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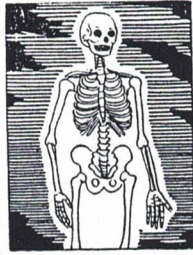
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Published monthly by the Osteopathic Press, Inc., 420 Lexington Ave., New York, N. Y.
N. L. Lingle, Managing Editor Josephine Hough, Advertising Manager

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Role Of Sacroiliac Joint In The Low Back Syndrome

by Earl H. Gedney, D.O.

LATE in the nineteenth century under the inquiring mind of Andrew Taylor Still the sacroiliac joint began to move. Others of note have made more recent gestures in this direction but it remained for Goldthwaite to organize the existing material and his own thoughts on the subject and make sacroiliac motion and subluxation a respected and respectable entity in other areas of the therapeutic world.¹ Mennell seemed to write a little easier on the subject and dared give credit by reproducing osteopathic illustrations.² This 'recent' phenomenon of joint physiology is still under continuing study and with our present knowledge and understanding we would like to present the case for what we feel is its major role in the low back syndrome.

Motion in this joint is aided and abetted by its almost every component part and characteristic, and why

it took so long to detect still amazes us. Functionally it occupies a position at almost the extreme limits of flexion, extension and rotation of the superimposed spine and must snub and contain these many forces in whatever combinations they may arrive at these lower limits. Similarly the appended lower extremities add their random abuse with their multiple functions, all sending varying forces through this joint. The levering actions are almost myriad. One of the normal tasks set for this juncture is carrying three-fourths of the body weight at every step during walking. Add to this whatever the person may be lifting or carrying and we get some idea of its obligation.

This is a large order for so small a joint whose surface is often no larger than can be covered by the index finger, and which has gained so little from the evolutionary processes. This job obviously could not be done were it not for its elaborate set of supporting ligaments which may be simply classified into: the anterior and posterior sacroiliac and the auxiliary; the sacrotuberous, sacrospinalis, lumbosacral and iliolumbar. The former bind the joint together front and back and maintain its stability. The latter have their principle function as check ligaments. These and some of the little understood motions of these bones are beautifully presented in the spine pre-

pared by Dr. Angus Cathie at the Philadelphia College of Osteopathy, after the method of Halliday.

We feel that the sacrum between its tethered ilia is the keystone of the low back and any loss of integrity in the components of the sacroiliac joints resulting in stability may have sinister and even disastrous complications. This tends to be substantiated by approximately one-half of our patients getting pain and symptom relief as soon as the integrity of these ligaments is restored, even when seemingly grosser pathologies are extant in neurologically related segments in the lumbar spine above.

These results have continued parallel in over a thousand patients with subsidence of the sprain syndrome and few further complications. If, on the other hand, dissolution of the annulus has begun and continues for whatever reason, or has been removed by whatever method, its containing ligaments may become lax and instability ensue. As destruction of the annulus takes place there is gradual narrowing of disk space with increasing instability, due to a decreased distance between the origin and insertion of the now lax ligaments. In this complication also, sclerotherapy is a specific.

While the exact mechanism of loss of disk substance may be unknown, it is known that it vanishes

and the demonstrations of K. Lindblom have long since implicated the phagocyte.³ In our technics we demonstrate pools of dark blood around the lateral spinal ligaments and feel that they may be associated with this process of disk digestion; in fact, what more ideal vehicle could one wish for than recurrent regional sprain with its successive changes to induce phagocytosis. Here again sclerotherapy with reactivation of the reparative functions and employment of round cell invasions with eventual fibrosis may be an effective deterrent to total loss of the annulus. Approximately two per cent have continued to total loss during the past five years, with a self-estimated residual pain of only ten per cent in these patients.

Good function may also be compromised by a number of other contingencies arising out of developmental inadequacies in the stabilizing elements of the body. Hypoplasia in the fibrous tissues may assert itself in the patient who has had a 'weak back all his life.' Biegeleison feels that these are of common origin with the herniae and varicose veins coexistent in these patients.⁴ The discovery of a relaxing hormone elaborated by the pituitary during pregnancy may indicate an answer to this enigma.

The multiple bony abnormalities in this area may not contribute to the solidity of the region, nor may

the detrimental normalities such as occur in twenty per cent of sacroiliacs wherein a smooth cartilage covering has created a true joint. Bony anomalies *per se* give us little trouble as long as the ligaments which hold them together are intact and adequate. It is our considered opinion that the scoliotic or otherwise malformed spine is granted a near normal by these vested structures which bind the joints together. Muscles are unquestionably the primary mobilizing tissues of our body but our bones, with their interlocking and stabilizing devices, assure us of position with the least amount of effort. The patient with an unstable back suffers almost constantly with an inordinate fatigue, due, in our opinion, to the constant excessive muscular activity necessary to maintain the erect position which, in turn, is due to lack of integrity of innate stabilizing constituents. Prescribed formal exercises have driven more low backs to us for treatment than any other therapeutic mood or modality in recent years, and we wish to warn against their use except in cases of minor instability where they may be of some value.

