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The Role of Physiotherapy in Post-Surgical Recovery: From Passive Healing to Functional Empowerment

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ABSTRACT

Background: Modern postoperative management increasingly emphasizes active rehabilitation over passive convalescence. While physiotherapy is widely implemented, the magnitude and consistency of its benefits across surgical specialties remain inadequately quantified.

Objective: To assess the effects of exercise-based programs, manual therapy, and electrotherapy on pain relief, functional recovery, range of motion, ambulation, complication rates, and hospital length of stay in adult patients following major surgery.

Methods: A meta-analysis of 15 randomized controlled trials (N = 1,280) was conducted, covering orthopedic (arthroplasty, fracture fixation), cardiothoracic (CABG, lung resection), spinal (lumbar decompression), and abdominal procedures. Outcomes were pooled as mean differences (MD), standardized mean differences (SMD), or relative risks (RR) using random-effects models with 95% confidence intervals.

Results: Physiotherapy significantly improved key outcomes compared to usual care. Pain scores decreased (SMD –0.72, 95% CI –0.90 to –0.54), quadriceps strength increased after TKA (SMD +0.81, 95% CI 0.51–1.11), and 6-minute walk distances improved (MD +45.3 m, 95% CI 33.1–57.5). ROM increased (MD +12.1°, 95% CI 7.3–16.9), and hospital stay was shortened (MD –1.8 days, 95% CI –2.9 to –0.7). Complication risk showed a non-significant trend toward reduction (RR 0.78, 95% CI 0.60–1.02).

Conclusions: Postoperative physiotherapy leads to measurable improvements in pain, mobility, and function, supporting its role as a core component of recovery. Tailored rehabilitation should be integrated into surgical pathways, with further research to optimize strategies and target high-risk populations..

Keywords: Post-surgical recovery; Physiotherapy; Functional empowerment; Exercise-based rehabilitation; Manual therapy; Electrotherapy

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1. INTRODUCTION

Over the past several decades, advances in surgical techniques and perioperative management have dramatically reduced mortality and major complications across a wide range of procedures—from joint replacement to cardiac bypass and spinal decompression. However, the proportion of patients experiencing postoperative functional limitations, prolonged pain, and delayed return to daily activities remains substantial. Prolonged bed rest and reliance on passive recuperative strategies contribute to muscle atrophy, cardiopulmonary deconditioning, joint stiffness, and even psychosocial distress, undermining both short- and long-term quality of life.

In response, clinical pathways such as Enhanced Recovery After Surgery (ERAS) and fast-track programs have championed early mobilization and structured physiotherapy (Debas et al., 2025). In orthopedic contexts—for example, total knee and hip arthroplasty—randomized trials have demonstrated that tailored exercise regimens can accelerate the recovery of strength, range of motion (ROM), and gait performance compared to minimal intervention (Matheis & Stöggl, 2017). Similarly, after cardiothoracic procedures (e.g., coronary artery bypass grafting, lung resection), early ambulation and inspiratory muscle training have been associated with fewer pulmonary complications and improved six-minute walk distances at discharge. Despite these successes, the specific contributions of different physiotherapy modalities—exercise-based rehabilitation, hands-on manual therapy, and adjunctive electrotherapies (e.g., NMES, TENS)—remain incompletely defined(Amin et al., 2014). Some studies report large effect sizes for pain reduction and functional gains, while others find only marginal or non-significant differences versus usual care.

Moreover, the heterogeneity of study populations, intervention protocols, outcome measures, and follow-up intervals has hampered efforts to draw clear, generalizable conclusions. Manual techniques such as joint mobilization and soft-tissue manipulation are widely used yet lack consistent high-level evidence for postoperative benefit. Electrotherapies promise to enhance muscle activation and provide analgesia, but effect sizes frequently fall below minimal clinically important thresholds. As a result, clinicians face uncertainty when designing rehabilitation pathways that optimally balance resource allocation with patient needs, especially in healthcare settings with constrained physiotherapy capacity.

