OSTEITIS CONDENSANS ILII AND ITS DIFFERENTIATION FROM ANKYLOSING SPONDYLITIS

BY

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Sicard, Gally, and Haguenau (1926) first described cases of the condition now known as osteitis condensans ili. The name of the disease was introduced by Bársny and Polgár (1928), who recorded fifteen cases; they considered it to be a specific clinical entity, the lesion being found on radiological examination of the lumbo-sacral area, and the essential feature being dense sclerosis in the iliac bone, adjacent to the lower part of the sacro-iliac joint.

Review of the Literature

Bársny and Polgár (1928) described fifteen cases which they saw within 18 months, an indication that the disease is not rare. All their cases complained of low back pain, and tenderness was noted over the sacro-iliac joints. The lesions could be unilateral or bilateral, and the site of pain coincided with the x-ray lesion in unilateral cases. In cases with bilateral involvement the pain was felt diffusely in the lower lumbar region. Some patients also had neuralgic pains in the lower limbs. The disease ran a chronic course, and, although relieved by heat and exercises, tended to relapse. Bársny and Polgár stated that "limited changes" occurred in the joint spaces in some of their cases, and that follow-up x-rays were needed to distinguish osteitis condensans ili from "sacro-iliac arthritis". They offered no firm opinion regarding the aetiology of the condition, but suggested that there might be some disease of the sacro-iliac joint, or that some mechanical strain of the sacro-iliac joints could account for the site of the sclerosis. In a subsequent paper, Polgár (1933) drew attention to the fact that Paget's disease of the ilium could commence in that area of the bone affected by osteitis condensans ili and simulate the latter condition.

Berent (1933, 1934) described three cases in female patients. He stated that the condition only occurred in women, and that it resulted from damage to the sacro-iliac joints during pregnancy and confinement. The ligaments were relaxed during pregnancy and allowed more movement of the joints. As a result, the ligaments might be stretched or torn, with accompanying periosteal damage.

Pines (1932) described two cases, one of which was a male. Both cases had unilateral disease, and joint tenderness coincided with the site of the lesion.

Rendich and Shapiro (1936) reported twelve cases, three of them in males. While some of their patients had low back pain, sciatica, and tenderness over one or both sacro-iliac joints, others had no symptoms referable to the affected area. These authors cast doubt upon the condition as a cause of low back pain. They stated that the joint outline was normal, and stressed the importance of taking oblique radiographs so as to demonstrate clearly the sacro-iliac joint.

Shafar (1938) reported a case in a male. He stated that the joint spaces were normal in this patient.

Hare and Haggart (1945) recorded their findings in 23 cases. Subsequently, Shipp and Haggart (1950) augmented this account, and reported a total of one hundred cases seen at the Lahey clinic over a period of 13 years. They reviewed all cases seen up to 1946, and, in 29 cases, amended the diagnosis from osteitis condensans ili to ankylosing spondylitis. All patients in this large series were women; 78 had borne children, and 48 of them dated their symptoms from their pregnancy. The authors considered the sacrum and the sacro-iliac joints to be normal. They advanced the theory that in the female the sacro-iliac joint lies in the sagittal rather than the normal oblique plane, and in pregnancy further strain is put on the articular surfaces owing to relaxation and stretching of the pelvic ligaments. Obesity was a factor in 64 cases. Tests involving movements of the joints did not provoke pain.

Szabados (1947) reported five cases, in three of which there was evidence of a chronic urinary infection; in another two cases a history of pyelitis was obtained. It was considered that the renal and ureteric infection could spread to the nutrient foramina in the iliac bone.

Ude (1950) described six cases in which he also found residual changes of Scheuermann's disease. He suggested that the iliac changes were either secondary sclerosing changes superimposed on an old sacro-iliac epiphysitis, or that the sacro-iliac changes were secondary to the directional strain placed on these joints by variations in the curvature of the spine. In three cases there was an associated degenerative process in the region of
the pelvic symphysis. Subsequently, Ude (1952) reported
more than thirty similar cases.

