

Original Research Article

Pre-operative fixed flexion deformity a curse to the knee arthroplasty surgeon?

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ABSTRACT

Background: The aim of the study was to study the effect of preoperative flexion deformity on the postoperative knee range of motion following total knee arthroplasty.

Methods: A total of 28 knees were studied out of which twenty were osteoarthritis and eight were rheumatoid arthritis. Cruciate substituting and cruciate retaining implants were used. Patients above the age of 45 years with a minimum follow up period of two years from April 2010 were studied.

Results: 28 knees had an average preoperative range of motion of 87.678. Patients with preoperative flexion deformity had postoperative range of motion of 97.5 degrees. The average postoperative flexion in 8 rheumatoid patients was 96.25 and 20 osteoarthritis patients was 107.462.

Conclusions: The average postoperative range of motion was 105.538. Patients with a higher pre-operative range of motion had higher postoperative range of motion. Rheumatoid patients had a significantly low range of motion when compared to osteoarthritis patients. Patients with increased fixed flexion deformity had a significantly low postoperative range of motion.

Keywords: Total knee arthroplasty, Fixed flexion deformity, Range of motion analysis

INTRODUCTION

Total knee arthroplasty is now a well-accepted and well established treatment for bi and tricompartmental arthritis of the knee. Postoperative fixed flexion deformity is a dreaded condition for all the knee arthroplasty surgeons.^{1,2} Apart from pre operative fixed flexion deformity, the other factors which affect the postoperative flexion is the age, sagittal plane deformity, obesity, disease proper (osteoarthritis/rheumatoid arthritis).^{3,4} It is a highly difficult task. This study was done to assess the range of motion of the knees following the total knee arthroplasty especially for the patients with preoperative fixed flexion deformity. Range of motion is an established modality of assessing the functional outcome. The objective of the study was to assess the

effect of preoperative flexion deformity on the postoperative knee range of motion following total knee arthroplasty.

METHODS

This is a prospective study of 28 patients. The study was done in Sri Ramachandra Medical Centre located in Chennai, Tamil Nadu. The study began in April 2010 with a minimum follow up of 2 years and maximum follow up of 6 years till April 2016. Proper ethical approval was obtained for the study and informed consent was given to the patients before they were included in the study. The factors assessed pre operatively were age, sex, BMI, preoperative range of motion, preoperative fixed flexion deformity, the disease. The factors that were

constant were surgical technique, surgeon, approach and postoperative protocol. Only medial parapatellar approach was followed. Cruciate substituting and cruciate retaining implants were used with deep dish option in cruciate substituting along with the regular CS prosthesis. Postoperative day 1, DVT prophylaxis was started with in bed mobilization. Patient was made to walk in postoperative day 2 with walker support. Regular wound dressings were done and sutures removed after 14th day. The statistical tool used was mean range of motion following the surgery.

RESULTS

Both sexes were included in the study with male patients 16 (57.14%) and female 12 (42.85%) (Figure 1). The knees with fixed flexion deformity were only included in the study. The patient group was above 45years. The 28 knees that were selected had an average preoperative range of motion of 87.678. Out of the 28 selected, 20 (71.42%) were osteoarthritic knees and 8 (28.57%) were rheumatoid knees.

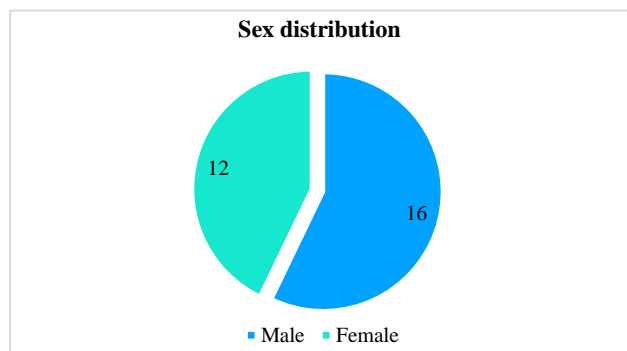


Figure 1: Sex distribution of sample.

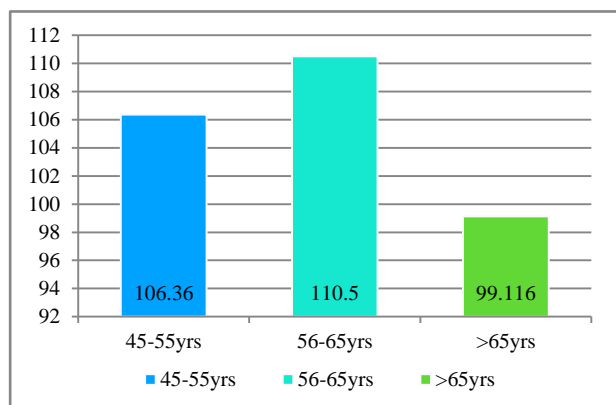


Figure 2: Mean distribution of age.

