TWO CASES OF SEPARATE ACROMION PROCESS, WITH A NOTE ON THE APPEARANCES PRESENTED IN RADIOGRAPHS OF THE ACROMION PROCESS AND UPPER END OF THE HUMERUS DURING OSSIFICATION.

By J. W. STRUTHERS, F.R.C.S., Assistant-Surgeon, Royal Infirmary, Edinburgh.

Although at first sight the ossification of the acromion process would not appear to be of great interest from the clinical point of view, it has nevertheless been the subject of close investigation by surgeons as well as anatomists, and the appearances presented have given rise to considerable discussion. As will be remembered, the base of the acromion process is ossified along with the spine of the scapula at an early age, while the tip remains cartilaginous till between the 14th and 16th years. About that time bone begins to be deposited in the tip of the acromion from a number of separate centres which finally coalesce, and the completely ossified tip, or epi-acromion, remains separated from the base of the process by a cartilaginous epiphysial line until growth is completed, at or before the 25th year.

Controversy has chiefly turned on the point as to whether this epiphysial line ever remains unossified or not.

In the post-mortem and dissecting-rooms, cases are not infrequently found, in adult subjects, in which the epi-acromion is separated from the base of the process along a line which corresponds to the position of the epiphysial line during the period of growth. This line corresponds also to the usual site of fracture of the acromion process, a not uncommon accident.

Some have maintained that the separation is always the result of fracture with non-union, while others believe that it is due to the persistence of the epiphysial line. A strong argument in favour of the latter view, though not a conclusive one, is the fact that the condition is frequently bilateral. In 1895 the late Sir John Struthers published an account of a number of specimens of separate acromion process found in the dissecting-room, and after reviewing all the evidence available at that time, concluded that the condition was probably always traumatic in origin. Cases of bilateral separate acromion process were, he believed, to be explained by the occurrence of injury, not necessarily synchronous, to both shoulders. At the period at which he and others wrote
Two Cases of Separate Acromion Process

investigation was necessarily confined to the post-mortem and dissecting-rooms, and the clinical histories of the cases found could not be ascertained to throw light on the matter.

Thanks to the revelations of the X-rays we are now in a position to observe the acromion in the living subject, and I have recently been fortunate enough to obtain radiographs of the shoulder in two cases which show a separate epi-acromion in healthy and uninjured joints.

The first case was that of a miner, aged 40, who was struck by a fall of coal and thrown violently against a beam in such a way that he struck the edge of it with his right shoulder but was otherwise uninjured. He was admitted to the Royal Infirmary some weeks later on account of persisting disability of the shoulder, and was found to have sustained a fracture-dislocation of the humerus. The head of the bone had been broken off at the anatomical neck and was lying in the axilla. The radiograph also showed that the acromion process had apparently been injured, as there appeared to be a crack running across it just behind the facet for the acromio-clavicular joint. A radiograph was then taken of the uninjured left shoulder for comparison, and this showed clearly a persistent epiphysial line in the acromion process (Fig. 1). The patient, fortunately, was able to give a perfectly definite account of his accident and previous history, which left it beyond doubt that he had never sustained any injury to the left shoulder. The line seen in the radiograph of the acromion corresponds exactly with that of the epiphysial line seen before ossification is complete.

The second case was that of a miner, aged 50, who had sustained an injury to the left shoulder and hand, resulting in dislocation of the humerus and wounds of the hand. He was admitted to the Royal Infirmary nine weeks later on account of persistent stiffness of the injured shoulder. A radiograph showed osteoarthritic changes following the injury, along with what appeared to be a separate acromion process. The uninjured shoulder was consequently radiographed for comparison, and showed, as in the first case, a persistent epiphysial line (Fig. 2). The joint was healthy, and had never been injured.

The presence of this condition in two well-developed muscular males, aged respectively 40 and 50 years, who were both able to give a clear history that the shoulder showing the abnormality best had never been injured, is good evidence that the condition, in some cases at any rate, is due to anatomical abnormality and not to injury.
The finding of the condition during life, in patients who could give a clear history, supplies the link in the chain of evidence which was wanting to those whose observations could only be made in the dissecting-room. Separate acromion process is so often found in the course of dissection that, on the assumption that it is always due to injury, some have asserted that although often overlooked clinically, fracture of the acromion is one of the commonest of all fractures. The evidence afforded by the use of the X-rays has not supported this contention. On the other hand, the close correspondence in the position of the usual line of separation with that of the epiphysial line during growth, taken with the fact that this separation is found in adult life, apart from injury, would seem to make it probable that the majority of cases are due to non-union of the epiphysis.

The writer has had a series of radiographs taken in order to show the appearances presented at different ages by the ossifying acromion process. These appearances coincide with the description usually given in the text-books, except that they show ossification to be complete at an earlier age than that usually given, as the two cases above noted are the only examples found showing a persistent epiphysial line after the 20th year. The number of cases examined so far is, however, not sufficient to enable a positive statement to be made as to the average age at which ossification is really complete.

In taking radiographs designed to show the acromion process, the best results are got if the patient is placed in the usual position for a radiograph of the shoulder, i.e. on the back, with the shoulder region lying on the plate and the tube in front. The tube should be centred about the junction of the anterior fold of the axilla with the arm. If it is centred higher the rays strike too much in the plane of the acromion process, with the result that its whole extent is not well shown, and the presence of a crack or persistent epiphysial line cannot readily be detected.

Owing to the irregular manner in which bone is deposited from several centres in the epi-acromion, appearances are often presented which closely resemble the results of disease or injury, and great care is necessary in interpreting radiographs taken during the period of growth. Both sides should always be examined before arriving at a conclusion, and care be taken that the limbs to be compared are radiographed in an exactly similar position.

That radiographs of a joint in slightly different positions may
show strikingly different appearances is well known but sometimes not fully appreciated. This is especially true when epiphysial lines are present to complicate the picture. Figs. 3 and 4, representing the right shoulder of a boy of 13, illustrate this point well. Fig. 3 shows the picture presented when the shoulder was taken from the front, with the humerus placed so that the greater tuberosity looked directly outwards. The conical shape of the upper end of the diaphysis, the contour of the epiphysial line, and the greater tuberosity are well seen. Fig. 4 shows the picture when the humerus was rotated in with the forearm across the chest so that the greater tuberosity looked forwards instead of outwards. The epiphysial line now appears to be doubled, and this appearance is apt to be, and in the writer's experience actually has been, mistaken for the result of injury, one line being regarded as the epiphysial line, the other as a fracture. This double contour is always seen, with a varying distance between the two lines, in any humerus radiographed in internal rotation, before ossification is completed. The radiographs also show the appearance of the acromion before ossification has begun in the epi-acromion.

In conclusion, the writer has to thank Mr. C. W. Cathcart and Mr. J. W. B. Hodsdon for having kindly allowed him to examine and make use of the two cases referred to above as showing separate acromion processes, and Drs. Hope Fowler and M'Kendrick, of the electrical department in the Infirmary, for their courtesy in allowing him to work in their department, as well as for much assistance in taking and examining a large number of radiographs.

REFERENCE.—Struthers, Edin. Med. Journ., 1895-6, p. 289.

INTUSSUSCEPTION IN CHILDREN—400 DANISH CASES.

By AAGE KOCH
and
H. P. T. OERUM, Kopenhagen.

ETIOLOGY AND SYMPTOMATOLOGY.

The geographical distribution of intussusception shows certain peculiarities, and it is with special reference to this circumstance that we desire to record our investigations on the subject in the English language.