In twenty per cent of cases the sacroiliac is a true joint and as such enjoys motion far beyond the normal. Its articular surface may be so smooth that the ilium does not lock in posterior position, as so many are wont to do. Instead it rides free

to both ends of its tether confined only by its ligaments, and their integrity defines these limits. Some of these are most difficult to control since they need far heavier ligaments to keep the ilia within non-spraining limits, or, in the lesser states, to keep the ilia from locking in posterior position with all the attendant disabilities.

Concern is seen in some quarters when the angle of the lumbosacral plane with the horizontal is greater than forty degrees, reputedly offering something less than a stable buttress against the incident forces. According to these standards forty-nine per cent of our patients enjoy stable lumbosacral planes and the syndrome in these patients differs in no wise from those who have unstable planes. The percentage is so high, and the response to treatment so identical, that we have long since held the lumbosacral angle in disregard.

On the contrary, in the course of our investigations we felt that the angle of the sacroiliac in weight bearing deserves much more recognition than it receives. This angle, in our group of cases measures from 8 to 19 degrees in the male, with an average of 12 degrees. In the female it measures 10 to 22 degrees and has an average of 15 degrees. It should not be hard to see that this almost vertical angle provides little or no bony shelf for sup-

port against the incident forces of weight bearing. The skid angle is seen to be 78 degrees in the male, and but slightly better at 75 degrees in the female.

Thus this joint is seen to be almost entirely dependent upon its ligaments for normal function, and it should require little imagination to appreciate the ruinous kinetic potential of these unadvantageous planes during weight bearing, especially in the absence of integrity of any of the structures necessary for a stable anatomical design. As either or both of these ilia slip out from under the load, one can readily visualize the havoc wreaked on the unwarned superimposed structures. Characteristically the whole symptom complex is of such sublimely innocent inception that the low back syndrome is almost universally of unknown origin. We know of no other etiologic offering that so satisfactorily spans this subtle void.

Laxness of ligaments may come about through degeneration of an interposed cartilage, shortening the distance between the origin and insertion of a previously normal taut ligament. This is more readily appreciated in the narrow joint fissure of the knee, but is equally applicable in the joint under study. Forty-five per cent of our low back cases have some form of degenerative arthritis visible in the films, and the true

occurrence rate may be much higher since routine filming does not visualize all of the surface. It is pretty generally agreed that this disease entity is a self-limiting one ending in fusion, but in most cases this takes many years and pain relief is predicated upon the patient's longevity. Much of the discomfort may be evaded with stabilization of the joint by shortening the ligaments with properly placed sclerosing solutions. We do not know that the course of the disease is otherwise affected.

Instability following known trauma with loss of integrity of these ligaments is a condition seen occasionally, although, in fairness to all parties, original etiologic injury is sometimes very difficult to assess. Trauma is omnipresent and often requires the judicial discretion of a Solomon to unravel its ramifications. It appears to us that the torn ligament must be held in highest regard, especially in the low back if we would grant our patients more continuing comfort following sprain or other inclusive pathology. Fracture through almost any joint must rend its ligaments and set up the need for their care. Dislocation is an even greater offender, and we need to look no further than the much-operated, recurrently dislocating shoulders following this tragedy to discern that ligaments are

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motor reactions and subsequent damage to the various components of the eye are known and explain visual loss from even mild trauma. It has been the purpose of this article to present a correlation of these facts for the general practitioner's information.

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Sacroiliac Joint

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the forgotten structures in the management of trauma. This will be corrected, we are sure, as surgeons become better acquainted with sclerotherapy.

Ample time should elapse for full regeneration of the substance of the rent ligaments and for their healing and contraction before re-assigning them to strenuous duty, remembering that young tissue is not strong tissue and readily stretches. Failure to obtain this end can result in a lax structure and

an unstable joint and initiate a low back syndrome.

Down through the years many maneuvers, both plain and fancy, have been advocated for the detection of motion in this area. It is a good general rule that the more simple a procedure the more reliable the results, manifestly if only by removing some of the element of human error. No matter how simple, however, there are times during acute phases of back problems that tests for motion are not well tolerated and must be postponed, in the hope of gaining enough information for intelligent treatment through palpation for point tenderness, and not very deeply at that. As soon as the acute pain has subsided sufficiently the involved region must be thoroughly studied with every means at our command lest one of the organic pathologies be overlooked. Patients seldom deny themselves laboratory tests prescribed for their benefit, and it is axiomatic that money spent for diagnosis is the cheapest form of therapy since once diagnosed, more often than not, treatment is dictated. Diagnosis is the heart of healing.

It has long been recognized that the ilium will rotate and become fixed in a posterior position. The defect may be so slight as to escape recognition unless the diagnostician is acquainted with the abnormality and the continuing pain and dys-

function it can and does cause. Neither have we been able to find any typical pain pattern associated with this malady due probably to its close anatomical associations with all the segments of the low back, and especially to the proximity of the fifth lumbar nerve as it courses in front of the joint. Concomitant muscle sprain further complicates any help from the chief complaint; so, it is always best to hold this subject suspect until such time as X-ray filming can be done and the joint put through its motions and corrective maneuvers.

