

A Lateral Subvastus Approach to Total Knee Arthroplasty: Short-term Safety and Efficacy

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Introduction

Current approaches to total knee arthroplasty (TKA) include the medial parapatellar approach, medial midvastus, and medial subvastus approach

Currently, the medial parapatellar approach is the recommended technique and standard of care for TKAs, yet patient dissatisfaction is approximately 20% at one year from primary TKA [1-2].

A lateral subvastus muscle sparing approach to TKA has the potential to improve rehab rates, muscle strength recovery, function, and pain when compared to existing approaches.

Objective

Retrospectively review of 778 primary knees performed through a lateral subvastus approach performed by a single surgeon with a single protocol. Surgical technique, patient demographics, and postoperative results are presented.

Surgical Description

The following are key points of the author's lateral approach and are technique and sequence dependent:

1. Lateral incision is made over the knee with dissection including a 1mm osteotomy of Gerdy's tubercle to assist with fascial closure.
2. Soft tissue retractors need to be positioned appropriately for medial collateral ligament (MCL) protection. The tibia is then resected in approximately 30 degrees of flexion.
3. The patella is everted with the knee in extension and resected free-hand.
4. The patella is retracted medially with soft tissue retractors and the knee is brought into flexion for standard femoral resection.
5. Flexion and gap balancing is performed in extension and 90 degrees of flexion.
6. Remaining soft tissue release and removal is performed with knee in extension.
7. Implantation is then performed in the standard fashion.



Methods

A retrospective chart review was performed on 778 consecutive TKA patients performed by a single surgeon with the same rehab protocol over a 12-month period.

Inclusion criteria: men and women with osteoarthritis, rheumatoid arthritis, and posttraumatic secondary arthritis receiving a primary TKA at Dr. Phillips Hospital (DPH).

Exclusion criteria: partial knee arthroplasty to TKA revisions, simultaneous bilateral TKA, TKA with hardware removal, and outpatient surgery center patients.

Office and hospital medical records were reviewed for patient demographic data, surgical data, and operative outcome measures such as: range of motion (ROM), knee society scores (KSS), readmission, and major and minor systemic and local postoperative complications based on accepted determinations from the literature [3,4]. Annually published DPH orthopaedic department data for surgical site infections, length of stay, and readmissions were also reviewed.

Results

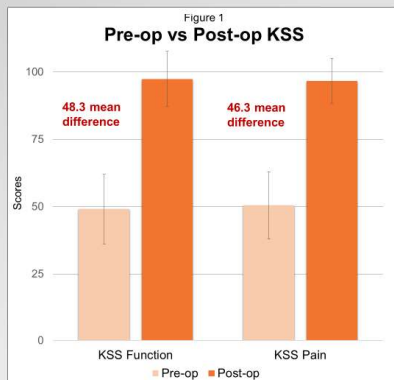
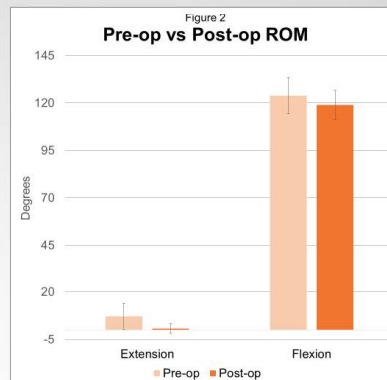
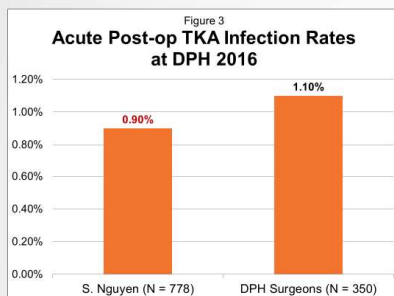
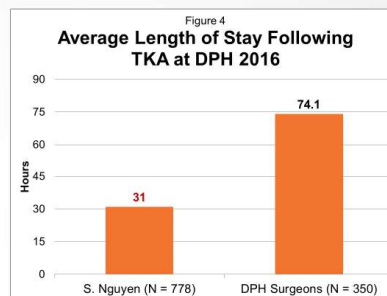


