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Utilizing Preoperative Measurements of Single Leg Stance and the Timed Up and Go as Clinical Predictors of Length of Stay Following Total Knee Arthroplasty

Sherrie Renzi, PT, MSPT; Susan Torchia, PT, DPT; Kathryn Belanger, PT, MPT; Gina Marsh, PT, MSPT; Jean Flanagan Jay, PT, DPT, CLT; Jamie Collins, PhD

Background

To accommodate for increasing number of primary total knee arthroplasty (TKA) each year and rising healthcare costs, predicting and decreasing length of stay (LOS) are important in providing efficient and cost effective hospital services. [1]

Research supports that LOS following primary TKA has significantly decreased due to:
- Improvements in surgical approach
- Multi-modal analgesia [1]
- Preoperative education
- Regional anesthesia
- Aggressive postoperative fluid administration
- Early mobilization [2]

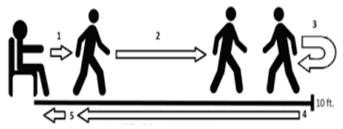
Predicting LOS following primary TKA is important for:
- Resource allocation
- Discharge planning
- Operational efficiency
- Managing patient expectations
- Maintaining healthcare costs [1]

Purpose

Research is limited on the correlation of functional assessment tools with LOS. We identified a need to determine if preoperative measurements of single leg stance (SLS) and timed up and go (TUG) are functional predictors of LOS; and identify patients who would be candidates for early discharge following primary TKA.

Clinic Testing

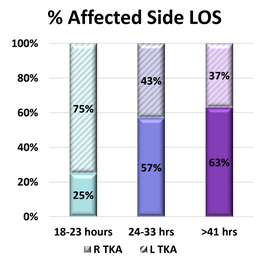
Timed Up and Go

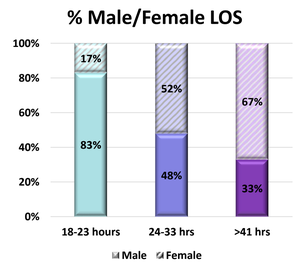


Single Leg Stance

Methods

Retrospective data analysis:
- 60 Patients: 29 males, 31 females
- Average age: 68 years
- Prior to a primary TKA, SLS and TUG data were collected during a preoperative Physical Therapy assessment immediately following an orthopedic surgical consultation in the clinic setting.
- All primary TKAs were performed by one surgeon using a minimally invasive approach, multi-modal analgesia, and early mobilization.
- Patients with opposite extremity TKA or THA within 3 months, revision surgeries, and postoperative complications were removed from the data set.
- To obtain SLS measurements, patients were instructed to alternate standing on the affected and unaffected lower extremity for as long as possible, up to 30 seconds. If external support was required to maintain balance, the timer was stopped. One repetition per extremity was collected.
- To obtain TUG measurements, Patients were instructed to stand from a chair, walk 10 feet to a marker on the floor, turn around, walk back to the chair, and sit down. The timer began when the patient initiated standing and stopped when they achieved the sitting position.

