Practical Points of Diagnosis and Treatment in Surgery and the Specialities.

TREATMENT OF FRACTURES OF THE UPPER LIMB.

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THIS article is limited to treatment and to such forms of treatment as have, in the writer's experience, consistently yielded good results. Alternative methods are excluded, for ease in reading, co-operation in assisting, and standardization in equipment.

Treatment in hospital (private or public) is often essential and must at all times be readily available if the need arise.

Our aim is fourfold: apposition, alignment, union, function.

To check up results, X-ray *films* are taken. Screening is inaccurate and leaves no permanent record.

Manipulations must be done with complete muscular relaxation. There is no place for "whiffs of gas."

Massage and movements should commence as soon as and when there is no likelihood of their separating broken ends.

Our stand-by is plaster of Paris, which should be of the best dental variety, rubbed by hand into No. 200 bookbinders' muslin.

Surgical and Nursing Associates must never be allowed to forget that a limb, distal to the point of application of a plaster, must exhibit painless mobility, good colour and freedom from swelling.

It is now proposed to deal with the fractures of the upper limb in the order of frequency in clinical surgery.

Colles' Fracture.

Under full ether anæsthesia, grasp the lower radial fragment with thumb and fingers of one hand, holding the patient's forearm with the other. Loosen the lower fragment by rocking it. Then pull on it and press it forward and ulnarward, at the same time flexing the hand at the wrist. Repeat this manœuvre if necessary until an X-ray film shows exact alignment of the anterior and posterior radial surfaces, and until the styloid processes are identical in position with those of the sound limb. It may be necessary to emphasize the above manœuvre by using a wedge or a Thomas's wrench.

When you have an X-ray film which records reduction, then apply a plaster slab to the anterior surface of the forearm and hand, these being in full flexion at the wrist. Mould the slab around the radial side of the wrist, forming a flange which will maintain ulnar adduction. (A plaster slab consists of eight or ten layers of wet plaster bandage, which sets a few minutes after being applied to any surface, so acting as a perfectly fitting splint. When dry it is removed, trimmed and bandaged back into position,

now conforming exactly to the contour of the limb which it retains exactly in the position selected.) It is much less likely to cause pressure than a plaster case surrounding a limb.

After Colles' fracture, massage of the dorsal aspect of the limb on the splint may be commenced at once. Movements are commenced as soon as it is judged they are unlikely to separate the fragments. Such separation is more likely when the fracture is oblique and then movement may have to be delayed a fortnight. When the fracture is transverse it may be commenced at once.

An old Colles' fracture with bad alignment is best treated by open osteotomy and splinting, as detailed above.

**Fracture of
the Lower
End of
the Humerus.**

This is the next commonest fracture of the upper limb. When a broken fragment is pressing on the vessels and causing swelling, immediate manipulation is necessary. This is exceptional, and as a rule a preliminary rest in bed for twelve hours with the arm resting on a pillow is advised, to allow the existing swelling to subside, and to cleanse the arm for operation, should subsequent manipulation fail. Under full ether anaesthesia, X-ray films are taken in true A.P. and lateral positions. The fragments are now manipulated, until further X-ray films record normal alignment, following which the elbow is well surrounded with wool, and a light plaster case applied, from metacarpals to shoulder, with the limb flexed as far as it will easily go without interfering with the radial pulse. Inspection hourly for the next twenty-four hours is made to make certain that the hand is of good colour, painless, mobile, and not swollen. The plaster case remains on three weeks, after which a "collar and cuff" sling is applied and the forearm let down during the next week.

The manipulation is done by holding the humerus firmly with one hand whilst the other pulls on and flexes the forearm, so that the hand comes up to the inner side of the shoulder, so allowing for the normal carrying angle.

When the fracture is confined to one condyle alone, the above manœuvre is supplemented by manipulation of the actual fragment with the fingers. When an X-ray records satisfactory alignment, the plaster case is applied as detailed above.

Should alignment prove impossible, the lower end of the humerus is cut down upon by splitting the triceps and exploring subperiosteally. The operation is easy and safe, since the periosteum lies between the operator and structures which he might otherwise damage.

Fixation is obtained by catgut or kangaroo tendon. If the fracture be "T"-shaped a tri-radiate plate may have to be applied.

After fixation of the fragments the arm is put in a plaster case as detailed above.

**Fracture of
the Clavicle.**

A 2-in. square rubber pad is placed over the clavicle at the point of break. A long piece of 2-in. wide adhesive strapping is now placed in the position of a "Sam Browne belt" so that its middle lies over the rubber pad. It is stuck to the back first so that its pull on the clavicle is backwards and upwards. The arm is placed in a sling. Massage is commenced at once. The adhesive plaster comes off in two weeks.

In most cases this will give an excellent result, and it does not interfere with wearing a coat as does a posterior splint. When a first-class cosmetic result is desired, the patient should be in bed three weeks, with a rolled towel between the shoulders, and

another towel folded flat across the point of the shoulder, its ends being fixed by sand-bags.

