SACRO-ILIAC STRAIN

BY

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The uncertainty that surrounds the vexed question of sacro-iliac strain has provided a basis for much quackery. While some authorities doubt its very existence, others hold it to be a common cause of backache and of pains felt radiating down the lower limb. Bone-setters and osteopaths have no misgivings, and habitually postulate the existence of subluxation of the ilium as a pretext for mobilizing the joints of the lower back. Confusion of this sort can spring only from great individual variations in the criteria held to justify this diagnosis. When tenderness "over the joint" suffices, strain is found to occur in a fair proportion of all patients with backache; but when this diagnosis is restricted to cases showing a positive response to one or more of the tests set out below, the fraction is found to be very small. This paper seeks to show how a diagnosis of sacro-iliac strain may be limited to cases in which the pain arises in the sacro-iliac ligaments.

Incidence.—Adherence to the diagnostic standards described below enabled the presence of sacro-iliac strain to be determined in 3 out of the 420 patients with symptoms referable to the lumbo-sacro-gluteal region seen in the physiotherapeutic department of St. Thomas's Hospital during the past two years. During the same period I have also seen two such cases in private practice. Hence the frequency of sacro-iliac strain as a cause of such pains is estimated not to exceed 1%. I have yet to see this condition affect a male patient.

Summary of Findings in a Series of Five Cases

The following table gives the salient features of five patients who, between them, had suffered six "attacks" of sacro-iliac strain.

Occupation	Age at Onset	Cause	Parity	Length of History (Months)	Side	Pain on Waking	Pain referred to	Tender Area	Palpable Subluxation	Control by Corset
1. Housewife	41	?	0	8	R.	No	Thigh, leg, and heel	All over sacrum	No	Yes
2. Physical training instructress	21	Twist in mid-air while vaulting	0	3	Both	?	?	?	?	Not tried
	33	Childbirth	1	12	"	No	Iliac fossae	None	Yes	No
3. Housewife	27	"	3	25	"	Yes	Hypogastrium	"Over joint"	"	Yes
4. Masseuse	21	?	0	3	"	"	Sacral only	"	"	"
5. "	22	?	0	1	"	No	"	None	No	"

All five were women of childbearing age. Recovery after three months' rest in bed was followed in one case by recurrence twelve years later during the first puerperium. Strain began after the birth of her third child in another patient—a treated congenital syphilitic. The influence of trauma seemed negligible: only one patient gave such a history, and then the injury appeared too slight to have done more than make manifest a laxity already in existence. In three instances the onset was gradual and no cause was discoverable. A feature common to all patients was the unusually large range of movement at the lumbar spine; this suggested that the sacro-iliac laxity formed part of a more widespread suppleness.

Symptoms and Signs of Sacro-iliac Strain

The outstanding symptom is a deep sacral ache, aggravated by exercise and relieved by rest; three patients were free from pain on awaking in the morning. Pain was referred to the lower part of the abdomen in two cases,

and to the thigh, leg, and heel in another. The fourth and fifth patients had a purely sacral ache.

No patient volunteered the information, but questioning after making the diagnosis elicited the fact that clicking followed by increased pain had been noticed in three cases. Two patients had realized that the pain could be eased by provoking another click, and had discovered methods of reducing the subluxation. One fixed her pelvis by standing with her legs crossed, and gave her trunk a quick twist; the other knelt with her thighs pressed against the abdomen.

The signs of sacro-iliac strain are as follows:

Pain on Stretching the Anterior Sacro-iliac Ligaments.—The anterior superior spines of the ilia are pressed apart while the patient lies supine. This test proved as reliable as any; for pain was easily provoked thus in four cases. In the fifth no pain was elicited by any tension put upon the sacro-iliac joint except rotation, but palpable subluxation occurred (see below). Since a negative response to this test appears to exclude the sacro-iliac joint as the source of pain with reasonable certainty, this manœuvre suffices during the routine examination of the lower back. Renewed search for the further signs described below is necessary only when the examination of adjacent structures fails to disclose the site of the lesion.

