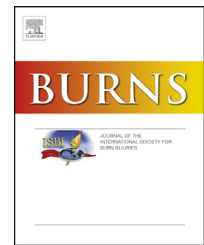


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# Early ambulation after-grafting of lower extremity burns

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## ABSTRACT

**Objective:** Early ambulation of lower extremity burns that undergo a skin graft may help to avoid some of the complications associated with immobilization. Despite recent evidence supporting early ambulation, post-operative immobilization following lower extremity skin grafting is still a common practice. The purpose of this study was to retrospectively assess the outcomes of lower extremity skin graft cases dressed with a multi-layer compression bandage who were ambulated in the immediate post-operative period.

**Methods:** This single centre observational study examined patients with a lower extremity burn that received a compressive dressing (Profore™) application immediately after surgical grafting and were ambulated no later than 1 day post-operatively.

**Results:** Forty-two burn patients (47 limbs) met inclusion criteria for this study. Of these 42 patients, 25 were operated on as an inpatient. The remaining 17 patients were done on an outpatient basis and discharged the same day of surgery. Mean patient age was 48.2 years and 34 (81.0%) of patients were male. Mean TBSA affected was 5.3% (792 cm<sup>2</sup>). Mean number of procedures was 1 and mean graft take was 98.9%. Nearly all patients were ambulated within 1 day of surgery. The graft take rate across all cases was 98.9 ± 2.3%. No patients failed early ambulation with their compressive dressings, were readmitted or underwent repeated skin grafting.

**Conclusions:** This study demonstrates the excellent graft take rates that can be achieved with immediate ambulation following lower extremity skin grafting and challenges the conventional teaching of post-operative bed rest following lower extremity skin grafting procedures.

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## 1. Introduction

Despite guidelines and randomized controlled trials that support early ambulation, immobilization and elevation

following grafting of lower extremity burns continues to be common practice [1]. A survey by Nedelec et al found that 50% of burn centres did not routinely practice early ambulation after lower extremity skin grafting [2]. The reasons for the continuation of these immobilization practices in the face of

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evidence supporting early ambulation, appears to be the fear of graft failure or loss due to hematoma formation and shearing resulting in a lack of graft adherence [3-7]. It is well known that immobilization is not without potential harm and can lead to associated morbidity, such as decreased range of motion, physical de-conditioning, lack of independence in activities of daily living, an increased risk of deep vein thrombosis and pulmonary embolism. Early ambulation may also reduce the risk of thrombo-embolism [8]. These complications can result in prolonged hospital stay and the increased costs associated with these hospital admissions. This conservative approach to ambulation with prolonged periods of bedrest requires a significant amount of hospital resources [3,9]. With the recent emphasis on moving minor surgeries to an outpatient setting [2], early ambulation can allow the treatment of a significant proportion of isolated leg burns as a day surgery saving substantial costs to the healthcare system.

## 2. Objective

The objective of this study was to examine if it is possible to safely and effectively treat lower extremity burns with early ambulation after debridement and grafting. We hypothesize that the use of a compressive dressing as a tool facilitates outpatient surgery for these procedures without significant graft loss.

## 3. Methods

### 3.1. Patient population

Following local ethics approval, we reviewed patients  $\geq 17$  year old admitted to our regional burn centre from July 2007 to June 2013 who underwent skin grafting for a lower extremity burn. This study incorporated patients with burns of the lower leg that received Profore compressive dressing for the below-knee portion (Fig. 1). One patient with an injury due to necrotizing fasciitis affecting a single limb was included. Patients with a history of lower extremity vascular disease, previous injury to the lower extremity or burns greater than 30% TBSA were excluded from the study. The following de-identified patient data was recorded:



Fig. 1 – Foot with Profore™ in place.

- 1) Demographic: gender, age.
- 2) Injury-specific: total body surface area (TBSA) affected (% and  $\text{cm}^2$ ), anatomical location of injury, whether or not the graft crossed a joint surface (ankle).
- 3) Outcomes: days from surgical coverage to discharge, days to ambulation, days to discharge from hospital, graft take rate (%).

### 3.2. Surgical methods and dressing protocol

The standard at our centre is to do a one stage excision and grafting as soon as the wound depth has declared. For smaller burns (<10% TBSA) the majority of distal lower extremity surgery is done on an outpatient basis. The patients are treated as outpatients while waiting for the depth to declare, unless there are extenuating circumstances. Due the challenges in transport there can be a delay until initial assessment at the regional burn centre. If the patient is already admitted they are discharged one to two days post operatively. The exceptions to this are those individuals who are transferred from out of town and have no local residence or those with significant comorbidities and psychosocial issues delaying discharge. The wound bed was prepped with tangential debridement prior to coverage with a meshed split thickness skin graft. The grafts were harvested using a Zimmer dermatome at 10-12/1000in. and meshed at a 1.5:1 ratio. The grafts were held in place using staples or sterile surgical tape, and dressed with silver nanocrystalline impregnated gauze followed by the compressive dressing. As we are unable to procure an Unna boot [6], for the compressive dressing we used Profore™ dressing (Smith & Nephew, Mississauga, Ontario, Canada). Profore™ is a multi-layer compression bandage system that is otherwise used for venous stasis ulcers. It is clean not sterile, inexpensive (approximately \$30 CDN), and is easy to apply. The dressing is placed at the time of surgery and left intact for five to seven days. There are no restrictions placed on the patients' ambulation and they are advised to weight bear as tolerated. Where possible, the surgery is done as day surgery and the patient is seen in clinic for initial dressing changes and removal of staples. Analgesic is given in the form of oral narcotics, supplemented with an NSAID. The same burn surgeon evaluated the percentage of graft take on the initial dressing change and any subsequent clinic visits.

### 3.3. Data management and statistical analysis

Patient information was entered into a database created using FileMaker Pro 12 software (Apple, Cupertino, CA, USA) and statistical analysis was performed using SPSS version 22 software (IBM, Chicago, IL, USA). Descriptive statistics were obtained for all variables and are presented as mean  $\pm$  standard deviation and range or N (%).

## 4. Results

Forty-two patients (47 limbs) met inclusion criteria for this study (Table 1). Of these, 25 were operated on as an inpatient basis whereas 17 were done as outpatients and were

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