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Dr. Sudhakar MV

Associate Professor, Department of Orthopaedics, Dr. SMCSI Medical College and Hospital, Karakonam, Trivandrum, Kerala, India

Dr. Jins Wilson

Senior Resident, Department of Orthopaedics, Dr. SMCSI Medical College and Hospital, Karakonam, Trivandrum, Kerala, India

Dr. Acksen T Raja

Associate Professor, Department of Orthopaedics, Dr. SMCSI Medical College and Hospital, Karakonam, Trivandrum, Kerala, India

Functional outcome of arthroscopic joint debridement in osteoarthritis knee patients, performed in a tertiary care teaching hospital in south Kerala: A prospective study

Dr. Sudhakar MV, Dr. Jins Wilson and Dr. Acksen T Raja

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Abstract

Knee osteoarthritis is a prevalent degenerative joint ailment characterized by persistent pain, functional impairment, articular cartilage loss, synovial membrane inflammation, and bone alterations. It ranks as a leading cause of knee joint pain in India, significantly affecting daily activities. Traditional treatments, including analgesics, physiotherapy, and corticosteroid injections, offer short-lived symptomatic relief. However, the utilization of arthroscopic joint debridement through techniques such as lavage, micro fracture, meniscal and cartilage debridement, as well as osteophyte and loose body removal, demonstrates the potential for enduring and enhanced symptomatic alleviation. This study endeavors to substantiate the efficacy of arthroscopic knee debridement in delivering substantial symptomatic relief by evaluating pre- and post-surgical "International Knee Documentation Committee (IKDC)" score and "Visual Analog Scale (VAS)" score.

Keywords: Knee arthroscopy, osteoarthritis, joint debridement

Introduction

Knee osteoarthritis (KOA) is a prevalent degenerative joint ailment characterized by persistent pain and diminished functionality [1]. This condition involves progressive deterioration of articular cartilage, inflammation within the synovial membrane, and alterations in the bone beneath the cartilage [2-4]. An article by Alexander MacDonald Wood *et al.* titled "Review on the Management of Hip and Knee Osteoarthritis" underscores the prominence of osteoarthritis in individuals aged 70 and above, with the knee being the most commonly affected joint, accounting for up to 41% of limb arthritis [5]. Chandra Prakash Pal *et al.* study on "Epidemiology of Knee Osteoarthritis in India and Related Factors" reveals a 28.5% prevalence of knee osteoarthritis in India [6]. Etiologically, this condition is multifaceted, influenced by diverse risk factors such as aging, genetics, trauma, malignancy, and obesity, which collectively contribute to its development [6].

Although no treatment method currently exists to reverse KOA progression, the primary objective of therapy is to alleviate symptomatic pain, thereby enhancing joint function and quality of life. Treatment modalities for knee OA encompass conservative approaches, pharmacological interventions, intra-articular injections, and surgical options [7]. Conservative therapies incorporate no steroidal anti-inflammatory drugs (NSAIDs), physical activity, and braces. Invasive therapeutic techniques encompass steroid injections, hyaluronic acid (HA) infusions, and platelet-rich plasma (PRP) injections [6]. Surgical options, pursued when conservative strategies prove inadequate, include arthroscopic debridement and lavage, osteotomy, and unicompartmental or total knee arthroplasty [8]. In accordance with Michel J. Lestasio *et al.*'s article "Knee OA: A Primer," non-operative treatments are beneficial for patients with Kellgren and Lawrence grades I to III, while surgical interventions become necessary for grade IV OA knees [9].

Arthroscopic joint debridement, is a minimally invasive surgical approach employed in managing knee osteoarthritis. This technique includes lavage, micro-fracture, meniscal and cartilage debridement, as well as osteophyte and loose body removal.

Corresponding Author:

Dr. Acksen T Raja

Associate Professor, Department of Orthopaedics, Dr. SMCSI Medical College and Hospital, Karakonam, Trivandrum, Kerala, India

The primary objective is to alleviate pain, enhance joint functionality, and potentially delay the necessity for more invasive interventions, such as knee replacement surgery. It's important to acknowledge that the long-term effectiveness remains a subject of ongoing debate among experts. The evidence compilation and standard branch, Health Quality Ontario, concludes that there is no significant distinction in pain or functional status between patients subjected to arthroscopic treatment versus a placebo [14]. However, Gin Way Law *et al.*'s exploration, "Arthroscopic Debridement of Degenerative Knee: Is There Still a Role?", discovers notable improvement in preoperative Kellgren Lawrence scores following arthroscopic debridement [15].

Given the absence of definitive evidence regarding the effectiveness of Arthroscopic Joint Debridement in enhancing knee function and relieving symptomatic pain, this study aims to address this gap by comparing procedure outcomes using "International Knee Documentation Committee (IKDC)" score and "Visual Analog Scale (VAS)" score.

Materials and Methods

A prospective hospital-based follow-up study was conducted, from November 2020 to October 2022, covering a duration of 24 months, subsequent to obtaining clearance from the Institutional Ethics Committee. The study focused on patients with osteoarthritis who sought care at the Orthopaedics Outpatient Department (OPD). Those who met the inclusion criteria were identified and evaluated for potential inclusion in the research. Thirty individuals who exhibited a BMI less than 35, Kellgren and Lawrence OA grades I-III on X-ray, and had found no relief with medical treatment for at least 6 weeks were enrolled. Patients with a history of septic arthritis, those on anticoagulant therapy, individuals with inflammatory arthritis, microcrystalline arthropathies, nonspecific synovitis, and neoplasms were excluded.