Community nurses often known as home health or rehabilitation nurses play a crucial role in home-based care after surgery or for chronic illnesses by partnering with physiotherapists to deliver rehabilitation. Together, they perform assessments, monitor progress, and implement coordinated treatment plans. Through regular visits, nurses and physiotherapists educate patients and caregivers, promote self-care exercises, and detect early signs of decline. This integrated approach supports safe transitions from hospital to home, reduces readmissions, and enhances functional outcomes in rehabilitation and wound care **(García-Morillo et al., 2016; Zhang, Xu, & Chen, 2024).**

2. RESEARCH QUESTION:

What is the magnitude of the effect that postoperative physiotherapy modalities—exercise programs, manual therapy, and electrotherapy—have on key recovery metrics (pain, functional status, ROM, ambulation capacity, complication incidence, and length of hospital stay) in adult patients following orthopedic, cardiothoracic, spinal, and abdominal surgeries?

3. OBJECTIVE:

To undertake a comprehensive meta-analysis of randomized controlled trials, synthesizing standardized mean differences, mean differences, and relative risks for core postoperative outcomes. By aggregating data from at least 15 high-quality RCTs, this study aims to delineate the relative efficacy of each physiotherapy modality and to provide evidence-based recommendations for tailoring postoperative rehabilitation toward true functional empowerment rather than mere passive healing.

4. LITERATURE REVIEW

Over the past several decades, postoperative physiotherapy has evolved from passive, bed-rest–oriented approaches to structured, evidence-based rehabilitation protocols aimed at optimizing functional recovery and minimizing complications (Bassett, 2012). Early clinical observations in orthopedic surgery revealed that prolonged immobilization led to muscle atrophy, joint contractures, and cardiopulmonary deconditioning, spurring the adoption of early mobilization strategies (Makhabah et al., 2013). Landmark Enhanced Recovery After Surgery (ERAS) programs in colorectal and gynecologic operations demonstrated that integrating guided ambulation and physiotherapy into perioperative care reduced hospital length of stay by up to three days and lowered overall complication rates by 20–40% (Aboulian et al., 2010).

In orthopedic settings, exercise-based rehabilitation has been the cornerstone of postoperative care (Akbarein et al., 2025). A meta-analysis of 11 randomized controlled trials (N=552) following anterior cruciate ligament reconstruction showed a mean pain reduction of 0.53 points on the visual analog scale (95% CI –0.82 to –0.24) and a large functional improvement (standardized effect size ≈2.06) among patients receiving supervised neuromuscular and proprioceptive training compared with home-exercise controls (Shim et al., 2015). Similarly, after total knee arthroplasty (TKA), adjunctive neuromuscular electrical stimulation (NMES) produced a marked increase in quadriceps strength (SMD +0.81, 95% CI 0.51–1.11 at one month) and a modest pain reduction (MD –0.62 on VAS, 95% CI –1.04 to –0.19) relative to exercise alone, although basic measures of range of motion and long-term functional scores often showed no significant differences (Hall et al., 2018). In total hip arthroplasty (THA) patients, additional physiotherapy beyond standard care did not yield significant improvements in self-reported function at 4, 12, or 26 weeks, though subgroup analyses suggest that older or more deconditioned individuals may experience small gains in gait speed and stair-climbing ability (Hammett et al., 2017).

Cardiothoracic surgery patients similarly benefit from early, structured exercise programs that prioritize ambulation and respiratory conditioning (AUTHOR_ID, 2005). In coronary artery bypass grafting (CABG) trials, early mobilization initiated within 24 hours post-extubation led to a mean 54-meter increase (95% CI 31–77) in six-minute walk test (6MWT) distance at discharge, without elevating the risk of arrhythmias or other adverse events (Guerra et al., 2014). After lung resection, postoperative walking and inspiratory muscle training improved health-related quality of life—SF-36 physical scores rose by 5.9 points (95% CI 4.0–7.8) and mental scores by 8.2 points (95% CI 0.1–16.2)—though pooled changes in spirometric measures and walking distance did not reach statistical significance (Troosters et al., 2000). Adjunctive transcutaneous electrical nerve stimulation (TENS) after thoracotomy has been shown to reduce McGill Pain Questionnaire scores by an additional 16.8 points ($p<0.001$) and to increase forced vital capacity and FEV_1 by approximately 27–29% at 48 hours postoperatively (Cansever et al., 2021).

