Staff Meeting Bulletin
Hospitals of the . . .
University of Minnesota

Low Back Pain

Volume VIII Thursday, February 25, 1937 Number 18

STAFF MEETING BULLETIN.
HOSPITALS OF THE . . .
UNIVERSITY OF MINNESOTA

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Published for the General Staff Meeting each week during the school year, October to May, inclusive.

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William A. O'Brien, M.D.

I. LAST WEEK

Date: February 18, 1937

Place: Nurses' Hall
Recreation Room

Time: 12:15 to 1:20

Program: Movie: Stranger than Fiction

Abstract: Subphrenic Abscess

Case Reports: 2

Present: 129

Discussion: C. J. Lind
L. G. Rigler
O. H. Wangensteen
C. J. Watson
A. A. Nelson
Reuben Johnson

II. MOVIE

Titles: Color Box
Kaleidoscope

Released by: Museum of Modern Art Films

III. ALPHA OMEGA ALPHA LECTURE

On Tuesday, March second, at 8:15 P.M., Dr. Henry E. Sigerist will give the William W. Root Alpha Omega Alpha Lecture.

Place: Medical Sciences Amphitheater.

The public is invited.

Title: LEPROSY AND PLAGUE IN THE MIDDLE AGES

Dr. Henry E. Sigerist, born in Paris, France, 1891, was educated in Paris and Zurich, Switzerland, and studied Medicine and Philology at the Universities of Zurich, London and Munich. He received his M.D. degree from University of Zurich in 1917.

He was Professor in the History of Medicine at the University of Zurich in 1921-1924, and Professor at the University of Leipzig and Director of the Institute of the History of Medicine as successor to Professor Karl Sudhoff. 1925-1931.

He came to the United States in 1931, to be Professor and Director of the Institute of the History of Medicine at Johns Hopkins University.

He has published the following books:

"Man and Medicine" 1932.
(Translated into six languages)

"Great Doctors" 1933.

"American Medicine" 1934.

At present he is editing the publication of the Institute of the History of Medicine, also Bulletin on the Institute of the History of Medicine at Johns Hopkins.

He is a very enthusiastic and entertaining speaker, according to all reports.

Richard M. Johnson,
Secretary-Treasurer,
A.O.A.

IV. ABSTRACT

LOW BACK PAIN

W. P. Ritchie

(Note: In this review, generous reference has been made to two monographs on Backache--that of Barker and Trescher[1], and that of Mennell[2].)

There are few entities in the field of medicine which are so unsatisfactory particularly as to diagnosis and treatment as low back pain. The orthopedists have given it special attention.

There are several very evident rea-

sons for this:

1. There are approximately 50 different conditions which can cause pain in the back.

2. The general practitioner and others are lacking in an adequate knowledge of the anatomy and physiology of the back.

3. A thorough examination is time consuming and often even when performed adequately by a specialist is difficult to evaluate.

4. Even for those who specialize in bone and joint diseases, there is often wide variation in opinion as regards the etiology of certain types of pain.

In the diagnosis of these conditions, it seems that one-half the battle is won if one understands the four or five fundamental anatomical points and can make an examination which is exact and which can be evaluated.

If this is done, the physician can at least differentiate those cases which are amenable to his treatment from those which need the care of a specialist in orthopedics. Valuable time will be saved and the endless cases which "go the rounds" of physiotherapy, heat, rest, or chiropractic treatment, finally ending up with a diagnosis of cord tumor or dislocated 5th lumbar vertebra, will be adequately cared for early in the disease.

This review is an attempt to point out the fundamental anatomical concepts, review the important features of the physical examination, and finally to point out the salient features of some of the more common causes of low back pain.

Following is a list of the causes of backache. On examining the list, an important point is focused on our attention, i.e. the absolute necessity for a careful history and a general physical examination.

A. Diseases of bone, joints and ligaments
- Arthritis - all forms
- Postural defects
- Malposition of joints and articular facets
- Fractures
- Dislocations
- Herniation of nucleus pulposus
- Carcinoma, syphilis, tuberculosis
- Kummell's disease
- Congenital deformities
- Contracted tensor fascia femoris
- Degenerations of the intervertebral discs
- Sacro-iliac diseases
- Spondylitis deformans - Marie Strumpell's disease

B. Acute infections
- Influenza
- Pneumonia
- Smallpox
- Typhoid

C. Diseases of the central nervous system
- Neoplasms involving the spinal cord or roots of the spinal nerves
- Adhesive pia arachnoiditis
- Radiculitis of the cauda equina
- Myelitis
- Haematomyelia
- Meningitides
- Disorders of the spinal root ganglia
- Multiple sclerosis
- Neuritis
- Psychoses

