

PM&R Assistive Technology Programs

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Special points of interest:

- The role of Rehab Engineering within the VA
- Assistive Technology (AT) highlights

Inside this issue:

AT Lab Highlights: 2
Minneapolis and Palo Alto

AT Lab Highlights: 3
Tampa and Richmond

AT Product Review 4

Special Interest Story 5

Management of Communication Needs in Amyotrophic Lateral Sclerosis 6-7

AT Program Mission 8

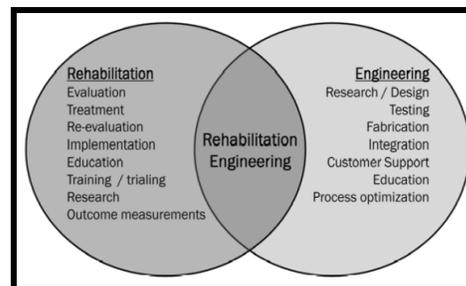
32nd National Veterans Wheelchair 8

The Role of Rehab Engineering within the VA.....Ben Salatin

A definition of rehabilitation engineering comes from the Rehabilitation Act of 1973, which says it is the

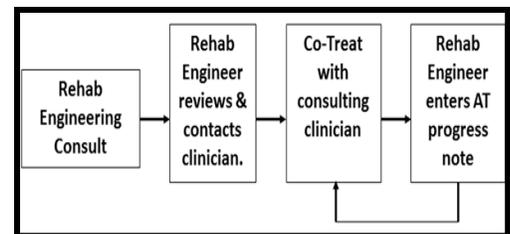
“systematic application of engineering sciences to design, develop, adapt, test, evaluate, apply, and distribute technological solutions to problems confronted by individuals with disabilities in functional areas, such as mobility, communications, hearing, vision, and cognition, and in activities associated with employment, independent living, education, and integration into the community.” What a rehab engineer does can be loosely divided up into 2 general categories: the research category (design, develop, adapt, test) and the application category (evaluate, apply, distribute). The Assistive Technology (AT) Programs within the VA focus on the application side of rehab engineering, servicing 7 different areas:

- ◆ Powered Mobility & Seating
- ◆ Augmentative and Alternative Communication (AAC) Devices
- ◆ Adaptive Driving Vehicles
- ◆ Specialized Computer Access
- ◆ Electronic Cognitive Devices
- ◆ Electronic Aids to Daily Living
- ◆ Adaptive Sports



Within their respective VAMCs, the rehab engineers work with rehab clinicians to restore a patient's ability to participate in activities of choice by integrating technologies into the daily life of the patient. This can be things such as assisting the rehab clinician in:

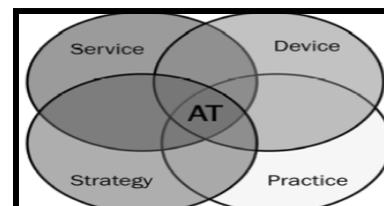
- ◆ Assessing Veterans' needs, tasks and environment
- ◆ Determining the best fit of technology for the Veteran
- ◆ Collaborating with the Prosthetics dept to get AT devices ordered
- ◆ Set-Up and Configuration
- ◆ Training Veteran and caregiver/staff
- ◆ Outcome Measures of Satisfaction and Functional Usage



And also includes:

- ◆ Learning about all the AT devices & software in the VAMC AT library
- ◆ Becoming knowledgeable about Clinical Practice Guidelines
- ◆ Researching the release of new technologies
- ◆ Providing in-services to clinicians on technologies
- ◆ Adapting/Modifying off-the-shelf technologies
- ◆ Developing new technologies
- ◆ Performance analysis
- ◆ Service delivery process refinement

In a nutshell, the role of the rehab engineer within the VA system is to collaborate with other rehab personnel, bringing their technical background into the mix to provide a complete range of AT services, devices, strategies and practices that are applied to improve the functional capabilities of Veterans with disabilities.



AT Lab Highlights...Minneapolis



Outreach to VISN23 and Polytrauma program PNS sites has occurred over the past two months. This has included Minneapolis hosting the Assistive Technology DeepDive Conference Aug 2-3 and establishing a process for informal AT consults and formal patient referral with VISN23 sites.

Closer to home, the AT Program has collaborated with therapy departments in selecting highly specialized rehabilitation devices including:

- ◆ Intendix Brian-Computer Interface (BCI) as a communication device for patients with Locked-In Syndrome due to Parkinson's, ALS, MS and PSA.
- ◆ ArmeoSpring Upper Extremity Rehabilitation system to assist in motor retraining following stroke of TBI.
- ◆ Improved motion analysis and electromyography

systems to enable improve prescription and monitoring of lower extremity prosthetics and manual wheelchair use

Each device offers potential research collaboration with VA and DVBIC research staff.

