LUMBOSACRAL AND SACRO-ILIAC STRAIN CAUSING LOW BACK PAIN

A REVIEW OF ONE HUNDRED FIFTY CASES

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FORMERLY we considered backache as Mark Twain said we considered the weather; namely, we talked about it much but did little about it. We knew that no one actually ever died of backache and, therefore, the sufferer from this condition received little sympathy. It is difficult, however, for any one to concentrate on his work when he is experiencing a dull backache. If one thinks that it amounts to little ask the person who has it. Backache is not a disease, but a symptom—often an outstanding solitary symptom. The patient seeks advice not alone for the pain but on account of incapacity to work. It accounts, therefore, not only for much irritability but also for much disability, frequently in the most muscular and robust laborers as well as in many office workers. In fact, I believe there is no one condition which produces more disability and economic loss and, therefore, is so costly to industry as low back pain.

As the subject of low backache has steadily acquired more prominence during the past 25 years, a perusal of the literature during that period will reveal an increasing number of contributions concerning it. Its causes are many. Some of these causes have been individualized and, because of their importance and preponderance, different clinical syndromes have evolved gradually from the so-called lumbago, once such a vague condition because so generalized. No longer are we content to pigeon-hole this condition under that caption with the hope that time and a bottle of liniment would bring about at least an amelioration, if not a complete relief of symptoms. Patients with low back pain are seen often first by the general practitioner who may not recognize the nature of the lesion and do little to relieve the pain. Consequently, sooner or later, the patients drift into the hands of a chiropractor, an osteopath, a naturopath or some other cultist who relieves them by the manipulation of their back. As there are few patients more grateful than these sufferers, henceforth they think of these cultists for the relief of all their future ailments. It behooves us, therefore, to take the subject of low backache seriously.

Because of its many etiologic factors, low back pain remains still a perplexing problem. Among its chief causes should be mentioned posture, trauma, infection, congenital anomalies and neurologic, metabolic and neoplastic conditions. Instead of one of these, several may be responsible for the disability. The majority of cases of backache will fall into three main groups: Ortho-

pedic; gynecopathic; and urologic.[10] Certainly acute and chronic sprains are responsible for the greatest number. Next to trauma in frequency as an etiologic factor comes infection; frequently the two coexist, and when they do it is difficult to even attempt to decide which is playing the more important rôle. A congenital anomaly or a faulty posture predisposes to strains or slips in the low back and greatly retards the recovery when they once occur. Neurologic, metabolic, neoplastic conditions and protrusion of an intervertebral disk must be considered and eliminated before any rational treatment is instituted. Arthritis cannot be associated very definitely with backache unless there is some acute condition present. There is no scientific proof that it is the cause of pain. The most extensive arthritis is seen in strong stevedores who have never had a backache. In this paper we shall not consider those various factors but shall confine the discussion to the so-called strains and slips of the lateral lumbosacral and sacro-iliac regions.

Anatomic Considerations.—*Lumbosacral Region:* In considering low back conditions one must bear in mind the rôle of the lower segments of the spine and especially the lumbosacral region. Here one finds innumerable anomalies and osseous variations[4] which, although asymptomatic, nevertheless contribute to render this region of the human body mechanically less strong. To these one must add structural variations of the soft tissues which are usually more difficult to demonstrate. Because of these multiple variations it is difficult for one to decide when looking at roentgenograms of the lower back what is and what is not normal.

In the review of the literature one finds a moderate degree of unanimity of opinion as to the part played by these vertebral anomalies in production of low back pain and the mechanism by which this pain may be explained.[12] Chamberlain[2] has called attention to anomalous fissures, of developmental origin, which are mistaken for small linear fractures. These anomalies and the consecutive weakness of this segment of the spine are the result of the changes this area has undergone in our development from the quadrupedal to the bipedal posture.[17] These changes make this area a weak point when, from the upright position, one assumes the quadrupedal position and to this the elements of weight lifting, rotation or twisting are added.

Furthermore, the lumbosacral region is at the junction of a flexible and mobile section of the spine with the fixed pelvis. This junction is at a variable angle which increases the instability of this region. As Smith-Petersen[14] points out, the joints of the lower back are: (1) The articular facets; (2) the intervertebral disks; and (3) the sacro-iliac joints. The articular facets are so interlocked as to give freedom in flexion and extension and to allow minimum amount of rotation. The anatomic variation of the facets not facing in the sagittal plane does not itself give rise to symptoms but results in increased mobility in rotation and, therefore, predisposes to strain. Any other anatomic variation, such as sacralization of the transverse process of the fifth lumbar vertebra, especially if unilateral, has a tendency to render the function of the lumbosacral junction asymmetrical and, therefore, predisposes to strain.

