

STRESS FRACTURE OF A METATARSAL IN A YOUNG CHILD

BY

LEWIS D. RUTTER, M.B., Ch.B.

Late Orthopaedic House-surgeon, Salford Royal Hospital

The following case is reported because of the early age of incidence.

Case Report

On July 23, 1946, a woman brought her child aged 4 years 9 months to hospital, stating that until the previous day the child had been well; she then complained of pain in her right foot on walking, and it was noticed that she limped. No history of trauma was elicited. There was nothing of note in the child's previous history; walking had never troubled her before.

On examination the right foot was mildly swollen but not bruised, and there was tenderness along the shaft of the second metatarsal. The appearance of the left foot was normal. She had a mild genu valgum. There was no clinical evidence of systemic disease. A skiagram (Fig. 1) showed: (1) A cuff

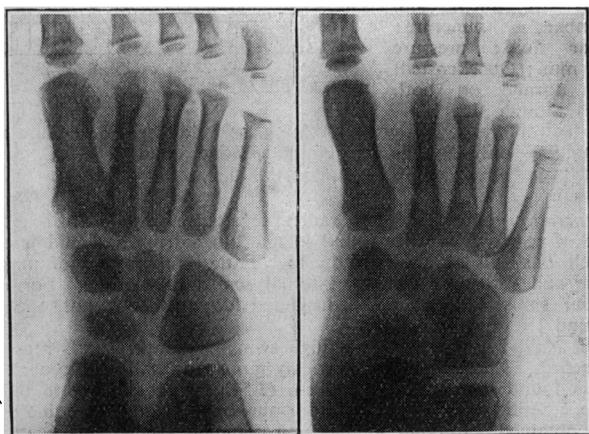


FIG. 1.—Skiagrams taken on day of admission, showing appearance of the second metatarsal shaft.

of fine new bone formation around the mid-shaft of the second metatarsal except for a small annular area of absence of bone in contact with the cortex. It appeared as if the bone was surrounded by a ring of tissue translucent to x rays.

This appearance has been noted by Sayle Creer (personal communication) in a number of cases of stress fracture of the metatarsal, and he wonders if it masks a very small crack. (2) New subperiosteal bone formation in contact with the whole length of the metatarsal shaft except for the annular area described in (1).

In view of the patient's age a tentative diagnosis of periostitis, possibly tuberculous in origin, was made and a short leg unpadded plaster cast was applied.

On Aug. 30 the plaster was removed and the appearance of the child's foot was normal, the swelling and tenderness having disappeared. A skiagram revealed a clear fracture line across the metatarsal shaft with some separation of the fragments. The fracture showed good union. On Sept. 2, after a fortnight out of plaster, the foot appeared normal and a skiagram showed consolidation of the fracture with nothing to distinguish it from an ordinary "traumatic" fracture.

Discussion

The condition was regarded as one of stress fracture of the metatarsal on the following grounds: (1) The sudden onset of pain on walking without previous trauma. (2) Swelling of the foot (but no bruising) and tenderness of the affected metatarsal shaft. (3) X-ray appearances: the solution of continuity of the shaft and the consolidation of the fracture seen on Aug. 30, and the initial annular area of absence of bone in contact with the metatarsal shaft surrounded by a cuff of new bone. No cortical "nick" or hair-line fissure was seen: both were suggested as criteria for diagnosis by Hartley (1943), but as the skiagram on Aug. 30 showed a fracture line it is probable that the hair-line fissure was visible at some earlier stage. There is little doubt that had there been no displacement of the fragments the final skiagram would have shown complete restoration to normal architecture—said to be characteristic of "march fracture." (4) It occurred as a single lesion in the commonest bone affected by stress fracture; the other bones showed no lesion, nor was there evidence of general bone disease. (5) There was no evidence of systemic disease. No previous report of a case of stress fracture of a metatarsal occurring at such an early age was discovered in the literature. Several cases of stress fracture of the tibial shaft have been recorded in young children (Hartley, 1942); and Roberts and Vogt (1939) reported a case in a child aged 4. Stress metatarsal fractures have their maximal incidence in adolescents and young men, particularly soldiers—the incidence being so great in soldiers that the condition has been described as an occupational disease associated with military training.

My thanks are due to Mr. R. Ollerenshaw and Mr. W. Sayle Creer for their assistance and advice in the publication of this case.

REFERENCES

Hartley, J. Blair (1942). *Brit. J. Surg.*, 30, 9.
 — (1943). *Brit. J. Radiol.*, 16, 255.
 Roberts, S. M., and Vogt, E. C. (1939). *J. Bone Jt. Surg.*, 21, 891.

