

QUESTION 6: Does shoe wear (i.e., operating room (OR) dedicated shoes, uncovered outside shoes, covered outside shoes) of the surgeon and OR staff affect the rate of surgical site infections/periprosthetic joint infections (SSIs/PJIs) in patients undergoing orthopaedic procedures?

RECOMMENDATION: There is little or no evidence to suggest that the use of dedicated OR shoes influence the rates of SSIs/PJIs. However, in view of the fact that shoes worn outside may be grossly contaminated, we recommend that outside shoes should not be worn in orthopaedic ORs, or shoe coverings should be worn to prevent the contact of outside shoes with the OR floors.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 94%, Disagree: 4%, Abstain: 2% (Super Majority, Strong Consensus)

RATIONALE

Though shoe soles are possible vectors for infectious disease, no studies currently exist directly linking shoe wear (OR only vs. outside shoes) with increased or decreased rates of SSIs/PJIs in patients undergoing orthopaedic procedures. However, published findings do suggest that OR shoes or OR over-shoes may be involved in the pathway of postoperative wound infection. In a study that assessed the level of bacterial contamination of OR shoes at the beginning and end of a working day and compared the results with outdoor footwear, findings showed the presence of pathogenic bacterial species responsible for postoperative wound infection on both shoe groups. However, outdoor shoes were the most heavily-contaminated. In addition, bacterial samples taken from OR shoes at the end of duty were less contaminated than those taken at the beginning of the day [1].

In a separate study that assessed bacterial floor colony counts in a general OR, use of OR over-shoes significantly increased colony counts, whilst non-use of over-shoes did not significantly increase colony counts [2]. However, there were no significant differences in mean bacterial floor colony counts when the two were compared. In another study that determined the effect of wearing shoe covers by medical staff and visitors on infection rates as well as the mortality and lengths-of-stay in an intensive care unit (ICU), use of shoe covers were not helpful in preventing infections of common ICU pathogens [3]. However, in the period when shoe covers were used, there were higher rates of infections compared to periods when shoe covers were not used. A study from the UK concluded that use of protective over-shoes was unnecessary for “day” surgery, which was classified as uncomplicated same-day surgical procedures, such as hernia repairs, varicose vein surgery and simple laparoscopy [4]. This poses an important question: should ambulatory versus inpatient ORs change our approach to shoe wear?

Conflicting findings have been reported. When OR floors were examined for contamination with and without the use of protective footwear, the results of the study performed by Copp et al. indicated that the use of over-shoes reduced the transfer of bacteria [5]. There is no evidence that outdoor shoes carry an increased risk of infection. However, it has been reported that the process of changing shoes or applying over-shoes can result in contamination of the hands of clinicians/surgeons [6]. In a study of 18 individuals whose hands were examined after contact with their over-shoes, findings showed that the organisms detected on their hands were likely to have been transferred from their outdoor shoes [7]. Ayliffe studied the role of the environment of the OR on postoperative wound infections. He noted that the use of surgical disinfectant mats, while proactive, may actually increase the number of organisms on the shoe soles of staff members entering the OR [8].

Based on the overall evidence, there is no evidence to support a direct link between shoe wear and the rates of SSIs and/or PJIs in patients undergoing orthopaedic surgery.

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