



Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

World Expert Meeting in Arthroplasty 2024

Is Prescribed Postoperative Physical Therapy Necessary after Routine Primary Total Knee or Total Hip Arthroplasty?

Claudio Diaz-Ledezma, MD ^{a,*}, Ilda Molloy, MD ^{b,c}, Rob Nelissen, MD, PhD ^d,
Lipalo Mokete, FRCS, FCOOrth (SA) ^e, Julian Costantini, MD ^f^a Adult Reconstruction Division, Department of Orthopaedic Surgery, University of California San Francisco, San Francisco, California^b Adult Reconstruction Division, Yale School of Medicine, Yale University, New Haven, Connecticut^c Department of Orthopaedic and Rehabilitation, Yale University, New Haven, Connecticut^d Department of Orthopaedics, Leiden University Medical Center, Leiden, The Netherlands^e University of the Witwatersrand, Johannesburg, South Africa^f Department of Orthopedics and Traumatology, Sector of Knee Arthroscopy and Reconstruction Surgery, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina

ARTICLE INFO

Article history:

Received 19 September 2024

Received in revised form

17 October 2024

Accepted 20 October 2024

Available online 28 October 2024

Keywords:

hip

knee

total hip arthroplasty

total knee arthroplasty

rehabilitation

physical therapy

Is Prescribed Postoperative Physical Therapy Necessary after Routine Primary Total Knee or Total Hip arthroplasty?

Response/Recommendation: Postoperative physical therapy remains an essential component of standard care following total joint arthroplasty. The specific approach (self-directed versus prescribed/supervised programs) should be individualized.**Voting.****Agree:** 73.4%, **disagree:** 24.9%, **abstain:** 1.7%.**Level of evidence:** Moderate.

Rationale

For decades, exercise therapy and other modalities have been part of the postoperative management plan in total joint arthroplasty (TJA), and consultation with a physical therapist is considered one of the quality-of-care indicators [1]. However, more recent efforts to define “quality measures” in TJA do not specifically mention postoperative physical therapy (PT) [2].

The National Institute for Health and Care Excellence guidelines (2022) in the United Kingdom stress that postoperative

rehabilitation should be individualized, led by physiotherapists who have multidisciplinary support, and tailored to clinical and personal needs [3]. Supervised outpatient therapy is offered for patients who have functional impairments, unmet rehabilitation goals, or difficulty with daily activities, while self-directed rehabilitation requires clear goal understanding and a support contact. The American Academy of Orthopaedic Surgeons and the American Association of Hip and Knee Surgeons recommend a structured rehabilitation program, often starting with supervised therapy in an inpatient or outpatient setting, then transitioning to self-directed exercises as patients progress, with a summarized list of self-directed (unsupervised) exercises for both total hip arthroplasty (THA) and total knee arthroplasty (TKA) patients [3].

Total Knee Arthroplasty (TKA)

Since 1977, rehabilitation objectives after TKA have emphasized quadriceps muscle strengthening, straight leg raising,

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to <https://doi.org/10.1016/j.arth.2024.10.105>.

* Address correspondence to: Claudio Diaz-Ledezma, MD, Department of Orthopaedic Surgery, University of California San Francisco, 500 Parnassus Ave, MU 323W, San Francisco, CA 94143-0728.

<https://doi.org/10.1016/j.arth.2024.10.105>

0883-5403/© 2024 Elsevier Inc. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

achieving at least 90 degrees of knee flexion, and full knee extension to zero degrees, which remain the foundational goals today [4].

Immediate and Inpatient Physical Therapy

Early initiation of exercise therapy after surgery, even in the postoperative acute care unit, can shorten the length of stay [5]. As shortened lengths of stay and outpatient programs are routine practices, the immediate start of an exercise protocol to achieve a steady gait and adequate knee range of motion are consuetudinary practices. Orthostatic intolerance, a recognized deterrent to rehabilitation in fast-recovery protocols [6], should be carefully evaluated.

According to a recent systematic review, cryotherapy helps reduce opioid use in the first postoperative week [7], but continuous cryotherapy offers no significant benefits over traditional methods and may not be cost effective [8].

Continuous passive motion machines are not recommended for immediate postoperative PT due to a lack of positive level 1 evidence for their usage [9].

Physical Therapy after Discharge

There is no strong evidence-based guideline for postoperative PT. The American Physical Therapy Association guideline [10], developed with input from the American Academy of Orthopaedic Surgeons, includes rehabilitation recommendations, but only a minority are supported by high-quality evidence.

Fleishman et al., in a level 1 study, demonstrated that unsupervised home therapy can be a safe alternative to regular PT [11]. Self-directed therapy can be facilitated through physical booklets or digital platforms, with Klement et al. showing that while these tools benefit many patients, not all may respond to such interventions [12]. Additionally, virtual PT and web-based platforms have been found to reduce the cost of care while providing effective rehabilitation support [13,14]. A randomized controlled trial conducted in the Netherlands with 624 TJA patients [15] has been completed and is undergoing publication. Its results will strengthen the evidence supporting physiotherapeutic interventions after TKA.

