

Comparative Analysis of Knee Replacement Surgery who follow up by Physical Therapy and Intra-articular Steroid Injections for Obese Patients

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Abstract

Knee osteoarthritis (KOA) is the most common chronic articular disease, and its prevalence has doubled since the mid-20th century. It affects 16% of the adult population over 50 years of age in the post-industrial era [1].

Obesity is one of the only modifiable risk factors for both incidence and progression of Osteoarthritis (OA).[2]

Although OA was previously regarded as a disease of the elderly, its development starts much earlier than originally thought, and OA is ranked among the top 20 diseases in the 40–45 years age group [3].

This review aims to provide a comprehensive analysis of the outcomes of knee replacement surgery following up physical therapy, versus intra-articular steroid injections for obese patients (BMI >30)

The study design employed in this review is narrative, and articles published after 2010 from PubMed were considered for inclusion. The review examines the impact of each intervention on the complete regain of knee function in this specific population.

Through the analysis of relevant studies, this review seeks to inform clinical decision-making and guide the management of obese patients with knee osteoarthritis.

Conclusion. Based on the reviewed literature, knee replacement surgery appears to offer a better chance of achieving complete regain of knee function in obese patients (BMI >30) undergoing physical therapy compared to intra-articular steroid injections. However, the findings are limited by the availability of studies and the heterogeneity in the research methodologies.

Keywords: knee osteoarthritis, knee replacement, knee corticosteroid injection, physical therapy

Introduction

Obesity, defined as having a body mass index (BMI) greater than 30, is a prevalent health concern that affects millions of individuals worldwide. [4]

There has been a significant global increase in obesity rate during the last 50 years. Obesity is defined as when a person has a body mass index [BMI (kg/m^2), dividing a

person's weight by the square of their height] greater than or equal to 30, overweight is defined as a BMI of 25.0-29.9. Being overweight or obesity is linked with more deaths than being underweight and is a more common global occurrence than being underweight.[4]

Obesity is a well-recognized global epidemic. The WHO estimates from 2008 indicate that more than 1.4 billion adults are overweight and, of these, more than 200 million men and 300 million women are obese¹. The trend is worrying: over the past 30 years, worldwide obesity has more than doubled.[5]

Among its many associated health complications, obesity significantly impacts musculoskeletal health, leading to increased stress on weight-bearing joints such as the knee. As a result, obese individuals commonly experience knee osteoarthritis, which can severely impair their mobility and overall quality of life.[6]

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The implications for the musculoskeletal system include both degenerative and inflammatory conditions, with the greatest burden resulting from osteoarthritis (OA) [5].

OA is a clinical syndrome of joint pain and dysfunction caused by joint degeneration, and affects more people than any other joint disease. Currently, nearly 10 per cent of the population is affected and the prevalence increases with age.[7]

Knee OA can be classified on clinical criteria alone (including pain, age, stiffness, crepitus, bony tenderness and bony enlargement), which make up the inclusion criteria for most clinical trials in this field. For patients with advanced knee osteoarthritis, knee replacement surgery is a commonly recommended intervention to alleviate pain and restore function.[8]

However, the presence of obesity adds complexity to the surgical procedure and subsequent recovery process. [9]

The pain and decreased function associated with OA place a major burden on communities as well as health and social care systems; hip and knee OA are leading causes of disability worldwide.

Treatment modalities for OA can be broadly divided into conservative and surgical.[10]

Obese patients undergoing knee replacement surgery often face challenges such as increased surgical risks, delayed wound healing, and difficulties in rehabilitation due to excess weight-bearing. Therefore, it is crucial to evaluate the outcomes and effectiveness of interventions for this specific population.[11]

Conservative therapies include supportive nonpharmacological therapy, systemic pharmacological therapy and localized intra-articular (IA) therapies delivered directly into the affected joint. [12]

Intra-articular injection of Corticosteroids (CS) is perhaps the most common conservative approach in the treatment of knee OA. The rationale behind its use relies on its immunosuppressive activity in the knee joint acting at different levels of the inflammatory cascade. In particular, it acts by blocking the synthesis of pro-inflammatory signalling molecules, such as interleukin 1 (IL-1), leukotrienes, prostaglandins and catabolic proteins such as metalloproteinases. These combined actions may be accountable for the pain relief observed in patients treated with CS. [13]

Intra-articular steroid injections have emerged as an alternative treatment option for knee osteoarthritis, offering pain relief and potentially delaying or avoiding the need for surgery. These injections deliver corticosteroids directly into the knee joint, reducing inflammation and providing temporary relief. While they are considered less invasive than surgery, their long-term efficacy and ability to promote complete regain of knee function in obese patients undergoing physical therapy remain uncertain. [13]

The primary aim of this review article is to compare the outcomes of knee replacement surgery followed by physical

therapy to those of knee replacement surgery followed by intra-articular steroid injections and physical therapy in obese patients (BMI >30). Specifically, we seek to evaluate which intervention leads to a better chance of achieving complete regain of knee function.

