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# Post-Surgical Recovery Through Multidisciplinary Collaboration: The Integral Roles of Physical Therapy, Social Services, and Pharmacy in Optimizing Patient Outcomes

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**Abstract**

*Post-surgical recovery is a complex process influenced by various factors, including pain management, nutritional status, and multidisciplinary collaboration. Effective management strategies are vital for enhancing patient outcomes, minimizing opioid use, and addressing the psychological aspects of recovery.This review synthesizes current literature on the collaborative roles of physical therapy, social services, and pharmacy in optimizing recovery in post-surgical patients. A systematic search was performed across databases such as PubMed, CINAHL, and Scopus, focusing on studies published between 2018 and 2023 that examined pain management strategies, nutritional interventions, and the impact of multidisciplinary teamwork.The findings indicate that a multidisciplinary approach significantly improves post-surgical recovery. Collaborations among physical therapists, social workers, and pharmacists enhance pain control, promote nutritional optimization, and support patients' psychological well-being. Non-pharmacological pain management strategies, including physical therapy and psychological interventions, were shown to reduce reliance on opioids while improving overall patient satisfaction.Integrating physical therapy, social services, and pharmacy into post-surgical care fosters a holistic approach that addresses the multifaceted needs of patients. This collaboration not only enhances recovery outcomes but also promotes sustainable pain management practices. Future research should focus on establishing standardized protocols to further enhance the effectiveness of multidisciplinary teams in surgical recovery settings.*

**Keywords:** *Post-Surgical Recovery, Multidisciplinary Collaboration, Pain Management, Nutritional Optimization, Holistic Care.*

## Introduction

Each year, 100 million surgical operations are performed in the United States, about 60% of which are outpatient procedures. More than 80% of surgery patients have postoperative pain, with 39% experiencing "severe" to "extreme" levels of pain [1,2]. Effective pain management is essential for patient happiness and recovery, necessitating a careful balance of risks and benefits. Although analgesics are essential, their

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excessive use, especially opioids, may result in dependency [3]. Research revealed that 72% of surgical patients using pain pumps had excessive sedation during the first 12 hours. The misuse of prescription opioids is a substantial public health issue, with over 10 million Americans engaging in such behavior in 2018, exacerbating the opioid epidemic [4]. Postoperative pain treatment, particularly for elderly patients after hip surgery, may be intricate. They are more prone to disorientation induced by pain or analgesics, and both unmanaged pain and excessive medicine may exacerbate results [4]. Postoperative discomfort may induce disorientation, impede healing, and facilitate the development of chronic pain. The combination of non-opioid and opioid drugs is often advised.

The World Health Organization (WHO) underscores the worldwide need for enhanced rehabilitation services, accentuating its significance in pain treatment [5,6]. Regional anesthetic provides alternatives for pain control during surgical procedures, including hip surgery, in conjunction with other analgesic strategies including multifunctional analgesia. Epidural anesthesia is favored, however other methods such as quadratus lumborum block (QLB) as well as psoas region block may also be successful. These injections disseminate medicine next to the lumbar plexus nerves, offering analgesic relief [7]. Contemporary best practices advocate for a multimodal strategy in postoperative pain treatment to reduce opioid use [8]. Conventional pain control methods such as oral or intravenous medicines, surgical area infiltration, and single-shot blockages of nerves may be inadequate and may have adverse consequences. Acetaminophen, a prevalent analgesic, has poor efficacy and a delayed beginning of action [9].

Opioids, however efficacious, are associated with the risk of respiratory depression. Regional anesthetic may significantly decrease postoperative pain and narcotic use; nevertheless, some patients may have return pain following the block dissipates, possibly undermining the advantages [10-12]. Nonetheless, there are non-pharmacological alternatives for postoperative pain alleviation. These methods provide an option for pain management devoid of the possible disadvantages associated with drugs [13]. Employing non-pharmacological strategies and non-opioid analgesics before, throughout, and following surgery is essential for minimizing opioid use [14]. Notwithstanding progress in analgesics and methods for addressing acute postoperative discomfort, the efficacy of incorporating non-pharmacological strategies into current multimodal protocols is still ambiguous. This research seeks to evaluate the efficacy of non-pharmacological therapies in postoperative pain relief, concentrating on their effects on diminishing pain intensity, decreasing opioid use, and enhancing patient happiness and rehabilitation results. Furthermore, it will examine the incorporation of these treatments into multimodal pain relief strategies, assessing their capacity to improve the effectiveness of pharmacological therapies while reducing opioid-associated hazards. The research aims to uncover the problems and obstacles healthcare practitioners have in embracing and carrying out non-pharmacological pain treatment options. This study did not include original research involving human participants or animals; hence, ethical approval was unnecessary.

