

# What You Need to Know Before Implementing Stacked ABR and/or CHAMP in Your Clinic

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# Patient Symptoms

- Symptoms of small acoustic tumors and early Meniere's disease are similar.
- Meniere's Disease: Idiopathic syndrome of endolymphatic hydrops, i.e., cochlear hydrops.
- Characterized by episodic vertigo, tinnitus, fluctuating hearing loss, and the sensation of fullness or pressure.

# Stacked ABR

# Summary of Standard ABR Test

- **Detects** nearly all **medium** and **large** acoustic tumors.
- **Misses 30-50%** of **small** ( $\leq 1$  cm) acoustic tumors.

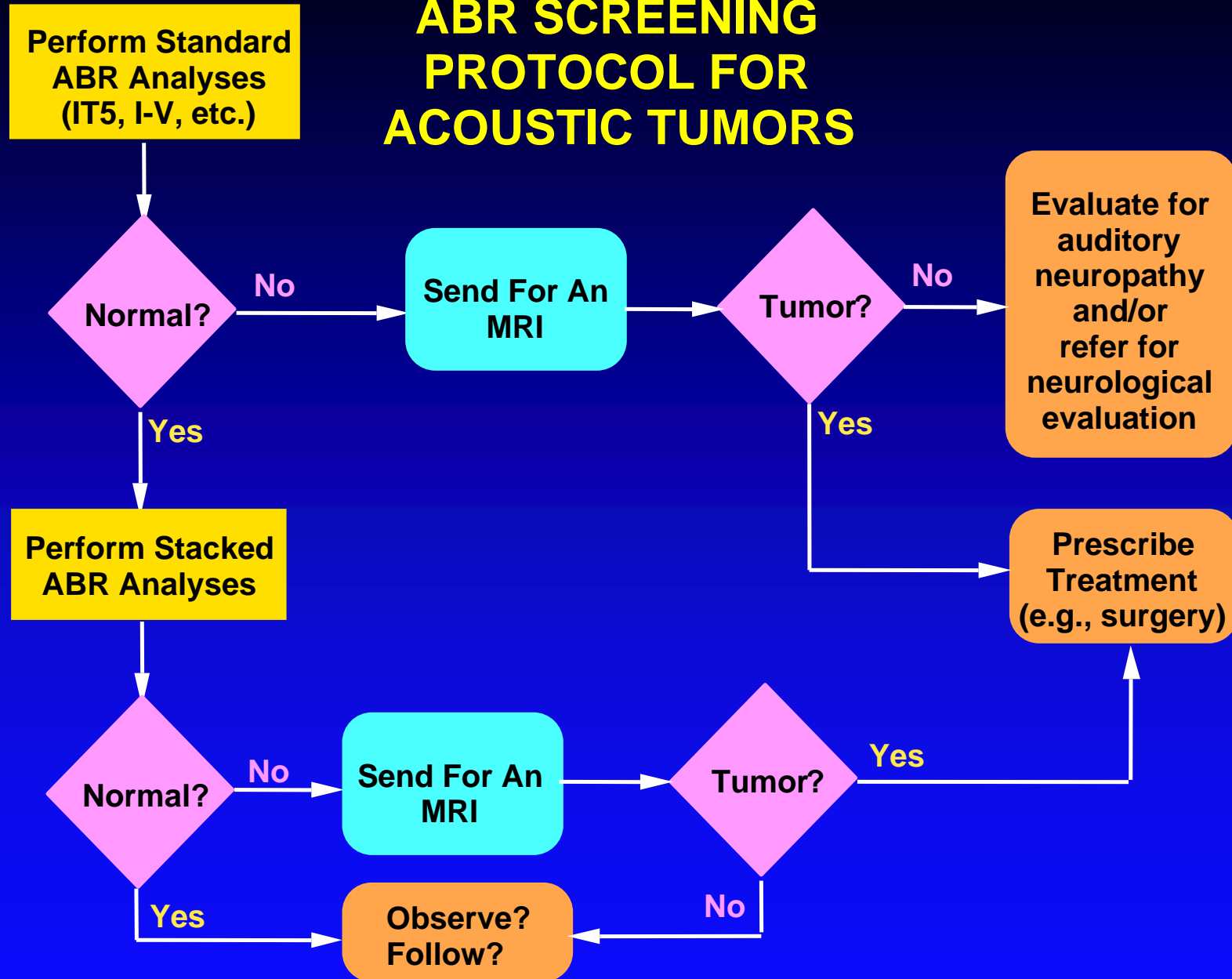
## Consequence of failure to detect small tumors

All patients with suspicious clinical hearing and balance symptoms are sent for Magnetic Resonance Imaging (MRI).

