Conclusions

1. The proper use of a Smith-Petersen nail is the best method of treating intracapsular fractures of the neck of the femur. Its simplicity and accuracy represent a great advance over older methods.

2. The Smith-Petersen nail is only the provision of an efficient internal splint. Its great merit is that it allows the patient to get up within a few days.

3. The Smith-Petersen nail will neither ensure nor encourage new bone formation, and therefore there must always be failures after its use.

4. The nail can only succeed if it is accurately inserted after the fracture has been perfectly reduced.

5. The open operation is the method of choice in young and vigorous patients.

6. For feeble old patients the blind method, using a mechanical guide for inserting the nail, should be used. This is easy and is free from danger.

7. In ununited cases a bifurcation osteotomy is usually the method of choice.

OPERATIVE TREATMENT AND RESULTS IN FRACTURE OF NECK OF FEMUR*

BY

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Hardly any form of fracture has attracted such interest and been the subject of so much discussion as fracture of the femoral neck, especially during the last few decades. The pessimistic feeling regarding its treatment has now given way to a more hopeful attitude. Authors differ, however, on this subject. As late as 1935 the well-known American surgeon, Kellogg Speed, called this fracture "the unsolved fracture." With the greatest surprise, then, we hear that one of the leading surgeons of Germany, Professor Sauerbruch of Berlin, last year proposed removal of the head of the femur as a standard method in patients over 35 years, a method which I thought had been abandoned all over the world a long time ago.

The bad results have been thought to be due to the peculiar anatomical conditions in this form of fracture and to the high average age of the patients. The experience of the last few years, however, seems to me to have produced abundant evidence that this view must be abandoned. With the proper technique, consisting in exact reposition and good fixation, not too quickly removed, fractures of the femoral neck can be healed as easily as others. Everything, or nearly everything, depends on the technique. That the demands can be met and good results be attained with conservative treatment has been shown by Whitman, Lorenz, and Löfberg among others.

The Conservative Method

It is, however, not so easy to get a clear idea of the results to be attained by conservative treatment. The different statistics are scarcely comparable, for the reason, among others, that the cases have been selected for treatment particularly with regard to age. Concerning the end-results most of the statistics leave much to be desired. I think, however, that the American surgeon Gill comes very close to the truth when he says:

"Making due allowance for the faults of statistical tables, and granting that some surgeons, because of their greater expertness in manipulation and putting on plaster, may get better results than others, it is still evident that the use of the Whitman method has given vastly better results than the older methods of treatment, and that good end-results may be expected on a general average in 50 to 65 per cent. of cases."

In a critical review of various statistics of conservative treatment Gill estimates the primary mortality at not less than 20 to 25 per cent. In my own ward all cases were treated conservatively up to the year 1932. During the ten-year period 1922-31 the number of cases amounted to 390 and the mortality was 19 per cent. Concerning the end-results I can only say that they were worse rather than better than the average.

I have no experience of my own regarding the operative treatment entailing exposure of the fracture site, and for this reason will not discuss that method.

Extra-articular Osteosynthesis

In the method of treatment evolved by myself—extra-articular osteosynthesis, first published in the *Zentralblatt für Chirurgie* in 1932—three fundamental points demand attention: first, non-operative reposition by extension in the position of abduction with inward rotation following; secondly, fixation—without exposure of the fracture site—by the use of Smith-Petersen's rustless nail; thirdly, artificial impaction according to the method of Cotton. The following are the details of the treatment.

The reposition is done in bed with wire traction through the tibial tuberosity. In general, one week is enough to reduce the dislocation in the frontal plane. It is important that this primary wire traction take place with retention of the outward rotation, otherwise there is always the risk that the head will rotate. At the start I performed the reposition on an extension table as soon as possible after the accident; in most cases a satisfactory reposition was attained in this way, but not in all. Of my first 100 cases, in which as a rule the reposition was made on the extension table—redislocation took place in 16 per cent., necessitating a second operation; in the later seventy-nine cases, in which previous extension in bed was the rule, the corresponding figure was only 4 per cent. The advantage derived from the period of waiting is that the patient can be specially observed in regard to heart and lungs. Cases which are bad risks can be improved or eventually excluded. The only manœuvre of reposition which is needed on the extension table is inward rotation (about 25 degrees), of course with maintained extension. An abduction of about 45 degrees is enough.

