Soumit Dasgupta

Consultant Audiovestibular Physician and Neurotologist

Alder Hey Children's NHS Foundation Trust, Liverpool, UK

Claremont Private Hospitals, Sheffield, UK

Sheffield Vertigo and Balance Centre, Sheffield, UK

Visiting Neurotologist

Royal Bolton Hospitals, Bolton, UK

Hony. Lecturer

Manchester Centre for Audiology and Deafness

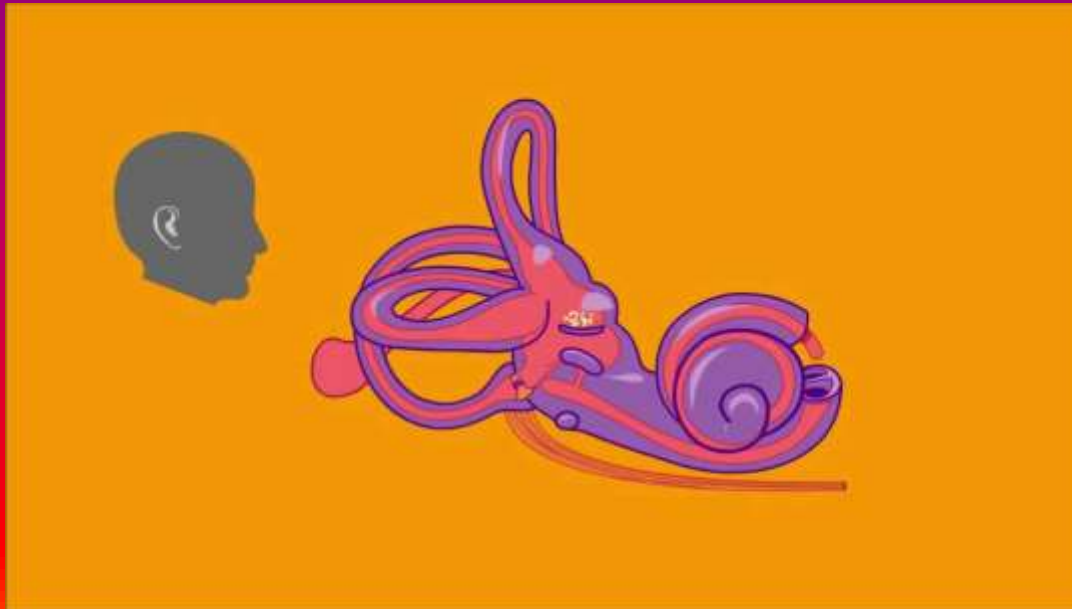
University of Manchester

This presentation

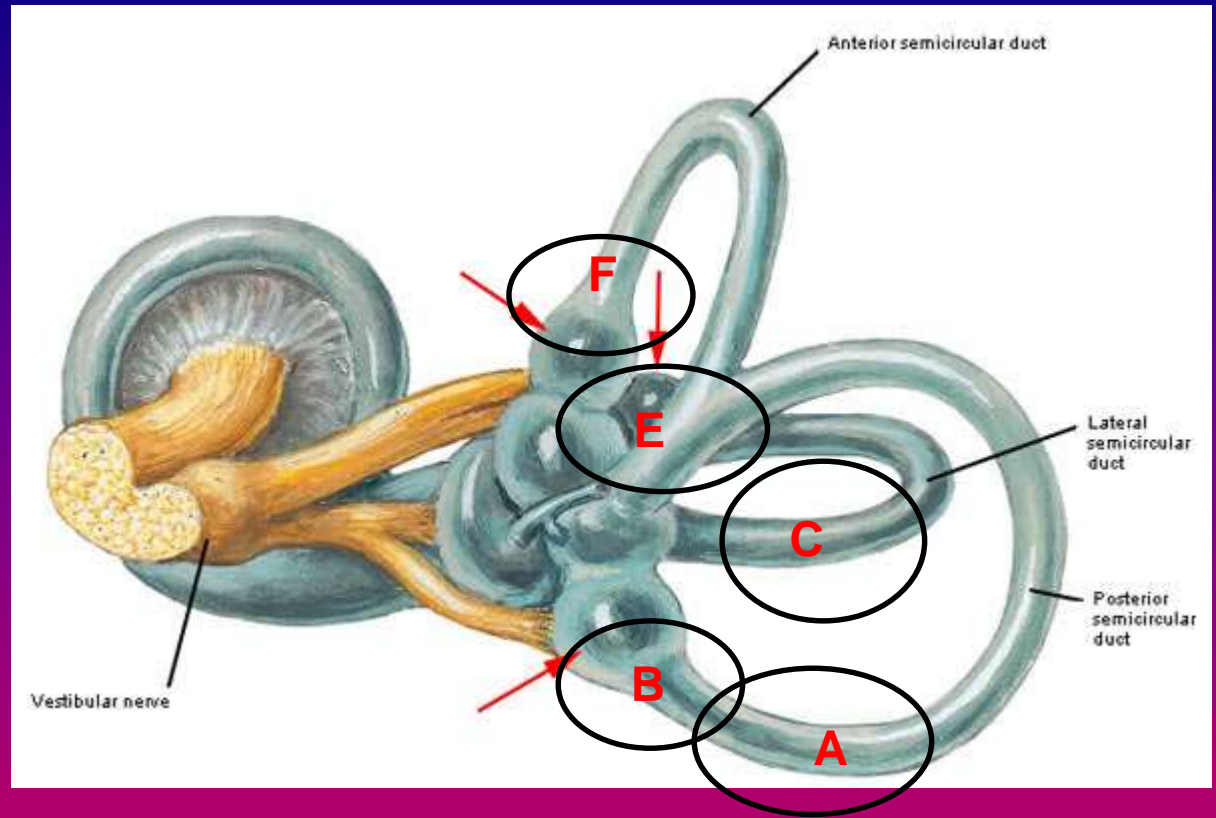
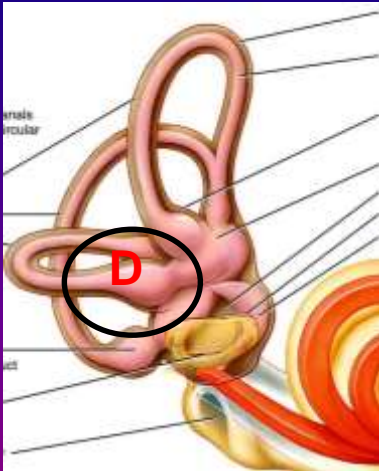
- Introduction and definition
- Relevant anatomy
- Variants
- Diagnosis and management
- Further management
- Conclusion