*Determinants Affecting Postoperative Discomfort*

Postoperative pain is a prevalent issue. The intensity of pain experienced, and its treatment are contingent upon many variables, including the nature and scope of the surgical operation. More invasive operations may result in increased discomfort and other complications that hinder recovery. The perception and reaction to pain differ across individuals [15]. Postoperative pain is affected by psychological, patient-specific, and surgical variables. Psychological variables, especially preoperative nervousness, are consistently associated with heightened postoperative pain. Research indicates that elevated anxiety levels before to surgery are associated with increased postoperative pain, resulting in greater analgesic needs and extended hospitalizations; however, several studies report no significant correlation, indicating that other variables may influence pain outcomes [16]. Psychological stress, such as pain worrying and neuroticism, profoundly affects pain tolerance and severity, since neuroticism and catastrophizing shape cognitive reactions instead of direct painful stimuli [17].

Patient features significantly influence postoperative pain. Female patients often endure more intense postoperative discomfort, whereas adolescents, those with superior pre-fracture functionality, and persons with pre-existing discomfort or chronic pain disorders, including opiate use, report heightened pain intensity post-surgery [18, 19]. The kind of operation and its invasiveness influence pain severity, with

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invasive surgeries resulting in greater pain intensity as well as complex recoveries [18]. Insufficient management of acute postoperative discomfort is a major risk factor for the onset of chronic postoperative pain. Contributing reasons include inadequate training for healthcare practitioners, patient misunderstandings concerning discomfort and opioids, as well as drug tolerance in chronic users, underscoring the need for enhanced schooling, patient interaction, and evidence-based pain treatment measures [20]. Despite these limitations, healthcare personnel are required to counsel patients and administer appropriate drugs for acute pain treatment; yet apprehensions about pain and analgesics may sometimes lead to insufficient management [21]. Effective postoperative analgesia is essential for mitigating the adverse effects of acute pain, decreasing the likelihood of chronic pain, and enhancing patient satisfaction. It is advised to use evidence-based, personalized, multimodal strategies for pain treatment that are customized to each patient's requirements, comorbidities, and social circumstances [22] (Figure 1). These methods have shown efficacy in diminishing opioid use, shortening hospital admissions, alleviating preoperative anxiety, and decreasing the need for sedative drugs [15, 22]. Ultimately, enhanced surgical pain management elevates patient outcomes and guarantees superior overall care.

