

struction; also the denser this new tissue is, the more it will interfere with the exact readjustment of the fractured surfaces. Nature begins her attempts at repair immediately and does not wait for us to reduce the displacement.

The following statements I believe to be facts:

A more exact replacement can be accomplished in the first few hours than if the reduction be delayed, especially if that delay be a matter of days.

The percentage of perfect anatomical results will be much higher with early reduction.

The ease of reduction to a large extent will vary inversely with the time elapsed since the injury.

The additional trauma caused by manipulations during reduction will be reduced.

The evil effects of pressure of a displaced fragment on adjacent structures will depend on the duration, as well as the amount of that pressure.

With a more perfect reduction comes a decrease in the amount of new tissue necessary to repair the injury, which means a lessening of the period of disability and a more complete return of function.

Lastly, the amount of pain and discomfort subsequent to the reduction will be lessened.

Shall we wait for an x-ray? It must be accepted that with a proper x-ray examination (and that includes always views in two planes, better stereoscopic and best of all with the aid of the fluoroscope) a more perfect reduction can be accomplished with less additional trauma than if it is done blindly. Whenever such an examination can be made within an hour or so of the injury, I believe we should wait for it. But if we must delay over night, or over Sunday, it is wiser to proceed without the aid of such examination. The differences between the two-hour reductions and the twelve-hour reductions are not very great, but after forty-eight hours the difference is marked, and to be able to make a second attempt within the pliable time is a strong reason for the immediate attempt. My preceding remarks apply to the closed reduction of fractures and not to the open method. The problem in open reductions differs in two respects: first, we are able at operation to remove the tissue interposed between the fragments in the early days of repair, and so to obtain a more exact replacement; and, second, a new factor is introduced, namely, infection. To combat better the latter we should wait for a few days until the body has had a chance to recover from the stunning of the original injury, before we add a second trauma; until the army of defense has had a chance to mobilize, and the war zone has been properly entrenched against the invading bacterial hosts. But this delay should not be overlong, as those of you who are doing open work well know the difficulty of obtaining and maintaining reposition where the dentations have been filled with

tissue hard enough to need the chisel, or where sharp margins have been rounded off so as to blur the landmarks. In this same connection many cases now requiring open reduction would never come to the operating table had proper attempts been made on the day of injury.

To quote from a former paper, "That odious dictum, 'wait till the swelling goes down,' is responsible for more permanent deformities and lasting disabilities than its author should care to contemplate."

Therefore, gentlemen, if there be any truth in what I have said, may I draw the following conclusions?

That our hospitals should be so equipped that the x-ray plant is available at any hour of the day or night, including Sundays and holidays.

That fractures should be considered in the same emergency class with ruptured ulcer and acute appendicitis.

## THE TREATMENT OF HIP FRACTURES.

By F. J. COTTON, M.D., F.A.C.S., BOSTON.

THE best way to be sure of satisfactory results in hip fractures is to have a system and a conviction; that makes it unnecessary to look up results.

A year ago a surgeon of deserved international reputation told me that if I would only use the Maxwell method always, I should never have any trouble with hip fractures; he never did. And he believed it!

The fact is the results are wretched. The unavoidable mortality is not small; the proportion of permanent cripples (total or partial), judging by data from Scudder and others, as well as my own, will run over 50% in any hospital series, and the private cases not much better.

When one comes to study cases and results in any number, it is obvious that there are two classes,—the trochanteric and the subcapital (probably better terms than the older extra- and intracapsular). The two classes divide sharply; in the trochanteric it is a question of position only; in the subcapital, we have not only position to consider, but a very real question—whether bony union or really close fibrous union is going to occur at all. This is due partly to the poor nutrition of the separated head; partly to the interfering presence of synovial fluid.

And the risk of non-union is not only in fractures loose from the time of injury, but also in those apparently impacted, as shall presently be shown.

Now as to the trochanteric cases. First as to types (Fig. 1). Now there is no question about union in these cases; they unite by massive callus—usually promptly. The



FIG. 1. Types of extracapsular hip fracture. Nearly three-fourths of the cases are of type A, a break at the base of the neck. The lesser trochanter split off as a separate fragment. Note the coxa vara deformity in both A and B.

question is purely one of deformity. There is apt to be outward rotation, easily taken care of, but the real deformity is a coxa vara type; an increase in the angle of the neck with the shaft (Fig. 2). With this goes a ten-

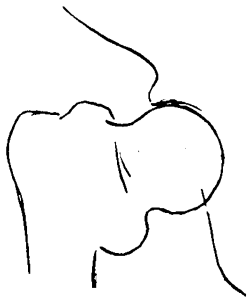


FIG. 2. Extracapsular fracture, old, united. Coxa vara deformity.

dency to adduction contracture, muscle shortening, common to all hip injuries. Any treatment that ensures a reasonable amount of abduction is adequate for this class.

