Bioengineered Skin Substitutes For Chronic Wound Healing
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Abstract—Over the past 30 years, bioengineered skin substitutes have proven to be a great development in the field of advance wound management.[1] Initially designed for burn application, they have been discovered to have a wider application. With a dramatic increase in chronic wounds in a aging population, skin substitutes had a apparent need. [1]

I. INTRODUCTION

Bioengineered Skin substitutes have the potential to dramatically impact skin wound therapy. Skin substitutes were first used in experimental wound therapy. Skin substitutes were first used in experimental wound therapy trials in the early 1980s.[1] Since then, they have evolved and new application and design methods have been discovered. Skin substitutes, now, have the ability to help with wound healing and increase recovery time.[1] Tissue-engineered skin substitutes can be used for temporary or permanent wound covering.

II. METHODS

Tissue engineering of skin substitutes are constructed with three components. The first components to be constructed is the cell source.[2] Keratinocytes are cultured and a variety of cell and double mediators are tested in different combinations until the desired strength is achieved.[2] The second and third components are tissue-differentiation-inducing substance and a matrix.[2] Both of these components have to be customized to the cells and cellular combination from component one.

III. RESULTS

Clinical trials have been conducted on skin substitutes extensively because of the apparent need for the product. In severe burn study, eighty-four percent of the patients had mature vascularized dermis regeneration over a six to twelve month period.[3] In another study, patients with seventy-eight percent total body burns had a ninety percent survival rate.[3] In terms of ulcers, forty-seven percent of of patients who had venous leg ulcer had healing at 6 months.[4] In another clinical study, thirty-nine percent of patients in a control centered clinical study had complete wound closure. The results for skin substitutes are impressive.

IV. DISCUSSION

Although a lot of clinical research has been conducted on skin substitutes, there area lot of improvements that can still be made. A couple disadvantages are cost, shelf life, fragility, and the need for custom preparation.[4] In terms of cost, the treatment cost is more expensive than most insurance are willing to pay for.[2] The reduction in cost could make this treatment plan more available to everyone. The shelf life of these products could be extended as well by more effective cell preservation methods.[2]

REFERENCES