OBSERVATIONS ON
LENGTHENING OF AMPUTATION STUMPS.BY W. E. GALLIE, M.B., F.R.C.S.,
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AMPUTATIONS in which the femur is sectioned less than three inches below the lesser trochanter are most unsatisfactory for fitting with artificial legs. The various suggestions made for overcoming the difficulties have not been very successful. As far as I know, no surgeon has hitherto attempted to lengthen the stump. The following case shows that such a procedure is possible.

Account of Case.

Pte. B. was admitted to the Granville Canadian Special Hospital, Buxton, on April 15th, 1918, with amputation of thigh at about junction of upper and middle thirds. The amputation had been performed with equal anterior and posterior flaps; wound had healed, except in centre, where a discharging sinus led to dead bone. On May 3rd, 1918, operation for the osteomyelitis; the terminal inch of the femur was necrotic and had to be removed, thus the bone extended only two and a quarter inches below lesser trochanter. The flaps were sutured back in position; wound healed in two months. Patient was then fitted with a temporary artificial limb, but the femur was so short that when he flexed the hip the end of the bone slipped forward over the top of the socket. We were confronted with the necessity of fitting him with the tilting-table leg or of lengthening the femur.

On Feb. 27th, 1919, he was operated upon again. The flaps were reflected as before and the incision continued up the outer side of the thigh as far as the great trochanter and deepened until the bone was exposed. The muscles were then reflected until the outer half of the femur was laid bare. With an osteotome applied in the sagittal plane a half of the terminal three and a half inches of the shaft of the bone was cut free. This piece of bone was slid downwards so as to lengthen the femur by two and a half inches, and was then fastened by two long screws of beef-bone.¹ The flaps were then dissected up sufficiently far to allow them to be drawn down and closed over the end of the bone. The wound healed by primary union, except for a hæmatoma, which opened spontaneously and disappeared without infection, otherwise recovery uneventful.

Two months later the fragments were solidly united and the patient commenced active exercise of the stump to increase the density of the bone. He is now wearing the ordinary artificial limb and has a very satisfactory stump.

Remarks.

This case resulted in several observations. Owing to osteoporosis the fixation was none too good. As solid fixation of the fragments is imperative, it would be wise to convert the screws into bolts by small nuts made of beef-bone. Heavy silver wire, or the brass ribbon used by Putti, or even metal bolts would serve, but the beef-bone has the advantage² of uniting rapidly to the living bone and of undergoing absorption and replacement, as does an ordinary autogenous graft.

The extensive splitting of the bone led to rather profuse hæmorrhage. This could be avoided by substituting for the method described an ordinary inlay bone-graft or a graft driven into the medullary cavity. We have one case of amputation of the leg in which the fibula will be used after splitting it into two halves to allow the endosteal osteoblasts to be bathed in lymph, either as an inlay or as a medullary graft, lengthening the stump an inch and a quarter. In this case the flaps are sufficiently long and the fibula is much longer than the tibia which was sectioned just below the tubercle.

The bone in the stump may be too short to allow an operation as such described, and it may not be wise to remove a graft from the other leg. In such a case a suitable graft might be obtained from a recently amputated limb. We have satisfied ourselves that bone transplanted from one animal to another of the same species—at any rate, in dogs—retains vitality in the same sense as does an ordinary autogenous graft—that is, those cells which are exposed on the surfaces to a supply of lymph survive and proliferate, and ultimately accomplish the absorption and replacement of the graft. It would be well, in transplanting bone from another patient or from a recently

amputated limb, to make sure that the cells of the one patient are capable of living in the lymph of the other, as indicated by the testing of their bloods for hæmolysis and agglutination. A recent paper by Masson indicates that Thiersch skin-grafts from a donor whose blood is not compatible with that of the patient do not live; if the bloods are compatible the transplantation is successful.

Up to now the operation described appears successful, but failure is still possible owing to absorption of the graft. Only time can show, and this paper is but a preliminary report. There is reason to believe, however, that such grafts will not disappear. When autogenous bone is transplanted into the muscles of the back in animals the bone ultimately disappears. But if such grafts are so placed that they have work to perform, as when used to bridge gaps in the long bones, they ultimately increase in thickness until the bone is restored to approximately its normal outline. Evidently the fate of such transplants is dependent upon the work performed. Up to the present the X ray shows no evidence of disappearance of the graft, and a mass of new bone has restored the normal thickness of the shaft where the graft was removed, and has also increased the thickness of the graft itself.

Among our wounded are many who could have such an operation done, for we have seen men passing through this hospital who had very short bones in their stumps and yet ample flaps of skin to allow bone-lengthening. It has been the practice to remove these redundant flaps by re-amputation. Again, if a successful lengthening of the bone can be looked forward to, the method of primary amputation, when short bones are inevitable, should be changed. The skin-flaps should be left very long, so that later sufficient skin will be available to cover the graft properly. This would also apply in civil practice.

A CASE OF
CARCINOMA OF THE PELVIC COLON

TREATED BY EXCISION AND ANASTOMOSIS.

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THE following case of apparent cure following excision of a carcinomatous stricture of the pelvic colon may be of interest inasmuch as there is no evidence of recurrence after six years.

The Case Described.

A man, aged 47, was admitted into St. George's Hospital on July 4th, 1913, for intestinal obstruction. He had apparently been absolutely well until four days previously; he then noticed a certain amount of colicky pain and had absolute constipation, which was not relieved by drugs or enemata. On examination he did not look ill. Pulse 88, temperature normal. Tongue slightly furred. The abdomen was enormously distended and was tympanitic all over. Rectal examination was negative. An attempt was made by means of further enemata to open the bowels but without result, and it was clear that the obstruction was complete. The same evening I opened the abdomen in the middle line; all the intestines were greatly distended, the cæcum being enormous and showing commencing splitting of the serous coat. The cause of the obstruction was an annular stricture of the pelvic colon just above the pelvic floor; the growth was movable and there appeared to be a prospect of excising it with good results if the man recovered from the intestinal distension. The mid-line incision was therefore closed and a second muscle-splitting incision made over the cæcum; as soon as the peritoneum had been incised the cæcum bulged out and burst partly externally and partly intraperitoneally; a Paul's tube was sewn into the tear in the cæcum and the peritoneal cavity was cleansed locally as far as possible. In spite of the enormous distension present before the operation and the peritoneal infection he rapidly improved, so that three weeks later a second laparotomy was performed with the idea of excising the growth. On examination the growth, which resembled a tight ligature round the gut, was found to be quite freely movable, and there appeared to be no glandular involvement. It was situated so near the pelvic floor that the feasibility of an anastomosis seemed doubtful. However, after clamping and dividing the gut above the growth and dividing the mesentery, it was found possible to draw the growth and the distal part of the gut up and divide it about three-quarters of an inch above the pelvic floor. An end-to-end anastomosis

¹ Canadian Medical Journal of Medicine and Surgery, May, 1916.² Journal A.M.A., April 20th, 1918, lxx., 1134-40.