Pain on Stretching the Posterior Sacro-iliac Ligaments.—The patient lies on her side, and the uppermost part of the iliac crest is pressed downwards. If the pressure is applied well forwards along the bone the posterior ligaments bear the greater stress. Pain was elicited thus in three cases; moreover, it was felt less certainly. Though this test is less delicate than that described above, it possesses the advantage of not pressing the sacrum against the couch, thereby obviating confusion between pain due to pressure on a tender area and that due to stretching the ligaments.

Pain on Attempting Forward Luxation of the Sacrum.—The patient lies prone, and pressure is applied centrally over the sacrum. This is a good test; it yielded a positive result in four cases and a doubtful result in the fifth.

Pain on Forcing Rotation at the Joint.—A rotation strain cannot be put upon the joint without also straining the lumbar spine or the hip-joint towards extension. Since the chief diagnostic difficulty lies in distinguishing between lumbo-sacral and

sacro-iliac conditions, this test has little practical value, though pain thus elicited was present in every case.

Signs of Sacro-iliac Laxity

Presumably strain is merely the early stage of laxity, before excessive movement becomes apparent. In three bilateral cases laxity was demonstrated; in one bilateral and one unilateral case only the signs of strain were present.

Palpable Subluxation.—As the patient lies prone the ilium is pulled backwards by the examiner's one hand about the anterior superior spine, while the other presses the sacrum forwards. This manipulation may succeed in producing palpable movement at the joint; if so, an unpleasant crunch occurs, reminiscent of the sensation produced by fractured bone-ends rubbing together. Three cases showed this sign.

Radiography during Subluxation.—This did not prove possible in any case, and the radiographic appearances were consistently normal. Sacro-iliac strain, therefore, is a diagnosis that can be arrived at only on clinical grounds. The fact that subluxation can be produced in the manner described above,

considered in conjunction with the way in which patients had learnt to achieve reduction, leads to the conclusion that the abnormal movement is towards posterior displacement of the ilium on the sacrum.

Tenderness "Over the Joint"

A glance at the diagram giving the relations of the sacro-iliac joint should finally dispose of the idea that tenderness of any structure accessible to the examiner's finger denotes tenderness of the sacro-iliac ligaments. Nevertheless, tenderness "over the joint" was present in three of the five cases, though the tender structure was clearly the sacral part of the sacrospinalis muscle. Evidently the movement apart of the sacrum and ilium puts lateral stresses upon the

Diagram of relations of sacro-iliac joints at first sacral level. A, Posterior superior spine of ilium. B, Sacro-iliac joint. C, Sacrospinalis muscle.

fibres of origin of this muscle, causing a series of minor tears in this position. Hence a chronic traumatic fibrositis is set up, and is the proximate cause of the tenderness.

Tenderness "over the joint" is in no sense a sign of sacro-iliac strain, for it occurs far more commonly in fibrositis of the lowest part of the sacrospinalis muscle and its sheath, in the absence of any sacro-iliac affection. A diagnosis of true sacro-iliac strain is made on grounds quite other than the existence of such tenderness, whose presence is to some extent confirmatory, but whose absence is without significance. As a rule, loosely made diagnoses of sacro-iliac strain can be shown to be incorrect by the simple expedient of infiltrating with a local anaesthetic solution the muscle fibres lying behind the joint. If cessation of pain for the duration of anaesthesia results the site of the lesion evidently lies in the muscle. The objection that it is possible to be mistaken as to the position of the point of a needle is met by the fact that no one can fail to perceive the wide difference between muscle and dense fibrous tissue both in the resistance they offer to the progress of a needle and in the degree of pressure needed for their respective infiltration.

