Active movements should be encouraged and all attempts at passive forcing should be avoided.

Extreme gentleness in handling is at all times necessary in order to avoid psychological trauma as well as physical discomfort. A case which has been dealt with at the field ambulance is more comfortably evacuated to the C.C.S. than the patient upon whom no operation has been performed. The equipment necessary is found in every field ambulance and C.C.S.

In the presence of general symptoms it is a wise precaution to take a blood film in malarial areas. It is illuminating to note how often an attack of malaria is initiated by the whitlow.

I wish to thank Lieut.-Col. P. D. Johnson, R.A.M.C., for permission to write these notes and also for help given and suggestions made.

EARLY OPERATION FOR VOLKMANN'S ISCHAEMIC CONTRACTURE

BY

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The recognition and adequate treatment of Volkmann's ischaemic contracture in its early stages will result in a good functional recovery in most cases. Failure to appreciate the significance of the early developing signs of this lesion is, unfortunately, the cause of much subsequent disability and, not seldom, of even gross crippling deformity.

In a recent standard textbook on orthopaedic surgery, in a paragraph dealing with the question of operations designed to relieve intrinsic pressure on the vessels in the developing stages of Volkmann's deformity, it is stated that "as a rule damage is already irreparable when the arm is observed, and for this reason the operation is seldom applicable." Too complete an acceptance of this ruling will result in many cases progressing to ischaemic deformity which would otherwise have been prevented had the benefits of early surgery been sought. I believe that operative exploration is indicated if arterial damage is suspected, or where gross swelling of the forearm is associated with beginning contracture of the fingers which has not responded to routine treatment. The case history given below demonstrates the good results which do follow surgery in the early stages:

Case History

While on Army manœuvres on Dec. 4, 1943, the patient, a well-developed man of 24, was hit accidentally by fragments from a ricocheting bullet. He felt an immediate burning sensation in the left forearm. A first-aid dressing was applied and the patient was admitted to an E.M.S. hospital.

When examined in the hospital four hours after the injury several small wounds were seen on the flexor aspect of the proximal third of the left forearm. There had been very little bleeding. Flexion and extension of the elbow were full and painless, but supination and pronation were reduced by 50% and were accompanied by pain. The fingers were slightly flexed, but could be extended at the metacarpo-phalangeal joints. There was no loss of sensation in the hand or forearm, and the radial pulse was easily palpable. Prophylactic doses of anti-gas-gangrene serum and antitetanic serum were given, and the administration of sulphapyridine was begun. The forearm was suspended from a Balkan frame to assist in venous return.

Three days after admission the range of movement of his fingers had increased, but there was a tendency to flex the wrist before full extension of the fingers was secured. Twelve days after admission to hospital four small pieces of metal were removed from the forearm under local anaesthesia. Following this minor procedure, the patient experienced an aggravation of pain in his arm and the degree of contracture of his fingers was found to have increased.

When seen on Dec. 24—20 days after injury—the muscles of the proximal part of the forearm were found to be hard, and the patient could not extend his fingers at the metacarpo-phalangeal joints without at the same time flexing the wrist fully. Volkmann's ischaemic contracture was diagnosed and surgical exploration decided upon. This was done through a linear incision on the volar aspect of the proximal third of the left forearm. The skin and fascia were incised, and superficial muscles which appeared normal were separated. When the insertion of the pronator radii teres was elevated and later partially incised, large blood clots welled up into the wound and profuse arterial bleeding occurred. This was found

to arise from a partially lacerated ulnar artery. No arterial spasm was present in either segment. Ligatures were applied above and below the laceration and the vessels divided. The deeper muscles were soft, dark red in colour, and failed to show any sign of contractility on stimulation even when a small section was removed from the flexor digitorum profundus for microscopical study. The divided structures were reunited, the wound closed in layers, and the wrist fixed in hyperextension on a dorsal plaster cast. A small rubber drain was left in for 24 hours.

The stitches were removed at the end of 12 days, when the wound was found to be well healed. There was still, however, slight flexion contracture of the distal phalanges of the index, middle, and ring fingers. Splinting in hyperextension was reapplied and physiotherapy by infra-red rays was begun. On Jan. 19, 1944 (26 days after operation) the patient had recovered full finger and wrist movement.

I am indebted to Col. W. F. Harvey for the following histological report: "The sections showed muscle fibres in various stages of degeneration or necrosis with loss of cross-striation in most cases. There was quite considerable longitudinal striation, although a large number of the muscle cells were amorphous and eosinophil. There was no fibrosis or inflammatory cell reaction. The appearances in these sections suggested the ischaemia analogous to Volkmann's ischaemia, possibly at an early stage before replacement reaction had taken place."

Comment

(1) In this case I believe a secondary haemorrhage occurred when the foreign bodies were removed. (2) The increasing tension within the forearm deep to the flexor digitorum sublimis caused mechanical contracture of the fingers. (3) Relief of tension with splinting of the fingers in full extension permitted recovery to occur. (4) Without surgical treatment, replacement fibrosis of the necrosed muscle fibres would have "fixed" the existing contracture, and as cicatrization occurred this existing deformity would have become more pronounced.

