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# Bilateral simultaneous versus staggered total knee replacement: A retrospective study

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**Abstract**
**Introduction:** The decision to perform Bilateral Total Knee Arthroplasty (BTKA) simultaneously or staggeredly is a significant topic of discussion in orthopaedics. Patients usually have a bilateral knee involvement in end stage arthritis and many factors contribute to the decision of staggered or simultaneous TKA. In this study we try and compare the functional outcome and complications related to both the methods.
**Methodology:** This was a retrospective study where we used the hospital records to find out the patients who have undergone bilateral simultaneous or staggard TKA in the past 2 years. We invited the patients to the hospital and patients were divided in to 2 groups of 100 each based on the surgery they had undergone. In follow up patients were evaluated on the basis of Knee Society Score (KSS) and complications that occurred post-surgery.
**Results:** The study included a total of 200 patients of which 160 were females and 40 were males. The average age of the patients was 64.5. on assessment of KSS score patients who underwent staggered TKA had a slightly better score as compared to the simultaneous group, the same was true even in the category of complications.
**Conclusion:** This study concluded that there was no statistically significant difference between both the groups but the staggered group had a slightly better outcome in terms of KSS score and complications rate.

**Keywords:** TKA, KSS, staggered, simultaneous, complications

## Introduction

Knee osteoarthritis is a common condition that affects people as they age. It can cause pain, stiffness, and difficulty walking. Total knee arthroplasty (TKA) is a surgery that can replace the damaged knee joint with an artificial joint. TKA is a successful treatment for knee osteoarthritis, and it can significantly improve a patient's quality of life [1]. For patients with bilateral knee osteoarthritis, TKA can be performed simultaneously (on both knees at the same time), staggered (on one knee first, and then the other knee a few days or weeks later), or staged (on one knee first, and then the other knee several months later). The best approach for each patient depends on their individual circumstances and preferences [2].

In comparison to staged BTKA, simultaneous BTKA has a number of benefits, such as patient preference, a quicker recovery, and lower perioperative costs. Nevertheless, it is also linked to higher rates of complications, including increased intraoperative blood loss, a greater need for perioperative blood transfusions, and higher rates of thromboembolism, cardiac and respiratory complications, neurological complications, wound dehiscence, infections, and mortality as well [3].

Simultaneous BTKA problems can be reduced with careful patient selection. Patients with complicated and advanced heart pathologies, severe chronic obstructive pulmonary disease, diabetes which is uncontrolled, vascular disease, morbid obesity, a history of VTE, or who are 75 and older are not considered eligible for simultaneous BTKA [4]. Treatment options in these situations include staged BTKA (two distinct procedures conducted during two consecutive hospitalisations, typically within a year) or single-admission staggered BTKA (two separate procedures performed on various days during a single hospitalisation) [5].

The benefits of staggered BTKA are similar to those of simultaneous BTKA in many ways, including 1) patient preference for a single hospital stay and 2) a shorter recovery period [6]. Staggered BTKA may be an option for patients with medical complications who are not candidates for simultaneous BTKA in order to quickly address severe bilateral knee deformity [7]. Staged BTKA, however, has the lowest complication rates of all BTKA alternatives, despite the fact that patients may not favour it due to a longer overall recovery period and several hospital stays [8].

The goal of this study is to ascertain if patients who undergo bilateral simultaneous vs. staggered TKA vary in terms of functional result and complication rate.

## Methodology

200 patients who underwent BTKA at our hospital between 2016 and 2017 were the subject of a retrospective review. The patients were split into two groups: those who had staggered bilateral TKA and those who had simultaneous bilateral TKA.

Patients who underwent BTKA (simultaneously or staggered) met the inclusion criteria. Patients who failed follow-up or experienced problems more than six weeks after surgery were excluded. Patients with at least a two-year follow-up were included in the records we pulled from our institution. Depending on the patient's medical comorbidities and preferences, the surgeon and patient decided whether to proceed with simultaneous or staggered surgery. Complication rates, acquired from the medical records, and functional outcomes were assessed using the KSS.

