3. Only 2 women had premature labours: in one of these the pulmonary disease was "recovered," and in the other "progressive."

4. The influence of age and previous pregnancies cannot properly be assessed on only 100 cases, but Table II summarizes the facts available, considering the cases which retrogressed:

TABLE II

	Arrested and Recovered Cases		Quiescent Cases		Progressive Cases		All Cases
	Under 30	Over 30	Under 30	Over 30	Under 30	Over 30	
Primiparae	2	1	2	0	1	2	8
Multiparae	0	0	0	0	3	1	4

Two-thirds of the patients showing retrogression were under 30 years of age, and two-thirds were primiparae. This does not support DuBois' famous remark: "If a woman threatened with phthisis marries she may bear the first accouchement well, a second with difficulty, a third never." The primipara has not had repeated pregnancies to threaten her general health; on the other hand, she is usually younger and in an age group which has a less favourable prognosis for her tuberculous condition than that of the average multipara. It seems probable that this is a more important factor than the number of babies she may bear.

Conclusions

The deductions based on this study of 100 cases of pulmonary tuberculosis complicated by pregnancy are probably accurate for cases of similar social circumstances. It is recognized that much larger figures must be produced before anything approaching statistical accuracy can be reached. None the less, enough experience has been gained to establish certain well-defined clinical impressions, and I have come to these conclusions:

1. Pregnancy and labour *per se* rarely exert any harmful effect on the progress of a woman known to have suffered from pulmonary tuberculosis.

2. It follows that therapeutic abortion is not a procedure to be resorted to simply because a woman is known to have suffered from pulmonary tuberculosis.

3. Active pulmonary disease is seldom accelerated by pregnancy and labour, and I have found that in such cases, treated under favourable conditions, pregnancy has been little more than an incident in their tuberculous career.

With these conclusions in mind, it is possible to counsel the tuberculous woman with greater confidence on the advisability of pregnancy or on the desirability of its termination if already established. It is not meant to imply that a woman suffering from active pulmonary tuberculosis should be encouraged to become pregnant; and there are, of course, other factors to be considered. In the above I have been considering the later stages of pregnancy and confinement supervised in a fully equipped sanatorium, and I am well aware that other considerations may have to be taken into account. There is the immediate and grave risk of infection to which the offspring may be exposed; there is the additional work, there are the disturbed nights, and sometimes the financial strain which may be imposed on the mother; and it may be distressing to a woman with advanced phthisis to endure the added discomforts and fears incidental to pregnancy. In some cases of advanced or very active disease the extra strain of pregnancy might be a precipitating factor to determine a devastating breakdown, and in such cases, if seen early enough in pregnancy, therapeutic abortion should be considered. On the whole, however, this investigation, though limited in numbers, indicates that so long as the tuberculous woman is placed under favourable conditions the risk of pregnancy to her progress has been exaggerated, and in the majority of cases it may safely be allowed to proceed to term.

I wish to express my appreciation of encouragement given by the late Dr. W. Burton Wood in the preparation of this paper, and my thanks to Dr. W. A. Bullough, County Medical Officer, and Dr. M. C. Wilkinson, Medical Superintendent, for permission to publish the results; and particularly to Mr. Alan Brews for his generously given advice and help in obstetrical problems.

DIFFERENTIAL DIAGNOSIS OF CHRONIC SCIATIC PAIN

A NOTE, WITH A SHORT ANALYSIS OF 100 RECENT CASES

BY

W. P. U. JACKSON, M.B., B.Ch., M.R.C.P.

Kellgren (1941) remarks that the term "sciatica" signifies a syndrome of deep pain and tenderness down the back of the leg and thigh, of varying distribution, and it is plain that this is a true statement of current usage. This being so, a diagnosis of "sciatica" without qualification is no more illuminating than a diagnosis of "abdominal pain." Three years ago Love (*Proc. roy. Soc. Med.*, 1939) made a similar remark, but nevertheless the term is still used as a complete and final diagnosis. An excellent War Office publication (*Army Medical Department Bulletin*, 1942) begins by calling for "a greater familiarity on the part of medical officers with the common causes of sciatica in the Army and of their corresponding clinical features."

