

Improved Success with Amplification via Audiologic Rehabilitation

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Chicago Skyline



Chicago in Summer



Chicago in Winter



Rush University Medical Center



Purpose of Presentation

- To illuminate the relationship between hearing aid fitting and the audiologic rehabilitation process
- To provide ideas for incorporating rehabilitative strategies into clinical practice

Rebirth of Audiologic Rehabilitation

"...slowly, we're starting to recognize that rehabilitative audiology is indeed more...that hearing aid fitting is rehabilitative audiology..."

(Mueller, 1998)

Rehabilitation: Back to the Future

- "Birth" of hearing rehabilitation in USA after WWII (1940s)
- Model rehab programs developed by Raymond Carhart for US Army
- Included:
 - Emphasis on auditory training
 - Personal adjustment to hearing loss/aids
 - Group sessions
 - 2+ week in-patient intense rehabilitation

Rehabilitation: Back to the Future

- By 1970-1990s, emphasis shifted from Carhart Model:
 - Audiologists dispensing products
 - Audiologists in private practice/business
 - Amplification technology
 - Programmable products with digital circuitry
 - Custom in-the-ear products
 - Meeting "targets" with real ear measures

Rehabilitation: Back to the Future

- By 1990s emphasis shifted again:
 - Patient and family expectations
 - Psychological/social factors in hearing aid adjustment
 - Patient education
 - Benefit and satisfaction
 - Quality of life changes with hearing aid

"...slowly, we're starting to recognize that rehabilitative audiology is indeed more...that hearing aid fitting is rehabilitative audiology..."

Mueller, 1998

"...slowly, we're starting to recognize that rehabilitative audiology is indeed more...that hearing aid fitting is rehabilitative audiology... The "hearing aid fitters" are joining hands with the people formerly described as into rehab..."

(Mueller, 1998)

Audiologic Rehabilitation: Why a Rebirth??

- Hearing aids not a magic “cure-all” for communication problems
- “Meeting targets” vs. “Meeting Expectations”
- Expanded med/surg practices needing audiologic rehabilitation follow-up
- Patient-centered, holistic process vs. dispensing a prosthetic device

Terminology: Aural vs. Audiologic Rehabilitation

- **Aural**
 - Suggests focus on ears/hearing
- **Audiologic**
 - More inclusive:
 - Ears
 - Eyes
 - Brain
 - Emotions
 - Social/Psychological Factors

not included. Beyond hearing aid fitting, a comprehensive model would include (a) information on assistive listening devices, (b) training in speechreading, lip-reading, communication strategies, and coping strategies; (c) educational and psychosocial adjustment counseling; and (d) training for communication partners (Arklegev, 2003; Chastol, Alvarez, & McArdle, 2004; Hains, Geba, Oshiro, & Browning, 2002; Hall, 2004; Montgomery & Houston, 2000; Pransky & Kelley, 2002; Spitzer, 2000; Weyer, 2006).

Goals of this Presentation:

- To present some practical ideas for incorporating rehabilitation strategies into a busy clinical practice
- To demonstrate how these strategies can:
 - Enhance amplification service delivery
 - Improve communication effectiveness
 - Increase probability of success with amplification

Adult Rehabilitative Audiology in Brazil

- **Brazilian Ministry of Health: Guidelines for the Provision of Hearing Aids (2004)**
 - Includes: Criteria, Diagnostic Evaluation, Hearing Aid Selection/Fitting, Follow-up
- Stipulates that services accredited by Ministry of Health **MUST** offer a “rehabilitation process”

Provision of Hearing Aids in Brazil

- **Brazilian Ministry of Health: Guidelines for the Provision of Hearing Aids (2004)**
 - “...must offer a rehabilitation process”
 - “...orientation and training for hearing aid use”
 - “...hearing aid validation must be carried out by means of...questionnaires for assessment of benefit and satisfaction provided by the hearing aids...”
 - *Once a year Follow-up: “Evaluation and orientation of hearing aid handling and use, counseling, orientations about communication strategies”*

How Can Audiologic Rehabilitation Enhance the Hearing Aid Fitting in Brazil??

- Income & Outcome Measures
- Significant Others
- Clear Speech

What are "Income Measures"??

- Asking important questions on the front end to insure better outcome of hearing aid fitting
- Are there expectations and attitudes that can undermine the success of the outcome?