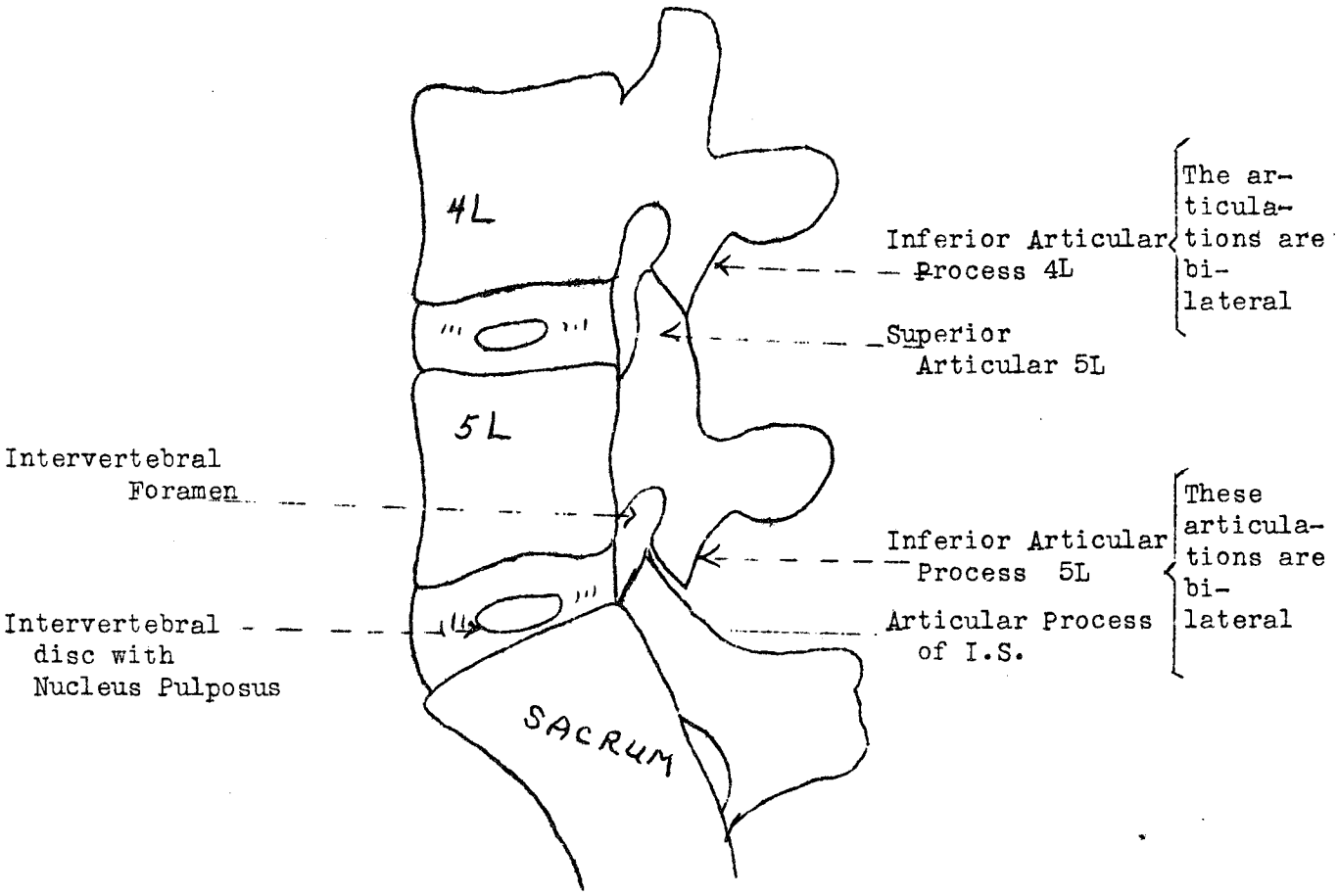
D. Diseases of the circulatory system
- Aneurysm of abdominal aorta
- Arterial hypertension

E. Diseases of the digestive tract
- Gastric and duodenal ulcer
- Retroperitoneal tumor
- Appendicitis
- Gallbladder disease
- Carcinoma of the rectum

F. Diseases of the genito-urinary system
Malposition of the uterus
Prostatic disease
Nephritis
Renal tuberculosis
Renal and ureteral calculi
Movable kidney

Anatomy and Physiology of the Spine

There are several fundamental points to consider as far as the anatomy and physiology of the back are concerned.



This diagram illustrates four essential points in the understanding of back pain:

1. Intervertebral foramen through which the nerves emerge from the spinal canal. Note the proximity of the articular joints. It is easy to visualize how dislocation, joint disease or anomalies can easily impinge on the foramen and the nerve.

2. The articular facets. The sketch does not bring out the true angle of the joints but they are so situated that forward slipping of the superior vertebra over the next lower one is prevented.

3. The nucleus pulposus which can herniate into the spinal canal.

4. The angle of the lumbosacral joint--usually about 30°. This angle

may be increased to almost 60°. One can visualize the strain on the joints and ligament in preventing forward slipping of the spine.

A. The intervertebral joints in the lumbar region consist of these articulations: (a) the articulations between the bodies, and (b) the articulations between the superior articular facet of one vertebra with the inferior articular facet of the next lower one bilaterally.

The former is unique because of the interposition of an intervertebral disc made up of an outer half of the fibrous and fibrocartilaginous tissue, and the inner part, the nucleus pulposus, a highly resilient elastic structure upon which the weight of the body largely rests. It is under tension and readily protrudes when a weakness develops in the surrounding fibrocartilage. The joint is not a true joint and has no synovia. The motion in each joint is negligible, but the spine as a whole has a considerable range of motion.

The bilateral articular joints are true joints and have a fairly wide range of motion. Being true joints with articular cartilages and synovia, it is easy to visualize them as seats of the diseases which attack other joints of the body.