Table 1	
Operative Complications	
Characteristic	% of patients (No. Of Complications)
Major Systemic Complications	1.3% (10)
Pulmonary Embolism	0.5% (4)
Myocardial Infarction	0.1% (1)
Congestive Heart Failure	0.1% (1)
Bowel Obstruction	0.1% (1)
Acute Renal Failure	0.1% (1)
Septic Shock	0.1% (1)
Death	0.1% (1)
Minor Systemic Complications	1.7% (13)
Urinary Tract Infection	0.5% (4)
Deep Vein Thrombosis	0.4% (3)
Gastrointestinal bleed	0.4% (3)
Pneumonia	0.3% (2)
Urinary Retention	0.1% (1)
Major Local Complications	1.7% (13)
Joint Infection	7 (0.9%)
Deep Wound Dehiscence	0.4% (3)
Periprosthetic Fracture	0.3% (2)
Implant Subsidence req. Surgery	1 (0.1%)
Minor Local Complications	5.0 % (35)
Superficial Wound Infection	1.1% (9)
Wound Drainage	1.1% (9)
Cellulitis	1% (8)
Implant Subsidence	0.5% (4)
Arthrofibrosis req. MUA	0.4% (3)
Skin Blisters	0.3% (2)
Hypersensitivity Reaction	0.3% (2)
Superficial Wound Dehiscence	0.1% (1)
Hematoma	0.1% (1)

Table 2	
Patient Demographics and Operative Characteristics	
Characteristic	Value
Age (n = 778)	
Mean ± SD	71.0 ± 5.6
Sex (n = 778)	
Male	353 (45%)
Female	425 (55%)
BMI (n = 778)	
Mean ± SD (kg/m ²)	30.9 ± 5.5
Tourniquet Times (n = 777)	
Mean ± SD (mins)	48.53 ± 9.03
ASA (n = 778)	
Mean ± SD	2.36 ± 0.51
Medical Comorbidities (n = 778)	
Diabetes	140 (18%)
CAD	109 (14%)
PVD	23 (3%)
RA	15 (2%)
H/O Smoking	311 (40%)
Readmission Systemic Complication	3.0% (23)
Readmission Local Complication	2.2% (17)

SD, Standard deviation; BMI, Body mass index; ASA, American Anesthesiology Association; CAD, Coronary artery disease; PVD, Peripheral vascular disease; RA, Rheumatoid arthritis

Conclusions

Average hospitalization following TKA with this lateral subvastus approach was 31 hours (1.3 days), which was less than 74.1 hours (3.1 days) - the average of other TKAs performed at the same institution through a medial parapatellar approach Fig. 4 [12]. This demonstrates excellent pain control and function immediately after surgery.

Short-term results for KSS and ROM of this lateral subvastus approach yields superior functional outcomes compared to the standard medial parapatellar approach as reported in the literature Fig. 1-2 [5-8].

Systemic complication rates with this approach were less than other standard and minimally invasive TKA approaches as reported in the literature Table 1 [3-4, 9-11].

Deep wound infection rate (0.9%) was less than the rate of all other TKAs performed at the same institution with the medial parapatellar approach (1.1%) Fig. 3 [12].

In this cohort, the hospital readmission rate was comparable to published data [13] and less than other surgeons at the same institution Table 2 [12].

Advantages of the lateral subvastus approach compared to standard TKA approaches:

1. Preservation of quadriceps function
2. No need for ancillary lateral release
3. Decreased pain due to less developed lateral subcutaneous nerve plexus and no disruption to the innervation of the medial saphenous nerve distribution over the anterior knee

Disadvantages of the lateral subvastus approach compared to standard TKA approaches:

1. Large learning curve and technically demanding requiring sequencing bony cuts in a specific order to obtain desired results. It is the primary author's opinion that it takes more than 250 cases to become proficient.
2. Performing TKA revisions through this approach is more difficult and was not addressed in this study.
3. Insertion of a posterior stabilized insert is more difficult than a cruciate retaining insert.

This approach is safe and demonstrates excellent results in the acute perioperative period.

Long-term, controlled studies are needed to determine safety and efficacy of the lateral subvastus approach with specific focus on TKA longevity and revision rates.

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