REFRESHER COURSE FOR GENERAL PRACTITIONERS

INJURIES TO THE BACK—II

BY

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Simple compression fractures are produced by hyperflexion of the spine, which may be caused by direct violence such as a weight falling on the back or by indirect violence such as falling on the feet from a height. The former is by far the more common, and two-thirds of the resulting fractures are in the dorso-lumbar region. They are often called "wedge fractures," because they produce a characteristic wedge-shaped deformity of the vertebral body. The deformity is never great, however, and in many cases cannot be recognized clinically. If the vertebral body is crushed by more than one-third of its height anteriorly, the ligaments posterior to the fulcrum (see Part I of this article, printed in our last issue) are almost certainly ruptured. Subluxation then occurs with separation of the spinous processes and the condition is no longer a simple compression fracture but a fracture-dislocation. The differentiation is very important, because, whereas a simple compression fracture is stable and relatively innocuous, a fracture-dislocation is extremely dangerous and associated with a high incidence of damage to the spinal cord or nerve roots.

Management of Simple Compression Fractures

It used to be taught that all compression fractures, however slight the deformity, should be corrected by hyperextending the spine and immobilizing it in plaster-of-Paris for three to four months. There are still many adherents of this view, but it is becoming increasingly accepted that most of these fractures can be treated as soft-tissue injuries with much less trouble to the patient, a quicker return to work, and a better functional result. This view is based on the fact that if the fracture is stable—that is, if the fulcrum and the ligaments posterior to it have remained intact—the deformity is necessarily slight and will not increase even if the spine is not immobilized. The fracture is a crushing of the cancellous bone and will therefore heal readily and rapidly even without fixation.

It has also been established that in a series of functionally perfect results there is the same proportion of patients with residual deformity as in a series of poor results. Deformity in itself is therefore not the crucial factor, nor can it be prevented in certain cases, even if the fracture is reduced and immobilized for a prolonged period. In many of these cases the intervertebral disk has been irretrievably damaged, and, since it is a structure devoid of blood supply, it is incapable of repair and will inevitably collapse once the supporting plaster is removed. It is such considerations as these that have led to a modification of our views about the treatment of simple compression fractures, though it cannot be stressed too strongly that the decision rests on an appreciation of the stability of the fracture and its differentiation from fracture-dislocation or fracture-subluxation. This calls for considerable experience in the interpretation of x-ray films and the films must be of very high quality.

Fig. 1 illustrates a stable compression fracture which was treated on these lines. The patient was kept at rest in bed for three weeks. He was then transferred to a rehabilitation centre, where he proceeded through the normal course of progressive remedial exercises for spine cases. Treatment was completed in eight weeks and he returned to light work.

In three months he was back at his ordinary work as a miner and x-ray films at that time showed that the fracture had consolidated without any increase in the amount of wedging. In other words, he was back at full work at a time when under the older method of treatment he would still have been in plaster.

However, the above regime may seem to be such a departure from orthodoxy that it is permissible to digress for a moment and consider the basic principles underlying the use of plaster or other immobilizing agents in the treatment of fractures, lest it become a ritual rather than a scientific procedure. There are only two reasons for immobilizing a fracture: one is to place it at complete rest in order to promote union; the other is to maintain reduction until union has occurred. There are many fractures, however, that will unite whether immobilized or not (fractures of the ribs, for example, which cannot be immobilized). There are other fractures—for example, of the clavicle—in which deformity within certain limits does not affect function. Simple compression fractures of the spine fall into both categories, so there is no scientific basis for reduction and prolonged immobilization. If plaster is used in such fractures it should be recognized for what it is—namely, a method of resting damaged soft tissues during the initial stages of healing—and as such it may be entirely justified. While I subscribe to these views, however, it must be stressed that there are still many authorities who adhere to the methods advocated by Böhler and Watson-Jones that all compression fractures of the spine should be immobilized in hyperextension for three to four months.

FIG. 1.—Radiograph of simple compression fracture.

Fractures of the Laminae

These injuries are comparatively rare, but their importance lies in the fact that they are difficult to detect, yet because of their instability they may result in the condition known as spondylolisthesis. The lesion occurs in the lowest part of the lumbar spine and is caused by a combination of flexion and rotation. It is often associated with fractures of the transverse processes. The laminae fracture near their junction with the pedicles and this allows the upper vertebra to slide forwards on the lower one, particularly at the lumbo-sacral junction, where the force of gravity alone will produce progressive displacement if the fracture is undetected and the patient is allowed to walk about. High-

quality x-ray pictures, including lateral and oblique views, are needed to reveal these fractures. If they are detected before forward displacement has occurred they should be immobilized in a full plaster-jacket, including both thighs so as to fix the lumbo-sacral junction. Once displacement has occurred, reduction by manipulative methods is impossible and fusion of the affected spinal segment should be carried out to prevent further displacement.