B. The intervertebral foraminae are important because it is through these that the spinal nerves emerge from the cord. Danforth and Wilson pointed out that the intervertebral foramen between the 1st lumbar and 1st sacral vertebra was the smallest and the 5th lumbar root is always the largest.

Another point to note is that the articular facets of the lateral articulations of the vertebra form a part of the ring of the foramina. One can thus visualize how a disease or dislocation of the joint might impinge on the intervertebral foramen and consequently the nerve emerging through it.

C. The lumbosacral joint: is extremely important because it is at this point that the movable part of the spine joins the fixed portion. It is peculiar in that it is inclined forward and downward (usually at about 30°). It is only the very strong ligaments which join the lumbosacral, lumbo-ilial and sacro-iliac bones together with the articular processes of the sacrum and muscle which keep the 5th lumbar vertebra from sliding forward on the sacrum. It is apparent that anomalies of the articular facets, such as changing of the angle or weakening of the muscles and ligaments, might tend to permit the 5th lumbar vertebra to slip forward not only destroying the intervertebral joint but lessening the intervertebral foramen and thus impinging the nerve.

D. The sacro-iliac joint is a true joint. It has a small amount of motion and, according to Pitkin, an increase in motion is found in many cases of pain referred to the sciatic regions. The strong ligamentous structures which hold the joint surfaces in contact are well known. Being a true joint, it is affected by the diseases common to all joints.

E. The neurological aspect can be summarized as follows:

The spinal cord ends at the lower border of the body of the 1st lumbar vertebra. The spinal nerves originate some distance above their exit from the vertebral canal. The lower part of the 11th dorsal spine is opposite the lower three lumbar segments of the cord and the 12th dorsal spine is opposite the sacral segments.

Pitkin and Pheasant have attempted to demonstrate the innervation of the sacro-iliac and sacro-lumbar regions in relation to referred pain. They state that pain in the joints or ligament of the sacro-iliac and lumbosacral region will be referred from this area of lower sensibility by means of central connection to areas of higher sensibility. These areas of higher sensibility are the gluteal or anal region, or both, and pssibly a part or any part of the lower extremity and genito-inguinal region ex-

cept the internal crural and plantar regions (as the sacro-iliac and lumbo-sacral regions have no central connection with the internal crural and plantar region). This referred pain they call "sacrothrogenetic telalgia."

F. Muscles and Ligaments: The point of interest is that the two main ligaments of the spine are the anterior and posterior longitudinal ligaments--lying respectively anteriorly and posteriorly between the bodies of the vertebra. There are, of course, many other ligaments posteriorly between the spinous and articular processes, etc.

The muscles are extremely important for without them the spine would collapse. According to Barker, "the posterior muscles may be visualized as a continuous sheet of muscles originating at various points from the occiput downward to be inserted into the posterior surface of the pelvis. Similarly, the anterior muscles can be visualized as a unit, the sternocleidomastoid extending from the occiput to the upper border of the sternum, the sternum forming a rigid anterior piece and the lower border of the thorax being joined to the pelvis by the straight muscles of the abdomen."

G. Maintenance of Equilibrium and Normal Posture: In a mechanically correct back, the weight of the body should be borne by the bony structures with the assistance of the ligaments and muscles which maintain the unity of the spine. In order to accomplish this, the bony structures must be in equilibrium not only in the anteroposterior direction but in a lateral one as well.

Anteroposterior equilibrium implies that the bones, joints, ligaments and curves of the spine are in such a position that the erect posture can be maintained in such a manner that the strain on the supporting ligaments and muscles are minimal. A deformity in one part will cause a corrective deformity in another.

Equilibrium in a lateral direction is also essential. The line of force extends down through the sacrofemoral line and the ligaments and muscles of the hip, knee, legs, ankles aid in maintaining equilibrium.

It is easily seen that deformities, such as poor posture, pes planus, shortened extremities, etc., will throw the normal state of equilibrium into an abnormal one resulting in unnatural stress and strain on bones, joints and muscles unaccustomed to their new and faulty position.

Normal posture is difficult to describe not only because there is no adequate, uniform method of measuring it but because there are marked normal variations in individuals of different habitus.

Thomas and Goldthwaite have formulated a broad statement as regards normal posture. The correct attitude, according to them, is one in which there is the least strain. This attitude is one in which "the head is erect, the shoulders are carried so that they are distinctly behind the center of gravity (which should fall midway between the feet at a point approximately midway between the head of the metatarsals and the calcaneus The chest is high, the abdomen flat, and the spinal curves are slightly concave backward in the thoracic region and concave forward in the lumbar region. The pelvis is inclined forward so that the axis from the promontory of the sacrum to the top of the pubic bone is downward and forward 30° from the horizontal and the top of the sacrum together with the 5th lumbar vertebra is directly over the greater trochanter or a little posterior to the center of the hip joint.

In this portion, the hamstring muscles are tight, the knees are straight, and the weight is received on the foot upon the astragalus with the calf muscles tight so that the heel rests lightly and the chief strain is thrown on the ball of the foot[11] with the greatest weight between the head of the 3d and 4th metatarsal.

The head is held erect so that while all the muscles are in slight contraction no group is carrying a greater load than the other.

"With the body so poised, not only is there the least possible expenditure of energy required for the maintenance of the position, but it is from this position that action is made most easily."

The Examination

It cannot be overemphasized that a thorough history and general physical examination should precede the special examination of the back.