## Drawbacks of Screening with MRI

- MRIs can be relatively expensive (\$2100 in LA)
- MRI not available everywhere
- Invasive, anxiety producing, and uncomfortable test for some patients
- Cannot be used on patients with implanted metal devices or materials
- Less Dynamic – MRI can only confirm the presence or absence of a tumor, but gives you no information regarding the pressure the tumor is exerting.
- **Most patients tested do not have a tumor**

# ABR SCREENING PROTOCOL FOR ACOUSTIC TUMORS



# **CHAMP (Cochlear Hydrops Masking Procedure)**

# Diagnosis and Treatment of Meniere's Disease

- Cochlear Hydrops and Meniere's Disease are often misdiagnosed.
  - Histopathological Studies have shown that hair cells are often normal in patients diagnosed with Meniere's (*Schuknecht; 1968, 1974*)
  - Therapeutic approaches (both surgical and pharmaceutical) assuming involvement of cochlear hydrops are not always effective.

## Diagnosis of Meniere's Disease

- Previous measures (ECochG) do not show clear separation between Meniere's Disease and normal non-pathological patients.
- Early work with cochlear and neural potentials attempting to diagnose Meniere's (*Schmidt , Eggermont, & Odenthal, 1974; Durrant & Dallos, 1974; Durrant & Gans, 1975; Eggermont, 1979*).

## **IMPORTANT!**

- Do not confuse the Stacked ABR method with the CHAMP method for evaluating Meniere's disease.
- The Stacked ABR is for small tumor detection and is not used for Meniere's disease assessment.

# SABR/CHAMP Minimum Background Knowledge

- Basic understanding of auditory system physiology
- Understanding of standard ABR protocols and parameters
- Experience/competence with standard ABR is a prerequisite. Even audiologists who are trained at performing standard ABR will need additional training. Remember Standard ABR is a latency measure – Stacked ABR and the 2<sup>nd</sup> measure of CHAMP are amplitude measures.
- Recognizing electrical interference and excessive noise
- Knowledge of troubleshooting techniques (listening checks, checking hardware and cables, calibration)
- Understanding of the limitations of the audiogram, and why it may not always exactly reflect neural response

# SABR/CHAMP Testing Condition Requirements

- Data should be collected in a sound booth/suite or a quiet room.\*
- There should be no electrical interference.
- Patient should be able to rest or lie down comfortably for testing (using a recliner, cot, or table).
- Patient's head and neck should be relaxed and comfortably supported.

## SABR/CHAMP House Ear Institute Testing Conditions

- Data were collected in a sound booth.
- Patients were tested in a recliner.
- No sedation was required for any of the published studies.

## SABR/CHAMP Data Collection Time Requirements

- In the beginning, expect test time of approximately 1.5 to 2 hours (including patient preparation)
- Once you become comfortable with patient preparation and testing, expect test time to be approximately 45 minutes to 1.5 hours.

# SABR/CHAMP Training Requirements

- Read the recent publications on SABR and CHAMP (see reference list).
- Attend a lecture given by Dr. Don (go to [www.acecenters.com](http://www.acecenters.com) for dates).
- Review/reference SABR/CHAMP training CD with practicum materials.
- Attend a 1.5 day practicum (courses offered quarterly, go to [www.acecenters.com](http://www.acecenters.com) for dates).
- You must meet minimum training requirements to receive full support.

## Billing and Reimbursement

- There is currently not a CPT code for SABR or CHAMP.
- Facilities have had the most success billing the extended ABR code: 92585-22.

