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A New Method of Bandaging Orthotopic Murine Skin Grafts.* (30225)

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The technique of Billingham and Medawar(1) is the most widely employed method of orthotopic murine skin transplantation. It is simple to perform and consistently yields rapid and firm healing of the graft to its bed. However, because of the occlusive Plaster of Paris dressing, the graft is inaccessible to continuous or even repeated observation during the first 6 postoperative days.

Algire and Legallais(2), Edgerton and Edgerton(3), and Sabet *et al*(4) each designed a transparent chamber which permitted continuous observation of orthotopic murine skin grafts. Although these techniques yielded excellent results, the chambers were relatively difficult to apply (Sabet's technique requires 30 minutes per animal), and were therefore not suitable for routine use in skin transplantation.

The technique of bandaging presented herein affords continuous observation and/or manipulation of experimental skin grafts. It differs from the technique of Billingham and Medawar(1) in two respects: a) the vaselinized tulle is discarded and in its place a glass chamber overlies the graft bed, and b) the Plaster of Paris dressing is replaced with a self-adherent bandage.

Method. Six-week-old CFW male mice (Carworth Farms, New City, N. Y.) were grafted with 6-week-old DBA-1/J male mouse skin (Jackson Memorial Laboratory, Bar Harbor, Me.) according to the method of Billingham and Medawar(1): The right lateral thoracic wall skin was clipped and shaved. Suprapannicular square graft beds were prepared by dissection with curved scissors, and pinch grafts were applied onto them.

The bed was covered by a glass tube which was three-eighths inch tall and one-half inch in diameter (Fig. 1). The tube's base was flanged, describing an arc of curvature of one-half inch. Its upper opening was covered with a circular siliconized coverslip, which was sealed onto the chamber with Permount (Fischer Scientific Co., Fair Lawn, N. J.); and its flanged rim was covered with Dermicel Surgical Tape (Johnson and Johnson, New Brunswick, N. J.). At the time of operation Mastisol (400 g mastic gum, 12.5

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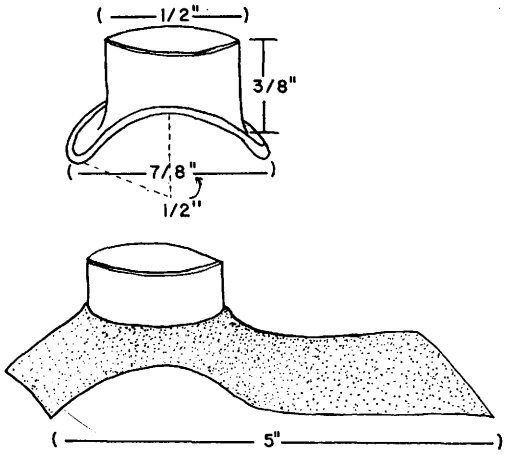

FIG. 1. Bandaging apparatus. Upper figure indicates dimensions of glass chamber. Lower figure shows chamber inserted into Stericrepe bandage.

ml castor oil, to 100 ml with benzene to dissolve; then filtered) was applied to the Dermicel Tape, and the chamber was sealed onto the bed, thus retarding evaporation. The Mastisol seal was protected by two turns of two-inch Stericrepe self-adherent bandage (Beacon and Janis, Ltd., London, England). Bryant and Bernard(5) found that such a self-adherent bandage greatly expedited the operative procedure, and still provided freedom of motion for the animal, positive pressure on the graft, and protection of the bed. For additional protection the Stericrepe bandage was bound to the glass chamber by one turn of one-half inch adhesive tape (Fig. 2). A single operator could easily graft 12 animals in 30 minutes with technical assistance.

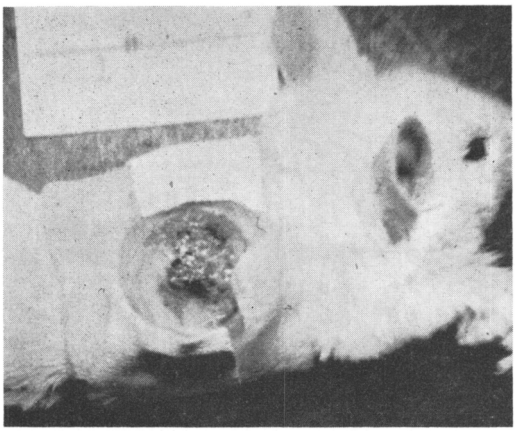

FIG. 2. Bandages applied to a CFW mouse which was grafted with DBA-1/J skin. Note the slight condensate on coverslip demonstrating retardation of evaporation from the bed. The graft is visible.