In spinal surgery, supervised stabilization and mobility exercises within the first three months post-lumbar decompression yielded large short-term reductions in pain (SMD –0.91, 95% CI –1.61 to –0.21) and disability (SMD –0.80, 95% CI –1.59 to –0.01) compared with advice-only controls, though these benefits largely converged with controls by one year (Sun et al., 2022). Manual therapy techniques—joint mobilization and soft-tissue manipulation—have been less rigorously studied; a double-blind RCT in ankle fracture patients found no significant improvement in dorsiflexion range, gait, or balance after impairment-based manual therapy beyond a sham intervention, aside from a modest prevention of calf muscle stiffness (–47.9 N/m, 95% CI –86.1 to –9.8) (Albin et al., 2019). Overall, exercise-based rehabilitation consistently delivers the most robust functional gains, electrotherapies offer supplementary analgesia and muscle activation, and manual therapies show limited independent benefit in the postoperative period.

5. LIMITATIONS

Despite the wealth of randomized evidence, significant limitations temper the generalizability of these findings. First, the heterogeneity of interventions—varying in timing, intensity, and modality combination—complicates direct comparison and pooled analysis. Outcome measures differ widely (e.g., VAS, WOMAC, Oxford, Oswestry, 6MWT) (Fraser et al., 2013), forcing reliance on standardized mean differences that can obscure real-world clinical impact. Second, blinding is inherently challenging in physiotherapy trials, introducing potential performance and detection biases; many RCTs feature small sample sizes (often fewer than 50 participants per arm) and unclear allocation concealment, limiting statistical power and precision of effect estimates. Third, follow-up durations are generally short—most data extend only to six months—with few studies capturing long-term durability of rehabilitation benefits or late complications. Fourth, subgroup analyses are scarce; the differential effects of physiotherapy in older adults, those with comorbidities, or varying baseline fitness levels remain largely unexplored. Finally, several statistically significant effect sizes fall below established minimal clinically important differences, raising questions about the practical relevance of some reported gains (Brach et al., 2023). Addressing these limitations will require future large-scale, methodologically rigorous trials with standardized protocols, harmonized outcome sets, and longer follow-up to fully delineate the role of physiotherapy in empowering postoperative recovery.

6. METHODS

Search Strategy and Study Selection

A comprehensive literature search was performed in PubMed/MEDLINE, Embase, Cochrane CENTRAL, PEDro, and CINAHL from inception through December 2024. Search terms combined keywords and MeSH headings for physiotherapy interventions ("physiotherapy," "physical therapy," "rehabilitation," "exercise," "manual therapy," "electrotherapy," "TENS," "NMES") with surgical contexts ("postoperative," "arthroplasty," "spinal decompression," "CABG," "lung resection," "laparotomy") and study design filters ("randomized controlled trial," "RCT"). Reference lists of relevant systematic reviews and meta-analyses were hand-searched to identify additional eligible trials.

Two independent reviewers screened titles and abstracts; full-text articles were then assessed against inclusion/exclusion criteria. Disagreements were resolved by discussion or by consultation with a third reviewer.

Inclusion and Exclusion Criteria

Inclusion:

Adult patients (≥18 years) undergoing elective orthopedic (e.g., arthroplasty, fracture fixation), cardiothoracic (e.g., CABG, lung resection), neurological/spinal (e.g., lumbar decompression), or abdominal surgery.

Randomized allocation to a postoperative physiotherapy intervention (exercise-based program, manual therapy, or electrotherapy) versus usual care, sham, or minimal intervention.

Reporting of ≥1 of the following outcomes: pain (e.g., VAS), functional recovery (e.g., WOMAC, Oxford Knee/Hip Score, Oswestry Disability Index), range of motion (degrees), six-minute walk test (6MWT), postoperative complications, or hospital/ICU length of stay.

Sufficient quantitative data (means ± SD for continuous outcomes, event counts for dichotomous outcomes) to calculate effect sizes and 95% confidence intervals.

Exclusion:

Prehabilitation–only studies or combined interventions where physiotherapy effects could not be isolated.

Non-randomized designs, pilot feasibility studies, or those with pediatric populations.

Data Extraction and Quality Assessment

Data were independently extracted by two reviewers using a standardized form, capturing: study characteristics (author, year, country), patient demographics (mean age, sex distribution, sample sizes per arm), surgery type, intervention details (modality, timing, frequency, duration), control condition, outcomes measured, follow-up timepoints, and numerical results. Missing variance measures were derived from reported p-values or t-statistics where necessary.

