

## QUESTION 9: Does the use of cloth or impervious stockinettes around the ankle and extremity affect the rate of subsequent surgical site infections/periprosthetic joint infections (SSIs/PJIs) in patients undergoing orthopaedic procedures?

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RECOMMENDATION: In the absence of evidence, we propose that a stockinette always be used to cover the unprepared skin in order to prevent potential contamination of the surgical field. Impervious stockinettes may be more resistant to soaking through during the surgery.

LEVEL OF EVIDENCE: Consensus

DELEGATE VOTE: Agree: 89%, Disagree: 5%, Abstain: 6% (Super Majority, Strong Consensus)

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### RATIONALE

Bacteria are thought to inoculate surgical wounds via an airborne pathway or through direct contamination by the patient's natural flora. Skin flora is a common source of infections, which are why appropriate antimicrobial skin preparations are of great importance in the surgical theater. One common source of contamination is the foot. An impervious stockinette forms an impermeable barrier and is used to protect the surgical site from bacterial contamination. This is especially important because the feet are often held and handled by surgeons and assistants during hip and knee arthroplasty procedures.

Stockinettes are made of non-woven material and are designed for single usage. The efficacy of non-woven drapes in preventing contamination has been proven [1]. Stockinettes (cotton or impervious) are primarily designed to isolate foot microbes from the operative site, and additionally they provide circumferential coverage of the lower leg, including the popliteal fossa. There is no definite evidence in the form of a randomized controlled trial to suggest there are differences in deep or superficial infection rates with the use of a stockinette.

Another concern is whether the stockinette is used over a prepared or an unprepared foot. In 2012, Boekel et al. experimentally used fluorescent ultraviolet powder on volunteers and compared the contamination of the powder near the surgical site with below knee versus above knee application. The foot was not prepared and only the surgical site was disinfected. There was a significant proximal spread of the powder up to 71.8% proximally in the above knee application group. The most important conclusion from this study was that a stockinette should be used in conjunction with foot preparation [2].

This work was further tested by Marvil et al. in 2014, when non-pathogenic *E. coli* was applied to feet in cadavers and compared between the chlorhexidine prepared versus the unprepared foot with an impervious stockinette to mid-thigh level. Bacterial contamination at various sites including foot, ankle, 12 cm, 24 cm and 36 cm proximal to the ankle were assessed. In the non-prepared foot group, significant contaminations, as proximal as 24 cm to the ankle joint, were found, whereas no contaminations were found at any site in the prepared group. The merit of this study over the previous one was that the group used a non-pathogenic organism instead of a powder which may have had different adhesion characteristics [3].

In their recent review in 2016, Ratto et al. questioned the role of sterile stockinettes for the prevention of prosthetic joint infections [4]. The authors further highlighted the relevance of numerous preoperative, intraoperative and postoperative confounding factors that may have higher impact on causation of a deep infection. A 2014 study on glove contamination done by Makki et al. found that not a single incidence of glove contamination of the assistant who was holding the prepped foot with the stockinette occurred during prepping and draping [5]. Instead, the procedure of draping itself led to maximum incidences of contamination, especially with hip surgery. Thus, other aspects of draping could potentially be of more concern than the type of stockinette used with the antimicrobial prepared foot.

### REFERENCES

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