Case Report
DOI: 10.16965/ijpr.2014.686

ARTHROFIBROSIS FOLLOWING TOTAL KNEE ARTHROPLASTY

Ravi B. Solanki *[1], Anjali R. Bhise [2].

*[1] Physiotherapist, Government Spine Institute and Physiotherapy College, Civil hospital, Ahmedabad, India.

[2] Principal, Government Spine Institute and Physiotherapy College, Civil hospital, Ahmedabad, India.

ABSTRACT

Arthrofibrosis following total knee arthroplasty is an uncommon complication defined as less than 80 degrees of knee flexion 6-8 weeks post operatively. It is characterized by abnormal scarring of the joint in which the formation of dense fibrous tissue and tissue metaplasia prevent normal range of motion. Clinical features include limited knee Range of motion with extension deficit, pain with activities of daily living and unusual amount of pain and swelling post operatively in the absence of infection, bleeding or mechanical complications. We present case of 55 years old female who undergone for total knee replacement before 3 months and presented to our department with complain of knee pain and swelling with activities of daily living. She was diagnosed on the basis of clinical examination. Her detailed evaluation was carried out and Physiotherapy treatment was started.

KEYWORDS: Arthrofibrosis, Total knee arthroplasty, Metaplasia, Range of motion, Physical therapy treatment.

Address for correspondence: Dr. Ravi B. Solanki, Physiotherapist, Government Spine Institute and Physiotherapy College, Civil hospital, Ahmedabad 380016, Gujarat, India.
Email: ravibsolanki@gmail.com

Access this Article online

Quick Response code

DOI: 10.16965/ijpr.2014.686

International Journal of Physiotherapy and Research
ISSN 2321- 1822
www.ijmhr.org/ijpr.html

Received: 16-10-2014	Accepted : 27-10-2014
Peer Review: 16-10-2014	Published (O): 23-11-2014
Revised: None	Published (P): 11-12-2014

INTRODUCTION

A number of factors are known to result in complications after total knee arthroplasty (TKA), which include preoperative deformity, neuromuscular disease, patient noncompliance with rehabilitation protocol and technical errors such as component malpositioning.[1,2,3,4] A separate portion of the patient population develops arthrofibrosis after total knee replacement (TKR). It is a potentially debilitating complication which can result in chronic pain, poor recovery of range of motion and patient disability. Incidence of arthrofibrosis following total knee replacement is 3-4 %. Clinical presentation include less than 80 degrees of knee flexion range of motion 6-8 weeks post arthroplasy[5], pain on activities of daily living and unusual amounts of pain and swelling after TKR in the absence of infection, bleeding and mechanical complications. Radiographic examination does not reveal abnormalities including radiolucent lines consistent with loosening, malposition of the joint line, heterotopic ossification, abnormal position of patellar malalignment of the implants, especially malrotation. Treatment options following diagnosis of arthrofibrosis include Physiotherapy, Manipulation under anaesthesia, open arthrolysis, arthroscopic debridement and revision surgery.[6,7,8] Manipulation under anaesthesia is commonly tried but has significant risk, including complications such as distal femoral fracture and patellar tendon rupture. Open arthrolysis is a more invasive option but allows a wide access

to the anterior and posterior aspects of the joint. The arthroscopic approach is a less invasive approach that has been advocated for both focal, discrete lesions as well as for more global arthrofibrosis. The procedure involves release of fibrous adhesions within the suprapatellar pouch and reestablishment of the medial and lateral gutters. Lateral patellar retinacular release is also performed. [9] Post-operatively, aggressive pain management using peripheral nerve blocks and intensive physical therapy are necessary. [6, 10]

CASE REPORT

A 55 years old female presented to our physiotherapy department with complains of stretching type of pain around anterior aspect of left knee joint, difficulty in sit to stand activities, decrease in walking speed and alteration in rhythm of walking sine 3 months. She had history of knee pain during walking since 5 years which was progressively increased. She was diagnosed as osteoarthritis of left knee and was under conservative treatment for the same. Before 3 months, she was operated for left total knee replacement. She was discharged after 4 days. During Post operative period, she was advised static quadriceps exercises. At the time of discharge, she was prescribed knee brace and she started walking on 4th post operative day. Stiches were removed 3 weeks post operatively. There was history of infection around stiches during this period. Following removal of stiches, she was under physical therapy treatment in the form of static quadriceps exercises, active knee range of motion exercises and straight leg raising exercises. This treatment was continued for 15 days. Knee flexion range of motion achieved at the end of 5 weeks post operatively was 45 to 50 degrees. Hence, she again consulted orthopaedician and underwent for Manipulation under anaesthesia. After Manipulation under anaesthesia, knee flexion was increased to 70 degrees. After few days she developed complain of stretching type of sensation at the anterior aspect of knee joint. Therefore she again consulted orthopaedician and was advised for arthroscopic debridement. She undergone for arthroscopic surgery 2 months post TKR. There was no or little improvement in range of motion following arthroscopic surgery.