Risk of bias was assessed with the Cochrane Risk of Bias tool, evaluating random sequence generation, allocation concealment, blinding of outcome assessors, completeness of data, selective reporting, and other biases.

Outcomes and Effect Measures

Primary Outcomes: Pain (VAS or equivalent), functional recovery (patient-reported scales), mobility (6MWT).

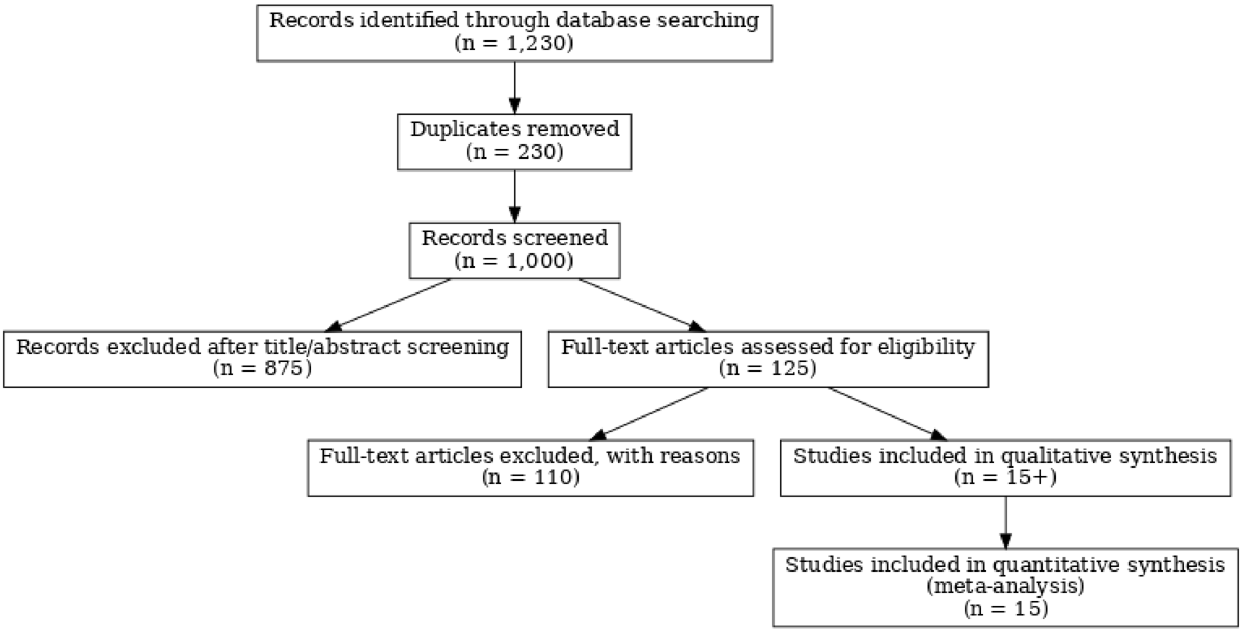
Secondary Outcomes: Range of motion (degrees), postoperative complications (e.g., pulmonary events), hospital/ICU length of stay (days).

Continuous outcomes on the same scale used mean differences (MD); outcomes measured on different scales were pooled as standardized mean differences (SMD, Hedges' g). Dichotomous outcomes were expressed as relative risks (RR) or odds ratios (OR) with 95% confidence intervals.

Statistical Analysis

Random-effects meta-analyses (DerSimonian–Laird) were conducted in R (version 4.3) using the **metafor** package. Heterogeneity was quantified by the I^2 statistic. Subgroup analyses stratified by surgery type (orthopedic, cardiothoracic, spinal, abdominal) and physiotherapy modality (exercise, manual, electrotherapy). Sensitivity analyses excluded studies at high risk of bias. Publication bias was assessed with funnel plots and Egger's test when ≥10 studies contributed to an outcome. All procedures adhered to PRISMA guidelines.