## Appropriate Patient Referrals

- Referring physicians should be made aware of the patient exclusion criteria for SABR and CHAMP.
- Referring physicians should be aware of SABR and CHAMP limitations.
- Referring physicians may consider developing clinical policies and procedures for the administration of light sedatives during the SABR or CHAMP techniques.

## Stacked ABR Exclusion Criteria

1. Flat hearing loss  $\geq$  55-60 dB HL.
2. Residual hearing only at frequencies  $\leq$  750 Hz.
3. Conductive or mixed hearing loss (middle ear pathology).
4. Neurological disorders (e.g., MS, head trauma, Huntington's disease, etc.).
5. Hyperacusis.

## CHAMP Exclusion Criteria

1. Flat hearing loss  $\geq$  65-70 dB HL.
2. Residual hearing only at frequencies  $\leq$  750 Hz.
3. Conductive or mixed hearing loss.
4. Neurological disorders (e.g., MS, head trauma, Huntington's disease, etc.).
5. Hyperacusis.

## Remember!

- Only perform the Stacked ABR if the standard ABR measures are normal.

If the standard ABR measures are abnormal, there is no need to do the Stacked ABR.

- The stimuli are presented at 60 dB nHL.

If the hearing loss is  $> 60$  dB HL or so, you won't see much in the responses.

## Limitations of Stacked ABR

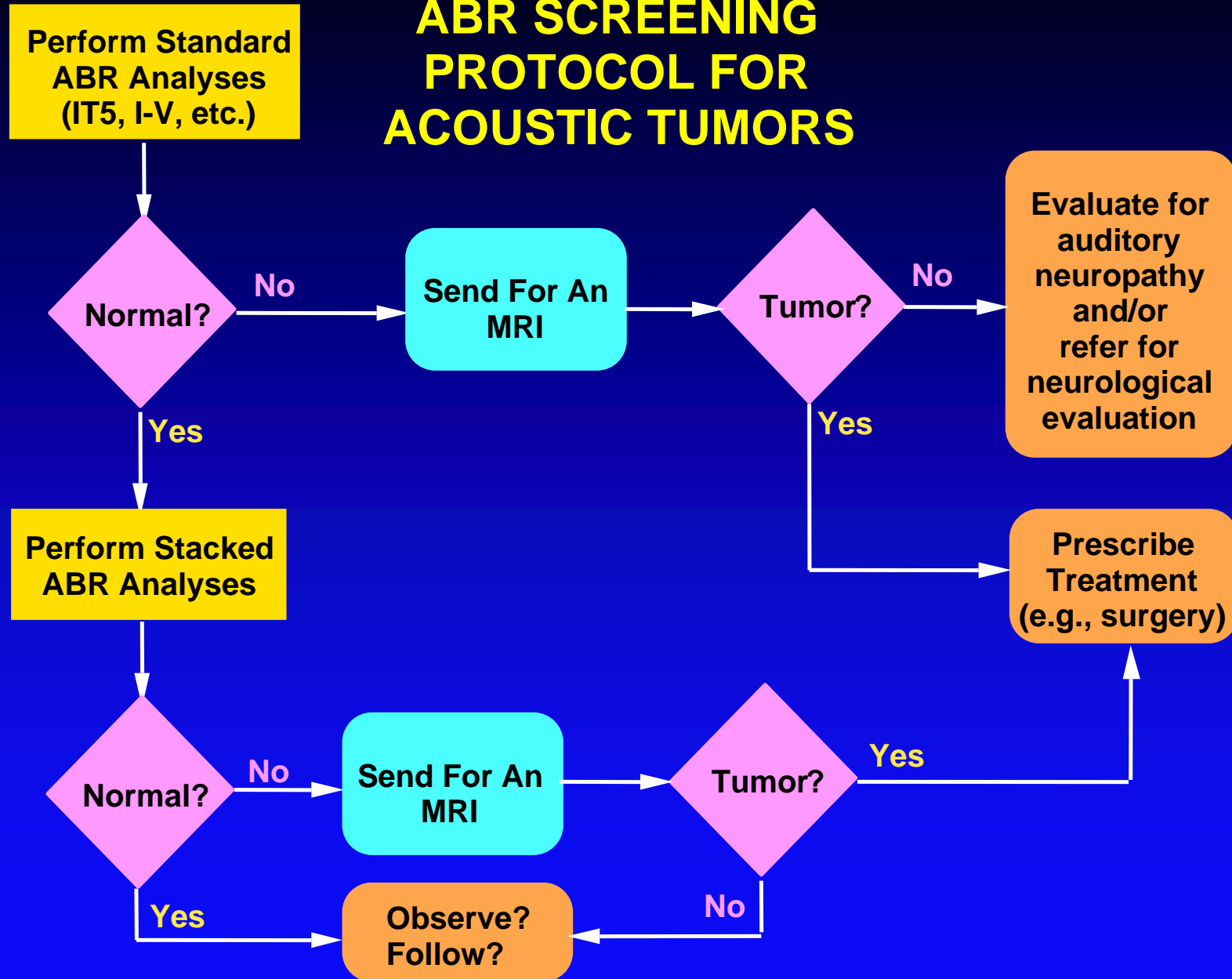
- To maximize the test's sensitivity to small acoustic tumors, careful data collection and analysis are absolutely essential.
- SABR amplitude may be affected by age-related factors.
- SABR amplitude may be reduced in patients that have mild to moderate hearing loss.