Installation of a stand-alone computer network with Internet access has begun. This network will extend to the PM&R, VISOR, SCI/D and Speech AT Labs and the inpatient TBI, CVA and SCI/D wards in the medical center. The network will enable improved access to adaptive software, WiFi hotspots for device configuration and training and continuing education resources for clinicians.

Minneapolis Assistive Technology DeepDive Conference

The Minneapolis VAMC AT Program hosted 25 on-site and 12 remote attendees for a

DeepDive AT conference August 2-3, 2012. Presentations focused on clinical aspects of applying technology for AT tracks: Wheeled Mobility and Seating, Adapted Recreation, Augmented and Alternative Communication, Computer Access, Environmental Control, and AT for Cognition. Additional presentations discussed the impact of visual commodities on polytrauma rehabilitation and the SETT model for evaluation, prescription and monitoring of AT. Tours of the medical center were followed up by an open discussion of how Minneapolis and VISN sites could collaborate on specialized application of AT. As a result of the conference, one follow-up consult between Minneapolis and Black Hills has occurred.

AT Lab Highlights...Palo Alto

The Palo Alto VA Assistive Technology Center welcomed Jonathan Sills, PhD, our new program director, on Sept. 4th. The VA is also planning to hire a program support assistant which will help our team manage our outcome follow-ups and general administrative support.

We hosted a "Deep Dive Institute" with the University of Pittsburgh on Sept. 11th and 12th. This was a regional education outreach event combined with an open house for the VA Palo Alto Health Care System staff. The program included a hands-on learning experience for participants to trial cognitive aids, electronic

aids to daily living, adaptive computer access, power seating/mobility, adaptive sporting devices, augmentative and alternative communication devices, adaptive vans, and low vision/sensory aids. In addition to 40 conference attendees, there were over 25 clinicians participating in the program via V-tel.

The AT Center is busy preparing for our upcoming CARF survey and had a successful 2 day program review in August. We are hoping to achieve CARF accreditation in the coming year.

The Assistive Technology team has continued outreach

efforts to spread the word on AT services, most recently to mental health services, long term care, Home Based Primary Care, and the Regional Amputee Center. We are also continuing to serve as an educational/clinical resource to VA providers throughout the western region. Our referrals and patient encounters continue to grow steadily each quarter. We have also received excellent responses on our outcome measures (device satisfaction with meeting desired needs) and are planning to implement a quality of life measure in addition to tracking device abandonment.



AT Lab Highlights...Tampa

The Assistive Technology Program at the James A Haley Veterans' Hospital in Tampa, FL was established in the Spring of 2010. Since that time, we have received a total of 479 consults resulting in over 2000 visits. Upon review of our outcomes data and patient satisfaction using the QUEST (Quebec User Evaluation of Assistive Technology), we have obtained an overall average QUEST score of 4.88 out of a possible 5 points.

In April 2012, we were awarded a three-year CARF accreditation reflecting that our organization met all confor-



mance requirements for quality standards that enhance the lives of persons served. Tampa was the first PRC Assistive Technology Program to obtain CARF accreditation and proudly joined the other 10 accredited programs and services at the James A Haley Veterans' Hospital Physical Medicine and Rehabilitation Service.

The AT Program continually coordinates, provides and organizes access to many educational activities for both staff, students and caregivers including lunch n' learns, live webinars, participation in family education series, lectures, inservices, assistive technology conferences and national presentations.

Additional activities involving the AT program include collaboration among Polytrauma staff, COE and Draper Engineering for development of EEG based assistive technology to evaluate potential for responsiveness and EEG-based bedside communication for

severe brain injury patients. Members of the AT team are also actively involved on the fundraising committee for the National Veteran's Wheelchair Games to be hosted by Tampa in July 2013.

Future plans for the AT Program include expanding our lab from the Polytrauma transitional building to also include space within the new Polytrauma Major Building projected for completion in the Spring of 2013.



AT Lab Highlights...Richmond

The Hunter Holmes McGuire VAMC Assistive Technology (AT) Program has been established since late 2010 and in 2012 saw 457 consults.

The Richmond VA Assistive Technology Program was actively involved in the 2012 Veteran Wheelchair games that was hosted by our VA in June. AT team members assisted everywhere from the airport, to powered soccer, to cycling and everything in between.