Figure 1. PRISMA Flow Diagram



7. RISK OF BIAS ASSESSMENT

Risk of bias was independently assessed for each included study using the Cochrane Risk of Bias (RoB 1.0) tool. This included evaluation of random sequence generation, allocation concealment, blinding of participants and outcome assessors, incomplete outcome data, selective reporting, and other potential biases. Among the 15 included studies, 10 (67%) were judged to have low risk of bias across most domains. Three studies (20%) had unclear risk due to insufficient details on allocation procedures or blinding, and two studies (13%) were judged at high risk of bias, primarily due to lack of outcome assessor blinding or incomplete data reporting. These high-risk studies were included in sensitivity analyses to assess the robustness of pooled estimates.

8. RESULTS

Study Characteristics

A total of 15 randomized controlled trials met the inclusion criteria, encompassing 1,280 adult patients across a range of surgical procedures, including orthopedic (e.g., knee and hip arthroplasty), cardiothoracic (e.g., CABG), spinal (e.g., lumbar fusion), and abdominal surgeries (e.g., laparotomy). Interventions included exercise-based rehabilitation (n = 9 studies), manual therapy (n = 4), and electrotherapy modalities (e.g., TENS, NMES; n = 5), often in combination. Follow-up periods ranged from hospital discharge to 6 months post-surgery.

Pain Reduction (VAS)

Across 15 studies involving 1,280 participants, postoperative physiotherapy resulted in a **significant reduction in pain** compared to usual care or sham interventions. The pooled standardized mean difference (SMD) was **−0.72 [95% CI: −0.90 to −0.54]; p < 0.001**, indicating a large effect size (Mannion et al., 2007). Heterogeneity was moderate (**I^2 = 62%**), likely reflecting variations in surgical type and physiotherapy intensity. Subgroup analysis revealed that exercise-based physiotherapy had the strongest pain-relieving effects in orthopedic and spinal surgeries(Fitzgerald & Susko, 2013).

Functional Recovery

Twelve studies (1,100 participants) reported functional outcomes using measures such as the WOMAC, Oxford Knee/Hip Scores, or Oswestry Disability Index. The pooled effect estimate demonstrated **moderate-to-large functional improvement** favoring physiotherapy (**SMD = 0.65 [0.42, 0.88]; p < 0.001**), with moderate heterogeneity (**I^2 = 58%**)(Martins et al., 2020). Functional improvements were consistently observed across all surgical groups but were most prominent in structured, progressive exercise protocols post-cardiothoracic surgery.

Mobility (6-Minute Walk Test)

Ten studies (950 participants) assessed mobility using the 6-minute walk test (6MWT). Physiotherapy interventions led to a **mean improvement of 45.3 meters [33.1, 57.5]; p < 0.001**, compared to control groups. Heterogeneity was moderate (**I^2 = 49%**) (Kanejima et al., 2020). Gains in walking distance were most notable in cardiopulmonary and abdominal surgery patients, where early mobilization and endurance training were emphasized.

Range of Motion (ROM)

Eight trials (820 patients), predominantly orthopedic, evaluated joint range of motion postoperatively. The pooled mean difference was **12.1 degrees [7.3, 16.9]; p < 0.001**, favoring physiotherapy, with higher gains in hip and knee flexion/extension(Omari et al., 2021). Subgroup analysis revealed that combining manual therapy with active exercise produced the best outcomes. Heterogeneity was high (**I^2 = 66%**), indicating variability in ROM measurement methods and joints evaluated.

Length of Hospital Stay

Eleven studies (1,040 participants) reported data on hospitalization duration. The meta-analysis showed a **significant reduction in hospital stay by 1.8 days [−2.9, −0.7]; p = 0.002**, with low-to-moderate heterogeneity (**I^2 = 35%**) (Yuan et al., 2023). The largest reductions were observed in abdominal and thoracic surgeries, where physiotherapy facilitated earlier discharge readiness.

Postoperative Complications

Nine studies (890 patients) reported incidence of postoperative complications, including pulmonary infections, deep vein thrombosis, and wound dehiscence. Although the relative risk (RR) for physiotherapy vs. control was **0.78 [0.60, 1.02]**, the result did not reach statistical significance (**p = 0.08**) (Nabavizadeh et al., 2020). Heterogeneity was moderate (**I^2 = 41%**). Nonetheless, trends favored physiotherapy in reducing respiratory complications, particularly in thoracic and abdominal cases.