Understanding the differential effects of these interventions on obese patients' knee function will provide valuable insights for healthcare professionals involved in their management.

By comparing surgical and non-surgical approaches, we can contribute to informed decision-making, ensuring that patients receive the most suitable treatment option tailored to their specific needs.

Additionally, it may pave the way for further research in this area, focusing on refining existing interventions and exploring innovative approaches to optimize knee function restoration for this vulnerable patient population.

Methodology:

A comprehensive literature search was conducted using PubMed, considering articles published after 2010. The search strategy employed relevant keywords such as "knee replacement surgery," "obese patients," "BMI >30," "physical therapy," "intra-articular steroid injections," and "regain of knee function." The inclusion criteria for articles were as follows: (1) studies comparing knee replacement surgery and intra-articular steroid injections in obese patients (BMI >30); (2) studies that assessed knee function outcomes; (3) studies published in English; and (4) articles published after 2010. After evaluating the search results, relevant articles were selected for inclusion in this review.

Discussion:

A total of 10 articles were selected for inclusion in this review. The studies encompassed various study designs, including prospective cohort studies, randomized controlled trials, and retrospective studies. The selected articles evaluated the outcomes of knee replacement surgery and intra-articular steroid injections in obese patients (BMI >30) undergoing physical therapy.

The studies consistently reported that knee replacement surgery resulted in significant improvements in knee function, pain reduction, and patient-reported outcomes. [14, 15]

Patient-report measures of physical function provide useful information related to patients' perceptions of physical function, but there is a burgeoning body of evidence that suggests patient-reports fail to capture the actual change in functional performance after Total knee arthroplasty TKA[16]. Objective measures such as range of motion, strength, and functional tests consistently showed improvements following knee replacement surgery. [17]

Few studies have included both pre-operative and post-operative assessments of physical function using both

patient-report and performance-based measures of physical function. Even fewer include acute assessment coupled with adequate follow-up after TKA [18]

Subjective measures, including pain levels and patient-reported outcomes, also demonstrated favorable results after surgery.

Improvements in patient-report often correspond strongly with improvements in patient's report of pain [19].

Patients who have advanced knee OA and subsequent TKA have difficulty discriminating pain from their ability to perform functional tasks. The assessment of physical function beyond the acute recovery phase is key as patients' outcomes normally do not stabilize until at least 6 months after surgery [17]

On the other hand, the evidence regarding the efficacy of intra-articular steroid injections was limited and inconclusive. Initiating treatments with either corticosteroid or hyaluronic acid injections was not associated with reduced symptoms compared to non-users over two years in patients with knee OA. [20]

While some studies reported short-term pain relief following injections, there was insufficient evidence to support long-term functional improvement. The studies highlighted the need for further research to establish the long-term effectiveness of intra-articular steroid injections in obese patients undergoing physical therapy.[21]

Overall, the findings suggest that knee replacement surgery offers a better chance of achieving complete regain of knee function in obese patients (BMI >30) undergoing physical therapy compared to intra-articular steroid injections. Obesity had a negative effect on progress during the CPM protocol, which commenced immediately after surgery and continued until discharge.[22]

However, it is important to note that the evidence is limited by the availability of studies and the heterogeneity in research methodologies. Further well-designed studies are needed to provide more robust and conclusive evidence on the comparative outcomes of these interventions in this specific population.

The findings from the selected studies suggest that knee replacement surgery leads to significant improvements in knee function, pain reduction, and patient-reported outcomes in obese individuals.[23]

The surgery is effective in restoring knee function and enhancing the quality of life in this specific population. In contrast, the evidence regarding the efficacy of intra-articular steroid injections is limited and inconclusive, with some studies reporting short-term pain relief but insufficient evidence of long-term functional improvement.[24]

Conclusion:

Based on the reviewed literature, knee replacement surgery appears to offer a better chance of achieving complete regain of knee function in obese patients (BMI >30) undergoing physical therapy compared to intra-articular steroid injections.

However, the findings are limited by the availability of studies and the heterogeneity in the research methodologies. Further well-designed studies are needed to provide more robust evidence on this topic.

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