

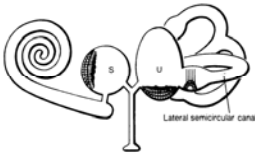
Rotatory Chair Testing 2008

Timothy C. Hain, M.D.

Rotatory Chair Overview

- Rotational chair tests the lateral canals
- Both sides are stimulated simultaneously
- Much more expensive than ENG
- Gold-standard test for Bilateral vestibular loss
- Useful to validate caloric paresis

5 sensors, 2 tests



- Clinical Correlate: can only measure 2/5 -- lateral canal and saccule with available vestibular tests.
- Rotatory chair measures lateral canal.

Active head rotational testing

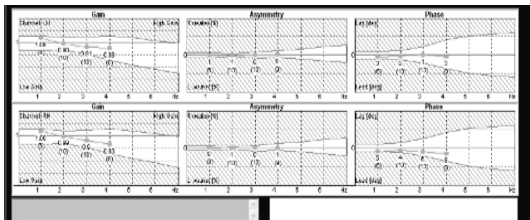
- (Vorteq/VAT)
 - Voluntary movement of head, measure eyes.



Vorteq (Micromedical Technology)

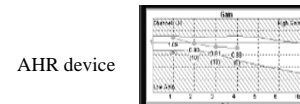
Vorteq Output

- Provides high frequency gain information
- Also tests vertical canals/sacculle (together)

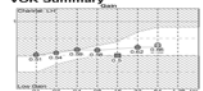


Rotatory Chair

Provides low and high frequency data that partially overlaps with AHR.




Rotational Chair Summary:
VOR Summary



Chair


Rotatory Chair Method

- A moderately powerful motor is attached to a chair
- An attempt is made to characterize the performance of the vestibular system using a range of frequencies



Rotatory stimulus profiles


- Sinusoidal rotation (easy, predictable)
- Sum-of-Sines (SOS) - unpredictable
- Step responses - predictable



All provide similar diagnostic data.

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Rotatory stimulus profiles

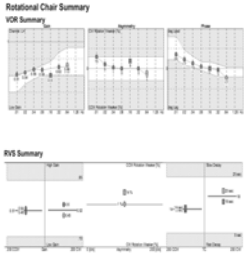
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All provide similar diagnostic data.

Outcome measures

- Sinusoidal methods
 - Gain and Phase vs. frequency
- Step-response
 - Gain (high-frequency)
 - Time constant (Tc)



Diagnostic logic Normal, Unilateral (UL), Bilateral (BL)

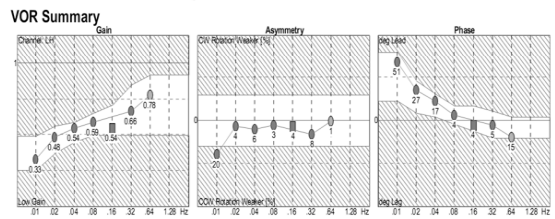
	Normal	UL	BL
Gain	Normal (> 0.7)	Reduced at low freq.	Greatly reduced (< 0.4)
Phase	Normal, Tc of 15	Lead, Tc of 7-10	Lead or no data, Tc < 7

Rotatory chair testing for central disorders ?

- Usually gain/phase responses are unaffected
- Occasionally may have abnormally increased gain or unusual patterns of gain.
- Fixation suppression is often impaired

Normal Rotation Test

Rotational Chair Summary

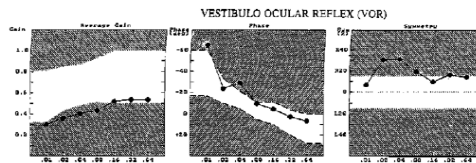


Rotatory chair tests are often normal in many common types of dizziness:

- BPPV (20% of all vertigo)
- Migraine associated vertigo
- Meniere's disease
- Perilymph fistula
- Anxiety
- Occasional unilateral vestibular loss patients

Rotatory chair in unilateral loss

- Not such a good test for unilateral loss (calorics are better, or vibration !)
- No good way to separate unilateral loss from partial bilateral loss
- Sometimes is in error - -some persons with good evidence for unilateral loss have (barely) normal rotatory chair tests.

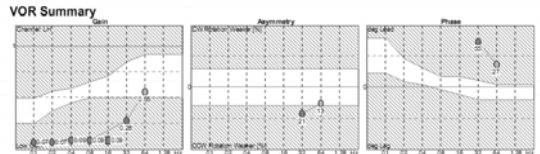


Acoustic Neuroma

Rotatory chair testing is the "Gold Standard" for bilateral loss

Bilateral Loss

Rotational Chair Summary



Patient TC 9-24-08

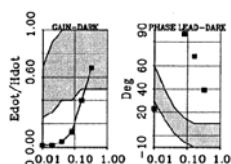
Why do rotatory chair testing ?

- Bilateral loss – best, “gold standard” test
- Validate caloric asymmetry
- Detect suppression of responses

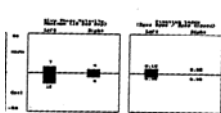
Caloric testing is insensitive to Bilateral Paresis

- Criterion for BVL is total response < 20
- Normal total response is 100
- **Must lose 80% of caloric response**
- Rotatory chair testing easily detects unilateral vestibular loss (50% loss).
- Problem is anatomic variability in caloric responses. False positives also a problem.

Example: Bilateral Paresis with nearly normal calorics



Rotatory Chair
Abnormal gain and phase



Caloric
40% weakness
26.5 total response

Bilateral loss can be confused with voluntary suppression

With complete bilateral loss there should also be:

- Abnormal R-chair and/or Active head test
- Absent VEMP's
- Vestibular pattern on CDP (posturography)
- Total response < 20 on calorics
- Failed DIE test on exam

Summary: Chair testing

1. Supplements caloric test – when normal contrary to caloric, should consider caloric technical factors (like wax).
2. Poor test to establish side of lesion
3. Gold standard for bilateral loss