

## Patient Safety Tip of the Week

March 28, 2023

### Intraoperative Team Continuity and OR Efficiency

Teamwork and team communication are critical for success in the OR. In our several columns on “after hours” surgery we’ve noted one of the likely contributing factors may be that you are often operating with a team that is likely different from your daytime team. The same also likely applies to surgery during daytime hours. In our December 13, 2022 Patient Safety Tip of the Week “[Surgical Teams – the ‘Consistency Score’](#)” we highlighted a metric, the “consistency score”, developed by researchers at the Hospital for Special Surgery in New York ([Kirksey 2022](#)). Using that metric, the researchers showed that for both THA’s and TKA’s better team consistency was associated with improved OR efficiency without any increase in adverse events.

Cousins et al. ([Cousins 2023](#)) recently looked at the impact of intraoperative changes of non-physician staff on measures of OR efficiency in hip and knee arthroplasty. Turnover among circulating nurses was associated with a significant increase in operative duration in both THA’s and TKA’s, with estimated differences of 19.6 minutes of room time in THA’s and 14.0 minutes of room time in TKA’s. The presence of a surgeon-preferred vendor was associated with a significant increase in operative duration in both THA’s (26.3 minutes) and TKA’s (29.6 minutes). On the other hand, the presence of a preferred anesthesiologist or surgical technician was associated with significant **decreases** of 26.5 minutes of procedure time and 12.6 minutes of room time, respectively, in TKA’s.

Interestingly, and perhaps unexpectedly, both the presence of anesthesia residents in THA’s and the presence of surgical residents in TKA’s was associated with significant **decreases** in operative duration. In some cases those decreases were up to 21.8 minutes of overall room time. The authors note that involvement of residents in many previous studies tended to increase case duration. But the data in the current study suggests that, in some settings, resident participation may constitute a net benefit to operative efficiency rather than being a costly educational investment. The presence of nonresident trainees (eg, nursing students, staff in training, medical students, and surgical fellows) was not associated with significant increases in operative duration for THA’s or TKA’s.

The authors feel that the fact that the presence of a preferred anesthesiologist was associated with a significant decrease in procedure time in TKA highlights the critical importance of smooth communication between surgeon and anesthesiologist throughout the duration of a procedure, even after induction.

And...vendors. We personally hate the idea of vendors in the OR. But it seems to be a fact of life. The presence of a preferred vendor was associated with an **increase** in operative duration in both THA's and TKA's, in some cases of up to 29.6 minutes of overall room time. The authors suggest that vendors play a multifaceted role in the operative team and that the qualities that surgeons prioritize in vendors may detract from intraoperative efficiency. We'd wonder if it does not simply mean that surgeons may have been unfamiliar with nuances of some newer implants, thus requiring more communication with the vendors.

Unfortunately, the researchers only assessed operative duration as a marker of operative efficiency and therefore were not able to quantify postoperative outcomes such as readmissions or surgical site infections.

In our many previous columns on surgical case duration, one statistic we've often cited is that the infection rate increases as surgical case duration increases. Procter et al. ([Procter 2010](#)) looked at a large database of general surgical procedures and demonstrated a linear relationship between duration of surgery and infectious complications. This relationship persisted even after adjustment for a variety of other risk factors for perioperative infections. The unadjusted infectious complication rate increased by 2.5% per half hour. Hospital length of stay (LOS) also increased geometrically by 6% per half hour. Logically, prolonged operative time would also be expected to increase pressure-related complications, such as decubiti and perioperative neuropathies. But longer duration also increases the likelihood of increased foot traffic into and out of the OR and more door openings and closings. These are risk factors for surgical infections and also the potential for distractions and interruptions, potentially contributing to errors.

In our January 2021 What's New in the Patient Safety World column "[Operative Time and Postoperative TKA Complications](#)" we cited another study ([Chen 2020](#)) that used data from the American College of Surgeons National Surgical Quality Improvement Program database on almost 15,000 patients who had undergone revision total knee arthroplasties (TKA's) between 2007 and 2016. After adjustment, each additional 15 minutes of operative time increased the likelihood of wound complications (odds ratio 1.023), postoperative blood transfusion (odds ratio 1.169), and extended hospital stay (odds ratio 1.060). Of course, from such database statistics one cannot determine the reason for the prolonged surgical durations. In some cases, whatever led to complications may have also prolonged the surgery. But, undoubtedly, in many cases the complications resulted from the long surgical durations.

Overall, the Cousins study clearly demonstrates that continuity of the team is important in terms of OR efficiency. Having a circulating nurse, surgical tech, and anesthesiologist who regularly work with the surgeon are clearly important.

