USING THE INTERNET FOR AN ANONYMOUS SURVEY OF MYOELECTRICAL PROSTHESIS WEARERS

Christian Pylatiuk, Stefan Schulz
Forschungszentrum Karlsruhe GmbH, Institute for Applied Computer Science (IAI), P.O. Box 3640, D-76021 Karlsruhe, Germany
Phone: ++49-7247-82-2430, fax: ++49-7247-82-5786, e-mail: pylatiuk@iai.fzk.de

INTRODUCTION

In the last decades, a multitude of surveys were carried out to investigate broadly different fields associated with prosthesis acceptance, reasons for non-use or user preferences for artificial hand improvements [1-9]. Typically, interviews were made by telephone [1,2] or during maintenance work on the prosthesis [3-5], or questionnaires were sent to potential users [6-9]. In most surveys, the persons to be questioned were pre-selected by the interviewer using different inclusion criteria, e.g. level of amputation, age, and contact with the limb fitting centre in a certain period or residence in a certain area [6]. Therefore, little is known about non-users that broke tie with the facility that supplied the device. Return rates of completed postal questionnaires typically range from 38% [7], to 49% [9] to 69% [6]. For the first time now, an anonymous internet survey has been performed using a questionnaire that can be answered on a homepage. By this method, it is intended to enable prosthetic hand users and non-users as well to provide information on the acceptance, usage, and wishes for the development of new and improved hand prostheses.

METHODS

An internet survey with 32 questions was designed to anonymously gain information from persons fitted with a myoelectric hand. Prior to making the homepage accessible, a different questionnaire was distributed in a pilot study to patients who routinely visited the prosthetic fitting centre at the University Hospital of Heidelberg. Questionnaires were comprised of all persons meeting the following criteria: Upper limb deficient persons of 14 years of age and older at the time of assessment that have been fitted with an electrically driven prosthetic hand. These questionnaires had been answered between 1st of April 2002 and 2005. The present evaluation is based on the completion of a five-page questionnaire on the non-commercial homepage http://www.handprothese.de/umfrage.htm. The questionnaire consists of different parts: In the beginning, facts about the age and gender of the user and date, reason, and level of amputation are requested. The second part concerns the kind of prosthesis and its use in recreation and working hours. Part 3 covers the subjectively perceived noise, weight, and cosmetic appearance of the prosthesis. Finally, questions about activities a prosthetic hand should be used for and open questions for comments and wishes are given.
RESULTS

Age and gender:
35 persons answered the questionnaire, 27 males and 8 females. The ages of the limb-deficient persons at the time of assessment ranged from 15 to 65 with a mean of 32.9 years. 4 women and 18 men had a traumatic amputation (mean age 36 years), and 4 females and 9 males had a congenital upper limb deficiency (mean age 27.9 years). The period between the accident and this survey ranged from 0 to 51 years with a mean of 18.2 years.

Level of loss:
There were 19 males and 7 females with below-elbow amputations, 6 males and 1 female with above-elbow amputations. 2 persons did not provide any information on the level of loss.

Use:
The question “For how many hours do you employ your prosthetic hand at work” was answered by 69% (24/35) choosing “more than 8 h”, by 11% (4/35) with “4 to 6 hours”, and 20% (10/35) answered “I don’t know”. A recreational use of “more than 8 h” was correct for 66% (23/35), “4 to 6 hours” for 6% (2/35), “occasionally” for 26% (9/35), while 3% (1/35) did not know for how long. 26% (9/35) can operate the prosthesis with one battery charge, 34% (12/35) just one day, 16% (4/35) less than one day, and 28% (10/35) answered “I don’t know”.

Subjective evaluation:
80% (20/25) consider their electrically driven hand to be too slow. The cosmetic appearance is rated “good” or “very well” by 40% (10/25) and “bad” or “very bad” by 60% (15/25). 72% (18/25) are “little” or “not at all” personally irritated by the noise of the prosthesis, whereas 28% (7/25) do not feel acoustically disturbed. 20% (5/25) complain about the prosthesis weight as being much too high, 56% (14/25) consider it a little too high, and for 24% (6/25) it is acceptable.

Desired activities and functions:
The respondents were asked “which of the following activities would you like to perform with your prosthesis?” and the answers given are:
Personal hygiene (washing, cleaning teeth): 76% (26/34)
Using cutlery: 79% (27/34)
Dressing and undressing 68% (23/34)
Writing 56% (19/34)
Opening and closing a door 74% (25/34)
Operation of electronic and domestic devices and switches 71% (24/34)
Bricolage 82% (28/34)
A difference was found between persons with a traumatic amputation, who selected an average of 5.4 of the 7 possible activities, and persons with a congenital limb deficiency, who marked only 4.2 activities with a cross. In particular, the prosthesis is wanted to be usable for personal hygiene by 86% (19/22) of the persons with a traumatic amputation compared to 58% (7/12) of the other group. 86% (18/21) would like to have a force feedback system integrated in the hand, whereas 65% (11/17) want additional functions like a temperature sensor. 33% (9/27) would accept a new prosthesis that has less grasping force, but a lower weight by
30% compared to conventional myoelectrical hands. 33% (9/27) would not accept such a new hand and 33% (9/27) do not know whether they would accept it.

**DISCUSSION AND CONCLUSIONS**

**Limits of the survey:**

As the survey was designed to be answered anonymously, there is no certainty of limb deficient persons only having completed the questions. However, there is no evidence of manipulation indicated by a certain repeated pattern of answering the questions. Another restraint of the results can be attributed to the number of questions and pages of the survey. Whereas almost all users answered all questions of the first two pages, the rate decreased to 63% (22/35) on the last page. Although there are an increasing number of persons in Germany fitted with a speedy myoelectric hand, all six responses received in the last six months rated the grasping speed of their artificial hand as being too slow. One explanation is that the respondents have become aware of the fact that there are faster hands in the meantime. Consequently, a question for the exact type of myoelectrical prosthesis should be included in a revised survey.

**Comparison of the results**

It was found that the majority of users utilise their prosthetic hand 8 hours or more on an average working day, which corresponds to the results found by [3] and [6]. In line with the results of [5-7], it was also found that light weight, speed, and the cosmetic appearance are important issues to be raised when designing a new prosthetic hand. With the present study, it was demonstrated that information on whether prosthetic hands are used in daily life and for what kind of activities they should be applicable can be gained by an anonymous internet interview.

**REFERENCES**


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