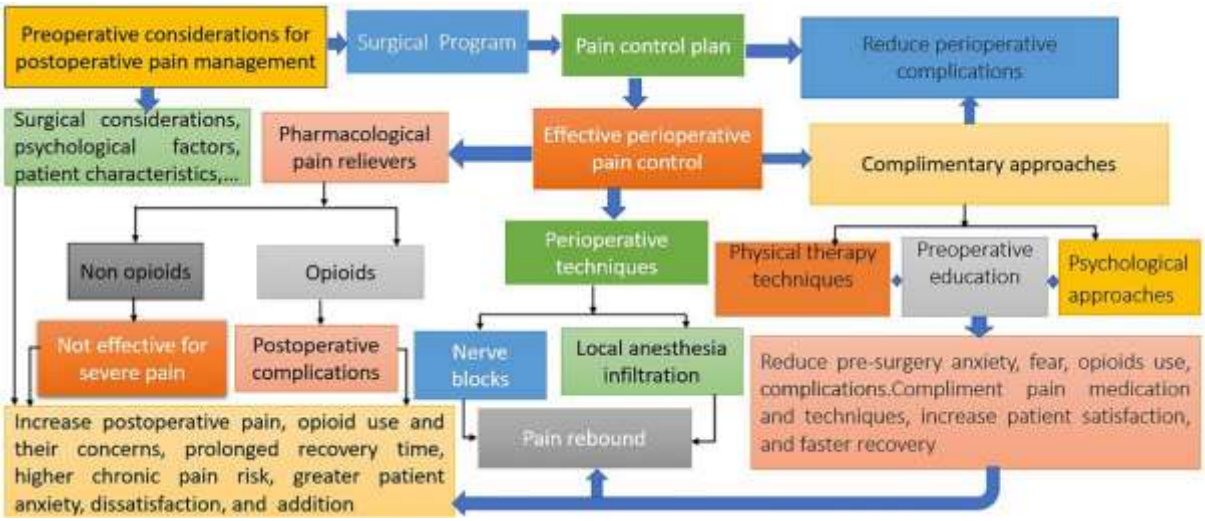


**Figure. One. Complementarity of Non-Pharmacological Methods for Postoperative Pain Management**

*Obstacles in Surgical Pain Relief*

Successful postsurgical pain relief requires a multidisciplinary strategy, incorporating comprehensive preoperative planning, accurate pain evaluation, and a blend of non-pharmacological and pharmacological treatments that consider the psychological, social, and biological causes of pain, thereby promoting a more beneficial postoperative recovery [23]. Opioids have traditionally served as the principal means for pain management; nevertheless, their prolonged consumption is linked to several detrimental effects, particularly addiction, acceptance, and hyperalgesia, in which opioids paradoxically increase pain sensitivity. Moreover, data indicates that opioids may not provide greater effectiveness than nonsteroidal anti-inflammatory medications (NSAIDs) for some acute pain disorders, and they are often linked to a higher occurrence of short-term negative effects [24]. Frequent opioid-related side effects involve postoperative vomiting and nausea, sleep problems, urine preservation, difficulty breathing, somnolence, and potentially fatal results like as coma. Opioid-induced hyperalgesia is particularly concerning, since it intensifies postoperative pain and is exacerbated by a surge in opioid prescriptions, leading to a 50% increase in nonfatal overdoses, mostly among non-chronic opioid abusers [10].

Acetaminophen is an efficient and reasonably safe painkiller at therapeutic dosages; nevertheless, high doses might jeopardize liver function [25]. NSAIDs are often used for analgesia; however, their administration is contraindicated in individuals with adequate preoperative kidney function owing to the risk of postoperative renal dysfunction. Prolonged NSAID use is associated with heightened likelihood of dysfunction of platelets and cardiovascular consequences, especially in those with pre-existing cardiovascular diseases [26-

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28]. Gabapentinoids, like gabapentin and pregabalin, provide an additional therapy option for neuropathic pain, however their use for short-term postoperative pain control is debated. Co-administration of these drugs with opioids has considerable hazards, including intensified sleepiness and respiratory impairment, which may lead to lethal consequences [29]. Elevated doses of gabapentin (exceeding 300 mg) and opioids (surpassing 20 mg oxycodone) were shown to raise the likelihood of respiratory problems after surgery, particularly in laparoscopic operations [30, 31].

A multimodal strategy including preoperative and intraoperative therapies, including acetaminophen, NSAIDs, adductor canal block, regional analgesia, and dexamethasone, is successful for total knee replacement surgery. Postoperatively, non-opioid analgesics ought to be emphasized, with opioids seen as a last choice. Gabapentinoids, ketamine, as well as certain nerve blocks (for instance, epidural, femoral) may provide restricted effectiveness and are linked to an increased occurrence of side effects [32]. Rebound pain (RP) is a significant therapeutic difficulty often encountered after the cessation of peripheral nerve barriers, which provide transient analgesia. Proactive treatment and forecasting of RP are essential to mitigate acute pain, decrease patient discontent, and avert excessive healthcare resource consumption. Inadequate management of RP may result in heightened analgesic use and prolonged recovery durations [33]. A study of 21 patients revealed that whereas peripheral nerve blocks successfully alleviated postoperative pain, their discontinuation led to substantial pain increases, especially in younger patients. Despite older patients exhibiting less severe rebound pain, their heightened reliance on morphine indicates some disadvantages in this demographic [34].

Opioids have historically been essential for postoperative pain management; nevertheless, their use is contentious owing to apprehensions about short-term adverse reactions and the long-term danger of reliance, especially in elderly individuals who are more vulnerable to opioid-related side effects [35]. An effective technique for controlling postoperative pain is using a multimodal analgesic prescription that combines pharmaceutical and non-pharmacological methods, therefore improving pain management and reducing comorbidities including nervousness, dread, and cognitive impairment [36]. Non-opioid painkillers, involving acetaminophen, NSAIDs, and COX-2 inhibitors (coxibs), with adjuvant medicines like gabapentin and pregabalin, are essential in modifying nociceptive pathways impacted by surgical trauma [10].

Psychological discomfort, including worry, stress, and depression, is common after heart surgery, with more than 50% of patients experiencing these symptoms and over 10% fulfilling clinical diagnostic criteria. These psychological concerns may last for more than a year, adversely affecting long-term rehabilitation [37]. Preoperative education, engagement in cardiac therapy, social support, and heightened physical activity were recognized as predictors of decreased postoperative suffering. In contrast, elevated pain as well as impaired function correlate with increased distress. Consequently, it is important to address all the physical as well as psychological dimensions of rehabilitation to optimize postsurgical outcomes in patients undergoing cardiac surgery [37]. Effective treatment of postoperative pain encounters hurdles including opioid-related hazards, rebound discomfort, as well as psychological discomfort. Multimodal strategies, preoperative instruction, and non-opioid treatments are essential for enhancing patient recovery and reducing problems.