Knutsson (1950) presented the radiological findings in
147 cases of ankylosing spondylitis and in 37 cases of
osteitis condensans ilii. In 32 of the patients with
condensans ilii, the joint spaces appeared to be normal,
and the articular surfaces were unchanged. While
indicating that in the early stages of spondylitis it might
be difficult to differentiate the changes from those of
osteitis condensans, Knutsson felt that such a differen-
tiation could be made at a later stage.

Baker and others (1950), on the other hand, considered
that the two conditions were related, and he included six
cases of condensans ilii in a series of one hundred cases of
ankylosing spondylitis, treated by roentgen therapy. He
felt that the conditions were identical because of their
identical anatomical situation, clinical symptoms and
response to treatment.

Layani and others (1950) reported a single case in
a male patient, in whom there was a complicating factor
of severe trauma with injury to a hip joint. They
obtained a portion of affected bone and examination
showed an overgrowth of bone, a periostal osteophytosis
and fibrous periosteal reaction.

Gillespie and Lloyd-Roberts (1953) described 21 cases,
all occurring in females who had borne children. They
did not consider that the back pain was due to the sacro-
iliac lesions, or that the physical findings were related
to the radiological appearances. While stressing the
incidence of sacral changes, they felt that the probable
explanation was an obliterator endarteritis. These
authors considered that there was evidence of a prolapsed
lumbar disk in thirteen of their cases, and they felt that
this was responsible for the pain; in the remaining eight
cases the pain was considered to be due to other causes,
not elicited.

Hutton (1953) has recently described a series of 28
cases, which included two men. He stated that in 22
cases there was a history of back pain, and in six the con-
dition was discovered accidentally during pyelographic
or other radiological examination.

Pathological Changes.—Rendich and Shapiro (1936)
obtained a biopsy specimen from one patient who,
because of persistent pain, had a sacro-iliac fusion per-
formed. Dr. W. Hala reported on this section as show-
ing marked condensation of the osseous tissue with
obliteration of the lacunae. No osteoblasts or osteo-
clasts were seen. The marrow spaces contained an
unusual number of myocytic and plasma cells. There
were occasional depositions of lime salts in the condensed
bone, occurring more or less parallel to the lamellae of
the bone.

Hare and Haggart (1945) studied the findings in two
cases from whom biopsy specimens were obtained. The
bony trabeculations were greatly increased in density, but
the lacunae were still discernible. Scattered islands of
cartilage were noted at a considerable distance from the
joint surface. The bone marrow showed focal areas of
fibrosis. There was osteoblastic activity in excess of the
normal in the form of clumps of osteoblasts and occa-
sional osteoclasts. Macroscopically the articular car-
tilage was fibrillated and irregular.

Gillespie and Lloyd-Roberts (1953) obtained a biopsy
specimen from a patient with marked bilateral condensans
ili, in whom the sacro-iliac joints appeared radiologically
to be normal. Prof. S. L. Baker reported that the
articular cartilage and ligaments were normal, and the
main findings in the bone were of concentric osseous
deposits, thickened lamellae and narrow Haversian
canals.

Radiological Appearances.—These have been described
in detail by several authors, notably Bársöny and Polgár
(1928), Knutsson (1950), and Gillespie and Lloyd-Roberts
(1953). There is a disturbance of the normal architecture
of that part of the iliac bone which lies in proximity to the
sacro-iliac joint. The characteristic lesion is a uniform
area of dense sclerosis, approximately triangular or
aliform in shape, the base of which lies on the iliac
border of the sacro-iliac joint. The apex of the lesion
spreads into the auricular portion of the ilium to a
variable degree. The smallest lesion merely occupies the
angle at the lower end of the sacro-iliac joint, but some-
times a large lesion is seen extending through the ilium
towards the pubic ramus, the base of the lesion occupying
the entire iliac border of the sacro-iliac joint. The
condition is bilateral in the majority of cases.

