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*Original Research Article*

# Total Knee Arthroplasty - Medial Parapatellar Versus Subvastus Approach – What Stands Where


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***Abstract***: For late stages of arthritis of knee, total knee arthroplasty (TKA) is the most successful joint replacement surgery for the patients to achieve good function. The medial parapatellar (MPP) approach is most often used, whereas the subvastus approach (SV) is a suitable alternative. This study is done to compare medial parapatellar approach to subvastus approach of TKR. This prospective study was conducted in our tertiary care centre from November 2021 to April 2023. 60 patients with osteoarthtitis of knee were divided into two groups , group A with 30 patients operated by medial parapatellar approach and group B with 30 patients operated with subvastus approach. ROM and KSS objective and functional scores in both groups were assessed preoperatively and postoperatively at 3 days, 2 weeks, 6 weeks, 3 months, and at 1 year. Days to straight leg raising (SLR) and VAS scores were calculated preoperatively and at postoperative days 1, and 3. Straight leg raising was regained 1.7 days earlier following the subvastus approach than medial parapattelar approach. Rom was 15° better following the subvastus approach at one week in most cases. The subvastus approach was associated with a statistically significant reduction in peri-operative blood loss by 58 ml . Pain was less in subvastus approach group but the operative time was more. Subvastus approach for TKR has advantage of less pain , good functional outcome in short term and less blood loss as compared to medial parapatellar approach.



*Keywords*: Subvastus , Medial parapatellar, Knee score.

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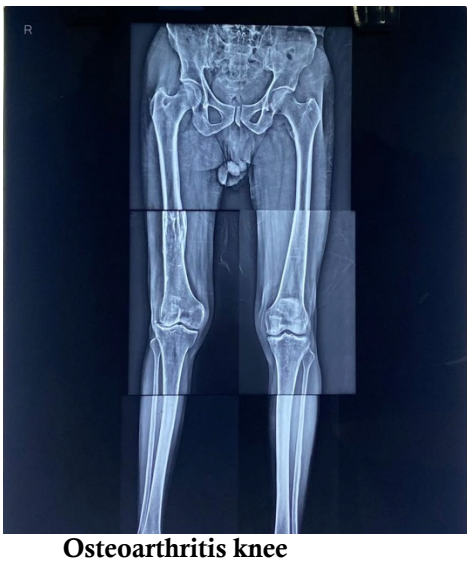
## INTRODUCTION

Total knee arthroplasty is an effective treatment for advanced knee arthritis providing significant pain relief and improved joint function [1]. The most common surgical approach for total knee arthroplasty is medial para patellar approach which is used as a standard approach in majority of knee joint replacement. [2, 3]. This approach requires an incision through the quadriceps tendon, which may impair the extensor mechanism of the knee post-operatively. The subvastus approach was described by erkes in 1929 (4) and popularized by hoffman in 1991. (5) it has the theoretical advantage of preserving the quadriceps mechanism with reports suggesting improved postoperative quadriceps muscle strength,(6) conservation of the patellar blood supply, (7) improved patellar tracking, (8) expedited rehabilitation(9) and reduced post-operative pain resulting in shorter hospital stays.(10)

## MATERIAL AND METHODS

This prospective study was conducted in our tertiary care centre from November 2021 to April 2023. 60 patients with osteoarthtitis of knee were divided into two groups, group a with 30 patients operated by medial parapatellar approach and group b with 30 patients operated with subvastus approach.



**Osteoarthritis knee**

**total knee replacement**

The primary outcome evaluated was postoperative knee range of motion (ROM). The evaluated secondary outcome variables included postoperative pain severity assessed through visual analog score (VAS), knee society score (KSS) objective and functional scores, and extensor mechanism integrity assessed through days to straight leg raise functional knee outcome scores and number of lateral releases performed. ROM and KSS objective and functional scores in both groups were assessed preoperatively and postoperatively at 3 days, 2 weeks, 6 weeks, 3 months, and at 1 year. Days to straight leg raising (SLR) and VAS scores were calculated preoperatively and at postoperative days 1, and 3.A

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Subvastus approach – after incision Subvastus approach – after implant insertion

**RESULTS**

A total of 60 patients' data were examined. The subvastus route was used in 30 individuals, whereas the medial parapatellar route was used in 30 patients. The majority of the patients in our research were women (78%) . The average BMI was 31.98 ( ±8.858). The preoperative quadriceps was rated as MRC 4 and 5 on the medical and research council (MRC) scale with only a small fraction of the studies patients (29%) having an MRC of 4 and the majority (71%) having an MRC 5 . Out of the studied patients (72%) had no co-morbidities .