A brief outline is given summarizing the routine of Mennell with some points interspersed according to Barker and Trescher.

The first principle of examination is adequate exposure.

A. Examination in sitting posture:

High stool, no back, feet on ground.

1. Does patient bear equal weight on both tuberosities?

If he is comfortable on either but does not wish to assume both, suspicion falls on the coccyx. Examine coccyx rectally in all examinations.

If weight bearing is deliberately favorable to one tuberosity while the other is saved, suspicion points to that joint which is most directly affected--in the sacro-iliac joint of that side.

(Note: If the hip is ankylosed or flexion of hip joint is decreased because of arthritis, normal use of the tuberosity of that side is impossible.

2. Note relative position of the two posterior superior spines.

This is often difficult and inaccuracies are frequent but the spines can be palpated with the examiner's thumb.

(a) Slip thumb horizontally outward 1 to 2 inches. If tenderness is present, this reveals that the sacro-iliac joint is not the offender but we are dealing with a sensitive area in the gluteal muscle, fascia or in the bone.

(b) Slip thumb horizontally inward. Pressure is now being applied on the top part of the main ligaments which bind the sacrum to the ilium and if this is the point of maximum tenderness, the suspicion falls on the sacro-iliac joint.

3. What is the status of the lumbosacral joint and lumbar spine?

(a) Note tone of paravertebral musculature. Spasm on one side is strongly suggestive of disease in the sacro-iliac joint. Spasm on both sides suggests that the lesion lies in the lumbosacral joint or lumbar spine.

4. Is there a scoliosis or lateral deviation of the spine?

According to Mennell, there is usually a scoliosis toward the affected joint, as the weight of the body is carried toward the affected side. However, the scoliosis usually accompanying sacro-iliac disease may be either homolateral or contralateral.

5. Is there an abnormality of the anterior posterior curves?

Usually the lumbar curve is somewhat flattened out in the sitting position. A maintenance of the lumbar curve when sitting points to one of two things: (a) spasm of muscles to protect against movement, (b) bony abnormality leading to limitation of movement (as occurs in sacralization of the 5th lumbar vertebra).

6. Palpate each spinous process noting deviations (which may not be apparent by eye) points of tenderness and abnormal spacing.

7. Thoracic and cervical region

Note muscle spasm, abnormal curvature, points of tenderness.

8. Movements in sitting position:

(a) Flexion and extension:

(1) Stooping toward one side suggests disease in that side.

(2) Flattening out of 3 or 4 spinous processes (which are not taking part in the curve) suggest the cause of trouble at that point.

(3) In extension, if the component parts of the cervical and thoracic vertebrae extend themselves normally one after the other and all of the lumbar joints extend in unison, the lumbosacral joint is suspected as being the seat of the disease.

B. Rotation

Place patient's hands behind the head.

If pain is elicited in the thoracic and upper lumbar region, the point of trouble is probably in this area but if pain is felt in the lower lumbar region and if this rotary pain is greater than the pain in all other movements employed, the possibility of an abnormally large transverse process of the 5th lumbar vertebra or sacralization of this vertebra is suggested. If the pain or rotation is greater on flexion than in extension, a diagnosis of an abnormal process in the 5th lumbar vertebra is very probable.

C. Examination in the standing position:

The patient should stand in the usual position with heels together in the same horizontal line. A plumb line dropped from a point just anterior to the ear should pass through the middle of the great trochanter of the femur and end at a point just anterior to the external malleolus[1].

1. Note general posture, muscle spasm, scoliosis, prominence of posterior superior spine of the ilium.

2. Note the position of the feet with particular attention to the arches.

Little or no alteration in the lumbar curve from the sitting and standing position indicates an abnormal rigidity of the lumbar spine.

If there is scoliosis present which was not present on sitting or the scoliosis of sitting is accentuated and if the patient is unable to extend the hip, carrying weight on the opposite leg, the probabilities are that either the hip joint, iliopsoas or sacro-iliac joint is at fault.

3. Note the point of greatest lumbar curve.

If this is rather high, it often designates that the pain is being caused by a lumbar lordosis.

4. Movements in the standing position:

(a) Touch floor with fingers keeping the knees extended.

Note limitation of motion at any point.

Compare all movements with those in the sitting position. If the limitation of motion is more marked in the standing position than the sitting, the assumption is that either the sacro-iliac joint is at fault because the hamstrings exert more tension on the tuberosities in the standing position or that the sciatic nerve is at fault because of stretching.

Rotation of the trunk in the standing position adds no information not obtained in the sitting position.

D. Examination in the lying position:

Note the manner in which the patient mounts the examining table. Measure each leg, from antero-superior spine of ilium to internal malleolus.

1. Hip movements:

To rule out hip joint disease is there any difficulty in extending the hips? Is there pain on lateral rotation of the legs?

If there is any difficulty or reluctance in extending either hip, a differential diagnosis of hip or sacro-iliac disease must be made. This test is carried out as follows: The unaffected hip is held in flexion by the patient. The affected hip is then slowly extended. If when pain appears, it is relieved by pressure on the anterior superior spine of the ilium, suspicion falls on the sacro-iliac joint; whereas if no relief is felt, the lesion is more than likely in the hip joint.