Introduction and definition

- BPPV is the most common condition involving the vestibular system where the otoconial debris move from the utricular macula to the semicircular canals as a result of trauma, inflammation, hydrops, ischaemia or derangements in calcium homeostasis or could be idiopathic
- Characterised by intense positional vertigo on performing anti gravity head or body movements
- Diagnosed by Dix Hallpike, lateral and deep head hanging tests



Relevant anatomy



- A – long arm PSCC
- B – short arm PSCC
- C – long arm LSCC
- D – short arm LSCC
- E – common crux ASCC & PSCC
- F – short arm ASCC

Direction of nystagmus governed by Flourens and Ewald laws

Variants

- Canalolithiasis – when particles in canals are free floating
- Cupulolithiasis – when particles are stuck in canals
- *Therefore, theoretically 6 varieties are possible; 2 in each canal*
- *However, each canal can have 2 distinct canalithiasis varieties; in the short arm and the long arm that behave differently*
- *The ASCC canalithiasis variety may be the so called common crux variety which may be a PSCC canalithiasis variety as well*

- Conventional theory of 6 varieties of BPPV has now been extended to 10 varieties – understanding of BPPV is thus becoming more complex
- Knowing the exact diagnosis is essential as particle repositioning exercises are specific and dedicated to treat the variety for maximum benefit
- PSCC long arm canalithiasis is the commonest variety with a 93% incidence followed by the LSCC canalithiasis with 3 – 9% and the most rare is the ASCC canalithiasis with an incidence of 2%
- Also possible are canal conversions and switches and multiple canal involvement
- The conventional wisdom of treating BPPV with an Epley's exercise is fraught with caution as it addresses only one or at the most 2 of the varieties, namely the PSCC canalithiasis or the common crux variety

Diagnosis (Buki et al 2014) and management

The Dix Hallpike test with VNG control

Posterior semicircular canal

Variety	Diagnosis	Treatment
Short arm canalithiasis	Only vertigo in positional movements but no nystagmus on the Dix Hallpike dubbed as BPPV type 2 or subjective BPPV	Brisk Epley
Long arm canalithiasis	Classical ipsitorsional upbeat nystagmus localised to the side of the Dix Hallpike with latent period and fatigue after 1 minute and reversal of direction on sitting	Epley or Brandt Daroff
Cupulolithiasis	Like long arm but with shortened latency and prolonged duration of more than a minute and severe intense vertigo	Semont
PSCC downbeats	Possibly from common crux without any torsional component; with contralateral torsion could be a cupulolithiasis	Half Epley or Yacovini

The Dix Hallpike test and the lateral roll test with VNG control

Lateral semicircular canal

Variety	Diagnosis	Treatment
Short arm canalithiasis	Ageotropic beating towards uppermost ear on the affected side i.e. affected side is lowermost and no nystagmus on Dix Hallpike on the intact side	Bar B Q
Long arm canalithiasis	Classical geotropic nystagmus on the Dix Hallpike on both sides with most strong on the affected side with latent period and fatigue after 1 minute and reversal of direction on sitting	Bar B Q
Cupulolithiasis	Ageotropic nystagmus on Dix Hallpike on both sides with the strongest one on the contralateral side; shortened latent period and prolonged duration	Semont or Brisk log roll

The Dix Hallpike test and the head hanging test with VNG control

Anterior semicircular canal

Variety	Diagnosis	Treatment
Short arm canalithiasis	May be caused by Dix Hallpike; counter torsional downbeat	Yacovini deep head hanging (Hain 2015)
Long arm canalithiasis	Possibly same as common crux but with counter torsional downbeat or even little or no torsion	Yacovini deep head hanging
Cupulolithiasis	Same as long arm but more prolonged and shorter latency	Brisk Yacovini deep head hanging

Further management

- BPPV may coexist with other vestibular pathology which must be considered
- A full metabolic screen especially Vitamin D and calcium levels must be performed as Vitamin D is directly linked to otoconial integrity (Dasgupta and Witana 2012) and therapy directed accordingly
- Stroke factors may need to be assessed
- Positional downbeats may be central; thus imaging may be indicated
- Surgery is very rarely indicated
- Cognition must be addressed

Conclusion

- The understanding of the complexities of BPPV have important treatment implications and cannot be emphasized enough
- Correct diagnosis and regular monitoring leads to favourable outcome even in the most resistant cases
- Otoconial weight and integrity is an important aspect which must never be overlooked



Grateful acknowledgement with quoted evidence and personal communication to Marco Mandala in Siena and Timothy Hain in Cincinnati

Thank you