

## QUESTION 2: Should skin and hair around a planned surgical incision be removed? If so, what is the best method and timing of removal?

RECOMMENDATION: Hair at the surgical incision site should be removed immediately prior to surgery using clippers or depilatory creams.

LEVEL OF EVIDENCE: Consensus

DELEGATE VOTE: Agree: 84%, Disagree: 13%, Abstain: 3% (Super Majority, Strong Consensus)

### RATIONALE

Skin preparation prior to surgical incision has traditionally involved localized preoperative hair removal [1]. Despite a lack of statistical significances between the incidence of surgical site infections (SSIs) with and without hair removal, it is still utilized during total joint arthroplasty (TJA) [1–3]. A recent meta-analysis conducted by Lefebvre et al. included findings from 19 randomized controlled trials (RCTs). Six trials included in the analysis compared shaving with no hair removal and results showed that no hair removal was associated with a lower risks of SSIs [3]. Another study compared chemical depilation with no depilation, and one study compared clipping with no depilation. In both cases, no significant differences were observed in paired analyses [3].

A 2006 Cochrane Systematic review of preoperative hair removal (updated in 2011) analyzed a total of nine RCTs, and found no significant differences in SSI rates among patients with or without hair removal at the incision site prior to surgery. It is worth noting, however, that investigators acknowledged that the comparison was underpowered [2,4]. Despite conflicting evidence on whether or not hair should be removed preoperatively, there is rationale behind the practice which should not be discounted. Depilation is thought to serve as a precautionary measure to reduce the risk of hair entering the open wound during the procedure. Potentially adverse outcomes due to hair contamination at the site of incision include foreign body tissue reactions subsequent to mechanical irritation during the wound healing process and infections [5].

Methods for depilation around a planned surgical incision include shaving, clipping and chemical removal. In 2011, Tanner et al. performed an update to a Cochrane Review previously published in 2006. A total of 11 randomized controlled trials related to hair removal prior to surgery were identified. The meta-analysis found electric clippers and depilatory creams to be associated with lower rates of SSIs in comparison to shaving with a razor blade [2]. These outcomes are attributed to the microtrauma inflicted on the skin during the shaving process, which then creates a nidus for bacterial colonizations and subsequent SSIs [6,7]. Chemical hair removal is a suitable alternative to clipping, however, there has been conflicting evidence on its efficacy. Lefebvre et al. showed that chemical depilation was associated with fewer SSIs compared to shaving. In the same study, indirect comparison with clipping as the reference showed no significant differences with chemical depilation [3]. Increased lengths of time to complete chemical depilation and the potential risk for chemical irritation of the skin make its utilization less advantageous [1–3,8]. In light of these findings, it is highly recommended that hair depilation be completed with an electric clipper [5,9]. Support for clipping has been reinforced by RCT results from Cruse and Foord, Alexander et al., Balthazar et al., Ko et al. and Taylor and Tanner [9–13].

In accordance with findings from the previous International Consensus Meeting, current literature lacks evidence to support an optimal time for hair removal [14]. Alexander et al. examined hair removal the night before and the morning of operations across a variety of surgical disciplines using both shaving and clipping. Excluding stitch abscesses, rates were lowest in the morning clipper group (at discharge:  $\chi^2 = 4.894$ ,  $p < .027$ , at 30 days:  $2 = 7.439$ ,  $p < .006$ ) [9]. In an RCT of 798 patients undergoing spinal surgery, Celik and Kara found that shaving (with a razor) of the incision site, immediately before spinal surgery, may increase the rate of postoperative infections over not shaving at all [15]. According to a network meta-analysis of 19 randomized control trials conducted by Lefebvre et al., differences in outcomes based on timing of depilation were not statistically significant enough to conclude when hair should be removed prior to surgery [3]. If hair removal is to be done prior to surgery, it should be completed as close to the time of surgery as possible by either the surgical team or the trained nursing staff [1,3,6–9,14]. Though there is an overall lack of research specific to the environment in which preoperative hair removal should take place, it is recommended that it take place outside of the operating room, if practical [5,14,16].

Given what has been published to date, definitive evidence to dictate hair depilation practices with greater statistical significance is desired. Based on what has been established in the literature, it is recommended that hair be removed at the site of incision with depilatory creams or clipping shortly before the operation or outside of the operating room. This practice should be followed out of necessity and not routinely. If hair around the site of surgical incision does not interfere with the operation, it should not be removed due to the potential risks of skin and wound contamination.

### REFERENCES

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