2. Straight leg raising test for differentiation between sacro-iliac and lumbosacral disease:

With the hand placed on the lumbar region, raise the leg with the knee fully extended. Pain will be present on the side affected with sacro-iliac disease at a point of less extension than on an unaffected side. If no pain is observed before lumbar movement takes place (noted by hand laying under this region), there is presumptive evidence that the affected part is in the lumbo-sacral region.

If true sciatic neuritis is present, the pain may be increased by forcibly dorsiflexing the foot at the time when pain first appears on extension. This apparently causes increased tension on an already tense sciatic nerve.

3. Pressure over the anterior superior spines

Will augment symptoms if sacro-iliac disease is present.

4. Rectal examination

Can usually be done at this time, noting the coccygeal area and the anterior ligaments of the sacro-iliac joint. According to Ghormley, pain in this area is almost a constant observation in cases of sacro-iliac affection.

E. Examination with patient lying face downward:

General observation is carried out noting deformities, muscle spasm, etc.

It is wise at this point to recheck all areas by palpation for points of tenderness.

F. In the lateral recumbency,

The one test which is occasionally used in diagnosing sciatica is Obli's sign, i.e., abducting the leg and if pain is present in maintaining this position over the sciatic areas, it indicates that the tensor fascia femoris is too taut and is causing pressure on the sciatic nerve.

G. Examine extremities

For muscular atrophy and weakness and test for diminished sensation.

H. Test deep and superficial reflexes.

I. X-ray examination is essential.

This should include the hip joints, pelvis, lumbar and lower thoracic region.

In days gone by, it was considered sufficient to take only antero-posterior views. Subsequently, lateral views were added and lately it has been felt necessary to take oblique views in order to view the articular facets.

Entities Causing Low Backache

A. Diseases of bones, joints and ligaments:

1. Pain due to faulty posture

A great percentage of cases of low backache seen by the general practitioner are due to faulty posture. Duncan in an analysis of 500 consecutive cases assigned faulty posture as the cause of pain in 34%.

It is easily recognized that if faulty posture is present, a compensatory mechanism takes place whereby abnormal stress and strain is applied to the muscles, joints and ligaments in an effort to maintain the upright position.

Brown showed that backache as a result of abnormal muscular strain is a definite entity; when examining 746 young adults, he found that none of those who had good posture complained of backache, whereas 14% of those with definitely abnormal posture did so. Henry found 20% of cases in a 100 complaining of back strain. "It is interesting to note that postural back strains occurred three times as often in females as in males, and when appearing in males, the individuals were always of poor muscular development."

If no definite bone, joint or nerve disease is found which might be the cause of the pain, it is well to recheck the history with emphasis on change of occupation, whether the pain occurs only in certain pursuits and to also reexamine the arches of the feet as pes planus is a frequent cause of postural defects.

The symptoms of back pain due to faulty posture are usually gradual and long standing. Often the history and findings are rather vague.

In no other condition is it necessary to rule out the other causes of backache.

Treatment: 1. Rest is all important.

2. Following a period of rest, rehabilitation is necessary.

The important feature of this period is in giving the patient an understanding of what his normal posture should be. Corrective measures to strengthen muscles and relieve strain (such as an abdominal support for an obese abdomen, or supports for faulty arches) should be begun.

In most large centers, there are efficient physiotherapists who can carry out corrective procedures. However, if one has knowledge of what the correct posture for an individual should be, it is fairly simple for the physician to work out a system of corrective exercise.

2. Congenital Anomalies

There is definite evidence that congenital anomalies or variations are a predisposing cause to back pain. Henry studied 100 consecutive cases of back strain and found that some abnormal variation was present in 80% by x-ray. He states that Dickson, Bohart, and others found variations present in 35 to 44% of all spines in large series studied by x-ray. Henry's percentage is much higher and as his cases complained of backache, it seemed reasonable that such backs are either more susceptible to strain or recover more slowly from strain.

(a) Occult spina bifida: There is some variation of opinion as to whether this condition is a cause of back pain as it is present in so many cases which do not have back symptoms. It occurred in 7% of Henry's cases. Most authors will concede that it at least predisposes the back to abnormal strain and stress.

X-ray, of course, is the only certain diagnostic method. Mennell states that this condition often gives pain on hyperextension.

(b) Anomalies of the 5th lumbar vertebra: Under this heading is included sacralization of the 5th lumbar vertebra and enlarged transverse processes which might impinge on the ilium on movement.

Sacralization, i.e.,

union between a large transverse process of the 5th lumbar vertebra and the ilium, may be unilateral or bilateral. This anomaly usually occurs in 4 or 5% of the cases with back pain.

There is some divergence of opinion as to whether or not these anomalies cause pain. Some argue that if there is bony union between the 5th lumbar vertebra and the ilium, the back should be more stable. However, Mennell states that one person in five or seven having sacralization or large transverse processes has back pain.

It seems reasonable to conclude that if pain is localized in this area and either sacralization or large transverse processes are found by x-ray that these deformities can be considered as a cause of the pain.

A diagnosis can be suspected if in the sitting position pain is felt on rotation with lessening of pain in rotating while flexed and increasing pain while rotating in the extended position.

In cases of unilateral sacralization, the symptoms are usually on the free side.

Treatment consists of rest, massage, strapping, and occasionally in persistent cases, excision of the transverse processes.

(c) Anomalies of the spinous processes: These may be lengthened or the angle increased so that repeated impingement on hyperextension causes irritation.

