CHAPTER TWELVE

PERTROCHANTERIC FRACTURES OF THE NECK OF THE FEMUR

IT is now universally agreed that pertrochanteric fractures of the femur are best treated by internal fixation whenever this is feasible. Because many of the patients with pertrochanteric fractures are in an advanced state of senility, sometimes complicated by mild dementia and incontinence, the non-operative treatment of these fractures presents formidable nursing difficulties.

Not all pertrochanteric fractures of the femur are suitable for internal fixation by the blade plate, and attempted operation may cause such comminution in some cases that to persist with difficult surgery is not to be advised and the case is better returned to the ward for treatment on traction. There will always be a place for the non-operative treatment of the pertrochanteric fracture, and it is necessary therefore to decide what technical matters are of importance with regard to the comfort of the patient and the convenience of the nursing staff.

RUSSELL TRACTION

It is obvious that some form of balanced traction is the only rational method of non-operative treatment, because a plaster hip-spica is quite out of the question in patients of this degree of senility. The most generally used type of traction is that popularly known as Russell traction. In its original form Russell devised this system for the treatment of fractures of the *shaft* of the femur and he evolved the rather complicated system of pulleys in order to correlate the traction force necessary to maintain length with the *upward lifting force necessary to correct backward angulation at the fracture.* To do this the fracture was supported in a sling under the distal third of the thigh, and the traction force was attached to the sling to give an upward lift by an arrangement of pulleys (Fig. 132, c). The same cord dispensing the traction force passed, in its course to the weight, through pulleys which doubled its effective pull and exerted this product in the length of the tibia below the knee. By estimating the direction of the traction force acting on the sling a parallelogram of force could be worked out and the resultant force acting in the axis of the femur could be calculated.

In the treatment of pertrochanteric fractures by Russell traction the original complicated system of pulleys is really quite unnecessary. Reduced to its mechanical elements all that is required is a means of suspending the lower extremity and a means of applying traction in the axis of the femur. For pertrochanteric fractures there is no need for the two forces to be correlated in any subtle fashion because there is no need for an upward lift to correct the backward angulation present in a shaft fracture.

The Importance of Skeletal Traction

To secure good results in the way most comfortable for the patient and most convenient for the nursing staff, skeletal traction applied to the tibial tubercle is incomparably better than adhesive traction. **Adhesive traction should always be avoided in combination with weight traction.** Weight traction on skin adhesive almost inevitably results in a 'creeping' of the adhesive strapping, pressure sores are produced, excoriation of the skin is frequent, and pain is invariable. External popliteal paralysis is a frequent result of adhesive traction, because, as it slides down the leg week by week, it carries the circular turns of cotton bandage which surround it and these constrict the limb as they pass from the small circumference at the level of the knee to the larger circumference near the head of the fibula. **Adhesive skin traction is to be recommended only in conjunction with fixed traction.** Fixed traction force on skin adhesive can only be temporarily excessive, because the adhesive slips or stretches until the tension falls again to a tolerable level and thereafter, unlike weight traction, no further slipping will take place. The misery which can result from weight traction applied to adhesive strapping is great enough in the young adult, but when applied to the senile case with its papery, inelastic skin and general low vitality, the result is often most distressing. The failure to use skeletal traction in these old people, and the choice of skin adhesive, arises from a misplaced feeling that skeletal traction is a drastic measure which they might be unable to stand. But a Steinmann nail can be inserted under local anæsthetic in the ward and at the bedside with the greatest ease, and all the patient's discomfort is thereafter at an end.

TECHNIQUE

Having inserted a Steinmann nail into the tibial tubercle, it is strongly to be recommended that the surgeon should apply a below-knee plaster cast, *over adequate padding*, and **incorporating the Steinmann nail in the upper end of the plaster.** In this way *a traction unit* is constructed as described on page 180. Having completed the traction unit, it can be suspended from a Balkan beam and a 10 lb. traction weight, arranged to give a horizontal pull by means of cords and pulleys (Fig. 126). *The incorporation of the Steinmann nail in the upper end of the plaster is specially stressed because of the danger of external popliteal paralysis if the upper end of the plaster is left loose and capable of cutting into the limb.*