*Alternative and Complementary Medicine for the Management of Postoperative Pain*

Nondrug pain treatment provides several alternatives for alleviating pain without the use of pharmaceuticals. Physical therapies such as massage, thermotherapy, and acupuncture aim to alleviate pain symptoms by directly affecting the body. Psychological methods, including relaxation techniques and meditation, target the emotional dimensions of pain. Moreover, religious traditions, music therapy, and spiritual introspection may all aid in pain relief [38, 39]. These non-pharmacological approaches are economical and exhibit low adverse effects; nonetheless, their safe and successful implementation may pose challenges in some healthcare environments [38]. Research suggests several non-pharmacological solutions may be both economical and effective. The choices including physical treatment, yoga, educational programs, acupuncture, and spinal adjustment [40].

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Cognitive-behavioral therapy (CBT) may be helpful for some disorders. An examination of information from 14,767 individuals throughout 12 European hospitals revealed that 44.4% of patients employed at least a single non-pharmacological approach for pain administration; however, these patients reported marginally lower discomfort relief compared to those who did not utilize non-pharmacological methods, indicating a statistically essential distinction. The application of NPMs did not influence patients' inclination for further pain management, with the exception of a beneficial impact shown in the subgroup of complete joint replacement individuals [41]. Expertise supporting nondrug interventions such as heat, spinal adjustment, acupuncture, massage, and exercise for specific acute pain disorders is limited [24].

This study indicates that non-pharmacological approaches, including physical rehabilitation and mental wellness therapies, may enhance the efficacy of opioid painkillers post-surgery. A meta-analysis indicated that psychological preparation correlated with a decrease in postoperative negative outcomes and a reduction in inpatient duration. Nonetheless, the considerable variation restricts trust in these results [42]. Nondrug therapies can aid in the prevention and management of postoperative delirium by facilitating patient reorientation, encouraging early mobilization, supporting a consistent sleep pattern, maintaining enough hydration, and offering visual and auditory support [43].

Research indicates that the use of transcutaneous electrical nerve stimulation (TENS) may improve mobility and respiratory function, while alleviating postoperative symptoms including nausea, vomiting, chest infections, hypoxia, cardiac complications, pressure ulcers, deep vein thrombosis, appetite loss, wound infections, and symptoms of depression and anxiety [44]. Moreover, these methods are economical and exhibit less side effects, hence facilitating post-discharge care as well [45]. These methods may provide a safer alternative or adjunct to pharmacotherapy. Nevertheless, the scarcity of direct comparisons across various procedures complicates the identification of the most successful strategies for specific patients. Nonetheless, integrating non-pharmacological approaches such as physical therapy, psychological interventions, and educational resources for patients and caregivers may markedly enhance pain alleviation. Nonetheless, whilst several non-pharmacological methods are beneficial alone, others have greater efficacy when combined with pharmacological treatments [46]. Multimodal analgesia, integrating non-pharmacological treatments with pharmacological interventions, including cognitive-behavioral therapy (CBT), is more congruent with the biopsychosocial concept of pain, recognizing the many aspects influencing pain perception and treatment [45, 47] (Figure 1).

The review's results on non-pharmacological approaches for postoperative pain management are encouraging. The research presented suggests that using alternative methods may alleviate pain and reduce the need on opioid analgesics. Methods include physical therapy and psychosocial therapies were beneficial in alleviating postoperative pain and diminishing opioid dependence. This underscores the possibility for incorporating alternative techniques into conventional pain treatment approaches. This complete approach has the potential to improve patient outcomes and facilitate recovery, highlighting the need of a thorough strategy to promote patient well-being and mitigate opioid-related hazards. Research evaluated the application of alternative and complementary therapies in the management of postoperative pain. The review included eight research, including five randomized as well as three non-randomized trials. All trials concentrated on postoperative pain, with five demonstrating a substantial decrease. Furthermore, five research examined opioid usage, with two revealing significant differences. A meta-analysis was impracticable due to heterogeneity, and probable bias was detected in all investigations [48].

