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Extensive Severe Burn Treated With Enzymatic Debridement and Microdermagrafting: Case Report

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IN JULY 1958 a 37-year-old woman was admitted to the Aiken County Hospital suffering from second and third degree burns covering approximately 80 per cent of her total body surface. The injury was sustained when she was wrapped in a kerosene saturated blanket and the blanket was ignited. She was treated initially for relief of pain and with shock preventative measures. Utilizing the open method, enzymatic debridement was carried out and skin grafting accomplished by microdermagrafts.

Case Report

A 37-year-old woman was first seen in the Emergency Room of Aiken County Hospital with extensive second and third degree burns. She was given 100 mg. of meperidine hydrochloride for relief of severe pain. Dermaplast was sprayed on all involved areas in an attempt to seal the wounds and help ease pain. No attempt at debridement was made at this time. An 18-gauge needle was inserted in an available vein and isotonic saline started. Whole blood was given as soon as available. One cc. of mephentermine sulphate, 80 units of ACTH, and 50 mg. of 11-dehydro-17-hydroxycorticosterone-21-acetate, were given to combat shock. Nasal oxygen was started. The patient was then admitted to the hospital and placed on a Stryker frame covered with sterile sheets. She was turned every three hours. An indwelling urinary catheter was inserted and a close watch maintained on urinary output. A venesection was performed and a sterile polyethylene catheter placed in a vein. Continuous infusion was given for the next five days, after which time, intake by mouth was adequate, and she was started on a high calorie, high protein diet. Antibiotics and multiple vitamins were given. Medical debridement was begun on the fourth hospital day. Streptokinase-streptodornase jelly was used for the first forty-eight hours after which the patient was washed with Septisol, rinsed with sterile saline, sprayed with Dermaplast, and involved areas covered with trypsin, chymotrypsin, and 9-aminoacridine hydrochloride oint-

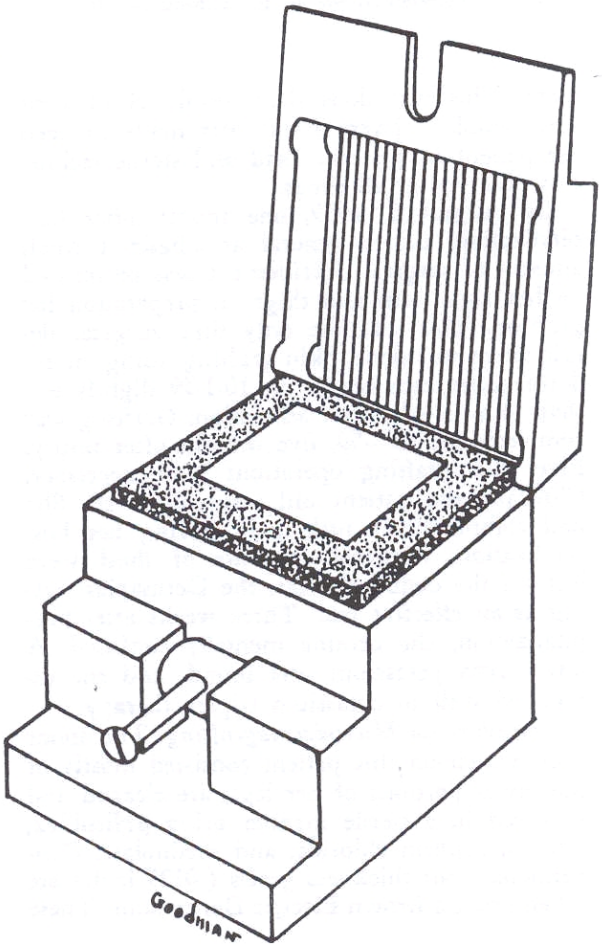

FIG. 1. Split thickness graft on cork square on block of microdermatome ready for cutting.