Fig. 1: Scar of arthroplasty and arthroscopy.

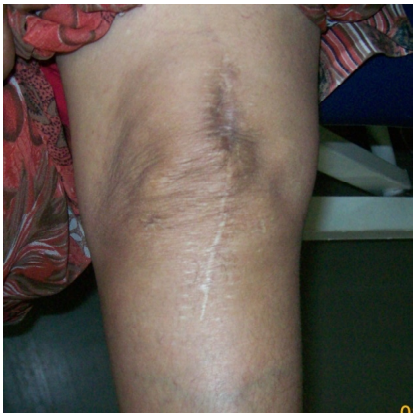
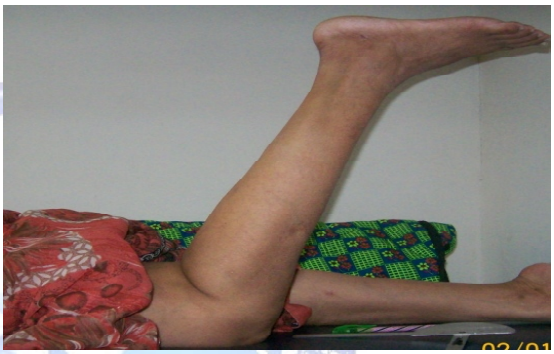
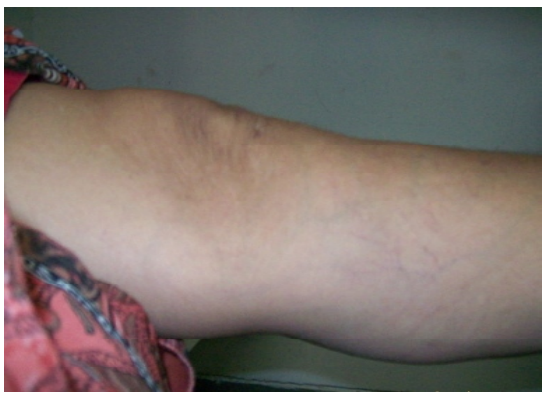


Fig. 2: Limited knee flexion range of motion.



At the end of 3 months post arthroplasty, she presented to our department. On observation diffuse swelling around operated knee and healed mobile scar (Figure 1) were present. Gait observation revealed trunk bending on right side on right stance, decreased left step length and decreased left stance time. Palpation revealed soft swelling with slight elevation of skin temperature around operated knee joint. On Examination, active and passive knee flexion was 70 (Figure 2) and 75 degrees respectively. Manual muscle testing revealed weakness of knee extensors (2/5 with 10 degrees of quadriceps lag, Figure 3), knee flexors (3/5)

Fig. 3: Extension deficit.



and hip abductors (3/5) on affected side. End feel was elastic for knee flexion and firm for knee extension. Moderate amount of Quadriceps tightness was confirmed by Ely's test. Functional impairment was assessed using Lower extremity Functional Scale (LEFES). The total score of LEFES was 51/80 which was 63 % of maximal function. Balance testing was done using Berg Balance Scale (BBS). BBS score was within normal limits. Physiotherapy treatment was started in the form of strengthening and stretching exercises for muscles around hip and knee joint, faradic stimulation for quadriceps, Stationary bicycle, treadmill walking and gait re-education.

DISCUSSION

Chronic Pain and stiffness occurring after total knee replacement are frustrating for both the patient and surgeon.[8] Stiffness after a total knee replacement results in pain and loss of range of movement. This decreased range of movement can severely affect the patient's 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.[11] Clinical findings of arthrofibrosis include limitation of knee range of motion with extension deficit, pain with activities of daily living or pain at rest. The loss of knee flexion is usually better tolerated than the loss of knee extension. Small discrepancies in extension can result in increased energy consumption during gait and cause undue strain on the quadriceps musculature and patellofemoral joint.[12] Prevention is the best form of treatment for arthrofibrosis, but when this entity does present, early recognition and a supervised physical therapy program are often successful. If conservative treatment fails, operative intervention is warranted. Arthrofibrosis has been treated with physical therapy, manipulation under anesthesia, and arthroscopic debridement with varying degrees of success. With aggressive physical therapy, flexion increases slightly over time and then reaches a plateau where range of movement can no longer be increased. At this point, the therapy is then used just for pain management.[13] Manipulation under anesthesia can be somewhat effective depending on the cause of stiffness and the amount of time that has passed after a total knee replacement.[14] Surgical debridement of adhesions with manipulation has also been shown to drastically improve range of movement in patients with arthrofibrosis after having a total knee replacement.[15] Arthroscopy at the site of a prosthetic knee is a technically challenging procedure, but various reports have shown promising success rates.[16]