Aetiological Analysis

Kellgren (1941) divides cases of sciatic pain into, first, referred pain from fascial structures in the back or round the hip, including also bone and joint disease, which, he states, accounts for three-quarters of all. The rest, except for occasional tumour or similar lesion, he believes to be cases of ruptured intervertebral disk. Bankart's topographical analysis presupposes direct involvement of the sciatic nerve, dividing cases into those with lesions of the cord, nerve roots, foraminal trunks, lumbo-sacral plexus, or peripheral nerve. Douthwaite (1933) divides cases into primary and secondary, and proceeds further to analyse primary ones into peripheral and central on clinical grounds which I find very difficult to follow. Symonds (*Proc. roy. Soc. Med.*, 1939, 1942) believes that the great majority of chronic cases are due to damaged disk, whereas analysis by Henderson (*Proc. roy. Soc. Med.*, 1939) of a large series from the Mayo Clinic showed the disk syndrome in 2% of all cases of low back or sciatic pain. Good (1943) claims that the vast majority (64 out of 65 consecutive cases!) arise as referred pain from "myalgic spots."

The cases here cited were all chronic or recurrent, most of which had been treated in several hospitals previously. The great majority were admitted to the neurological or neuro surgical unit of an E.M.S. hospital during 1942 as unselected cases of "sciatica" mostly from the Services and resistant to ordinary treatment elsewhere. They represent in general those mixed cases of chronic sciatic pain occurring in increasing number, especially in the Services. All cases were examined by at least two doctors while in hospital, and the final diagnosis was approved by Dr. W. Russell Brain or Mr. D. W. C. Northfield. I have divided this series as follows:

Diagnosis	Number
Doubtful	21
Fibrositis (local)	20
Ruptured intervertebral disk	18
Hysteria	10
Fibrositis and neurosis	8
Congenital bony abnormality	4
Fibrositis (generalized)	3
Sciatic neuritis	3
Malingering	2
Sacro-iliac strain	2
Lumbo-sacral strain	2
Spinal osteo-arthritis	1
Bony infection	1
Neoplasm of cauda equina	1
Polyradiculitis	1
Secondary carcinoma	1
Disseminated sclerosis	1
Spastic paraplegia (? aetiology)	1
	100

Of the doubtful cases, seven were probable but unproved damaged disk, and the rest were mostly seen in the later stages of a pain from which recovery was occurring and which gave insufficient evidence for a positive diagnosis. These included doubtful cases of zoster, radiculitis, sacro-iliac strain, and fibrositis of the ligamentous strain type. There was also a probable case of spinal arachnoiditis and one of thickened ligamentum flavum, in which no disk damage was discovered at operation. Others were obscure, and often so rendered by superadded neurosis. The ruptured disk cases were all proved at operation.

The Importance of Neurosis

This aspect of the sciatica problem has been largely understressed. A knowledge of its frequency, mode of development, and clinical features is of paramount importance—in acute cases for prevention, and in chronic cases for recognition and prompt action. In the present series 10 cases were purely hysterical by the time we saw them. Eight cases of mild fibrositis had a gross overlay of neurosis, while the neurotic element was definitely present in a further 6 cases, classified here under the primary disease. Wilson (*Proc. roy. Soc. Med.*, 1942) also remarks upon the frequency with which neurosis occurs in "sciatica."

Symptoms and Signs

The various groups have been further analysed as regards their history and examination (Tables I and II).

stages, increasing the importance of early and thorough examination. One reason for this overlapping is the frequency with which the various aetiological factors are combined.

There may well be a history of injury to the back in cases other than those of damaged disk; nor is this even the usual thing in this condition (in this series, though Love and Walsh (1938) report such a history in 83%). Similarly, intermittence of the pain, though usual in the disk syndrome, is common throughout the series. Bilaterality of symptoms virtually excludes sciatic neuritis, but nothing else. Suddenness of onset seems more common with fibrositis, while the site of the first pain is more often the buttock in fibrositis and the low back in ruptured disks. Pain on coughing is usual in all groups. Sphincter disturbance, if not hysterical, points to a space-occupying lesion.

TABLE I.—Symptoms

Diagnosis	Onset		Injury to Back		Inability to Straighten Up	Site of Primary Pain							Coughing		Onset associated with Febrile Illness	Pain Bilateral	Pain Intermittent	Sphincter Disturbance	Occupation: Driver of Heavy Vehicle
	Sudden	On Waking	Lifting	Other		Low Lumbar	Sacral	Buttock	Hip	Groin	Calf	Thigh	Ankle	Shoulders	Pain	No Pain			
Doubtful	6		1	3		8	2	7	1			3			18	2	2		
Fibrositis (local)	6	2	1	2	2	3	2	10				2			14	2	4		
Ruptured intervertebral disk	1	1	1	5	3	3	9	1				2	1		9	2	2		
Hysteria	1	1		2		3	3	1		1		1			3	4	6		
Fibrositis + neurosis			1		2	3	1	1				2			6	2	5		
Congenital bony abnormality	1				1	1	1	2	1						3	1	2		
Fibrositis (generalized)				1	1	1								2			1		
Sciatic neuritis					2	2						1			3	1	1		
Malingering								1			1								
Sacro-iliac strain				1		2									1		1		
Lumbo-sacral strain	1		1		1	1		1							2		1		
Spastic paraplegia												1					1		
Spinal osteo-arthritis						1											1		
Caudal neoplasm						1						1					1		
Bony infection															1				
Polyradiculitis						1									1				
Secondary cancer								1				1				1			
Disseminated sclerosis													1						
Total	16	4	4	14	11	35	8	25	2	2	1	14	2	2	61	16	8	14	9