In the traumatic low back disability, which I am considering, it is surprising to notice that there is no relation between the degree of disability and the severity of the trauma producing it but that "the manner of application of the force rather than the degree of the force is the outstanding factor in these injuries."[4] Factors to be considered, although constantly varying, are also the resistance and adaptation of the back to the forces acting upon it.[9]

In the mechanism of production of these slips, one has to remember, as Troedsson[17] has emphasized, that "the stability in this area in a stooping or lifting position is to the greatest extent dependent upon the tropism of the articular facets and the direction of the articular processes of the fifth lumbar vertebra."

To understand this one must consider the comparative anatomy: "In the quadruped the superior articular facets of the sacrum lie in the horizontal plane and receive the inferior articular processes of the fifth lumbar vertebra. This overlapping gives a very effective bony support to the body weight at the sacral end as it hangs between the shoulder and the pelvic girdles. With the assumption of the erect posture in man and a consequent great loss of weight-bearing function of these processes, there has been a change in their direction as well as in the direction of their articular facets." These processes in the lumbosacral region will have a tendency to slide, especially when there is an upward pull on the sacrum such as in lifting.

Sacro-Iliac Region.—The architecture of this joint is such as to limit or minimize any rotatory movement. In fact, reasoning *a priori*, many surgeons claim that a sacro-iliac slip never occurs except as the result of a severe trauma, such as a fall from a great distance or a severe, direct blow. It has remained, therefore, a controversial subject since Goldthwait and Osgood,[6] in 1905, introduced it as a clinical entity. In 1933, Reginald H. Jackson[8] reported a number of cases not due to severe trauma. Chamberlain,[3] a roentgenologist, also believes it is a definite clinical entity, and that a relaxation of this joint can be demonstrated roentgenologically in some instances.

History.—An accurate history is always essential and at times the most important part of the procedure, especially in industrial practice or medico-legal cases in which the element of exaggeration or malingering has always to be considered. The frequency of patients simulating backache, and the difficulty often in proving the nonexistence of it, has caused this condition to be called by some "the compensation disease."[16] A detailed description of the pain, that is in relation to its onset, whether or not it was associated with a trauma, location, radiation, duration and other factors influencing it, should be elicited, as this will greatly assist in a differential diagnosis. This is often a tedious procedure. If the pain was associated with trauma, the history will often reveal that it was of a sharp character and was ushered in suddenly during a twisting movement of the spine while leaning over, lifting or pulling, when suddenly his foot slipped or a coworker, who was lifting one end of the load, let go unexpectedly, throwing the entire load on him suddenly. He was not prepared for the sudden strain and there was a lack of coordination.

Often he will tell you he heard and felt something snap. He was unable to continue with his work. The next morning on attempting to get out of bed, he again felt a severe pain. Because of it he has been unable to lean over to lace his shoes. The pain will be described usually as constant, located across the lower back or on one side, and aggravated by any movement of the lower spine.

The history and examination should be systematic and follow a comprehensive outline in order not to overlook some important information. The factor of compensation, of various sick benefits, or of litigation and the influence they may have upon the outlook of the patient, should always be kept in mind by the attending physician. Often it is necessary to obtain this information from others than the patient. The malingerer is usually very vague and varied in the description of his symptoms. To a good listener he will be profuse in his remarks.

Examination.—After a thorough history has been taken, the examination includes a careful note of their gait, the attitude of standing, method of sitting or arising from a chair.[15] Often a complete physical examination is necessary to properly evaluate the factors causing a back condition of long standing, but in the acute cases, to which I refer, the examination is usually limited to the back. The patient should have the entire back and hips exposed. One should notice the presence or absence of *postural changes* or defects, muscular atrophies and muscular spasms. If the patient is examined in bed or on a table it will be observed that he lies on his unaffected side with the affected limb flexed at the hip and the knees. The lumbosacral region will be flattened.

Areas of tenderness are elicited by palpation and percussion. Smith-Petersen, in 1924, outlined a routine examination in such cases which will be of assistance to those interested in the subject.

