Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 11644 - 11650
Received 05 March 2021; Accepted 01 April 2021.

# Effect of ankle dorsiflexion range in rehabilitation protocol of total hip arthroplasty: a case report

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## ABSTRACT

Total Hip Arthroplasty (THA) is a successful orthopedic procedure for treatment of hip symptomatic osteoarthritis (OA) when conservative medical therapy has failed that reduces pain and improves function and quality of life. This case study of Rehabilitation Protocol after total hip arthroplasty consists of effect of improvement in ankle dorsiflexion range on total hip arthroplasty. A 46 year male contractor was operated for total hip arthoplasty and came for physiotherapy. In this case we gave conventional rehabilitation protocol with more focus on increasing ankle dorsiflexion range with core strengthening which was effective in improving patient quality of life and early recovery. This studyconcludes on the impact of ankle dorsiflexion range in total hip arthroplasty stating the ankle dorsiflexion has directly improved hip range of motion.

**Keywords:** Total hip arthroplasty, ankle dorsiflexion, rehabilitation protocol, physiotherapy, hip joint

## Introduction:

Total hip arthroplasty (THA) is one of the most clinically successful interventions in health care, with excellent long term results in terms of reducing pain and improving function and quality of life in patients with debilitating hip disease, Incidence of osteoarthritis constantly increasing due to ageing process(Bottai et al., 2015). A prosthetic hip that is implanted replaces the painful hip joint(Vaidhya et al.,2020). The modern prosthetic hip replacement system used today has three components – the femoral stem, the femoral head, and the acetabulum(Xie et al., 2015). Each component has multiple sizes which allows for a custom fit. Physical therapist role is crucial at the post-surgical stage of recovery to give better pain relief and clinical outcome(Bottai et al., 2015).Studies have shown that patient receiving's standard protocol

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based physical therapy interventions have shown better and speedy recovery(Bawiskar et al., 2020).

In this case study patient had difficulty in hip movement and weight bearing on affected leg was reduced. For this physiotherapy protocol was given which include normal traditional modes of treatment after total hip arthoplasty with addition of mobilization for ankle dorsiflexion range and core muscle strengthening. This improves patient's quality of life and early recovery in patient after total hip arthroplasty.

**Case presentation:**

A 46 year old male contractor has pain in his left hip since two months. Patient was having dull aching pain in his left side of hip joint for past two years. The pain gradually increased and intermittent in nature started interfering in his ADL for past three months. Patient then consulted Orthopaedic surgeon at AIIMS. After proper investigation he was diagnosed to have T.B of left hip joint and THR was performed.Patient hadDifficulty in bending forward and maintaining normal posture during sitting. Patient had 6 on NPRS pain during activity and 3 on NPRS during rest. Severity of condition is moderate.


Figure 1: Anterior view of Total Hip Arthroplasty

**Clinical evaluation:**

After patient came to physiotherapy clinic he has following findings. On postural evaluation he has slightly stopped posture. Trendelenburg gait were seen. On inspection patient had swelling around hip joint. Grade 2 Tenderness over hip joint were present. Spasm on the Lumbosacral region muscles. Muscle atropy of gluteus minimus and gluteus maximus was present. Active and passive ranges of hip

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flexion, extension and abduction were painful and limited. End feel was empty. Tightness in hip flexors was seen.

Muscle strength of left leg Hip Flexors- 3+/5 , Hip Extensors- 4-/5 , Hip Abductors- 3/5, Knee Flexors- 4/5, Knee Extensors- 4/5 and of right legHip Flexors- 4/5, Hip Extensors- 4/5, Hip Abductors- 4/5, Knee flexors- 4+/5, Knee Extensors- 4+/5 . Resisted isometrics are strong and painful. Girth measurement shows changes in left and right leg( table 1). Balance is impaired. Weight bearing on affected leg reduced.

Table 1: Girth Measurment Grading

| LANDMARKS | RIGHT | LEFT |
|---|---|---|
| | | |
| 5cm above Patella | 28.5cm | 23.5cm |
| 10cm above Patella | 32cm | 28cm |
| 15cm above Patella | 38cm | 34.5cm |

Table 2: Measured AROM and PROM of hip and knee

| Right | | | | | Left | | | |
|---|---|---|---|---|---|---|---|---|
| HIP | | KNEE | | | HIP | | KNEE | |
| Active | Passive | Active | Passive | | Active | Passive | Active | Passive |
| 0-120$^0$ | 0-125$^0$ | 0-120$^0$ | 0-130 $^0$ | Flexion | 0-50 $^0$ | 0-65 $^0$ | 0-110$^0$ | 0-120 $^0$ |
| 0-10$^0$ | 0-15$^0$ | 120-0$^0$ | 130-0 $^0$ | Extension | 0-2 $^0$ | 0-5 $^0$ | 110-0 $^0$ | 115-0 $^0$ |
| 0-40$^0$ | 0-45$^0$ | | | Abduction | 0-20 $^0$ | 0-25$^0$ | | |

(in degrees).

**Diagnosis:**

According to subjective and objective evaluation and considering investigation diagnosis is post operative total hip arthroplasty.

**Intervention:**

A 4 week protocol on daily basis will be given to patient. In 1$^{st}$ week active assisted exercises, quads setting exercise were given. Core muscle activation was started from 1$^{st}$ week and continued

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throughout the treatment.In 2nd week active assisted exercises, terminal knee extension, graded strengthening exercises, mobilization for ankle AP glide and OKC exercises of quads table were started. In 3rd and 4th week all the above exercises were given with addition of gait training on even, uneven and stair climbing was started.


