

# Rotatory Chair Testing

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## 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

## 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



## Active head movement (e.g. VAT)

- Provides similar information to rotatory chair at high frequencies
- As movement is active, there is the potential for contribution of voluntary and neck
- Much less expensive than rotatory chair (about an order of magnitude)

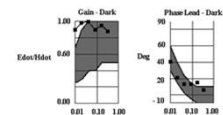
## Rotatory stimulus profiles

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

All provide similar diagnostic data.  
 Sum of sines is probably the best

## Outcome measures

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



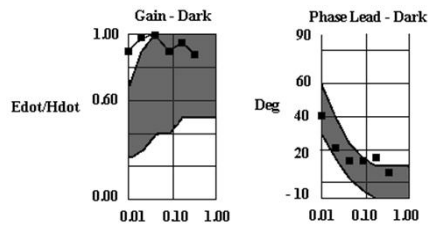
### Diagnostic logic

	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



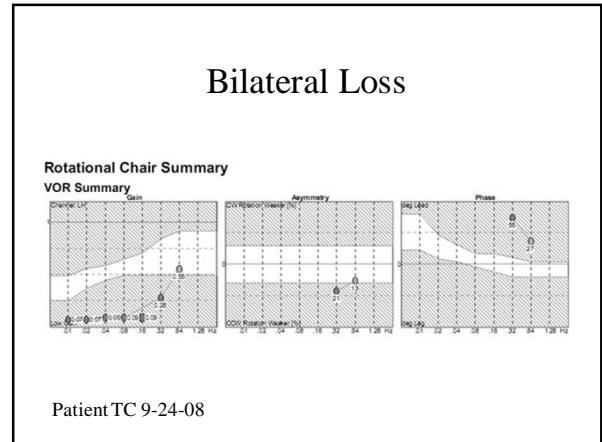
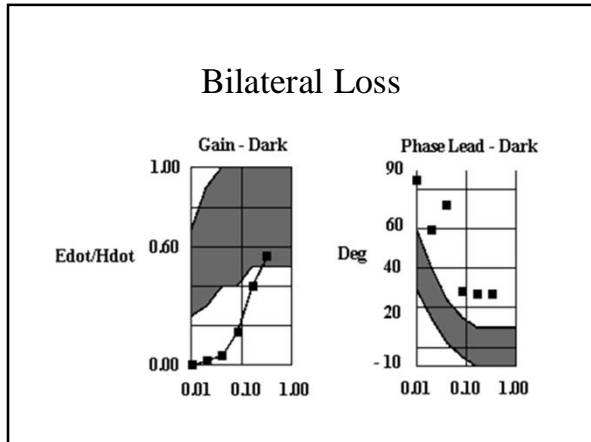
### Rotatory chair tests are often normal in many common types of dizziness:

- 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.

Rotatory chair testing is the “Gold Standard” for bilateral loss



Bilateral loss can be confused with voluntary suppression

With bilateral loss there should also be:

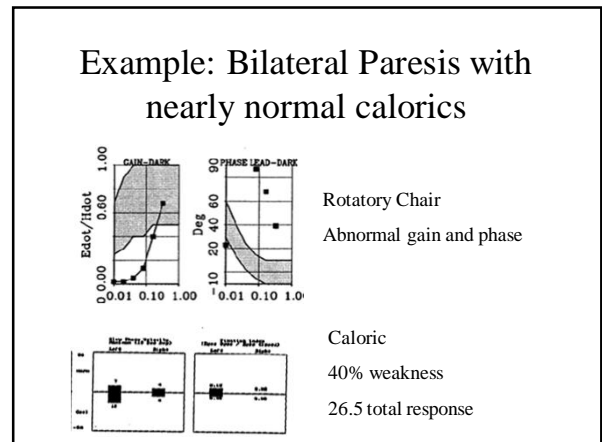
- Severe vestibular pattern on MVP
- Total response < 20 on calorics
- No OKAN at all

### 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

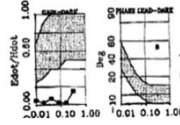
- Criterion for BVL is total response < 20
- Normal total response is 100
- **Must lose 80% of caloric response**
- Rotatory chair testing easily detects unilateral vestibular loss (50% loss).
- Problem is anatomic variability in caloric responses. False positives also a problem.



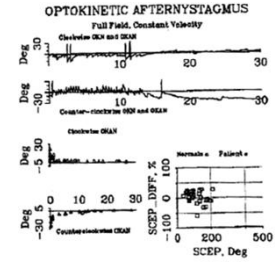
Suppression pattern  
sometimes seen in uncooperative  
or malingering patients

- High-frequency gain is reduced
- Phase is normal at all frequencies

Gentamicin toxicity – is there suppression in  
this medicolegal case ?



MVP shows vestibular  
pattern.



Summary: Chair testing

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