



## EFFECTS OF PHYSICAL THERAPY IN PATIENTS WITH TOTAL HIP JOINT ENDOPROSTHESIS

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### ABSTRACT

The normal movement of the hip joint allows normal walking. When it is not possible to prevent joint destruction or to eliminate pain, surgery must be considered. Rehabilitation begins before the surgery if it is possible. The aim of this study is to determine the efficiency of physical therapy in rehabilitation of patients with embedded total hip joint endoprosthesis. The study included 60 patients with hip arthroplasty, who were divided into two groups of 30 patients. Group A – patients who had only early postoperative rehabilitation program at the Department of Orthopedics at RMC, "Dr. Safet Mujić" in Mostar. Group B – patients with hip arthroplasty with early rehabilitation program and fully participated in additional program of 14-day balneotherapy at CMR "Reumal" in Fojnica. The results showed that in Group A cause was fracture in 23,3% and coxarthrosis in 76,7% examinees, while in Group B cause was in 13,3% and coxarthrosis in 86,7% examinees. Coxarthrosis predominates as a cause of the hip endoprosthesis. Group A did exercises that includes exercise therapy of upper limbs, active exercises with help of lower operated limb, izometric exercise for muscle quadriceps and standing up for 96.7% examinees. Group B had individual therapies: balneotherapy (56,7%), hydrotherapy (100%) and kinesiotherapy (100%), electrotherapy (86,7%). The results obtained show that, within both groups of patients, the largest share of examinees falls within the "rehabilitated" category. Physical therapy has positive effect on results of rehabilitation after implantation of total hip endoprosthesis.

**KEYWORDS:** Hip arthroplasty, balneotherapy, rehabilitation.

### INTRODUCTION

The normal movement of the hip joint allows normal walking. Walking is a very individual trait of every man, and consists of moving the body through alternating leg movements. Any mismatch between natural, rhythmic and alternating leg movements causes disturbance, i.e. limping.<sup>[1]</sup>

The treatment for coxarthrosis is operative and conservative. Conservative treatment is done through medication, as well as relieving the pressure of the joint (correction of postural dysfunction, cane use, weight reduction, appropriate footwear, rest) and physical rehabilitation procedures.<sup>[2,3]</sup> When it is not possible to prevent joint destruction or to eliminate pain, surgery must be considered.<sup>[4]</sup> Physical therapy use conservative treatments after operation such as: kinesiotherapy,

electrotherapy, interferent current and balneotherapy.<sup>[5]</sup> Kinesiotherapy is obligatory part of rehabilitation because it improves strength of muscle, range of movements in joint and prevents disability.<sup>[6]</sup> Balneotherapy with modern medicament treatment and methods of physical medicine and rehabilitation contributes to overall outcome of all diseases of locomotor apparatus. Effects of balneotherapy are based on mechanical and thermal influence of balneo factors, but it also includes chemical and mineral ingredients and absorption, and biological effects are examined in many randomized, controlled studies.<sup>[7]</sup> Balneotherapy can be of multiple benefit to the elderly through daily activities, diet, relaxation and positive psychological experiences with social contacts.<sup>[8]</sup> Prior to involving an elderly person in a physical activity program, it is necessary to carefully assess the presence of limiting factors and

contraindications for this activity, and quality of life.<sup>[9]</sup> Rehabilitation begins before the surgery itself because preoperative preparation consisting of breathing exercises, muscle tension and the use of hand tools significantly facilitates postoperative rehabilitation.<sup>[10]</sup> Postoperative rehabilitation begins on the first day after surgery. The principles of early rehabilitation are adjusted first and foremost to each patient depending on their general condition, age and surgical intervention.<sup>[11]</sup> The main task of the rehabilitation program is to enable the patient to return to activities of everyday life and to educate patients for the regular performance of the exercises.<sup>[12]</sup>

Contraindications for the treatment include: acute rheumatic diseases, uric arthritis, unspecific and specific arthritis, malignant diseases, diseases indicating bleeding tenderness, skin diseases (except psoriasis), severe heart disease, vascular disease, excessive exhaustion, and deep aging.<sup>[13]</sup>

The aim of this study is to determine the efficiency of physical therapy in rehabilitation of patients with embedded total hip endoprosthesis.

#### MATERIALS AND METHODS

The study included 60 examinees with embedded total endoprosthesis of the hip, both sexes, of different age groups. Examinees were divided into two groups of 30 patients.