Non-pharmacological therapies such as schooling, treatment, and distraction methods may be used preoperatively, intraoperatively, and postoperatively [49]. These procedures are often economical and straightforward to execute, and may alleviate pain and worry, particularly for apprehensive people. They may also enable patients to control their pain [49]. Furthermore, patients may effectively manage pain with safe and economical drug-free techniques, including respiration, massage, as well as music [50]. Musical treatment is a secure, cost-effective strategy shown to alleviate discomfort, nervousness, and the requirement for analgesics in several surgical contexts, including orthopedic, cardiovascular and gynecologic procedures [51]. A meta-analysis conducted by Fu et al. shown that perioperative music significantly decreased postoperative opioid use by 31 percent as well as intraoperative propofol as well as midazolam usage by 72% as well as 107 percent, respectively. Nevertheless, it did not substantially affect the duration

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of hospitalization [52]. The research examined data from 14,767 individuals who had surgical procedures. Although 44.4% of patients employed non-pharmacological measures (NPMs) such distraction and chilly packs, these techniques did not correlate with substantial pain alleviation when compared to those who weren't using NPMs. Individuals who did not employ NPMs got marginally greater pain alleviation. Furthermore, the use of NPMs did not affect the need for supplementary analgesics. In the particular instance of complete knee replacement individuals, NPMs were linked to a degree of pain alleviation [53]. A review indicated that several psychological methods (relaxation, education, therapy) might alleviate postsurgical pain and decrease opioid use, but outcomes differed across research [54]. A review of 18 trials indicated that non-pharmacological therapies such as cognitive-behavioral therapy, relaxation techniques, exercise, massage, as well as music therapy enhanced sleep quality, decreased pain, and mitigated stress in post-cardiac surgical patients relative to standard care [55]. Additional study is required to evaluate the relative efficacy of treatments for various acute pain situations and their influence on non-pain outcomes, including long-term impacts, surgical complications, duration of hospitalizations, co-effectiveness, as well as chronic pain avoidance [56].

Postoperative pain may be alleviated and controlled by various preoperative, intraoperative, as well as postoperative methods [47]. Pre-anesthesia education may mitigate pre-surgery anxiety and dread, resulting in enhanced patient confidence, satisfaction, and expedited recovery. Preoperative education for patients must establish clear, evidence-based expectations for expected nutritional intake, pain management strategies, physical rehabilitation protocols, and mobility objectives throughout the postoperative recovery phase [56]. Patients must be apprised of post-operative analgesic alternatives. This teaching may decrease opiate use, anxiety, sedative requirements, and hospital admissions, particularly for high-risk individuals. Understanding their alternatives enables individuals to engage in care decisions. Preoperative anxiety is prevalent, impacting 61–80% of patients. Preoperative information presented in diverse media, such as movies or slideshows, may markedly alleviate anxiety in patients selecting regional anesthesia. This method is simple to execute and may advantage several sufferers [57]. Preoperative schooling for cardiac operation patients significantly diminished preoperative anxiety ($p = 0.02$) and reduced the duration of intensive care unit (ICU) stay ($p = 0.02$), while also resulting in moderate enhancements in postoperative nervousness, depression, as well as patient happiness ($p = 0.04$), as indicated by a meta-analysis of 22 trials encompassing 3167 participants [58].

*Methods of Physical Therapy*

Physical treatments like as TENS, acupuncture, massage, cryotherapy, thermotherapy, and others are used in perioperative pain management. Although usually considered safe, the data supporting their usefulness as adjunctive therapies in a multimodal strategy shows significant variability [47] (Figure 1). Non-pharmacological methods for managing postoperative pain may be used from the preoperative to the postoperative phases. These economical and uncomplicated therapies include patient education, cognitive-behavioral therapy, and distraction methods like as music and aromatherapy. They augment patient autonomy and independence and are progressively investigated owing to apprehensions about conventional medication adverse effects [49].

Humans have historically used cold remedies, referred to as cryotherapy, for wellness and recuperation. These therapies alleviate discomfort, enhance well-being, and facilitate post-exercise recovery [59]. The physiological significance of cryotherapy is its efficacy in alleviating pain by reducing the velocity of sensory nerve transmission [59]. Post-operative ice treatment for shoulder surgery alleviates pain; however, its duration and intensity are contingent upon the kind of anesthetic used. A particular surgical block is most effective when combined with 24 hours of ice at 5 °C. In the absence of the block, brief applications of extremely cold ice at 5 °C for 16 hours, followed by reduced ice exposure for 24 hours, provide superior alleviation at 10 °C [60]. Cryotherapy is an economical and practical method used to alleviate pain, inflammation, and rigidity after knee surgery. It expedites therapy and assists patients in returning to normalcy more swiftly [61].

