

Updated Classification of Skin Substitutes

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Sir,

Skin substitute is used as temporary skin cover to buy time until patient is prepared for skin grafting or cultured keratinocyte is available. The added advantages are reduced pain and accelerated wound healing in superficial wounds. Also, this is usually readily available.

Skin substitute could be biologic, synthetic, or biosynthetic materials and can be used to optimize the wound condition for resurfacing by autologous skin graft or keratinocytes.¹

Various types skin substitutes have been classified in three broad classes by Kumar.² Class 1 skin substitute described by Kumar² includes temporary dressing materials that prevent bacterial invasion, reduce evaporative water loss, and provide moist healing environment for better healing. However, there is a risk of infection and accumulation of exudate underneath it leading to untoward consequences^{3,4} (► **Fig. 1**).

Limited-access dressing (LAD, a combination of moist healing and intermittent negative pressure dressing)⁵ also has all the properties of Class 1 skin substitute with advantage of negative pressure that prevents collection underneath the cover, takes care of infection,⁶ and provides favorable wound environment for wound healing/faster wound preparation for surgical intervention (► **Fig. 2**).

Hence, it will be better to update the Kumar's classification² as below:

- **Class 1 Skin substitute:**

- A. *Temporary impervious dressing materials without negative pressure*

1. Single-layer material:

- i. Naturally occurring membrane/cover as biological dressing substitute, for example, amniotic membrane, potato peel.
- ii. Single-layer synthetic skin dressing material substitute, for example, synthetic polymer sheet

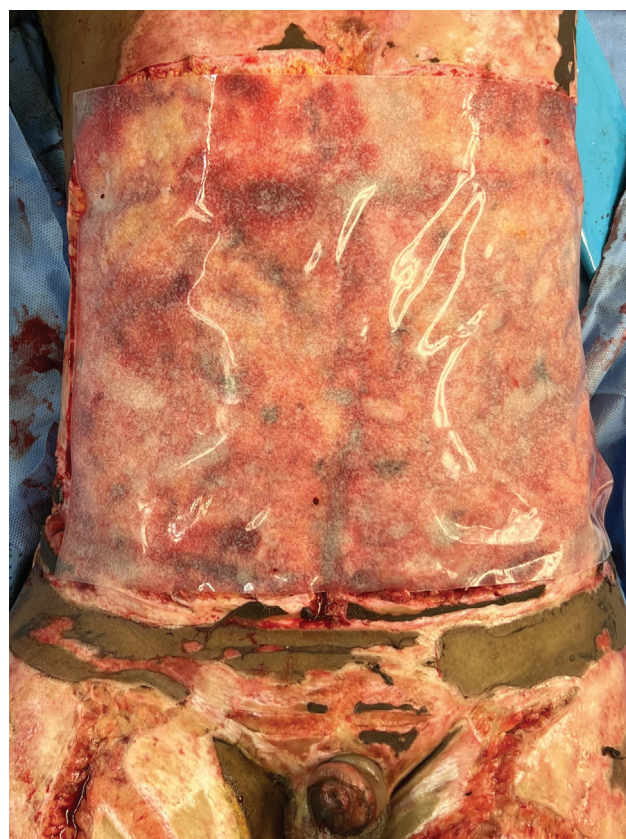


Fig. 1 Photograph of a burn patient showing collection of secretions/pus under bilayer skin substitute applied over abdomen and lower part of chest.

(Tagaderm, Opsite, Derma film, Vygon (UK) Ltd, Swindon, UK); polymer foam/spray.

2. Bi-layered tissue engineered material (e.g., Transcyte that separates spontaneously after healing or needs surgical intervention for healing).

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Fig. 2 Photograph of a burn patient showing burn wound of upper extremity (A) that was covered with limited-access dressing (LAD) (B). Condition of the wound (C) after 12 days of LAD application. Polyethylene of LAD acts as skin barrier preventing wound infection and reducing evaporative loss. Negative pressure of LAD removes any collection underneath it and takes care of infection.

B. *Temporary impervious dressing materials with negative pressure*: for example, LAD without interface material like sponge used in vacuum-assisted closure therapy. Under LAD collection will be removed by negative pressure and also, it will prevent/clear infection leading to healing or requiring further surgical intervention for healing.

- **Class 2 Skin substitute**—Single-layer durable substitutes:
 - i. Epidermal substitutes.
 - ii. Dermal substitutes (bovine collagen sheet, porcine collagen sheet, bovine collagen matrix, e.g., MatriDerm, human collagen matrix, e.g., Alloderm).
- **Class 3 Skin substitute**—Composite skin substitutes
 - i. Skin graft (allograft-cadaver skin, Xenograft-pig).
 - ii. Bioengineered skin (Integra, Biobrane, Nevelia).

Conflict of Interest

None declared.

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