

Reference

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Prosthetic use in adult upper limb amputees: a comparison of the body powered and electrically powered prostheses

Prosthetics and Orthotics International, 1986, 10, 27-34

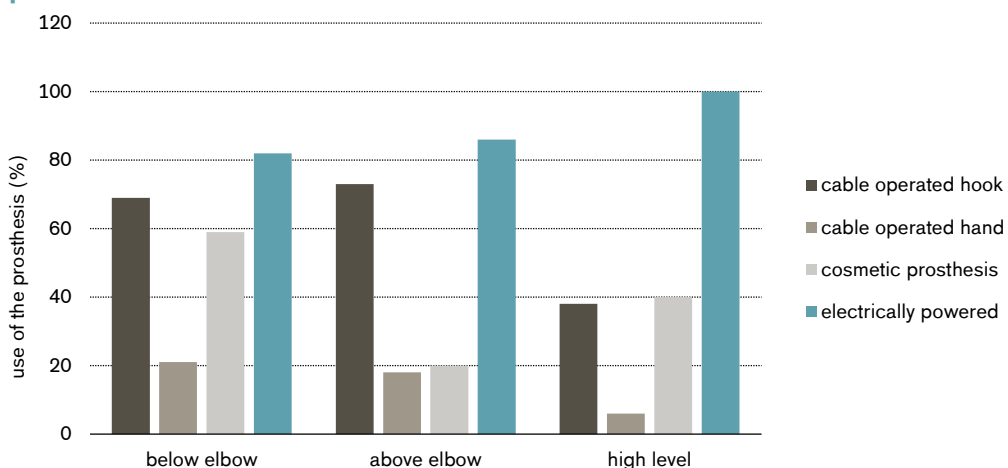
Products

Electrically vs body powered prostheses

Major Findings

- The most preferred prosthesis was electrically powered prosthesis.
- The cable operated hook was the second most favoured prosthesis.
- 82% of below-elbow patients fitted with electrically powered prosthesis reported using it.
- 69% of below-elbow patients fitted with body powered prosthesis reported using it.
- The majority of amputees used more than one prosthesis for their functional needs suggesting that it is necessary to fit amputees with more than one type of prosthesis.

Acceptance of body-powered and electrically powered prostheses



Amputees reported that electrically powered prosthesis is the most preferred one, followed by the cable operated hook, cosmetic and cable operated hand. Acceptance rate for electrically powered prosthesis was 82% at below elbow, 86% at above elbow and 100% at high level amputation.

Population

Subjects: 314 upper limb amputees
Prosthesis type: cable operated hook, cable operated hand, cosmetic prosthesis, electrically powered
Amputation causes: work related accident
Mean age: 49 years
Mean time since amputation: 15 years.

Study Design

Retrospective study:

The period between amputation and follow-up ranged from 1 to 49 years with a mean of 15 years. Evaluation after the follow-up period included the questionnaire and the review of patients' records.

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 electrically vs body powered prostheses	Sig.*
Activities of daily living	Questionnaire (self-designed)	The electrically powered prosthesis was used 8h each day through the week. The cable operated hook was used for an average 8h each work day and 7h on weekend day. The cable operated hand was used for an average 5h each day and cosmetic hand was worn on average 4h per week day.	+
		Work use: Amputees who used electrically powered prosthesis primarily had jobs that involved office work, supervisory work or contact with general public.	+
		Amputees who used cable operated prostheses had jobs that required lifting heavy objects and handling objects that were dirty, greasy or sharp.	-
		Sports use: Both electrically and body powered prostheses were used for variety of sports.	0
		Social use: Electrically powered prosthesis was more acceptable in the social sphere than the cable operated hook.	+
Satisfaction	Questionnaire (self-designed)	Home use: Electrically powered prosthesis was used most often for eating, holding objects and occasionally driving a car.	+
		Complete or useful acceptance of an upper prosthesis was reported in 89% of below-elbow amputees, 76% of above-elbow amputees and 60% of high level amputees.	n.a
		Amputees reported that electrically powered prosthesis is the most preferred one, followed by the cable operated hook.	+
		Acceptance rate for <u>cable operated hook</u> was 69% for below elbow, 73% for above elbow and 38% for high level amputation. Acceptance rate for <u>cable operated hand</u> was 21% for below elbow, 18% for above elbow and 6% for high level amputation. Acceptance rate for <u>cosmetic prosthesis</u> was 59% for below elbow, 20% for above elbow and 40% for high level amputation. Acceptance rate for <u>electrically powered</u> was 82% for below elbow, 86% for above elbow and 100% for high level amputation.	+

Category	Outcomes	Results for electrically vs body powered prostheses	Sig.*
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* no difference (0), positive trend (+), negative trend (-), significant (++/--), not applicable (n.a.)

Author's Conclusion

“The findings of the review of 314 upper limb amputees confirm that complete or useful acceptance of and upper limb prosthesis was reported in 89% of below-elbow, 76% of above-elbow and 60% of high level amputees. Prostheses are well used and essential to the amputees' personal and employment activities. Most upper limb amputees should be fitted with both a body powered and electrically powered prosthesis to meet their various functional requirements. The benefits of these prostheses far outweigh their costs. The cable operated hook s well accepted and used by the majority of amputees for heavy work and precision tasks at work and at home. It provides good sight of grasped objects is not easily damaged and is easy to clean. The cable operated hand and cosmetic prosthesis are used by a small number of amputees primarily for cosmesis at social occasions. In spite of the high initial cost and continued maintenance and repair, improvement in comfort, cosmesis and comfort and function have led to good levels of acceptance of the electrically powered prosthesis. For high level amputees, it provides better function, superior pinch force and requires less energy expenditure than the body powered prosthesis.” (Millstein et al. 1986)

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