Income Measurement Tools

- A variety of tools available
- Two common, easy to administer tools:
 - ECHO (Expected Consequences of Hearing Aid Ownership) (Cox and Alexander, JAAA, 11, 2000)
 - COSI (Client Oriented Scale of Improvement) (Dillon et al., JAAA, 8, 1997)

ECHO: Expected Consequences of Hearing Aid Ownership

- Measures prefitting expectations of hearing aid use
- Companion for SADL (Satisfaction with Amplification in Daily Living) (Cox & Alexander, 1999)
 - 15 items, 7-point response scale
 - 4 sub-scales:
 - Positive Effect
 - Service/Cost
 - Negative Features
 - Personal Image

EXPECTED CONSEQUENCES OF HEARING AID OWNERSHIP (ECHO)

Circle the number that best describes your feelings about each item. Use the same number for all items.

1 = Strongly Dislike, 2 = Dislike, 3 = Somewhat Dislike, 4 = Neither Like nor Dislike, 5 = Somewhat Like, 6 = Like, 7 = Strongly Like

Item	7	6	5	4	3	2	1
1. My hearing aids will help me understand the people I speak to (without lip-reading).							
2. I will feel disappointed when my hearing aids go up because they keep me from hearing what I want to hear.							
3. Hearing my hearing aids in noisy situations.							
4. People will notice my hearing aids more often I mean my hearing aids.							
5. My hearing aids will make the appearance of being a hearing aid user (people's opinion).							
6. My hearing aids will be worn by other people.							
7. Hearing aids will be laughed at or ridiculed for not working (because they are hearing aids) unless I make them work.							
8. Hearing aids will be the subject of other people's jokes.							
9. Using hearing aids will improve my self-confidence.							

ECHO

- Cox & Alexander (2000) used the ECHO to answer these questions:
 - What are realistic expectations for hearing aid wearers?
 - Do novice hearing aid wearers generally hold realistic expectations?
 - Are expectations related to satisfaction post-HAE ?

ECHO

Cox and Alexander (2000) found:

- New users expect: more performance, function, better service/value than they perceive that they receive
- Prospective hearing aid users have preconceived ideas
- Expectations were unrealistically high

ECHO: Pre-Fitting Valuable Information

- Provide prefitting counseling to manage expectations
- Low score on Negative Features - Informational Counseling
- Low score on Personal Image - "red flag"
- Low score on Personal Image *and* Service and Cost - at risk for unsuccessful fitting

COSI: Client Oriented Scale of Improvement

- **PREFITTING:** Patient identifies up to five specific listening situations in which he/she would like to hear better
 - "Want to hear better at the dinner table with my wife and two children"
 - Patient- directed, specific and relevant
- **POST-FITTING:** Change in hearing function for each identified listening situation is recorded

COSI: Client Oriented Scale of Improvement

- Easy, quick to administer
- Patient-centered, individualized
- Allows patient to monitor his/her own goals
- Develops format for pre-fitting counseling
- Eliminates unrealistic expectations

Why use "Income" Measures?

- Save time at the "front end"
- Direct counseling re: expectations for patient and family members
- Document potential "pitfalls" before the fitting process
- May produce better outcomes

Where to find these tools?

- **ECHO:** (not in Portuguese at present)
 - <http://www.ausp.memphis.edu/harl/echo.html>
- **COSI**
 - <http://www.nal.gov.au/Publications/4%20Hear%20aids%20&%20rehab%20procedures.htm>

Outcomes: Did the rehab process make a difference?!?

- Multitude of tools available
 - What do you want to measure?
 - What tool(s) will answer your question and fit your patient population?

Outcomes: Did the rehab process make a difference?!?

- Are there any creative tools out there that can give a LOT of information in a short amount of time??
- TIME!!! Do you have time to administer, score and interpret?

Outcomes: Did the rehabilitative process make a difference?!?

- What are the "Subjective Domains" that will answer this question?
 - Perceived Benefit
 - Overall Satisfaction
 - Hours of Use
 - Quality of Life

Hearing Aid Outcome Measures: Subjective Domains

Perceived Benefit - difference in hearing performance with and without hearing aids

- Objective measures
- Subjective measures
 - APHAB (Portuguese version)
 - HAPI
 - COSI
 - HAPI

Hearing Aid Outcome Measures: Subjective Domains

Satisfaction: how does amplification meet patient's expectations and needs?

