DOI 10.32782/2077-6594.2.1.2022.258920
УДК 617.58-089.873:316.614

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The importance of rehabilitation in patients with bilateral transfemoral amputation

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Значення реабілітації у пацієнтів з двосторонньою трансфеморальною ампутацією

Вища школа охорони здоров'я та соціальної роботи Св. Алжбети, м. Братислава, Словаччина

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Introduction

Amputation is a significant interference with a person's integrity. Not only physically but also mentally. Especially if it is a bilateral amputation at the level of the thighs. If it is a planned procedure as a result of a long-term illness, the patient can prepare for it. However, if it is an urgent matter as a result of trauma, it is all the more challenging for the person.

Amputation is one of the oldest surgical procedures. Already Hippocrates described the principles of amputation: remove diseased tissue, reduce disability, save life. These principles are still valid today [7]. It is defined as the removal of a peripheral part of the body along with soft tissue cover and skeletal discontinuity, resulting in a cosmetic or functional change with the possibility of further prosthetic treatment [2].

Aim: in our study we investigate the effect of complex rehabilitation treatment in patients after bilateral transfemoral amputation. Rehabilitation includes not only exercise, but also prosthetic treatment, social support and the possibility of psychological intervention.

The basic indications for amputation include

Trauma – as a result of a devastating injury, when the reconstruction of individual structures is not possible again. Vascular diseases – in critical limb ischemia, in diabetic angiopathy leading to diabetic gangrene. Tumours – as a radical treatment of malignant tumours or metastases. Infections – in local infections causing intractable sepsis [2]. Congenital developmental defects and disability – if the limb is afunctional and orthotic-prosthetic treatment is not possible, amputation is a last option [7].

The amount of amputation is decided based on local findings and surgical options. The aim is to keep the keel as long as possible to make the prosthesis more controllable and reduce the energy demand of walking.

Complex rehabilitation therapy

Rehabilitation in the care of the amputee patient is multidisciplinary. A doctor, physiotherapist, occupational therapist, prosthetic technician, social worker and psychologist are needed. Our goal is to make the patient aware that life does not end with amputation. He becomes self-sufficient in normal daily activities, he is not a nuisance to his surroundings. Involvement in group rehabilitation promotes resocialisation. Finally, the patient is able to accept the changed conditions and fully return to his or her original life role.

Ideally, rehabilitation care starts already at the stage of preparation for amputation. We focus on strengthening the muscles of the upper limbs, trunk, or strengthening the second lower limb. Vascular and respiratory gymnastics are also important [3]. Immediately after amputation, it is necessary to start caring for the keel. It needs positioning, bandaging, strengthening, increased hygiene and massage. The care of the keel is long-term and does not end with the handover of the prosthesis. The keel takes several months to form. The resulting shape, sensitivity and position of the keel have an impact on walking with the prosthesis for the rest of your life. The prevention of contractures is positioning. As reported by Brozman [1], hip flexors versus extensors are predominant after amputation in the thigh. Abductors also tend to outnumber adductors. Therefore, prolonged sitting with 90° hip flexion is not advisable, which promotes shortening of the flexors and subsequent contractures. It is recommended to alternate the positions. A supine position with a weight on the keel, such as a sandbag, is suitable. For a better effect, a pad can be placed under the bump of the sit bone. It is also possible to lie on the stomach, in which we place a sandbag on the buttocks. Bandaging with an elastic bandage, hardening of the keel with alternating water temperature and massage of the calyx help to relieve subcutaneous edema, relieve hypersensitivity of the keel. As a result, the patient will better tolerate the pressure of the prosthesis and its load.

Next, we focus on fitness exercises. We will start as soon as health permits. As described by Malý [6] walking an amputee with a prosthesis is challenging. If we label a person walking with both lower limbs with a difficulty index of 100, walking with a thigh prosthesis has a difficulty index of 200 and walking with a thigh prosthesis bilaterally has a difficulty index of 400. Therefore, with active exercise, the focus is on improving mobility and strengthening the muscles of the upper limbs, trunk and pelvic plexus. In passive exercise, we are concerned with preventing hip contractures and improving the range of extension in the hip joints. All this gives us the basis for verticalization and standing training in prostheses. In case

