APROPOS TO FRACTURES.

BY HAROLD DODD, CH.M., F.R.C.S.ENG.

Hon. Surgeon, King George Hospital, Ilford and Royal Hospital, Richmond.

THE first essential point in treating a fracture is to "diagnose the fracture." In this obvious statement are two streaks of gold :—

(1) To urge almost every injury, no matter how trivial, to be X-rayed ; repeatedly unsuspected fractures, pathological changes, like signs of an old fracture, a chondroma or bony cyst, and when a wound is present, sometimes a foreign body, are found.

(2) One is fulfilling the oft-repeated sound advice of the Medical Defence Societies and many others ; it benefits and protects the patient and oneself.

Having established the diagnosis, what is the best treatment ? No matter what line is favoured its *immediate* application goes a long way to ensuring its success. Usually the first real, early effort is the best and the last, and anxiety as to result is banished. Delay often means several attempts before even a passable position is obtained often with some associated anxiety and apprehension.

Immediate Treatment.

For complete reduction, in most cases, some sort of anæsthetic is necessary, and it is advisable to have the help of another doctor. This permits two things : (1) A consultation and his advice with reference to the patient's condition, and legal support if necessary ; (2) undivided attention to the reduction and splinting.

Four types of anæsthesia are available : (1) The general. This must be deep for the necessary, complete relaxation, so that the patient needs to be prepared for it several hours before and lie up some hours after it, besides not always being a

Anæsthesia.

suitable subject for it. It is useful for upper limb fractures ; (2) spinal anæsthesia is excellent for injuries of the legs. Novocaine is probably the safest. It needs some experience in dosage and administration ; (3) regional or plexus anæsthesia calls for a skill in injection which is not always available, e.g., brachial plexus anæsthesia in the arm ; (4) infiltration of the fractured bone ends has been popularized by Bohler's lead during the last few years. It gives excellent results adequately done, but the sterility of the skin, solution and syringe must be quite dependable before using it. In any case, it converts a simple fracture into a compound one, and the fracture may become infected. I have seen a simple fracture become infected without any interference, so that this injection anæsthesia carries a definite added risk to the fracture.

With Regard to Splints.—Aluminium gutters, skeleton types like the Thomas knee-splint and plaster of Paris are the varieties of choice. Wooden splints

Splints.

have had their "day." Speaking generally, they are not satisfactory, and of them, one would single out Carr's splint for prompt relegation to the museum and scrap-heap.

The position should be checked immediately by X-rays and early repeated ; further checked attempts made if necessary.

After-treatment.—Carefully and regularly observe for : (1) Ischæmic palsy in forearm injuries ; see the patient twice the first twenty-four hours, and daily for three to four days afterwards. Pain is a warning symptom ; in a reduced and adequately splinted limb ; pain quickly subsides and patients are soon comfortable ; (2) nerve palsies ; in fractures of the arm, forearm and

After-Treatment.

elbow, a musculo-spiral, ulna or median nerve paralysis; in leg injuries, external popliteal (shown by a drop-foot), sometimes occur; (3) splint sores on the leg, especially over the heel. To avoid this, nothing should touch the heel, or it can be protected by a rubber pad; sores or patches of necrosis are then unlikely.

In leg injuries avoid the use of crutches. These stimulate a "crutch" cripple mentality, causing some patients to behave as cripples and "play up" for sympathy, directing their thoughts to compensation instead of recovery. Modified weight bearing by elbow or hand sticks is infinitely more preferable. Crutches are scarcely ever necessary and cannot be too heartily condemned for ordinary fractures.

