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# A NEW METHOD OF COUNTER-TRACTION FOR FRACTURES OF THE RADIUS AND ULNA

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Fractures of the shafts of the radius and ulna require almost perfect reduction if permanent limitation of pronation and supination is to be avoided. After the fracture has been reduced, provision must be made so that the plaster cast can be applied without moving the forearm and allowing displacement of the fragments.

Unless the fractures are transverse and therefore relatively stable, the method of reduction in which two assistants exert traction and counter-traction on the hand and arm respectively is generally unsatisfactory. The fragments are not under full control, owing to the minor tug-of-war that unconsciously occurs—the result of an unsustained force. Furthermore, the application of the plaster cast to the arm is rendered difficult and cannot be efficiently accomplished without interfering with the traction, an event which predisposes to re-displacement of the fragments.

A more satisfactory method of traction and counter-traction consists in passing a sling of calico bandage over a pad of wool in front of the lower arm just above the elbow, and attaching it to a fixed object. Traction is applied by an assistant, who holds the thumb in one hand and fingers in the other, and is maintained while a plaster slab is lightly bandaged to the limb. The slab extends from the metacarpal heads to the shoulder, passes through the loop of calico sling and up the back of the arm. When the plaster has set, the sling is removed and the cast completed by encircling turns of plaster bandage.

With this method, it is not uncommon to find re-displacement of the fragments in control X-rays taken immediately after the plaster has been applied, and it is obvious that this is one of the inevitable results of the release of counter-traction during the application of the plaster.

In an attempt to overcome these difficulties a simple mechanical appliance has been devised to maintain constant traction during the application of the plaster cast and the excellent results obtained warrant a detailed description. Fig. 3 is a diagrammatic representation of the apparatus and Fig. 1 the method of its application.

*The Method of Application*

With the patient supine on the fracture table, the abducted arm is placed in an aluminium gutter (Fig. 1),

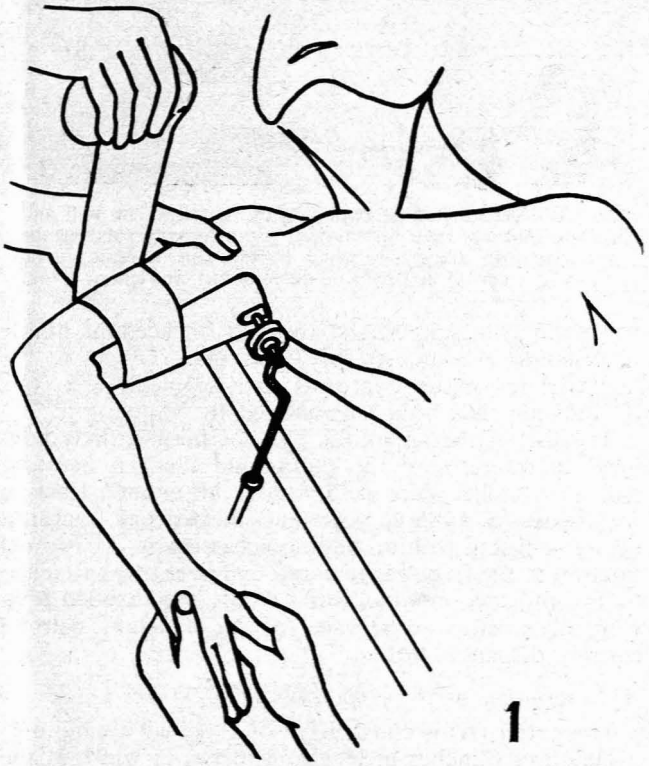


*Fig.* 1. The abducted arm is placed in the gutter and traction is applied to the thumb and fingers. Plaster bandages are applied, encircling the limb from the metacarpal heads to the axilla and incorporating the gutter. Traction is not released until the plaster cast has set.

and traction exerted on the fingers by an assistant. The long gutter ensures that the pressure exerted on the soft tissues of the arm is even and diffuse, unlike the localized constriction produced by a sling. The fractures having been reduced and checked by X-rays, a circular plaster bandage is applied from the metacarpal heads to the axilla and firmly moulded. Traction is not released until the plaster has set. The fracture is X-rayed again and if the position of the fragments is satisfactory, the gutter is removed as follows. Dismantle the ball-and-socket joint and externally rotate the arm through 90° when the gutter, which follows suit, can readily be removed by drawing it across the front of the chest (Fig. 2). It is obvious that the gutter cannot be removed