The outer margin of the sclerosis often presents a well-
defined edge if the film has been over-exposed. Close
examination shows, however, that there is a gradual
transition from the dense opacity of the lesion to the
zone of completely normal bone. In some cases the
lateral margin of the lesion is grossly irregular.

Although the sclerosis appears to be very dense and of
uniform consistency, it has been noted that the cancellous
structure of the bone has been preserved. This is more
evident if the film has been slightly over-exposed.

Sclerotic changes are seen in the sacrum in a small
proportion of cases. Since Bársöny and Polgár first
reported this feature, several other workers have com-
mented upon its occurrence, especially Rendich and
Shapiro (1946) and Gillespie and Roberts (1953).
Because of the oblique position of the sacro-iliac joint,
it is impossible to say on the study of the antero-posterior
film alone whether the sacrum and sacro-iliac joint are
affected. Oblique views of the sacro-iliac joints and
tomographs will establish the true location of the changes.
Tomography has been used to prove that the lesion
extends to a depth of several centimetres into the bony
substance.

Thus far all authorities are agreed, but there is a con-
siderable amount of controversy regarding the question
of alterations in the margins of the sacro-iliac joint.
Bársöny and Polgár (1928) reported limited changes in
the sacro-iliac joints in some of their cases, and that
serial x rays were required to distinguish osteitis con-
densans ilii from "sacro-iliac arthritis". These authors
were probably referring to the sacro-ilits seen in anky-
losing spondylitis, as the significance of this finding
was not fully appreciated until Scott (1942) stressed the initial
involvement of the sacro-iliacs in spondylitis. Pines
(1932) considered that his second patient, a female, might have a sacro-iliitis. Ude (1950) mentioned that in one of his cases, that of a female patient with unilateral disease, there was narrowing of the sacro-iliac joint adjacent to the affected bone. Knutsson (1950) reported narrowed joint spaces and lip shaped protrusions from the edges of the articular margins in some of his cases, and stated that, although the distinction between osteitis condensans ilii and ankylosing spondylitis was easy in the majority of cases, there were border-line cases, with insignificantly developed sclerosis on the iliac margin and seemingly intact joint spaces, in which initially it was impossible to make a differential diagnosis.

Rendich and Shapiro (1936), Hare and Haggart (1943), and Gillespie and Roberts (1935) all maintained that the sacro-iliac joints are not affected in osteitis condensans ilii. All these authors studied the sacro-iliac joints by oblique radiographs and tomograms. Other radiological findings reported in cases of osteitis condensans ilii have been

(a) changes in the pubic symphysis with sclerosis and small cystic spaces (Ude, 1950; Gillespie and Roberts, 1953);
(b) Garre's sclerosing osteitis (Szabados, 1947);
(c) evidence of old spinal osteochondritis (Ude, 1950);
(d) bony islets in other regions of the skeleton, reported in occasional cases.

Present Study

Material.—In view of the many divergent opinions regarding osteitis condensans ilii, especially with regard to its significance, clinical features, aetiology, and radiological appearances, a further series of twenty cases is here presented. All twenty cases had an initial x ray which suggested the diagnosis of osteitis condensans ilii. The patients have been investigated since July, 1950. In each case a full clinical, radiological, and haematological investigation was performed; the serum calcium, phosphorus, and alkaline phosphatase were measured; the Wassermann reaction was tested. An intravenous pyelogram was performed in five cases in which there was a history indicative of a previous urinary infection. Five of the patients were admitted to hospital, and the remainder were investigated at the Out-patient Department.

Results

Symptoms.—All the patients in the series were females, and all had a complaint of low back pain. Their ages ranged from 26 to 47 years (mean 35·1). The duration of symptoms ranged from 2 to 14 years (mean 7·05). The age at onset varied from 18 to 41 years (average 28).

The onset of the pain occurred during pregnancy or in the puerperium in eleven cases. Two patients had had children since the onset of their symptoms without any increase in symptoms or any relapse. Three patients stated that successive pregnancies increased the pain. Five of the patients were nulliparous.