Medical Memoranda

Prevention of Peritoneal Adhesions by Transplantation of Amnion

Various procedures have been suggested to prevent adhesions following repeated laparotomy. The main object is to secure normal peristalsis. Glinn, Hoehne, and other authors recommended the intraperitoneal administration of soft paraffin and similar substances; for a time camphor was employed. It was established, however, that the mixture of fats and chemical compounds was noxious. Some workers, believing adhesions to be due to the absence of fibrinolytic ferments, suggested administering Pregel's pepsin solution or "leucoferment." Mayert and Feldmann tried to prevent adhesions by air insufflation. All these procedures have been criticized.

A case is reported here in which defective peritoneum has been replaced by sterile amnion to prevent new adhesions. For this operation only those cases should be considered in which deficiencies of the peritoneum, with severe adhesions, cannot be repaired by the older procedures because they are so extensive and deep that the body itself is incapable of repair. The transplantation of amnion is intended to provide a moist gliding surface ensuring natural bowel movements. Four suitable patients have been found in the course of four years whose condition necessitated the operation.

Though the problem of adhesion formation has been clarified, there is no reliable method of prevention or treatment. It has, however, been shown that besides asepsis, control of bleeding, and delicate manipulation of the tissues, the replacement of peritoneal defects is the most important factor in prevention. We believe that sterile amnion fulfils these requirements. Transplantation of sterile amnion in the course of gynaecological operations was performed in this country

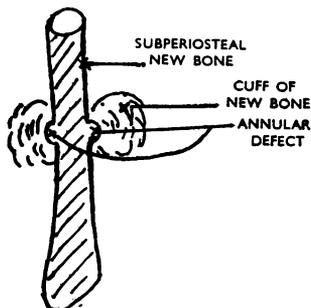


FIG. 2.—Diagram of the second metatarsal shaft as seen in Fig. 1.

as early as 1937 by K. Burger. Only intact amnion obtained in the first stage of labour should be used for this purpose. Histological examination has shown that there is a close relation between human peritoneum and amnion. To investigate the question of how long sterile amnion can be preserved, pieces of sterile amnion were put in Ringer's solution at 2° C. and then removed severally at six-hour periods and histologically examined. No change occurred in the peritoneum or in the amnion at the end of the first six hours. Nevertheless we performed our laparotomies simultaneously with the caesarean sections in the same operating theatre; thus the amnion remained in the physiological solution only for a few minutes.

We treated four cases with amnion transplantation. The first patient attempted suicide by shooting himself in the belly. In two cases evisceration due to a war injury has caused adhesions. The fourth patient had a stomach perforation followed by hernia of the abdominal wall.

CASE REPORT

He was 32 years old in 1940 when his ulcer perforated. The perforation was sutured 18 hours later. The wound separated, and secondary healing lasting many weeks occurred. One year later reconstruction of the abdominal wall was tried, but unfortunately the bowel was injured during this operation. A faecal fistula formed through which faeces were continuously passed. He suffered severe pain, and a chronic ileus developed. Two further operations were performed to relieve the ileus and to close the fistula.

He came to our ward in 1943 with a marked intestinal obstruction which could be relieved by conservative measures. He had constipation lasting for 4 to 5 days at a time and responding only to the simultaneous administration of hypertonic sodium chloride, "doryl," and "prostigmin." A pregnant woman belonging to the same blood group and having a contracted pelvis, with no other indication for caesarean section, was available. Operation was performed on the man simultaneously with the caesarean section. We removed the scar and liberated the intestinal adhesions. In the vicinity of the fistula there were a peritoneal defect measuring about 40 cm. in length and two other defects measuring 15 cm. each. These areas were covered with pieces of amnion, which were held in place by catgut stitches. Primary healing ensued, and the patient left the ward on the twelfth post-operative day. He has been followed up. He is a journeyman mason and has fully recovered.

We have operated similarly on three other patients with small peritoneal defects. They also healed by primary intention. One of them still complains at times. The patients have been followed up for 2 to 3 years. Amnion transplantation should be performed rarely, and only in cases which cannot be repaired by any other method.

ANDREW KUBANYI,
Budapest.

REFERENCES

- Burger, K. (1937). *Zbl. Gynäk.*, 61, 2437.
Clairmont, P., and Meyer, M. (1929). *Arch. klin. Chir.*, 157, 474.
Kubányi, A. (1941). *Wien. med. Wschr.*, No. 48.

