INJURIES OF THE ATLANTO-AXIAL JOINT*

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Injuries of the cervical spine are relatively common and are becoming more readily recognised as a result of early radiographic examination. Many of these injuries are of a minor nature, whereas others are immediately fatal—and between these two extremes a wide variety of lesions reveal themselves. Because of the facilities that exist along the coastal belt of New South Wales for diving, swimming and surfing during many months of the year, injuries of the cervical spine are probably more frequent than in areas where these forms of sport are less common.

The following cases represent three different types of injury of the atlanto-axial joint; each case presented a different problem and each required a different type of treatment.

CASE REPORTS

Case 1—Boy aged fourteen years. When diving into the surf he injured his neck and complained of pain and stiffness of the upper cervical region. A radiograph taken soon after the injury was reported to show no osseous lesion. The pain and stiffness persisted and one month later a second radiographic examination revealed forward dislocation of the atlas on the axis and a fracture of the arch of the atlas, allowing the lateral masses to spread laterally (Fig. 1). He was admitted to hospital five weeks after the injury and the displacement was reduced by means of a Glisson sling and weight traction; eight weeks later a "Minerva" collar was applied and he was discharged home. In spite of a well-fitting plaster the deformity recurred and five months after the injury he was readmitted to hospital and the deformity was again corrected by weight traction. It was then decided to fix the atlas and axis with a bone graft. The posterior surfaces of the atlas and axis were exposed by dissection of the cervical muscles from the occiput and adjacent vertebrae. The posterior arch of the atlas was found to be fractured in the midline. A fine hole was drilled in

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each fragment and a length of stainless steel wire was threaded through the holes and tied so as to approximate the fragments; the same wire was then passed through a hole made in the spinous process of the axis and tied in order to hold the atlas in extension. The arch of the atlas and laminae of the axis were rawed with a small chisel, and cancellous chips from the ilium were packed between and over the two bones. The wound was closed and the patient was nursed on a plaster bed for three months, after which a wire collar was applied and he was discharged home. Radiographs four months after the operation showed sound union of the graft (Fig. 2). An interesting temporary complication was a "tic" which developed in the right sternomastoid muscle about two months after leaving hospital and lasted for several weeks. A good range of movement was ultimately restored and the boy has now resumed high diving and championship swimming.

Case 2—Girl aged two years. This child was involved in a road accident and was admitted to hospital where a fractured mandible was treated by the appropriate specialists, who applied a plaster-of-Paris skull cap incorporating a metal mandibular splint. Five weeks later it was noticed that her chin was resting on the sternum and that neck movements were greatly restricted. Radiographic examination showed a fracture through the base of the odontoid process; with the atlas, the distal fragment of odontoid was displaced so far forwards that its base lay against the front of the body of the axis (Fig. 3). The child was placed in a plaster-of-Paris bed which extended from the feet to the base of the neck, a stout wire head-piece supporting the occiput; weight traction was applied by means of a Glisson sling and every few days the wire head-piece was bent more and more into a position of extension until finally the head was hyperextended on the neck. Control radiographs were taken at frequent intervals. Reduction of the deformity occurred gradually during the ensuing three weeks; a plaster jacket with head cap was then applied and the child was allowed up. At no time was there any sign of cord pressure or irritation. Radiographs taken nine months after the injury showed good reposition of the odontoid process and atlas and firm bony union of the fracture (Fig. 4).

Case 3—Boy aged ten years. While swimming under water he struck his head against a rock and suffered slight discomfort in his neck and some tenderness about the mid-cervical region. Radiographic examination showed a small fragment at the tip of the odontoid process without displacement. The head was kept at rest for three weeks lest there had been some damage to the transverse ligament of the atlas. Two months after the injury neck and head movements were of good range, but slight tenderness at the back of the upper part of the cervical spine persisted. Further radiographic examination showed that the small fragment at the tip of the odontoid process had failed to unite to the main fragment.

Comment—This case is of interest only because of the situation of what appears to have been a fracture at the tip of the odontoid process.