- SADL (Portuguese version)
- MarkeTrak Surveys (Kochkin, Hear Journal, 51, 1998)

Hearing Aid Outcome Measures: Subjective Domains

Hours of Use:

- Hours used per day as a benefit measure (Hutton and Canahl, JARA, 1985)
- Related to satisfaction; greater reported satisfaction reported with greater number of hours used per day

Hearing Aid Outcome Measures: Subjective Domains

Quality of Life: -related to everyday participation in activities of life and satisfaction with those activities

- Generic tools
 - SIP - Sickness Impact Profile
 - Euro-Qol
 - Glasgow Health Status Inventory
 - WHO-DAS II (World Health Organization - Disability Assessment Scale)
 - Short Form 36 Health Survey (SF-36).

Hearing Aid Outcome Measures: Which domain to assess during post-fitting verification?

Innovative questionnaire developed to sample several of these domains:

- ILO (International Outcome Inventory) (Cox et al., 2004)
****Portuguese version**

IOI-HA: International Outcome Inventory for Hearing Aids

Only 7 questions - one per domain

- Hearing Aid Use
- Benefit
- Residual Activity Restriction
- Satisfaction
- Residual Participation Restriction
- Impact on Others
- Quality of Life

(Cox, Stephens & Kramer, 2002)

IOI-HA -International Outcome Inventory for Hearing Aids

Hearing Aid Use:

"Think about how much you used your present hearing aid(s) over the past two weeks. On an average day, how many hours did you use the hearing aid?"

(*none *less than 1 hour/day*1-4 hours/day*4-8 hours/day*More than 8 hours/day)

IOI-HA -International Outcome Inventory for Hearing Aids

Benefit:

"Think about the situation where you most wanted to hear better, before you got your present hearing aid(s). Over the past two weeks, how much has the hearing aid helped in those situations?"

(*Helped not at all*Helped slightly*Helped moderately*Helped quite a lot*Helped very much)

IOI-HA -International Outcome Inventory for Hearing Aids

Residual Activity Limitation:

"Think again about the situation where you most wanted to hear better. When you use your present hearing aid(s), how much difficulty do you STILL have in that situation?"

(*Very much difficulty*Quite a lot of difficulty*Moderate difficulty*Slight difficulty
*No difficulty)

IOI-HA -International Outcome Inventory for Hearing Aids

Satisfaction:

"Considering everything, do you think your present hearing aid(s) is worth the trouble?"

(*Not at all worth it*Slightly worth it*Moderately worth it*Quite a lot worth it*Very much worth it)

IOI-HA -International Outcome Inventory for Hearing Aids

Residual Participation Restriction:

"Over the past two weeks, with your present hearing aid(s), how much have your hearing difficulties affected the things you can do?"

(*Affected very much*Affected quite a lot*Affected moderately*Affected slightly*Affected not all)

IOI-HA -International Outcome Inventory for Hearing Aids

Impact on Others:

Over the past two weeks, with your present hearing aid(s), how much do you think other people were bothered by your hearing difficulties?"

(*Bothered very much*Bothered quite a lot*Bothered moderately*Bothered slightly*Bothered not at all)

IOI-HA -International Outcome Inventory for Hearing Aids

Quality of Life:

"Considering everything, how much has your present hearing (s) changed your enjoyment of life?"

(*Worse*No change*Slight*Quite a lot better*Very much better)

IOI-HA -International Outcome Inventory for Hearing Aids

- Normed on adults fitted bilaterally with analog, single-channel, single-memory, compressions ITE hearing aids
- Two sets of norms for subjectively assessed mild-mod loss and mod-severe loss (Cox et al., 2003)

IOI-HA -International Outcome Inventory for Hearing Aids

- Can be used to assess the relative success of a hearing fitting
- Can present clinical baseline against which individual performance can be evaluated
- Can determine rehabilitative issues in each domain

IOI-HA in Clinical Practice

- Cook & Hawkins (2007) mailed IOI-HA to new hearing aid users for 1 year period (Mayo Clinic)
- Results showed:
 - a high level of satisfaction
 - improved quality of life
- Conclusions:
 - IOI-HA was implemented easily with little incremental cost
 - Demonstrate to administrators, patients, and payers that hearing aids and rehabilitative services have positive outcomes
 - Can insure that program quality is being monitored.

IOI-HA -International Outcome Inventory for Hearing Aids

- Practical
- Quick
- Easy
- Normed data
- IOI-HA:

<http://www.sisemb.org/har/haio>
<http://www.sisemb.org/har/haio> (*Portuguese version)



Outcomes: Did the rehab process make a difference?!

- Glasgow Hearing Aid Benefit Profile
- Assesses 6 domains:
 - Hearing Handicap
 - Hearing Disability
 - Hearing Aid Use Time
 - Benefit
 - Residual Disability
 - Satisfaction

Glasgow Hearing Aid Benefit Profile

Hearing Aid Wear Time Domain

In this situation, what proportion of the time do you wear your hearing aid?