Experience has shown that the reposition made in bed is not endangered by the removal of the patient to the extension table. Local anaesthesia and a few drops of ether while inserting the nail are enough if the patient has been given morphine beforehand. If spinal anaesthesia is used there is always the risk of an undesired over-extension. The reposition is controlled with x-ray pictures taken in two positions at right-angled planes; the position of the guiding wire and the nail is controlled in the same way. To simplify the insertion of the nail a thin stiff wire is first drilled into the centre of the femoral neck. After radiographs in two planes have shown the position of the wire to be satisfactory, the nail, which is bored through, is threaded on the wire. The wire is then withdrawn, and with a few blows on the femur shaft below the trochanter the desired artificial impaction is effected. The most important point is to judge the direction accurately when introducing the wire. This is done in the following simple way.

* Read in opening a discussion in the Section of Orthopaedics, including Treatment of Fractures, at the Annual Meeting of the British Medical Association, Belfast, 1937.

About two centimetres below and parallel to Poupert's ligament are placed two rows of lead shot, each row consisting of three pieces. In this way the determination of the central point of the head in the frontal plane is greatly facilitated, it being possible to fix it within a millimetre or so. The point, when ascertained, is marked with a short hypodermic needle. In order accurately to locate the actual point of entrance for the guiding wire a sharp-pointed steel pin is inserted percutaneously just below the greater trochanter and radiographs are taken. The optimum point of entrance for the guiding wire, in both the frontal and the sagittal plane, is now easily calculable.

The required length of nail is ascertained in the following manner. The guide-wire is inserted for a distance of 9 cm., or, if the femoral neck is very short, 8 cm., and a skiagram readily shows whether the nail should be longer or shorter than the wire. Allowance must be made for the slight enlargement of the picture produced by the distance between the x-ray tube and the film. I once had the unfortunate experience of seeing a nail broken: the patient in question was unusually heavy. This kind of accident can be avoided, however, by using a nail with wings one millimetre broader than usual.

The position of the nail in the femoral neck is not a matter of indifference, since the forces of displacement that are compensated for by means of the nail are in a large degree dependent upon the situation of the fracture line. This fact was convincingly demonstrated as a mechanical problem by Pauwels in his work on fractures of the neck of the femur, published last year.

Owing to individual variability the axis of the femoral neck does not always assume a horizontal position upon 25 degrees inward rotation of the knee-joint, but by my method this does not much matter as the alignment apparatus I use permits a very satisfactory adjustment of the angle to the horizontal plane.

In the majority of cases I consider the axial location of the nail to be the best, for the simple reason that there is less risk of getting outside the femoral neck and head. Only in the cases in which the fracture line is almost vertical—uncommon cases in my experience—should one try to put the nail in the uppermost part of the neck.

After the operation the patient is placed in bed in a position of slight flexion at hip- and knee-joints, and remains there as a rule for at least one month. During this time treatment consists of mobilization of the limb, muscle massage, and stimulation by faradic currents. In order to avoid pulmonary congestion very old patients are allowed to sit out of bed at an earlier date, but any weight-bearing is absolutely prohibited. Thereafter one proceeds to walking exercises in a walking-chair. This continues for about a month, after which time the walking-chair is replaced by crutches—two at first and one later on. In uncomplicated cases, after about three months the ability to walk is usually quite good, and even full weight-bearing is painless. Observation by repeated radiographs is to be recommended as a safeguard against unpleasant surprises.

