SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

FRACTURES IN THE REGION OF THE ELBOW-JOINT

BY

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Fractures involving the elbow are common, especially in children, and their treatment is often a matter of difficulty and anxiety. Although painful at the time, there may be no very obvious deformity or alarming incapacity, as in the case of a broken leg, and parents are apt to regard treatment as a simple matter and blame the doctor if the result does not come up to expectations.

Reduction may be difficult or impossible without surgical intervention. Restoration of movement may be slow or imperfect because of the peculiar liability of the elbow region to form excess of bone and undergo fibrosis around the joint. Deformity through interference with growth may be unavoidable. At least some of these dangers and difficulties should be pointed out to those concerned at the beginning rather than wait until they arise. Efficient treatment demands x-ray examination, repeated as often as necessary, probably a general anaesthetic, and adequate nursing and supervision, at any rate for a day or two. Where unhappy results occur it is usually found that in order to save trouble or expense some of these measures have been neglected. Failure to provide the best treatment must be made the responsibility of the patient or parents, as the case may be, and not of the doctor.

Supracondylar Fractures

A fall on to the extended arm in an adult is likely to cause a dislocation of the elbow, but in a child the weakest point is just above the lower epiphysis of the humerus, and this common type of injury will produce a supracondylar fracture. The most usual age is between 8 and 12 years. The condition is easily recognized. The arm hangs straight or is supported with the other hand. Palpation may help very little because of the swelling, but the slight backward displacement of the elbow combined with the unnatural side-to-side movement makes the diagnosis clear enough. Movements of the finger and the hand should be tested in order to detect possible nerve injury.

First aid consists in supporting the elbow in the position of deformity with a thick layer of wool and bandage, perhaps combined with a light splint. No attempt whatever should be made to bend up the elbow or to reduce the fracture until preparations have been made. Although the longer the fracture is left the more difficult reduction becomes, this applies to days and not to hours. There is therefore time enough to allow the child to get over the immediate effects of the accident, to obtain some x-ray films of both elbows for comparison, and to allow a reasonable period to elapse since the last meal before giving a full general anaesthetic. Gas is not enough, and local anaesthetics are unsuitable in the case of children.

REDUCTION

Reduction is accomplished in the following manner. An assistant steadies the upper arm while firm traction is applied to the pronated forearm with the elbow in extension. While still maintaining the pull on the forearm

the elbow is flexed gradually, and at the same time forward pressure is applied to the olecranon and lower end of the humerus by the thumb of the operator's other hand. The sensation of reduction should be experienced. If it is not, the lower fragment has probably got caught behind the shaft, and further flexion must not be pressed. When reduction takes place the forward position is maintained by thumb pressure, while any side displacement is checked and corrected. The elbow is then brought up into full but not forced flexion, in which position the fracture is stable. The forearm should be pronated to relax the muscles, which otherwise tend to rotate the lower fragment.

How should this position be maintained with security and safety? A collar-and-cuff sling supports the wrist from below the neck, but may cause twisting of the fracture and subsequent loss of the "carrying angle." Strapping which encircles the flexed arm may cause danger from pressure, and must not be employed. A satisfactory method is to apply a wet plaster-of-Paris "slab," made from a four-inch bandage, direct to the back of the elbow from the top of the upper arm to the palm of the hand. At no point does it go more than half-way round the limb, and it cannot constrict. It is closely moulded to the skin, and so gives firm support. It is held in position by a few turns of bandage around the forearm and upper arm, but nothing whatever encircles the elbow itself. The bend of the elbow is therefore uncovered and free for inspection. When set the whole is supported in a sling. Without delay an x-ray examination should be made to check the position. If this is unsatisfactory the arm must be dropped again into semi-extension until a further attempt is made. The child should remain in bed for twenty-four hours at least, with the arm resting on a pillow, and a constant watch should be kept for any disturbance of the circulation. The signs of this are pain, congestion, and numbness of the fingers, and weakness or loss of voluntary movements. These are the danger signals of beginning ischaemia. The fracture itself becomes a matter of secondary importance. All pressure in the antecubital region must immediately be relieved by removing everything from the limb and reducing the flexion of the elbow. It should be remembered that it is not as a rule the swelling and flexed position alone which cause pressure, but flexion in the presence of an unreduced fracture. Hence the importance of obtaining x-ray evidence of reduction before resting content.