Bilateral Chronic Suppurative Otitis Media with Complications

Mrs. R., aged 34, was admitted to hospital on Nov. 18, 1946, with a diagnosis of bilateral chronic suppurative otitis media complicated on the left side by: (1) Mastoiditis. Sclerotic mastoid (no swelling or oedema over mastoid). (2) Polypi, granulations, and cholesteatomata of the middle ear cavity. (3) Extradural abscess of the middle fossa. (4) Fistula of the external semicircular canal. (5) Lateral sinus thrombosis, extending down the jugular vein.

CASE HISTORY

Past History.—Known to have had attacks of bilateral otorrhoea since the age of 12. Attacks had lasted 3-6 months, with remissions of up to three months between. Not accompanied by pain or giddiness. Had measles, scarlet fever, and chicken-pox during childhood; not known whether complicated by otitis media. Scarlet fever *aet.* 10. "Rheumatic chill" lasting three weeks *aet.* 19. "Nervous breakdown" *aet.* 19.

Present History.—Six weeks before admission she was taken ill with giddiness and generalized headache. After 2-3 days pain in her left ear began and with it otorrhoea and giddiness on pressure over the tragus. All this subsided in a week, but during the next four weeks she did not feel too well and had attacks of giddiness. The ear continued to discharge and her head "felt queer" although there was no severe headache and no earache.

Seven days before admission she was taken ill with sudden severe pain in the ear and considerable headache and giddiness. During

the next seven days she felt hot and had repeated "shivering attacks." No vomiting. During the first week of the illness, however, she had vomited repeatedly.

On Admission.—Giddiness on pressure over tragus. Polypi and granulations removed from meatal wall and roof of attic. Lumbar puncture: Normal fluid; pressure normal; culture sterile. There were some signs of meningism but these were not very marked. High fever. Drowsy. Nystagmus, particularly on looking to right.

Put on penicillin 20,000 units three-hourly (total: 1,440,000 units) and sulphathiazole 1 g. four-hourly for three days (total: 18 g.).

X-ray Report.—Acellular type of mastoids and therefore difficult to assess degree of infection, but some infection is present in left mastoid. No cholesteatoma.

Ophthalmologist's Report.—No signs of any papilloedema. Disks normal.

By Nov. 24 she had failed to respond to treatment despite the fact that the temperature fell dramatically during the first 24 hours. Still showed signs of meningism. Lumbar puncture: Clear fluid; pressure 120 mm.; Queckenstedt test normal on both sides though sluggish—

no great difference between the two sides; fluid sterile on culture and containing only 5 cells per c.mm. Blood count: W.B.C., total 19,200; polymorphs 66%, lymphocytes 25%, monocytes 9%. Smear normal.

Operation.—Nov. 25. Left radical mastoidectomy. Hard sclerotic type of mastoid. Caries found in mastoid antrum and middle ear, which was full of cholesteatomata. Extradural abscess of middle fossa and fistula of wall of external semicircular canal. Forward lateral sinus exposed and considered doubtful but not opened. Wound left open.

On Nov. 27 she still had a high swinging temperature. Mastoid reopened. Bone removed posteriorly more than half-way to occiput. Sinus found thrombosed for 1 in. (2.54 cm.) posteriorly to upper knee. Septic clot removed and sinus opened until free bleeding was obtained. Internal jugular and common facial veins ligatured in neck.

Culture of pus obtained at first operation now showed a pure growth of *Proteus*. She was therefore put on sulphathiazole 1 g. four-hourly for six days (total: 42 g.). Three days later the temperature, which was still high and swinging, fell to normal and remained down. Signs of meningism disappeared after the mastoidectomy. The nystagmus disappeared slowly after the second operation and the general condition gradually improved. The ear still discharges. She left hospital on Dec. 24, 1946, with the wound completely healed but a slight serous discharge from the meatal cavity.

DISCUSSION

Although the patient was severely ill there was no swelling or oedema over the mastoid process because she had an acellular sclerotic mastoid. In these cases the infection spreads inwards and backwards and so she developed an extradural abscess, fistula of the external semicircular canal, and lateral sinus thrombosis.

As meningitis was suspected she was put on full doses of penicillin and sulphathiazole, but these failed to arrest the progress of the disease. The mastoid was of the acellular sclerotic type, and when entrance to the antrum was effected pus gushed out and was obviously under great tension. Culture of pus showed the organism to be *Proteus*, which is penicillin-resistant.

A very anterior lateral sinus—hence more ready infection of sinus. When the sinus was opened and septic clot removed the patient made a steady but sure recovery.

CONCLUSION

Chronic otorrhoea is a common malady. When intracranial complications develop treatment with penicillin alone or in combination with the sulphonamides does not arrest the disease, and surgical intervention is necessary.

A. MACKENZIE ROSS, M.D., D.L.O.