Should the position of the nail immediately after the operation or later prove unsatisfactory and redislocation occur one should not hesitate to reoperate. I have done so in nineteen of my 179 cases—that is, in about 10 per cent. In ten of these nineteen cases bony union took place. Redislocation has as a rule resulted from the use of the wrong technique; in some cases the nail had slipped on account of too early weight-bearing, in others the cause is not known. In twenty-six cases out of 179 the nail was extracted after it was certain that bony union had ensued

(generally not before six months). The reason was in most instances that the nail had been displaced outwards and caused pain and aching.

A very important point is secondary necrosis of the femoral head. Here one has to differentiate between the healed cases and those not healed (pseudarthrosis). That the head in the latter cases should necrose is not surprising; in the former—that is, the healed cases—necrosis is, according to my experience, not very frequent. I have only seen it happen three times; in one case with very slight alteration and no clinical symptoms. On one occasion I performed arthrotomy and removed the necrotic part, which resembled typical osteochondritis dissecans. Even in cases treated conservatively one now and then observes necrosis. This is probably due to primary lesions of the vessels and not to the operation as such.

Partial necrosis of the head is more frequent in young than in elderly patients. In one of my cases, that of a boy 13 years old with a medial fracture, it occurred after the fracture had healed—a spontaneous epiphyseolysis.

Results

My own statistics now comprise 179 cases, most of them medial fractures. The classification has been according to Anschütz's scheme. The results are shown in the following table:

Medial Fractures

Age	Total Cases	Deaths	Cases Operated on	Complications				
				Non-union	Osteo-Arthritis of Hip	Aseptic Necrosis of the Femoral Head	Separation of Upper Femoral Epiphysis	Cases the Fate of which is Uncertain
Under 60	53	1	52	0	1	1	1	1
Over 60 ..	112 (66)	18 (15)	94 (51)	8 (5)	1 (1)	1		6 (6)
Totals ..	165 (66)	19 (15)	146 (51)	8 (5)	2 (1)	2	1	7 (6)

Intertrochanteric (Basal) Fractures

Age	Total Cases	Deaths	Non-union
Under 60	3	0	0
Over 60	11 (7)	0	0
Totals	14 (7)	0	0

The mortality was 10.6 per cent. Bony union followed in 95 per cent. of all cases alive, and in 94 per cent. of all medial fractures alive.

The figures in parentheses represent the number of patients in that group over the age of 70.

In one case only can the cause of death be attributed to the operation. This was a case of fat embolism. In nine cases the cause of death was found after full investigation not to be due to either the fracture or the operation. Fifteen patients out of the nineteen who died were more than 70 years old.

Time does not allow of an account of other statistics and comments on them. In passing I will only mention that, among others, Böhler and Felsenreich in Vienna, who used the method I have described, a short time ago published relatively large statistics showing the same favourable results.

Conclusions

My conclusions are as follows: By proper reposition and fixation bony union and fully satisfactory functional

results may be obtained in the majority of cases, even in medial fractures and in very old patients.

It is possible to obtain the fixation necessary for good union by means of the method of extra-articular osteosynthesis just described. This method is capable of wide application, because it is not necessary to put the patient in plaster-of-Paris afterwards—a fact which reduces the risk of mortality. The after-treatment is thus very much simplified.

The conservative treatment, as well as operative treatment with exposure of the fracture, should therefore be replaced by extra-articular osteosynthesis as the standard method.

PHYSICAL DISORDER IN 164 CONSECUTIVE ADMISSIONS TO A MENTAL HOSPITAL

THE INCIDENCE AND SIGNIFICANCE

BY

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The existence of certain types of mental disorder which are caused by organic disease is too well known to need emphasis. Physical illness consequent upon mental disorder is equally well known. The extremely large number of physical disorders present in a series of consecutive admissions to the above hospital has indicated the need for an analysis in some detail of the types encountered, and a correlation, if any, between the mental and physical symptoms. This mental hospital serves a wide and thickly populated area, one which has suffered greatly owing to the industrial depression during the past few years. Hence a large number of the cases under consideration were admitted from what have been truly termed "distressed areas." This fact may be of significance as contributing, in the opinion of the author, to an abnormally high incidence of physical disorder in mental admissions.