AFTER-TREATMENT

After-treatment consists in maintaining fixation until union of the fracture is firm. This usually takes four weeks. At the end of this time the plaster splint is removed and a collar-and-cuff sling substituted. In a few days, by gradually lengthening the sling, the elbow may be let down to a right angle, and then an ordinary sling can be substituted. Active movements are encouraged and a careful watch kept for any tendency for the range of flexion to become diminished. This may indicate the occurrence of myositis ossificans, which would demand a further period of rest. Radiographs will show this.

The last stage before full movement is restored may take many months. The parents must be made to understand that

massage, vigorous stretching, or manipulation of the joint would not only retard recovery but probably lead to still further stiffness. In certain cases some treatment from a reliable masseuse, who will help to restore the child's confidence but confine herself to heat and gentle active movements and exercises, may help the situation and prevent the parents from seeking unskilled advice.

Fractures of the Condyles

Injuries which cause either abduction or adduction strains of the elbow may lead to fractures of either the outer or the inner side of the lower end of the humerus. They occur most commonly in children because of the weakness associated with the multiple centres of ossification. For the accurate interpretation of radiographs a knowledge of these ossific centres and their appearance at different ages is necessary. Mistakes, however, may be avoided if exactly corresponding films are taken of the uninjured and the injured elbow. Careful comparison will disclose an abnormality, and the error of mistaking a separate bony centre for a fracture is avoided. It must be remembered that the lower end of the humerus in early childhood is largely cartilaginous, and that a torn-off epicondyle may be much larger than the x-ray appearance suggests.

INTERNAL CONDYLE

Forcible abduction of the elbow-joint at any age up to 16 may cause avulsion of this part of the bone through a pull exerted by the attached flexor group of forearm muscles. The importance of the injury lies in the close proximity of the ulnar nerve, which may be damaged at the time or become the seat of delayed neuritis in after-years. Exact diagnosis of the injury is not always easy without an x-ray examination, but if displacement has occurred a movable lump can be felt below and in front of the normal situation of the epicondyle, and there is lateral instability of the joint with a great deal of bruising. Nerve-pressure symptoms must be sought. Treatment depends upon the degree of the injury.

1. *Fractures without displacement* can be treated with a collar-and-cuff sling for a fortnight, and afterwards the resumption of active use.

2. *Fractures with downward displacement* are best treated by open operation. The steps of this consist of, first, a dissecting free of the ulnar nerve, which is often tightly stretched across the broken surfaces; then reposition of the condyle and attached muscles, fixing them in place by a few catgut stitches or a beef-bone peg; and, lastly, the transposition of the ulnar nerve to a muscle bed in front of the condyle, to make sure that it will escape a traumatic neuritis later on. The arm is fixed in flexion by means of a posterior plaster splint for three weeks, and then active movements are begun. If for any reason surgical treatment is impossible a fair result as regards function follows treatment by simply keeping the elbow flexed for three weeks. The condyle will not unite, however, and some lateral instability of the joint will persist, together with a variable degree of cubitus varus deformity. Furthermore, there is the risk of ulnar nerve irritation from friction behind the irregular condyle.

3. *Fracture with Displacement of Condyle into Joint.*—Although by manipulative methods it has been found possible to extricate the condyle, yet in almost all cases operative treatment is necessary. The ulnar nerve is often affected from the beginning, and this may demand exploration. The condyle is fixed back in position and the freed nerve transposed to the front.

EXTERNAL CONDYLE

Fractures of the external condyle usually involve a part of the articular portion of the humerus and are not confined to the epicondyle itself. In children particularly the large fragment may carry the whole of the capitellum and even part of the trochlear surface. For purposes of treatment there are two varieties: first, fractures without displacement, which should be dealt with on the lines of a supracondylar fracture; secondly, those with displacement. In the latter the broken-off portion is pulled out of the joint and drawn downwards by the muscles, and operative treatment is imperative. This may not prove a very easy matter, as the fragment is often rotated and at a distance from the joint. Some patience may be necessary to make out exactly how to fit it back without separating its muscle attachments. When in place it may be secured by a catgut stitch or by a small beef-bone peg. The elbow is held at a right angle, with the forearm supinated and the wrist a little dorsiflexed, by means of a posterior plaster slab and bandage. This is retained for three weeks before starting gentle active movements. No physical treatment is required.