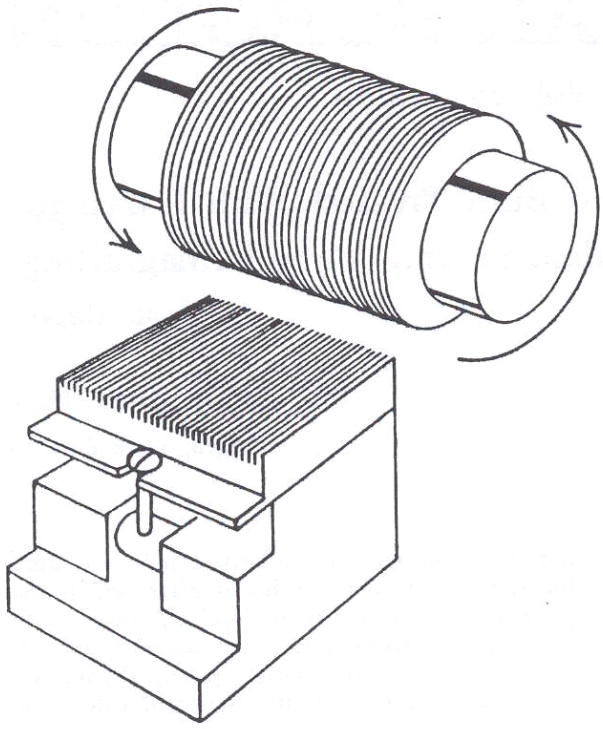

FIG. 2. Microdermatome in the cutting position.

ment. This was done daily until debridement was complete. Every effort was made to keep the patient in a sterile field and sterile technic was observed at all times.

On August 5, 1959, one month after hospitalization, under general anesthesia a small amount of surgical debridement was performed on her right arm and thigh in preparation for grafting. This was the only time surgical debridement was done. Skin grafting, using microdermagrafts, was begun on 10-1-59 slightly less than two months after admission. Grafting was completed on 12-3-59, five months after injury. Five skin grafting operations were necessary. Clinically the patient did unusually well. She had comparatively little pain during her hospitalization. Minimal amounts of fluid were lost via the denuded areas, the Dermaplast acting as an effective seal. Three weeks after hospitalization, she became mentally confused. A low serum potassium was found, and she responded well to potassium triplex therapy.

Procedure for Microdermagrafting: The donor sites, which on this patient consisted mostly of the lower portions of her legs, are cleaned and prepared in a sterile manner using pHisoHex, alcohol, zephrin chloride, and methiolate. Conventional split thickness grafts (.0125 inch) are taken using a Brown Electric Dermatome. These grafts are placed, with the cut surface down, on cork squares which are previously soaked in sterile saline. The cork with the grafts in place is placed on the cutting block of the Meek-Wall Microdermatome, manufactured and distributed by Zimmer Manufacturing Company, Warsaw, Indiana. The grill is put into position and a cut is made extending down into the cork but not completely through it. The cork is rotated 90 degrees and another cut is made completely cutting the split thickness grafts into microdermagrafts. Padgett's Skin Glue is used to cover the microdermagrafts after they are cut but before they are removed from the cork. The glue is also used to cover the prefolded bandages (Fig. 3) which are used to separate and apply the grafts. The bandage is stuck to the outer surface of the microdermagrafts and allowed to dry before removing the grafts from the cork. After removing them from the cork the bandage is expanded in all directions thereby separating and spacing the microdermagrafts. This is placed directly onto areas of third degree burn with the grafts in growing position. (In this case no effort was made to remove the fibrinous exudate or the accumulated Dermaplast.) Five-nitro-2-furaldehyde semi-carbozone gauze dressings is placed on top of the bandage to which the micrografts are stuck, and this in turn is covered with dry sterile dressings. It is made secure by wrapping with an elastic bandage. The bandages are removed for the first time ten days later and the new grafts are covered again with 5-nitro-2-furaldehyde semi-carbozone dressings

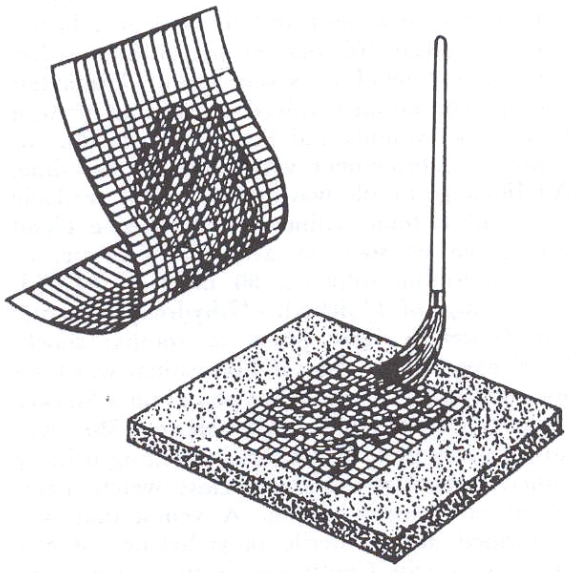

FIG. 3. Skin glue being applied to microdermagrafts and prefolded bandage.

for three to five more days, leaving them exposed thereafter. Microdermagrafts have an excellent percentage of take and growth is rapid. The size of the microdermagrafts can be adjusted. (Two size squares were used on this patient. One being one-eighth of an inch square and the other being one-sixteenth of an inch square. There was no difference in the taking and the growth of the sizes.)

