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

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Introduction

- 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 rooms with higher rates of airborne contamination and subsequently increased rates of SSIs.
- High rates of door openings during total hip and total knee arthroplasty have been previously reported.
- Prior literature has shown an increase in airborne contamination during the preincision period compared to the postincision period, however, the difference in door openings between these periods has not been clearly defined.
- This study aimed to understand the reasons for door openings in the preincision and postincision periods to provide insight on how to best develop interventions for these 2 periods

Methods

- Cross-sectional, observational
- Data collected at 3 large academic institutions between June 2019 and August 2020.
- Observations were made by 4 observers who all underwent identical training and used a standardized data collection form
- 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
- 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

Variable	Total Staff Break	Nurse Supplies	Vendor Supplies	Surgical Team	Halfway Door	Other
Preincision						
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
Postincision						
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
- 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 preincision door openings, it is reasonable to hypothesize that door openings may affect the sterility of the instrument tray
- 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 postincision door openings (18% and 18%, respectively)
- An intervention to potentially 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

References

1. Roth JA, Juchler F, Dangel M, Eckstein FS, Battegay M, Widmer AF. Frequent door openings during cardiac surgery are associated with increased risk for surgical site infection: a prospective observational study. Clin Infect Dis 2019;69:290-294.
2. Lynch RJ, Englesbe MJ, Sturm L, et al. Measurement of foot traffic in the operating room: implications for infection control. Am J Med Qual 2009;24:45-52.
3. Perez P, Holloway J, Ehrenfeld L, et al. Door openings in the operating room are associated with increased environmental contamination. Am J Infect Control 2018;46:954-956.
4. Healey AN, Sevdalis N, Vincent CA. Measuring intraoperative interference from distraction and interruption observed in the operating theatre. Ergonomics 2006;49:589-604

Specific Contributions

- Primary data collection at multiple sites
- Drafting of abstract

QUICK TIPS
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Using the template

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Using the placeholders

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