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Integration of Physiotherapy and Pharmacotherapy in Postoperative Recovery: A Narrative Review

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ABSTRACT

There are many challenges to recovering from surgery such as, learning how to manage pain, getting the body to function normally again, and avoiding complications. In the past, recovery was done by using the traditional method of recovery with the use of prescription painkillers. However, studies have shown that recovery is faster if physiotherapists collaborate with others in the medical field. This brings us to the intent of this mini review: the merger of physiotherapy with medicine during the recovery phase of surgery. Many studies focus on the use of pain medications during recovery, the prevention of pain medication overdoses, and the complications of physiotherapy that are synergistic to the use of drugs, and recovery of physical and psychosocial functions, and even the prevention of complications.

There is also a lot of documented evidence that states that the prescription of early physical activity, and even exercise, diminishes the chances of using opioids, and restores dominant function, while also preventing complications that antagonize re-stagnation (or deep vein thrombosis) and disuse muscle atrophy. There is also evidence that states that if physiotherapy and psychotherapy are used together, there is a greater chance that the patient with psychosocial self-efficacy will have greater anxiety. In contrast, the patient with greater psychosocial self-efficacy will have lesser anxiety. There is, however, a considerable lack of organization when it comes to post-operative physiotherapy as well as providing tailored physiotherapy treatment plans, which remains a huge obstacle.

Keywords: Postoperative recovery, Physiotherapy, Pharmacotherapy, Opioid reduction, Functional recovery

INTRODUCTION

The recovery stage after surgery is one of the most influential parts of surgical care, and will to a large degree determine a patient's level of rehabilitation and their quality of life. After surgeries, patients have to deal with different levels of pain, stress and emotional issues, as well as functional limitations, and all of these will hamper the recovery procedures [1]. Traditional approaches to after-care management have used a pharmacotherapy-based approach to deal with issues such as pain, infection, and the general promotion of wound healing [2]. There is, however, increasing evidence to suggest that a more integrated approach to the recovery process is needed in which the role of physiotherapy integrated with pharmacotherapy is fundamental in optimizing the recovery process and in the improving functional outcomes [3].

The use of pharmacotherapy, which involves the use of analgesics, anti-inflammatory agents, as well as antibiotics, is still the most used method of managing the post-operative patient [4]. While analgesics in the form of NSAIDs and opioids are used to control pain, antibiotics are used in the prevention and treatment of surgical site infections. While pain control and complication prevention is important in post-operative care, the concerns that have been raised regarding such interventions, especially the adverse side effects, the potential for drug dependency and a slow recovery are considerable [5]. This is the reason why health care in post-operative care has been forced to work in the use of other complementary interventions that deal with the gaps that exist in operational recovery and they include the operational recovery gaps that deal with mobility, muscle strength and emotional issues [6].

On the other hand, physiotherapy works to improve certain aspects of rehabilitation including, but not limited to, physical functioning, mobility, and overall recovery via specific rehabilitation techniques, manual therapies, and other methods the practitioner may choose to include. One of the main functions of physiotherapists include suggesting and guiding patients through rehabilitation exercises to improve joint range of motion, muscle strength, and overall cardiovascular fitness [7]. On top of this, physiotherapy helps to positively impact the recovery from/post surgical complications which may include,

but is not limited to, deep vein thrombosis (DVT), a pulmonary complication, muscle atrophy, etc. When combined with some sort of drug therapy, physiotherapy can provide patients with a more active role in the recovery process, while also decreasing the need for drug therapy, thus, promoting overall positive functional benefits in the long term [8].

There are several benefits for postoperative care which result in a positive outcome from the integration of physiotherapy with pharmacotherapy. For example, certain studies show a positive correlation between a decrease in length of stay in the hospital, decrease of postoperative complications, and an overall improvement of postoperative outcome with early mobilization, and active rehabilitation exercises [9].

