SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

SACRO-ILIAC STRAIN

BY

A. LAWRENCE ABEL, M.S., F.R.C.S.

One of the more irritating remarks sometimes made by a patient to his medical adviser is that, in the patient's opinion—"in order properly to understand his condition"—the doctor should have had the disease for which he is treating the patient, or should have had the proposed operation or course of treatment carried out upon himself. If such a state of affairs is indeed a recommendation, then I must lay claim to this added qualification in regard to sacro-iliac strain, because, in spite of two years' treatment, my own crippling agonies gradually became more and more unbearable until, four and a half years ago, I was fortunate enough to come under the care of Dr. Wallace Duncan at the Crile Clinic, Cleveland, Ohio. Since that time I have seen upwards of 300 cases of this distressing complaint in my own practice, and my remarks on this subject are therefore the result of a more than ordinarily personal knowledge of the condition.

Sacro-iliac strain is by far the commonest cause of the complex group of symptoms often called "low back pain." Even taking into account the more accurate diagnosis and treatment of the various causes of low back pain, there seems to be no doubt that sacro-iliac strain—like obliterative arterial diseases and certain forms of cancer—is relatively much more common than it was a decade or two ago. Many unfortunate sufferers are likely to remain unrelieved until the term "rheumatism" is discarded, and until careful investigation, accurate diagnosis, and suitable treatment are applied to every form of low back pain.

Symptoms

The essential feature of the condition is pain. The degree of pain varies in different cases. The milder forms give rise to a discomfort on one side over the affected sacro-iliac joint, which may become worse at certain times. All grades of pain are found up to the most severe agony. Although the pain begins over one sacro-iliac joint it may extend to the opposite side, round the pelvis, and down the whole course of one or even both sciatic nerves. Sitting, standing, or lying may be a persistent torture, diminishing the patient's sleep, undermining his health, and becoming accompanied by a severe neurosis. Three of my patients, at the time when I first saw them, had been confined to bed for as long as six weeks with no relief from various electrotherapeutic and manipulative measures, and their only movements had been to roll out of bed and crawl on all fours to the commode.

The onset of pain may be either sudden or gradual. Even a slight injury, such as a strain at golf or tennis, may bring on acute disabling symptoms. The lifting of a heavy weight, or a sudden strain while bending, is another common causative factor. A unilateral leverage suddenly applied through a lower limb, as in football, skiing, or falling from a horse, also accounts for a certain number. When the onset is gradual it may still have been caused by a sudden injury. By far the largest proportion of patients in whom the onset has been gradual have no

recollection of any sudden strain or injury when first questioned. In fact, usually they stoutly deny that any such accident has ever happened to them. By the time of their second consultation they have often remembered a severe fall or strain which has occurred, commonly, in my experience, anything from two to eleven years before they reach the surgeon for advice. In yet other types of cases the cause has obviously been a chronic long-continued strain—for example, pregnancy and occupations involving standing with the weight on one leg. I have seen several dentists and stokers with this condition. Nurses who were in the habit of straining themselves, in a bending position, by lifting heavy patients, have been among my patients.

Characteristics of the Pain

A careful history must be taken in order to elicit exact information as to the site and distribution of the pain. The patient commonly points to the posterior aspect of the sacro-iliac joint or runs his hand across the small of the back opposite the upper half of the sacrum. When the condition is bilateral there is sometimes difficulty in deciding which side is the more painful. The pain is usually increased or induced by forward flexion of the body beyond a certain degree. The moderate degree of bending over a comfortably raised operating table—that is, 10 to 15 degrees—does not induce the pain, but flexion of the trunk to more than this angle—for example, digging, bending over a bed or a bath or a wash-tub—will excite the pain. It is commonly worse at night, as lying in bed tends to obliterate the normal lumbar lordosis and a further strain is put upon the sacro-iliac joint. Similarly, standing or sitting for a long time, or even sitting for a short time on a hard chair, tends to make the pain worse, as in these circumstances the muscles become more readily tired and allow further straining of the joint to take place. Any pelvic abnormality or even a normal menstrual period often increases the pain, as also may a loaded colon and rectum.