The back pain was felt in the lumbo-sacral area, usually most marked just to one or other side of the midline. In eighteen of the cases (90 per cent.) pain radiated to one or other hip, or beyond. In nine cases there was bilateral sciatic radiation.

The pain was usually described as dull, persistent, and "nagging" in character. Sudden movements, and any physical activity involving the lumbo-sacral area, aggravated the pain. Coughing, sneezing, and straining at micturition or at stool, did not usually cause increased discomfort. With only one exception, the patients remarked that the pain was aggravated at the time of the menstrual periods, and in several cases the symptoms had been originally attributed to dysmenorrhoea.

All the patients experienced periods of complete or partial remission, which varied from a few weeks to 3 years; the attacks of pain lasted from 2 weeks up to 5 months, and five patients stated that they were never completely free from some discomfort. Three patients gave a definite history of a flexion injury in the back, consistent with a prolapsed lumbar intervertebral disk lesion. In only two patients was any history given of a near relative affected by low back pain. X rays of these relatives did not reveal any abnormality in the sacro-iliac region.

Eleven patients complained of marked stiffness of the spine in the mornings; this stiffness gradually wore off as the day progressed.

Physical Features.—The principal physical findings on examination of the spine are shown in Table I. No constant associated abnormalities or physical defects were noted, the principal complicating dis-

<table>
<thead>
<tr>
<th>Physical Sign</th>
<th>No. of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenderness over Sacro-Iliac Joints</td>
<td>17</td>
</tr>
<tr>
<td>Spinal Deformity</td>
<td>4</td>
</tr>
<tr>
<td>Restricted Spinal Movements</td>
<td>13</td>
</tr>
<tr>
<td>Positive Straight-Leg Test</td>
<td>2</td>
</tr>
<tr>
<td>Pain on Movement of Sacro-Iliac Joints</td>
<td>16</td>
</tr>
<tr>
<td>Obesity</td>
<td>5</td>
</tr>
</tbody>
</table>

TABLE I

PRINCIPAL PHYSICAL FINDINGS ON SPINAL EXAMINATION OF TWENTY CASES OF "OSTEITIS CONDENSANS ILII"

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## ANNAALS OF THE RHEUMATIC DISEASES