Not to mention the combined positive impact of both strategies in the postoperative period for the management of pain which is a target for almost all patients. For example, in the case of positive pain management with the help of pharmacotherapy, patients are given a form of analgesic which helps relieve the pain.

On the other hand, physiotherapy helps remove the psychological barriers to a patient's functional recovery [10].The reduction of opioid medication intake as part of a multi-disciplinary approach integrating physiotherapy and pharmacotherapy is a growing facet of opioid crisis management in postoperative pain management [11]. The effective relief of pain through opioid use and the associated risks of dependency, overshoot, and gastrointestinal and respiratory adverse effects are all well-documented.

The introduction of physiotherapy measures allows for the use pain management methods that lessen the requirement for opioids and other pain-relieving medication. The use of movement techniques, TENS, and other forms of manual therapies have been shown to reduce pain and improve function in a clinically effective manner [12].

Postoperative interventions and the subsequent recovery period is as much psychological as it is physical. Many patients experience psychological distress whose forms include clinically significant anxiety, major depressive episodes, and pain-related fear of movement [13].

The loss of confidence in the body to heal and regain function is a psychological and emotional barrier to recovery that the physiotherapy component of the multi-disciplinary approach integrates to rectify. The overcoming of these barriers is paramount to the recovery process and is achieved through physiotherapy provided support in movement, instruction, and motivation [14].

Notwithstanding the evidence indicating the importance of integrating physiotherapy and pharmacotherapy, several barriers continue to exist, including the absence of established protocols regarding the integration of the two, discrepancies pertaining to the availability of physiotherapy, and the complexity of the patients. Furthermore, the essential teamwork involving the healthcare professions of surgeons, anesthesiologists, physiotherapists, and pharmacists may be, and often is, obstructed owing to communication difficulties and operational constraints [14].

Review

The initial management of pain, infection, and other postoperative complications such as deep vein thrombosis (DVT) and other blood clots, is vital to the patient’s recovery and is where pharmacotherapy manages the recovery process. Pain management is done using opioids such as morphine or fentanyl as well as non-steroidal inflammatory opioids (NSAIDs) along with other pain management strategies [15].

Opioids are potent and the preferred management strategy for pain, however, there are side effects such as sedation, gastrointestinal pain, and dependency. Other pain management strategies such as NSAIDs assist with inflammation but also have the side effect of triggering GI bleeding. To prevent surgical site infections (sepsis is also a complication) prophylactic antibiotics and/or heparin are prescribed [16].

Heparin is routinely ordered to prevent DVT and other thromboembolic events which can be fatal. Corticosteroids are also prescribed for inflammation and healing. This is true for non-joint surgeries as well, but more so for surgeries such as joint prosthesis replacements where there is a significant amount of reconstruction [17].

However, there is a barrier to certain pharmacotherapy options, including opioid medications, which have detrimental side effects of dependency and may negatively impact the digestive and respiratory systems [Table 1]. Moreover, the analgesics do not take the physical deconditioning and muscle atrophy after surgery into account, showcasing the need for interdisciplinary approaches such as physiotherapy.

Table 1: Pharmacological Agents in Postoperative Recovery

Pharmacological Agent	Purpose	Examples	Limitations
Analgesics	Pain management	Opioids (e.g., morphine, fentanyl), NSAIDs	Risk of dependence (opioids), gastrointestinal issues
Antibiotics	Infection prevention	Cefazolin, Vancomycin, Piperacillin	Resistance, adverse reactions
Anticoagulants	Prevention of thromboembolic events (DVT, PE)	Heparin, Low-molecular-weight heparin	Risk of bleeding, requires monitoring
Corticosteroids	Inflammation reduction and tissue healing	Prednisone, Dexamethasone	Immunosuppression, long-term side effects

