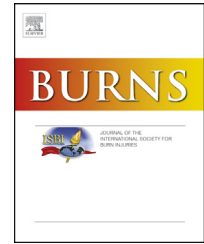


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# Split thickness skin graft meshing ratio indications and common practices

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## ABSTRACT

**Background:** Split thickness skin grafting is a commonly used technique in burn surgery for resurfacing wounds that are unlikely to heal without scarring. Meshing and expanding skin grafts allow for reconstruction of larger wounds with smaller donor sites.

**Methods:** A retrospective chart review was performed of 210 patients with burns equal to or greater than 20% total body surface area admitted to Vancouver General Hospital between 1998 and 2014. Charts were reviewed to collect data on patient and burn demographics. A survey was sent to Canadian plastic surgeons registered with the CSPS to collect data on common practices in burn surgery nationwide.

**Results:** The patients that received 3:1 or higher meshed grafts were all flame burns, had a significantly higher average TBSA ( $51.89\% \pm 14.87$  vs  $29.13\% \pm 9.48$ ,  $p=0.001$ ), and a significantly higher full thickness burn TBSA ( $25.76\% \pm 21.97$  vs  $6.20\% \pm 9.04$ ,  $p=0.001$ ). We found no significant differences in gender, age, or burn location between the less than 2:1 and 3:1 or greater meshing ratio groups. The survey of plastic surgeons performing burn surgery in Canada revealed that 60% of responders had experience with skin grafts using meshing ratios of 3:1 or higher. Of these surgeons, 100% felt that burn size and 36% felt that burn location would influence their decision to use a 3:1 or higher meshing ratio.

**Conclusions:** A larger burn size is the major influencing factor for the use of higher skin graft meshing ratios by Canadian burn surgeons. Furthermore, burn location determines the choice of donor and recipient sites in these cases.

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## 1. Introduction

Skin transplantation has a fascinating history and evolution from a humble beginning roughly 3000 years ago in India [1–3]. In this modern age, technological advances have popularized skin graft use for resurfacing of traumatic or chronic wounds by many medical specialties [4–6]. However, a pitfall of skin grafts is the creation of a secondary wound of identical size in the form of a donor site. Although this donor site is harvested

as a split-thickness skin graft and therefore heals with less scarring, it does not eliminate scarring entirely [4–10]. In 1958, the first method for skin graft expansion was developed by Meek in the form of small postage stamp sized islands of graft spread over the recipient site [11]. In 1964, the Meek method was discontinued in favor of the new meshing technique invented by Tanner et al. [12]. To this day, surgeons use specialized meshing devices to expand harvested skin grafts to available ratios of 1:1, 1.5:1, 2:1, 3:1, 4:1, 6:1 and rarely to the maximum possible ratio of 9:1 [13,14]. Skin graft expansion

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allows for smaller donor sites per recipient area grafted. This in turn allows for immediate grafting of larger surface area wounds such as severe burns where limited donor areas are available. In addition to this primary benefit, skin graft meshing also reduces skin graft failure due to hematoma or seroma formation. However, disadvantages of meshing include an increased risk of failure due to shear forces and a less favorable cosmetic outcome (Fig. 1) [4-9].

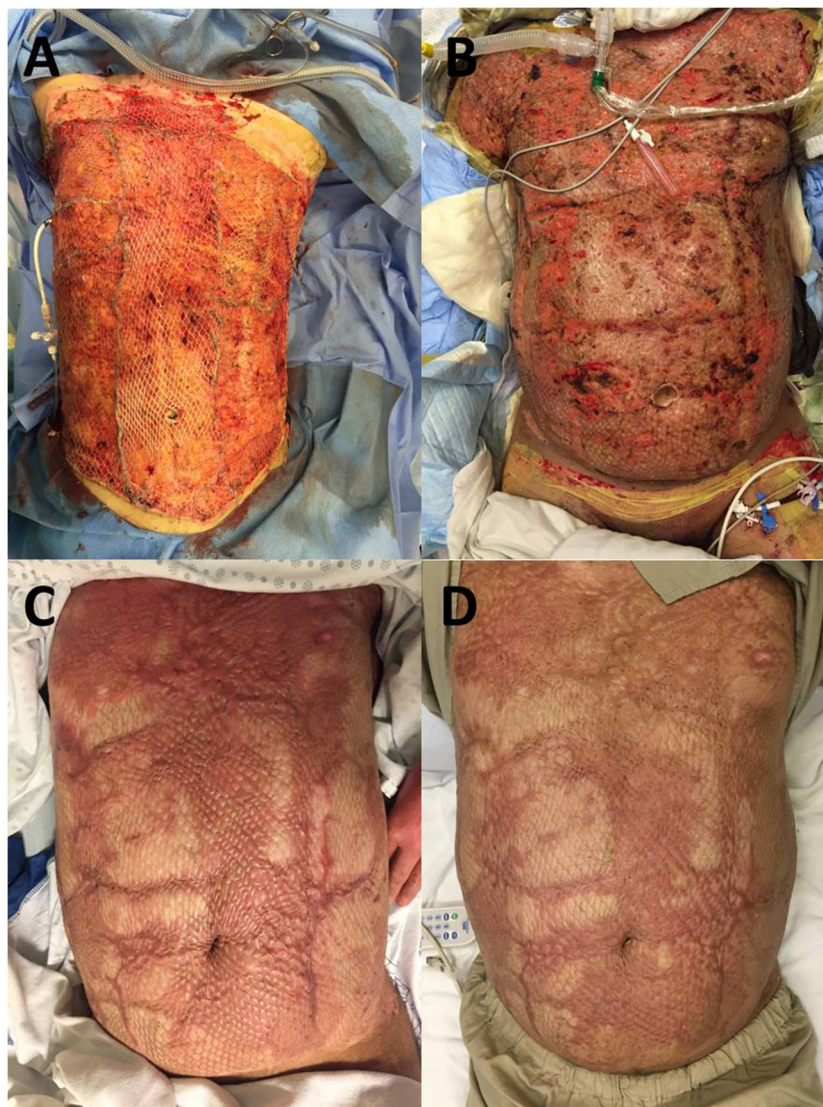
Many studies have been published with creative approaches toward improving higher skin graft meshing ratios in order to maximize the benefits and reduce the risks associated with these grafts [15-23]. However, with the rapid global acceptance of the skin graft meshing technique, there have been no studies reporting specific indications for the use of a certain ratio over another. This decision is left to the surgeon based on their individual experience and comfort with meshed grafts.

We present a retrospective chart review of 210 patients with burns greater than or equal to 20% TBSA to identify common indications for the use of 3:1 or higher meshing ratio. Additionally, a questionnaire was sent out to Canadian plastic surgeons to identify common meshing ratio practices across the country.

## 2. Methods

### 2.1. Retrospective chart review

The Vancouver General Hospital burn database was accessed to identify patients that were admitted with burns greater than or equal to 20% TBSA between 1998 and 2014. All charts were reviewed by a single reviewer. Data collected included patient age, gender, and burn details such as etiology, size,



**Fig. 1 – A 34-year old male with 60% TBSA flame burn treated with 3:1 meshed split thickness skin graft and healing over time at (A) immediately post operatively, (B) 2 weeks, (C) 5 months, and (D) 1 year.**

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