### TABLE II

**RADIOLOGICAL CHANGES IN TWENTY FEMALES INITIALLY DIAGNOSED AS CASES OF OSTEITIS CONDENSANS ILII**

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age (yrs)</th>
<th>Sacrum Involved</th>
<th>Sacro-Iliac Joint</th>
<th>Spine</th>
<th>Other Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40</td>
<td>0</td>
<td>Spaces normal</td>
<td>Slight sclerosis L5 region</td>
<td>Opaque maxillary sinuses</td>
</tr>
<tr>
<td>2</td>
<td>36</td>
<td>+</td>
<td>Narrowed space</td>
<td>Mild osteo-arthritis changes</td>
<td>Slight irregularity of manubrioster nal joint</td>
</tr>
<tr>
<td>3</td>
<td>34</td>
<td>0</td>
<td>Normal</td>
<td>Minor osteo-arthritis of thoracic spine Narrow L4/5 space</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>47</td>
<td>0</td>
<td>A little lipping at lower margins</td>
<td>Minor osteo-arthritis of C5/6</td>
<td>Cystic changes in pubis</td>
</tr>
<tr>
<td>5</td>
<td>34</td>
<td>0</td>
<td>Normal</td>
<td>Schmorl's node in T7</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>40</td>
<td>+</td>
<td>Lipping at lower margin of right joint</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>36</td>
<td>0</td>
<td>Narrowing of lower part of joint spaces</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>43</td>
<td>0</td>
<td>Lipping at lower margin</td>
<td>Mild osteo-arthritis in thoracic and LV5 regions</td>
<td>Slight irregularity in manubriosternal joint surfaces</td>
</tr>
<tr>
<td>9</td>
<td>31</td>
<td>0</td>
<td>Normal</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>35</td>
<td>0</td>
<td>Normal</td>
<td>Schmorl's node in LV3</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>30</td>
<td>+</td>
<td>Narrowing of joint spaces in inferior parts</td>
<td>Narrowed LV5/S1 joint space</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>26</td>
<td>+</td>
<td>Narrowing of joint spaces with minor irregularity</td>
<td>Mild changes of osteochondritis in thoracic spine</td>
<td>Healed T.B. focus in lung</td>
</tr>
<tr>
<td>13</td>
<td>44</td>
<td>0</td>
<td>Lipping at lower margin</td>
<td>Gross kypho-scoliosis</td>
<td>Left renal calculus</td>
</tr>
<tr>
<td>14</td>
<td>30</td>
<td>0</td>
<td>Minor sclerosis and erosion Sub-marginal osteoporosis</td>
<td>—</td>
<td>Iritis Erythrocyte sedimentation rate raised Increasing limitation of spinal movements</td>
</tr>
<tr>
<td>15</td>
<td>30</td>
<td>0</td>
<td>Minor erosions along iliac border of right joint</td>
<td>—</td>
<td>Slight erosion of manubrioster nal joint Erythrocyte sedimentation rate raised</td>
</tr>
<tr>
<td>16</td>
<td>35</td>
<td>+</td>
<td>Irregular widening, erosion, and osteoporosis</td>
<td>Failure of fusion of a few epi-physes</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>30</td>
<td>+</td>
<td>Marginal erosions</td>
<td>? Involvement of apophyseal joints</td>
<td>Cystic changes in pubis Mitral cardiac lesion Calcaneal spurs</td>
</tr>
<tr>
<td>18</td>
<td>33</td>
<td>0</td>
<td>Irregular joint space right side</td>
<td>? squaring of lumbar vertebrae</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>27</td>
<td>+</td>
<td>Patchy erosions and widening</td>
<td>—</td>
<td>Increasing limitation of spinal Movements Erythrocyte sedimentation rate raised</td>
</tr>
<tr>
<td>20</td>
<td>42</td>
<td>+</td>
<td>Irregular widening and erosions</td>
<td>? squaring of lumbar vertebrae</td>
<td>Mitral cardiac lesion Calcaneal spurs</td>
</tr>
</tbody>
</table>

Cases 1-13: Osteitis condensans ili (mean age 36.6 yrs)  
Cases 14-20: Ankylosing spondylitis (mean age 32.4 yrs)

Orders being mild obesity (five cases), and maxillary sinusitis, mitral stenosis, healed pulmonary tuberculous focus (one case), cervicitis and iritis (one case), and renal calculus and pyelonephritis (one case).

**Radiological Examination.**—The radiological changes in the present series are shown in Table II. They are recorded in detail because of the conflicting descriptions that have been given by various authorities in the past. The illustrations also
OSTEITIS CONDENSANS ILII AND ANKYLOSING SPONDYLITIS

provide evidence of the range of changes that may be seen (Figs 1-8).

The condition was bilateral in all but two cases, and the lesions varied considerably in size (Figs 1 and 2). The margin of the lesion was usually fairly distinct and even, but occasionally irregular. The sacrum was involved in seven cases, a feature that was demonstrated by means of an oblique radiograph of the sacro-iliac joints (Fig. 4).

Detailed study of the radiological features elicited some points of interest. All the cases in this series were initially considered to be cases of osteitis condensans ilii, inasmuch as the posterior-anterior radiograph of the pelvis showed dense sclerosis in the lower iliac region of the sacro-iliac joint, with an apparently normal joint outline. In seven cases, however, oblique views of the sacro-iliac joints showed minimal but definite abnormalities of the joint margins in the inferior cartilaginous region of the joint (Cases 14-20, Table II). These changes consisted in erosions of the joint margin with patchy areas of submarginal osteoporosis, and some resulting patchy, irregular widening of the joint space (Fig. 8). They were interpreted as indicating

Fig. 1.—Case 2, female aged 33 years, osteitis condensans ilii, lesion restricted to left ilium.