How long should splints be retained? This is a difficult point to decide. There was hesitation to give definite times at a recent discussion on "Fractures about the Ankle-joint" at the Royal Society of Medicine. The crux of the matter is *the*

**Union of
Fragments.** *presence of bony union*, and the only guide to this is the X-ray taken at regular intervals. The rate of union varies according to: (1) The age and general health of the patient; the latter can be improved by large doses of the old fashioned, syr. ferri phos. B.P., three times a day, and cod-liver oil and malt. Constitutional disease like fragilitas ossium or a nerve lesion will retard union. Union is much quicker in young people; (2) the blood-supply of broken fragments. This is a dominating factor and it varies considerably. This has been well demonstrated to me many times. The following two cases illustrate it:—

(a) A young man had a spiral fracture of his tibia, on which I performed open reduction and plating. After drilling the holes in the upper fragment, blood briskly welled out of them, but after making similar holes in the lower fragment, the drill shavings were dry as sawdust, and the holes remained quite clear, no blood issuing, thus demonstrating that the blood-supply to this fragment was almost cut off and that close to the fracture, it was actually, approximately an autogenous graft. Callus was not visible by X-ray for ten weeks.

(b) An old man, aged 65, sustained a comminuted fracture of his tibia, breaking it into three pieces of about equal length. I plated it; the upper two fragments bled copiously on drilling the holes, but the lower piece not at all, and X-ray showed, as was expected, union between the lower two fragments was very considerably delayed after that of the upper two, in fact ten weeks after the accident; when the patient had been up a month in a caliper, movement was perceptible in the lower fragment, ample callus having been thrown out early between the upper two fragments; however, union was firm a month later.

Thus a reliable working guide in the treatment of fractures is demonstrated, i.e., that splints should be retained until X-ray shows that bony union is progressing. No unpleasant sequelæ are likely if this rule is followed. Union based on this determination takes much longer than is commonly thought; the

**Period
Splinting is
Required.** classical three weeks for the radius and ulna, four weeks for the humerus, five weeks for the tibia and six weeks for the femur is often and considerably exceeded. I have seen a fifth metacarpal take three months, a Colles' fracture ten weeks, and a fractured scaphoid six months; but being in a plaster, which permitted the performance of ordinary duties, union ultimately took place and there was no pain after removing the plaster, whilst function was almost immediately normal, without any massage, &c.

I have had the mortification of seeing a perfectly reduced fractured radius bend

with a marked prominence, because the splints were removed in three weeks. This was before the days that I used X-ray as routine to determine progress. Bohler emphasizes this point, and also that when bony union is complete pain is absent ; but if splints are removed before union, then discomfort is certainly experienced, and relieved by the re-application of the supports.

IN the *British Medical Journal* correspondence columns recently, there was a brisk discussion which emphatically favoured the treatment of fractures of the lower limb, when possible, by plaster and early careful weight bearing. My experience is strongly in favour of this. I believe it is a fact that if a dog or cat breaks a leg, and it is firmly splinted non- or delayed union results, but if the limb is left alone, and the animal is permitted to hop about without splints, union takes place quickly and in a useful position. A human being is admittedly different, but there is a fundamental truth applicable to both cases, i.e., that function increases the blood-supply of the part and therefore assists union, whilst lack of function actually impairs the nutrition of the part, muscle wasting and osteoporosis of the bones taking place, thus retarding union ; recovery occurring "in spite" of the immobilization treatment and not as a result of it.

Another useful, homely practice is, after removing the splints (I use the word splint in the general sense), to keep the part warm ; this is frequently neglected in the injuries to the arm, forearm and hand, including whitlows, nerve palsies and fractures. How often one sees recovering hands, mottled red and blue, shiny and cold ; no wonder recovery is slow. How stiff and clumsy are normal hands when cold, so how much worse off is a cold injured hand ! On this account I instruct my patients to wear a glove, day and night, from the beginning of the injury until complete recovery ; the warm comfort is always appreciated, and the accelerated recovery in whitlows and nerve injuries is considerable. In the event of the dressing or splint not permitting the use of a glove, a woollen sock or stocking pulled over serves the purpose well. The same remarks apply to a foot. One reason advanced for the use and advantage of plaster is that it keeps the part so warm.