Usually the onset is gradual over a long period. Pain is well localized and is increased on hyperextension.

Treatment is by limitation of motion by strapping, support by brace and in cases of longstanding with no results on conservative therapy, excision of the spinous processes.

(d) Anomalies of the articular processes: More credit has been given to abnormal articular processes as causes of back pain than most other entities. Henry found abnormal variations in 63% of his cases of back strain. Ghormley, Ayres, and many others have called attention to these anomalies as a cause of back pain.

If one examines the diagram, he will realize the importance of these joints. Particularly at the lumbosacral articulation are they important for they are the only bony parts which prevent the 5th lumbar vertebra from slipping forward on the sacrum. They are areas of great activity and variation may cause subluxation, abnormal motion with injury of the surrounding fascia, and possibly impingement of the intervertebral foramen and irritation of the spinal nerves of that segment.

The diagnosis and treatment of this condition will be subsequently discussed in spondylolisthesis.

3. Affectations of the coccyx:

Coccygodynia is a term applied to all conditions of the coccyx causing pain. True coccygodynia is usually accompanied by a definite history of trauma or injury. At times, pain is referred to the coccyx from the lumbosacral region. The coccyx may be the seat of arthritis, fractures and dislocation.

It is well to remember that persistent coccygodynia is often found in psychoneurotic patients.

The treatment is usually very difficult. Protection by the use of a rubber ring when sitting is the first procedure to carry out. Manipulation under local or gas anesthesia has been recommended.

Yeoman has advocated the injection of 80% alcohol. Quinine and urea hydrochloride is also used.

Excision of the coccyx is usually attempted in persistent cases demanding relief. The procedure is not always curative, however.

4. Lumbosacral affectation:

A majority of cases of low back pain are referred to the lumbosacral area. This is not surprising as one recalls the tremendous load placed on this joint, the mechanically imperfect angle of the lumbar and sacral vertebra, the importance of the articular processes of the sacrum which are the only bony structures preventing the spine from slipping over the sacrum, and the proximity of the largest lumbar nerve, the 5th emerging through the rather small intervertebral foramen.

(a) The congenital anomalies of the lumbosacral have previously been discussed.

(b) Arthritis of the lumbosacral region: Both hypertrophic and atrophic arthritis occur. There is no question that arthritis predisposes to back injury and strain. There were 24% of Ghormley's cases of backache.

Usually the pain occurs after periods of rest and wears off after periods of activity.

The one danger in regard to this condition is that as so many people of the older age groups have some evidence of arthritic changes in the spine that x-ray evidence of arthritis may tempt the examiner to conclude that arthritis is the etiological factor in the particular case and he will not rule out the other possibilities. Treatment is no different from that of arthritis of the other joints.

(c) Spondylolisthesis: This condition is a forward slipping of the 5th lumbar vertebra on the sacrum. It is not uncommon. Kimberley found 62 cases out of 800 in his clinic. There were 121 cases at the Mayo Clinic from 1918 to 1930.

Congenital anomalies, such as defective articular facets, spinal bifida occulta, and arthritis, are predisposing causes.

Kimberley states that an exaggerated lumbosacral angle is commonly found with spondylolisthesis.

The symptoms in Meyerding's 121 cases were: (1) rest usually gave relief; (2) although backache was the most common complaint, and equal number referred to the hips and legs; (3) there was usually a lordosis with limited spinal motion, shortened torso, and depression of the 5th lumbar spinous process.

Treatment: Attempts should be made to relieve the lumbosacral region of muscular strain by means of a corset or a brace. Meyerding states that relief of symptoms is often rapid by complete rest. Attempts to reduce acute dislocation due to trauma should be made but are usually of no avail. In intractable cases, a fusion operation for stabilization is necessary.

(d) Posterior dislocation of the 5th lumbar vertebra: This entity was found in 123 of 800 patients examined by Kimberley. In nearly all of these cases, there was some deformity of the articular facets noted. Pain radiating down the sciatic nerve is common in these cases.

(e) Narrowed 5th lumbar disc: According to Ghormley, this occurs sufficiently to warrant consideration. He found 4 cases in 100 of backache. Trauma is usually the cause. A severe injury which is not recognized at the time may cause gradual elimination of the disc. A lateral x-ray is necessary to make the diagnosis. According to Ghormley, the treatment is similar to that of spondylolisthesis.

5. Sacro-iliac affections:

The localization of the pain to this area has been described. The important feature to recognize is that this joint is a true joint and some diseases which invade other joints can be found here.

The history of sacro-iliac strain is usually one of persistent pain, usually localized in the region of the joint but

very frequently radiating into the buttocks, groin and leg. The pain is severe and a "sciatic scoliosis" is frequently developed.

Frequently, the "sciatic" symptoms overbalance the sacro-iliac symptoms. Pitkin and Pheasant call this referred pain "sacroarthrogenetic telalgia." They state that the pain arising in the sacro-iliac, sacrolumbar joints (the areas of lesser sensibility) are referred through central connections to the nerves of the lower extremity (such as the sciatic) which serve areas of higher sensibility in the lower extremity.

Treatment: Rest in bed is usually necessary in both the traumatic and non-traumatic types in the acute stage.

Strapping, the use of a belt, and finally manipulation by Baer's maneuver (hyperflexion of the limb, knee extended under anesthesia, followed by application of cast) and finally stabilization of the joint by operation are the accepted procedures. There is such a wide variance of opinion concerning this latter procedure that it is difficult to evaluate.