As the pain increases in severity so the distribution of the pain increases in area. This is also usually true as the condition becomes more chronic. In all cases it reaches the sciatic notch and the region of the inferior sacro-iliac ligament. In at least nine cases out of ten it radiates to the posterior aspect of the thigh, and in nearly as many to the posterior aspect of the leg, and in a large number as far as the heel. The commonest mistake in diagnosis is to call the condition sciatica, and it must always be remembered that the most frequent cause of sciatica is sacro-iliac strain. As the condition gets worse the pain may spread up the spine, around the iliac crest, and into the lower part of the iliac fossa or groin. The patient often complains that he cannot lie with comfort on the affected side, and turning in bed may bring on excruciating pain in the region of the joint and render sleep fitful and restless. Occasionally pain is complained of inside the pelvis. This is an interesting type of pain: the patient describes it as "un-get-at-able," and says he has a desire to press three or four inches into the pelvis between the rectum and the ischial tuberosity. In the majority of cases the pain is unilateral, and if adequately treated will not spread to the opposite

side. In untreated or improperly treated cases a large proportion find the pain gradually beginning on the hitherto unaffected side, rapidly spreading to the buttock and down the leg, until a severe bilateral sciatica has developed that brings the patient to the surgeon with a suspected carcinoma of the rectum or to the neurologist with a suggestion of a spinal or cauda equina tumour.

Coughing, sneezing, and straining at stool produce varying degrees of pain—often excruciating—and, though this is transient, the patient often seizes a handy object for support, for he has the momentary feeling that the bones of his pelvis are being wrenched apart. In the more severe forms it is fairly common for a patient to take half an hour to get his socks and shoes on. Almost all forms of indoor and outdoor exercises are denied to him. Walking can be indulged in in moderation until a late stage of the disorder, and horse-riding seems to improve rather than to aggravate the condition.

It already follows from what has been said that a most careful physical examination of the patient must be made in all cases, and it is equally important that an x-ray examination of the lumbar spine and pelvis should also be made.

Clinical Examination

When the patient is completely undressed he should be asked to stand erect in a good light. The shoulder on the affected side will usually be seen to be anything from half an inch to three inches lower than on the sound or less affected side. On asking him to indicate where his pain is he will point to the posterior superior iliac spine, which overlies the centre of the sacro-iliac joint. Sometimes he indicates both this point and one an inch or two lower, over the great sacro-sciatic notch. The patient should then be told to lie on his face, and the surgeon should press firmly over each spinous process in turn, and over the whole of the sacro-iliac and gluteal regions. The point or points of maximum tenderness are usually elicited on deep pressure over the posterior superior iliac spine and the inferior sacro-iliac ligament and the great sciatic notch. Occasionally tenderness is also present on pressure over the buttock to the outer side of this area. The great sciatic nerve should now be carefully palpated on each side. The place where this is most readily felt is where it crosses the lesser trochanter of the femur. This point may be easily found in the following way: with the patient still lying on his face, the examiner stands on the patient's left and places the thumb of his left hand on the top of the patient's left greater trochanter and his middle finger on the ischial tuberosity; his index finger will fall naturally on to the position of the lesser trochanter of the femur. His right hand should raise the patient's foot until the knee is at a right angle, and the leg should be used to rotate the femur alternately inwards and outwards. His index finger will then easily detect the subcutaneous portion of the great sciatic nerve rolling between it and the trochanter, and thickening or tenderness may be found. The opposite limb should be examined in a corresponding manner.

The patient is now asked to turn on to his back. The more serious the case the more will be the discomfort produced by the turning, and the pain may be still present while the patient is lying quiet. The lumbar spine is often held away from the couch, and any attempt to flatten it either actively or by abdominal pressure elicits or increases the pain. The following investigation is then carried out on each leg alternately: keeping the knee extended, place the hand under the patient's ankle and slowly raise the

leg, asking him to indicate when and where he begins to feel pain. Note the angle of flexion of each thigh on the trunk when pain behind the knee or in the hamstrings first occurs. Further flexion is limited by pain, and the degree of movement possible is less than in a normal individual, and usually less on the affected side than on the opposite one. At the same time as the hamstring pain is produced a small proportion of patients experience pain in the sacro-iliac region. Occasionally this pain is felt in the sacro-iliac joint when the leg of the same side is flexed, and any attempt to increase the movement results in an increase of pain in the sacral region or in the leg. This is known as Goldthwaite's sign. To my mind a more pathognomonic sign is when the pain in the affected joint is elicited by flexion of the *opposite* side, but even this occurs in only some 25 per cent. of cases. In my experience pain in the leg is present in the vast majority of cases when carrying out this investigation. The milder the case the nearer does the possible movement approach to the normal, while in the more severe case pain is more quickly produced.