Fig. 2.—Case 5, female aged 32 years, osteitis condensans ilii, marked bilateral lesions.
no progression in the limitation of joint movement. Morning stiffness was not a marked feature in the patients with osteitis condensans ilii, except in those patients who had concurrent osteoarthritic changes. The principal differences between the groups are shown in Table III (opposite).

The x-ray changes were unilateral in two cases (Fig. 1), and predominantly unilateral in four other cases (Fig. 4). There was a correlation between the site of the lesion (as shown on x-ray), the site of the pain, and the localization of the sacro-iliac tenderness and pain. In no instance did the patient localize the pain over a normal joint. In two cases the principal symptoms were referred to the less grossly affected ilium (as judged radiologically). In several cases of destruction of the cartilage, an osteoclastic process. These seven patients were considered to be cases of ankylosing spondylitis.

Further consideration and study of the clinical course of these seven cases has lent support to this view. Thus, in four cases, the erythrocyte sedimentation rate has intermittently been raised. One patient developed iritis, one had calcaneal spurs, and two patients developed progressive limitation of spinal movements compatible with ankylosing spondylitis. All these seven patients have had rest, physiotherapy, and the usual conservative treatment for low back pain—without any relief. Four have since had radiotherapy with benefit; the other three patients have deferred treatment. These seven patients all had a complaint of marked morning stiffness, and all had bilateral lesions. In no instance in this group was there any other lesion present which could be held to account for the low back pain.

In the remaining thirteen cases, classed as osteitis condensans ilii, there are four cases in which the differentiation from ankylosing spondylitis has proved difficult. However, in these thirteen cases, the sacro-iliac joint spaces have shown no abnormality, apart from slight narrowing, minimal irregularity or lipping. In the osteitis condensans ilii group, the symptoms have been milder, periods of prolonged remission commoner, and response to conservative methods of treatment better, than in the spondylitis group. The erythrocyte sedimentation rate has remained within normal limits, there have been no signs of any systemic disturbance, and a grossly involved region was not tender or painful on movement.

X-rays of the remainder of the spinal column and long bones did not reveal any constant abnormality. The findings are listed in Table II.

Differential Diagnosis.—The differentiation
### Table III

**Comparison between features of Osteitis Condensans Ilii and Early Cases of Ankylosing Spondylitis**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Ankylosing spondylitis</th>
<th>Osteitis condensans ilii</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Predominantly male</td>
<td>Predominantly female</td>
</tr>
<tr>
<td>Relation to Pregnancy</td>
<td>Not usual</td>
<td>Very common</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Stiffness and pain</td>
<td>Pain more than stiffness</td>
</tr>
<tr>
<td>Signs</td>
<td>Some restriction of spinal movement often present</td>
<td>Restriction of spinal movements not a marked feature</td>
</tr>
<tr>
<td>Lesions</td>
<td>Bilateral</td>
<td>May be unilateral</td>
</tr>
<tr>
<td>X-ray Appearances</td>
<td>Patchy sclerosis with osteoporosis, and irregular widening of joint spaces</td>
<td>Sclerotic lesion, mainly in iliac bone, with relatively normal joint spaces</td>
</tr>
<tr>
<td>Systemic Disturbance (e.g., loss of weight, anaemia, raised erythrocyte sedimentation rate)</td>
<td>May be present</td>
<td>Absent</td>
</tr>
<tr>
<td>Complications (e.g., iritis, calcaneal spurs)</td>
<td>May be present</td>
<td>Absent</td>
</tr>
</tbody>
</table>

**Prognosis**—Osteitis condensans ilii runs a chronic course, but remissions are common and the response to treatment is usually good. The lesion usually shows little or no change over a period of years, although Shipp and Haggart (1950) found evidence of regression in several of their cases. In the present

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Fig. 5.—Case 14, female aged 31 years, radiograph taken in 1945 considered to be osteitis condensans ilii.