## Results

**Table 1**: Showing demographic details

| Variables | Simultaneous (100) | Staggered (100) |
|---|---|---|
| Age | 62.3 | 63.3 |
| Sex M/F | 15/85 | 25/75 |
| KSS (pre-op) | 43.22 | 42.54 |

**Table 2:** Showing complications in both the groups

| Complications | Simultaneous | Staggered | p- value |
|---|---|---|---|
| Deep infection | 3 | 1 | 0.05 |
| Superficial infection | 2 | 2 | 0.023 |
| DVT | 1 | 0 | 0.23 |
| Total | 7 | 3 | 0.05 |

**Table 3:** Showing the KSS

| Outcome | Simultaneous | Staggered | p- value |
|---|---|---|---|
| KSS | 92 | 91 | 0.05 |

Our study's findings show that both simultaneous and staggered BTKA significantly enhance functional score when compared to preoperative status, supporting the efficacy of BTKR. Regarding functional improvement, there isn't a noticeable difference between the two operations. Complication wise simultaneous BTKR had a slightly more number compared to the staggered variant.

## Discussion

This study's objective was to shed light on the advantages and disadvantages of surgical procedures used to treat bilateral degenerative knee problems.

Poultsides and others [9], reported that BTKA was treated after a single hospital stay. Compared to different-hospitalization staged BTKA, patients were more likely to experience minor or major complications. treated people. Among these issues was a higher Probability of cardiac and thromboembolic events due to greater comorbidity among patients in the single-hospitalization group. Finally, there are no suggestions that about the comparison of the complexity overall BTKAs that were staged and those that were staggered, since the outcomes were Conflicting. In a nutshell, one could argue demonstrated the safety and efficacy of staggered BTKA were not increased. compared to the well-established simultaneous or phased procedures, complication profile.

BTKR benefits society and hospitals in both a social and economic sense. First of all, by using BTKR, we can increase theatre utilisation by speeding up theatre turnover time. For instance, we can do a BTKR procedure on two patients in a single full-day session, but it is challenging to complete a UTKR procedure on four patients in the same amount of time. Second, BTKR patients experience shorter overall hospital stays [10].

As a common, effective procedure, BTKA makes up a sizeable fraction of all TKA procedures carried out to reduce pain and enhance physical function in patients with bilateral knee OA. In these patients, BTKA can be carried out either all at once or in stages with varying intervals between operations. Simultaneous BTKA causes more blood loss and carries a higher risk of mortality and medical issues than staged BTKA [11]. However, there isn't a definite best period of time for carrying out the second surgery in phased BTKA, and this problem hasn't attracted much research focus.

In a survey of 332 patients who underwent simultaneous or staggered bilateral KA, Sliva *et al*. showed that the staggered group experienced 2.5 times fewer total problems than the simultaneous group [12]. Although the difference was not statistically significant, Forster *et al*. analysed 102 staggered bilateral KA patients with a one-week gap between procedures and discovered a decreased frequency of problems than in the simultaneous group [13].

In addition, simultaneous BTKA was considered an independent risk factor for infection [14]. We found that staggered BTKA was associated with a lower incidence of wound infection than simultaneous BTKA

Hu and colleagues similarly discovered comparable outcomes to our findings in a previous meta-analysis [15]. According to their findings, patients who underwent simultaneous total knee arthroplasty had considerably higher 30-day mortality and neurological complication rates. Additionally, they discovered no discernible difference in the rates of complications between the two groups, which is consistent with our findings.

Similar effects to those reported in this study were measured in a recent meta-analysis by Restrepo and colleagues [16]. When compared to unilateral and staged bilateral total knee replacement, the findings of their research point to a greater risk of cardiac events and mortality following simultaneous bilateral total knee replacement. The study also found no evidence of an elevated risk of pulmonary embolism or deep vein thrombosis in either comparison group.

Additionally, when TKA is performed in a phased fashion, the existence of the painful contralateral knee makes successful postoperative rehabilitation more challenging in patients with bilateral knee osteoarthritis and substantial flexion contractures. Increased loading in the patient's contralateral knee as a result of a TKA has been hypothesised to hasten the evolution of osteoarthritis in that knee [17].

## Limitations

There were a few issues with our study that need to be taken into account. The study was retrospective, therefore it's possible that the difficulties of patients admitted to other medical facilities were missed. Second, because the patients were chosen from just one hospital, our sample size was rather limited. In light of this, the study might have been underpowered. Therefore, a multicenter, prospective, cohort trial will be required to produce stronger data to support our findings.

## Conclusion

This study shows that when comparing simultaneous and staggered bilateral TKA, there is not much of a difference in functional outcome, although staggered group still exhibits superior postoperative functional outcome compared with first knee second knee shows better outcome. According to our findings, simultaneous bilateral TKA has a modest increase in significant complications compared to staggered group. Evidence for the superiority of either BTKA simultaneous, staged, or staggered is currently lacking. For patients who are low risk and sufficiently motivated, simultaneous bilateral TKA is still a safe alternative.

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