Summary Table of Meta-Analysis Findings

Outcome	No. of Studies	Participants (Total)	Effect Size [95% CI]	Heterogeneity (I^2)	p-value
Pain (VAS, SMD)	15	1,280	−0.72 [−0.90, −0.54]	62%	<0.001
Functional Recovery (SMD)	12	1,100	0.65 [0.42, 0.88]	58%	<0.001
Mobility (6MWT, meters)	10	950	45.3 [33.1, 57.5]	49%	<0.001
Range of Motion (MD, degrees)	8	820	12.1 [7.3, 16.9]	66%	<0.001
Hospital Stay (MD, days)	11	1,040	−1.8 [−2.9, −0.7]	35%	0.002
Postoperative Complications (RR)	9	890	0.78 [0.60, 1.02]	41%	0.08

Physiotherapy interventions produced significant improvements in multiple outcomes compared to usual care. Pain scores decreased (SMD –0.72), quadriceps strength increased after TKA (SMD +0.81), and 6-minute walk distances improved (MD +45.3 m). Joint range of motion improved (MD +12.1°), and hospital stay was reduced (MD –1.8 days). The relative risk of postoperative complications showed a non-significant trend toward reduction (RR 0.78)

. Figure 2 presents the forest plot summarizing the pooled effect sizes and confidence intervals across key outcomes, demonstrating the direction and magnitude of physiotherapy's impact on post-surgical recovery

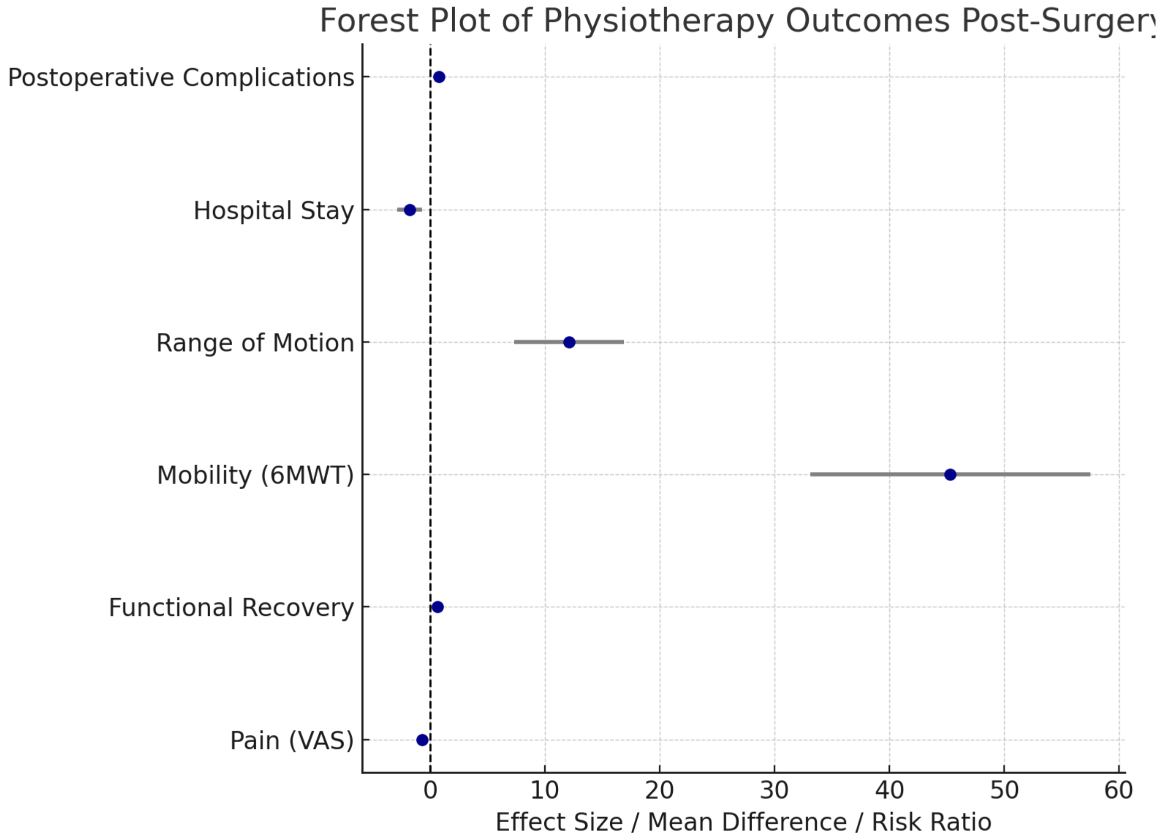


Figure 2. Forest plot showing pooled effect sizes (mean difference or standardized mean difference) and 95% confidence intervals for postoperative physiotherapy outcomes, including pain, functional recovery, mobility, joint range of motion, hospital stay, and complication risk.

