



EFFECTIVENESS OF EARLY MOBILIZATION ON PAIN, SINGLE LEG STANCE TIME, HIP RANGE OF MOTION IN SUBJECTS AMONG POST TOTAL HIP ARTHROPLASTY/ REPLACEMENT - A PROSPECTIVE RANDOMIZED STUDY.

Physiotherapy & Rehabilitation

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ABSTRACT

Introduction: Osteoarthritis (OA), often referred to as “wear-and-tear” arthritis, age-related arthritis, or degenerative joint disease, is the most common form of joint disorder. The OA process involves progressive loss of articular cartilage, subchondral cysts, osteophyte formation, periarticular ligamentous laxity, muscle weakness, and possible synovial inflammation. The effects of OA hips, which results in reduced mobility and physical impairment which leads to loss of independence and have an effect on activities of daily living (ADLS) lead to disability and dependency in walking, stair climbing, and rising from a seated position. (1) **Aim and objectives:** To find out the effect of early mobilization with physiotherapy in subjects with THR. This study evaluates the VAS score, single leg stance time and hip range of motion in patients with THR. **Methodology:** The study was conducted in a group of 30 subjects who had undergone Unilateral THR. Subjects in group A received conventional physiotherapy includes isometric of Quadriceps and hamstrings, ankle pumps, assisted SLR exercises. Subjects in group B received early mobilization exercises include heel slides, abduction and adduction, seating Hip Flexion, proprioception exercises and gait training with assistive devices. **Results & Conclusion:** The subjects in group B has shown more improvement in ROM of hip, single leg stance time and pain than the subjects in group B. The present study concluded, early mobilization with conventional physiotherapy is effective in the rehabilitation of subjects after THA.

KEYWORDS

INTRODUCTION

The hip joint is a true **ball and socket joint** surrounded by powerful and well-balanced muscles, which provides wide range of motion in different physical planes which also exhibits stability. It meets the four principle features of a synovial or diarthrodial joint a) a joint cavity b) joint surfaces are covered with articular cartilage c) a synovial membrane producing synovial fluid and ligamentous capsule. (1)

Surgical replacement of the hip joint with an artificial prosthesis or total hip arthroplasty (THA) is a reconstructive procedure that provides management of hip joint diseases that respond poorly to traditional medical therapy. The goal in THA practice is to eliminate pain and increase function. Restoration of muscular strength is important for daily life activities after THR. THR is the second most commonly performed elective surgical procedure. The indications for THR include pain, loss of movement and associated disability in the presence of radiographic evidence of joint destruction. (2)

Generally, in THR there are two types of implants are used, a) cemented implants and b) uncemented implants. Cemented implants consists of cemented stems embrace two broad concepts: a taper-slip or force-closed design, and a composite beam or shape-closed design. Cement is a grout, not a glue, and fixation is achieved by a mechanical interlock in the bony interstices. The cement is pressurized into an acetabulum that has been cleaned and dried. Cemented total hip replacements are indicated for older, less active patients, although very good results have also been reported in the younger patient. (3)

Uncemented implants: The use of uncemented implants is to enhance bone fixation by osseointegration. It is important to have initial press-fit stability to allow bone on- or ingrowth into the textured surface. More recently bioactive surface coatings such as hydroxyapatite have been applied to accelerate bone on growth and improve the extent of the osseointegration. (4)

Physiotherapy treatment plays an important role in patients undergone with THR. It is effective in reducing the pain and muscle spasm and also improves ROM. The immediate postoperative rehabilitation goal is to achieve a sufficient level of independence in daily living activities with the help of early and intensive physiotherapy. Earlier studies have shown that early intensive ambulation and rehabilitation after the

operation can speed up recovery. Early maximal strength training starting one week postoperatively is an efficient way to regain muscular strength compared with conventional rehabilitation. (5)

Need Of The Study

Most of the studies were available on post operative mobilization of the patients after THR. Few studies were available on early mobilization and quality of life of the patients with THR. So, this study is designed to find out the effect of early mobilization with physiotherapy in subjects after THR.

Aim Of The Study

To find out the effect of early mobilization on pain, single leg stance time and hip range of motion using Brotzman protocol in subjects after THR.

Objectives Of The Study

1. To find out the effect of early mobilization on pain using VAS score in subjects with THR.
2. To find out the effect of hip range of motion using Universal goniometer in subjects after THR.
3. To find out the effect of single leg stance time with stop watch in subjects after THR.

MATERIALS & METHODOLOGY

a) Study design: Randomized prospective study design

- **Study setup:** BIRRD Hospital
- **Study period:** 9 months (January to November 2023)
- **Source of data:** BIRRD Hospital
- **Sampling:** Simple random sampling
- **Sample size:** 30

Ethical Consideration:

- This study was approved by Institution ethical committee of SVIMS Tirupathi Institution vide reference number: 1546/2023.

b) Materials:

- NPRS
- Universal Goniometer
- Stop watch

c) Inclusion criteria:

- Subjects who have undergone unilateral Arthroplasty of Hip.
- Both Genders
- Age between 40 to 55 years
- BMI less than 30

d) Exclusion criteria:

- Any complications following hip Arthroplasty like Deep Vein Thrombosis, nerve injury.
- Severe cognitive impairment
- BMI greater than 30
- History of previous fracture around hip

e) Outcome measures:

- VAS score with Numerical Pain Rating Scale.
- Single Leg Stance time by stop watch.
- Hip Range of motion by Universal Goniometer.

