

## QUESTION 6: Does surgical skin preparation starting from the surgical site, proximal portion of the extremity or distal portion of the extremity affect the rate of surgical site infections/periprosthetic joint infections (SSIs/PJIs)?

---

**RECOMMENDATION:** Despite the absence of supportive evidence, we recommend starting skin preparation from the site of surgical incision and moving towards the periphery. In general, skin preparation should be performed from a less-contaminated towards a more-contaminated area. In the case of a draining sinus, the area around the sinus should be prepped at the end of the preparation process.

**LEVEL OF EVIDENCE:** Consensus

**DELEGATE VOTE:** Agree: 95%, Disagree: 3%, Abstain: 2% (Unanimous, Strongest Consensus)

---

### RATIONALE

Surgical skin preparation is one of the multiple steps implemented to minimize infections after surgical procedures [1]. Different techniques and antiseptic solutions are currently in use with proven efficacy for a number of agents. Skin preparation consists of application of an antiseptic solution to the surgical site and the surrounding areas. The most commonly-used antiseptics are alcohol-based solutions of chlorhexidine or povidone [2].

The process requires some mechanical effect (friction) for removing dead skin and bacteria from the surface of the surgical field, thereby reducing the number of viable bacteria.

Despite the lack of studies addressing the specific question cited above, reviews and guidelines are available recommending that skin preparation should start at the incision site and be directed towards the periphery [3–5]. In some guidelines/recommendations the use of concentric circles is recommended. It is commonly stated that the process should be directed from less to more contaminated areas, such as the foot, groin or the unsterile drape covering the tourniquet [4,6,7]. Including the entirety of the skin surface is important (for example, prepping the knee in full flexion and full extension can enhance the ability to obtain a thorough coverage of the intended sterile surgical surface areas) [8].

The amount of friction (force applied with the device soaked in antiseptic fluid against the skin), the number of applications over each area and direction are not specified in any guidelines or recommendations available to date. It is, however, known that sufficient time is required for an antiseptic solution to act on the surgical site allowing for maximum elimination of microorganisms [9]. Antiseptic agents have different action times and it is recommended that the manufacturer's instructions for each specific antiseptic be followed [10].

In the absence of specific studies addressing the above question, it is our recommendation that special attention be paid to preparation of the surgical site. The preparation should start from the surgical site, and then be directed to the periphery. It is also advisable to prevent the contact of the preparation sponge with more contaminated areas that could potentially transfer bacteria back to the surgical site.

### REFERENCES

- [1] Parvizi J, Cavanaugh PK, Diaz-Ledezma C. Periprosthetic knee infection: ten strategies that work. *Knee Surg Relat Res.* 2013;25:155–164. doi:10.5792/ksrr.2013.25.4.155.
- [2] O'Grady NP, Alexander M, Dellinger EP, Gerberding JL, Heard SO, Maki DG, et al. Guidelines for the prevention of intravascular catheter-related infections. *Am J Infect Control.* 2002;30:476–489. doi:10.1067/mic.2002.129427.
- [3] AORN. Guideline at a glance: skin antisepsis. *AORN J.* 2016;104:273–276. doi:10.1016/S0001-2092(16)30508-7.
- [4] Spruce L. Back to basics: surgical skin antisepsis. *AORN J.* 2016;103:95–103. doi:10.1016/j.aorn.2015.11.002.
- [5] Murkin CE. Pre-operative antiseptic skin preparation. *Br J Nurs.* 2015;18:665–669. doi:10.12968/bjon.2009.18.11.42718.
- [6] Illingworth KD, Mihalko WM, Parvizi J, Sculco T, McArthur B, El Bitar Y, et al. How to minimize infection and thereby maximize patient outcomes in total joint arthroplasty: a multicenter approach. *J Bone Joint Surg Am.* 2013;95.e50. doi:10.2106/JBJS.L.00596.
- [7] Dumville JC, Mcfarlane E, Edwards P, Lipp A, Holmes A, Liu Z. Preoperative skin antiseptics for preventing surgical wound infections after clean surgery. *Cochrane Database Syst Rev.* 2015;2017. doi:10.1002/14651858.CD003949.pub4.
- [8] Knoll PA, Browne JA. Prepping the knee in maximal flexion: getting into every nook, cranny, and fold. *Arthroplast Today.* 2016;3:99–103. doi:10.1016/j.artd.2016.08.004.
- [9] Echols K, Graves M, LeBlanc KG, Marzolf S, Yount A. Role of antiseptics in the prevention of surgical site infections. *Dermatol Surg.* 2015;41:667–676. doi:10.1097/DSS.0000000000000375.
- [10] Cowperthwaite L, Holm RL. Guideline implementation: Preoperative patient skin antisepsis. *AORN J.* 2015;101:71–80. doi:10.1016/j.aorn.2014.11.009.

