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Research article

The experience of Romanian physiotherapists in the management of postoperative rehabilitation of patients with total hip arthroplasty - content and criteria for completion of physiotherapy sessions

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Abstract: Background: Total hip arthroplasty (THA) is a procedure that removes damaged bone and cartilage and replaces it with prosthetic components and is performed by orthopedics. Objective: management of post-operative rehabilitation of THA patients in terms of content and completion criteria of physiotherapy sessions. The research aims to explore the experience of Romanian physiotherapists about the content and completion criteria of physiotherapy sessions involved in the management of postoperative rehabilitation after THA. Methods: The method used in this study was a questionnaire-based survey, with 120 Romanian specialists in the field completing an online screening tool that contained, along with a socio-demographic questionnaire, a series of questions about their professional experience. Results: One of the most important results of the study is the identification of statistically significant associations between the completion criteria of physiotherapy sessions and three techniques included in the rehabilitation program after THA: edema management, gait re-education exercises, and exercises to increase hip mobility. Conclusion: The the research revealed that the experience of Romanian specialists regarding postoperative rehabilitation after THA is concordant with the experience of specialists in the field, and can be used to develop and test an individualized therapeutic protocol and to design continuing professional training programs for physiotherapists in Romania.

Keywords: total hip arthroplasty, physiotherapy, postoperative rehabilitation, patient management

1. Introduction

The issues related to postoperative recovery after total hip arthroplasty (THA) are of major concern, both in terms of the continuing increase in the incidence of osteoarticular

pathology of the hip and the number of THA surgeries, and in terms of the social and economic impact of the difficulties of adjustment of hip surgery patients (it is known that patients may have functional deficits such as reduced muscle strength, postural stability, or gait speed) up to 2 years after THA [1,2,3].

The rehabilitation program aims to restore the joint mobility and muscle strength of the hip-stabilizing muscles [4], . At the same time, recent studies indicate that gait and proprioceptive disorders rehabilitation plays an important role in regaining physiological function as well as quality of life.

Saueressig et al. (2021), in a meta-analysis of a total of 32 randomized clinical trials with 1753 patients and 26 individual studies with 1004 patients show that a decrease in patients' quality of life has been reported in the postoperative period [5].

Mizner et al. (2005) in meta-analysis, performed on studies of the effectiveness of exercise programs after THA, indicates that the most commonly used exercise protocols in the early postoperative phase are neither supported nor refuted by controlled clinical trials. In the late postoperative phase (operative interval > 8 weeks), exercise programs consistently improve both limitation and functional capacity. In the late postoperative phase (> 8 weeks postoperatively) the benefits were due to weight-bearing exercises. The conclusion drawn by the authors is that there is insufficient evidence to construct a detailed evidence-based exercise protocol after THA [6].

In the postoperative rehabilitation management of patients with total hip arthroplasty, the content and completion criteria of physiotherapy sessions are two very important aspects. The literature specifies that both the content and the criteria for completion of physiotherapy sessions are very different, not only from country to country but also from patient to patient.

Wijnen et al (2023) show that in postoperative interventions after THA in Germany, the rehabilitation program is prescribed according to specific evidence-based standards by the Deutsche RentenVersicherung (DRV), and the minimum duration of different therapies is specified for each module. For quality management purposes, DRV publishes an annual report on the extent to which rehabilitation centers have met the standards for each year. Immediately after discharge from the hospital, German patients follow a 3-week rehabilitation program in a specialized rehabilitation center with a variety of partly personalized, partly more general therapeutic measures, including physiotherapy, occupational therapy, or health-related training. However, although the content of rehabilitation in Germany is prescribed by DRV following certain standards, there is some variety in the content of physiotherapy sessions (manual lymphatic drainage, manual therapy). In contrast to Germany, the transparency of post-operative physiotherapy in the Netherlands is lacking, despite existing recommendations. Both the Dutch Orthopaedic Association and the Royal Dutch Society for Physical Therapy recommend continuing physiotherapy exercises after discharge from the hospital to improve muscle strength, mobility, stability, and gait and to decrease limitations in daily activities (walking). However, references to the characteristics of physiotherapy exercise interventions, duration of follow-up, and measurement of outcomes are missing [7].