TABLE II.—Signs

Diagnosis	Weakness				Wasting			Sensory Manifestations		Complete Absence of Tenderness	Lasègue Test Negative	Ankle-jerk Diminished		Back Deformity		X-ray Abnormality		Cerebrospinal Fluid	
	Functional	Ankle Only	Gross	Total	Moderate	Gross	Including Quadriceps	Paraesthesia	Anaesthesia			Unilateral	Bilateral	Scoliosis	Flattened Lumbar Curve	Total	Of Definite Diagnostic Value	Protein over 50 mg. per 100 c.cm.	Other Findings
Doubtful	3	4		10	3		1	2	5	5	3	6	1	4	3	4		6	One block at L 4-5
Fibrositis (local)		2		2				Both ? disks	5	2								4	
Ruptured intervertebral disk		4		4	2	2	1	7	5	2	7	3	3	1				1	
Hysteria	6	1	1	6				2	3	1	2							1	
Fibrositis + neurosis	4	2		5					3			1						2	
Congenital bony abnormality				1				1	1			2	1	1		4		2	
Fibrositis (generalized)								Spondylolisthesis											
Sciatic neuritis		1	1	3	2	1			2		2	2		2				1	
Malingering																			
Sacro-iliac strain																			
Lumbo-sacral strain					1			1								1			
Spinal osteo-arthritis					1					1	1	1				1		1	
Bony infection												1							
Caudal neoplasm			1	1		1						1							
Polyradiculitis		1		1			1						1	1			1	10 lymphocytes	
Secondary carcinoma																			
Disseminated sclerosis																		5 lymphocytes	
Spastic paraplegia									1										
Total	13	15	3	37	9	4	5	13	20	8	12	21	6	12	7	15	6	16	

Notes based on the Tables

Overlapping.—The first thing which emerges from a consideration of a number of cases of sciatic pain is the realization of a complete absence of a single clear-cut group. The majority of all the symptoms and signs may occur in any group, and no one is pathognomonic. This overlapping is a cause of difficulty in the accurate diagnosis of the "sciaticas," and means that there must be a number of "doubtful" cases. The more characteristic signs are most likely to be present in the early

To be of real value true weakness or paresis must be at least moderate in degree, since, even allowing for the reluctance to move caused by pain, it seemed clear that uncomplicated fibrositis often produced evident, though never severe, weakness of the affected part, or even distant from this (e.g., eversion of the ankle in gluteal fibrositis). Such patients may show mild, but certain, wasting of the muscles involved, perhaps due to disuse in these cases of long standing. Paraesthesia and sensory loss occur only in direct involvement of the sciatic nerve or as hysterical phenomena. Postural loss in the toes was here

found in one patient only, who had a ruptured disk severe enough to produce almost complete spinal block.

Postural deformities of the back are non-specific, and Lasègue's test (straight leg raising) is valueless on its own in diagnosis, though useful in assessment of severity and progress. The result of the test should be compared with the patient's ability to touch his toes, and, in organic cases, these two will correspond. The foot plantar-flexion and dorsiflexion modifications of this test seem to be of no diagnostic value. A raised protein in the cerebrospinal fluid signifies an organic lesion, and is common in, but by no means confined to, cases of ruptured disk. Symonds remarks that in any "long-standing sciatica" the protein may be raised to between 40 and 100 mg. per 100 c.cm.

Tendon Reflexes.—Diminution or absence of ankle-jerk is significant as indicating an organic lesion of the sciatic nerve. Bilateral absence or equal diminution may, however, be congenital or be due to coincident disease. Further, an absent ankle-jerk on one side is not necessarily evidence of present disease, since it may remain permanently depressed after an attack of sciatic neuritis from which recovery has otherwise been complete. In one case of doubtful aetiology, in fact, the reflex was absent on the side opposite from the pain, being brisk on the same side. Bilateral depression of the reflex usually indicates a space-occupying lesion (six cases in this series).