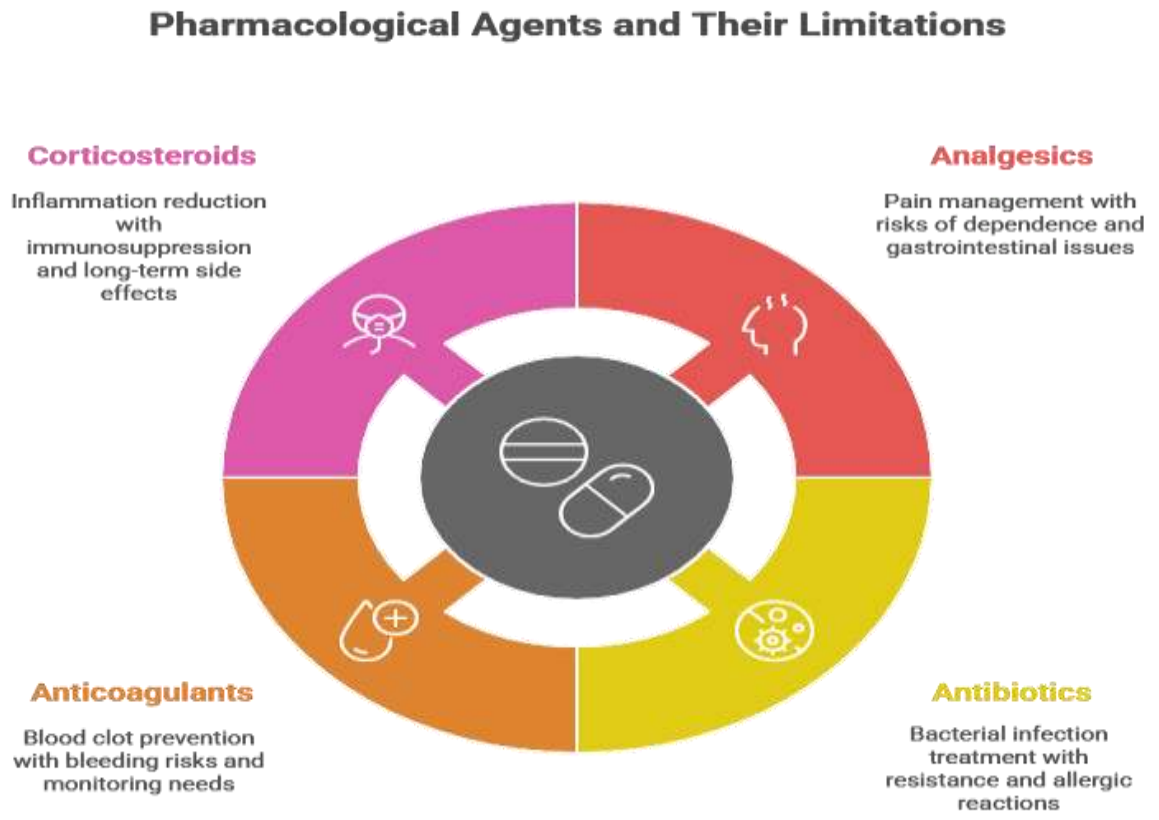

Figure 1: Pharmacological Agents in Postoperative Recovery

Following surgical procedures, physiotherapy significantly assists in recovering lost mobility, strength, and functional independence. Key to physiotherapy is pain relief. Tasks such as TENS, manual therapy, and pain med therapy supplementation, pain therapy adjuncts, and physiotherapy opioid analgesics, opioids, and other pain therapy medications, consequently, their negative consequences [18]. Moreover, physiotherapy post-operatively mobilizing, circulatory complications like deep vein thromboembolism DVT, pulmonary embolism, and other respiratory physiotherapy also helps in. In the later stages of the process recovery, rehabilitation is also aimed practices recover to re-establish normal sustain mastery of the range of joint motion, strength of the target muscles, and increase of endurance [19]. This is crucial is of combat loss of muscle strength and joint mobility, the recovery. The process complications, prolonged in bed immobilization rest sedentary also immobilization bed rest. The preceding benefits, physiotherapy also provides psychological benefits [20]. Therapeutic practices like controlled movement coordination education aimed at regaining control and relief of anxiety and depression are common after most surgical procedures [Table 2].