On the sixth postoperative day the coverslip was removed in order to expose the graft to the air. The chamber itself was left in place to protect the graft from scratching or gnawing. On the specified postoperative day the chamber was removed, the animal was photographed, and the graft and adjacent bed area were fixed for histologic preparation according to the method of Medawar(6). Gross and histologic scoring was then performed according to the method of Billingham *et al* (7).

Preliminary studies were performed to compare the technique of Billingham and Medawar(1) with the technique presented herein. First-set grafts protected by chamber dressings were all well vascularized by the fourth postoperative day (Fig. 3). Autografts were uniformly successful, and on the thirtieth day were distinguishable from the surrounding host skin only by their reversed hair direction. On the other hand, homografts were routinely destroyed by reactions which appeared grossly and histologically identical to those described by Medawar(6). First-set DBA-1/J male skin grafts applied onto CFW mice dressed with Plaster of Paris dressings were destroyed with a median survival time of 10.2 days (S.D. 1.2 days, total number = 66 recipients), while those dressed with cham-

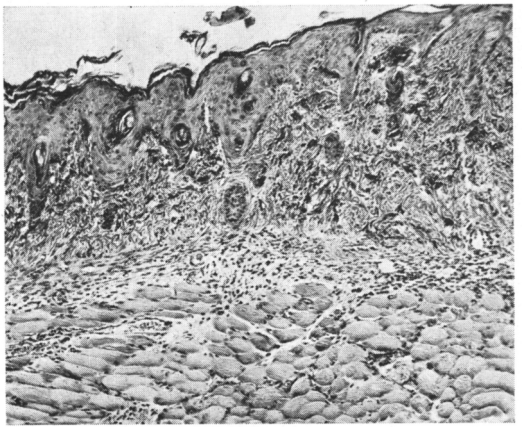

FIG. 3. Histologic section of a first-set skin homograft at sixth postoperative day. Note acanthotic epithelium and clear dermal field. H & E.

bers were destroyed with a median survival time of 10.7 days (S.D. 1.0 day, total number = 121 recipients). Second-set DBA-1/J skin grafts on CFW mice immunized with orthotopic skin grafts, with splenic cells and their fractions(8), or with purified transplantation antigen(9) exhibited gross and histologic stigmata of accelerated reactions by the sixth postoperative day.

The new technique overcomes the principal disadvantage of the bandaging technique of Billingham and Medawar(1), namely inaccessibility to the graft, by sacrificing positive lateral pressure. The excellent results described here, as well as those described by Cannon and Longmire(10), suggest that although positive lateral pressure is undoubtedly beneficial, it is not essential for successful transplantation.

In addition to its value in exposing the early events after skin transplantation, the technique has been of special merit in experiments dealing with the transplantation of fragile embryonic tissues, with the daily application of pharmacologic agents to the graft or its bed, and with the second-set phenomenon where early examination of the test graft is mandatory.

Summary. A simplified chamber technique for bandaging orthotopic murine skin grafts was demonstrated to offer accessibility to the graft and rapid application of the bandages. There were no significant differences between the behavior of orthotopic grafts bandaged with this chamber technique or with the conventional Plaster of Paris method.

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Chemical and Metabolic Changes of Hepatic Lipids from Rats Exposed to Chronic Radial Acceleration. (30226)

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Of the many environments that have come into sharp focus by the recent advances in space exploration, one that needs to be studied in depth is acceleration as it affects human and other mammalian organisms. Studies of acceleration and deceleration are of interest since they are encountered during lift-off and reentry phases of space flights.

Oyama and co-workers(1) have described some general effects on growth, metabolism, body chemistry, and morphology following prolonged exposure of rats to centrifugation. Growth rates and final body weights of rats centrifuged from weaning age to maturity were reduced significantly. Except for minor changes in the relative size of certain organs and some slight changes in hematology, it was observed that rats tolerated and adapted to prolonged exposure of simulated high gravity.

Liver slices from rats subjected to 4.7 *g*