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[Reprinted from THE PHILADELPHIA MEDICAL JOURNAL, November 5, 1898.]

RESTITUTION OF SKIN BY PLASTIC OPERATION IN CASES OF EXTENSIVE TRAUMATIC SURFACE-DEFECTS OF THE SCROTUM AND PENIS.

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SURGEONS have for a long time been made aware of the fact that extensive skin-defects of the scrotum caused by injury or disease are usually repaired in a comparatively short time by granulation, cicatrization, and epidermization. In cases of gangrene of the scrotum resulting in denudation of both testicles, the exposed organs are, in the course of a few weeks, furnished with a new coating without operative intervention, by the formation of a contracting scar, which, by making traction upon the surrounding skin, approximates the margins of the granulating surface from all sides, so that when the process of healing is completed the new scrotum is largely composed of normal skin obtained from the neighborhood by cicatricial contraction.

Bruns attributed to the scrotal tissues a maximum recuperative power in explanation of the speedy and satisfactory healing of extensive skin-defects. Kocher, on the other hand, denies any such special properties inherent in the tissues of the scrotum, and asserts that wounds of the scrotum heal in the same manner, and the healing process requires the same length of time, as the repair of surface-wounds in any other part of the body. He explains the apparently more rapid

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healing of scrotal wounds by the displacement of the adjacent loose skin by the contracting scar, an opinion that has since become satisfactorily substantiated by extensive and careful clinical observations.

Skin-grafting by Reverdin's or Thiersch's method has been resorted to and has been strongly advised by some surgeons to expedite the healing of large granulating wounds of the scrotum, but it is doubtful if the results obtained with the aid of this modern surgical resource are any better than those following spontaneous healing of such wounds. The skin-grafts are, at best, only an imperfect substitute for normal elastic skin, and their presence must, necessarily, interfere with the desired displacement of the adjacent skin by the contracting scar.

Nothing has been done in the way of primary plastic operations in restoring extensive traumatic skin-defects of the scrotum and penis. Surgeons have relied on the healing of such wounds by granulation in all cases in which, owing to the size of the wounds, suturing was out of the question. The location of such wounds renders it almost impossible to secure and maintain an aseptic condition long enough for the completion of the healing process. The denuded and exposed parts are exposed to the dangers incident to infection, and healing seldom takes place without suppuration, and often weeks and months are required before the injured parts are protected by new and displaced skin.

Considering that the external genital organs are surrounded on all sides by an abundance of loose skin, well adapted for plastic operations, it is somewhat strange that surgeons have not taken advantage of this favorable anatomic environment and resorted to plastic procedures in restoring recent extensive traumatic skin-defects of the scrotum and penis. In the case that forms the subject of this paper such an effort was made,

and the result was so satisfactory that I have deemed it of sufficient importance to bring it to the attention of the profession. In this instance the entire scrotum, one testicle, and the whole cutaneous sheath of the penis were torn away in a machinery-accident:

The patient, a German laborer, 33 years of age, in good health, was injured October 11, 1897, and was admitted to St. Joseph's Hospital a few hours after the accident occurred.

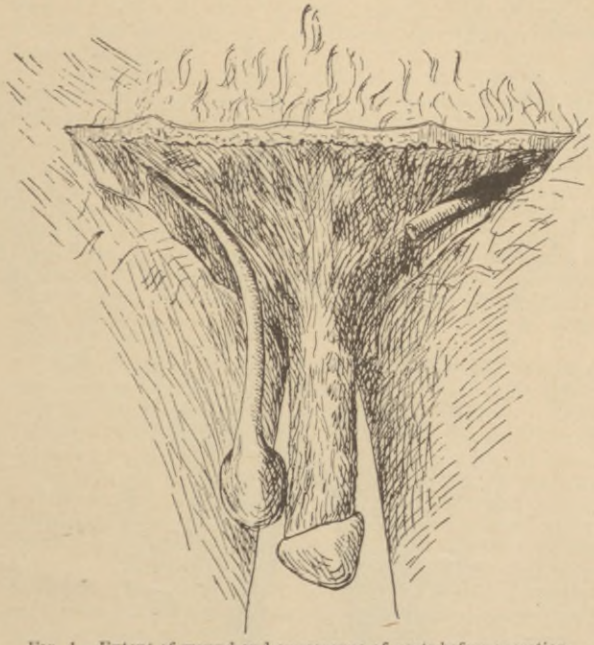

FIG. 1.—Extent of wound and appearance of parts before operation.