The Richmond AT Program implements its mission as serving as an expert resource in the areas of AT through staff education using V-Tel to reach other VA sites, presenting at the local university's BioMedical

Department, holding a booth at the Parkinson Disease Community Education Day and Nursing Skills Days.

The AT Program has actively been preparing for our CARF survey in hopes of achieving CARF accreditation this year.

The goals of the Richmond AT Program is to continue to serve our veterans and active duty members in the achievement of their goals through use of assistive technology as well as grow our TeleHealth AT program to reach veterans who are not able to come to our center. In addition, the AT program plans to develop an AT website for both staff and patients, develop a wheelchair

obstacle course to assist rehabilitation therapist s' in providing a more thorough evaluation and training for wheeled mobility, and develop an AT research and development program in order to better serve our veterans.



AT Product Review

When we are helping a veteran select the appropriate assistive technology, much time and consideration is involved in choosing the right device. We want to make sure that the device will offer the right combination of elements to allow the individual to meet his or her goals. But, how can we be assured it is a good product, and just as importantly, that it is the right fit for a particular patient? In the real world, we have a wide range of options to obtain objective feedback on everything from restaurants to washing machines. In this smaller field of very specialized (and often expensive devices), however, it can be difficult to find good information for the AT professional and the end-user.

As a part of the collaboration between National VA AT Centers and the University of Pittsburgh, VA Assistive Technology clinicians have taken the lead in reviewing assistive technology products, including hardware and software. These reviews rely on the following:

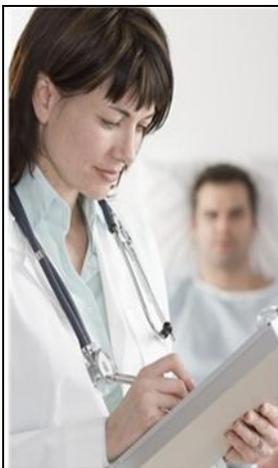
- ◆ Selection of clinically relevant assistive technology;
- ◆ Systematic review of each device; and
- ◆ Input and feedback, via the blog format, from rehabilitation professionals at the four VA AT Centers.

Reviewers provide an overview of the specific product and possible clinical applications, and provide specific comments on its affordability, dependability, durability, ease of assembly and maintenance, and Consumer/supplier repairability. Reviewers also provide input on the device/system's effectiveness, flexibility, learnability, the extent to which the device is easy to operate, and personal acceptability. In comments, these factors also are rated numerically (on a Likert 5-point scale) to combine into overall rating for the device.

To date, the Assistive Technology Center clinicians have completed reviews on 28 products. Some examples of recent product reviews including

- ◆ Medication reminder app for iPad/iPhone
- ◆ Power wheelchair
- ◆ Laser pointer communication device
- ◆ Specialized cognitive device for TBI patient
- ◆ Handcycle

To obtain information on specific product reviews, or for more information about the product review process, contact an AT professional at one of the national VA AT Centers (Richmond, Palo Alto, Tampa, and Minneapolis).



Holly Crabtree's Story

CPO Crabtree is a 32 yo AD OIF Navy female s/p GSW to the L temple in Iraq on 4/15/10 with TBI resulting in moderate sensory, physical, cognitive and communication deficits. She is s/p decompressive craniectomy. Brain imaging revealed a deep white matter stroke (L basal ganglia/posterior internal capsule infarct). She presents with residual anomic aphasia, alexia, agraphia, right hemiplegia, seizure disorder, auditory processing disorder and right hemianopsia. Holly participated in the Polytrauma Brain Injury Program at James A Haley VAMC transitioning from acute inpatient rehab to PTRP followed by the outpatient day program and now resides at home with her daughter for the past two months. Holly received AT services through the Assistive Technology Program in Tampa related to computer access, cognitive orthotics and learning technology. She received the following AT: wireless mouse, 23" flat panel monitor, scanner, DNS II Premium and Read and Write Gold 10. This is what she had to say about the AT Program:

How well did the AT staff keep you informed about your treatment options?

Extremely well

How responsive was the AT staff to your questions?

Extremely responsive

How knowledgeable was the AT staff?

Very knowledgeable

How clear was the information at AT staff presented to you?

Very clear

How helpful were the AT staff?

Extremely helpful

Was your experience with the AT Program better than you expected it to be, worse than you expected it to be or about what you expected it to be?

Better

How well did the AT staff listen to you?

Extremely well

How quickly did the AT staff help you?