Group A - patients who only performed the early postoperative rehabilitation treatment at the Orthopedics Department at RMC "Dr. Safet Mujić" in Mostar. Early rehabilitation program starts with kinesiotherapy after operation by protocol that lasts until the stitches are removed. After that patients continue with mobilization and kinesiotherapy in house program.

Group B – patients who, after embedding of the total hip endoprosthesis, performed early rehabilitation program and fully participated in additional program of 14-day balneotherapy in CMR "Reumal" in Fojnica. Both programs are applied depending on current state of patients.

The survey excluded patients who, for any reason, interrupted the rehabilitation and those who did not abide by the therapeutic protocol. The research method is retrospective-prospective and is based on the analysis of the existing documentation and the analysis of the data from the medical rehabilitation charts in these institutions. The study was comparative, aimed at comparing different treatment methods, application of a rehabilitation program that includes balneotherapy in CMR "Reumal" in Fojnica after the implantation of total hip endoprosthesis and the implementation of a rehabilitation program after implantation of the total hip endoprosthesis including early postoperative stationary form of rehabilitation.

Statistical analysis of the results is presented in tables. To test the significance of the differences in the results was used Hi squared test and in the absence of the expected frequencies Fisher's exact test was applied. The significance level is  $p = 0.05$ , and in the case of  $p$  values that cannot be expressed up to three decimal places they will be shown as  $p < 0.05$ .

#### RESULTS

There were two groups analyzed. In Group A were 26,7% men and 73,3% women. In Group B were 30,0% men and 70,0% women. The results showed that women prevail in both groups of patients. There was no statistically significant difference between the groups in terms of gender representation ( $X^2=0,081$ ;  $df=1$ ;  $p=0,774$ ;  $p = 0.774$ ).

The results showed that patients over the age of 50 were prevalent in both groups as shown in Table 1. Although in the analyzed groups of patients there is a difference in the prevalence of patients in certain age groups, the difference is not statistically significant ( $p = 0.593$ ).

We analyzed cause of endoprosthesis. The results showed that in Group A cause was fracture in 23, 3% and coxarthrosis in 76,7% examinees, while in Group B cause was in 13,3% and coxarthrosis in 86,7% examinees. The results showed that in both groups of patients, coxarthrosis predominates as a cause of the hip endoprosthesis. There was no statistically significant difference between the observed rehabilitation centers, with regards to the cause of endoprosthesis ( $X^2=1,002$ ;  $df=1$ ;  $p=0,317$ ).

Group A did exercises that includes exercise therapy of upper limbs, active exercises with help of lower operated limb, izometric exercise for musculature quadriceps and standing up for 96.7% examinees as shown in Table 2. Some examinees started walking (16,7%).

Group B had individual therapies: balneotherapy (56,7%), hydrotherapy (100%) and kinesiotherapy (100%), electrotherapy (86,7%) as shown in Table 3.

All examinees were divided by their therapy outcome:

- Rehabilitated (Group A, 56,7%; Group B, 60,0%)
- Partially rehabilitated (Group A, 30,0%; Group B, 40,0%)
- Not rehabilitated (Group A, 13,3%, Group B, 0%).

The results obtained show that, within both groups of patients, the largest share of examinees falls within the "rehabilitated" category ( $X^2=4,457$ ;  $df=2$ ;  $p=0,108$ ).

**Table 1: Distribution of respondents by age.**

Age	Group A		Group B		Total	
	n	%	n	%	n	%
30-40	0	0	0	0	0	0
40-50	1	3,3%	0	0	1	1,7%
50-60	4	13,3%	4	13,3%	8	13,3%
60-70	10	33,3%	14	46,7%	24	40,0%
>70	15	50,0%	12	40,0%	27	45,0%

**Table 2: Exercise program for Group A.**

Exercises		n	%
Exercise therapy of upper limbs	No	1	3,3%
	Yes	29	96,7%
Active exercises with help of lower operated limb	No	1	3,3%
	Yes	29	96,7%
Izometric exercise for muscle quadriceps	No	1	3,3%
	Yes	29	96,7%
Standing up	No	1	3,3%
	Yes	29	96,7%
Started walking	No	5	16,7%
	Yes	25	83,3%

**Table 3: Exercise program for Group B.**

Therapies		n	%
Balneotherapy	No	13	43,3%
	Yes	17	56,7%
Hydrotherapy	No	0	0
	Yes	30	100,0%
Kinesiotherapy	No	0	0
	Yes	30	100,0%
Electrotherapy	No	4	13,3%
	Yes	26	86,7%