*When you test these patients, you must use your clinical intuition and consider other clinical test results.*

## Limitations of Stacked ABR cont'd.

- IT5 detects nearly all large and medium sized tumors and better than 50% of the small tumors.
- The 95% detection criterion means that about 1 in 20 small tumors will be missed by the Stacked ABR.
- Standard tests are latency measures and different from the amplitude based Stacked ABR measure.
- Thus, it is possible that the rare small tumor missed by the Stacked ABR will be detected by the standard ABR tests. That is, that tumor is one of the 50% detected by the standard (IT5) measure. That is why you must use the recommended screening protocol.

# ABR SCREENING PROTOCOL FOR ACOUSTIC TUMORS



## Limitations of CHAMP

- To maximize the test's sensitivity to cochlear hydrops, careful data collection and analysis are absolutely essential.
- Published studies describe two distinct populations: individuals with full-blown Meniere's disease and normal hearing, asymptomatic subjects.

*Ongoing investigations are focused on patients with less than three symptoms, those with hearing loss, and older patients.*

## Before you test clinical patients. . .

### 1. Familiarize yourself with the program.

Use the manual. Run through the data collection steps and practice the analyses until you're really comfortable with the program.

### 2. Practice on normal-hearing friends and family first! DON'T practice on a patient!

The best subject(s) to practice on first are young (early 20's) normal-hearing women.

### 3. Create Clinical Norms specific to your facility and test set-up.

## Cost of System and Training

- Contact your local dealer representative for a price quotation.
- Cost of Practicum at Bio-logic- \$150 per clinician (one included in quotation).
- Cost of on-site training travel expenses (\$1500) plus \$300/hour. On-site training only offered after practicum has been attended.

# References

**Don M, Masuda A, Nelson RA, and Brackmann DE (1997).** Successful Detection of Small Acoustic Tumors Using the Stacked Derived Band ABR method. *Am J Otolaryngol.*; 18: 608-621.

**Don M and Kwong B (2002).** Auditory Brainstem Response: Differential Diagnosis. In: Katz J, Eds. *Handbook of Clinical Audiology*, Fifth Edition. Pennsylvania: Lippincott Williams & Wilkins Publishing; pp. 274-297.

**Don M (2002).** Auditory brainstem response testing in acoustic neuroma diagnosis. *Current Opinion in Otolaryngology & Head and Neck Surgery* 10:376-381.

**Don M, Kwong B, Tanaka C, Brackmann DE, Nelson RA (2005)** The Stacked ABR: A Sensitive and Specific Screening Tool for Detecting Small Acoustic Tumors (*Audiology & Neurotology* 10: 274-290)

**Don M, Kwong B, Tanaka C (2005)** A Diagnostic Test for Meniere's Disease and cochlear Hydrops: Impaired High-pass Noise Masking ABRs. (*Otology & Neurotology* 26: 711-722.)