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the patient when he is asked to put his finger on the exact point or points where the pain is felt. If the region of the sacroiliac is indicated it is an almost pathognomonic sign of sprain of the area, and it is safe to proceed, making certain, of course, of the absence of organic processes. Any of the segments from the lumbodorsal juncture on down may be symptomatic from the near or remote effects of sprain, depending entirely on the dynamics encountered.

In the milder chronic states and the subsiding acute problems, much can be learned by laying a patient prone over a table break flexed to the point of tolerance. In this position the topical anatomy of the bones is more readily identified and the sacrum is held by the drag of the reposing member. Standing on one side the operator grasps the contralateral thigh just above the knee anteriorly, and raises the extended extremity to the near limits of extension of the thigh on the trunk, meanwhile palpating motion of the ilium on the sacrum with the other hand. The finger tips are placed against the ala of the ilium just above the spine with the pads on the sacrum where any excursion or lack of motion will be quickly palpated.

If the articulation seems to be permitting motion beyond the 2 to 4 mm. we consider normal, it deserves the stable or hypermobile label; but

if it seems to move not at all, further tests are necessary, provided no fusion is noted on the films. The table is brought to the horizontal and the operator again similarly grasps the opposite thigh and draws the extended extremity over its fellow where it is anchored by an assistant, or the examiner's ankle inserted between those of the examined. Pressure is now made tableward with both hands, using the contralateral hand on the upper part of the ilium and the other on the lower part of the sacrum. The ilium will be felt to glide forward on the sacrum, or there may be an abrupt snap as it returns to its normal position. Almost always the patient is conscious of the motion and appreciates relief of at least some of the pain. Should this occur repeatedly, it is but another type of instability.

These are tests using direct palpation of the bones involved and are very reliable in judging laxity of ligaments and joint integrity. We have found them more reliable and easier to interpret than any others we have contacted. They are especially helpful in an area where X-ray is of so little assistance. We have yet to develop X-ray technics which will show instability in the sacroiliacs in anything approaching actual percentages. We have adopted these particular tests as standards in the qualification of these par-

ticular ligaments for sclerotherapy. Neurological changes are interesting but are subject to so many variables, that here again we must confine ourselves to the better known constants.

In the highly acute problem that will not tolerate free motion of the involved part, we are restricted to what can be learned by direct palpation and by X-ray filming as well as the clinical picture and history. A tender facet, acute or chronic, is an ailing one, as is any other sore structure except, perhaps, the interspinous ligament which is the 'window of the sclerotome' and may reflect deeper pathologies of the disk and bodies of the vertebrae. It is also very tender in the presence of deep congestive states, including the more severe sprains and degenerations. Continued, deep interspinous tenderness must be viewed with suspicion unless, of course, the X-ray films demonstrate contracting spinous processes with pseudoarthrosis or collagen disease. Progressive disk degeneration must never be lost sight of in the management of the chronic low back, nor instability lower down be discounted.

The facet syndrome is mentioned only to use it as a differential sign in the acute or chronic back. It is well in approaching this area to remember the innervation of the sacroiliacs, L4 and L5, and that they

may be involved as they emerge from the spine beneath these lesser arthrodials. An acute or 'hot' distended set of facet arthrodials may make considerable pressure on its proximal nerve trunk. This, coupled with an associated local muscle spasm producing a disk compression and expansion on the other side of the nerve trunk, can most certainly supply the necessary 300 mm. of mercury to cause pain. Direct finger-point palpation can elicit these areas of varying tenderness over the involved structures and assay them by their degree.

Instability in a joint can only eventually result in sprain when under stress. This will result in chronic sprain syndromes, which conditions appear to be what some writers are attempting to describe as 'triggers.' Repeated trauma anywhere will result in hyperalgesia, as the man well knows who has sprained his ankle several days in a row. In many instances this has been going on for years in the unstable sacroiliac ligaments and in those of the spine above. Hackett⁵ has pointed this out very nicely in the former, but in our practice it does not stop there. This same hypersensitive process is found in the lateral spinal ligament and we are only able to get complete pain relief in many of our segmental neuralgias after this ligament has been properly treated and strength-

ened to the point of being able to cope with the spraining forces. The scope of this paper does not include a discussion of ligament triggers, but lest the uninitiated be led down a blind alley let him remember that stability is one of the more important goals in the treatment of joints. It is one of the oldest axioms in orthopedic surgery, without which much is left to be desired.

Occasionally in our patients the joint cartilage disintegrates and is absorbed, many times without coinciding and paralleling ligament shortening. It is self evident that these patients will need supplemental care. This relentless process occurs in approximately 5 per cent of our low backs and involves the interposed cartilages of either the major or minor arthrodials and/or that between the sacrum and the ilium. This is rather discouraging to the afflicted but the blow is softened when they come to know that to keep abreast of the degeneration, treatment is only necessary at six-months to one-year intervals.

The safety of the treatment is attested by its zero mortality rate and its negligible morbidity. It is equally applicable to the ambulant patient and to the one prostrated with pain and requiring hospital care. It is not at all dismayed by the positive myelogram, but grants exception to the defect logically interpreted as a tumor. The successfully treated cases