Fig. 6.—Case 14, radiograph taken in 1951, showing no substantial change from that taken 6 years previously. Although initially considered to be suffering from osteitis condensans ilii, this patient developed iritis and an intermittently raised E.S.R. in 1952, indicating a diagnosis of ankylosing spondylitis.
series, no such evidence was obtained, although serial radiographs extending over 3 years were studied in most of the cases, and in two cases films were obtained dating back to 1945.

Treatment.—The majority of patients obtained substantial benefit from a simple conservative regime of treatment. This included:

(a) rest on a firm mattress;
(b) local application of heat by an electric pad or radiant heat lamp, and short-wave diathermy to the tender areas;
(c) spinal exercises to correct faulty posture;
(d) correction of obesity by dietetic measures when indicated;
(e) instruction in the avoidance of flexion strains to the spine, heavy lifting, and jarring movements;
(f) daily maintenance dose of analgesics adequate to control symptoms;
(g) spinal support to control symptoms (four patients).

Of thirteen patients, nine obtained substantial relief by the above regime, and one further patient had a remission in the early stages of treatment without any subsequent relapse. In one further case, complicated by gross congenital spinal deformity and renal calculus, it was not possible to give the full course of treatment or to assess the results. Only two patients failed to gain substantial benefit, intractable cases. It is difficult to understand how this operation should be successful in a condition in which the joint surfaces are virtually intact.

Discussion

Nomenclature.—The term osteitis condensans illii has, by general usage, become accepted, although there is little to commend it. There is no clinical or pathological evidence of any inflammation, and the changes are not always restricted to the ilium. For these reasons the condition is often referred to as
"condensans ili" or "osteitis condensans". At present the most suitable descriptive term would be sacro-iliac osteosclerosis, but until the pathogenesis of the condition is understood, the time-honoured designation of osteitis condensans ili must suffice.

**Aetiology.**—The aetiology of osteitis condensans ili is still unknown. The present series of cases lent no support to the theories that have involved trauma (Shafar, 1938; Layani and others, 1951); juvenile epiphysitis and a possible relationship to Scheuermann's disease (Ude, 1950, 1952); or chronic urinary infection (Szabados, 1947). No patient in the present series gave any history of trauma, and in only one case was infection of the urinary tract present. Minor changes, possibly indicative of mild vertebral epiphysitis, were seen in two cases, and Schmorl's nodes were noted in a further two patients (Table II). Many other investigators have failed to establish any relationship between osteitis condensans ili and Scheuermann's disease.

The striking sex incidence of the disease and its common relationship to pregnancy (in nine cases out of thirteen in the present series), have led to several related theories concerning the aetiology and pathogenesis. Thus Berent (1934) considered strains during pregnancy and parturition led to ligamentous, capsular, and periosteal damage, but this theory has been invalidated by the finding, at operations, that the ligamentous and extra-articular structures were normal (Shipp and Haggart, 1950; Gillespie and Lloyd-Roberts, 1953).

Relaxation of the pelvic ligaments during pregnancy would allow more movements at the sacro-iliac joints, especially in view of the fact that the gynacoid pelvis is more obliquely set than the android, and the stabilizing ridges on the iliac joint surface are usually less prominent in women than in men (Shipp and Haggart, 1950). The absence of cartilaginous destruction and the comparative infrequency of sacral changes are factors which weaken this theory.

Another theory has invoked the pelvic obliterator endarteritis that follows parturition as a causative agent. An extension of this process to involve the nutrient artery supplying the affected region of the ilium could lead to ischaemic changes in the bone. Rendich and Shapiro (1936) have drawn attention to the constant position of a nutrient artery in the inferior iuxtarticular region of the ilium, and this would account for the characteristic situation of the lesion. The grosser lesions would be accounted for by involvement of smaller vessels in the middle and superior regions of the joint. Support to this theory is given by the histological studies of affected bone (Rendich and Shapiro, 1936; Shipp and Haggart, 1950; Gillespie and Lloyd-Roberts, 1953). The histological appearances are those of a non-inflammatory calcium condensation, and are in keeping with an ischaemic process. Serious objections to the theory of pelvic endarteritis obliterator are the occurrence of cases in males and nulliparous females, and the absence of changes in other regions of the pelvis, e.g. the pubic articulations.

