

Introduction

Skin grafting is a fundamental method to repair skin defects and heal chronic wounds. Graft fixation and maintaining the wound environment is essential to the success of split or full thickness skin grafting. Skin grafts survive the first 24-48 hours as the result of serum imbibition. The graft is bathed in serum from the wound that supplies its nutrients via capillary action keeping the graft alive. Fixation methods prevent shear and slipping of the graft so as to hold it secure on the wound bed. Fixation allows the process of inosculation to occur as capillary buds in the wound bed align and grow into the vascular channels of the graft. Both of these processes are important for graft success and prevent graft loss.

Hypothesis

A new powder wound dressing technology can be utilized to "anchor" a meshed autograft or bio engineered skin substitute** in place on a wound without the use of fixation such as sutures or staples.

Materials and Methods

Transforming powder dressing was used to fix split thickness skin grafts and bio engineered skin substitutes. Skin grafts were harvested at 0.012 to 0.015 inch. The grafts were meshed 1:1.5 and applied to the wound bed. Transforming powder was applied and aggregated fixing the grafts in place. Skin grafts were checked at weekly intervals until graft take was assured and documented.

Bio engineered skin substitute was meshed 1.5:1 and applied to wounds. The graft was fixed with transforming powder dressing. Wounds were followed at weekly intervals. If necessary, Bioengineered skin substitutes can be re-applied at 2 week intervals.

The technique was tested on two cases involving autologous mesh grafts harvested as 0.015 inch thick split thickness grafts. One case was a debrided third degree burn on the dorsal left foot. The second case involved a surgical excision where the graft did utilize limited suture fixation. In both cases with autologous grafts, the transforming powder dressing was not changed after application.

The technique was tested on two cases where living skin equivalent was meshed and applied directly to a debrided venous ulcer or DFU. In these cases, the powder dressing was left in place over the living skin equivalent for two weeks then the wound was cleaned and a new application of living skin equivalent was applied to the wound with another application of transforming powder dressing.



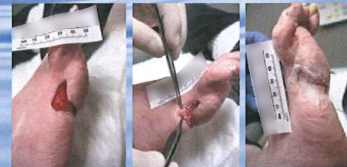
Case 1: Third degree burn debrided and treated with 0.0015 in ch split thickness skin graft meshed 1:1.5. Sutures and clips were not applied to this graft.



Case 2: Surgical excision site grafted with 0.015 inch autologous split thickness skin graft meshed 1:1.5. Sutures were used to anchor the edges of the graft.



Case 3: Venous Stasis Ulcer treated with Living Skin Equivalent fixed in place using Transforming Powder Dressing.



Case 4: Diabetic foot Ulcer treated with Living Skin Equivalent fixed in place with Transforming Powder Dressing. Patient was offloaded with a contact cast.

CONCLUSIONS

Transforming powder dressing can be employed as a method of graft fixation for both split thickness skin grafts and bioengineered skin substitutes. Whether applied in the operating room using split thickness skin grafts or in the clinic with bio engineered skin substitutes, the material remained in place with the grafts. The grafts were meshed and the powder material filled the spaces in the graft and securing it in place.

This method simplifies the use of bioengineered skin substitutes in the clinic setting and avoids problems with disturbing the grafts with dressing changes. Maintaining the moist wound environment without fluid build up is an important aspect of grafting and a material that optimizes the wound moisture while securing the graft in place can be beneficial. Graft take can be improved and optimize the effectiveness of these commonly used wound care products.

One other important finding from this study is that this technique of graft fixation can be used under compression wraps or in conjunction with contact casting.

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 ** Apligraf ©-Organogenesis Inc.