- 0 ___ N/A
- 1 ___ Never/Not at all
- 2 ___ About $\frac{1}{4}$ of the time
- 3 ___ About $\frac{1}{2}$ of the time
- 4 ___ About $\frac{3}{4}$ of the time
- 5 ___ All the time

Glasgow Hearing Aid Benefit Profile

- Provides 4 different situations
- Example:

"LISTENING TO THE TELEVISION WITH OTHER FAMILY OR FRIENDS WHEN THE VOLUME IS ADJUSTED TO SUIT OTHER PEOPLE"

» Does this happen in your life? (yes, no)

» 1-5 point rating scale for each of 6 domains

Glasgow Hearing Aid Benefit Profile

- Can nominate 4 other situations (ala COSI)
- Provides normative data
- Can download for computer administration and scoring
- Identifies success or problems in each domain

Summary re: Outcome Measures

- Many tools available: Which domains do you want to assess?
- ILO
 - assess each domain in a relatively quick, practical and patient-centered manner
 - <http://www.ausp.memphis.edu/harl/loi/ha.html> (*Portuguese version)

Significant Others: Always Significant

- Effects of hearing loss on family member/significant other:
 - Experience difficulty in communication AND personal and social relationships (Brooks, Hallam & Mellor, 2001)
 - Hearing aids reduce negative quality of life effects for BOTH hearing impaired individual & SO (Starks & Hickson, 2004)

Expectations of Family Members: Are they different?

- Expectations of Patient vs. Spouse using ECHO prior to hearing aid fitting process (Jachim & McCarthy, 2004)
 - Compared expectations of new hearing aid users with the expectations of spouses
 - Administered to 15 dyads
 - Modified ECHO given to spouse

Expectations of Family Members: Are they different?

- Results:
 - No significant differences between groups
 - However, individual dyads showed markedly different "expectations" on a number of items
- Conclusion:
 - Look at individual items rather than "total" scores for pre-HAE counseling

Family & Significant Others: Always Significant

- Outcomes of adult group post-HAF rehabilitation classes (Preminger, 2003) :
 - Increased use of communication strategies
 - Reduction in hearing handicap
 - GREATEST reduction in handicap among subjects who attended with family or Significant Others

Families & Significant Others: Always Significant

- National Council on Aging (NCOA, 1999)
 - surveyed 2,300 hearing impaired
 - surveyed 2,090 close family/ SO
 - 50 yrs. and older
 - Looked at benefit of hearing aids reported by individuals and family members

Families & Significant Others: Report Greater Hearing Aid Benefit

- Relationships @ home
 - Hearing Aid Users: 56%
 - Family Members: 66%
- Life Overall
 - Hearing Aid Users: 48%
 - Family Members: 62%

Family & Significant Others: Take-Away Message

- Incorporate expectations of SO and/or family into pre-fitting counseling sessions
- Include family members and/or SO in post-fitting sessions
- SO and family members need rehabilitation process, too!!

Speak Clearly

- What is "Clear Speech"?
 - speech that is somewhat slower and precisely enunciated
- Comparison of "clear" vs. conversational speech
 - found average improved intelligibility with Clear Speech was 17%
 - definite changes in acoustic structure of speech result from clear and intelligible speaking style (Picheny et al., *JSHR*, 1985)

Speak Clearly: What is it?

- **CLEAR SPEECH** - distinct acoustic parameters:
 - Speaking rate reduced substantially
 - Stop bursts and word-final consonants produced
 - Consonants and vowels are lengthened
 - Acoustic vowel spaces expanded
 - F0 mean and range are greater
 - Long term speech spectrum 5-8dB louder
- (Picheny et al., 1986; Bradlow et al., 2003)

Clear Speech

Results of Clear Speech

- Vowels are full and complete
- Consonants are longer and closer in amplitude to vowels
- Word endings preserved
- Distinct stress patterns emerge

Clear Speech

Conversational vs. Clear Speech

"The kids'r swim'n in the pool"

vs.