Discussion

Much progress has been made in the past few years in the management of burn patients. There has been a tremendous increase in the knowledge and understanding of burns and this has been directly responsible for the lowered mortality of thermal burns. This increase in survival is reflected mainly in the moderate to moderate-severe burn group, while in the 70 to 100 per cent total body surface burn group the mortality rate is only slightly better than it was 10 to 15 years ago. Our patient fits the latter group. She survived this catastrophe with much less discomfort and less morbidity using enzymatic debridement and microdermagrafting than one expects using conventional surgical debridement and homografts. It is with this group that much can be done. We must be alert constantly for newer and easier methods for treating the problems these patients present.

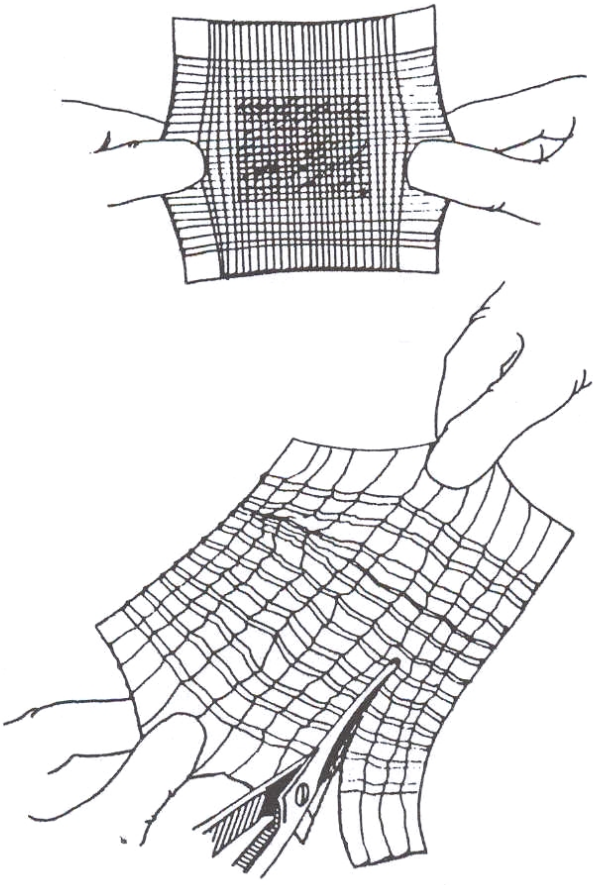

Fig. 4. Unfolding of the prefolded bandage, separating and spacing microdermagrafts; also shows excessive bandage being cut off before placing on third degree burn area.

Fig. 5. Postoperative view showing microdermagrafts.

Enzymatic debridement of the burn eschar, which is the residue of skin coagulated by heat, has been used in several centers in the past ten years. In many cases this eliminates the necessity for surgical debridement and hastens preparation of the burn for skin grafting. The most widely used method has been surgical debridement after involved areas are clearly demarcated. In experienced hands this is probably more successful, but in extensive burns the number of procedures required and the trauma inflicted is significant, remembering these patients are in poor condition. Enzymatic debridement is pos-

sible in these patients and might be the method of choice, especially in mass burn casualties, where surgical debridement would be impossible. As a result of the shortage of skin in these patients skin grafting is an increased problem. By using what skin is available for grafts and magnifiying its coverage area as one does in making microdermagrafts definitive grafting can be accomplished earlier. These grafts take readily and the technic is simple, relatively inexpensive, and is actually less time consuming than other methods.

Summary

A patient with extensive severe burns has been presented and the method of treatment outlined. The procedure for microdermagrafting using the Meek-Wall Microdermagraft is given. Enzymatic debridement and microdermagrafting is discussed briefly.

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