**Ankylosing Spondylitis.**—The clinical and radiological findings in the group of seven cases suggest that there is a restricted or abortive type of spondylitis which occurs especially in women. The symptoms are restricted to the lower lumbar area; the signs are minimal; the constitutional disturbance is negligible; the radiological evidence is predominantly that of sclerosis of the iliac bone adjacent to the sacro-iliac joint (Figs 5-8), with only slight evidence of the erosion and destruction seen in the more flagrant forms of the disease. The existence of this group accords with the experience of Tyson and others (1935) who stressed that spondylitis runs a milder course in women. Another investigator, White (1953), recently presented a series of one hundred cases of spondylitis in women, and stated that one-third had a normal erythrocyte sedimentation rate.

The existence of this group is of considerable interest, inasmuch as more widespread recognition of such cases would significantly alter the accepted sex ratio of the disease. Patients in this category should be offered deep x-ray therapy, as the disease may be more active. If they are not anxious to have therapy at this stage, they must be kept under periodic review.

It is possible that abortive or restricted cases are commoner than is thought, so that some of the credit claimed for radiotherapy in limiting the disease process, may be mainly due to the natural course of the disease.

**Osteitis Condensans Ilii.**—In the remaining thirteen cases, the diagnosis of osteitis condensans has been sustained. The lesions may be unilateral or bilateral, and there may be involvement of the sacrum. The joint spaces are usually normal; occasionally some slight narrowing and lipping at the lower margin may be seen, or some minimal irregularity. The patients have long remissions, and, although the onset may be related to a pregnancy, a subsequent pregnancy does not necessarily aggravate the symptoms. The erythrocyte sedimentation rate is within normal limits, there is no
associated systemic disturbance, and there are no consistent collateral findings on physical or radiological examination.

It is considered that osteitis condensans illi is a specific clinical entity, occurring in women in over 90 per cent. of cases, often related to a pregnancy, and accompanied by low back pain. In no instance, in this series, could the condition be termed an incidental radiological finding. Although alternative causes for the back pain have been indicated by some authors, in only three patients out of the thirteen in this series was such an alternative explanation convincing.

**Summary**

A review of the condition known as osteitis condensans illi is presented, and a further thirteen cases are described. It is considered that the condition is a specific pathological entity which can cause low back pain.

The differential diagnosis of osteitis condensans illi is considered, with special reference to ankylosing spondylitis.

Seven cases initially diagnosed as osteitis condensans illi, have now been recognized as examples of ankylosing spondylitis. These represent a restricted or abortive type of spondylitis, more common in women than in men.

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**Ostéite condensante iliaque et sa différenciation de la spondylarthrite ankylosante**

RÉSUMÉ

On passe en revue l’affection connue sous le nom d’ostéite condensante iliaque et on en décrit treize autres cas. On considère que cette affection est une entité pathologique spécifique capable de provoquer une douleur lombaire. On considère le diagnostic différentiel de l’ostéite condensante iliaque, surtout par rapport à la spondylarthrite ankylosante.

Sept cas, diagnostiqués au début comme ostéite condensante iliaque sont reconnus maintenant comme ceux de spondylarthrite ankylosante. Ils représentent un type de spondylite limitée ou abortive, plus fréquente chez les femmes.

**Osteitis condensans illi y su diferenciación de la espondilitis anquilosante**

**SUMARIO**

Se pasa en revista la afición conocida como osteítis condensans illi y se describe tres casos más. Se considera que esta afición es una entidad patológica específica que puede causar un dolor lumbar.

Se considera el diagnóstico diferencial de la osteitis condensans illi, particularmente respecto a la espondilitis anquilosante.

Siete casos, inicialmente diagnosticados como osteitis condensans illi, fueron luego reconocidos como ejemplos de espondilitis anquilosante. Estos representan un tipo de espondilitis limitada o abortiva, más común en mujeres.
Osteitis Condensans Ilii and its Differentiation from Ankylosing Spondylitis
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