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Emerging technologies that integrate cold treatment with compression may provide superior pain management outcomes [61]. Nonetheless, several disadvantages need consideration. Although conventional cold treatment helps in alleviating pain from acute injuries, extended use may impede recovery. Hyperbaric gaseous cryotherapy has enhanced analgesic and anti-inflammatory benefits; yet contradictory research findings remain [62]. Moreover, research indicates that it may not consistently enhance bone repair. Research indicates it cools tissues to a depth of 3 cm, perhaps affecting bone in slender individuals [63]. The prolonged cooling of bone is not widely recognized. It is essential to recognize that pain alleviation with cryotherapy is likely due to the numbing of the skin rather than the muscles or joints [63]. Cryotherapy may reduce inflammation but might potentially impede the healing process. While it may reduce pain and inflammation, it might potentially restrict blood circulation and postpone the transport of healing substances to the affected region. As a consequence, this may lead to tissue death or nerve damage [62]. Studies indicate possible advantages for older individuals after surgical treatment of hip fractures [64]. Utilizing ice post-surgery may reduce swelling and pain; however, the effectiveness of this method after oral surgery remains ambiguous [65]. Additional rigorous study is necessary to comprehensively comprehend the impacts of both cold treatment and hypoxic gaseous cryotherapy [59].

Fortunately, low-level heat treatment is a safe, non-pharmacological, and effective solution for alleviating both immediate postoperative discomfort and chronic lower back discomfort. Research has shown its efficacy in alleviating pain, facilitating muscle recovery, and aiding patients in regaining normal function [66-68]. Heat treatment functions by alleviating muscular tension, enhancing circulation, and expelling pain-inducing substances [67]. Research demonstrated that those who received warmth immediately post-hernia surgery had significantly lower pain levels than those who did not get warming [68]. Hilotherapy markedly reduces edema and discomfort, expediting the recuperation of mandibular mobility, improving patient comfort, and facilitating treatment for healthcare personnel [69]. Thirty people had third molar surgery along with treatment with either Hilotherm or traditional cooling methods. Hilotherm demonstrated decreased edema, alleviated discomfort, less neurological complications, and enhanced patient satisfaction relative to traditional cooling methods [70]. In a randomized experiment, the Hilotherapy mask effectively reduced facial skin temperature after facelift surgery, although it resulted in a substantial rise in patient-reported postoperative edema [71].

Research examining stimulating electrical nerves as well as acupuncture-like TENS (ALTENS) for diminishing postsurgical pain medication use revealed that their efficacy was contingent upon stimulation settings. In 21 studies including 1350 patients, both approaches decreased analgesic use by 26.5% vs to placebo. Trials validating "strong, subnoxious" electrical stimulation at appropriate frequencies showed a 35.5% decrease, but those without validation shown just a 4.1% reduction. This variation demonstrated statistical significance ($p = 0.0002$), underscoring the need of suitable stimulation settings for effective pain alleviation and reduced medication use [72]. Furthermore, studies indicate that TENS may improve mobility and respiratory function, while alleviating postoperative symptoms including nausea, vomiting, pulmonary infections, hypoxia, cardiac complications, ulcers caused by pressure, thrombosis of deep veins, appetite loss, wound infections, and symptoms of anxiety and depression [44]. Nevertheless, the proof is not wholly consistent. Research examining the application of TENS after inguinal hernia repair in males indicated no significant differences in pain intensity, breathing patterns, or medicine consumption among the TENS as well as placebo categories, notwithstanding the patients' perceived advantages [73]. In contrast, studies using high-frequency TENS (100 Hz) to mitigate pain post-inguinal hernia surgery shown a significant reduction in pain and drug use relative to a placebo group throughout the first 24 hours after the procedure. Active TENS significantly reduced postoperative pain severity at 2, 4, 8, and 24 hours after inguinal herniorrhaphy compared to placebo TENS ($p < 0.05$). The use of analgesics was markedly reduced in the continuous TENS category ($p = 0.001$) [13]. The use of TENS to acupuncture sites for pain management post-hip replacement surgery in older patients had positive results, as those in the TENS group required less analgesic medication during the first two days post-surgery [74].