The care of the feet in and after leg injuries is important. Patients frequently put on weight during their enforced period of limitation of activity, and this, plus the loss of leg muscle tone, due to the disuse or the injury, may quickly excite a pair of flat feet, which must be avoided, and are often very resistant to cure. The uninjured foot should also be cared for ; it is called upon to carry a greater share of the work than usual.

Post-traumatic flat-feet can be guarded against in two ways :—

(1) By fitting them with an adequately strong pair of shoes or boots, which can be adjusted, if necessary, e.g., by internal wedges to the soles or heels, by an outside iron and inside T-strap, or even a walking caliper.

Often patients are seen in the street, in hospital, &c., with a crutch or stick, and a slipper. Little wonder that they are incapacitated for weeks, with a flat painful and swollen foot, and that they develop pain in the opposite foot, knee or hip.

Swelling of parts after fractures often occurs if immobilization without function has been the method of treatment. It is persistent and painful. Firm bandaging, and encouragement with regard to perseverance in effort is the treatment. Diathermy is

**Plaster v.
Splints in
Treatment of
Fractures—
Lower Limb.**

**The
Importance
of Warmth in
Restoration of
Function of
Injured Limb.**

**Post-
Traumatic
Flat-Feet.**

especially helpful for relieving the pain. Splinting so that some useful purpose can straight away be performed by the limb does a good deal to prevent this residual oedema.

Occasionally, an eczematous condition may develop in the injured limb, and for this I have used elastoplast applications satisfactorily, together with persistence in purposeful exercises.

(2) Instructing patients regarding the danger and advising them how to take care of the feet. The following underlined points are printed separately on a card and given to them : (a) Scrub the feet and legs daily in hot water. This ensures a form of effective massage to the feet and muscles of the calf ; patients speak highly of its effectiveness. (b) Wear thick stockings or socks and change these frequently. (c) Avoid standing. Standing strains the already weakened calf muscles, it taxes the feet more than walking, which calls for an intermittent effort alternating with momentary rest, whilst standing demands a sustained effort. (d) Walk with the toes pointing directly forwards, never turned outwards. This tends to throw the weight on to the outsides of the feet—that is, away from the strained inside arches. (e) Shoes or boots must be worn from the moment of getting out of bed in the morning until getting into bed at night. This ensures arch support all day. Recovering muscles can easily be exhausted by neglect of this point in the morning and evening. (f) Never walk in soft slippers or in stockinged feet. This avoids unsupported arches. (g) When sitting, the feet should be put up on a chair or couch, if possible. This permits an easy circulation and removes the weight of the legs and thighs from the feet. (This is quite considerable, as is clearly realized when carrying an amputated limb, or holding the limb of a patient during an operation.) Whilst sitting thus, I tell patients they may remove their boots, but that they must put them on before moving. (h) Practice moving the feet and toes up and down, about twelve times before or after food daily, also when in bed, on the bus or on the train. This retones the muscles of the feet and calf, and is definitely helpful, though it appears to be a trivial exercise.

In this wandering discourse over a large field, touching upon points I have found of value, but not so widely practised as they perhaps deserve, no mention has been made of *massage*, for the reason, that generally speaking, it is not an essential when fractures are treated on these lines. It is, I fear, sometimes used as an alternative to vigorous, prompt, direct methods, but it is a very bad one. Active re-education of muscles is of greater use, but alas, in these days the habit is to demand something easy. Encouragement, and goading patients into making active efforts calls for a sustained mental effort from the re-educator and the patient ; the former is often short-staffed and working in a crowded department, and has not sufficient energy to go round, whilst the “pupil” is not always willing, preferring to doze or read or chat under the smoothly-powdered hand of the masseuse.

In one condition I do find massage of definite value ; it is that of the nervous, debilitated adult, in whom the accident has precipitated a general “upset” ; insomina and so-called “ neuritis ” all over being prominent symptoms. Gentle, firm massage to the body and limbs has a definite soothing effect on these sufferers, and will do a good deal towards inducing sleep, loss of which occurs early, is wearing and depressing to the patient and trying for the doctor.

**Is Massage
Necessary ?**