Nature of Physical Disorders Encountered

Table I classifies in general terms the numbers of those admitted who have been or are suffering from medical, surgical, or gynaecological conditions. It also includes a miscellaneous group which will be described later, and a special group of cases termed "acetonuria" which are considered to be indirectly due to mental illness. From the table it is seen that of the 164 patients admitted 137 were found to suffer from some pathological lesion, but in this figure are included eight cases of senility (patients of 70 years of age or over) and seventeen of general paralysis of the insane. If excluding these, therefore, from the 164 admissions, 112 were considered to be physically unfit, a percentage of 68.

TABLE I

Total admissions	..	..	..	..	..	..	164
Medical conditions	..	..	..	..	..	..	61
Surgical conditions	..	..	..	..	..	..	20
Gynaecological conditions	..	..	..	..	..	..	8
Miscellaneous group	..	..	..	..	..	..	9
Senile cases	..	..	..	..	..	..	8
General paralysis of insane	..	..	..	..	..	..	17
Acetonuric group	..	..	..	..	..	..	14

These cases may also be classified under three distinct headings, dependent upon the connexion with the mental symptoms exhibited by the patient:

1. Patients whose mental symptoms are apparently the direct result of physical disorder—for example, arteriosclerotic dementia.

2. Cases in which the mental and the physical illness vary *pari passu* with one another. Thus, two females were admitted suffering from benign hypertension, and under treatment both physical and mental symptoms improved simultaneously. These cases will be described later in greater detail.

3. Patients with both physical and mental disorders which possess no apparent connexion with one another, and must be regarded as two distinct entities. These are well exemplified by cases with surgical conditions which could not be correlated with the psychoses of these particular patients. In the interests of clarity and detailed analysis it is of advantage to discuss these cases after classification according to the various systems affected.

Circulatory System

Of the total admissions twenty-nine were found to be suffering from some form of cardiovascular change, as shown in the following table:

TABLE II

Hypertension :	No. of Case
(a) Benign	5
(b) Malignant	10
Valvular disease of the heart	9
Chronic myocardial disease	5

The cases of benign hypertension are of interest, being good examples of physical and mental disorder varying *pari passu*. Thus on examination three females were found to have an average systolic blood pressure of 190–200 mm. Hg in the absence of any renal lesions. The average age of these patients was 50 years, and consequently the condition might well be termed a "menopausal hypertension." Each patient exhibited similar mental symptoms—namely, nervous and emotional instability, being easily fatigued, readily upset by small everyday worries, and showing a tendency to hypochondriasis. Rest and the administration of bromide and theominal resulted in a simultaneous amelioration of both the physical and the mental symptoms in two of the three cases, with subsequent discharge from the hospital.

The patients with malignant hypertension constitute a fairly definite group in which the mental symptoms in most cases can be attributed to the physical disorder—namely, generalized arteriosclerosis accompanied by renal changes. Three of these were suffering from residual hemiplegia on admission. In six, whose ages varied between 56 and 65 years, the mental state was in the main one of confusion and restlessness, and although no cerebral accident had occurred before admission two died of cerebral haemorrhage during residence. The last case was that of a young male schizophrenic aged 30 years, who had a previous history of acute nephritis and whose physical state on admission was typically that of malignant renal arteriosclerosis. It is, however, realized that this group, which one is apt to class as arteriosclerotic dementia, may not be quite so clear-cut as one might infer, owing to the common incidence of arterial disease in mental patients even at comparatively early ages.

The nine cases of valvular disease of the heart included in this series exhibited no obvious relation to the type of psychosis present. Three of these patients were suffering from mitral stenosis, one of whom incidentally has since developed signs and symptoms of subacute infective endocarditis; three from mitral regurgitation; and three from aortic regurgitation. Again, in the five cases with physical