When should patients begin ambulating following lower limb split skin graft surgery: a systematic review

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CRD summary
The review summarised the effects of early ambulation in patients with lower limb split skin graft surgery. The literature suggested that patients should start walking early after surgery (no adverse effects on wound healing and graft take). However, as most studies were uncontrolled and poor quality, it is unclear to what extent the conclusions are supported by the data presented.

Authors' objectives
To determine when patients should begin walking after lower extremity skin graft surgery, with respect to graft healing, duration to discharge, post-operative complications, functional outcomes, quality of life and patient satisfaction.

Searching
The following databases were searched: AMED (1985 to February 2006), CINAHL (1982 to February 2006), EMBASE (1974 to February 2006) and MEDLINE (1951 to February 2006). Search terms were listed. Reference lists of identified articles were also searched. This was supplemented by handsearching of the British Journal of Plastic Surgery, the Annals of Plastic Surgery, and Physiotherapy (1980 to February 2006). Unpublished studies and articles not published in English were excluded.

Study selection
Clinical trials investigating the effects of ambulation in patients with lower limb skin graft surgery were eligible for inclusion. The review evaluated immediate ambulation and ambulation from one day to more than one week post-operatively.

The trials included patients with lower limb split skin graft surgery subsequent to burns, pretibial lacerations, lower limb venous ulcers, diabetic heel ulcers and excision of malignant melanomas. Patients in the study had an age range from 0 to 89 years.

No specific requirements for outcome assessments were stated. The review reported a variety of outcomes including graft take, hospital stay, and less commonly activity and functional levels.

A single reviewer performed the literature search and study selection.

Assessment of study quality
The quality of the included studies was determined by a single reviewer using the PEDro (Physiotherapy Evidence Database) scale.

Data extraction
A single reviewer extracted the data, which included study design, population characteristics, average wound size, surgical and post-operative interventions, outcome measures, follow-up period and results.

Methods of synthesis
Studies were summarised narratively in tables and text. No meta-analysis was carried out. The studies were classified by the earliest post-operative day that ambulation was started.

Results of the review
Seventeen trials were included (n=730).

From the tables it appeared that nine studies were retrospective reviews, four were observational studies, and four were
randomised controlled trials. However, the text indicated that only three studies were RCTs. Sample size ranged from nine to 100. Study quality was generally poor with PEDro scores ranging from 0 to 5. Methodological flaws included small sample size, lack of control group and absence of reporting of statistical tests.

Nine studies investigated immediate ambulation in patients with skin grafting for various reasons. The only RCT did not find a significant difference in graft take (93% versus 90%) in patients with one week's bed rest compared to immediate ambulation. Two studies reported on hospitalisation; one study was maximum hospitalisation was four days; in the other study, 64% of patients were discharged after 3 days and 81% were discharged after one week. Two studies reported on function, with all patients in one study achieving full joint range of movement, and patients in the other study walking independently 30ft by 1.7 days post-operatively. Studies reported graft take of 100% in between 67 and 100% of patients (seven studies) after varying periods of time (range where reported 15 days to three weeks).

Five studies investigated the effects of commencing ambulation one day after lower limb graft surgery. Two RCTs reported no difference between early and late ambulation (at five days and 10 days) in graft healing rates (one study), or mean time to graft take and hospital stay (one study that did not report statistical values). One study reported no difference in wound healing between ambulation one day post-operatively and bed rest. Of the remaining uncontrolled studies, one reported a range of 85 to 100% (average 97%) for graft take; the other reported that graft take was 90 to 100% complete in 80% of patients. One study had an average hospital stay of 0.9 days (range 0 to 3), the other of 3.8 days.

One study found complete healing in 50% of patients after two weeks when commencing ambulation two days post-operatively, with complete healing in all patients after six weeks. One study found significantly shorter durations of bed occupancy for patients commencing ambulation after nine days, compared to those commencing ambulation after 11 or more days (12.5 days versus 18.6 days, p<0.05).

**Authors' conclusions**
The results of the review suggest that patients with lower limb skin graft surgery should begin walking immediately or as soon as possible after surgery. While this may not improve wound healing, it does not seem to jeopardise graft take significantly. However, the conclusions are based on evidence of limited quality and should therefore be treated cautiously. Further research is required.

**CRD commentary**
This review had clearly stated inclusion criteria. A thorough search of electronic databases was carried out and supplemented by additional searching. However, limitation to published studies and studied published in English may have led to omission of relevant data and language bias. Study selection, quality assessment of studies and data extraction were described, but were conducted by a single reviewer which may have introduced some bias. Characteristics and quality of studies were tabulated in detail. Results were summarised narratively, study by study, without attempting any more global classifications (other than by earliest day of ambulation) and no systematic overall summary. In view of the diversity among studies, a narrative synthesis was appropriate. However, attention was not drawn to higher quality evidence. Most studies were uncontrolled and it was not always clear to what extent these studies distinguished between varying times to ambulation and to what extent they were suitable for assessing any effect of early versus later ambulation. Additionally, most studies were small and of low quality. It is uncertain to what extent the conclusions are substantiated by the results shown.

**Implications of the review for practice and research**
Practice: The authors did not make any implications for practice.

Research: The authors state that a well-conducted randomised controlled trial is needed to determine the effectiveness of early ambulation in patients with lower extremity skin graft surgery.

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