Table 2: Physiotherapy Techniques in Postoperative Recovery

Physiotherapy Intervention	Purpose	Examples	Limitations
Pain Management	Non-pharmacological pain relief	TENS, Manual therapy, Mobilization	May not provide complete pain relief in severe cases
Functional Recovery	Restoring movement, strength, and fitness	Exercise therapy, Strengthening, Stretching	May require extensive rehabilitation sessions
Prevention of Complications	Prevention of DVT, muscle atrophy, and pulmonary issues	Early mobilization, Respiratory exercises	Risk of injury if not done properly
Psychological Support	Reducing anxiety, depression, and fear of movement	Education, Psychological support	Emotional challenges may still persist for some patients

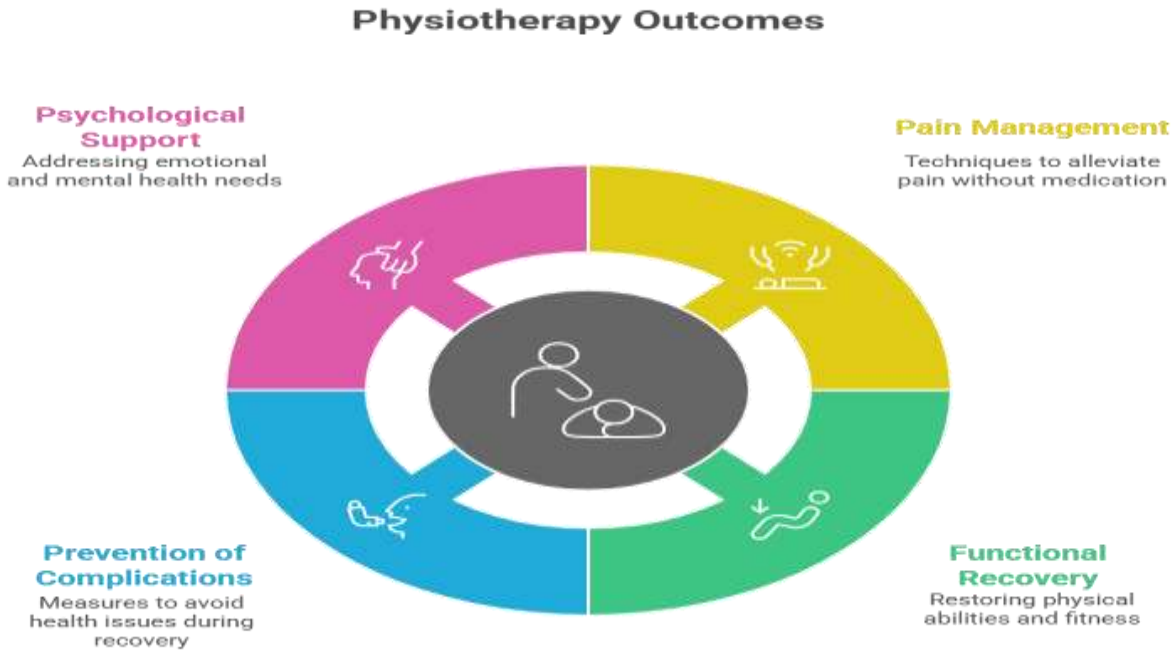

Figure 2: Physiotherapy Techniques in Postoperative Recovery

This line of interdisciplinary research aims to unify both physiotherapy and pharmacotherapy for patient positive outcomes. Undoing functional impediments and chronic disability is what therapy targets. While pharmacotherapy aims to mitigate pain and other potential complications. Together, genuine and holistic recovery is achieved [21]. For one, the integrated technique is known to improve outcomes concerning pain relief. More opioid pain relief medications averagely prescribed to patients for relief, were optimum pain relief achieved. Researchers explain the physiotherapy patients used less opioids compared to patients of the no medication control group, while TENS, physiotherapy pain relief technique, and manual therapy, ported the pain, thus exercising the positive side effects of the drugs [22]. The integrated approach is effective in restoration of recovery cardiovascular endurance, and strengthening of major muscle groups and range of motion in joints. Medications provide short term relief of pain while physiotherapy exercises provide long term relief. Additionally, the integrated approach provides the prevention of complications including DVT, pulmonary embolism, and muscle atrophy [23].