The Denham nail is a great improvement over the original Steinmann nail in the treatment of old people in whom the bone of the tibial tubercle is osteoporotic. In this type of bone the Steinmann nail rapidly becomes loose and then starts to slide sideways and ulceration of the skin is brought about. The Denham nail (Fig. 127) is provided with a short length of screw thread positioned slightly to the side of the middle which is nearest the end gripped by the introducer. This short length of thread engages with the lateral cortex of the tibia and holds the nail securely against medial and lateral slipping.[1]

[1] I do not recommend this nail for use in compression arthrodesis. In order to manufacture this nail it has to be of much softer metal than that of the ordinary 4 mm. Steinmann nail which is work-hardened in the wire-drawing process. Under high pressures the Denham nail will pass the elastic limit and fail to operate as a spring and the screw thread, acting as a 'stress raiser,' may induce fatigue fracture under the conditions of compression arthrodesis.

A satisfactory method of suspending the traction unit is illustrated in Fig. 126. A plaster loop is incorporated in the plaster to facilitate attachment of a cord to the foot of the cast. Two pulleys are arranged on the Balkan beam

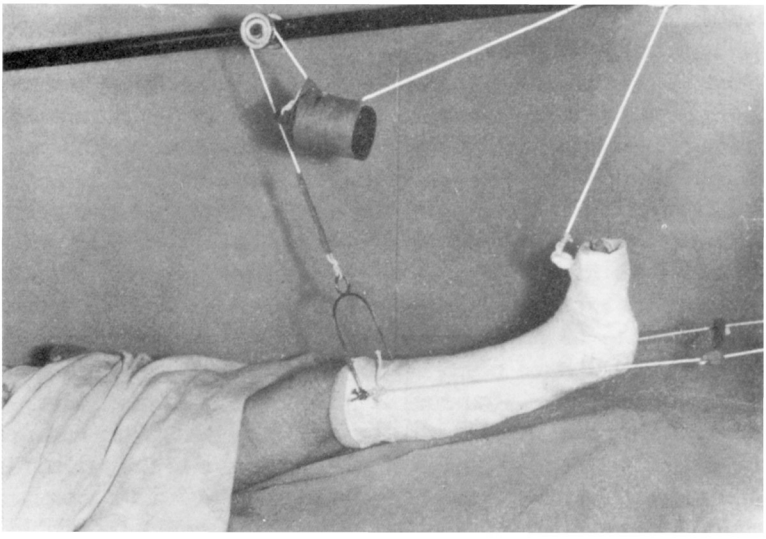


FIG. 126

Modified Russell traction for pertrochanteric fractures—using the pin-and-plaster traction unit. The whole limb should be strongly abducted.

2 feet apart and a cord is passed over them to suspend the cast. The length of this cord should be such that there is no slack when the leg is held out with the knee straight and almost touching the surface of the bed (Fig. 128, A). A weight of about 7 lb. is now attached to the horizontal part of the cord *close to the pulley*

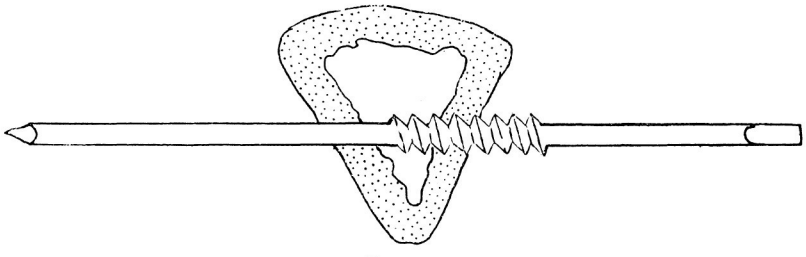
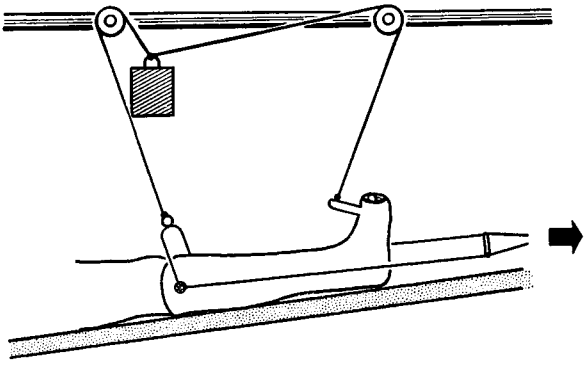