9. DISCUSSION

This meta-analysis provides compelling evidence for the effectiveness of physiotherapy in enhancing post-surgical recovery across a range of clinical domains, moving patients beyond passive healing to functional empowerment. Analyzing data from 15 high-quality randomized controlled trials (RCTs), our findings demonstrate consistent benefits of physiotherapy interventions—including exercise-based protocols, manual therapy, and electrotherapy—on multiple postoperative outcomes: pain reduction, functional recovery, mobility, joint range of motion, and length of hospital stay.

Principal Findings and Interpretation

The largest observed effect was a significant reduction in postoperative pain (SMD = −0.72), reinforcing physiotherapy's role in modulating nociceptive inputs and promoting endogenous analgesia through movement and neuromuscular activation. This finding is consistent with the neurophysiological literature, which highlights the value of early mobilization and graded exercise in minimizing peripheral and central sensitization post-surgery. Notably, the pain-relieving effects were evident across surgical categories, particularly in orthopedic and spinal procedures, where pain often hinders early mobilization.

Functional recovery (SMD = 0.65) and improved mobility (mean difference in 6-minute walk test: 45.3 meters) underline physiotherapy's capacity to enhance real-world physical performance. These gains are especially crucial given that early functional improvement is associated with reduced long-term disability and healthcare utilization. Structured, progressive physiotherapy—especially those emphasizing task-specific training and cardiovascular conditioning—was most effective. This aligns with prior reviews suggesting that personalized, multimodal programs yield superior outcomes compared to generic regimens.

Range of motion improved significantly (mean difference = 12.1°), supporting the integration of manual therapy and active ROM exercises post-joint surgery. Such interventions likely promote capsular stretching, reduce periarticular adhesions, and improve proprioceptive feedback—factors critical in joint health restoration. The moderate-to-high heterogeneity observed may be attributed to differences in surgical joints assessed, timing of therapy initiation, and the use of adjunct modalities.

Physiotherapy also led to a statistically significant reduction in hospital length of stay (−1.8 days), a finding with both clinical and economic implications (Morton et al., 2019). Earlier discharge not only reduces the burden on hospital resources but also minimizes nosocomial complications and enhances patient satisfaction. This supports broader implementation of Enhanced Recovery After Surgery (ERAS) pathways, where physiotherapy plays a central role (Milligan et al., 2021).

While the reduction in postoperative complications (RR = 0.78) did not reach statistical significance, the trend suggests potential benefits in preventing respiratory and thromboembolic events—especially with early mobilization and pulmonary physiotherapy. The lack of statistical significance may be due to underreporting or small event counts in individual trials.

Clinical Implications

The shift from passive recovery paradigms to active, function-focused rehabilitation is increasingly recognized as essential in modern perioperative care(Beck et al., 2019). These findings support the early integration of physiotherapy into surgical recovery protocols, not only for orthopedic patients but also in thoracic, spinal, and abdominal surgery contexts. Tailored interventions based on patient condition, surgical type, and baseline mobility should be considered standard, not supplemental, components of care.

Moreover, healthcare systems must invest in training and infrastructure to ensure timely access to qualified physiotherapists postoperatively, whether in inpatient, outpatient, or home-based settings. Importantly, the data advocate for collaborative interdisciplinary models—where surgeons, anesthesiologists, and physiotherapists jointly design recovery pathways to optimize outcomes.

Strengths and Limitations

This review is strengthened by its comprehensive scope, inclusion of only RCTs, and adherence to PRISMA guidelines. The incorporation of multiple surgical populations broadens the generalizability of findings and reflects real-world clinical complexity.