He was employed in a bicycle-factory, and when the injury was sustained he was standing on a ladder, adjusting a belt on a pulley from the headline-shaft to a stamping-press. His clothes were caught by the revolving shaft, and, with the exception of his shoes and stockings, were torn from his body. He fell from the ladder down to the floor, a distance of ten feet, and at once discovered the extent of injury to the external genital organs. He attempted to arrest the bleeding, which was quite free, by washing the wound with cold water obtained from a sink. A physician was called, who dressed the wound and sent the patient to the hospital.

On examination at the hospital the entire skin covering the external genital organs, as well as the left testicle, was found torn away with the clothing. The parts lost are now in possession of the physician who first dressed the wound. Figure 1 represents the extent of the injury and the appearance of the parts before the operation. The loss of skin extended nearly over the entire region of the mons veneris. The left spermatic cord and vessels were torn off near the

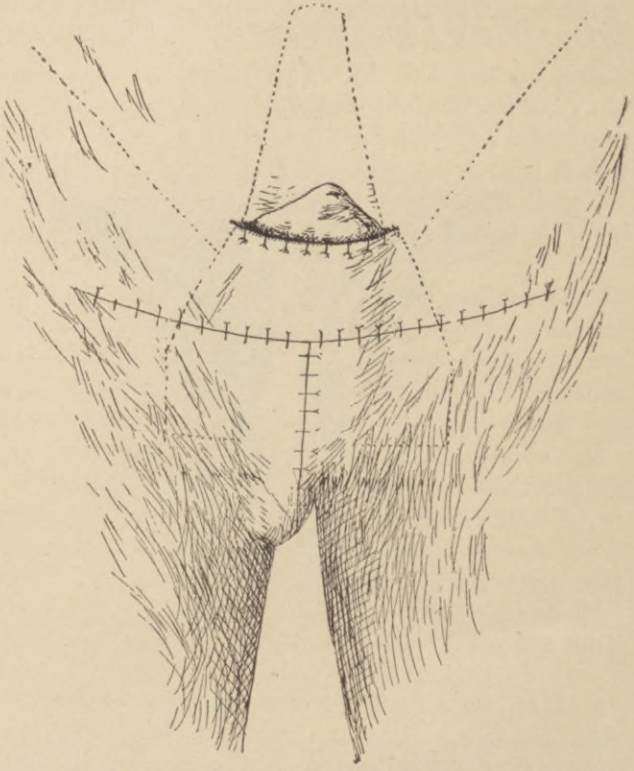

FIG. 2.—Appearance of parts after first operation; dotted lines showing incisions of second operation.

external inguinal ring. The left inguinal canal was torn open nearly in its entire length. Hemorrhage from the spermatic artery had been arrested by applying hemostatic forceps.

The patient was pale, but did not suffer from any severe

symptoms of shock. He was at once placed under the full influence of ether, when the wound and surrounding skin were thoroughly disinfected. The left spermatic vessels were ligated with catgut and the inguinal canal was sutured with the same material. Formalin-iodoform catgut was used both for ligatures and sutures. The right testicle, spermatic cord, and accompanying vessels were found loose and detached from the underlying tissues as far as the external inguinal ring; the tunica vaginalis was intact; pulsation of the spermatic artery was distinct. I decided to cover the wound by undermining and mobilizing the adjacent skin. The testicle was brought in proper position and was covered with skin by undermining the margins of the wound and suturing it in a vertical direction as far as the root of the penis.

