It is in this position that we get complete physiological rest for the small median muscles of the thumb.

The duralumin plate is then encased in leather and with a special pocket for the thumb part. The covering is ordinary glove leather and the lining is chamois. Along the ulnar border is the opening, which is closed after putting on by lacing through eyeholes. The photographs show the efficiency of the appliance. In Fig. 1 the thumb is flat and flush with the hand, giving little hope of any recovery taking place in the muscles. Fig. 2 shows the correct position of rest and also the fact that the hand can be easily used while the splint is worn. A rough drawing of the duralumin splint when flattened out is given to show the shape (Fig. 3).

I have to acknowledge the valuable assistance of Mr. Arch. Young, Forrest Road, Edinburgh, who makes the splint.

THE RELATION OF SCIATICA TO THE SACRO-ILIAC JOINT.

BY

JOHN COWAN, M.B.,

MEDICAL OFFICER IN CHARGE, MASSAGE AND ELECTRICAL DEPARTMENT,
MANCHESTER ROYAL INFIRMARY.

SCIATICA is commonly defined as pain in the distribution of the sciatic nerve. Both neuritis and neuralgia of the nerve are included under the term. The most frequent condition giving rise to the pain appears to be a much disputed point. Observers appear to be divided into two schools according to their opinion as to whether neuritis or neuralgia is the more common condition. Gowers¹ regards all cases with persistent tenderness of the nerve as neuritis, and consequently he considers neuralgia as rare. Oppenheim² considers that in most cases the signs of neuritis are absent. Barre and Duprez³ consider that if pressure on the nerve causes acute pain the case is not one of neuralgia. As most cases have this pain on pressure, these two observers must consider neuritis as the common condition. Holmes,⁴ however, points out that the nerve trunks are tender in facial neuralgia when no disease of the nerve can be found.

I have recently reviewed my notes on forty successive cases of sciatica which have been referred to me for treatment, and I have been struck by two facts: The first is the great frequency with which sacro-iliac joint pain is found associated with the nerve pain; I have found the joint pain present in most cases of under six months' duration, but that it tends to disappear, although the nerve pain persists. The second point is that pressure on the sacro-iliac joint, in nearly all cases, causes acute pain down the course of the nerve, which, with pressure on the joint, is much more severe than the pain caused by local pressure on the painful spots down the course of the nerve.

From the above facts I have formed the opinion that some morbid condition in or about the sacro-iliac joint (probably an arthritis or a peri-arthritis) is usually the cause of the pain in sciatica. Further, that the pain is usually neuralgic.

The connexion between the joint and the nerve in cases of sciatica has been noticed by other observers. Barre and Duprez³ observed the connexion, and coined the term "sacro-iliac sciatica." They also noticed that in early cases there is frequently sacro-iliac joint pain which tends to disappear. Gowers¹ states: "The neuritis (sciatic) often arises by extension of adjacent rheumatic affections of the fibrous tissues, especially that form of 'lumbago' which involves the fibrous attachment of muscles to the back of the sacrum, less commonly in its ordinary site." Probably those cases of "lumbago" were painful sacro-iliac joints and the sciatica was neuralgic.

Gibson,⁵ in an analysis of 1,000 cases, found lumbago in 132, but he considers that number too low, as many patients overlook the slight pain owing to the more severe sciatic pain. It is probable that those cases of lumbago were those with painful sacro-iliac joints, as most patients refer to any pain in the lower part of the back as "lumbago."

Anatomy.

There is a close relation between the sacro-iliac joint and the sciatic nerve. The lumbo-sacral plexus is the source of origin of the nerve, and it also gives a nerve supply to the joint; a morbid condition of the joint, therefore, would cause referred pain down the nerve. The plexus lies immediately in front of the joint, being separated from it only by the pyri-

formis muscle. A peri-arthritis could, by extension, set up a neuritis of the nerve.

I do not consider that a local neuritis is common, otherwise one would expect most pain to be around the joint instead of down the nerve. On the other hand, in neuralgia the pain is frequently felt at some distance from its source of origin.

Clinical.

Bending and walking cause severe pain in patients suffering from sciatica. Both these actions cause strain on the sacro-iliac joint. Assuming that there is an arthritis of the joint, an exacerbation of the pain would be expected.

Lasegue's sign (flexion of the hip with knee extended) is used to test for sciatica. This movement not only stretches the nerve, but also puts a strain on the joint; consequently it can be used to test for sciatica, whether due to neuritis or a morbid condition of the sacro-iliac joint.

In cases of sciatica the patient usually obtains almost immediate relief by lying down, especially in the semi-prone position with hip and knee slightly flexed. This is the position in which all strain is removed from the joint. One can readily understand how this position would give relief so quickly if the joint is the cause of the trouble, but it is not so easy to see how it would be obtained if the trouble is neuritis.

Treatment.

Considering the sacro-iliac joint as the seat of disturbance in cases of sciatica, it has been my custom to apply treatment towards that part and not towards the course of the nerve. The results have been striking in most cases, and could not have been obtained if the joint had not been the cause of the pain.