Moderately-very quickly. "I know you guys have a lot of patients so you saw me as soon as you could see me."

Overall, were you satisfied with the care you received at the AT Program?

Very satisfied

How likely are you to recommend the AT Program to other Veterans and SMs?

"Definitely!"

In what environments were AT services provided for you?

"In the AT Lab, in my PTRP apartment and in my personal apartment in Tampa."

Do you feel competent and/or independent with the utilization of your technologies?

"It's about a 3 but that's because I have a new question to ask you guys since I moved back home. Something's wrong with my computer." on a scale of 1-5.

Did you feel involved in the goal-making process in AT?

"Yes, it was so overwhelming and I can't really remember that well."

Are you now able to do what you want in terms of the technology?

"Somewhat, better now than before. I can use my iPad and my laptop and my Kindle."

Has your QOL improved in your opinion since receiving AT services?

"Yes."

What can you do now that you were unable to or struggled with before?

"Take classes in school. I am able to use them a lot better now and more independently than I was before."

What was your favorite part of your AT experience?

"You girls are the best. Most of the time I just wanted to go up there to talk to you guys but whenever I had a question, you guys did great with working it all out."

Any other general comments?

"This is so awesome! This is going to help me so much!"

Management of Communication Needs in ALS.....Beau Bedore, MA, CCC-SLP

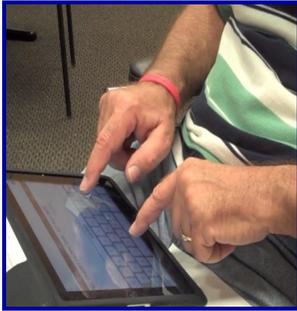


Figure 1.1. Individual with bulbar ALS utilizing an iPad with an augmentative communication app (Proloquo2go). This individual has impaired speech, adequate hand functioning, and adequate mobility and is classified in Grp 3.



Figure 1.2. Individual with spinal ALS utilizing a speech-generating device with eye gaze (Tobii C12 with Ceye). This individual has impaired speech, impaired hand functioning, and impaired

Amyotrophic lateral sclerosis (ALS) is a progressive neuromuscular disease whose cause remains unknown and for which no cure has been identified [1]. Generally, ALS is classified according to three types: bulbar, in which symptoms are first observed in the cranial nerves; spinal, in which symptoms are first observed in the limbs; and mixed, in which symptoms are observed in both brainstem and spinal motor neurons [3]. The best approach to clinical decision making in ALS is to consider not just speech decline, but also decline in upper- and lower-extremity functioning [4]. Yorkston, Miller, and Strand (2004) described a typical progression of the speech course in individuals with ALS:

- ◆ Stage 1: No Detectable Speech Disorder
- ◆ Stage 2: Obvious Speech Disorder with Intelligible Speech
- ◆ Stage 3: Reduction in Speech Intelligibility
- ◆ Stage 4: Natural Speech Supplemented with Augmentative Communication
- ◆ Stage 5: No Useful Speech

(Readers are encouraged to visit www.aac-nerc.com for more information on a clinical pathway model for communication changes with ALS.)

Approximately 95% of persons with ALS are severely dysarthric or unable to speak at some point prior to their death [2]. Because of the high percentage of severe speech impairment in ALS, most individuals will benefit from using aug-

mentative and alternative communication (AAC). AAC assessment and acquisition should be based on observed decline in speaking rate. It is recommended that when speaking rate (calculated from sentence reading tasks on the *Sentence Intelligibility Test*) reaches 125 words per minute, with 190 words per minute considered typical for adult speakers, an AAC evaluation should be initiated [3].

Selection of appropriate augmentative communication systems depends on a variety of factors. Among the most important of these factors in the ALS population is the user's level of mobility and hand function. Six groups, each reflecting different AAC needs, have been identified [5]:

- ◆ Group 1: Adequate Speech and Adequate Hand Function
- ◆ Group 2: Adequate Speech and Poor Hand Function
- ◆ Group 3: Poor Speech, Adequate Hand Functioning, and Adequate Mobility
- ◆ Group 4: Poor Speech, Adequate Hand Functioning, and Poor Mobility
- ◆ Group 5: Poor Speech, Poor Hand Functioning, and Good Mobility
- ◆ Group 6: Poor Speech, Poor Hand Functioning, and Poor Mobility

This classification of groups is one way of providing an overview of augmentative communication needs in the ALS population based on these critical factors; however, one

should always consider the progressive nature of ALS, that capabilities change over time, and that people will move from group to group as their speech, hand function, or mobility changes. Therefore, it is necessary to consider projected changes in capability in addition to the person's current status.