Hansen et al. (2019) show in a meta-analysis of evidence-based rehabilitation exercise protocols that the organization and postoperative content of rehabilitation after THA varies widely. Programs include strengthening exercises, stability training, range of motion training, and functional exercises (gait training). Postoperative physiotherapy intervention includes a standardized program that focuses on evidence-based components, with regular assessments of goal attainment [8].

Madsen et al. (2023) in a recent study stated that hip strengthening exercise dose is not associated with clinical improvements after THA, refers to conservative treatments such as pain medication, therapeutic exercise, physiotherapy, weight management, gait reeducation, and aims to increase muscle strength, joint flexibility, and balance [9]. Also, proprioceptive exercises are very important for maintaining joint stability [10].

Based on existing studies in the international literature and the lack of information in the Romanian literature, a broader observational study on the experience of Romanian physiotherapists in the postoperative rehabilitation of THA patients was conducted. The

observational study aims to identify the defining aspects of postoperative rehabilitation programs for patients with THA in Romania implemented by local physiotherapists.

The present report aims to analyze the content and completion criteria of physiotherapy sessions used by Romanian specialists in the management of postoperative rehabilitation of patients with total hip arthroplasty.

As specific objectives, subsumed to the aim of the present study, were formulated:

O1. To identify / overview current practices in Romania regarding the content of physiotherapy sessions for THA patients;

O2. To identify / overview of the current practices in Romania regarding the criteria for the completion of the physiotherapy program implemented for THA patients;

O3. Identify the association between the content of physiotherapy sessions offered postoperatively after THA by Romanian specialists and the criteria for completion of the postoperative rehabilitation program.

As this is a descriptive, exploratory, observational research without a strong theoretical basis for inferring results based on hypothesis testing, the following research questions are formulated:

Q1. What is the content of the physiotherapy sessions offered postoperatively after THA by Romanian specialists?

Q2. What are the criteria for completion of the postoperative physiotherapy program used by Romanian specialists for THA patients?

Q3. Is there an association between the content of physiotherapy sessions offered postoperatively after THA by Romanian specialists and the criteria for completion of the postoperative physiotherapy program used by Romanian specialists for THA patients?

2. Materials and Methods

2.1 Participants

The research participants were 120 Romanian physiotherapists included based on the following inclusion/exclusion criteria: holding a certification of professional training (certificate of professional practice) in physiotherapists, active practice of physiotherapists in a structure (public or private) of the physiotherapist's profession, age between 21 - 65 years. The sample was a convenience sample and the sample size was not calculated beforehand (a situation allowed in exploratory studies as specified in the literature, e.g.: [13]. The 120 physiotherapists, were: aged 21 - 65 years (M=36.37, SD= 9.80), 62 males (51.7%) and 58 females (48.3%). Of these, 30 (25.0%) worked in the public sector, 74 (61.7%) in the private sector, 8 (6.7%) in both public and private sectors and 8 (6.7%) in other sectors (NGOs). The level of education of the research participants was: Post-secondary (N=4, 3.3%), Bachelor (N=40, 33.3%), Master (N=70, 58.3%), and PhD (N=6, 5.0%).

2.2 Study Design

The research involved a cross-sectional, descriptive, exploratory and correlational design and was conducted according to the Rules of Good Practice in Scientific Research.

The questionnaire was administered online via google form and distributed using social media (Facebook) via Whatsapp phone contacts and personal email. Participants were told the purpose of the research with the understanding that they could withdraw from the research at any time. Data collection took place in the timeframe October 2021 - April 2023. Participation in the study involved informed consent, was voluntary and not rewarded. The time taken to complete the questionnaires was approximately 20 minutes.

2.3 Instruments

The method used for data collection was the questionnaire survey method. The questionnaire was constructed based on existing models in the literature and is a cross-sectional observational questionnaire composed of sixty questions of which 20 allowed to obtain information on the postoperative recovery of THA patients: organizational details and content [11]. In the present study, only data collected on the content of physiotherapy

sessions and those on the criteria for completion of sessions used in the management of postoperative rehabilitation of THA patients are reported.