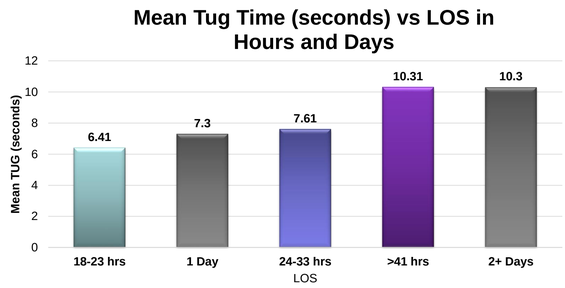


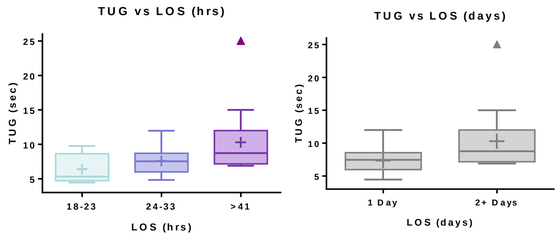


	18-23 hours	24-33 hours	>41 hours
Total Patients	12	21	27
Right TKA	25%	57%	63%
Left TKA	75%	43%	37%
Male	83%	48%	33%
Female	17%	52%	67%
Mean Age in Years (SD)	65.6 (8.4)	64.8 (8.5)	71.7 (7.7)
Mean Pre-op Pain (SD)	4.25(1.7)/10	4.67(2.1)/10	5.07(2.1)/10
Mean Post-op Pain (SD)	2.75(1.9)/10	4.19(1.9)/10	3.56(2.4)/10
D/C Status	Home (100%)	Home (100%)	Home (92.6%)

Results

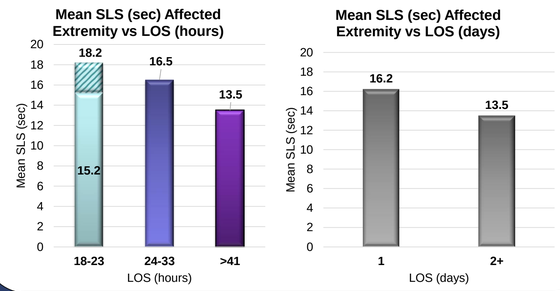
TUG is a statistically significant clinical predictor for LOS:
- Number of hours (p=0.0219)
- 1 vs 2+ days (p=0.0153)





Though a trend of increased LOS with decreased SLS time was observed within the SLS affected side data set, SLS is not a statically significant clinical predictor of LOS
- LOS in hours (p=0.7797)
- LOS in 1 vs 2+ days (p=0.5572)

Data includes a single value of zero for the right TKA 18-23 hour group. This value in the raw data affects the mean SLS value for the 18-23 hour group, reducing it to 15.2 (±13) seconds. Removing this outlier results in an adjusted mean SLS value of 18.2 (±12) seconds.



Conclusions

- TUG is a statistically significant clinical predictor for LOS. Preoperative TUG mean value of 6.41 (±2.2) seconds is a functional predictor in identifying patients with an 18-23 hour LOS following primary TKA.
- Mean SLS values decreased with increasing LOS; however this relationship was not statistically significant for this data set to predict LOS.
- Age factors into LOS with a significant p-value of (p=0.0131). Patients with a mean age of 65.1 (±8.4) are more likely to discharge home in 18-24 hours. Patients with a mean age of 71.7 (±7.7) discharge >41 hours.

Clinical Relevance

- Preoperative TUG measurements demonstrate predictability of a patient's LOS after primary TKA. As a patient's TUG time increases their LOS also increases.
- Performing TUG measurements preoperatively will assist with identifying patients who would be candidates for discharge within 18-24 hours following primary TKA.
- Conversely, the TUG value can help identify patients who may require an increased LOS.

- Clinically, SLS less than 5 seconds can help identify patients who are at a higher risk for falls. [3]
- SLS values as predictors of LOS may be valid with an increased sample size and evenly dispersed laterality.
- We should not eliminate the SLS as a predictor of LOS; rather we should continue to collect data to validate and/or expand findings.

- The TUG and SLS can be easily utilized in many different clinical settings. Both are reliable, easily reproducible, time efficient, and economical.

Patients undergoing unilateral primary TKA who have decreased preoperative SLS time and increased TUG time should be considered for preoperative education, early discharge planning, and higher acuity needs of Physical Therapy intervention during their admission.

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For references and a PDF of this poster please use the QR scan or visit: https://bwfh.org/APTA-CSM-2019

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3. Mancini, M, Horak, F.B. (2010) The relevance of clinical balance assessment tools to differentiate balance deficits. *European Journal Physical Rehabilitation Medicine. 46(2): 239-248.*