Fractures of Head of Radius

A point to remember is that a supposedly "sprained" elbow may often contain a fractured radial head. It is usually produced by a fall on to the hand. There are none of the signs of gross fracture. Pain in the elbow on twisting the wrist is suggestive. Examination with the thumb over the radio-humeral joint while rotating the forearm with the other hand will reveal localized tenderness, limitation of movement, and often irregularity of the head of the bone. X-ray examination will show the type of fracture and determine the line of treatment.

1. *A crack with little or no displacement* should be treated by fixing the elbow in full flexion with the arm in supination. This position is most easily maintained by a very light posterior plaster splint supported by a collar-and-cuff sling. It should be retained for a month, after which a sling should be worn for a further week. Exercises and active movements are to be encouraged, but movements, especially extension, are slow to return.

2. *Fractures of a segment with displacement* do very badly with conservative treatment. Pain and stiffness persist, and traumatic arthritis develops later in the elbow-joint. The broken-off fragment should be removed by operation without delay. The radio-humeral joint is approached through a lateral incision which passes just behind and below the external epicondyle. The muscles are raised for a short distance from their origin and the capsule of the joint incised. The joint will be full of blood, and when this has been cleared away the damage can be inspected. The broken segment and any small fragments are removed as gently as possible, leaving the standing portion of the head if this is undamaged. Sometimes the articular cartilage of the adjoining capitellum is broken and rough. It should be made smooth with a knife and a sharp spoon. The capsule is closed and the muscles are replaced with a few interrupted catgut sutures and the skin with interrupted stitches. The exposure and work inside the joint are carried out with bleeding controlled by an Esmarch bandage, but in no circumstances should this be left on for more than half an hour.

3. *Comminuted fractures of the radial head* demand surgical treatment. The whole of the head should be removed, together with any loose fragments. After partial or complete excision of the radial head the arm is supported at a right angle by means of a thick layer of wool

and a firm bandage. Rotation movements of the forearm are encouraged from the start, and flexion and extension of the elbow after a fortnight.

Fractures of Olecranon

In these cases the question to be decided is whether or not to advise operation. The age and occupation of the patient, which arm is injured, and the degree of comminution or separation of the fracture must all be taken into consideration. The pull of the triceps and consequent separation cannot be efficiently overcome by any method of splinting, not even in full extension with strapping and pads. Bony union will not be secured, but nevertheless a remarkably useful arm may result from a fibrous union with separation of the fragments.

In elderly patients who are not required to do hard manual work the best course is to support the arm in a sling at a right angle and encourage active use from the beginning. In all other cases operative treatment is the method of choice. It should be carried out as soon as the skin condition is surgically satisfactory. Only a few points of technique need be mentioned. The patient lies prone, with the arm stretched out from the side and with the front of the elbow resting on a flat sandbag. An Esmarch bandage is used for the first part of the operation. The incision should be a curved one, passing to the inner side of the point of the elbow. The resulting scar is not in an exposed position and is hardly visible—an important point in women patients. Aluminium-bronze wire, made of many strands and flexible for tying, or two strands of strong fishing-gut, will serve to hold the fragments together. Silver wire is quite unsuitable. The wire should lie within the bone, only emerging at the sides of the lower fragment, to get a grip on the cortex, and deep in the triceps insertion where the knot is tied. A flexed post-operative position of the elbow is desirable, but the amount of flexion will depend on the security of the fragments. This can be tested before sewing up the wound. A posterior plaster slab outside the dressings aids fixation and comfort. In the average case active movements may be started in three weeks.