The Maxwell method works; the Whitman method works; and of late I have been trying Moore's scheme of a double spica in flexion and abduction, in which patients can be sat up erect,—a method of advantage in feeblar patients, and of real comfort. This works, and I understand Binnie's method of sitting them up without apparatus gives good results, though I have not used it. One doesn't need forced abduction; simply the prevention of adduction deformity, that's all. (Fig. 3.)

The subcapital breaks, on the other hand, are essentially intracapsular, and therefore have no massive callus. Some are impacted in the beginning, and if they stay impacted, they unite by bone, slowly. If they start loose, or work loose, they do not unite by bone, and produce cripples.

Now, everyone has been claiming everything for his pet method in *all* hip fractures.

I have tried to attack the problem of failure of bony union in subcapital fractures. I am going to try to give an idea of the reality of



FIG. 3. A, Coxa vara.

B, Abduction treatment. Angle of neck corrected.

this problem; of the frequency of failure along conventional lines; then to speak of my attempts.

There are, of course, some cases in which there never was any impaction (Fig. 3). In



FIG. 4. Typical loose fragments. Neck all absorbed. Pictures under push and pull of  $\pm$  50 lbs.

others, not uncommonly, an impaction apparently adequate breaks up. Do not forget that in all repair, especially of soft bone, a period of rarefaction precedes vigorous bone growth (Fig.

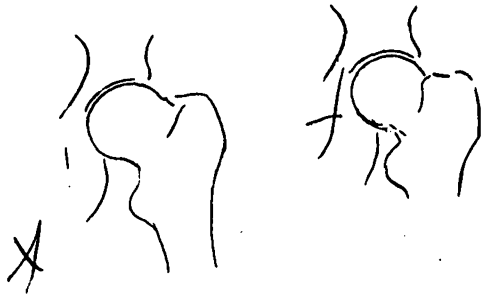


FIG. 5. A, Fresh neck fracture—hardly more than a crack.  
B, Same, forty-four days later. Note absorption of length of femoral neck without loosening of bony contact.

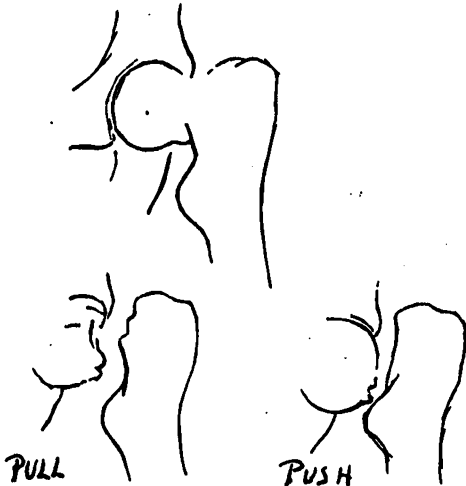


FIG. 6. A, Accidental impact. This loosened without fresh accident.  
B, Pull; C, Push, taken five months later, showing what happened in the end. A wretched clinical result.

5). During this stage, or later, many a hip falls apart (Fig. 6).

My idea was to secure to the loose fractures the advantage of impaction; to re-impact those that needed correction; to fix them all in a



FIG. 7. Two end-results of artificial impaction.  
A is the x-ray taken at 10 months.  
B was taken at 15 months.  
Both these patients walk without a limp. Both were shown in October before the Clinical Congress.

moderate abduction. This I have done for some six years, in about thirty cases.

The method has been of hammer impaction (after reduction) and a plaster spica. No harm has resulted in any case. The plates show some of the results (Figs. 7, 8, 9, 10).



FIG. 10. Loose fracture. Mallet impaction. Figure to the right shows condition six weeks later. Is now beginning to walk.

It is my contention that these results are encouraging; that no one has shown better results in intracapsular cases.

The other cases do not strike me as worth quarreling about; they do well under any careful treatment. The question is: Is this the best way to treat this class; the unimpacted or poorly impacted subcapital fractures; the ones that have in the past given such lamentable results, even in competent hands?



FIG. 8. Artificial impaction. A, Before; B, After; C, Three months later. At six months has not over five-eighths inch shortening and promises an excellent result.



FIG. 9. Case of loose neck fracture operated on at the Peter Bent Brigham Hospital. Courtesy of Dr. Harvey Cushing.  
A, Before impaction. Impacted with mallet in usual way.  
B, Shows result two weeks later. (From x-ray through plaster spica.)  
C, Taken four months later.