Issues with anticoagulants patients are commonplace; however, slow, gentle movements directed by physiotherapist help avoid complications or overexertion by going too fast through the range of motions. More of the patients' mental structures whose physiotherapy received, under the inclusive ambulatory renovation, are whose improvements, because they are in charge of their recuperation [24]. Having such an inactive role in their recuperation, patients ameliorate the mental bloc against rehabilitation, increase their participation in physical rehabilitation, and improve their overall mental health [Table 3].

Table 3: Integration of Physiotherapy and Pharmacotherapy

Area	Role of Physiotherapy	Role of Pharmacotherapy	Synergistic Effect
Pain Management	TENS, Manual therapy, Active movement to reduce discomfort	Opioids, NSAIDs	Reduced opioid consumption, enhanced pain relief
Functional Recovery	Exercise therapy, Strengthening, Improving mobility	Analgesics for pain control	Faster muscle strength recovery, improved joint mobility, functional independence
Prevention of Complications	Early mobilization, Breathing exercises	Anticoagulants, Antibiotics	Prevention of DVT, pulmonary embolism, and muscle wasting
Psychological Well-being	Education, Building confidence through gradual activity	-	Reduced anxiety, fear of movement, and depression

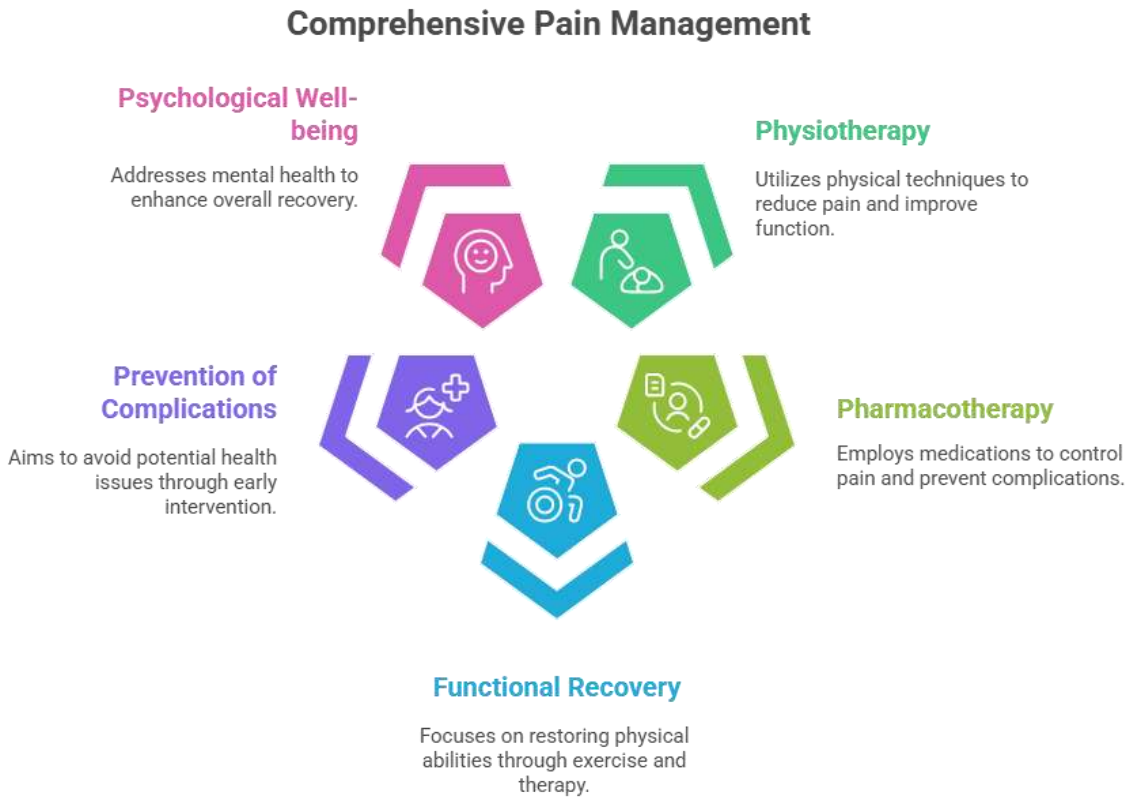

Figure 3: Integration of Physiotherapy and Pharmacotherapy

More advantages exist in integrating physiotherapy and pharmacotherapy in postoperative recovery. However, some issues must also be remedied. The first is the lack of 'how-to' guides on integrating these practices. There is some uncertainty on when and what kind of physiotherapy practices should be introduced for a given recovery stage. This also relates to instances when patients do not have physiotherapy services, particularly in rural and underserved settings lacking physiotherapists and rehabilitation specialists [25]. The absence of this information also complicates personalizing rehabilitation. The type of surgery, medical and surgical history, and recovery goals must also be present. Adding to this, the integration of physiotherapy and pharmacotherapy into one plan is a collaborative and multidimensional task, concerning a team of health professionals including a surgeon, a physiotherapist, a pharmacist, and an anesthetist [26]. However, due to the unequal distribution of interprofessional collaboration, there is no workflow, and this may extend the recovery time as it becomes more complicated [Table 4].