Modern rehabilitation programs have stressed early motion and weight bearing resulting in fewer motion problems and better outcomes. Recommended exercise strategies following surgery of arthrofibrotic knee[17] include Passive knee Range of motion exercises by wall slides and CPM (Continuous Passive Motion), prone flexion exercises, Hamstring and Calf muscle strengthening to stretch posterior capsule, hanging legs off the table to encourage knee extension and Patellar mobility exercises. Stationary bicycle can be helpful to loose and mobilize soft tissues. It can be introduced without resistance 2 weeks post operatively to decrease incidence of swelling and joint irritation and resistance can be added after 6 weeks. Treadmill walking has also been recommended to improve cardiovascular and muscular endurance. Other recommended advanced exercises include elastic resistance strengthening, forward and backward jogging, single knee bends, side to side lateral agility etc. according to tolerance of patient.

CONCLUSION

The best treatment of arthrofibrosis of the knee is prevention. Physical therapy is usually first line approach to any post operative problem with motion about knee and is essential after surgical treatment of arthrofibrotic knee. In early post operative period, range of motion exercises and patellar mobility should be stressed. CPM machine and other rehabilitative aids such as stationary bike can be used. Once motion is established, strengthening by elastic resistance,

jogging and treadmill walking can be started and can be ended eventually to sport specific rehabilitation and full activities.

Acknowledgement: We are thankful to Dr. M. M. Prabhakar, Director, Govt. Spine Institute and Physiotherapy College for his immense support and guidance to channelize the efforts.

Conflicts of interest: None

REFERENCES

1. Bong MR, Di Cesare PE. Stiffness after total knee arthroplasty. J Am Acad Orthop Surg 2004;12(3):164-71.
2. Laskin RS, Beksac B. Stiffness after total knee arthroplasty. J Arthroplasty 2004;19:41-6.
3. Yercan HS, Sugun TS, Bussiere C, Ait Si Selmi T, Davies A, Neyret P. Stiffness after total knee arthroplasty: prevalence, management and outcomes. Knee 2006;13:111-7.
4. Kim J, Nelson CL, Lotke PA. Stiffness after total knee arthroplasty. Prevalence of the complication and outcomes of revision. J Bone Joint Surg Am. 2004;86-A(7):1479-84.
5. Walton NP, Jahromi I, Dobson PJ, Angel KR, Lewis PL, Campbell DG. Arthrofibrosis following total knee replacement; does therapeutic warfarin make a difference? Knee. 2005 Apr;12(2):103-6.
6. Jerosch J, Aldawoudy AM. Arthroscopic treatment of patients with moderate arthrofibrosis after total knee replacement. Knee Surg Sports Traumatol Arthrosc 2007;15:71–7.
7. Nicholls DW, Dorr LD. Revision surgery for stiff total knee arthroplasty. J Arthroplasty 1990;5:269–81.
8. Ries MD, Badalamente M. Arthrofibrosis after total knee arthroplasty. Clin Orthop Relat Res 2000;380:177-83
9. Bocell JR, Thorpe CD, Tullos HS. Arthroscopic treatment of symptomatic total knee arthroplasty. Clin Orthop Relat Res 1991 Oct;(271):125-34.
10. Campbell ED Jr. Arthroscopy in total knee replacements. Arthroscopy 1987;3:31–5.
11. Bong MR, Di Cesare PE. Stiffness after total knee arthroplasty. J Am Acad Orthop Surg 2004 May-Jun;12(3):164-71.
12. Perry J, Antonelli D, Ford W. Analysis of knee-joint forces during flexed-knee stance. J Bone Joint Surg Am 1975;57:961–7.
13. Mont MA, Seyler TM, Marulanda GA, Delanois RE, Bhave A. Surgical treatment and customized rehabilitation for stiff knee arthroplasties . Clin Orthop Relat Res 2006 May;446:193-200.
14. Kim J, Nelson CL, Lotke PA. Stiffness after total knee arthroplasty: prevalence of the complication and outcomes of revision. J Bone Joint Surg Am 2004 Jul; 86-A(7):1479-84.
15. Scranton PE Jr. Management of knee pain and stiffness after total knee arthroplasty. J Arthroplasty 2001;16:428–35.
16. Seyler TM, Marker DR, Bhave A, Plate JF, Marulanda GA, Bonutti PM *et al*. Arthroplasty Functional Problems and Arthrofibrosis Following Total Knee. J Bone Joint Surg Am 2007;89:59–69.
17. Millet P, Carlson J, Johnson B, Krishnan S, Steadmen. J. Rehabilitation of arthrofibrotic knee. Am J Orthop 2003 Nov;32(11):531-8.

How to cite this article:

Ravi B. Solanki, Anjali R. Bhise. ARTHROFIBROSIS FOLLOWING TOTAL KNEE ARTHROPLASTY. Int J Physiother Res 2014;2(6):762-765.
DOI: 10.16965/ijpr.2014.686