A randomized experiment indicated no significant decrease in patient- controlled analgesia (PCA) employ with TENS in comparison to sham TENS following total knee arthroplasty, suggesting that TENS is ineffective for postoperative pain relief in this procedure [75]. Patients having cardiac surgery who got a

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parasternal block exhibited superior pain management and necessitated fewer opioid analgesics compared to those using TENS or getting no intervention. While TENS offered modest analgesic benefits relative to no intervention, it was less efficacious than the block [76]. Transcutaneous electric acupoint stimulation (TEAS) seems to be useful in alleviating postsurgical pain. Research demonstrates a considerable reduction in pain ratings and narcotic needs in comparison to acupuncture or no therapy, especially in the context of abdominal surgery. TEAS may improve recovery and decrease nausea, vomiting, and duration of hospitalization after laparoscopic surgeries [77]. The study suggests that TENS may be used in conjunction with medicine in perioperative contexts to alleviate acute pain and reduce the need for analgesics during and post-surgery [44]. The effectiveness of extended TENS treatment for postoperative pain management has been contested owing to variations in pain intensity and surgical techniques [78].

*Psychological Methodologies*

Research examining non-pharmacological methods for managing postsurgical pain produces inconsistent findings. A study with 312 respondents participating in surgery for malignant bone and soft-tissue tumors revealed that those who utilized the Registered Nurses' Association of Ontario (RNAO) pain management protocol, specifically Jacobson's relaxation technique (JRT), exhibited significantly lower pain scores at 6-, 24-, and 72-hours post-operation compared to the placebo group [79]. At the 72-hour post-operative mark, pain evaluation parameters were considerably reduced in the JRT category. Additionally, individuals in the JRT category exhibited superior satisfaction levels regarding nursing care and postoperative pain management compared to the control group. These results underscore the effectiveness of JRT in improving postoperative pain and nurse satisfaction [79]. Research contrasting jaw calmness to full-body calmness for postsurgical anxiety and discomfort revealed relatively little pain decrease across the two categories, with no substantial variations in stress or calmness levels [80]. A review of studies on psychological methods for managing pain and mobility post-surgery indicates that these therapies may not substantially enhance pain relief or movement, but some data supports possible advantages for emotions [81]. An examination of 105 studies encompassing 10,302 participants indicated scant evidence that psychological preparation techniques correlated with diminished postoperative pain, reduced hospitalizations, and lowered negative emotions in comparison to control groups [42]. The data for enhanced behavioral rehabilitation was of minimal quality but suggested some advantages, especially with behavioral education. Nevertheless, owing to significant heterogeneity and ambiguous potential for bias, the researchers determined that the existing data is inadequate for decisive conclusions, emphasizing the need for more rigorously conducted research in this domain [42]. In a trial involving hernia surgery individuals, the application of relaxing with heat (RWH) significantly reduced presurgical stress compared to just providing procedural information, leading to enhanced emotional readiness for surgery [81]. In summary, while some non-pharmaceutical methods such as JRT show potential, more study is required to conclusively establish the efficacy of psychological strategies in controlling postsurgical pain as well as movement.

*Obstacles in the Implementation of Non-Pharmacological Pain Management Strategies*

These non-pharmacological approaches are economical and exhibit few adverse effects; nonetheless, their safe and effective implementation may pose challenges in some healthcare environments [38]. Blinding both patients and scientists in non-pharmacological pain studies is difficult owing to the challenges in creating a credible placebo intervention [82]. Healthcare personnel are essential in non-pharmacological pain treatment for surgical patients by offering emotional support, aiding with daily tasks, and fostering a pleasant atmosphere [83]. Nevertheless, variables like as age, training, expertise, and hospital setting may affect the use of these methodologies [83]. Notwithstanding the advantages, research revealed that nurses recognized some limits in their understanding of non-pharmacological pain treatment methods. Although they acknowledged benefits such as reduced cost, diminished side effects, enhanced patient self-management post-discharge, and relaxation advantages, the results indicate that nurses may need further training to execute these strategies proficiently [45]. Research has highlighted insufficient training, inadequate resources, and limited managerial and medical support as prevalent obstacles to the implementation of nondrug pain management methods [38]. Healthcare professionals reported insufficient time as the primary obstacle to implementing nondrug pain treatment. Moreover, patient resistance and

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their perceptions of pain were identified as substantial obstacles [45]. Cross-sectional research including 154 nurses from national reference and private medical facilities evaluated the application of non-pharmacological pain treatment techniques and identified perceived obstacles.

Nurses mainly utilized psychological support, assistance with daily tasks, and the establishment of a pleasant atmosphere, but cognitive-behavioral as well as physical measures were seldom employed. At the multivariate threshold, nurses' age, education, work experience, and workplace exhibited significant associations with the use of non-pharmacological methods. Multivariate analysis indicated that the hospital environment was the only significant factor, with statistical importance. Significant reported obstacles were excessive workloads, insufficient time, constrained resources, lack of pain treatment protocols, noncompliant patient conduct, language barriers, and nurses' deficiencies in expertise as well as expertise. The study determined that the inconsistency in the application of non-pharmacological methods stemmed from the varying knowledge and experience of healthcare providers, indicating that education and practice for every practitioner could improve the implementation of these approaches for postoperative pain administration [83]. Bayoumi et al. investigated the use of non-pharmacological pain management strategies by physicians in surgical wards. The age varied from 20 to 49 years. Over 80% of the caregivers were female. The majority of nurses had nursing certificates from technical institutions or bachelor programs. The years of experience varied from beginner to expert, with a mean ± SD of 9.36 ± 7.50 years [45].