Nova et Vetera

BICENTENARY OF BOERHAAVE'S DEATH

Friday, September 23, 1938, will be the two hundredth anniversary of the death of Herman Boerhaave, the leading physician of his age. At Leyden, where he practised and died, the *Nederlandsche Maatschappij tot bevordering der Geneeskunst*, in association with other learned bodies in Holland, will commemorate the occasion. Dutch physicians and colleagues from other countries have been invited to pay homage to Boerhaave, and a commemorative volume is to be prepared, which, besides the addresses given on September 23, will include tributes from foreign physicians, botanists, and chemists. At the end of the ceremony a wreath will be laid before the statue of Boerhaave, and visits will be paid to the church where he is buried, to the old wards of the former St. Caelilia Hospital where he taught clinical medicine, and to his country seat "Poelgeest," near Leyden. The following day has been set apart for an excursion to the vicarage at Voorhout, where Boerhaave was born on December 31, 1668, and thence to Harderwyk, the ancient little town near the Zuyder Zee, where formerly stood a

university in which Boerhaave graduated M.D. on July 15, 1693. The arrangements are in the hands of a committee headed by Dr. L. C. Kersbergen of Haarlem, whose office address is Keizersgracht 327, Amsterdam.

Before turning to the study of medicine Boerhaave took his degree in philosophy at Leyden in 1689; in 1701 he was appointed lecturer on the institutes of medicine at Leyden, and in 1709 professor of botany and medicine. In 1714 he was appointed rector of the university and professor of practical medicine, and four years later professor of chemistry. In 1728 he was elected into the French Academy of Sciences, and in 1730 the Royal Society of London made him a Fellow. "His genius so raised the fame of the University of Leyden, especially as a school of medicine, that it became the resort of strangers from every part of Europe."

BENJAMIN TARNOWSKY, 1838-1906

Professor Benjamin Tarnowsky, the first Russian syphilologist, was born on July 9, 1838, in Poltava. After medical education at Moscow, where he qualified in 1859, he went to Paris, where he studied syphilology and urology under Ricord. On his return to Russia he settled in St. Petersburg, where he became attached to the Kalinkine Female Lock Hospital. In 1863 he published his lectures on the diagnosis of syphilis in women and children, the first Russian manual on venereal diseases. In 1868 he was appointed to the Military Medical Academy of St. Petersburg, where he lectured to young soldiers on the dangers of exposure to venereal disease, and was made assistant professor of syphilology in the medical faculty, becoming full professor three years later. He also founded a school for the special education of midwives in syphilology. In 1885 he founded a society of dermatology and syphilology which was the first society of the kind not only in Russia but also in the world, and served as its president for many years. In addition to numerous original articles on various aspects of venereal disease, most of which he published in the *Archiv für Dermatologie und Syphilis*. Tarnowsky translated Lancereaux's monograph on syphilis. His work met with wide recognition both at home and abroad. The Russian Government conferred on him various distinctions, and he was elected honorary member of numerous Russian and foreign medical societies. Throughout his married life he received valuable help from his wife, Dr. Pauline Tarnowsky, who was one of the first medical women in Russia, and was well known for her work on psychiatry and craniology. His death took place on May 17, 1906.

HEINRICH MEIBOM, 1638-1700

From the stately days of the seventeenth century to recall into the hurried atmosphere of modern specialization the name of Meibomius, the tercentenary of whose birth occurred on June 29, engenders feelings of envy and melancholy regret. Though he has found a narrow memorial in the Meibomian glands of the eyelids which he described so accurately in 1666 ("De vasis palpebrarum novis, epistola")—these had previously been noticed by Giulio Casserio (1561-1616)—through the very act of eponymous commemoration, however pious, we tend to drift away from the man behind the name. Like so many of his contemporaries, he was indeed a child of Apollo, god of culture, poetry, rhetoric, and healing. While still a medical student (he became M.D. at Angers in 1663) he was appointed to, and in 1664 took up, the professorship of medicine in the University of Helmstädt. Fourteen years later he accepted the additional chairs of history and of poetry. He further showed his versatility by straying into the pleasant fields of archaeology, philology, and philosophy, and all his life he was an insatiate traveller. His father, Johann Heinrich Meibom, is a familiar figure in medical history, but his son, Brandanus, also a physician, is a comparative stranger.