To identify the content of physiotherapy sessions, participants were asked to indicate on a scale of 1 to 5 (where 1=never, 2=rarely, 3=sometimes, 4=often, 5=always) the extent to which they include the following 14 contents in their therapy program: Edema management (item 19), pain management (item 21), muscle strength increasing exercises for hip stabilizers (item 23), use of resistance in muscle strength increasing exercises (item 25), hip mobility increasing exercises (item 27), stretching exercises (item 28), balance exercises (item 30), gait retraining (item 31), stair climbing/lowering (item 32), transfer practice (item 33), manual therapy (item 34), cardiovascular fitness exercises (item 36), hydrotherapy (item 37), patient education on recovery (item 38).

To identify criteria for completion of physiotherapy sessions, participants were asked to choose (one or more of) the following criteria: completion of exercise program, independent transfers, independent/safe mobility, minimal or controlled pain, patient decision, reaching the plateau of progress after a pre-determined number of sessions, other (to be specified).

2.4 Statistical Analysis

The data were automatically recorded in Google Forms and from there imported into Excel and then into SPSS 22, the statistical data analysis program, where processing and analysis were performed. For quantitative data, where possible, descriptive starting indices (mean, standard deviation) were calculated. For qualitative data, frequency analysis (including percentage) was used.

The chi-square test was used to determine whether the number of specialists who include a particular therapeutic technique is associated with the number of specialists who use a particular program completion criterion applied. Testing the association of the values of the two variables (applied technique and program completion criterion) using the $\chi 2$ test had as decision criterion: alpha=0.05 and the effect size for $\chi 2$ was determined with the association index φc (fi) Cramer interpreted similarly to the correlation coefficient: .10 (small effect), .25 (medium effect) and .40 (large effect).

3. Results

Regarding the content of the physiotherapy sessions for THA patients provided by the investigated specialists, the procedures/techniques used are shown in Table 1.

Table 1. Descriptive statistics for the extent to which a range of procedures/techniques are included in the content of physiotherapy sessions for THA patients offered by specialists (N=120)

	Min	Max	Average	Standard Deviation
Edema management (Item 19)	1	5	3.99	1.049
Pain management (Item 21)	1	5	4.42	.885
Exercises to increase muscle strength for hip stabilizers (Item 23)	3	5	4.75	.506
Using resistance to increase muscle strength exercises (Item 25)	2	5	4.04	.844
Exercises to increase hip mobility (Item 27)	2	5	4.65	.657
Stretching exercises (Item 28)	1	5	4.04	.982
Ecilibru exercises (Item 30)	1	5	4.18	.788
Gait re-education (Item 31)	4	5	4.79	.408
Climbing up/down steps (Item 32)	1	5	4.27	.857
Transfer practice (Item 33)	1	5	4.22	.893
Manual therapy (Item 34)	1	5	3.88	1.117
Cardiovascular fitness exercises (Item 36)	1	5	3.27	1.010
Hydrotherapy (Item 37)	1	5	2.06	1.169
Patient education on recovery (Item 38)	1	5	4.77	.670

Note: 1=never, 2=rarely, 3=sometimes, 4=often, 5=always

As can be seen in Table 1, the highest mean scores (indicating the highest orientation of the specialists surveyed for that procedure/technique respectively always included) are recorded for gait retraining (Item 31) (M=4.79, SD=.041), patient education on recovery (Item 38) (M=4.77, SD=.067), exercises to increase muscle strength for hip stabilizers (Item 23) (M=4.75, SD=.051).

The lowest mean scores (indicating a moderate preference - above 3 = sometimes include it) are for the inclusion of manual therapy and cardiovascular fitness exercises in their recovery program for THA patients.

Only the inclusion of hydrotherapy in physiotherapy sessions for THA is close to value 2 (M=2.06, SD=1.16) and reveals a weak orientation of the investigated specialists to include this procedure in the THA rehabilitation program (they rarely include it).

The majority of the investigated specialists inform patients about the content of the physiotherapy sessions offered (118 representing 98.3% of the total) (Item 4).