I have to thank the Medical Superintendent of the hospital for permission to publish this case.

Medical Memoranda

Locked Twins

Though not quite as rare as was previously thought, a case of locked twins seems of sufficient interest to merit publication.

CASE HISTORY

Mrs. A., a primipara aged 30, expected her first baby on Dec. 22, 1943. I saw her for the first time on Nov. 27, for obstructed labour. During the previous three weeks her pregnancy had been mildly toxæmic; there had been oedema of the legs and abdominal wall, a systolic blood pressure of 150 mm. Hg, but no albuminuria, headaches, or ocular symptoms. Her pelvic measurements were normal. Labour started naturally on Nov. 26, 36 hours before I saw her; six hours previously she had been found to be fully dilated, and for four hours she had been making strenuous efforts to deliver herself.

On examination she was found to be getting tired, though by no means exhausted. On palpating the abdomen one child was thought to be present lying in the left occipito-posterior position. Limbs were felt anteriorly, and one foetal heart only was heard—in the left flank. Palpation was made difficult by the oedema of the abdominal wall. An anaesthetic was then administered; vaginal examination after catheterization revealed that the membranes were intact: these were ruptured, and the hand introduced to confirm the diagnosis of persistent occipito-posterior position. The head, however, was found to be in an occipito-anterior position. To ascertain the cause of non-descent the hand was inserted further into the birth-canal, and it was then found that a second head was lying in the brim of the pelvis, wedged between the head and shoulders of the first child and completely preventing the birth of either. It was found possible to push up the head of the second child about an inch: forceps were then applied to the head of the first child, which was delivered with little difficulty. The second child was then delivered with forceps; it was also in an occipito-anterior position, and delivery was even easier than the first. Very little liquor amnii escaped. There were no lacerations, and a single placenta was expelled ten minutes later. Post-partum haemorrhage was normal in amount. The uniovular boy babies weighed 5 lb. 6 oz. and 5 lb. 2 oz. respectively.

The puerperium was normal, the mother feeding both babies at the breast; their weights on discharge from hospital were both 5 lb. 4 oz. The blood pressure returned to normal, and the oedema subsided during the first few days.

The frequency of locked twins is said to be 1 in 90,000 deliveries—i.e., once in about every 1,000 cases of twin birth. This statement was made by von Braun of Vienna, but in view of the number of cases recorded during the last ten years it seems

that the condition is not quite so uncommon. It is indeed surprising that locking does not occur more often. Oligo-hydramnios has been observed in many of the recorded cases, and seems the most likely cause: it was undoubtedly present in the case reported above, in view of the fact that, though there were two children weighing over 5 lb. each, the size of the abdomen did not suggest to anyone who saw the case that there might be a twin pregnancy.

I have to thank Dr. A. G. Winter, of Crowborough, for permission to publish this case.

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Latent Fractures of Vertebral Column after Aircraft Crashes

Three cases of fracture of the vertebral column after forced landings of aircraft were observed in a Polish Fighter Squadron within three weeks. Two of the accidents had occurred within a week of one another, and the third ten weeks previously. In each case there had been a latent period, varying from nine days to nine weeks, between the crash and the appearance of symptoms suggestive of fracture.

HISTORY OF THREE CASES

Case 1.—Flight lieutenant aged 30. Crash-landed on June 22, 1943. Sustained shock and severe cuts of the forehead. C.N.S. normal. Transferred to an E.M.S. hospital immediately after the crash and discharged as cured some weeks later. When on leave on Aug. 29 he felt a sudden pain in the back while digging in a friend's garden. His friend, who was a doctor, sent him for radiography, which revealed a crush fracture of the bodies of D.12 and L.1; this affected particularly the antero-superior border of each vertebra, the total vertebral border being only slightly reduced. This officer stated that he had had backache following the accident; but this had not been severe, and it had been vague in character. He was readmitted to hospital on Sept. 3 and discharged symptom-free on Sept. 29. No further symptoms have been complained of.

Case 2.—Flight sergeant aged 23. Forced landing on Sept. 2, 1943, with no visible injuries. Complained of pain in the right shoulder, which was x-rayed on the same day, no bony injury being apparent. There was no backache, and a physical examination revealed nothing abnormal. On Sept. 14 he complained of pain in the lower back, particularly on jumping from his aircraft to the ground. On examination there was some guarding of the lumbar muscles on the left, and he felt slight pain on bending the trunk to the right. Radiography on this date showed: fracture of right inferior articular process of L.5, obliquely upwards and outwards through the base; no displacement or deformity. He was admitted to hospital on Sept. 16 and was discharged symptom-free on Sept. 26. There has been no recurrence of symptoms.