Clinical Course of Sacro-iliac Strain

The strain in Case 1 had been present for eight months when this patient was first seen. A corset was worn for a year, and she is now symptom-free without a corset. The laxity in Case 2 at the age of 21 cleared up completely after rest in bed for three months. The recurrence at the age of 33, after childbirth, has now continued unchanged for twenty months in spite of corsetry for the past eight months. Arthrodesis will be performed as soon as the patient can arrange to leave home. The laxity in Cases 3 and 5 is adequately controlled by a corset, which is still being worn. It is obvious that progress is being made towards freedom from pain in the absence of corsetry. The laxity in Case 4, though considerable in degree and in the amount of disability present, had improved so much after only one month's corsetry that this could be discarded for several hours a day without ill effect.

Treatment

The sacro-iliac is like the acromio-clavicular joint in that no muscle spans it; hence each relies for stability on its capsular ligaments alone. Mobilization of the joint leads to further overstretching and increased pain; indeed, the stresses put upon the joint by its mere clinical examination temporarily aggravate the symptoms. The fact that mobilization has cured "sacro-iliac strain" by supposedly adjusting the position of the ilium on the sacrum is in itself strong evidence that such strain was not present. All the manipulations calculated to move the ilium on the sacrum, as anyone who watches an osteopath can see, stretch or rotate the lumbar spine. Hence cure by mobilization suggests that the pain had a lumbar origin.

In true sacro-iliac strain, then, stretching the joint makes the patient worse. Immobilization is required, and is best obtained by a corset that holds the ilia firmly against the sacrum. It should be worn day and night until the pain on waking disappears; thereafter it need be worn only by day. After several months, if full relief has been attained meanwhile, the patient may try increasing periods up and about without the corset. Throughout she should be warned to do nothing that hurts, and to rest at once if pain begins. Since no muscle controls movement at the joint, exercises are contraindicated; for they can serve only to strain the ligaments further. Since a laxity absent for twelve years reappeared after childbirth in one case, it is evidently wise to prescribe adequate corsetry for several months before and after the confinement as a prophylactic measure in patients who have suffered from true sacro-iliac laxity in the past.

When repeated subluxations add to the patient's pain she should be shown one or other of the methods of reduction already described. Attempts at forcing by the practitioner are unwise, in so far as they are at best only momentarily successful; they are more apt to result in a prolonged increase in the symptoms.

Corsetry and the avoidance of all activity that sets up pain proved successful in four out of the five cases cited here; and progress towards full relief without a corset has been, or is being, achieved. Patient No. 2, though waking symptom-free, found a corset useless to prevent the regular onset of pain about two hours after rising. Since prolonged rest in bed—the only other conservative treatment—is impracticable, arthrodesis will be performed.

Discussion on Aetiology

When a ligament the tension on which is not under muscular control has been sprained, any overstretching thus caused is permanent. For example, it is a commonplace that lengthening of the cruciate ligaments of the knee, or of the capsule of the acromio- or sterno-clavicular joints, persists indefinitely. Now the sacro-iliac joint is not under muscular control; yet its laxity appears not to be due to injury, not to affect men, usually to be bilateral, to have some connexion with pregnancy, and to be recoverable from completely. These facts suggest that the cause is non-traumatic, general, peculiar to women, and temporary. It is interesting, therefore, to speculate on the possibility of an endocrine element in the aetiology of sacro-iliac strain. Evidence of very slight lengthening of the ligaments towards the end of pregnancy has been demonstrated and measured radiographically. The existence of a special hormone of the corpus luteum—relaxin—has been suggested to account for this change, which is strikingly large in some animals. Hence, sacro-iliac strain may in the future come to be regarded as due to a temporary over-

secretion of this hormone, and thus in essence a medical rather than a surgical condition. An increase in the distance between the bones at the symphysis pubis, had it been visible on the radiographs, would have afforded valuable confirmation of this hypothesis, but was not in fact demonstrable.

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CONGENITAL ARTERIOVENOUS ANASTOMOSIS

BY

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Cases of congenital arteriovenous anastomoses in the limbs have been recorded by Reid (1925), de Witt Lewis (1930), Holman (1937), and others. Most of these, however, had an associated surface naevus, which was not present in the following case. The existence here of an arteriovenous communication is suggested by the slowing of the pulse after reducing the arterial flow through the anastomosis by occlusion of the right common femoral artery. Lewis and Drury (1923) suggest this fall in rate is vagal in origin.