Assessment of current and anticipated capabilities (see Table 1.1) will determine the range of AAC strategies that might be considered for an individual with ALS with regard to speech, hand function, mobility, vision, hearing, cognition, and social support. The AAC matching phase of the assessment involves the identification of low-tech and high-tech AAC options that meet current and expected communication needs while being consistent with current and expected capabilities.

Management of Communication Needs in ALS, cont.

Criterion-Based Assessment of Visual Acuity	
Vision	Determine whether the individual can perceive the visual information associated with the AAC options being considered: Font type and size, color contrasts, display precision, and zoom features are assessed with and without corrective lenses. Typically, a formal eye examination is not required.
Criterion-Based Hearing Assessment	
Hearing	Determine whether the person with ALS and (most important) frequent listeners understand the voice output of the preferred AAC devices. This can be accomplished by creating questions using the device that require a response from various communication partners. Women frequently choose to use male voices if hearing is an issue because of the greater ease of understanding male synthesized speech. Increasing loudness levels of voice output can also facilitate understanding. A trial period of device use is advised to ensure that important communication partners can understand the voice output when hearing may be an issue.
Criterion-Based Cognitive Assessment	
Cognition	Determine whether an individual can operate AAC options and use them functionally to communicate. The person must have access to specific AAC options before a determination of cognition or cognitive function can be finalized. This is especially important if the person is no longer able to produce intelligible speech or dementia is suspected. It is typically not necessary to complete a formal <i>language assessment</i> because it is uncommon for people to experience language impairments as a result of ALS; a screening of overall language skills will usually provide necessary information to determine whether the person will be able to read and spell messages. <i>Literacy skills</i> can be evaluated by determining what the person enjoys reading: If the person indicates that he or she never reads, magazines or newspapers can be used to screen literacy ability.
Assessment of Social Support	
Social Support	This assessment identifies the availability of people to interact with the individual with ALS. It assesses the available technical, instructional, and emotional support for the individual on a regular basis. It attempts to identify whether an individual has the technology support necessary to operate a technically complex AAC system involving communication interaction, computer access, Internet access, and environmental controls. Without ongoing technical support, the complexity of the AAC option might need to be reduced. This assessment will also identify the availability of an AAC facilitator who will coach the individual who relies on AAC, train new communication partners, interact with the AAC specialist and the manufacturer, and troubleshoot problems. AAC facilitators tend to be family members—spouses, adult children, or grandchildren. Friends or clinicians may also serve as facilitators. Finally, this assessment attempts to determine the support of family members regarding the individual's decision to use AAC technology.
Matching Phase → AAC Trials	
Matching Phase	In matching a person with ALS to the available devices, it is important to consider a combination of low-tech and high-tech AAC solutions that allow for communication in multiple environments. The majority of people with ALS are literate and will require a device that allows them to create novel utterances using text-to-speech options.

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Assistive Technology Program Mission

To enhance the ability of Veterans and Active Duty members with disabilities to fulfill life goals through the coordination and provision of appropriate interdisciplinary assistive technology services.

To serve as an expert resource to support the application of assistive technology within the VA health care system

32nd National Veterans Wheelchair Games

April Mizell, CTRS

Thirty-two years ago, a dedicated group of Veterans and volunteers from the Hunter Holmes McGuire Veterans Affairs Medical Center in Richmond, VA launched a landmark event with 74 participants that has continued to grow, and moves annually from city to city across the country.

This year, June 25-30, Richmond VAMC welcomed the Games back home. During this weeklong event, over 600 athletes from all over the United States, Puerto Rico, and Great Britain, competed in 17 different events including track, field, swimming, air guns, archery, trapshooting,

basketball, 9 ball, bowling, slalom, motor rally, hand-cycling, power soccer, weightlifting, swimming, quad rugby and softball.

Our Richmond team consisted of 50 athletes who brought home 80 medals: 43 gold, 25 silver, and 12 bronze. The majority of participants who compete in the Games have spinal cord injuries. Other athletes have disabilities that include multiple sclerosis,

amputations, or traumatic brain injuries.

Some use their wheelchairs as their means of mobility and others can walk but may require use of a wheelchair to compete in sports.

The Veterans get classified and compete against others similar to their abilities. There are also different groups that they fall into for competition such as novice athletes (first-timers), open category (anyone), masters category (those 40 and over). For both spectators and participants, experiencing the Games is an unforgettable, life-changing event.