*"The kids (pause) are swimming
(pause) in the pool."*

(Clark and English, 2004)

Clear Speech

- Can be produced by almost anyone (family members!)
- Minimum 10-15 minutes of instruction (Schum, 1997)
- Provides a benefit above and beyond the hearing aid

Clear Speech

- **Speakers should:**
 - speak as clearly as possible as if trying to communicate in a noisy environment
 - enunciate consonants and avoid slurring words
 - naturally louder and naturally slower
 - no monotone, staccato, artificial, exaggerated or shouted speech

Clear Speech

- Can simply asking a speaker to speak clearly be effective?
- **YES!**
- Does providing instruction to communication partners make a difference?
- **YES!**
 - Providing intervention resulted in more changes in speech parameters, more stable changes and better speech recognition

> (Caissie, Campbell, Frenette, Scott, Howell, and Roy, 2005)

Clear Speech: Family

- Caissie et al. (2005):
 - Trained spouses to use Clear Speech
 - Compared conversational and clear speech
 - HI subjects performed as well as normal hearing with clear speech samples
 - Did not perform as well with conversational speech
 - **Conclusions:** Training family members in clear speech results in improved speech recognition for persons with hearing loss

Clear Speech

- Find patient hand-out info at:

<http://otikids.oticon.com/eprise/main/Oticon/com/SEC_Products/SEC_OtiKids/Parents/Networking/LST05_RecommendedReading>

Clear Speech: Brochure



Clear Speech: Take-Home Message

- involves the family
- is easy to explain and teach
- information can be disseminated with hand-outs
- is logical and practical
- produces almost immediate results if done correctly

Groups, Groups, Groups

- **Not a new idea !**
 - Historical note: Raymond Carhart initiated the first hearing aid follow-up groups following World War II at Deshon General Hospital.
- **Consistent with one of the hottest current trends in health care: patient education**
- **Economic impetus: "cost-effective"**
(Now I've got your attention!!)

Groups, Groups, Groups

- Recent studies have fueled interest in "group rehabilitation"
- Preminger (2003) found significant reduction in HHIE/A handicap scores following 6-week adult group rehab
- Even 3 hours of group sessions have shown reduced hearing handicap (Abrams et al., 1992)
- Beynon, Thornton & Poole (1997) found significantly greater reduction hearing handicap in subjects who attended 4-week group rehab course following HAF

Groups, Groups, Groups

Abrahamson & Wayner (1997) cite potential benefits to offering group rehab programs:

- PEER INTERACTION AND SUPPORT
- REALISTIC EXPECTATIONS
- SPOUSE INVOLVEMENT
- FREQUENT CONTACT WITH THE AUDIOLOGIST DURING THE TRIAL PERIOD
- OPPORTUNITY TO PRACTICE SKILLS
- QUALITY SERVICE
- COST EFFECTIVENESS

Groups, Groups, Groups

Support for group rehab found in often quoted Northern & Beyers study (1997):

- N= 7178 hearing aid purchasers:
- 42.3% participated in HELP (Hearing Education & Listening Program)
- Overall return rate for all subjects = 7%
- Return rate of group not attending HELP classes = 9%
- Return rate of group who attended HELP classes = 3%

Groups, Groups, Groups: Take-Home Message

- post-hearing aid fitting group sessions provide a "win-win" situation for patients, families and audiologists
- *"...besides, its not only stimulating and fun, but a clear demonstration that we are indeed a "doctoring" profession that practices the aural rehabilitation services we preach." (Ross, 1997)*

What is in the Not-So-Distant Future?

- Telehealth
- Distance-learning program modules
- Software for patient education/counseling available either via personal computer or Internet (e.g., LACE, Multi-media HHIE)
- Internet Bulletin Boards, List-Serves and Chat Rooms

Conclusions

- Fitting hearing aids is a labor-intensive rehabilitative **PROCESS**
 - Takes place over days, weeks and months
 - Need to assess pre-fitting expectations
 - Need to measure subjective outcomes

Conclusions

- The hearing aid fitting process involves family members, significant others
 - Not just person with hearing loss

Conclusions

- There are a number of quick, efficient and effective strategies to utilize during the hearing aid fitting process
 - Will improve **SUCCESS** of the hearing aid fitting
 - Will improve **OVERALL COMMUNICATION SUCCESS**

Conclusions

- **"The overwhelming majority of people being fitted with hearing aids for the first time need help. They all can benefit from services that transcend what a hearing aid alone can provide."**

(Ross, 2000)

"The overwhelming majority of people being fitted with hearing aids for the first time need help. They all can benefit from services that transcend what a hearing aid alone can provide. Rehabilitation for them constitutes information and services we provide that will help them minimize the disability and handicap for a hearing loss..."

(Ross, 2000)

AURAL Rehabilitation:

- "add-on" but not critical to success of hearing aid fitting
- rarely offered outside university settings
- focus on lipreading

In the present, **audiologic** rehabilitation is one of the integral part of services offered in clinics, universities, private practices, etc...