The number of days to regain an active straight leg raise was recorded . Straight leg raising was regained 1.7 days earlier following the subvastus approach than medial parapattelar approach

ROM was about 10° better following the subvastus approach at the 1st day and $15^0$after one week in most cases but this difference did not persist at one year . The subvastus approach was associated with a statistically significant reduction in peri-operative blood loss by 58 ml . Operative times and tourniquet times were both approximately 10 minutes longer following the subvastus approach there was statistical significant difference between two groups in the operative time ($p<0.05$). Subvastus had more operative time with mean duration of surgery of 91.60 minutes, (range 56 – 135) whereas; the mean operative time was 71.7 minutes (range 40 – 127) in medial para patellar approach

Subvastus - range of movement from $0^0$ to $120^0$

Pain was less in subvastus approach group. Post operatively pain was measured on day 1 and day 3 using visual analogue score. On day 1 in the medial parapatellar group 10 percent of patients patients had score of 0. Whereas in subvastus approach 40 percent had score of 0 on day 1.. On day 3, in the subvastus group 60 percent of patients experienced pain score of 0 and only 25 percent had a score of 0 in patients operated by medial parapatellar approach. Mean pain score was 2.5 and 4.5 in subvastus and medial para patellar group respectively. Pain on day 3 was significantly less in subvastus group when compared to medial para patellar group (p value <0.01).

 

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Medial parapatellar – range of movement from $0^0$ to $100^0$

Although subvastus group (6.67 days) had shorter duration of stay in the hospital (range of 3- 11 days) than medial parapatellar group (8.83 days) (range of 4 to 18 days) there was no statistical significant difference between two groups in terms of duration of stay ($p>0.05$)

The data clearly show that patients in group A (subvastus approach) had faster recovery of SLR, indicating that the surgery spared the quadriceps. Those in group a recovered 0.45 days faster in SLR than patients in group B. With a p-value of 0.008, this difference was likewise statistically significant.. BMI did not affect the post-operative recovery of patients' quadriceps strength, and no significant difference ($p = 0.104$) was detected between patients with a BMI of >30 and those with a BMI of 30 . Side of surgery again did not show significant relevance ($p = 0.833$) to the mean number of days for the first post-operative SLR . Gender of the studied patients didn't show any statistical importance ($p = 0.182$) on SLR in our analysis of collected patient data

## DISCUSSION

The standard MPP approach, which was initially described by von langenbeck in 1879, has been arguably the most common approach in TKR surgery as it is simple and provides excellent exposure [11,12]. However, it is associated with impairment of the extensor mechanism and interferes with the blood supply to the patella .Only recently has the subvastus technique to the knee acquired prominence in knee arthroplasty [13 ,14, 15]. A randomized blinded trial done on 89 patients showed that the subvastas technique offered early advantages in gaining mobility for patients postop [13].there were no significant difference between two groups in terms of blood loss and blood transfusions ($p>0.05$). This was similar to findings of meta-analysis by teng, et al. [16] and in randomised controlled studies by weinhardt, et al. [17],

Duration of surgery was significantly higher in subvastus group when compared to medial parapatellar approach (p value < 0.01). The other studies with similar results were by bridgman, et al. [13] .Pain score on day 1 was significantly higher in medial parapatellar group when compared to subvastus group, whereas after 1 year there was no significant difference between two groups. Roysam and oakley [19] and bridgman, et al. [13] found similar results. Patients who underwent subvastus approach had shorter stay in the hospital for 6.67 days (range 3-11 days) compared to 8.83 days (range 4-18 days) in medial parapatellar group. However it was not statistically significant ($p > 0.05$). This was similar to results obtained by bourke, et al. (2012) [3] and teng, et al. (2012). Systematic review and meta-analysis done by berstocket al.[20] demonstrated earlier return of straight leg raise, lower visual analog pain scores on day 1 and improved rom at 1 week following the SV approach as compared to the MPP approach

## CONCLUSION

The subvastus approach in TKR appears to provide better results in knee function score and straight leg raise, with slight improvement in ROM, blood loss, and hospital stay, but the operative timehas to be taken care of. But long term results are almost same

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