## DISCUSSION

Arthroplasty represents a significant advance in the treatment of painful and severe pathology of the joints, but the treatment of diseased joints does not stop with the surgical procedure. The goal is to provide painless movement and improve patient's quality of life, defined by the World Health Organization as a "multidimensional" model that includes physical, material, social and emotional well-being, as well as individual development and daily activities.<sup>[14]</sup> Sex and age group representation is confirmed by the data from the which is explained by the fact that coxarthroses and fractures of the bone as the most common causes of hip joint endoprosthesis are more frequent with women, mostly older. More than 80% of respondents are older than 60. This information is consistent with the literature data.<sup>[15]</sup> Authors compared results between elderly patients and other patients, and results were better in the patients who did exercise with supervision than in those who had treatment in house.<sup>[16,17]</sup>

Bitterli and others studied effects of preoperative sensory training on improving physical and sensory function, quality of life, and reduction of impairment after hip joint endoprosthesis, measured by the WOMAC index, indicating no beneficial effects of this training<sup>[4]</sup>.

Scientists conclude that preoperative physical therapy does not affect the postoperative condition, recovery and rehabilitation of such patients. On the other hand, there are studies suggesting that preoperative preparation of the patient to replace the diseased hip joint is very important.<sup>[18]</sup> The preoperative preparation for hip joint endoprosthesis incorporates the strengthening of gluteal and thigh musculature of the patient and is performed prior to hospital admission. It is essential for patients to undergo preoperative rehabilitation procedures to increase the volume of movement and regulate body weight. At this stage of preparation, the patient should learn to practice proper walking and the use of aids, which will significantly shorten postoperative rehabilitation.<sup>[19]</sup> With hip osteoarthritis regular therapeutic exercises are recommended, including strength training, as muscle strength is a significant indicator of physical function.<sup>[20]</sup>

Several studies have shown that cost-effective home-based exercise can reduce pain, improve physical function and quality of life of patients with osteoarthritis and embedded total hip endoprosthesis. Results were better in patients who had kinesiotherapy after endoprosthesis of hip.<sup>[21]</sup> Kinesiotherapy, particularly exercises in water have positive outcome on strength of

muscle and functions after different musculoskeletal disorders.

In this study Group A were patients with early postoperative rehabilitation. Considering that one patient in the mentioned group had a tumor, he did not undergo a rehabilitation program. Rehabilitation was adapted to people based on status and age, disease and condition.<sup>[21,22]</sup> The beneficial effect of hydrotherapy factors on the function of the locomotor system is well documented, such as systematic part of the anti-stress program in wellness centers.<sup>[23,24]</sup> Results of our research showed better outcome in patients with hydrotherapy. Comparison of effects of thermomineral and common water in double blind randomized and controlled studies is insufficient. Numerous studies have shown that therapies in thermomineral water contribute to the prevention of the disease of a modern man with a sedentary lifestyle.<sup>[23]</sup>

Hydrotherapy programs of kinesiologic rehabilitation are preserving the health of people of every age. Anthropometric changes predominantly occur in the locomotor and cardiorespiratory system with positive psychological influences.<sup>[26]</sup>

The results of the conducted research indicate the importance of the operative procedure and the rehabilitation process with these patients, but once again confirm the success of the accepted protocol of physical therapy and rehabilitation with the participation of a balneo factor that is well adapted to the patients.<sup>[25]</sup> These results are consistent with our research.

Other research confirms the importance not only of the operation of the complete hip joint endoprosthesis in patients with developed osteoarthritis, but also the importance of well-organized stationary physical therapy and rehabilitation as well as the importance of balneo-climato therapy which provided good results, regardless of it being primary or secondary osteoarthritis.<sup>[27]</sup> These results are consistent with our research.

Balneotherapy might be beneficial, but the evidence is yet insufficient to make a definitive statement about its use. High-quality trials are needed on balneotherapy and aquatic exercises research especially in specific patient categories that might benefit most.<sup>[8,9]</sup>

## CONCLUSIONS

Physical therapy has positive effect on results of rehabilitation after implantation of total hip endoprosthesis. Most respondents have been rehabilitated or partially rehabilitated with the treatment applied. Balneotherapy is highly effective in rehabilitation of patients with implanted total hip endoprosthesis, but since it is combined with other forms of therapy it is difficult to make a conclusion about its total efficacy.

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Conflict of Interest None Declared.

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