## Summary

This research underscores the considerable potential of non-pharmacological therapies in postoperative pain management, highlighting their capacity to diminish opioid dependence and improve recovery outcomes. Evidence indicates that strategies including preoperative education, physical therapy, and mind–body practices may significantly reduce pain severity and enhance patient satisfaction post-surgery. These therapies target both the physical and psychological-social features of pain, according with the biopsychosocial paradigm of pain management. Nonetheless, the execution of these techniques encounters other obstacles, such as resource limitations, inconsistencies in healthcare professional education, and the necessity of a conducive hospital culture.

Although acknowledging the advantages of non-pharmacological approaches, healthcare professionals often indicate deficiencies in their knowledge and abilities pertaining to these strategies, which may impede their efficient implementation in clinical practice. To enhance postoperative pain relief, it is crucial to include these nonpharmacological methods into multimodal analgesia protocols, ensuring they augment conventional pharmacological therapies. Future study must concentrate on generating substantial proof for the effectiveness of distinct non-pharmacological therapies, examining their enduring advantages, analyzing the discrepancies in physiotherapy methodologies, and formulating extensive educational courses for healthcare practitioners. By tackling these issues and fostering a cooperative strategy to pain administration, we may markedly boost patient outcomes and optimize the postoperative recovery processes. Our present study provides a short examination of TENS treatment; however, we want to investigate its applicability and effectiveness in other postoperative settings in further research.

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# التعافي بعد العمليات الجراحية من خلال التعاون متعدد التخصصات: الأدوار الأساسية للعلاج الطبيعي والخدمات الاجتماعية والصيدلة في تحسين نتائج المرضى

## الملخص

**الخلفية** :يُعد التعافي بعد العمليات الجراحية عملية معقدة تتأثر بعوامل متعددة، بما في ذلك إدارة الألم، الحالة التغذوية، والتعاون بين التخصصات. تُعتبر استراتيجيات الإدارة الفعّالة ضرورية لتحسين نتائج المرضى، وتقليل استخدام الأدوية الأفيونية، ومعالجة الجوانب النفسية للتعافي.

**الطرق** :تجمع هذه المراجعة بين الأدبيات الحالية حول الأدوار التعاونية للعلاج الطبيعي والخدمات الاجتماعية والصيدلة في تحسين التعافي لدى المرضى بعد العمليات الجراحية. تم إجراء بحث منهجي عبر قواعد بيانات مثل PubMed و CINAHLوScopus، مع التركيز على الدراسات المنشورة بين عامي 2018 و2023 التي تناولت استراتيجيات إدارة الألم، التدخلات التغذوية، وتأثير العمل الجماعي متعدد التخصصات.

**النتائج** :تشير النتائج إلى أن النهج متعدد التخصصات يُحسّن بشكل كبير من عملية التعافي بعد العمليات الجراحية. يُعزز التعاون بين أخصائيي العلاج الطبيعي، الأخصائيين الاجتماعيين، والصيادلة من التحكم في الألم، وتحسين الحالة التغذوية، ودعم الصحة النفسية للمرضى. كما أثبتت استراتيجيات إدارة الألم غير الدوائية، بما في ذلك العلاج الطبيعي والتدخلات النفسية، فعاليتها في تقليل الاعتماد على الأدوية الأفيونية مع تحسين رضا المرضى بشكل عام.

**الخلاصة** :يُسهم دمج العلاج الطبيعي والخدمات الاجتماعية والصيدلة في رعاية ما بعد العمليات الجراحية في تحقيق نهج شامل يلبي احتياجات المرضى المتعددة الجوانب. يُعزز هذا التعاون من نتائج التعافي ويُروّج لممارسات إدارة الألم المستدامة. ينبغي أن تركز الأبحاث المستقبلية على وضع بروتوكولات موحدة لتعزيز فعالية الفرق متعددة التخصصات في بيئات التعافي الجراحي.

**الكلمات المفتاحية** :التعافي بعد العمليات الجراحية، التعاون متعدد التخصصات، إدارة الألم، تحسين التغذية، الرعاية الشاملة.