Case Report

The patient, a girl aged 8, was an only child of healthy parents, who stated that since birth they had noticed that their child's right leg was bigger and hotter than the left. Apart from this the limb had given no trouble until two days before she was seen, when a "milky discharge" had appeared in the right groin. This was painless and did not follow any known injury. She had always been healthy except for scarlet fever, measles, and an attack of catarrhal jaundice.

When she first attended the out-patient department the girl's general condition was good apart from discomfort from the discharge. This came from a pin-point opening on the inner side of the right thigh, about the apex of Scarpa's triangle, and was quite profuse, 1 c.cm. being easily collected in a test-tube. Her clothing, though changed about two hours previously, was soaked. There was no obvious sinus and no reddening or thickening of the skin. Her right leg was larger and warmer to the touch than the left.

She was admitted to the ward for further observation, but by the following morning the discharge had ceased; it never recurred in spite of massage and exercise of the limb, nor could we find the opening through which it had come. She had never had this trouble previously, nor has it recurred since she was seen last April. The fluid collected was reported on by Dr. Gough as follows: "The appearance is that of a pale yellow milky opaque fluid with a clot stained faintly pink on standing. The cell count is 1,600 per c.mm., all lymphocytes. No organisms were seen, and nothing was grown on culture. The fluid contains only a little fat. It is not 'chyle,' but may be a fluid from a lymphangiectasis."

Examination of the right leg showed that throughout its whole length it was larger and warmer to the touch than the left. The measurements of the limbs and bones were as follows:

	Right Leg	Left Leg
Iliac crest to heel	29½ in.	27½ in.
Iliac crest to tibial spine	16½ in.	15 in.
Tibial spine to big toe (foot extended)	17½ in.	16½ in.
Length of foot	8 in.	7½ in.
Maximum circumference of thigh	14 in.	12 in.
Maximum circumference of leg	9 in.	8½ in.
Radiograph of both tibiae on single film:		
Length of tibia	12½ in.	11 in.
Breadth of head of tibia	2½ in.	2 in.
Breadth of shaft of tibia	3¼ in.	11/16 in.
Breadth of shaft of fibula	1¼ in.	1¼ in.

Pulsation was felt behind the inner border of the right tibia almost throughout the length of the bone, and there were several palpable and pulsating vessels around the inner aspect of the

right knee-joint. The limb surface in the upper thigh area was shiny, with some distension of the superficial veins extending to just above the iliac crest. No demonstrable oedema of the limb was observed. The internal saphenous vein was palpable and visible along its course from the internal malleolus to the inner side of the thigh; the skin was grooved over it, and it was patent throughout. There was no collection of enlarged superficial vessels in the skin.

Pulsation in the dorsalis pedis artery was equal to the touch in both feet, and the systolic pressure in both legs was 130 mm. Hg. The blood pressure in each arm was 110/80 mm. Hg. Occlusion of the right common femoral artery slowed the pulse after an interval of about 6 beats by 10 to 15 beats a minute, with quickening soon after release. Occlusion of the left artery was without effect on the pulse rate. No other vascular abnormalities were noted, and the heart was normal in size. A radiograph of the right tibia showed no grooving suggestive of erosion by enlarged vessels.

Surface temperatures were not taken, but daily groin temperatures were on the average 0.4° to 0.8° higher in the right groin than in the left. Repeated observations in which the skin was felt showed the temperature to be consistently higher on the right side throughout the whole leg.

Discussion

The unusual and puzzling feature of this case was the milky discharge, and no reference to a similar happening has been found in the literature. Unfortunately this cleared up so quickly that we were unable to make full observations on it, but its presence pointed to an increased flow of lymph in the limb. The close embryonic relation between lymphatic vessels and veins, which are both derived