Spondylolisthesis also occurs as the result of a congenital defect in the laminae. It is a gradual process which often does not produce symptoms until adult life. These symptoms may be precipitated by an injury to the lower part of the spine, so that the congenital variety may be revealed for the first time following trauma. There is no doubt, however, that traumatic spondylolisthesis resulting from actual fracture of the laminae is a real entity. The spinal cord is not endangered to the same extent as in fracture-dislocations, because the neural arch posterior to the fracture or congenital defect is not displaced forwards. The nerve roots can, however, be involved in this displacement, causing a radiating type of pain. The roots affected are usually the fifth lumbar or first sacral, so that spondylolisthesis is one of the conditions apt to be confused with a prolapsed intervertebral disk.

Fracture-dislocations

Fracture-dislocations are the result of direct violence causing hyperflexion, and they are the most dangerous of all spinal injuries because of their tendency to cause damage to the spinal cord or cauda equina. The supraspinous, interspinous, and capsular ligaments, which stabilize the spine in flexion, are all ruptured, allowing the spinous processes to separate and the posterior intervertebral joints to dislocate. The flexion force causes a forward displacement of the upper vertebra and a compression fracture of the lower one (Fig. 2). At least 50% of these fracture-dislocations are associated with damage to the spinal cord or cauda equina, causing varying degrees of paraplegia or quadriplegia according to the level of the injury. They are among the most difficult of all first-aid problems, particularly as most of them occur in mining accidents and the patient may have to be extricated from a very confined space. Any movement of the patient which increases the

flexion deformity may damage the cord irretrievably, therefore the handling and transport of these men is of the utmost importance. The angular deformity can always be felt, as can the large gap between the spinous processes.

Some years ago it was advocated that all back injuries should be transported in the prone position to avoid any possible flexion of the spine, and this is no doubt the safest procedure if it is practicable. There are often circumstances, however,

FIG. 2.—Radiograph of fracture dislocation.

which make it impracticable, and then the main concern of the first-aid worker should be to ensure that at all times the spine is supported and not allowed to flex. The same precautions must be observed during the reception of the case into hospital and during the x-ray examination.

Some fracture-dislocations can be reduced by manipulative means, but in others the dislocated facets become locked and reduction cannot be achieved except by operation. Locked facets can usually be demonstrated on x-ray examination, although once again it must be stressed that high quality x-ray films are needed to disclose these details.

All fracture-dislocations are highly unstable and a great danger to the spinal cord. They should always be reduced at the earliest possible moment either by manipulative or by operative methods, depending on whether the facets are locked or not. If manipulative reduction is possible and there is no paraplegia, fixation in plaster should be carried out for four months with frequent x-ray checks to ensure that reduction is maintained. If operative reduction has to be carried out, it is usual to supplement it by applying a bone graft to the spinous processes as an additional safeguard against late redisplacement. In either case a period of four months' fixation in plaster is necessary, but during most of this time the patient may be ambulant. On removing the plaster, progressive remedial exercises are carried out, together with other forms of rehabilitation such as recreational and occupational therapy. It may be eight months before the patient is fit to resume work, but if sound union is obtained and the injured segments of the spine are securely stabilized there is no reason why these cases should not eventually achieve the same degree of fitness as those with simple compression fractures.

Traumatic Paraplegia

The system of treatment outlined above for fracture-dislocations of the spine does not apply to cases complicated by paraplegia. In these the use of plaster inevitably leads to pressure sores and thence to a vicious circle of complications ending in renal failure. The treatment of traumatic paraplegia would demand an article in itself, so the present review must necessarily be confined to a brief survey in very general terms.

Paraplegia following spinal injuries was first described about 5,000 years ago in the Edwin Smith Papyrus, and the author of that remarkable document summed up treatment in the words "an ailment not to be treated." His view, no doubt, was that the physician should not try to prolong a state of misery which he was powerless to alleviate, and any doctor who has worked long enough in a mining community to become familiar with the distressing spectacle presented by these unfortunate patients might well be forgiven for agreeing with him. Unable to move, incontinent of urine and faeces, with large stinking pressure sores getting larger as the patient becomes more emaciated, painful involuntary spasms, contractures, urinary sepsis, renal calculi, and finally uraemia—this is the distressing sequence of events that is often dragged out for four or even five years.

The change that has been brought about in the past 10 years is almost unbelievable, and the story of its accomplishment is one of the most remarkable "combined operations" of surgery and social medicine. It demands a degree of special knowledge, skill, nursing attention, and social welfare that can be achieved only in special units, but that it *can* be done has been proved beyond all doubt by the work of such centres as Stoke Mandeville and Wharncliffe in this country and by many others in America. There can surely be no middle course with a condition capable of causing such prolonged misery and suffering: it must be treated either superbly well or not at all. The worst thing that can happen to these unfortunate patients—and there is no doubt it is still happening—is that they should be treated well enough to prevent them from dying but not well enough to make life worth living.

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