of insufficient muscular strength of the trunk and upper limbs, it is possible to start verticalization – i.e. standing in a prosthesis through a suspension device. When muscle strength improves, the patient can be verticalized with the help of 2 people, later 1 person and then independently. Standing training is carried out at a fixed support, for example at a ladder or in a chinwalk. After successful verticalization, we can practice standing. We focus on even weight distribution, later we can gradually train head turns, trunk bends and standing without support of the upper limbs. Mastery of verticality is necessary for a person to be able to perform basic daily activities in space. After mastering the stable standing, we can move on to practicing the school of walking. For starters, it involves transferring weight from prosthesis to prosthesis. For firm support, start with small steps, alternating the width of the base. Next, through the practice of stepping it is possible to move on to the first steps. Once the patient has mastered walking forward, backward and sideways in the chinwalk, it is possible to exit the chinwalk via French crutches. At first one French crutch is used at a fixed support, later 2 French crutches. Gradually we teach the patient to cope with different bases and architectural obstacles.

Mechanotherapy methods (massage, soft techniques), electrotherapy (e.g. TENS – transcutaneous electrical neurostimulation), light therapy (laser therapy), hydrotherapy (subaqual massage), thermotherapy are also used in rehabilitation. They are mainly used for their analgesic effect in phantom pain.

The aim of occupational therapy is the highest possible level of self-sufficiency in normal daily activities, the patient's independence in these activities and his/her resocialization [5]. It uses social rehabilitation methods. Various tests are used to assess the level of self-sufficiency, such as the Barthel Index, the ADL activities of daily living test and others. We used the Functional Independence Measure (FIM). This questionnaire focuses on six areas: personal care (eating, grooming, bathing, dressing the upper half of the body, dressing the lower half of the body, hygiene), sphincter continence (continence of urine, stool), transfers (bed, chair, wheelchair, toilet, bathtub, shower), locomotion (walking/walking, stairs). Compared to other questionnaires, it is also expanded to include the areas of communication (ability to understand and express oneself) and social adaptability (social contacts or inclusion, problem solving, memory).

Psychological support is also part of the complex rehabilitation treatment. As a result of the loss of a limb, various mental conditions can arise that affect all areas of life and are sometimes difficult to control [8]. The most difficult condition is when the patient falls into depression, losing interest in the surroundings. Then the intervention of a clinical psychologist or psychiatrist is necessary. Psychological support helps the patient to reduce stress and to look for something positive in the new situation. Sessions can be individual or group. In group therapy, the patient meets other people with a similar fate. In this way, they see how others are able to cope with the change in physical condition, which is also motivating.

Social support is also an indispensable component. The key is to create the right conditions for a return to the home environment. The family, which forms the social background, must also be included in this phase of rehabilitation. The conditions in which the patient lives are ascertained, and further possibilities for adaptation and fitting with compensatory aids are proposed accordingly. In this way, we increase the patient's self-sufficiency in normal daily activities. As Gúth [3] states, the main task of sociotherapy is to strengthen, restore and maintain the patient's interest in real social life and social relationships.

Results and discussion

Our sample consisted of patients with bilateral transfemoral amputation who were hospitalized at the National Rehabilitation Centre in Kováčová between July 2015 and June 2019. Patients who received comprehensive rehabilitation treatment within 8 weeks were included in the survey. A total of 20 patients were treated during this period. However, we had to exclude 3 from our survey due to shorter hospital stay. These were patients with severe associated comorbidities and uncooperative organic psychosyndrome. Of the 17 patients, 15 were male and 2 were female. This represents 88% male representation. We were also interested in the age composition. The youngest patient was 19 years old, the oldest 75. The average age of the respondents was 59.24. For better evaluation, we divided the patients into two categories. The first group consisted of patients under 40 years of age, which was 17.64%, corresponding to 3 respondents. In the category of above 40 years, there were 14 patients, representing 82.35%.

Regarding the reason for amputation as the most common cause was due to vascular complications and this was up to 52.94% of the cases, specifically in 9 probands. In another 4, accounting for 23.52%, the causes were complications of diabetes mellitus. Another 3 patients (17.65%) had amputation due to traumatic causes. One respondent (5.88%) had amputation performed due to complications of casus socialis. The comparison of age and cause of amputation is interesting. In all patients under 40 years of age, the cause of amputation was trauma. With increasing age, the number of civilisation diseases such as coronary artery disease, diabetes mellitus and others increases. In long-term poorly compensated diseases, complications arise, which can result in amputation. This was confirmed when complications of civilisation diseases accounted for up to 92.8% of the causes of amputations in the over 40 age group. It is striking that despite modern healthcare and well-developed social care, complications due to casus socialis have a place in the causes of bilateral transfemoral amputation.