The range of motion postoperatively was assessed and results were formulated. The postoperative outcome was affected by various factors such as disease, preoperative range of motion and most importantly preoperative flexion deformity. Post operatively, males performed better with an average range of motion of 108.75 as

opposed to 103.65. Figure 1 shows the mean age distribution with respect to the range of motion. The 45-55 years' age group had an average range of motion of 106.36, 56-65 years with an average of 110.5 and >65 yrs with an average range of motion of 99.116. As the age increases the range of motion decreases postoperatively. Knees that were osteoarthritic performed better with an average range of motion of 104.462 as opposed to the rheumatoid knees (96.25).

Patients with preoperative flexion deformity had a direct impact on the postoperative range of motion.

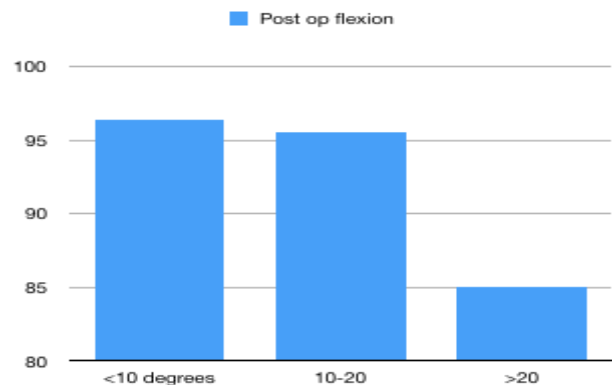


Figure 3: Post op ROM with respect to pre-op FFD.

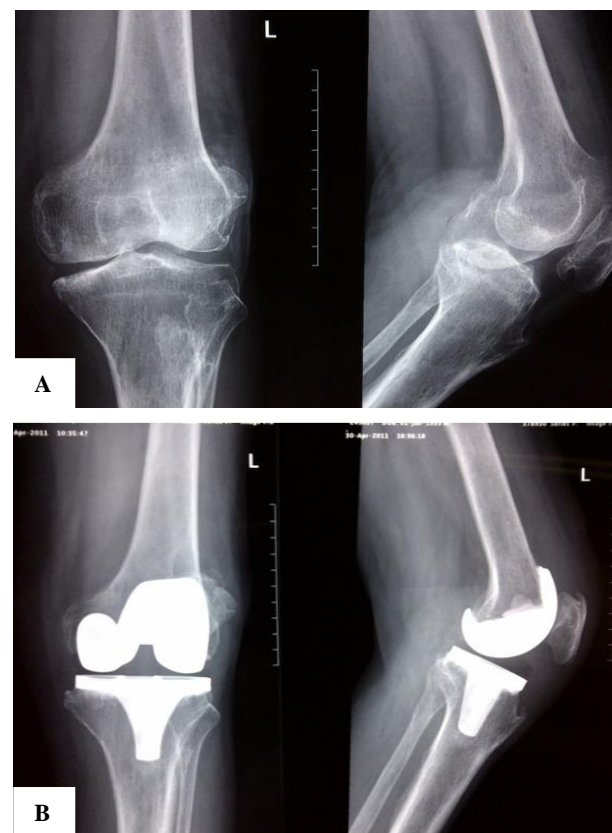


Figure 4: (A): A case of osteoarthritis with an FFD of 15 degrees and (B): post operatively no fixed flexion deformity.

Figure 3 shows that the patients who had a fixed flexion deformity of up to 10 degrees had an average postoperative flexion of 96.40. 10-20 degrees deformed knees had an average post op flexion of 95.5 degrees. The worst knees with deformity of >20 degrees had an average postoperative flexion of only 85degrees. This shows a direct relationship between the preoperative fixed flexion deformity and the post op range of motion. Figure 4 shows a case with FFD of 15 degrees and no obvious post op FFD.

DISCUSSION

We found that in our study the postoperative range of movements was directly proportional to the preoperative range of motion. The relationship was better highlighted when compared to other studies. Our study was compared with another article published by Reddi et al.⁵ That study was a broader study with multiple factors affecting range of motion being assessed. In their study the disease proper didn't have a significant alteration in the range of motion post operatively. But the preoperative range of motion and fixed flexion deformity had a significant burden on the postoperative flexion. The cruciate substituting prosthesis performed better when compared to the cruciate retaining prosthesis in our study. This correlated with the study conducted by Kim, Hoo et al.⁶ Another study performed by Dennis et al in 1998 also had the same observation.⁷ That study also concluded that range of motion is a superior modality of assessing functional outcome. For this issue of fixed flexion deformity some authors suggest that there are few specific techniques for flexion, the tibial tuberosity should be osteotomized to protect the patellar tendon in case of severe stiffness, if quadriceps arthrolysis has been excluded.⁸ On the other side of spectrum, some studies suggest that, preoperative fixed flexion deformity show continued improvement in their fixed flexion up to ten years after arthroplasty and have similar outcomes to those with no preoperative fixed flexion.⁹ Nevertheless, there are ways to improve the preoperative range of motion before the procedure. Major factor optimizing knee flexion is surgical technique Another important factor was the ease of prosthetic sizing of the femur.¹⁰

CONCLUSION

The preoperative fixed flexion deformity is a curse after all. The degree of deformity was directly proportional to the postoperative outcome of the knee (Figure 1). The effect of fixed flexion deformity was more in rheumatoid arthritis (96.25 degrees) when compared to osteoarthritis (107.46 degrees).

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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