While the patient is still lying on his back a general clinical examination should be made, with special reference to the abdomen. The central nervous system—knee-jerks, ankle-jerks, and pupil reflexes—should be carefully examined. The tendon reflexes on the affected side are often diminished. A rectal examination should be made in all cases, and a vaginal examination in women, as mild degrees of low back pain may be produced by a great variety of both minor and major rectal and gynaecological conditions.

The patient is now asked to stand again, and the movements of his spine are tested. When rising from the recumbent or sitting position the hands are commonly used to help him to get up. On stooping, flexion of the trunk is limited, and whereas a few weeks or months before he could touch his toes with his finger-tips he may not now be able to get within a foot or even two feet of them. When he straightens his back pain is experienced over the affected joint, and on asking him to bend further backward, beyond the vertical movement, is found to be limited; many patients also flex their knees. Rotation of the spine is unaffected. There is often diminution of unilateral side bending, whereas the unaffected side is free. When walking the patient avoids long steps on account of the characteristic spasm of the hamstring muscles and a diminution of the pelvic inclination, which is commonly present. It is often alleged that the pain in cases of sacro-iliac strain may be elicited by lateral compression of the pelvis. This is absolutely incorrect.

X-ray Examination

In a typical case of sacro-iliac strain x-ray examination, including stereoscopic pictures, reveals no abnormality whatever. In rare cases a little sclerosis may be detected in the bone immediately adjacent to the joint. In long-standing cases the changes of osteo-arthritis may rarely be seen. The real reason for x-raying all cases is to exclude abnormalities of the spinal column and such rarities as tuberculous disease of the sacro-iliac joint and malignant conditions of the bones in the immediate vicinity.

Differential Diagnosis

Apart from the general and intra-abdominal conditions already mentioned as producing low back pain, it is important to be familiar with certain local lesions which

may simulate or be confused with true sacro-iliac strain. These are as follows: lumbo-sacral strain, lumbar back strain, osteo-arthritis of the spine, spondylolisthesis, lumbago, and coccygodynia. In addition to the above there are, of course, more serious conditions with their own typical signs and symptoms, which may produce pain in the lower part of the back. For example, tuberculosis of the spinal column, depression fractures of the lumbar vertebrae, prolapse of the nucleus pulposus of the intervertebral disk, and tumours of the spinal cord and cauda equina. Not only are these conditions of considerable rarity, but they are usually readily distinguished by their physical signs and radiological and other appearances, and they will not be discussed in any more detail. The commoner conditions, however, demand more detailed attention.

Lumbo-sacral Strain.—In this condition the pain is situated at the lumbo-sacral junction, and may be referred down the lateral side of the leg and on to the dorsum of the foot. Examination reveals that the tenderness is situated over the spines of the fourth and fifth lumbar and the first sacral vertebrae and over the ilio-lumbar ligament. It is found that the movements of the lumbar spine are restricted in all directions, whether the patient is standing, sitting, or lying, whereas in sacro-iliac disease the movements are all free, except unilateral side-bending and forward bending in extremes with the knees straight. On the other hand it is found that in cases of lumbo-sacral strain the patients can bend forward freely, sitting or standing, because they hold their spine rigid and movements take place at the hip-joints. On carrying out the straight-leg-raising test with the patient lying in the supine position it is found that in lumbo-sacral strain the movement of the leg is limited in extremes on both sides equally, whereas in sacro-iliac disease there is unilateral limitation at a small range on the affected side. It is also important to note that extension of the thigh causes as much pain as flexion in lumbo-sacral strain, whereas this is not the case in sacro-iliac strain. Further, in lumbo-sacral strain the referred pain passes to both the lower limbs and not only to the affected side as in sacro-iliac strain. It is, of course, important to remember that sacro-iliac strain may be bilateral. In lumbo-sacral strain there is no deformity and the radiographs are normal.

Lumbar Back Strain.—This condition, which may be acute or chronic, is a localized rupture of the deeper fibres of the erector spinae muscle of one side, produced by muscular action. On examination pronounced muscular spasm of the erector spinae is observed in the lumbar region. There is a definite localized point of tenderness of the erector spinae of one side, and in acute cases the whole of the lower part of the back is found to be hyperaesthetic. Radiographic appearances are normal, except in rare cases where there is a fracture of a transverse process.

Osteo-arthritis of the Spine.—In this condition the pain and tenderness are situated over the lumbar spine and frequently extend upwards into the dorsal region. The movements of the lumbar spine are stiff and limited, and x-ray examination shows the typical appearances.