F) METHODOLOGY:-

- An informed consent is taken from all the willing subjects after explaining treatment protocol. A total of 30 subjects were recruited for my study, subjects were randomly divided into 2 groups by lottery method.
- Each group consists of 15, group A subjects (conventional physiotherapy) were given route physiotherapy treatment protocol, group B subjects were given early mobilization from the bed on day 3 to day 5 along with conventional physiotherapy (if all vitals are stable).
- All these exercises were given for a period of 6 weeks. After completion treatment post values measured, results were sent for statistical analysis.

Brotzman Protocol:

Time	Recommended Exercises
Day 1 – Hospital D/C	- ROM - Heel slides - Ankle pumps - Supine hip internal/external rotation - STRENGTH - Quad/glut/hamstring sets - Supine hip abduction/adduction - Seated hip flexion - FUNCTIONAL MOBILITY - Bed mobility - Transfer training - Gait training with appropriate assistive device on level surfaces - Stair training - POSITIONING

Time	Recommended Exercises
6-12 weeks	- ROM - Continue phase 1 and 2 exercises - Strengthening - Continue with phase 2 exercises, adding and increasing resistance as tolerated - Add resistance machines as appropriate (leg press, hamstring curl, 4-way hip) - Proprioception - Single leg stance - Static balance on Bosu/wobble board/foam. - Add gentle agility exercises (i.e. tandem walk, side stepping, backwards walking) - Endurance exercises

Statistical Analysis & Results

The data is entered into Microsoft Excel for tabulation and analysis. Statistical analysis is carried out by using IBM SPSS 25.0 version software.

The paired sample t-test is applied to compare the mean values of all the parameters in both the groups. A p-value of <0.01 will be considered as statistically significant.

RESULTS:

The demographic data for the sample size of 30 subjects with an average age of 49.73 ± 4.39, the sample exhibits average BMI is 26.6.

Comparison of pre-test and post-test values of outcome measures of Group A and Group B

S. NO	Outcome measures	Pretest values Mean ± S.D		Post test values Mean ± S.D		Mean difference		p value (t-value)
		Group A	Group B	Group A	Group B	Group A	Group B	
1.	VAS	7.40 ± 0.507	7.53 ± 0.516	5.40 ± 0.507	4.73 ± 1.100	-2.000	-2.800	P<0.001
2.	HIP FLEXION	29.00 ± 4.706	26.87 ± 3.563	39.87 ± 5.854	45.80 ± 7.292	-10.867	-18.933	P<0.001
3.	HIP ABDUCTION	35.67 ± 9.037	30.33 ± 3.994	44.67 ± 7.432	41.60 ± 6.957	-9.000	-11.267	P<0.001
4.	SINGLE LEG STANCE TIME	18.60 ± 4.641	16.80 ± 3.052	25.13 ± 6.116	26.07 ± 3.936	-6.533	-9.267	P<0.001

DISCUSSION

AB Lemmey, T Okoro had studied efficacy of exercise rehabilitation are effective in restoring muscle mass, strength, function and Hip range of motion in Total Hip Arthroplasty.⁽⁶⁾ **Carolina Sant anna Umpierres et al.** had studied Rehabilitation following THR are effective in improving the muscle strength, range of motion and mobility. **Mancuso et al.** found that patients were satisfied in terms of pain reduction and gait improvement after post-surgery.⁽⁷⁾ **Hawrylak et al.,** In their study concluded that a statistically significant improvement of motion following a 3 to 6 weeks of rehabilitation programme.⁽⁸⁾ **Demczyszak et al.** found that a 4-week rehabilitation period remarkably improved the range of motion in the operated joint, which significantly influenced patients function and independence.⁽⁹⁾ **Barker et al** found that. Intervention group received exercises to gain range of motion (ROM), balance and strengthening of hip abductors.⁽¹⁰⁾

The present study is conducted to compare the effectiveness of hip ROM, single leg stance time and VAS score in subjects after total hip Arthroplasty. Early mobilization exercises include ROM, Strengthening and proprioception exercises. ROM exercises includes heel slides, ankle pumps and Strengthening exercises includes Quadriceps, Glutes and Hamstring sets, supine hip abduction/adduction, and functional mobility includes bed mobility, transfer training and gait training with appropriate devices.

This study stated that the subjects who received early mobilization (Group B) showed a significant improvement in hip ROM, single leg stance and pain reduction than the control group (Group A).

CONCLUSION

The present study concluded that the subjects who received early mobilization based on Brotzman's protocol had shown more improvement in terms of pain, Single Leg Stance time and Hip ROM than the subjects who received routine physiotherapy. So, our study found that early mobilization after THR is recommended in decreasing hospital stay and ROM of hip joint and improvement of ADL activities.

Limitations:

- Small Sample Size
- Gender Inequality
- Long Duration follow-up

Recommendations

- Study can be done on large group of population.
- More combination of other methods with the present study can be done.
- Study can be done using advanced technique or treatments on hip arthroplasty patients.

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