

Some evidence is given that smoking can produce more severe symptoms. The relation between smoking and chronic bronchitis is discussed.

I would like to thank Major J. L. Kilgour, M.B., Ch.B., R.A.M.C., for his encouragement.

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## TRAUMATIC EFFUSION OF THE KNEE—A DISCUSSION

BY

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PATIENTS suffering from chronic lesions of the knee following injury are all too familiar to any surgeon attending orthopaedic out-patients. A considerable proportion have identifiable lesions amenable to specific treatment, *e.g.* tears of the cartilages. In many, however, no such lesions can be found and the only physical signs are wasted quadriceps muscles and effusion. This effusion, the patient will tell you, varies in size and any minor strain or undue exertion suffices to cause an exacerbation. In addition the patient may well complain that the knee "feels weak."

Why should these effusions recur so disappointingly?

What is the rationale of treatment?

### *The function of the knee joint*

The instability of the bony configuration of the knee is universally recognised. The elbow joint has a similar range of movement, but because of the socket shape of the trochlear notch considerable skeletal stability is achieved. The fundamental difference between the two joints perhaps depends upon the factor of weight bearing. This requires that the inferior aspect of the femoral condyles be relatively extensive, and the curvature of the condyles cannot therefore be constant—a true hinge joint being thereby impossible. Some stability is provided by the ligaments, but these are only taut in limiting positions. It appears then that the quadriceps muscle with its tendon and expansions must be the mainstay of the stability of the joint. Indeed the quadriceps expansion comes so far back (to the level of the collateral ligaments) that the muscle grips

about two-thirds of the circumference of the joint. With the patella and top of the tibia these expansions effectively complete a socket for the condyles, while the situation of the patella in a groove on the femoral surface enhances the control effected by the quadriceps muscle.

It may be suggested then that in addition to its function as a prime mover of the knee, the quadriceps shows in extreme degree that function as a "living-ligament" with which we are familiar in the short muscles of the hip and shoulder. Such function must depend on the very rapid and powerful reflex activity of the muscles, and accords with the high speed and plasticity of the stretch reflex.

#### *The reaction of the quadriceps to injury*

It is a matter of simple observation that extremely rapid wasting of the quadriceps follows acute inhibition after injury. It is not altogether easy to understand a reaction which proves so disastrous in the long run—but it is probably an effect of the intensive inhibition of local muscle tone induced by nociceptive stimuli. With the muscle in such a state it is not surprising that innumerable minor strains prove injurious, with recurrence of effusion.

It seems likely, too, that the displacement of the quadriceps expansion by a large effusion should impair the mechanical perfection of the "socket," and should distort the reflex settings upon which integrity of quadriceps function depends.

#### *The vicious circle of "traumatic synovitis"*

The foregoing discussion arises from an attempt to explain the association of chronic quadriceps wasting with recurrent effusion, so familiar in the out-patients department. It is postulated that the muscle wasting and the effusion comprise a vicious circle, and that rational therapy is designed to break it. We have two points of attack :

- (a) The quadriceps.
- (b) The effusion.

#### *Management of the quadriceps*

The value of quadriceps exercise has been widely recognised. Yet it is disheartening to notice the number of cases of traumatic synovitis seen in out-patients for the first time, months after initial injury, in whom no such exercise has been advised or practised and in whom the muscle is grossly flabby and wasted.

It may be stated dogmatically that in any knee injury with effusion not severe enough to warrant immediate hospitalisation vigorous supervised quadriceps drill should be started at once—straight leg raising being almost entirely adequate and entirely safe. Most soldiers, I suspect, will drill the muscle sufficiently only under strict hospital supervision.

Almost universally the effusion disappears permanently when the quadriceps has regained adequate power and bulk. Further recurrence compels a careful search for some unrecognised specific lesion.

*Management of the effusion*

We have the following measures at our disposal :

- (1) Rest.
- (2) Aspiration.
- (3) Control by pressure.
- (4) Natural reabsorption of the effusion as healing proceeds.

*Rest.*—The essence of this is release from weight bearing, and suggests that initial treatment of all large knee effusions, in Army personnel, should be undertaken on an in-patient basis, with confinement to bed. When, because of the apparently slight nature of the injury, ambulant treatment is prescribed careful supervision is surely essential, any delay in recovery suggesting the need for bed rest.

*Aspiration.*—It is generally agreed that hæmorrhagic effusion should be aspirated because intra-articular blood is irritant and may lead to adhesions. If it is agreed, however, that the mere bulk of an effusion impairs quadriceps control, and hence recovery, it may be thought that a controlled trial of aspiration as a first step in the management of large simple effusions would be worth while.

*Pressure.*—The Robert Jones bandage ingeniously provides compression and a high degree of immobilisation, if well applied. Probably because of their rapid loss of elasticity, and relatively small support, crêpe bandages should be regarded as essentially a placebo, to be used in conjunction with other treatment.

*Natural reabsorption.*—Le Gros Clark (1945) points out that synovial absorption of the joint fluid increases with movement of the joint. On the other hand, it seems reasonable to suppose that movement of a joint in the acute stage of injury will tend to exacerbate the pathology.

While at the Military Hospital, Wheatley, I was for a few months much concerned with the chronic knee effusions in the hospital. During that period the physiotherapists and I changed our policy from limiting quadriceps drill to straight leg raising until the effusion was almost resolved, and introduced active non-resisted knee flexion exercises immediately the acute reaction appeared to be past. I have not had an opportunity to make anything of the nature of a controlled trial, but our observations at that time lead me to think that such a controlled trial would be well worth while.

## SUMMARY AND CONCLUSIONS

It is suggested that the ætiology of "traumatic synovitis" of the knee is a vicious circle of quadriceps wasting and joint effusion, and that this depends upon the peculiar function of the quadriceps as a living ligament to the knee, its sole stabiliser in many positions.

The value of quadriceps exercises, and the lack of appropriate enthusiasm for them, is emphasised. In the management of the effusion itself, the use of aspiration, the place of non-resisted flexion exercises, and the use of the pressure bandage are discussed.

It remains to ask what is the eventual outcome in cases where these effusions and their concomitant wasted quadriceps persist indefinitely. I do not know of any certain answer to this question, but wonder in what proportion of cases of idiopathic osteo-arthritis of the knee in older people a history of such earlier effusions would be obtained by direct questioning. I have seen at least two cases in men of about 30 in whom an early osteo-arthritis has arisen after a few years of such recurring effusions associated with weak quadriceps.

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## A CASE OF SURGICAL EMPHYSEMA FOLLOWING DENTAL EXTRACTION

BY

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SURGICAL emphysema following dental operations appears to be a rare occurrence: 46 cases have been reported since 1900. A further case is now reported which by a coincidence occurred within a few days of publication of an article on the condition by Shovelton (1957).

A healthy soldier, aged 22 years, had an extraction of his lower right second molar under regional anaesthesia on 18th February, 1957. Following the extraction he used antiseptic mouthwashes and the socket was syringed daily. On 21st February, 1957, he reported that for the past three days he had noticed a cracking sensation on the right side of the face.

On examination a mild degree of surgical emphysema was detected in the right temporal region, over the right cheek and especially below and anterior to the angle of the right mandible. The socket appeared healthy and there was no evidence of sinus or antrum pathology.

The condition had subsided without treatment by 23rd February, 1957.

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