In early cases, mainly when there is pain in the joint, I have found that radiant heat and massage to the joint is very effective. In older cases I have found that ionization with iodine ions and massage to the joint usually give relief. Anodal galvanism to the painful spots down the course of the nerve can be given conveniently with the ionization. In some cases it is necessary to break down adhesions in the joint; this can be done by Swedish remedial exercises and also by means of the movement which is adopted in nerve stretching.

Recently I have tried diathermy in all cases, and I have found that the results are better than with any other form of treatment, especially in old-standing cases.

Analysis of Forty Successive Cases of Sciatica.

Of the 40 cases 14 were of less than six months' duration; in 2 of these the pain was situated in the nerve, and in 12 in joint and nerve. There were 26 cases of more than six months' duration; in 15 of these the pain was in the nerve, and in 9 in joint and nerve. There were 2 cases of hip disease.

Duration and Situation of Pain.	Effect of Pressure on Sacro-iliac Joint.			
	Pain in Nerve and Joint.	Pain in Nerve only.	Pain in Joint only.	No Pain.
Group 1: Under six months—in nerve and joint.	11	0	1	0
Group 2: Under six months—in nerve only.	2	0	0	0
Group 3: Over six months—in nerve and joint.	6	0	3	0
Group 4: Over six months—in nerve only.	11	2	1	1
Totals	30	2	5	1

Three cases showed definite signs of neuritis—namely, muscle wasting, sensory changes, etc. Two of these cases belonged to Group 3, and only gave pain in the joint alone on pressure on joint. One case belonged to Group 4, and gave no pain with pressure on the joint. The 6 cases which did not give any response down the nerve with pressure on the joint did not respond to treatment at all. Of the remaining cases trace was lost of 3, there was no improvement in 2, a cure was effected in 12, and in addition 15 were in different stages of improvement.

Summary.

Out of 38 cases only 3 had neither signs nor symptoms in the sacro-iliac joint.

Thirty-two cases had a positive response down the nerve to pressure on the joint. Of these cases 21 were improved by treatment of the joint.

In 12 cases out of 14 of under six months' duration there was pain in the joints as well as down the course of the nerve.

In only 9 cases out of 24 over six months' duration was there pain in the joint.

REFERENCES.

¹ Gowers: *Diseases of the Nervous System*. ² Oppenheim: *Diseases of the Nervous System*. ³ Barre and Duprez: *Revue de médecine*, 1920. ⁴ Holmes: Osler and McCrae's *System of Medicine*. ⁵ Gibson: *Lancet*, 1893.

PORTAL PYAEMIA SECONDARY TO UMBILICAL INFECTION.

BY

G. BRUCE WHITE, M.B., CH.M.S.D.,

HOUSE-PHYSICIAN, ST. GEORGE'S HOSPITAL, LONDON.

SUPPURATIVE phlebitis, as a result of spreading infection from the umbilicus, is rarely seen nowadays. The case here reported is of interest from several points of view, especially as there was no sign of inflammation of the umbilicus when the infant was admitted to hospital sixteen days after birth.

History.

On November 30th, 1922, when I was house-physician to the Royal Waterloo Hospital, a female infant aged 16 days was admitted at 9 p.m. on account of swelling of the abdomen, first noted twelve hours previously. There had been no action of the bowels for two days, even after a dose of castor oil, and an enema given that morning returned clear. Some blood and mucus had been passed per rectum during the last eighteen hours. The mother stated that the child had had several "convulsions" within a few days of birth, but had appeared healthy until three days before admission, when the skin became yellow. There had been no vomiting.

The infant was fairly well nourished, it was rather deeply jaundiced, and the marked abdominal distension rendered palpation difficult. The umbilicus was perfectly healed, the temperature was subnormal, but the pulse rate was rapid (uncountable). The abdomen was hyper-resonant from distension with gas; the liver was distinctly enlarged, but no other swelling could be detected on palpation. The rectum, the anal canal, and the lower part of the rectum felt swollen and boggy, and the examining finger was streaked with blood.

Mr. Cairns Forsyth saw the child an hour after admission, and the likely causes of the condition were discussed. The onset of the jaundice was too late for physiological jaundice of the newborn, and rather early and abrupt for that due to atresia of the bile ducts. Infection spreading to the liver by the umbilical vein was regarded as improbable, since the umbilicus was soundly healed and the temperature was subnormal. No conclusion as to the origin of the jaundice was arrived at; but since the infant was obviously suffering from intestinal obstruction it was decided that exploratory laparotomy was justifiable.

Operation.