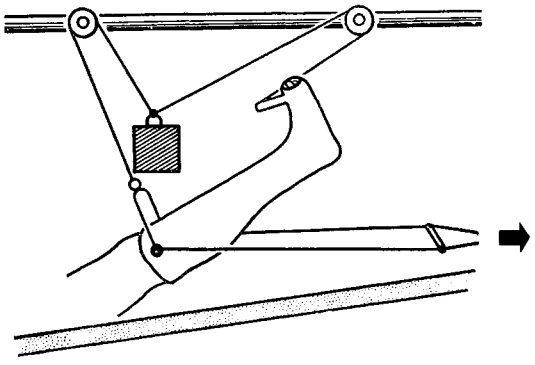
FIG. 127

Denham nail. Particularly suitable for holding skeletal traction in the porous bones of elderly patients for two or three months without loosening.

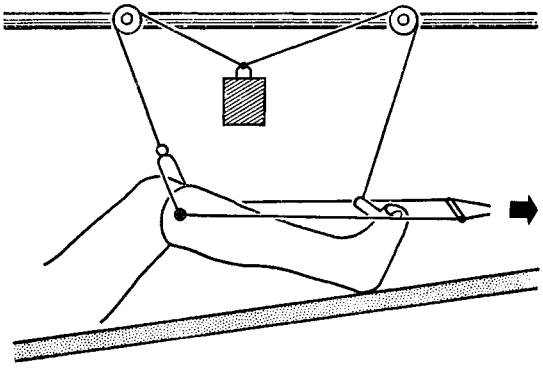
which is nearest the head of the patient. *This weight must not be loose on the cord but must be rigidly tied into the cord.* This detail ensures that there is more upward lift on the knee than there is on the foot, so that the leg does not always lie with the knee fully extended. The patient can raise the leg with the knee straight (Fig. 128, B) and then flex the knee (Fig. 128, C). To permit knee movements the



A



B



C

FIG. 128

Mechanical arrangement of Russell traction. Overhead weight is fixed to the cord (not sliding on the cord) and attached nearer to knee than foot, A, in order to elevate knee more than foot.

cords carrying the main traction force in the horizontal direction to their point of attachment to each end of the Steinmann nail should be kept wide apart with a wooden spreader.

Padding the Heel.—It is important to take the greatest care with the padding of the heel. Felt or sponge rubber should be placed under the heel before applying the plaster which is needed to prevent equinus. If wool alone is used there is still some danger of pressure sores despite the plaster.

In no circumstances should a below-knee plaster be used over adhesive traction ; the danger of pressure sores is very great and the combination of plaster of Paris and adhesive traction should be regarded as an abomination.

A B

FIG. 129

A, Pertrochanteric fracture while on traction and over-distracted as shown by slight valgus position. This delays consolidation and encourages, B, collapse into coxa vara even as late as three months after the injury.

Post-operative

Having established this traction system and having placed the limb in some degree of abduction, the further conduct of the case is quite straightforward, and there is little else which is not obvious on common-sense grounds. One fact only needs mentioning, and that is a warning that these fractures are very prone to the late development of coxa vara unless the traction is maintained for a minimum of twelve weeks. Even after this time some recurrence of this deformity is possible, due undoubtedly to the collapse of the fracture into the cavity in the cancellous bone left when the fracture has been disimpacted under the traction force (Fig. 129 and Figs. 10 and 11, pp. 10 and 11). Too much correction of the deformity in the direction of coxa valga is therefore not to be recommended, and the acceptance of a slight degree of coxa vara from the outset is advisable in the interests of rapid consolidation. Even after three months the collapse of the fracture under partial weight-bearing is very likely, and therefore weight-bearing should be postponed for at least six months. The tendency to late deformity in this fracture is another

reason why the internal fixation of this fracture by the blade plate is steadily gaining general favour. Some idea of the enormous forces available to produce coxa vara, even in the later stages of treatment, can be drawn from the fact that blade plates can fracture during the period of early rehabilitation.

Used in the manner described, the comfort of these aged patients is quite surprising, and it will be seen that the non-operative method is far from being the lethal procedure which some enthusiasts of the blade plate proclaim it to be. The high mortality which is associated with the conservative method is the result of continuous pain and discomfort which wears out these old people; on skeletal traction these old patients become happy and their health is correspondingly improved. In institutions which cater for large numbers of these old patients, and when the home conditions render it impossible to receive them back unless fully ambulant, the non-operative method can hold its own against the operative, for there is no point in operating unless the relatives can take the patient home within a few weeks.