### **Our prior columns focusing on surgical case duration:**

- March 10, 2009 [“Prolonged Surgical Duration and Time Awareness”](#)
- January 2010 [“Operative Duration and Infection”](#)
- July 21, 2012 [“Surgical Case Duration and Miscommunications”](#)
- August 26, 2014 [“Surgeons’ Perception of Intraoperative Time”](#)
- December 30, 2014 [“Data Accumulates on Impact of Long Surgical Duration”](#)
- November 24, 2015 [“Door Opening and Foot Traffic in the OR”](#)
- July 26, 2016 [“Confirmed: Keep Your OR Doors Closed”](#)
- November 7, 2017 [“Perioperative Neuropathies”](#)
- December 2017 [“A Fix for OR Foot Traffic?”](#)
- January 2021 [“Operative Time and Postoperative TKA Complications”](#)

### **Our prior columns focusing on surgical OR foot traffic and door opening:**

- March 10, 2009 [“Prolonged Surgical Duration and Time Awareness”](#)
- January 2010 [“Operative Duration and Infection”](#)
- August 26, 2014 [“Surgeons’ Perception of Intraoperative Time”](#)
- December 30, 2014 [“Data Accumulates on Impact of Long Surgical Duration”](#)
- November 24, 2015 [“Door Opening and Foot Traffic in the OR”](#)
- July 26, 2016 [“Confirmed: Keep Your OR Doors Closed”](#)
- December 2017 [“A Fix for OR Foot Traffic?”](#)
- April 23, 2019 [“In and Out the Door and Other OR Flow Disruptions”](#)
- June 8, 2021 [“Cut OR Traffic to Cut Surgical Site Infections”](#)
- January 11, 2022 [“Documenting Distractions in the OR”](#)
- October 4, 2022 [“Successfully Reducing OR Traffic”](#)

### **Some of our previous columns on “after-hours” surgery:**

- September 2009 [“After-Hours Surgery – Is There a Downside?”](#)
- October 2014 [“What Time of Day Do You Want Your Surgery?”](#)
- January 2015 [“Emergency Surgery Also Very Costly”](#)
- September 2015 [“Surgery Previous Night Does Not Impact Attending Surgeon Next Day”](#)
- October 4, 2016 [“More on After-Hours Surgery”](#)
- August 15, 2017 [“Delayed Emergency Surgery and Mortality Risk”](#)
- October 24, 2017 [“Neurosurgery and Time of Day”](#)
- December 2019 [“Surgeon On-Call Shifts”](#)
- October 13, 2020 [“Night-Time Surgery”](#)
- December 13, 2022 [“Surgical Teams – the “Consistency Score””](#)

### **References:**

Kirksey M, Sasaki M, Grace D, et al. A Novel Network-Based Metric of Surgical Team Consistency Opens Opportunities to Improve Hospital Performance and Care Value. NEJM Catalyst 2022; 3(12): December 2022  
<https://catalyst.nejm.org/doi/full/10.1056/CAT.22.0244>

Cousins HC, Cahan EM, Steere JT, et al. Assessment of Team Dynamics and Operative Efficiency in Hip and Knee Arthroplasty. JAMA Surg 2023; Published online March 22, 2023  
<https://jamanetwork.com/journals/jamasurgery/article-abstract/2802864>  
(Cousins 2023)

Procter LD, Davenport DL, Bernard AC, Zwischenberger JB. General Surgical Operative Duration Is Associated With Increased Risk-Adjusted Infectious Complication Rates and Length of Hospital Stay, Journal of the American College of Surgeons 2010; 210: 60-65  
[https://journals.lww.com/journalacs/Abstract/2010/01000/General\\_Surgical\\_Operative\\_Duration\\_Is\\_Associated.10.aspx](https://journals.lww.com/journalacs/Abstract/2010/01000/General_Surgical_Operative_Duration_Is_Associated.10.aspx)

Chen AZ, Gu, A, Wei C, et al. Increase in Operative Time Is Associated With Postoperative Complications in Revision Total Knee Arthroplasty. Orthopedics 2020; 44(1):18-22 Posted November 25, 2020  
[https://journals.healio.com/doi/10.3928/01477447-20201119-01?url\\_ver=Z39.88-2003&rfr\\_id=ori:rid:crossref.org&rfr\\_dat=cr\\_pub%20%20pubmed](https://journals.healio.com/doi/10.3928/01477447-20201119-01?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%20pubmed)



<http://www.patientsafetysolutions.com/>

[Home](#)

[Tip of the Week Archive](#)

[What's New in the Patient Safety World Archive](#)