As Kuhns[9] pointed out, the examination of the spine should also be made both supine and prone, in a position as symmetrical as can be assumed with comfort. "Consistently localized tenderness is of the greatest importance in determining the type of lesion. Tenderness, of course, is a subjective manifestation and, therefore, its importance may be questioned. In most instances an experienced examiner can tell whether a patient's response to percussion or palpation is overdone or feigned. The moment of response is never accurately timed by the malingerer. He responds too quickly as a rule; sometimes too slowly."[5]

Movements.—They should be tested to determine their range and any degree of limitation in the three different positions: Standing; sitting; and lying.[13] Guarded motion of the spine is early assumed by the patient. In these conditions one will notice that the patients "walk with a shuffling gait, and body bent slightly forward and the lower back held rigid. It is difficult for them to sit down or get up, and almost impossible for them to take off their shoes." They complain of pain across the lower back, at times radiating to the groin or towards the buttocks on one or both sides.[17]

Diagnosis.—Only a thorough history and a careful analysis of every sign

and symptom will permit an accurate diagnosis in cases in which the low back is affected. There are many special tests in the examination of a back, which are best carried out by the patient lying down on a table. These tests are helpful in differentiating between a lumbosacral and a sacro-iliac condition.

Lumbosacral Strains.—In these the pain is over the fifth lumbar and the lumbosacral joint, and this joint resists movements of the spine in all directions. There is tenderness over the fifth lumbar and first sacral vertebrae and in both iliolumbar notches.

The tests suggestive of this condition are:

(1) Prone thrust in hyperextension test is best carried out by having patient raise himself up if possible from table. A sudden thrust over the lumbar region will produce or aggravate the pain in lumbosacral cases.

(2) Forward bending does not reverse the lumbar lordosis in lumbosacral sprains.

(3) Nachlas' sign—hyperextension of the thigh with the patient prone and the knee flexed, may produce pain in the lumbosacral joint, suggestive of a lesion there.

(4) Goldthwait's sign—inability to flex the thigh with the knee extended, does not become positive until the leg has been raised quite high.

(5) Patrick's sign—forced abduction of the flexed thigh, elicits no pain.

Sacro-Iliac Strains.—In these there is pain over the posterior aspect of the joint which becomes worse at night. If the pain is unilateral it is relieved by sitting on opposite buttocks. In extreme cases there may be some swelling over the joint. There may also be painful areas over the second, third and fourth sacral vertebrae with radiation down the sciatic nerve. The accompanying muscle spasm has a tendency to make the whole spine list, usually to the affected side.

The following tests may be found useful:

(1) Kernig's sign is positive on the affected side; with the patient lying on his back and the extended leg being flexed as far as possible on his abdomen. A normal leg can be flexed to 100°, while the affected leg can only be flexed through a much lesser range without producing definite pain. When this sign is positive it is suggestive, but not pathognomonic, as it occurs in other conditions where the sciatic nerve is involved.

(2) Straight leg raising is usually limited and painful, more on the affected side regardless of the leg tested. The pain is felt in the low back, either in the lumbosacral or sacro-iliac region. The examiner should have one hand under the lumbar region and if the pain is complained of before this portion of the spine begins to move, this reaction suggests a sacro-iliac condition.

(3) Compression of the iliac crests and pressure over the pubes may bring on or aggravate the pain in the sacro-iliac joint.

(4) Cross leg sitting test increases the pain.

(5) Goldthwait's sign is manifested immediately the heel is raised from the bed or the table.

(6) Patrick's sign is occasionally positive, pain being produced over the sacro-iliac joint.

(7) Ober's sign[11] is positive if the fascia lata is contracted. This consists in adducting the extended leg with the knee flexed at right-angles and the patient on his side.

(8) Ely's sign may be positive in sacro-iliac sprains—forcible flexion of the leg on the thigh causes the pelvis to rise off the table and produces pain.

Treatment.—In recent cases of lumbosacral and sacro-iliac strains, deep heat is applied over the lower back for 15 to 30 minutes followed by deep massage for a few minutes and then manipulation is carried out. The following procedure has been found helpful: The patient lies on his back on a narrow, firm table. He is told to relax. The manipulator, standing at the end of the table, grasps in each hand the patient's heel and ankle and slowly and gently rocks, with a rotatory motion, the lower limbs on the pelvis, reassuring the patient and thereby obtaining the relaxation desired. One lower extremity is then allowed to hang over the side of the table and the other is flexed on the pelvis in order to hold the pelvis steady. Pressure is then gently, but firmly, exerted on the limb hanging over the edge of the table for a few minutes, while counterpressure is exerted on the flexed limb. The position of the limbs is then reversed and the maneuver repeated.

