

QUESTION 5: Does surgical preparation of the skin on the whole limb instead of a partial limb reduce the rates of surgical site infections/periprosthetic joint infections (SSIs/PJIs)?

RECOMMENDATION: Surgical skin preparation of the whole limb may potentially reduce the risk of SSIs and/or PJIs by decreasing the risk of contamination associated with partial limb preparation. Despite the limited evidence, we recommend surgical skin preparation of the whole limb as there is a potential for contamination with partial limb skin preparation, and little downside to whole limb skin preparation.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 84%, Disagree: 12%, Abstain: 4% (Super Majority, Strong Consensus)

RATIONALE

SSIs and PJIs can be devastating and costly complications associated with joint arthroplasty [1–3]. As multiple variables are associated with SSIs and PJIs, considerable research has focused on reducing the rates of infections with the use of prophylactic antibiotics, utilization of laminar flow, various skin preparation solutions, medical optimization of patient risk factors, appropriate sterile techniques, etc.[4–9]. However there is a paucity of literature on partial versus whole limb skin preparation.

At the time of surgery, much effort is spent on sterile technique while prepping and draping the operative extremity to create a sterile surgical environment in an attempt to reduce the risks of SSIs and PJIs [10]. Often, surgical draping techniques are based on surgeon training and preferences rather than scientific evidences. Improper draping techniques may provide an opportunity for surgical field contamination [11]. One common extremity draping practice is to apply an impervious stockinette over a non-prepared foot rather than preparing the whole limb.

There are two potential sources of contamination associated with partial limb skin preparations: (1) potential bacterial contamination through the stockinette from strikethrough and (2) proximal bacterial migration from application of a sterile stockinette over a non-prepared foot.

Although the literature is limited, several small studies have evaluated partial versus whole limb skin preparation with conflicting conclusions. Bloome et al. assessed potential bacterial strikethrough utilizing an impervious stockinette over a non-prepped foot [12]. Of the twenty samples taken, only two grew one colony forming units of coagulase-negative *Staphylococcus*. Based on these findings, the authors concluded that strikethrough from a non-prepped foot is unlikely to be a significant source of contamination and therefore disinfecting the ipsilateral foot with a skin preparation solution is unnecessary.

Two other studies used either a fluorescent powder, or a non-pathogenic fluorescent *Escherichia coli* strain as a surrogate for contamination in order to evaluate proximal bacterial migration from application of a sterile stockinette over a non-prepped foot [13,14]. In both studies, the majority of extremities with a non-prepped foot had significant proximal migration of either fluorescent substance. The authors from both of these studies concluded that the application of a sterile stockinette over a non-prepped foot may be a source of proximal bacterial migration and, therefore, potential risk for surgical field contamination.

We propose that surgical preparations of the skin should include the whole limb given that the aim of this procedure is to reduce the microbial load on the patient's skin as much as possible. The prepared areas of the skin should extend to an area large enough to accommodate potential shifting of the drape fenestration, extension of the incision, potential for additional incisions as well as all potential drain sites. Despite our current knowledge about the antimicrobial activity of many antiseptic agents and application techniques, the best approach for surgical site preparation still remains unclear and further high-quality studies are warranted.

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