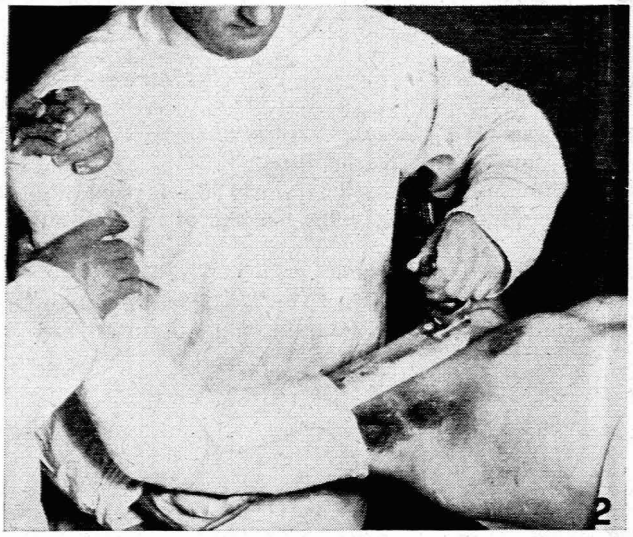

*Fig.* 2. The method of removing the gutter. The ball and socket joint has been dismantled. By externally rotating the abducted arm the gutter, which follows suit, is removed by drawing it across the front of the shoulder and chest.

while the arm is internally rotated, on account of the obstruction encountered by the axilla. Owing to the fact that the gutter conforms to a segment of a cone no difficulty has been encountered in removing it.

The use of the apparatus has not been entirely confined to fractures of the radius and ulna; it has also had a valuable place as a means of counter-traction for numerous Colles', wrist and metacarpal fractures, thus dispensing with an additional assistant. If manual traction to the fingers is replaced by finger traps attached to an appliance in which the tension is controlled by a wingnut screw, the services of an assistant can be entirely dispensed with.

*A Description of the Apparatus* (Fig. 3)

The gutter (A) is constructed of 18-gauge aluminium; it measures 6 inches in length, 4 inches in width at the axillary end and 3½ inches at the elbow end, and thus conforms to a segment of a cone. The elbow end of the gutter is cut away to accommodate the convexity of the bent elbow. 18-guage aluminium has been selected, because it is strong enough to withstand the force of traction necessary to reduce the fracture, and

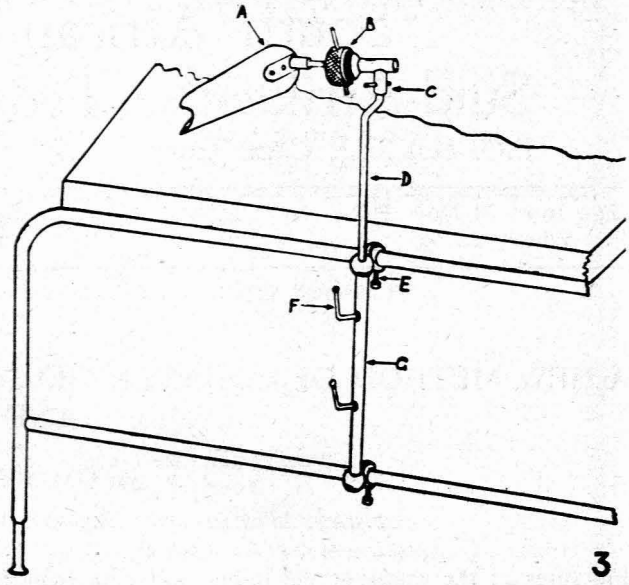


*Fig.* 3. Schematic representation of the apparatus. (A) Aluminium gutter (18 gauge) shaped to the form of a segment of a cone. (B) Detachable ball-and-socket joint with tension collar. (C) Detachable swivel joint and locking pin. (D) Supporting column offset at base and fitting into the tube (G) which is attached by detachable clamps (E) to the fracture table. (F) Locking screw which allows the column to be locked in a variable vertical position.

at the same time malleable so that it can be moulded to conform to the shape of different arms. Attached to the axillary end of the gutter is a rigid right-angled bracket with one limb extending 1½ inches along the convex side of the gutter and secured by two rivets which are countersunk on the concave side of the gutter. The other limb of the bracket ends in a ball-and-socket joint, which can be dismantled by unscrewing the tension collar (B). The base of the socket is connected to a ⅝-inch steel column (D) which slides in the tube (G) and can be locked in variable vertical positions by two simple locking devices (F). The stem of the supporting column (D) is offset from its long axis so that, by rotation in a horizontal plane, the gutter can be moved towards or away from the anaesthetized patient. The tube (G) containing the column is attached to the longitudinal bars of the Hawley table and secured there by two detachable clamps (E). On loosening the clamps the whole apparatus can be moved cranially or caudally. Thus the gutter has a wide range of mobility and its position can be varied vertically, horizontally and circumferentially by simple adjustments without having to move the anaesthetized patient. For treatment of fractures of the forearm bones of the opposite limb, the ball-and-socket joint with its attached gutter can be rotated through 180° at the swivel joint (C) and locked in position by a tapered pin.

## SUMMARY

1. An apparatus for counter-traction in the reduction of fractures of the radius and ulna has been devised,

the use of which allows a plaster cast to be applied quickly and efficiently and to be completed without release of traction, thus reducing the incidence of re-displacement of the fragments.

2. The apparatus is simple in design, portable and easily assembled; and it can be constructed in any hospital workshop.

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