**Fracture of
the Carpal
Scaphoid.**

The hand and wrist are immobilized for eight weeks in a plaster case. This reaches from the elbow to the heads of the metatarsals, holding the hand in the position of grasp, with the wrist dorsiflexed at the radiocarpal joint, and the thumb lying beneath the index finger in the opposed position. Should an X-ray show that manipulation has failed to appose the fractured surfaces, then the proximal half or the whole scaphoid should be excised forthwith, using the anterior incision approach.

**Fracture of
the Shaft of
the Humerus.**

This is best treated by the application of a plaster case including the chest, upper abdomen and the upper limb, reaching to the metacarpo-phalangeal joints. The case abducts the shoulder from 45 to 90 degrees, the actual amount being determined when the arm is moved under the anæsthetic. The elbow is flexed at a right angle and the wrist dorsiflexed. Three weeks later the upper half of the case is removed. The limb now lies in an open gutter, being readily accessible for massage and movement of the elbow.

During the application of the case the assistant extends the upper arm by pulling on the condyles. This extension is retained during the wearing of the case, since the elbow is kept at a right angle. An X-ray is taken the next day when the plaster is dry. It may be found in a muscular man that the ends overlap or are angulated.

The case is removed and the patient placed in bed with a Thomas's arm splint in full abduction with extension by adhesive strapping. An oblique fracture had better be treated this way at the outset. In the writer's experience it is difficult to obtain adequate extension in muscular manual workers if Jones's ambulatory splint be used. This may well be his fault rather than that of the splint. In the event of failure to obtain alignment in a powerful muscular arm by external splinting, there should be no hesitation to cut down and fix by internal splinting.

In a child or lightly-built woman such difficulties do not arise. A sling and co-aptation splints may indeed suffice.

**Surgical
Neck of the
Humerus.**

A plaster case is applied just as described above for the shaft. The appropriate degree of abduction of the shoulder is determined under the anæsthetic at the time of application of the plaster case.

**Shafts of
Radius and
Ulna.**

For fracture of either bone alone, manipulate under anæsthesia and apply a plaster slab splint to the dorsal surface of the forearm, with this latter in full supination and the elbow at a right angle. Should both bones be broken, a plaster slab should be applied in the same manner, but it will be found much harder to obtain alignment. Open reduction should be performed when manipulation fails. The best type of internal splint will be found to be a loosely fitting ivory intramedullary peg.

**Fracture of
Metacarpals
and Phalanges.**

If only one be injured and there be little displacement, the hand should be bandaged over and grasping a roll or ball. If several be broken or there be displacement, the "banjo" splint is easy to apply and efficient in action. A ring of malleable iron wire is made encircling the hand at a distance of at least six inches, with its ends incorporated in a plaster case surrounding the forearm. Six-inch sewing needles are pushed antero-posteriorly through the distal phalanges of the affected digits, and corks are thrust on the projecting ends. Tapes

passing round the needles are fastened to the wire banjo and provide the extension.

Those without experience of the method might well imagine this transfixion to be a septic and painful procedure. That it is neither is as astonishing as it is true.

**Fracture of
the Neck of
the Scapula.**

This is not uncommon when a heavy weight falls on the abducted shoulder of a meat porter. It is difficult to retain reduction. Under full anæsthesia, the patient wearing a vest with arms has a plaster case applied to the chest, the plaster being well moulded over the scapula and its axillary border with the arm near the side. When the plaster has dried the arm is abducted and traction exerted on it. The plaster case is now extended to take in the arm as far as the metacarpal heads, the elbow being flexed and the wrist dorsiflexed. The case is bivalved and the upper half removed after three weeks, when massage is commenced. The rest of the case is removed two weeks later.

**Complications
of Fractures
of the
Upper Limb.**

(a) *Co-incident Nerve Injuries.*—Paralysed muscles are prevented from stretching by suitable splinting and their nutrition maintained by physiotherapy. Should signs of returning function not appear, the nerve must be explored and freed or resutured.

(b) *Sepsis.*—This is usually due to the fracture being an open one from the outset. Treatment consists in packing the wound with gauze and cleansing the surrounding skin. Next the edges of the wound all hopelessly damaged tissues are excised.

The wound is wiped out with ether and Carrel-Dakin tubes sewn to gauze placed in its depth. Freshly prepared Dakin solution is run in at regular intervals, until it is shown both clinically and by swab smears of the wound juices that infection has been overcome. It is sometimes amazing how little sepsis results from the gross traumatic insults which tissues sustain. The writer once removed from the knee-joint two ounces of road grit, grease and mud. The joint healed by first intention.

(c) *Delayed Union.*—If there be apposition and asepsis, this is best treated by a buffed leather gaiter splint lacing around the limb. Exercises are performed promoting axial pressure on the broken ends. The patient leads an open-air life with a liberal diet.

(d) *Non-Union.*—This will already have had treatment under the heading of delayed union. Should this fail an inlay bone graft is advised forthwith. It is usually obtained from the patient's tibia. It is to be preferred to a dowelled intra-medullary peg.

THE TECHNIQUE OF THE INJECTION TREATMENT OF HYDROCELE.

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THE rationale of the treatment is the introduction of a sclerosing solution into the sac, sufficiently irritating to produce an aseptic, intense, inflammatory reaction of the serous lining, which reaction causes the opposing walls to adhere firmly, and since endothelium is mesodermal in origin the process of repair following this reaction