

PERSPECTIVE OF A PRM SPECIALIST ON REHABILITATION OF PERSONS FOLLOWING UPPER LIMB AMPUTATION

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INTRODUCTION

The human upper limb, especially hand, is a very complex part of the body with many different functions including motor, sensory and expression. After amputation, all functions of the human hand are lost. The amputation dramatically changes a person's sense of body image, it has severe psychological consequences and it influences a person's satisfaction with life (1). Due to lost functions, a person has problems at many activities, leisure pursuits, social contacts as well as at work (2 - 9). The main aim of rehabilitation is to enable persons of any age, gender or culture to become independent in performing individual meaningful activities of daily living and to reintegrate them into society (to be able to participate in all social roles).

TEAM WORK

The key to successful rehabilitation of people following upper limb amputation is teamwork (10) which improves short- and long- term outcomes (11, 12). The team consists of the patient and his or her family, surgeons experienced in upper limb amputation, specialists of physical and rehabilitation medicine (PRM), nurses, occupational therapists (OTs), physiotherapists (PTs), certified prosthetist orthotists (CPOs), psychologists, social workers, vocational counsellors, and others, all with special knowledge and experience in rehabilitation of people following upper limb amputation. It is important that all the stakeholders are included into rehabilitation and its planning. The rehabilitation team has to contact the school for persons who are still in the educational process or the employer for those who are working and together with them find the optimal solution for the individual. Recommendation B (good practice) of British guidelines for amputee and prosthetic rehabilitation is that experienced clinical counselling and psychological support should be available to all upper limb amputees (13).

The rehabilitation team has to work on all levels of human functioning (14, 15) in an interdisciplinary way. The team also has to use valid, reliable and sensitive outcome measures to demonstrate the improvement and the effects of work. All team members have to participate in the research work. Unfortunately there is only little low-quality evidence

which supports our work and demonstrated benefits of newly developed prosthetic components.

RESEARCH

Our research work focused on four main areas: outcome measurement for children and adults; development of CAD CAM system and further procedures which will allow us to make silicone partial hand prostheses as mirror copies of the non-amputated hand; problems people following upper limb amputation have at return to work; and driving abilities.

Outcome measurement

Outcome measurement has always been an important part of our clinical and research work. In children, significant correlation between UNB spontaneity and skill score as well as between the parental CAPP score and UNB test was found (16). For adults we revised the Orthotics-Prosthetics User Survey Upper Extremity Functional Scale (changed the original scoring and deleted 4 items) and ABILHAND questionnaire (changed the original scoring, selected 22 items appropriate for unilateral upper limb amputees). Both new scales are promising instruments to measure the degree of manual functioning after unilateral upper limb amputation (17, 18). In both children and adults haptic interface was tested and found to be promising for assessing upper limb function in upper limb amputees.

CAD CAM

Major Appearance and cosmesis are very important for people in many countries (5, 19). Enhanced cosmesis may imply better psychological well-being independently of body-image. Nowadays, prosthetists produce silicone partial hand prosthesis using technology where previously an individually constructed mould defined the shape of the prostheses, or with direct modelling of silicone on a model of the stump (20, 21). With both methods the shape of the prostheses differs from the shape of the non-amputated hand. For that reason we have tried to develop a system which would enable making a prosthesis as a mirror copy of the other hand. With collaboration of two other institutions in Slovenia we have succeeded in our endeavour (22 - 24).

Return to work

Full-time employment leads to beneficial health effects and being healthy leads to increased chances of full-time employment (25). Employment of disabled people enhances their self-esteem and reduces social isolation (26). Employment rates of people after upper limb amputation are lower than employment rates for general community and may even decrease with time passing from the amputation (27). Whether a person after upper limb amputation will be still able to do the same work as before the amputation mainly depends on the type of work and the amputation level (28). We found out that people who were younger at the time of amputation and had less severe phantom pain had fewer problems, and those injured at work had more problems returning to work (29). Less than half of the patients who had had a partial hand amputation were able to do the same work as before amputation (6). The subjects who had manual work and amputated more than two fingers had more problems. Less than one-third wore their silicone prosthesis at work (6).

Driving abilities

An ability to drive is important for participation. Already in some previous studies the authors have reported that people following upper limb amputation have problems with driving and need adaptations of the car (30) and approximately 25 percent found prosthesis beneficial for driving (31). We review medical records of all the people following upper limb amputation performed in the last five years and found out that most people had problems driving. They needed from zero up to four different car adaptations, 2 on average. The most frequently suggested adaptation was automatic transmission, followed by moving of the commands from one side of the wheel to the side held by the non-amputated limb. Six needed a ball on the wheel, 4 reinforced assisted steering and one was allowed to drive only with the prosthesis. There were no differences in the number and type of needed adaptations in relation to the side of upper limb amputation and the amputation level. It was not possible to compare differences between subjects using different type of prosthesis since all except two had body-powered ones. It is important that clinicians working with persons following upper limb amputation are aware of that and refer them to driving assessment.

SECONDARY PROBLEMS

There are not many articles about secondary impairments people following upper limb amputation have as a consequence of amputation. In our preliminary study of 22 subjects we found out that they had from zero (five subjects) up to four different problems (one subject), most frequently with the shoulder on the non-amputated side and carpal tunnel syndrome, both presented in half of the included subjects. Persons who used their prosthesis less

had more problems and, surprisingly, the same was found in those who had been amputated more recently.

CONCLUSION

Rehabilitation of people following upper limb amputation has to be performed by a multi and interdisciplinary rehabilitation team whose members regularly assess their work and try to improve it. The team includes also the patient and a PRM specialist. There are still many areas that are not really supported by evidence but are based on experts' experience. Good new multicentric clinical studies are needed to get better evidence for our work.

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Unless there are six authors or more give all authors' names; do not use "et al.". Capitalize only the first word in a paper title, except for proper nouns and element symbols.

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