6. The "Facet Theory" of Back Pain:

There are those who consider the majority of low backaches as due to: (a) anomalies of the articular facets allowing the vertebra to slip forward or backward; (b) arthritis of the facets.

Dislocations or impingement on the intervertebral foramina by diseases of the joints[3].

Ghormley states that most of these cases will recover with rest alone but many need to return to work and operation is indicated--a stabilization procedure; however, if operation is contemplated, the pain must have been of longstanding, must be continually localized to lumbo-sacral or sacro-iliac region, narrowing of the disc between the 5th lumbar and 1st spinous vertebra must be demonstrated by x-ray and the central nervous system must be carefully checked.

7. The Intervertebral Disc:

According to Geist, the pathology of the disc can be understood if the interval pressure of the disc be kept in mind as it will tend to herniate whenever there is a weakness in the surrounding structures.

In 3,000 routine autopsy examinations, Schmoral found fissuring of the cartilaginous plates allowing herniation of the nucleus pulposus with the spongiosa in 38%. This naturally narrows the disc which in turn disturbs the intervertebral relationship and may cause pain.

Beadle found herniation of the disc into the spinal canal in 15.2% of 368 cases.

Love reported about 60 cases of low back pain of sciatica caused by herniation of the disc into the spinal canal causing symptoms of irritation to the caudal nerves. This is a definite entity and is often found when exploration is being carried out for suspected cord tumor.

8. Pathological conditions of the bodies of the vertebra:

Metastatic carcinoma, tuberculosis, syphilis, osteomyelitis, old fracture must always be ruled out by x-ray.

B. Backache due to disease of the central nervous system:

One of the first considerations in the diagnosis of backache is the question of the presence of a spinal cord tumor. In the earlier stages, it is often impossible to tell.

Sensory changes, and above all root pains, are the earliest symptoms.

The pains are usually accentuated by sneezing, coughing or jarring the body.

If in examination there is any evidence of root pain, any reflex change, any anesthesia, paresthesia or paralysis, the usual examination for spinal cord

tumor should be carried out.

C. Backache caused by disease of the genito-urinary tract:

The prostate is often the focus of infection in arthritis causing back pain.

Malposition of the uterus is being described less and less as a cause of back pain. If present, the pain is usually low in the sacrum. If a pessary relieves the pain, the diagnosis is made. Gynecological operations for relief of back pain should always depend upon the results of a thorough orthopedic examination unless the diagnosis has been made by corrective pessary.

D. The "Railway Spine" or "Compensation Neurosis" is a different problem:

The symptoms are usually entirely out of proportion to the findings. The patient is usually unable to adequately outline the area of the pain. They may be different areas on subsequent examinations.

Barker states that there are fewer of these cases than is realized; at that there is a true neurosis believed the complaint.

Frequent examinations and adequate consultations are essential in diagnosing and treating these cases.

Conclusions

1. Low backache is a clinical entity which is a difficult problem to solve.

2. The foundation of any diagnosis is a thorough history, general physical and special examination. The special examination requires a thorough understanding of the anatomy, and physiology of the back.

3. The general physician should at least have such fundamental knowledge of these factors so he can discriminate between those cases which need specialized care and those which do not.

4. There is still a wide variation of opinion as to the various causes of back pain. The subject is a very difficult one to write about with an open mind.

5. The more prevalent causes of back pain, as far as bone, joint and muscle disease are concerned, are:

(a) Postural defects
(b) Sacro-iliac affections
(c) Lumbosacral strain
(d) Anomalies of 5th lumbar vertebra
(e) Spondylolisthesis
(f) Narrowed 5th lumbar disc
(g) Arthritis
(h) Congenital anomalies, such as spina bifida occulta, and deformed articular processes
(i) Herniation of nucleus pulposus
(j) Metastatic carcinoma, syphilis, tuberculosis, and osteomyelitis of the bodies
(k) Coccygodynia
(l) Old fractures

6. Spinal cord tumor must always be ruled out.

7. X-ray examinations should be made not only in the anteroposterior and lateral views but also in an oblique view.

8. The treatment of these diseases can be carried out as far as the conservative aspects are concerned by the general physician providing an accurate diagnosis is made; however, it is wise to have consultation in cases which are not evident as to the cause.

