Biofeedback:  
An Enhancement of Amputee Rehabilitation  
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Introduction  
The drive for continuous improvement led the ADP to recognize the need to develop a more in-depth myoelectric training program.  

A physiotherapist with specialized training in biofeedback was consulted on two cases.  

Case 1 – was a short above elbow amputee  
\begin{itemize}  
\item The client had reported having a cold limb, leading to phantom pain, which he set as a priority for our intervention.  
\end{itemize}  

Case 2 – above elbow amputation just proximal to the epicondyles  
\begin{itemize}  
\item Primary problems related to determining optimum electrode placement and poor signal control due to co-contractions.  
\item Our program consulted with Dennis to determine the benefit of using biofeedback to select electrode sites, develop and train the appropriate muscle groups.  
\end{itemize}
Intervention

- The triceps and biceps were evaluated and optimum electrode placements were determined.
- The client was then taught the technique of contracting one muscle group while minimizing the contraction of the opposing muscle group.
- Initially he was asked to visualize opening and closing of the hand, then a target SEMG level was chosen alternating from biceps to triceps.
- Progressed to practicing with residual limb held in various functional positions-simulating reaching above the shoulders, to the side, and working in midline at waist height.

Conclusions

- Benefits came from focusing on the condition of the residual limb; problems such as cold limb, muscle tension and phantom limb pain were resolved through the combination of biofeedback and autogenic relaxation.
- Benefits came from focusing on issues related to preparation for myoelectric prosthesis provision such as, electrode site location, reduction of co-contraction, and improved muscle endurance.

Discussion

- Changes were made to our approach based on these two cases
  - Assessment equipment options improved
  - The use of current technology was enhanced
  - The prosthetic hardware options have improved
  - Maximized options for clients on an individual basis through extensive training