

**Evidence-Based Practice Group Answers to Clinical  
Questions**

**Lower limb stump  
and  
subcutaneous infections, cysts, folliculitis**

**A Rapid Systematic Review**

By

**WorkSafeBC Evidence-Based Practice Group**

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## About this report

# Lower limb stump and subcutaneous infections, cysts, folliculitis

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### About the Evidence-Based Practice Group

The Evidence-Based Practice Group was established to address the many medical and policy issues that WorkSafeBC officers deal with on a regular basis. Members apply established techniques of critical appraisal and evidence-based review of topics solicited from both WorkSafeBC staff and other interested parties such as surgeons, medical specialists, and rehabilitation providers.

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## Objective

To explore whether there was a change in the number of reported lower limb stump subcutaneous infections, cysts, and folliculitis in recent years and if so, to identify newly emerging treatment approaches

## Methods

- A systematic literature search was conducted on March 7, 2019
- Commercial medical databases that are available through the OvidSP interface, including Cochrane Central Register of Controlled Trials (February 2019), Cochrane Database of Systematic Reviews (2005 to March 6, 2019), Database of Abstracts of Reviews of Effects (1st Quarter 2016), Health Technology Assessment (4th Quarter 2016), Embase (1974 to 2019 March 06), Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily (1946 to March 06, 2019) were searched
- The search strategy included selected keywords combined using Boolean Operators (AND /OR) as appropriate

[lower limb OR lower extremity] AND [stump OR amputation stump OR amputation site]

### AND

[subcutaneous infection OR cyst OR folliculitis]

- Nine citations were located
- After removal of duplicates seven citations remained<sup>1-7</sup>
- When the titles and abstracts for these seven articles were screened; four of them were found to be irrelevant and remaining three were retrieved in full text<sup>1, 2, 7</sup>

## Results

- **Skin problems of the stump and hand function in lower limb amputees: A historic cohort study** (Baars, 2008)<sup>1</sup> → Baars et al. conducted a retrospective chart review to study skin problems related with stump and found that impaired hand function was the most important variable among various factors. They reviewed sixty trans-tibial and knee disarticulation amputees, from June 1998 to May 2006, from a single rehabilitation centre in Netherlands. The authors highlighted the importance of 'careful donning' with silicon liner sockets and even distribution of the liner over the stump (to avoid possible creasing of the liner and air trapping that may lead to increased skin problems). Out of 60 amputees 70% had liners with their first prosthesis and 83% of these liners were made of silicon. Overall, 38% of the amputees reported liner-related skin problems. Out of all factors for which data was available for, impaired hand function was the only one that seemed to be significantly associated with liner-related skin problems ( $p=0.035$ ). As such, 70% of the 10 amputees who sustained hand impairment and 32% of the 50 amputees who did not, reported liner-related skin problems. Authors acknowledged the limitations of their study. For example, age/quality of prosthetic liners were not known, no information was available for minor skin problems, hand dominance was not known for all amputees and hand function was assumed clinically, but was not measured. (Level of evidence 4. Appendix 1)
- **Skin problems in lower limb amputees: An overview by case reports** (Meulenbelt, 2006)<sup>8</sup> → The authors undertook a systematic review of case reports, which highlighted lower limb amputees with skin problems on the stump. They searched the databases MEDLINE, EMBASE, CINAHL, and RECAL until 2005, with selected MESH headings and text words; and identified 56 reports with 76 cases. They classified reported skin problems into eight categories based on physical presentation and aetiology (e.g., acroangiodermatitis, allergic contact dermatitis, bullous diseases, epidermal hyperplasia, hyperhidrosis,

infections, malignancies and ulcerations). After summarizing their findings in each category the authors stated that development of a skin problem might be related with various factors. For example, the cause of amputation, or comorbid conditions (e.g., vascular problems, diabetes, malignancy), prosthesis related factors (e.g., new prosthetic components and materials emerged – suction socket prosthesis, silicon liners, etc.). The authors mentioned the limitations of their systematic review as some potential bias were existent in the primary case reports. For example, writing bias (authors of the case studies choose to write only certain cases), publication bias (journal reviewers'/editors' decision on publishing a case report), and selection bias (difficulty for review authors to find every published case study with search strategies). The authors concluded that prosthetic choices/applications had a major influence on manifestations of skin problems in lower limb amputees. (Level of evidence 2. Appendix 1)

- **Long Term Effects of Prostheses on Stump in Lower Limb Amputees: A Critical Analysis of 100 Cases** (Bhandari, 1996)<sup>2</sup> → The authors conducted a chart review study of 100 consecutive patients (January 1990 to December 1990) who were wearing prosthesis for over 5 years and were admitted to their centre for a new prosthetic. For 73% of the patients trauma (including work-related injuries) was the cause of amputation. There were five cases of tissue destruction, five cases of tissue proliferation, three cases of contact dermatitis, four with recurrent folliculitis, and three with bursa formation. Four patients developed circulatory changes and one experienced eczematous changes. The authors stated that rubbing and pressure by the prosthetics may lead to scaling, edema, fissuring or erosion; and some patients might have less tolerant skin than others. They also suggested that sweat around the stump skin leads to a warm/moist environment in which many bacteria may flourish. The formation of post-traumatic epidermoid cysts (freely movable under the skin) were also noted. The authors concluded via highlighting the importance of proper stump hygiene to avoid possible related conditions. (Level of evidence 4. Appendix 1)

## Summary

- This systematic review did not locate any high quality studies either referring to a change in the number of subcutaneous infections, cysts, and/or folliculitis in lower limb stumps, or any emerging treatment approaches in recent years
- All three articles collected in full text were outdated (e.g., 2008, 2006, 1996)
- Development of skin lesions in lower limb amputees may be due to various factors. For example, the cause of amputation, preexisting conditions prior to amputation, prosthesis related factors, general stump hygiene, and even impaired hand function

## References

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## Appendix 1

### WorkSafeBC - Evidence-Based Practice Group Levels of Evidence

(adapted from 1,2,3,4)

<b>1</b>	Evidence from at least 1 properly randomized controlled trial (RCT) or systematic review of RCTs.
<b>2</b>	Evidence from well-designed controlled trials without randomization or systematic reviews of observational studies.
<b>3</b>	Evidence from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group.
<b>4</b>	Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled
<b>5</b>	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.

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