Figure 2: Active assisted SLRFigure 3: Side lying SLR


Figure 4: Quads TableFigure 5: Mini Squat with Gym Ball

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Figure 6: static ankle dorsiflexion and hip and pelvis kinematics

Outcome- After 4 weeks of treatment protocol patient improved his posture. Swelling and tenderness was reduced. Range of motion of hip flexion, extension and abduction was improved and its pain-free. Muscle strength was improved. Weight bearing on affected leg was improved.

| | Left Hip | Pre Intervention Measurement (0 weeks) | Post Intervention Measurement (after 4 weeks) | Improvement |
|---|---|---|---|---|
| Pain | NPRS | 6 | 2 | 4 |
| Joint ROM | Hip Flexor | $65^0$ | $80^0$ | $15^0$ |
| | Hip Extensor | $5^0$ | $15^0$ | $10^0$ |
| | Hip Abductors | $25^0$ | $40^0$ | $15^0$ |
| Manual Muscle Testing | Hip Flexor | 3+ | 4+ | 3+ → 4+ |
| | Hip Extensor | 4- | 4+ | 4- → 4+ |
| | Hip Abductor | 3 | 4+ | 3 → 4+ |
| FIM | Walking | 3 | 6 | 3 |

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| | | | | |
|---|---|---|---|---|
| | Stair climbing | 3 | 6 | 3 |
| | Squatting | 4 | 6 | 2 |
| | Cycling | 5 | 7 | 2 |

Table 3: Results Of The Treatment

**Discussion:**

Static ankle dorsiflexion angles are associated with less ankle dorsiflexion motion which also alters pelvic and hip kinematics during a step-down was proved in one study(Wu et al., 2019). In our study we focus on range of ankle dorsiflexion to improve hip ranges(Foster et al., 2020). In prone position the arc of hip rotation was highest and increase arc of ankle dorsi-flexion was found in squatting position(Risaldar et al., 2020). In this study they suggested that there is age related reduction in hip rotation and ankle dorsiflexion(Kumar et al., 2011). In our study we gave mobilizationto improve ankle range of motion and also squatting was incorporated in treatment protocol to get early recovery in total hip replacement patient(Birelliwar and Athawale, 2020). Core muscles strengthening is effective in lower limb conditions as it provides stability which generate force and motion in lower extremities and also distribute impact forces and allowing controlled and efficient body movements(Rivera, 2016). In our study we focus on core muscle strengthening to improve ranges of hip joint and get early ambulation of patient.

**Conclusion:**

The rehabilitation program used in the study improves the hip joint function post operatively after THA of the patient. However, exercise therapy of higher intensity and duration combined with other maneuvers and adherence to the home programis required for promoting more significant change in the operated hip joint range of motion, muscle strength, decrease in pain and prevention of any complications and deformities in the patient. Ankle dorsiflexion had effects in improving hip range of motion and also early recovery in patient. The rehabilitation protocol duration also reduced and had improved effects on patient quality of life. Ankle dorsi-flexion range should be considered in patients with total hip arthroplasty to get early recovery.

**Author's Contribution**: All authors contributed equally to the case report.

**Conflict of Interest**: The authors declare no conflict of interest.

**Acknowledgement:** We thank the patient who participated and contributed to the study.

**Informed Consent:** Written & Oral informed consent was obtained from patient included in the study.

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## References:

[1] Birelliwar, A., Athawale, V. Early gait training program and proprioceptive neuromuscular facilitation in the patient with post debridement amputation – A rare case report 6, 2020.
[2] Bottai, V., Dell'Osso, G., Celli, F., Bugelli, G., Cazzella, N., Cei, E., Guido, G., Giannotti, S. Total hip replacement in osteoarthritis: the role of bone metabolism and its complications. Clin. Cases Miner. Bone Metab. Off. J. Ital. Soc. Osteoporos. Miner. Metab. Skelet. Dis. 12, 247–250, 2015.
[3] Dushyant Bawiskar, Sapna Dhote, Pratik Phansopkar. Early physical rehabilitation post-surgery in a complex type 5 Schatzker Tibial plateau fracture improves functional outcomes: A case report. Medical Science. 24(104), 2675-2682, 2020.
[4] Foster, S.N., Harris, M.D., Hastings, M.K., Mueller, M.J., Salsich, G.B., Harris-Hayes, M. Static Ankle Dorsiflexion and Hip and Pelvis Kinematics During Forward Step-Down in Patients With Hip-Related Groin Pain. J. Sport Rehabil. 1–8, 2020.
[5] Kumar, S., Sharma, R., Gulati, D., Dhammi, I.K., Aggarwal, A.N. Normal range of motion of hip and ankle in Indian population. Acta Orthop. Traumatol. Turc. 45, 421–424, 2011.
[6] Laukik Vaidya, Kiran Kumar, Waqar Naqvi, Simran Narang, Gajanan Pisulkar, Mohit Dadlani. Revision of total hip replacement surgery in elderly patient and its recovery based on periprosthetic fracture rehabilitation. Medical Science. 24(104), 2628-2638, 2020.
[7] Risaldar, P.B., Vaidya, D.L., Kumar, D.K. Achilles Tendon Repair With Soft Tissue Reconstruction Followed By Functional Rehabilitation To Resume Functional Tasks: Clin. Med. 07, 4, 2020.
[8] Rivera, C.E. Core and Lumbopelvic Stabilization in Runners. Phys. Med. Rehabil. Clin. N. Am. 27, 319–337, 2016.
[9] Wu, J.-Q., Mao, L.-B., Wu, J. Efficacy of exercise for improving functional outcomes for patients undergoing total hip arthroplasty: A meta-analysis. Medicine (Baltimore) 98, e14591, 2019.
[10] Xie, L., Ding, F., Jiao, J., Kan, W., Wang, J. Total Hip and Knee arthroplasty in a patient with osteopetrosis: a case report and review of the literature. BMC Musculoskelet. Disord. 16, 259,2015.