In Table 2 it can be seen that a large number of specialists always include in the physiotherapy sessions: gait re-education - 95 (79.2%) and exercises to increase muscle strength for hip stabilizers - 94 (78.3%). In contrast, a very small number of specialists always include in the physiotherapy sessions: cardiovascular fitness exercises - 10 (8.3%) and hydrotherapy - 6 (5.0%).

Table 2. Procedures/techniques sometimes, often and always included in rehabilitation programmes after THA.

	Sometimes		Often		Always	
	Number	Percent	Number	Percent	Number	Percent
19. Physiotherapy sessions include edema management	30	25.0	31	25.8	50	41.7
21. Physiotherapy sessions include pain management	17	14.2	25	20.8	75	62.5
23. Physiotherapy sessions include exercises to increase muscle strength for hip stabilizers	3	2.5	23	19.2	94	78.3
25. Use resistance to increase muscle strength exercises	25	20.8	50	41.7	40	33.3
27. Physiotherapy sessions include exercises to increase hip mobility	6	5.0	24	20.0	88	73.3
28. Physiotherapy sessions include stretching exercises	18	15.0	46	38.3	46	38.3
30. Physiotherapy sessions include equilibrium exercises	13	10.8	59	49.2	44	36.7
31. Physiotherapy sessions include gait re-educationv			25	20.8	95	79.2
32. Physiotherapy sessions include climbing up/down stairs	13	10.8	45	37.5	57	47.5
33. Physiotherapy sessions include transfer practice	20	16.7	38	31.7	58	48.3
34. Physiotherapy sessions include manual therapy	20	16.7	44	36.7	42	35.0
36. Physiotherapy sessions include cardiovascular fitness exercises	43	35.8	44	36.7	10	8.3
37. Physiotherapy sessions include hydrotherapy	25	20.8	8	6.7	6	5.0
38. Physiotherapy sessions include patient education about recovery	2	1.7	14	11.7	102	85.0

Regarding the criteria for completion of the physiotherapy program, most of the specialists surveyed mentioned as criteria for completion of the physiotherapy program (Item 16): full functional independence - criterion mentioned by 35 (29.2%) specialists; full functional independence, independent/safe mobility, minimal or controlled pain - criterion mentioned by 14 (11.7%); independent/safe mobility - criterion mentioned by 11 (9. Other criteria for completion of the physiotherapy program (Item 16) mentioned by only 1-2 of the investigated specialists were: reaching the plateau of progress, after a predetermined number of sessions or combinations of criteria: full functional independence and patient decision or full functional independence, independent/safe mobility, minimal or controlled pain, patient decision.

An issue of interest for the optimization of rehabilitation programs after THA and for the training of specialists in running such programs is the association between the procedures/techniques included in the rehabilitation program and the criteria for program completion. Consequently, we have resorted to testing the association between the values of the two variables.

The analysis revealed that there was a significant association between only three procedures/techniques included in the recovery program and the program completion criteria:

(a) Always including edema management in the rehabilitation program after THA is statistically significantly associated with the use of the criteria reaching the plateau of progress independent/safe mobility, minimal or controlled pain (χ^2 = 155.31, df = 60, p = .04, Cramer's V = .04). Specialists who always include edema management in their program tend to complete the cumulative program when the plateau of progress is reached, mobility becomes independent/safe and pain becomes minimal or controlled;

b) Always including gait re-education exercises in the THA rehabilitation program is statistically significantly associated with the use of the program completion criteria: a predetermined number of sessions, patient decision, reaching the plateau of progress (χ^2 = 36. 89, df = 32, p = .02, Cramer's V = .02). Gait re-education specialists who always include gait re-education exercises in their program tend to complete the cumulative program after a pre-determined number of sessions, at the patient's decision and when the plateau of progress is reached

c) Always including hip mobility enhancement exercises in the rehabilitation program after THA is statistically significantly associated with the use of the criteria full functional independence, independent/safe mobility, minimal or controlled pain (χ^2 = 131.133, df = 96, p = .010, Cramer's V = .010). Practitioners who always include exercises to increase hip mobility in their program tend to complete the cumulative program when the patient reaches full functional independence, independent/safe mobility, and minimal or controlled pain.