Table 4: Challenges in Integrating Physiotherapy and Pharmacotherapy

Challenge	Description	Impact on Integration
Lack of Standardized Protocols	No universally accepted guidelines for combining physiotherapy and pharmacotherapy	Variability in recovery outcomes, inconsistency in treatment approaches
Access to Physiotherapy Services	Limited access to physiotherapists in certain regions, especially rural areas	Inconsistent patient recovery, delayed or insufficient rehabilitation
Individual Patient Needs	Each patient has unique needs based on surgery type, health conditions, and recovery goals	Difficulty in creating a one-size-fits-all recovery plan
Interdisciplinary Collaboration	Challenges in communication and coordination between healthcare professionals	Delays in treatment initiation, conflicting treatment approaches

LITERATURE REVIEW

The recovery process after surgery involves managing multiple facets, including pain, mobility, emotional well-being, and the prevention of complications. Traditionally, pharmacotherapy has been the cornerstone of postoperative care, focusing primarily on pain management and preventing infections. However, the integration of physiotherapy into this model has gained increasing attention due to its synergistic benefits for improving functional recovery and reducing complications.

Table 5: Integration of Physiotherapy and Pharmacotherapy

Study	Intervention	Key Findings
Aoyagi et al. (2021) [27]	Physical Therapy after Total Knee Replacement	Early PT significantly reduced long-term opioid use in TKR patients, improving functional recovery.
Braun-Taylor et al. (2021) [28]	PT and opioid use in post-surgical recovery	Emphasized the importance of early PT to reduce opioid use, strengthening postoperative recovery protocols.
Afzal et al. (2022) [29]	Active physiotherapy after lumbar disk surgery	Active PT 1-2 months post-surgery led to better pain management and functional recovery compared to standard care.
Shao et al. (2022) [30]	Combined drug and exercise intervention	Postoperative exercise combined with pharmacotherapy improved recovery outcomes in muscle strength and joint mobility.

In recent studies, the integration of physiotherapy and pharmacotherapy has shown promising results in postoperative recovery.

Aoyagi et al. (2021) [27] conducted a study focusing on physical therapy after total knee replacement (TKR). Their findings revealed that early physiotherapy significantly reduced long-term opioid use in patients, leading to an improvement in functional recovery .