The patient is then put on his side with the lower extremity, nearest to the table, extended fully and the other one flexed at the knee. Pressure is exerted downwards on the flexed knee while counterpressure is put on the shoulder of the same side so as to obtain a rotation of the spine, clockwise of the pelvis, and counterclockwise of the shoulders. This same maneuver is repeated with the patient on the other side, changing the position of the legs. During this maneuver, which must also be carried out gently but firmly, a definite snap is frequently felt by the patient and may even be audible to bystanders. When this occurs the pain usually ceases instantly, the patient is completely relieved or may feel only a soreness in the low back. The movements of the back immediately become freer, and the patient delights in trying them out, and as soon as he gets off the table will, almost invariably, bend forward, a movement which he could not make previously, to see if he can reach to his shoes.

Another simple and quick manipulation which may work well in some patients who are not too large or heavy is as follows: Stand the patient back-to-back with yourself, and then put your arms under his axillae and lean forward, lifting him up on your back, hyperextending his lumbosacral region, and then suddenly give a hump or jump which will often instantly relieve him.

In the less severe cases an elastic belting is applied to the low back and pelvis. In the more severe cases of relaxation of the sacro-iliac joint a stronger support, such as a buckskin or army belt, is ordered. This belt is placed on a level with the third sacral vertebra between the anterior superior spine and the trochanter and held in place, if necessary, by two perineal straps. The patient is then instructed in the care of his back, *i.e.*, to sleep on a hard bed which does not sag in the middle. Boards put in the middle of the bed

between the springs and the mattress will often prevent the spinal sag. As a further aid in relieving the soreness in the lower back the patient is instructed how to sit down and arise from a chair without bending the lower back. A brief course of physiotherapy, consisting of deep heat and massage, may be necessary for a short time. If the posture is poor and the tone of muscles weak, corrective exercises should be instituted. Where there is a pronounced lumbar lordosis the patient is instructed in the following: To stand, letting weight come on ball of foot rather than on the heel or arch; to contract the muscles of the leg, thigh, and buttocks; to push the pelvis forward; to draw in the abdomen; and to let the shoulders fall naturally rather than to push them back.

In more severe cases, especially old sacro-iliac strains, manipulation may be best performed under general or spinal anesthesia, followed occasionally by the application of a plaster encasement of the body, as suggested by Jackson.[8] It has seldom been found necessary, however, to apply this. In these cases manipulation consists in flexing the leg on the body until the toes reach the forehead, as described by Baer.[1] It may be necessary to perform this procedure in two or three stages, especially in old cases with adhesions and contractures. In some patients with severe pain it is often advisable to put them to bed and apply traction to the lower extremities and administer sufficient anodynes to give relief. After the plaster encasement is removed it may be necessary to substitute a short Taylor brace for it, and this in turn by a belt with a Cooke pad over the affected side.

Old cases require a more thorough investigation, especially for foci of infection. Anteroposterior, lateral and also oblique roentgenograms should be taken. If foci are found these are eliminated, if possible, or treated. Infection in the gallbladder has been known to produce so-called recurrences of "lumbago" which would cease entirely after a cholecystectomy. Infection in the prostate and seminal vesicles may be the sole cause of low backache in some patients and a contributing cause in others. In many patients the prostate is not a factor, even though a prostatitis may be present. A thorough rectal and proctoscopic examination should eliminate any pathology in the lower bowel.

CONCLUSIONS

(1) Lumbosacral and sacro-iliac strain causing low back pain is a definite clinical entity.

(2) Many of the sufferers of this condition go outside of the medical profession for relief.

(3) There are few patients more grateful for relief than the sufferers with low back pain.

(4) A very careful history and thorough examination will often lead to an early diagnosis.

(5) Of the 150 cases reviewed in this series, the youngest was age 19, and the oldest age 80. The majority were in middle life.

(6) This condition occurred more often in the strong, robust, muscular individuals.

(7) Arthritis, *per se,* was not an important factor in the production of the pain or the disability.

(8) Roentgenograms usually give little aid in the diagnosis.

(9) Low back pain is a favorite complaint of the malingerer.

(10) Trauma was the cause of the condition in the majority of the cases.

(11) The manner of the application of the force, rather than the degree of the force, is the important factor in the production of these lesions.

(12) Early treatment by manipulation, and a belt if necessary, will effect a prompt and often permanent cure in the majority of cases.

(13) A plaster of paris body encasement was applied to ten patients in the series. This form of treatment is, however, being employed less frequently by the author, although it has its indication.

(14) The disability in those treated with a plaster encasement averaged several months and was prolonged by many contributing causes.

I wish to express my appreciation to my associate, Dr. Piero Albi, for his assistance in the preparation of this paper.

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