

# Extensive arthroscopic release of the stiff total knee to improve range of motion after arthrofibrosis

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**Abstract.** A retrospective chart review was conducted on patients that had undergone a total knee arthroplasty (TKA) done by the same orthopedic surgeon and subsequently were referred to a different surgeon who performed a diagnostic arthroscopy for debridement of soft tissue problems following the replacement. Twelve patients met criteria for inclusion in the study; however 6 patients were subsequently excluded. All of the hardware used in the first surgery was of appropriate size and position and no revision of hardware was necessary. All of the patients considered for this study suffered from arthrofibrosis following the TKA, resulting in decreased range of motion (ROM) and stiffness. The debridement included lysis of adhesions, release of the lateral retinaculum, fat pad revision, and a synovectomy. Some patients also required manipulation under anesthesia during the arthroscopy. Following the debridement, all patients were referred to physical therapy (PT) to continue increasing ROM and to prevent the formation of additional scar tissue lesions. The mean ROM for pre-operative extension improved from 24 ° to a postoperative ROM 3.66°. The average improvement of extension was 25.33°. The mean improvement in ROM for flexion improved from 88.33° to 106°. The average improvement in flexion was 17.66°. Overall all patients were satisfied with the results. All patients had improvements in range of motion and decreased pain ratings.

## 1. Introduction

Loss of motion or stiffness after a TKA is frustrating for the patient and surgeon. Stiffness after a TKA results in pain and loss of ROM. Overall, stiffness is defined as an inadequate ROM that results in functional limitations [1]. The criteria for assessing stiffness requiring surgical treatment is defined as having a flexion contracture of 15° or flexion of less than 75° [2]. This decreased ROM can severely affect the patients ability to perform tasks of daily living such as walking, climbing stairs, or getting up from a seated position. Biomechanical studies and gait analysis have shown that patients required 67° of knee flexion during the swing phase of gait, 83° of flexion to climb stairs, 90°- 100° of flexion to descend stairs, and 93° of flexion to stand from a seated position [1].

Arthrofibrosis has been treated with PT, manipulation under anesthesia, and arthroscopic debridement with varying degrees of success. With aggressive PT, flexion increases slightly over time and then reaches a plateau where ROM can no longer be increased. At this point the therapy is then used just for pain management [3]. Manipulation under anesthesia can be somewhat effective depending on the cause of stiffness and the amount of time that has passed after a TKA [4]. Surgical debridement of adhesions with manipulation has also been shown to drastically improve ROM in patients with arthrofibrosis after having a TKA [3]. The purpose of this study is to measure the preoperative and postoperative ROM after arthroscopic debridement in patients that have been diagnosed with arthrofibrosis after having a TKA.

## 2. Experiment, Results, Discussion, and Significance

A retrospective chart review was conducted on patients that had undergone total knee arthroplasties done by the same orthopedic surgeon and subsequently were referred to a different surgeon who performed diagnostic arthroscopies for debridement of soft tissue problems following the replacement. Information was gathered by reviewing medical records from both doctors. ROM before the debridement was documented and compared to the ROM after the debridement and this information was evaluated to see if the improvements in flexion and extension were significant. The initial ROM after the TKA and before the arthroscopy was gathered from reviewing the charts. Following the scope, all patients were given a prescription for 6-8 weeks of PT. The post operative ROM data was gathered from the final PT release report that each physical therapist had sent back to the second surgeon. All of this data was analyzed and interpreted using parametric, nonparametric and descriptive statistics.

All the patients used in this study suffered from stiffness following their TKA. A number of contributing factors were considered during patient selection. Comorbidities such as injury, osteoarthritis, gout, and rheumatoid arthritis were considered and used in the exclusion data. Also, any patients that had received a

TKA due to a traumatic event were excluded. The common preoperative diagnosis before TKA was arthrofibrosis. The preoperative diagnosis for the patients before the debridement included at least one or more of the following in addition to arthrofibrosis: lack of patellar mobility, flexion contracture, tight retinaculum (lateral and medial), pain, and stiffness. Postoperative diagnosis included arthrofibrosis, scar tissue adhesions, and a flexion contracture.

Twelve patients originally met criteria for being in this study because each patient suffered from arthrofibrosis following a knee replacement surgery and required a postoperative debridement. The original inclusion requirements were then narrowed to only include patients that had a TKA performed by the same orthopedic surgeon and excluded any patients that only had unicompartamental replacements. Completion of PT following the debridement was added to the inclusion criteria. Out of the twelve patients that initially met the requirements for this study, six of them were excluded due to not meeting the specific requirements as the study progressed. The six patients that were included in this study had a mean age of 59.33 years (ranging from 43-84). Five women were included in the study along with one male. The mean time from TKA to the time of the debridement was approximately 8 months (ranging from 4-12 months).

All patients will have undergone PT following their TKA. Some patients had also undergone manipulation prior to debridement without any increases in ROM. The surgical procedures that the patients underwent following the TKA were diagnostic arthroscopies with debridement of scar tissue, lysis of adhesions, and a synovectomy. Four patients also underwent lateral or medial releases at the time of debridement to correct patellar tracking problems. Three patients underwent manipulation under anesthesia during the arthroscopic surgery and one patient had a loose body removed.

The operative and rehabilitative protocol used improved ROM in all knees involved. The mean clinical follow up was an average of 3.38 weeks. The PT release was approximately 2 months after the arthroscopic debridement. The mean ROM for preoperative extension improved from 24 ° to a postoperative ROM 3.66°. The average improvement of extension was 25.33 °. The mean improvement in ROM for flexion improved from 88.33 ° to 106 °. The average improvement in flexion was 17.66 °. At the last follow up visit, all patients were satisfied with the results of the debridement. Despite the improvements made in range of motion and a decrease in pain overall, one patient did report minor persistent pain. The overall results for this study can be seen in Table 1.

**Table 1.** Patient data including initial diagnosis, pre and postoperative ROM from extension to flexion , and patient outcomes.

Patient	Age (yrs)	Initial Diagnosis	Preop Motion (Degrees)	Postop Motion (Degrees)	Reoccurrence	Follow Up (weeks)
1	43	Arthrofibrosis	45-85	10-100	N	3
2	64	Arthrofibrosis	60-90	5.0-100	N	3
3	55	Arthrofibrosis	3.0-95	-3.0- 109	Y	5
4	55	Arthrofibrosis	6.0-85	0.0- 110	N	2
5	84	Arthrofibrosis	15-85	0.0-120	N	4
6	55	Arthrofibrosis	15-90	10.0-97	N	4

### 3. Conclusion

In the years between 2002-2006, six patients with stiff total knees were arthroscopically treated. Extensive release of fibrotic tissue was performed, allowing increased range of motion. There were vast increases in range of motion, which exceeded thirty degrees. At the time of the last clinical visit following the debridement, all patients seemed satisfied with the improvements that were made. There were improvements not only with increases of ROM but also a decrease in pain. No new postoperative problems were recognized after the debridement.

### 4. Acknowledgements

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