The skin above was undermined in an upward direction sufficiently to secure room for the denuded penis, when a transverse incision was made sufficiently large to bring the glans penis out, and the mucous membrane of the corona glandis was sutured to the skin with fine catgut and horsehair sutures. The remainder of the wound was then closed transversely, as shown in Figure 2. Drainage was secured from the lower angle of the vertical to the left angle of the transverse wound by inserting a strip of iodoform-gauze. With the exception of the drainage-openings the wound was sealed with iodoform-collodion, over which the ordinary antiseptic dressing was applied and held in place by means of strips of adhesive plaster.

The operation was not followed by any untoward symptoms. The patient emptied his bladder without any difficulty, being directed to lie on his side during the evacuation. With the exception of a small place about the left angle of the transverse incision, the entire wound healed by primary intention.

On October 25th, two weeks after the first operation, a second plastic operation was performed, for the purpose of releasing the penis from its abnormal position and providing for it a complete cutaneous sheath from the skin of the abdomen. The operation was carried out under full ether-anesthesia. The dotted lines in Figure 2 show the number and direction of the incisions. The incision above the glans penis secured a flap to cover the dorsum of the organ. The lateral incisions furnished a flap to cover at least two-thirds of the circumference of the penis. The dorsal flap received an ample blood-supply from its new attachments with the base of the glans penis. After liberating the penis and bringing it into its natural position the dorsal flap was sutured on each side to the lower flap, which had become attached in the center to the whole length of the under surface of the penis. (Figure 3.) The large wound above the penis was covered with two triangular flaps, which were sutured together in the median line, and when in position were

attached to the lateral incision and base of the penis by means of tension-sutures of silk and coaptation-sutures of silkworm-gut and horsehair. The dressing was the same as after the first operation, with the exception that the penis was dressed separately and with special care, to prevent harmful circular pressure. Primary union failed to take place at the root of the penis on the left side, where the apex of the triangular flap sloughed, leaving a limited granulating

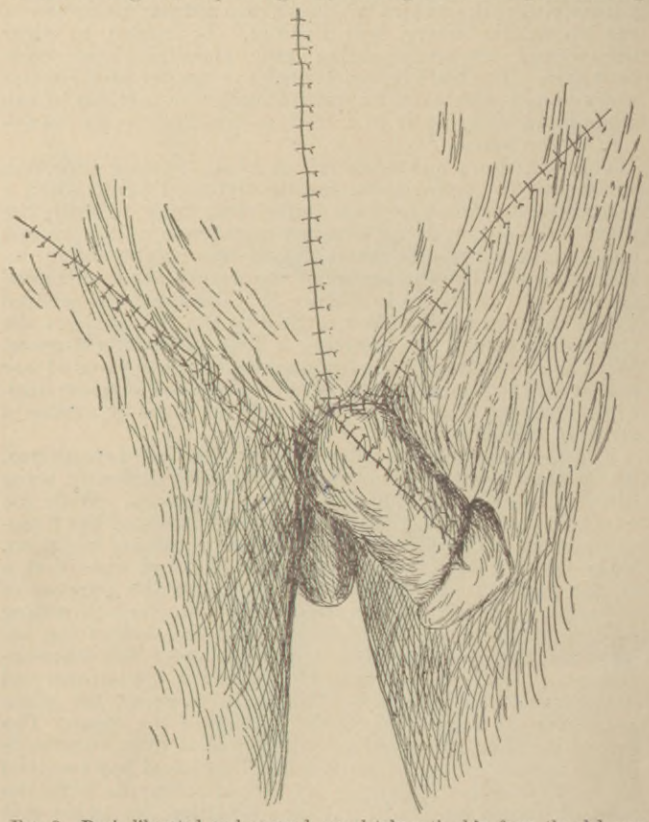

FIG. 3.—Penis liberated and covered completely with skin from the abdomen. Wound above closed with two triangular flaps.

defect, which healed in a most satisfactory way in the course of three weeks. In spite of frequent and severe erections, the wounds on the side of the penis healed almost throughout by primary intention. The patient left the hospital two months after his admission, highly pleased with the immediate and remote results of the two plastic operations.