Total Hip Arthroplasty (THA)

The objectives of formal rehabilitation after routine THA are to restore joint function and achieve a stable gait without assistive devices while preventing postoperative falls and dislocations.

Immediate and Inpatient Physical Therapy

A narrative review by the Cochrane Database evaluated the evidence supporting the provision of assistive devices, education on hip precautions, environmental modifications, and training in activities of daily living for people undergoing THA [16]. Unfortunately, the variability and limitations of the available evidence precluded a systematic review. The effectiveness of these interventions remains uncertain due to the low quality of the underlying studies.

Physical Therapy after Discharge

A systematic review and meta-analysis on PT after THA by Saueressig et al. [17] included 32 studies in its qualitative analysis and 26 studies in its quantitative analysis. The authors compared usual care or minimal intervention with active control interventions (such as progressive and supervised rehab exercises,

pool-based therapy, and neuromuscular stimulation). The primary outcome, self-reported physical function, showed no significant difference between groups at the follow-up closest to 1 year after surgery, with a low level of certainty using the GRADE scale. For shorter follow-ups at 4, 12, and 26 weeks, the analysis also found no differences in physical function, but the evidence was rated with moderate certainty. Additionally, hip strength (abduction and flexion) showed no differences at 4, 12, 26 weeks, or the 1-year follow-up, but with very low certainty according to GRADE.

Duration of Postoperative Physical Therapy after TJA

Yayac et al. [18] noted that PT accounts for 8% of the total cost in TJA, suggesting the need for cost-effective alternatives, such as standardizing therapy duration. Groot et al. [19] found that prolonged PT (over 12 weeks) was more common in TKA patients who had lower functionality at 6 months, and THA patients who had extended therapy had worse functional outcomes at 6 months. Variability in PT use is evident: among 20,260 TKA patients [20], 79% of TKA patients had at least one session in the first year, compared to only 53% of THA patients (most having fewer than five sessions). Given these findings, optimizing and standardizing PT protocols could reduce costs and improve outcomes.

Conclusions

Based on the current evidence, we believe postoperative PT remains an essential component of standard care following TJA. However, the specific PT approach should be individualized. The observed outcomes of self-directed exercise programs must be carefully weighed against the benefits of structured, supervised PT programs, considering both cost effectiveness and potential advantages within each healthcare setting. Cultural and regional factors should also be contemplated for optimal patient care. Every surgeon should develop a preoperative plan that defines success for each patient before discharge.

CRedit authorship contribution statement

Claudio Diaz-Ledezma: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Ilda Molloy:** Writing – review & editing, Writing – original draft, Validation, Data curation, Conceptualization. **Rob Nelissen:** Writing – review & editing, Writing – original draft, Supervision, Data curation, Conceptualization. **Lipalo Mokete:** Writing – review & editing, Writing – original draft, Validation, Data curation, Conceptualization. **Julian Costantini:** Writing – review & editing, Writing – original draft, Data curation, Conceptualization.

References

- [1] SooHoo NF, Lieberman JR, Farnig E, Park S, Jain S, Ko CY. Development of quality of care indicators for patients undergoing total hip or total knee replacement. *BMJ Qual Saf* 2011;20:153–7. <https://doi.org/10.1136/bmjqs.2009.032524>.
- [2] Amanatullah DF, McQuillan T, Kamal RN. Quality measures in total hip and total knee arthroplasty. *J Am Acad Orthop Surg* 2019;27:219–26. <https://doi.org/10.5435/JAOS-D-17-00283>.
- [3] Fortier LM, Rockov ZA, Chen AF, Rajaei SS. Activity recommendations after total hip and total knee arthroplasty. *J Bone Joint Surg Am* 2021;103:446. <https://doi.org/10.2106/JBJS.20.00983>.
- [4] Manske PR, Gleeson P. Rehabilitation program following polycentric total knee arthroplasty. *Phys Ther* 1977;57:915–8. <https://doi.org/10.1093/ptj/57.8.915>.