Following obtaining informed consent, participants underwent Arthroscopic Knee Joint debridement, encompassing Joint Lavage, Micro fracture, Meniscal debridement, as well as the removal of loose bodies and osteophytes. Preoperative symptoms and knee functions were assessed, and subsequent post-operative follow-up occurred regularly for a duration of 6 months, utilizing the "International Knee Documentation

Committee (IKDC)" score and "Visual Analog Scale (VAS)" scoring systems.

Stringent measures were taken to ensure that all procedures were performed by a sole orthopedic/arthroscopic surgeon following informed consent. Follow-up assessments were carried out at the end of 1st month, 3rd month, and 6th month, respectively. A comprehensive evaluation of each case involved history, clinical examinations, and relevant investigations.

Clinical data were meticulously gathered using a structured proforma, and the observations recorded were entered into a Microsoft Excel sheet and subjected to analysis using the SPSS Software. The outcomes were primarily evaluated with a focus on the study's objectives.

Results

The study encompassed 30 patients diagnosed with knee osteoarthritis who underwent arthroscopic joint debridement at the Orthopaedics Department of Dr. SMCSI Medical College, Karakonam.

The mean age of the participants in the arthroscopic joint debridement group was 55.03 years, with a standard deviation of 8.48 years. Out of the total participants, 13 were male, accounting for 43.33% of the group, while 17 were female, constituting 56.67% of the group.

Participants were categorized based on their occupations, leading to the division into professional, skilled, semiskilled, and unskilled categories. Among these, the majority were found to be unskilled (46.67%), followed by semiskilled (26.67%), skilled (16.67%), and finally professional (10%).

In terms of BMI classification, 76% of individuals exhibited a BMI above 25, while the remaining 23.33% had a normal BMI.

The preoperative mean IKDC score was approximately 30.02, with a standard deviation of 8.89. Postoperatively, at one month, the mean IKDC score rose to 39.63, with a standard deviation of 9.18, resulting in a z-score of 12.24. At the three-month mark, the IKDC score increased further to 51.93, accompanied by a standard deviation of 7.65 and a z-score of 15.992. Finally, at the six-month interval, the IKDC score reached 58.93, with a standard deviation of 6.05 and a z-score of 21.97. Table 1.

Table 1: Comparison of Pre-Op and Post-Op IKDC score.

Analysis	Pre-op IKDC Score	Post- Op 1 month IKDC Score	Post- Op 3 month IKDC Score	Post- Op 6 month IKDC Score
Mean	30.02	39.63	51.93	58.93
Standard deviation	8.89	9.18	7.65	6.05
Mean Difference		9.61	21.91	28.91
Percentage difference		32.01	72.99	96.30
z-score		12.24	15.992	21.97

Regarding the Visual Analog Scale (VAS) scores, the mean preoperative score stood at 8.07, with a standard deviation of 0.83. At one month post-operation, the mean VAS score dropped to 5.93, with a standard deviation of 1.05, and a z-score of 8.77. After three months, the mean VAS score further

decreased to 4.1, accompanied by a standard deviation of 0.96 and a z-score of 15.78. By the sixth month, the mean VAS score had notably diminished to 1.7, with a standard deviation of 0.84, and a z-score of 27.40. Table 2.

Table 2: Comparison of Pre-Op and Post-Op VAS score.

Analysis	Pre-op VAS Score	Post- Op 1 month VAS Score	Post- Op 3 month VAS Score	Post- Op 6 month VAS Score
Mean	8.07	5.93	4.1	1.7
Standard deviation	0.83	1.05	0.96	0.84
Mean Difference		-2.14	-3.97	-6.37
Percentage difference		26.52	49.19	78.93
z-score		8.77	15.78	27.40

The data illustrates the progressive improvement in both IKDC and VAS scores following arthroscopic joint debridement, thereby suggesting positive outcomes in terms of knee function and pain relief.

Discussion

Understanding Knee Osteoarthritis

Knee osteoarthritis remains a prevalent orthopedic concern, frequently associated with factors such as age-related changes and elevated BMI. The management approach for mild to moderate knee osteoarthritis leans towards conservative treatments, embracing weight management, physiotherapy, analgesics, hyaluronic acid injections, and intra-articular steroid treatments. Arthroscopic Joint debridement performed for such patients also shows good symptomatic relief as shown by the results.

Patients grappling with knee pain, diagnosed under the Kellgren Lawrence classification as knee osteoarthritis, underwent the restorative intervention of arthroscopic joint debridement. The efficacy of this intervention was assessed through the application of IKDC and VAS scores. Our study, conducted within the Orthopaedics Department of Dr. SMCSI Medical College, Karakonam, encompassed a total of 30 participants. Notably, the mean age of the participants stood at 55.03, accompanied by a standard deviation of 8.48. Gender distribution indicated the presence of 17 females and 13 males, highlighting a gender balance within the study group. Remarkably, 76.67% of participants with knee pain exhibited a BMI exceeding 25. The initial mean IKDC score registered at 30.02, accompanied by a standard deviation of 8.89. Post the 6-month follow-up, the IKDC score notably surged to 50.93, with a standard deviation of 6.05. Similarly, the mean VAS score depicted an initial value of 8.07 and culminated at 1.7 during the 6-month follow-up. These findings signify a considerable 78.93% enhancement in VAS score during the follow-up period. The overall trend underscores significant improvement in both pain management and functional capabilities post arthroscopic joint debridement.

Conclusion

Empowering Knee Osteoarthritis Management.

The pervasive prevalence of knee osteoarthritis within our population is undeniable. While conventional treatments such as analgesics, physiotherapy, and corticosteroid injections offer only transient relief, the efficacy of arthroscopic joint debridement emerges as a dependable treatment avenue. Our study illuminates the potential of arthroscopic joint debridement to not only alleviate pain but also empower individuals grappling with knee osteoarthritis towards a better quality of life.

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Author's Contribution

Not available

Conflict of Interest

Not available

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