



# Pre-Incision vs. Post-Incision Frequent Door Openings During Total Joint Arthroplasty

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## Background

- Surgical Site Infections (SSIs) are a serious complication of total hip and total knee arthroplasty
- Several studies have implicated frequent door openings in the operating room with higher rates of airborne contamination and subsequently increased rates of SSIs<sup>1</sup>
- High rates of door openings during total hip and total knee arthroplasty have been previously established in the literature<sup>2</sup>
- Previous studies have also shown an increase in airborne contamination during the pre-incision period compared to the post-incision period<sup>3</sup>
- We sought to understand the reasons for door openings during total hip and total knee arthroplasty and to determine if door openings are significantly different between the pre-incision and the post-incision period

## Methods

- Cross-sectional, observational study
- Data was collected at 3 large academic institutions between June 2019 to August 2020
- Observations were made by 4 observers who all underwent identical training and used a standardized data collection form
- The number of door openings, the reason for the door opening and the period in which the door was opened were recorded
- Distractions associated with door openings were also recorded and rated according to severity using a scale adopted from Healy et. Al<sup>4</sup>
- The pre-incision period was defined as the time between the opening of the sterile instrument tray to the first incision. The post-incision period was defined as the time between the first incision and the application of the bandage
- This study met the classification for “not human subject research” by our institutional review board
- Data were analyzed using the Wilcoxon 2-sample median test

## Results

**Table 1. Reasons for Pre-Incision and Post-Incision Door Openings**

Variable	Total Staff Break	Nurse Supplies	Vendor Supplies	Surgical Team	Hallway Door	Other
<b>Pre-Incision</b>						
Median no. per case	0	8	2	7	3	7
% of total door openings	0	25.40	5.43	20.53	11.98	19.74
<b>Post-Incision</b>						
Median no. per case	4	6	6	1	0	8
% of total door openings	12.50	18.60	18.75	3.70	0	17.14

- We found 0.56 (IQR, 0.40–0.70) door openings per minute in the pre-incision period and 0.34 (IQR, 0.26–0.45) door openings per minute in the post-incision period
- We found a significant difference between these 2 periods (P = .0036)

## Discussion

- 36% of door openings associated with a question or conversation regarding surgical equipment were rated as severe distractions and may contribute to surgical error and increased risk of SSI
- However, 97% of door openings that did not result in a subsequent conversation were rated as mild distractions
- Given the previously reported significant increase in airborne contamination during the pre-incision period and the high rate of pre-incision door openings, it is reasonable to hypothesize that door openings may affect the sterility of the instrument tray
- We found a significant difference in the reasons for door opening between the pre- incision and post-incision periods, which signifies that their roles in the increased rates of SSI are likely distinct and that they should be investigated separately
- Nurse and vendor supplies constituted a considerable number of pre-incision door openings (25% and 5%, respectively) and post-incision door openings (18% and 18%, respectively)
- A promising intervention to address these door openings would be the implementation of a checklist to ensure the presence of all necessary supplies prior to the pre-incision period
- Further research is needed to understand the effect of door openings in the pre-incision and post- incision period as well as to discover an effective and sustainable door-opening intervention

## Reference

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