- [5] Chen AF, Stewart MK, Heyl AE, Klatt BA. Effect of immediate postoperative physical therapy on length of stay for total joint arthroplasty patients. *J Arthroplasty* 2012;27:851–6. <https://doi.org/10.1016/j.arth.2012.01.011>.
- [6] Hristovska A-M, Andersen LB, Grentoft M, Mehlsen J, Gromov K, Kehlet H, et al. Orthostatic intolerance after fast-track knee arthroplasty: incidence and hemodynamic pathophysiology. *Acta Anaesthesiol Scand* 2022;66:934–43. <https://doi.org/10.1111/aas.14098>.
- [7] Wyatt PB, Nelson CT, Cyrus JW, Goldman AH, Patel NK. The role of cryotherapy after total knee arthroplasty: a systematic review. *J Arthroplasty* 2023;38:950–6. <https://doi.org/10.1016/j.arth.2022.12.004>.
- [8] Liu M-M, Tian M, Luo C, Wang S, Shao L. Continuous cryotherapy vs. traditional cryotherapy after total knee arthroplasty: a systematic review and meta-analysis of randomized controlled trials. *Front Surg* 2022;9:1073288. <https://doi.org/10.3389/fsurg.2022.1073288>.
- [9] Yang X, Li G-H, Wang H-J, Wang C-Y. Continuous passive motion after total knee arthroplasty: a systematic review and meta-analysis of associated Effects on clinical outcomes. *Arch Phys Med Rehabil* 2019;100:1763–78. <https://doi.org/10.1016/j.apmr.2019.02.001>.
- [10] Jette DU, Hunter SJ, Burkett L, Langham B, Logerstedt DS, Piuze NS, et al. Physical therapist management of total knee arthroplasty. *Phys Ther* 2020;100:1603–31. <https://doi.org/10.1093/ptj/pzaa099>.
- [11] Fleischman AN, Crizer MP, Tarabichi M, Smith S, Rothman RH, Lonner JH, et al. 2018 John N. Insall award: recovery of knee flexion with unsupervised home exercise is not inferior to outpatient physical therapy after TKA: a randomized trial. *Clin Orthop Relat Res* 2019;477:60–9. <https://doi.org/10.1097/CORR.0000000000000561>.
- [12] Klement MR, Rondon AJ, McEntee RM, Greenky MR, Austin MS. Web-based, self-directed physical therapy after total knee arthroplasty is safe and effective for most, but not all, patients. *J Arthroplasty* 2019;34:S178–82. <https://doi.org/10.1016/j.arth.2018.11.040>.
- [13] Prvu Bettger J, Green CL, Holmes DN, Chokshi A, Mather RC, Hoch BT, et al. Effects of virtual exercise rehabilitation in-home therapy compared with traditional care after total knee arthroplasty: VERITAS, a randomized controlled trial. *J Bone Joint Surg Am* 2020;102:101–9. <https://doi.org/10.2106/JBJS.19.00695>.
- [14] Zachwieja E, Theosmy EG, Yacovelli SJ, Beatty EW, McGrath ME, Lonner JH. Web-based self-directed exercise program is cost-effective compared to formal physical therapy after primary total knee arthroplasty. *J Arthroplasty* 2020;35:2335–41. <https://doi.org/10.1016/j.arth.2020.04.061>.
- [15] Groot L, Gademán MGJ, Peter WF, van den Hout WB, Verburg H, Vliet Vlieland TPM, et al. Rationale and design of the PaTIO study: Physiotherapeutic treat-to-target intervention after orthopaedic surgery. *BMC Musculoskelet Disord* 2020;21:544. <https://doi.org/10.1186/s12891-020-03511-y>.
- [16] Smith TO, Jepson P, Beswick A, Sands G, Drummond A, Davis ET, et al. Assistive devices, hip precautions, environmental modifications and training to prevent dislocation and improve function after hip arthroplasty. *Cochrane Database Syst Rev* 2016;7:CD010815. <https://doi.org/10.1002/14651858.CD010815.pub2>.
- [17] Saueressig T, Owen PJ, Zebisch J, Herbst M, Belavy DL. Evaluation of exercise interventions and outcomes after hip arthroplasty: a systematic review and meta-analysis. *JAMA Netw Open* 2021;4:e210254. <https://doi.org/10.1001/jamanetworkopen.2021.0254>.
- [18] Yayac M, Moltz R, Pivec R, Lonner JH, Courtney PM, Austin MS. Formal physical therapy following total hip and knee arthroplasty incurs additional cost without improving outcomes. *J Arthroplasty* 2020;35:2779–85. <https://doi.org/10.1016/j.arth.2020.04.023>.
- [19] Groot L, Latijnhouwers DaJM, Reijman M, Verdegaal SHM, Vliet Vlieland TPM, Gademán MGJ, et al. Recovery and the use of postoperative physical therapy after total hip or knee replacement. *BMC Musculoskelet Disord* 2022;23:666. <https://doi.org/10.1186/s12891-022-05429-z>.
- [20] Smith TO, Dainty JR, Clark EM, Whitehouse MR, Price AJ, MacGregor AJ. Demographic and geographical variability in physiotherapy provision following hip and knee replacement. An analysis from the National Joint Registry for England, Wales, Northern Ireland and the Isle of Man. *Physiotherapy* 2020;106:1–11. <https://doi.org/10.1016/j.physio.2019.11.003>.