Case 3.—Sergeant aged 27. Crash-landed on own aerodrome on Sept. 5, 1943. Had a cut of the head necessitating two sutures, otherwise no apparent disability. Detained in station sick quarters for 24 hours and discharged, after complete medical examination, without complaining of symptoms. On Sept. 14 he complained for the first time of pain in the lower dorsal vertebrae. Radiographs on the same day showed fracture of the inferior tip of the spinous process of D.7, with little displacement, and transverse fracture of the right inferior articular process of L.3, with no displacement. Detained in hospital until Sept. 20. Discharged symptom-free, and has not complained of any symptoms since.

COMMENT

All three fractures were anatomically different, although each was caused by a crash landing in the same type of single-engined fighter aircraft. These crash-landings were attended by varying degrees of damage to the aircraft, and by obvious injuries to the pilot varying from no visible injury in Case 2 to severe facial injuries and shock in Case 1. All three cases occurred among Polish personnel, although no specific significance can be attached to this.

A search in the literature has not revealed any similar occurrences. Rocher and Magnant (*Revue d'Orthopédie*, 1938, 25, 694), report three cases of fracture of the vertebral column following crashes of gliders from low altitudes. They state that these fractures are common after glider crashes, being next in order of frequency to those of the legs and the head. Their cases also show three anatomically different fractures, although each of these lesions at once caused symptoms, making a fracture apparent or probable. All three patients likewise made full recovery, only one (where financial compensation was involved) showing any delay in the resolution of symptoms.

It is felt that a number of undetected fractures of the spine may possibly have occurred through crash-landings, and it is hoped that this note may draw attention to their possible occurrence.

Our thanks are due to Wing Cmdr. T. Montgomery for permission to publish this report.

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Reviews

FIELD SURGERY

Forward Surgery in Modern War. By Major-General W. H. Ogilvie, M.D., F.R.C.S., Hon. F.A.C.S., Hon. F.R.C.S.C., Army Medical Service. (Pp. 96; illustrated. 10s. 6d., plus 3d. postage; 5s. 6d. post free to doctors serving in H.M. Forces.) London: Butterworth and Co., Ltd.

"Field surgery," the author claims, "is the most important branch of military surgery because upon its quality all that follows will depend." With this there can be no argument. The need for a comprehensive work on the subject, based on hard experience in really modern warfare, has been felt for some time. That need has now been met, in the fifth year of war, by Major-General Ogilvie, who was consulting surgeon to the East African Force in 1941-2 and to the Middle East Forces from 1942 to February, 1944. The work, therefore, is an epitome of experience in East Africa, in Abyssinia, in the Western Desert, Libya, and Tunisia.

It is a slim volume, as any volume on field surgery should be, not merely for the pedestrian reason of easy carriage but because such a work should present principles rather than details. The latter, though important, will vary with every campaign, and field surgeons, not to mention administrators, must be adaptable. There is much also to be said for a work which is confined purely to field surgery, except for one chapter entitled "An Outline of Treatment at the Base." A good deal of confusion has been caused by articles, though not those written by men of genuine field experience, in which the advice given does not distinguish clearly or at all between field and base hospital surgery. Surgeons arriving fresh to the field after almost four years of war had much to learn. In the absence of casualties at home—even air-raid casualties are not really comparable—they presumably had taken their cues from published advice. The latter had been copious. Too much of it has been theoretical and "fancy." Yet if the brief papers published in this *Journal* in 1939 are re-read not much exception can be taken to the principles enunciated by men with long first-hand experience in the last war. Most of their observations have stood the test of time, even in a very different type of war: some of them, such as those of Col. J. M. Weddell on the possible drawbacks of air evacuation and on forward operating, have been prophetic. But military surgery does not stand still any more than any other art, and its further evolution is here clearly traced.

General Ogilvie's work gives a realistic presentation. There is no forgetfulness that the first object in war is to win battles, that fighting materials must have priority over medical stores, and that surgery must adapt itself to the campaign in hand. Thus, while his advice on the siting and organization of units, on the arrangement of operating theatres, and on the categorization of casualties is clear, it is also elastic. On technical points he not only gives his personal opinions but calls in the wealth of the Middle East Memoranda on Surgery on various subjects. These memoranda, under his own editorship and often authorship, and those of his predecessor in office, Major-Genl. D. C. Monro, not only have been a guide to Middle East surgeons but have been eagerly sought after and prized far and wide as the real substantial surgical advice in modern warfare. Thus we find also included here the advice tendered by specialists with field experience on resuscitation, burns, wound infection, neurosurgery, maxillo-facial surgery, and chest wounds.

What has the Middle East contributed to the art of field surgery that is likely to stand the test of other campaigns in different fields? In organization there have been the establishment of mobile surgical units and their exploitation to suit fluid warfare. Blood transfusion was, of course, making much headway in civilian practice, but its development and organization in the Middle East will surely serve as a model for the future. The employment of the sulphonamides has followed a similar pattern. In actual technical practices there are some changes unlikely soon to be discarded, even in the possible closer fighting of future campaigns. Among these there is the undoubted success of the Tobruk plaster for the transportation of the fractured femur patient and the like. There is the