To objectively assess the impact of rehabilitation treatment, we used the measure of self-sufficiency in activities of daily living. This was evaluated using the Functional Independence Measure (FIM) questionnaire. As we report, this scale assesses the domains of personal care, sphincter continence, transfers, locomotion, communication, and social adaptability. Based on the completed questionnaire, patients are divided into 7 groups ranging from completely non-self-sufficient to fully self-sufficient. The lowest level is No. 1, when the patient is completely unresponsive and full assistance is needed. Level 2 represents the level where the patient is only

managing 25% of total self-sufficiency, significant assistance is required. Levels 3-5 represent partial self-sufficiency, where supervision and moderate assistance is required. At level 6, the patient is already self-sufficient with the use of compensatory aids. The highest level is level 7, when the patient is completely self-sufficient. At the beginning of the rehabilitation stay of our probands, the representation was as follows: the lowest level reached was No. 2, the highest level reached was No. 6. The mean of the functional self-sufficiency measure before receiving rehabilitation treatment was 4.18. Modus, as the most frequently occurring value, was 3. At discharge, the lowest and highest values were the same. However, there has been a change in the modus, which has been changed to a higher level No. 5. The mean of the functional self-sufficiency measure also increased to 4.8. A paired T-test was used to confirm or refute the findings and the results were confirmed as statistically significant.

Conclusions

Bilateral transfemoral amputation represents a significant life change. It is not only a medical but also a social problem. In our work we confirmed the positive effect of complex active rehabilitation treatment, namely by improving the level of self-sufficiency in normal daily activities. Early and comprehensive rehabilitation gives the patient the opportunity to resume an active life even if their physical status changes. Our ambition is for the patient to return to his or her original role in life and to be able to resume it fully in the new adapted conditions.

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Дата надходження рукопису до редакції: 27.04.2022 р.

The purpose: bilateral transfemoral amputation poses both a rehabilitation and a societal problem. Although it is not a common diagnosis, its physical and psychological impact is significant. Our goal is not only to improve the patient's locomotion but also to resocialise the patient.

Materials and methods: our file consisted of patients diagnosed with bilateral transfemoral amputation who underwent 8 weeks of comprehensive rehabilitation treatment between July 2015 and June 2019. Data were assessed retrospectively and then statistically processed.

Results: based on our observation, we can evaluate the positive impact of complex rehabilitation treatment. There has been an improvement in the self-sufficiency rate in the FIM score.

Conclusions: in our work we confirmed the positive effect of complex active rehabilitation treatment by improving the level of self-sufficiency in normal daily activities. Timely and comprehensive rehabilitation has a positive impact not only on self-sufficiency, locomotion but also on social reintegration.

Key words: bilateral transfemoral amputation, functional self-sufficiency rate, complex rehabilitation treatment, socialization.

Мета: двостороння трансфеморальна ампутація становить як реабілітаційну, так і соціальну проблему. Хоча це не поширений діагноз, його фізичний і психологічний вплив є значним. Наша мета полягає не тільки в покращенні локомоції пацієнта, але й у ресоціалізації пацієнта.

Матеріали та методи: наше досьє складалося з пацієнтів з діагнозом двостороння трансфеморальна ампутація, які пройшли 8-тижневе комплексне реабілітаційне лікування з липня 2015 року по червень 2019 року. Дані були оцінені ретроспективно, а потім оброблені статистично.

Результати: на основі наших спостережень ми можемо оцінити позитивний вплив комплексного відновного лікування. Відбулося покращення показника самозабезпечення в оцінці FIM.

Висновки: у своїй роботі ми підтвердили позитивний ефект комплексного активного реабілітаційного лікування шляхом підвищення рівня самозабезпеченості у звичайній повсякденній діяльності. Своєчасна і комплексна реабілітація позитивно впливає не тільки на самодостатність, пересування, але й на соціальну реінтеграцію.

Ключові слова: двостороння трансфеморальна ампутація, коефіцієнт функціональної самозабезпеченості, комплексне реабілітаційне лікування, соціалізація.

Конфлікт інтересів: відсутній.
Conflicts of interest: absent.

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