When the child was under anaesthesia the abdomen was again palpated, but no swelling could be detected. The abdomen was opened by a small paracentral incision, the right rectus being displaced outwards. Some clear fluid escaped as soon as the peritoneum was incised and coils of intensely congested small intestine protruded into the wound. No signs of mechanical obstruction of the bowel could be found. The small intestine was everywhere distended, but the large intestine was collapsed. The appendix was normal. The liver was enlarged, of a deep maroon colour, and its lower surface was smooth. The gall bladder appeared normal and bile could be seen in its interior through its translucent wall. As the intestinal obstruction was evidently due to paresis of the bowel, secondary to a grave toxæmia probably of hepatic origin, the abdomen was closed.

Necropsy.

The child died twelve hours later, and at the autopsy the same general condition of the abdomen was observed, but on cutting through the ligamentum teres to remove the liver pus poured from the umbilical vein, which was widely distended (to three-eighths of an inch). On exposing the liver its upper surface showed a number of whitish areas which on section corresponded to small abscesses within the liver substance. The liver was enlarged and between the infected areas was intensely engorged with blood. There were a number of small haemorrhagic spots scattered throughout the lungs, but no evidence of abscess formation in any other viscera or in the brain could be detected. The lower part of the rectum and the anal canal were much congested and swollen and doubtless accounted for the passage of blood and mucus.

It is highly probable that infection took place in a clot in the umbilical vein and spread to the liver. That the navel should have healed soundly when the intra-abdominal part of the umbilical vein was full of pus is somewhat remarkable. The symptoms from which the child suffered are easily explained by the condition of the liver found at autopsy.

I am greatly indebted to Mr. Cairns Forsyth for permission to report the case.

EXCISION OF THE FIBULA IN AMPUTATIONS BELOW THE KNEE-JOINT.

BY

CHARLES NOON, F.R.C.S.,

ASSISTANT SURGEON, NORFOLK AND NORWICH HOSPITAL.

SERVICEABLE stumps after amputations of the lower extremity must possess good movement, be painless, and able to sustain the direct pressure of a part of the body weight upon the artificial limb. Without these attributes it is practically impossible to fit an absolutely satisfactory artificial limb. Much time and money are often wasted in making and attempting to fit artificial limb after artificial limb to unsatisfactory stumps, whereas correct operative treatment before fitting the artificial limb might have saved much time and trouble both to the artificial-limb maker and the patient.

During the last five or six years a great deal has been learned about amputations, amputation stumps, and the fitting of artificial limbs. Some amputations which were before the war considered "first class" have been of late unable to stand the tests to which they have been subjected. There are still probably many amputation cases in the country which require operative treatment before they can be fitted with really satisfactory artificial limbs. Many below-knee amputation stumps which are at present painful and unsound can be transformed into serviceable stumps by excision of the remaining part of the fibula and removal of that part of the external popliteal nerve which lies below the level of the knee-joint.

In a considerable number of cases of amputation below the knee-joint the presence of the fibula appears to cause considerable difficulty in fitting and wearing a satisfactory artificial limb. This difficulty is more especially noticeable in stumps where atrophy of the muscles covering the bones has been excessive. It is well known that structures that do not exert their normal function undergo atrophy, particularly muscles and bones, so that it is easy to explain the excessive atrophy often seen in amputation stumps. It is in these cases especially, where atrophy has been excessive and in which pressure on the prominent head of the fibula causes pain, that removal of the bone improves the condition and produces serviceable stumps.

Although the removal of the fibula has been practised by a few surgeons it does not appear to have received the consideration due to it, taking into account the benefit which is likely to be derived from its practice. The textbooks of surgery scarcely make any mention of the procedure. Muirhead Little in his recent book on *Amputations and Amputation Stumps* (Chapter II, p. 39) refers to the procedure as follows:

"When the amputation is below the knee excision of all that remains of the fibula will add to the amount of skin available, and sometimes enable the surgeon to cover the tibia satisfactorily without shortening it."

In *Orthopaedic Surgery of Injuries*, edited by Sir Robert Jones (vol. 1, p. 478), there is the following reference to excision of the fibula in amputation below the knee:

"In these short stumps there is a tendency for the fibula to tilt away from the tibia and project. In these cases it is a good plan to remove the fibula. In this way a piece of bone is removed which stands pressure badly, and at the same time the bulk of the stump is diminished, so that a flap which would otherwise be too small may suffice."

A man with a serviceable stump, fitted with a satisfactory artificial limb below the knee, is often able to earn his living at a laborious occupation which may necessitate him standing for many hours a day and walking long distances in the performance of his duties. The following cases, taken from a large series of amputations which have come under my care during the last five or six years, will illustrate how excision of the fibula has been the means of obtaining serviceable and satisfactory stumps.

CASE I.—*Gunshot Wound of Right Leg: Amputation below the Knee: Re-amputation below Knee with Excision of the Fibula. Result, Serviceable Stump.*

J. A., a professional golfer, aged 28, was wounded in the right leg on March 16th, 1916, while serving in France; the leg was amputated, and he was transferred to England on April 6th.

Examination (May 1st, 1916).—General condition good. Local condition: The right leg has been amputated below the knee by the guillotine method. The extremity of the stump is covered by a healthy granulating area.