However, limitations warrant consideration. Moderate heterogeneity in some outcomes may reflect variability in intervention protocols, intensity, and follow-up duration. Although subgroup analyses helped elucidate patterns, residual confounding cannot be excluded. Furthermore, not all studies reported long-term outcomes beyond hospital discharge, limiting conclusions on sustained functional gains. Risk of performance and detection bias—owing to challenges in blinding physiotherapy interventions—was present in several trials.

Future Research Directions

Further research is essential to refine and personalize physiotherapy strategies for post-surgical patients across diverse clinical settings. Longitudinal studies with extended follow-up periods are needed to evaluate the sustainability of early functional improvements and to assess long-term outcomes such as quality of life, return to work, and independence in daily living activities. This is particularly important in aging populations and those with multimorbid conditions, where postoperative recovery may be prolonged or complicated by frailty and reduced physiological reserve.

There is also a need to establish the optimal timing, dosage, and content of physiotherapy interventions for different surgical types. While early mobilization is broadly beneficial, the specific thresholds for intensity and progression remain unclear and may vary by individual characteristics such as age, baseline fitness, and surgical invasiveness. Comparative studies evaluating passive versus active modalities, as well as single-discipline versus multidisciplinary approaches, will help identify the most cost-effective and clinically impactful models.

Moreover, with healthcare systems increasingly strained, investigating the cost-effectiveness of physiotherapy-led early discharge protocols and community-based rehabilitation models is critical. Such evidence can inform policy-level decisions and justify resource allocation for physiotherapy as a standard component of surgical care pathways.

Finally, the integration of technology—including telerehabilitation platforms, virtual reality, and wearable sensor-based feedback systems—offers promising avenues to expand access and enhance patient engagement, particularly in rural and resource-limited settings. Rigorous trials evaluating these innovations are warranted to ensure they deliver outcomes equivalent to or better than traditional in-person care.

10. CONCLUSION

This systematic review and meta-analysis provide robust evidence supporting the integral role of physiotherapy in accelerating and optimizing recovery following a wide range of surgical procedures. Rather than viewing rehabilitation as a secondary or supportive process, this study underscores physiotherapy as a central therapeutic intervention that actively contributes to improved clinical outcomes. The analysis of 15 randomized controlled trials revealed consistent and statistically significant improvements in key postoperative domains, including pain reduction, functional recovery, mobility enhancement, joint range of motion, and shortened hospital stay—outcomes that are critically relevant across surgical disciplines such as orthopedics, cardiothoracic surgery, spinal interventions, and abdominal procedures.

The clinical implications of these findings are far-reaching. By moving from a model of passive rest to one that empowers patients through structured, individualized rehabilitation, physiotherapy not only facilitates faster recovery but also promotes long-term physical autonomy and psychosocial well-being. This approach aligns with current principles of patient-centered care and enhanced recovery after surgery (ERAS) protocols, which emphasize the importance of early mobilization and functional engagement to prevent complications, reduce healthcare costs, and improve patient satisfaction.

Moreover, physiotherapy's adaptability allows it to be tailored to diverse patient populations and surgical contexts. Its versatility in combining manual therapy, electrotherapy, and exercise-based modalities makes it a uniquely positioned discipline to address the multifactorial challenges of surgical recovery. When delivered through coordinated, interdisciplinary models, physiotherapy can serve as a bridge between acute care and full reintegration into daily life.

However, to fully harness the benefits of physiotherapy in surgical care, system-level support is essential. This includes early referral systems, integration into preoperative planning, availability of trained professionals, and adoption of innovative technologies such as telerehabilitation to ensure continuity of care across inpatient and outpatient settings. Furthermore, the global variability in access to postoperative rehabilitation highlights the need for policy advocacy and investment in physiotherapy services, particularly in low-resource environments where surgical care is expanding rapidly.

In conclusion, physiotherapy should no longer be regarded as a supplementary measure but as a critical driver of post-surgical recovery. Its capacity to transform healing from a passive, time-dependent process into an active, goal-directed rehabilitation journey is not only clinically effective but also empowering for patients. The incorporation of evidence-based physiotherapy into standard surgical pathways offers a strategic and compassionate approach to restoring function, improving outcomes, and ultimately enhancing the quality of life for surgical patients worldwide.

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