Spondylolisthesis.—In this complaint there is almost always a congenital non-fusion of the elements of the neural arch of the fifth lumbar vertebra, with a consequent tendency of the body of that vertebra to slip from the upper aspect of the sacrum. Actual deformity of the spine immediately above the spinous process of the fifth lumbar vertebra may be present. Localized pain and tenderness are bilateral. None of the typical signs of

sacro-iliac strain is present, and radiographs clinch the diagnosis.

Lumbago.—In this condition the pain is much higher than in sacro-iliac disease; it is stabbing in nature and affects the lumbar muscles on both sides. Goldthwaite's sign is absent.

Coccygodynia.—The pain in cases of coccygodynia is situated at or around the region of the coccyx and at a lower level and nearer the midline than the pain of sacro-iliac strain. The two conditions are, however, occasionally confused. Coccygodynia is of two types: (1) traumatic; (2) functional or hysterical. Traumatic coccygodynia is produced by falls, kicks, etc., and the coccyx may be fractured or displaced forwards or laterally. It produces pain on walking, sitting, and defaecation. The displacement may be reduced by a finger passed into the rectum aided by the thumb on the skin outside. Such replacement is seldom maintained, but strapping with a firm pad is usually sufficient to effect a cure, even though the displacement remains. The immediate pain of the injury may be relieved by the injection of from 10 to 20 c.cm. of an oil-soluble anaesthetic. In cases of functional or hysterical coccygodynia there may be a history of some minor injury or of no injury at all. The pain is described as being excruciating and it is, indeed, out of all proportion to the physical signs. The condition is most intractable to treatment, as removal of the coccyx is followed by cure in only some 50 per cent. of cases. In this type of case psychological treatment is indicated before recourse is had to surgery.

Treatment of Sacro-iliac Strain

Radical treatment for the cure of sacro-iliac strain may be carried out in almost all cases without resort to surgical operation. Most cases respond to treatment by manipulation or fixation with a belt, or, better still, by a combination of the two. In comparatively mild and early cases manipulation may sometimes be carried out with the patient conscious, but not, of course, in powerful muscular people. With a rather more long-standing case of moderate severity the manipulation should be performed under intravenous pentothal anaesthesia, which produces full muscular relaxation lasting for the two or three minutes necessary for the performance of the manipulation and allows the patient to go home a few hours later. The actual manipulation employed is a forcible twist of the pelvis upon the spine.

Manipulative Technique

The patient lies upon a firm low operating table or couch, and as soon as he is fully anaesthetized rotatory manipulation of the pelvis of the affected side and of the opposite side is carried out and forced flexion and extension of the lumbar spine performed. The patient lies upon his back and the surgeon raises the leg of the affected side and passes it across the opposite limb in such a way as to cause the pelvis to rotate away from him, and until the leg and foot hang over the table on the opposite side. His other hand steadies the patient's shoulder on the affected side and keeps it so far as possible resting on the table throughout the manipulation—that is to say, the supine position is maintained on the shoulder girdle as far as possible and the prone position as far as may be adopted for the pelvis. Firm pressure is then put upon the posterior aspect of the crest of the ilium and a sudden wrenching movement is made to try and turn the innominate bone of the affected side forwards away from the surgeon towards the

table, all the time keeping the shoulder of the affected side as much in the supine position as is possible. In a large proportion of cases a crack or crunching noise is clearly audible; this, however, is not essential, and many cases obtain dramatic relief when no sound has been produced.

The patient's pelvis is now rotated in the opposite direction, and with the surgeon standing on the other side of the table a similar forcible movement is carried out upon the innominate bone on the less affected or unaffected side. Several forceful jerks are made upon the iliac crest so as to be certain that the sacro-iliac joint is fully mobilized. The patient is then placed in the supine position and the thighs and knees are forcibly flexed upon the trunk, so that the fullest possible flexion of the whole spine is obtained. Lastly, the patient is placed in the prone position and, with one arm of the manipulator resting beneath the patient's knees and the other in the small of his back, the spine is forcibly extended as much as possible.