The Value of Straight Radiographs.—In this series abnormalities were revealed by radiographs of the lumbo-sacral region in 16 cases, but in only six were these considered of primary significance. There were included two cases of spondylolisthesis, three of unilateral sacralization of the fifth lumbar vertebra, one of bilateral sacralization with absent twelfth ribs, one spina bifida occulta, two of osteo-arthritis, and a further probable osteo-arthritis with an enormous osteophyte protruding from the body of the fifth lumbar vertebra. This osteophyte, however, and one of the sacralized vertebrae also were on the side opposite to the affected limb. Considerations of this sort must make one chary of accepting x-ray evidence as a diagnostic criterion *ex cathedra*.

A Type of Fibrositis.*—Some of the cases of fibrositis appeared to be associated at their onset with a febrile illness resembling influenza, in which aches and pains were felt first in the back (as is, of course, common in influenzal chills) or in the back and round the shoulders, and then, instead of going away in a few days, remained present, becoming chronic and recurrent. If significance is to be attached to these eight cases, then it would seem either that influenza or influenza-like illnesses should be added to the list of causal factors in fibrositis, or else that fibrositis itself may at its inception be a febrile illness.

Conclusion

Some people still consider "sciatica" synonymous with "sciatic neuritis," and then, calling all cases with pain in the back of the leg "sciatica," make these, *ipso facto*, cases of sciatic neuritis. It is generally agreed that "true sciatica" or sciatic neuritis is uncommon in young people. If there are signs of involvement of the sciatic nerve itself then a ruptured disk is more likely.

Ruptured intervertebral disk, fibrositis, and neurosis are the three states of greatest importance in the causation of chronic sciatica in young people; they correspond with the three types of sciatic pain—namely, neural, referred, and functional—into one of which latter groups all cases of sciatic pain should be placed as a preliminary step in accurate diagnosis.

I should like to thank Dr. Russell Brain and Mr. Northfield for their advice and permission to make use of the material supplied by their patients, and also Mr. R. L. Galloway, medical superintendent of Chase Farm Hospital, for his permission.

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* Since this was written a somewhat similar suggestion has been made by Lieut.-Col. W. S. C. Copeman in an article in the *Journal* of Aug. 28, 1943, p. 263, which he has developed more fully.

THYMECTOMY FOR MYASTHENIA GRAVIS

BY

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The association of an enlarged, persistent, or cystic thymic gland with myasthenia gravis has long been known. The removal of a thymic cyst in a patient with myasthenia gravis was reported by Blalock *et al.* in 1939. The patient had been operated on four years before, and had apparently remained cured for that period. Since that report the operation of thymectomy for this disease has been performed, sometimes successfully, by different surgeons.

Blalock, Harvey, Ford, and Lilienthal (1941) recorded six cases of thymectomy for myasthenia gravis, with one post-operative death. Of the remaining five cases, three after a varying period were cured and needed no more prostigmin; two were improved but still needed prostigmin. More recently, in England, James Carson (1943), in a report on nine cases of thymectomy for myasthenia gravis, stated that three of these patients had died after operation; three had recovered and needed no prostigmin, and remained well for three, six, and nine months after operation. Three showed no improvement. Russell Brain (1943) reported three cases of myasthenia gravis in which he had recommended thymectomy, but none of these cases had improved as a result of the operation.

Case Report

A nurse in a London hospital, aged 23, first attended Dr. Wilfred Harris's out-patient clinic at St. Mary's Hospital on May 19, 1942. She gave a history of having been quite well until the beginning of March, when, after a bad cold, she began to have difficulty in swallowing, nasal regurgitation of food, and diplopia. These symptoms were becoming progressively worse, and for the preceding two weeks she had noticed weakness in the arms as well. The symptoms were always worse at the end of the day.

Examination disclosed weakness of the soft palate and weakness of eye and lip movements. The patient had obvious ptosis and diplopia, and also a myasthenic facies. She was at once admitted to the wards, and responded dramatically to 2 mg. of prostigmin subcutaneously, being able to eat normally for the first time for two months. She could now close her mouth, whereas this was impossible before the injection. Her prostigmin requirements increased throughout the period of her first stay in hospital from two injections of 2 mg. a day to one injection of 2 mg. in the morning and 30 mg. by mouth four times a day. She was discharged on June 13 on this dosage.

She was readmitted on June 27 needing about the same amount of prostigmin, but her requirements rose from this time until, about two months later, she was receiving 225 mg. daily to control her

GRAPH I.—Showing increase of strength of hand contraction after 1 mg. of prostigmin into brachial artery.

weakness. On July 2 1 mg. of prostigmin was injected into the patient's right brachial artery. This rapidly increased the strength of the right hand, which was maintained for over three hours. Graph I illustrates this increase of strength. F. R. Fraser *et al.* (1937-8) by injecting prostigmin into the femoral artery showed the resulting increase in strength in the limb. Harvey and Lilienthal (1941) found that if 0.5 to 1 mg. of prostigmin is injected into the