3. Discussion

The results of the study highlight the following:

- The content of the physiotherapy sessions for THA patients provided by the investigated specialists includes a range of procedures/techniques but predominates gait re-education, patient education on recovery, exercises to increase muscle strength for hip stabilizers;

- moderate preference - above value 3 = sometimes include it) is recorded for including manual therapy and cardiovascular fitness exercises in their rehabilitation program for athymic patients;

- hydrotherapy is only rarely included;

Most of the investigated specialists mention as criteria for completion of the physiotherapy program (Item 16): full functional independence, independent/safe mobility, and minimal or controlled pain.

Statistically significant associations were found between:

- Always including edema management in the rehabilitation program after THA and the use of program completion criteria: reaching the plateau of progress, independent/safe mobility, and minimal or controlled pain;

- Always include gait re-education exercises in the rehabilitation program after THA and use program completion criteria: pre-determined number of sessions, patient decision, reaching plateau of progress;

- Always include hip mobility exercises in the rehabilitation program after THA and use completion criteria: full functional independence, independent/safe mobility, and minimal or controlled pain.

Thus: (a) specialists who always include edema management in their program tend to complete the cumulative program when the plateau of progress is reached, mobility becomes independent/safe, and pain minimal or controlled; (b) specialists who always include gait re-education exercises in their program tend to complete the cumulative program after a predetermined number of sessions, at the patient's discretion and when the plateau of progress is reached; c) specialists who always include hip mobility exercises in their program tend to complete the cumulative program when the patient reaches full functional independence, independent/safe mobility and minimal or controlled pain.

These results are similar to results reported in other studies internationally [12-21].

The results obtained in this study should be viewed with caution due to some limitations. The first methodological limitation of the research stems from the non-random sampling method and the relatively small number of specialists investigated.

Despite these limitations, the results of the study contribute to the development of knowledge in the field and suggest future directions for development: the resumption of the study on a larger number of participants, from more geographical areas; the systematization of recent approaches to the proposed problem, but also filling some gaps in existing knowledge and testing some own hypotheses on the prediction of individualized rehabilitation therapies for patients THA.

Given that patients who played sports in their youth were more disciplined and complete in the rehabilitation process, future studies should also consider the mechanisms of injury production that are associated with Osteoarthritis of the Hip and THA, such as domestic trauma, road traffic accidents, occupational diseases (prolonged orthostatic position) and sports-related injuries. Physiotherapists should include these elements in the physiotherapeutic assessment, as physical condition, patient motivation, and discipline in performing physiotherapy exercises are important in the rehabilitation process. Gurau et al. in 2023 demonstrated that the prevalence of lower limb injuries in amateur footballers is much higher than in professional footballers [22,23]. Tenforde et al. in 2020 demonstrated that there is a higher prevalence of THA in footballers than in the general population, suggesting that previous participation in football may contribute to a higher risk of THA at younger ages [24].

5. Conclusions

The present study aimed to analyze the content and completion criteria of physiotherapy sessions used by Romanian specialists in rehabilitation management as well as the association between them.

It can be stated that the results answered the three research questions and allowed the conclusion that the objectives were achieved.

The results of this research can be used for the development and testing of an individualized, patient-centered therapeutic protocol with a specific content for the deficits frequently observed after THA as well as for the design of continuing professional training programs for THA in Romania.

The research can be used to develop and test an individualized therapeutic protocol and to design continuing professional training programs for physiotherapists in Romania.

The key points of this study were:

a) establish an evidence-based intervention model that allows the development of concrete strategies for the implementation and evaluation of an optimal recovery program for patients included in rehabilitation programs after THA;

b) systematize recent approaches to the proposed problem, but also fill some gaps in existing knowledge and test some own hypotheses on the prediction of individualized rehabilitation for patients with THA.

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Informed Consent Statement: The study was conducted in accordance with the principles set out in the Declaration of Helsinki. All patients were properly informed, agreed with their participation in the study, and have signed a consent form.

Data Availability Statement: Data are contained within the main text of the article. Raw data were generated at Faculty of Physical Education and Sports, University of Craiova. Derived data supporting the findings of this study are available from the corresponding author I.O. on request.

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