9. Sciatica is very often associated with disease of the lower back.

Bibliography

1. Barker, L.F. and Trescher, J.H.
Backache
J.B.Lippincott Co., Phila., 1931.

2. Mennell, James
Backache
P. Blakiston Sons Co., Phila., 1935.

3. Danforth and Wilson
J. Bone and Joint Surg., 7: 109, (Jan.) 1925.

4. Pitkin, H.C. and Pheasant, H.C.
J. of Bone and Joint Surg. 18: 365, (Apr.) 1936.

5. Thomas, L.C. and Goldthwaite, J.E.
Body Mechanics and Health.
Cambridge, (Mar.) 1922.

6. Brown, L. T.
Am. J. Orthop. Surg. 15: 774, 1917.

7. Duncan, W.
Radiology 70: 282, (April) 1933.

8. Henry, M.O.
Minn. Med. 13: 372, (Aug.) 1930.

9. Ghormley, R. K.
J.A.M.A. 101: 1773, (Dec. 2) 1933.

10. Ayres, C. E.
Boston Med. & Surg. J. 196: 9, (Jan. 6) 1927.

11. Kimberley, A. G.
Western J. of S., G., & O., 43: 699, (Dec.) 1935.

12. Ghormley, R. K.
Paper read before South. Minn. Med. Assoc., Mankato, (Aug. 25) 1930.

13. Meyerding, H. W.
J. of Bone and Joint Surg. 12: 39, (Jan.) 1931.

14. Pitkin, H. C. and Pheasant, H. C.
J. of Bone and Joint Surg., 13: 3, (Jan.) 1936.

15. Geist, E.
J.A.M.A. 96: 1676, (May 16) 1931.

16. Love, G.
Report at Northwest Orthop. Soc., Rochester, 1936.

V. GOSSIP

The State Legislators are our guests today. They will spend this afternoon in a tour of the campus, eat dinner at the Union this evening, and enjoy (?) entertainment in the Music Auditorium after dinner. The University is hopeful that they will appreciate why we need $4,000,000 annually to efficiently operate our school.....The list of precocious youngsters grows with the addition of baby girl Watson of the Barney Watsons of the Health Service, born this week. Although they are well satisfied with their second daughter, Obstetrician Leonard Lang had better find out what has happened to the male entries.....The Bob Millers came through with a boy just to show that it could be done.....Editor of today's review, Wallace Parks Ritchie, is to be complimented on his contribution. It is a collection of information not readily accessible to all of us. Dr. Ritchie, the third representative of the Drs. Ritchie (grandfather and father), is rapidly taking his place in local medical circles as an able representative of his line.....Dental Public Health Meeting Speaker C. N. Johnson, editor of the American Dental Association Journal, has been an active practitioner of dentistry for over 50 years. In addition, he has found time for many other activities. At the February 23d meeting, his 76 years seemed to hang very heavily on his head as he sat on the stage wrapped up in an overcoat. When he started to speak, the audience was thrilled by the vigor of his delivery, the clarity of his voice, and his straight-forward message. The Dental Health circus put on by a group of high school students was a most effective show. Only the speakers' heads with doll bodies could be seen in the booths. The antics of the bodies were a source of delight to a large, appreciative audience.....In the March issue of Fortune will be found a splendid article on cancer. In the near future, Life will carry a spread on the same subject to round out a most

ambitious program which has included a March of Time movie feature. The editors of these various publications are to be complimented for these unique features.....George Washington's Birthday was the occasion for much medical comment on the health problems of our first president. His face was pock marked, his teeth were miserable, his false teeth exhibited at the Century of Progress in Chicago were not much better, a random remark to his health officer about the seriousness of mumps made one writer wonder if his sterility was due to orchitis, one step-child was an epileptic, the other a problem child described as lazy, indifferent and voluptuous. When he died from laryngeal obstruction thought to be due to diphtheria, his physicians industriously bled him as he choked to death. Of his many problems, his teeth made him rather backward about associating with his fellowmen, so that he had plenty of time to think about their problems before he was called to lead the struggling colonists. Another feature of his life, not well known, was his activity as a conservationist.....J.A.M.A. Editor Morris Fishbein's favorite remark that the modern use of store teeth, spectacles, etc., has practically eliminated the possibility for philosophical consideration by unemployed men in middle and late life.....Speaking of Dr. Fishbein, he will probably represent the parents at the annual parents and daughters medical technology dinner to be held in Minnesota Union, April 22d. Each year, the medical technologists invite their parents to school, show them what they are doing, introduce them to the staff, and entertain them at a dinner the same evening. Last year, the attendance was over 250, and a most enjoyable time was had by all. In addition to a talk by one of the parents, a considerable amount of horse play involving the faculty is put on by the students. As many of them are accomplished in other respects, they also supply the music, dancing, monologues, and polish many a faculty apple. Dr. Fishbein's invitation is being extended by his daughter, Barbara, who is a graduating senior.....The recent editorial in the J.A.M.A. concerning the fate of a group of patients-to-be, sent to their family physicians by the department in an industrial organization, is informative. Routine serological tests were done for syphilis and the positive reactors referred for further study and treatment to the doctors' offices. In spite of the educational effort in recent years on the criteria for diagnosis and treatment of syphilis, the reception of these people is interesting. Some were told that the company doctor did not know what he was talking about, others were assured that they did not need treatment. Some were given pills, while only a small number were actually treated in orthodox fashion. The first reaction to a situation like this from the public health standpoint is one of frank criticism and a desire to see some other system of medical service established. On the other hand these physicians are very much like ourselves, as we dislike being told what to do. Their inability to keep abreast of therapeutic advances is also similar to most other members of our profession. The solution of such a problem is a long time job, involving human nature, which does not change very rapidly..... ....Dean Harold Shelly Diehl and Hospital Superintendent Raymond Michael Amberg attended the Council on Medical Education meeting in Chicago last week. Everybody was a special pleader for his particular interests as far as the medical school curriculum is concerned. Of special interest is the suggested course in medical economics. The American Medical Association has planned such an outline which is a frank consideration of the various forms of arranging and paying for medical service. To many people medical economics means arguing with some legislator or other official about legislation to protect somebody's interests. Real medical economics is a fascinating consideration of social trends and economic practices as they affect the lives of all of us.

Adios.