Braun-Taylor et al. (2021) [28] reviewed several studies on the relationship between physical therapy and opioid use in post-surgical recovery. They highlighted the importance of initiating physiotherapy early in the postoperative period, which was shown to reduce the use of opioids and strengthen the overall recovery process.

Afzal et al. (2022) [29] investigated the impact of active physiotherapy 1-2 months after lumbar disk surgery. Their research demonstrated that active physiotherapy provided better pain management and functional recovery compared to standard care, emphasizing the critical role of physiotherapy in long-term recovery.

Shao et al. (2022) [30] explored the combined effects of postoperative exercise and pharmacotherapy. Their study found that integrating exercise with drug therapy significantly improved recovery outcomes, particularly in terms of muscle strength and joint mobility.
These studies collectively reinforce the beneficial effects of combining physiotherapy with pharmacotherapy, highlighting its role in improving recovery speed, reducing dependency on opioids, and enhancing functional outcomes after surgery.

DISCUSSION

The recent empirical studies highlight the synergism of physical therapy and drugs for recovery from surgery. Aoyagi et al. (2021) [27] from the cohort study in the database of Association of Physical Therapy Interventions with Long-term Opioid Use After Total Knee Replacement analyzed over 67 thousand patients and knee replacements (TKR). Aoyagi et al. found that attending physical therapy (PT) prior to or following TKR, particularly beginning PT within 30 days of surgery and attending six or more sessions, had significantly reduced odds of opioid use in the long-term.

Furthermore, in the scoping study Braun-Taylor (2021) et al. [28] Relationships between physical therapy intervention and opioid use of the 13 studies reviewed, 8, concluded that early PT, of emphasized, reduced opioid use, which brings to the forefront an optimized rehabilitation process, recovery, and reduction of drugs. This, for certain, strengthens the early integration of physiotherapy in the postoperative care protocols.

In addition to the reduction of opioids, increased functional restoration also occurs as a result of physiotherapy. Afzal et al. (2022) [29] investigated the impact of active physiotherapy on pain and overall recovery after lumbar disk surgery. They found that active physiotherapy, which occurs 1-2 months after surgery, is associated with better pain reduction on visual analog scales, functional recovery, and overall recovery compared with control standard care. These results demonstrate that physiotherapy helps restoration of motion, reduction of pain, and functional recovery after surgery, all of which cannot be achieved with medication therapies alone.

Shao et al. (2022) [30] provide empirical evidence for the integrated model. Their study demonstrates that post-operative exercise therapy can be combined with medication use (analgesics, anti-inflammatories) for improved recovery by decreasing muscle strength, decreasing joint stiffness, and decreasing inflammation, as well as providing overall physical rehabilitation. This is well aligned with the concepts and theories of a multimodal rehabilitation approach, in which pharmacotherapy may control pain and inflammation, and physiotherapy may be used for functional restoration.

The studies, however, are not without their differences. These include types of surgeries which pertain to the varying fields of study, such as knee surgeries (TKR) as opposed to surgeries involving the spine and disk in the lumbar area, as well as the timing of the physio intervention the study is centered around, and the intensity of the physiotherapy that may or may not affect the outcomes of each study.

CONCLUSION

Presurgical patients recover faster when undergoing psychological and physical exercises along with medication as supposed to taking medication alone. Analgesics allow patients to function better and recover more seamlessly with minimal adverse events. Overall, faster recovery while taking less opioid medication is seen as a good thing, however that is not to say there are absolutely no negative consequences.

As with all postoperative patients, there lies a significant opportunity with the combination of physical rehabilitation and postoperative medication. Ideal postoperative rehabilitation along with the strategic timing of medication administration depending on movement and/or type of surgery, will optimize the developed protocol. Existing pathways allow to predict recovery timelines for various surgical procedures, therefore all patients can reap the benefits of integrating rehabilitation with medication. The integration of rehabilitation and medication is the greatest improvement we can offer in postoperative care.

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