Reference

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Effect of Feedback during Virtual Training of Grip Force Control with a Myoelectric Prosthesis

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Products

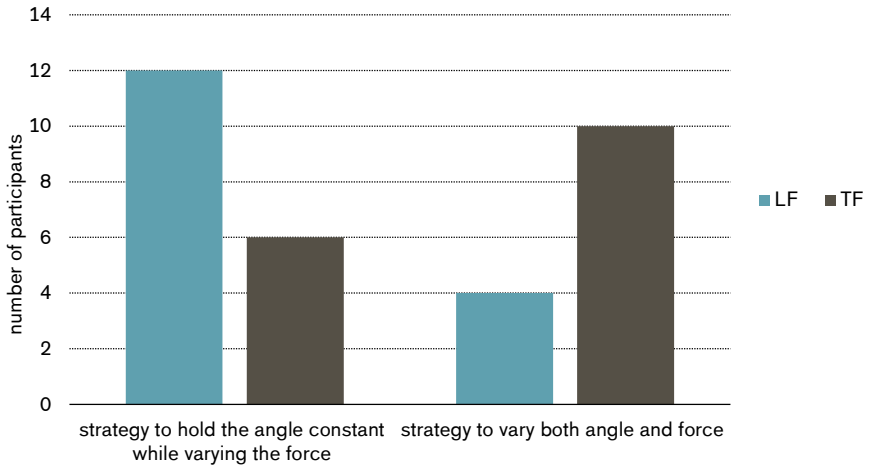
Myoelectric simulator - MyoHand VariPlus Speed

Major Findings

When different types of feedback were compared:

→ Feedback during training is important
→ When performing cognitive tasks keep oral feedback to the minimum

Strategy while performing virtual gaiming in groups feceiving less (LF) and more feedback (TF)



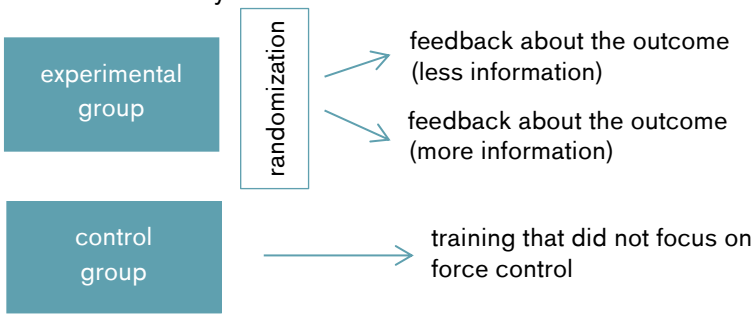
Able-bodied participants were provided with a prosthetic stimulator and asked to play a virtual ball throwing game. By grasping and controlling the handle with the prosthetic simulator, their task was to throw a ball with a certain angle and velocity into a target. One strategy was to hold the angle constant while varying the force (12 participants whom less oral feedback was given (LF) and 6 participants whom more feedback was given (TF)); the other strategy was to vary both angle and force (4 participants with LF and 10 participants with TF). Group which received fewer oral feedback had faster transfer of the learned skills into real life tasks.

Population

Subjects:	48 healthy, able-bodied participants
Previous:	none
Amputation causes:	none
Mean age:	21 ± 3 years
Mean time since amputation:	none

Study Design

A randomized study:



32able-bodied subjects were randomly assigned to either a group that received feedback about the outcome—the landing position of the ball (LF)—or feedback about the movement execution—the applied parameters angle and force, and the trajectory of the ball (TF). Thirty-two able-bodied participants trained grip force with a virtual ball-throwing game for five sessions in a two-week period, using a myoelectric simulator. Another sixteen able-bodied participants received training that did not focus on force control.

Results

Body Function		Activity			Participation	Others	
Mechanics	**Pain**	**Grip patterns / force**	**Manual dexterity**	**Activities of daily living (ADL)**	**Satisfaction and Quality of life (QoL)**	**Training**	**Technical aspect**

Category	Outcomes	Results for different types of feedback	Sig.*
Training	Virtual training	Number of errors decreased over time	n.a.
	Influence of feedback on performance	No main effect of feedback was seen during training.	0
		The type of feedback provided during training influenced the transfer of the learned grip force control to the tests. Movement outcome (LF) enhanced transfer of the learned skill more than feedback on movement execution (TF).	+
	Grip force control	In experimental group transfer of learning occurred from this virtual training to a real life task.	+

* no difference (0), positive trend (+), negative trend (–), significant (++/––), not applicable (n.a.)

Author's Conclusion

"Performance increased during virtual training of force control with a prosthetic simulator, reflected in a reduction in error. Using the TNC approach, variability was shown to decrease mainly as a result of the reduction of N-cost and a good covariation between the used force and angle during training. Grip force control improved only in the test-tasks that provided information on the performance. Starting the training with a task that required low force production decreased transfer of the learned grip force. Whereas feedback on movement execution was detrimental, feedback on the movement outcome enhanced transfer of the grip force to other tasks than trained." (Bouwsema et al. 2014)