Fixation with a Belt

It has been learned from experience that manipulation of the more severe grades of the condition may cause an acute exacerbation of the pain, with consequent increase of the disability. These cases are best treated, therefore, with a sacro-iliac belt. In my experience there is only one type of sacro-iliac belt which is really efficient, and that is the Camp sacro-iliac support. This is made in Canada and is readily available in this country. I find, however, that it is so poorly known and its benefits so little recognized that a few words as to its efficacy will not be out of place. There are three different types of sacro-iliac support made by Camp's, of which their third type (Series C) is by far the most efficacious. This belt, when it is completely relaxed, should be small enough to encircle the pelvis firmly. It suits any average build of patient and comes well down under the gluteal muscles at the back. It has two powerful straps, pulling upon which causes great pressure around the pelvis. A sense of comfort and relief from pain are immediately experienced when the belt is accurately applied. In even the most serious cases the patients are usually back at work within twenty-four hours of its application. The belt is applied around the pelvis while its straps are completely slackened, and it must always be kept well down in position by perineal straps in the male or by attachments to the stockings in the female; many of the latter, however, prefer perineal straps on account of the injury to their stockings. When correctly in position the middle of the belt should be opposite the anterior superior iliac spines in front. Then the two lateral straps must be drawn equally tight, and as tightly as the patient can comfortably stand. When the belt has been fastened the patient should just be able to sit down on an ordinary chair without cutting the front of the thigh where it joins the groin. The pressure points where cutting tends to occur are at this position on both sides and in the midline in front, where the belt stops at about the level of the umbilicus. In these situations a little padding with a small square of gamgee tissue or a silk handkerchief will prevent actual damage to the skin. The patient or the surgeon may know when the belt is correctly adjusted by the fact that the opening in the back of the belt where the lacing is situated should have its two sides parallel.

The belt should be worn continuously by day for a week or ten days, in severe cases without other treatment, or in milder cases after manipulation has been carried out. If at the end of this period there is not a

very great improvement in the patient's condition, then manipulation should be undertaken. If manipulation has been previously undergone without an anaesthetic, then on this occasion the patient should be given a general anaesthetic. If improvement is considerable there may never be any need to manipulate the case, or a further manipulation in the consulting-room without anaesthesia may be enough. As a rule it is necessary to wear the belt for about four weeks, leaving it off at night time and when exercises or radiant heat are employed.

My common practice, therefore, is as follows: When the patient is seen at the first consultation and a diagnosis of sacro-iliac strain is arrived at arrangements are made for a radiological examination and for the patient to be fitted with a Camp sacro-iliac belt. Two or three days later, at the second consultation, the radiographs are examined and the belt personally fitted to the patient. In early non-muscular cases manipulation is given in the consulting-room and the belt fitted immediately. Seven to fourteen days later the patient reports progress; in the vast majority of cases no further manipulation is necessary and the patient is advised to wear the belt for a further week or two. The belt may then be gradually left off and more strenuous exercises undertaken. It is uncommon for a patient to need to wear the support for more than three or four weeks, but if symptoms persist after one or two conscious manipulations recourse should be had immediately to manipulation under anaesthesia and the belt should be resumed for a short time. As the belt is discarded, so more and more carefully graduated exercises to move the spine and joints are encouraged.

Little has been said of electrotherapeutic measures in relation to this type of strain. In my experience their influence is of very little value, though in the more severe types radiant heat, medical diathermy, and infra-red irradiation have sometimes played an alleviating part. Radical surgical operation is indicated only in those cases which are resistant to the two foregoing methods, and so far I have never had to resort to it. Various types of operation are employed, the essential feature of each being the same—namely, to cause complete bony ankylosis of the two sacro-iliac joints.

With a more careful investigation and more accurate diagnosis of the condition a great deal of unnecessary suffering can be avoided and the condition be cured in a relatively short time. To epitomize the treatment there should be:

1. Prompt application of mobilization in early and mild cases by manipulation.
2. Complete and thorough fixation with the Camp sacro-iliac belt, alone or following manipulation in the more serious cases.

A course of lectures on cranial radiology will be delivered in the Institute for Tropical Diseases, Antwerp, on Thursday, July 27, and the two following days, dealing at length with the technique, the interpretation of films, and the management of a radiological clinic. There will be simultaneously an exhibition of films. On the fourth day, July 30, there will be a general meeting of all radiologists and clinicians interested in cranial radiography, with a view to founding an international society in this application of radiology. The fee for the course of lectures is 300 Belgian francs, and fuller details of the proposed arrangements may be obtained from Dr. R. Thienpont, Avenue Rubens 30, Antwerp. The course will include such topics as radiography in relation to the influence of sinus infection on the brain; fractures of the labyrinth; mastoiditis and chronic otorrhoea; and the eye.