Current Practice

JOINTS AND THEIR DISEASES

The Elbow

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The localization of pain in the upper limb is often imprecise. Though patients may attribute their symptoms to the elbow, such pain may actually originate from the cervical spine, brachial plexus, thoracic outlet, shoulder structures, or occasionally from a deep-seated lesion in the forearm. This is especially likely when the pain is diffuse and there are no localized tender points. However, when the fault lies in some superficial structure in the elbow region—for example, the tendons affixed to the epicondyles or the olecranon bursa—the painful area can usually be indicated with accuracy and the point of maximum tenderness over the damaged structure identified with precision.

Furthermore, in considering the disorders of any peripheral joint it is essential to remember that the symptoms may be due to a generalized disease process, most commonly a polyarthritis such as rheumatoid arthritis or gout, but in some cases a process from another system may also involve the elbow joint—for example, as in neuropathic arthropathy or a haemarthrosis occurring in haemophilia.

Thus unless the trouble is clearly limited to the elbow the patient must have a general clinical examination and in many cases a careful regional examination of the upper limb as well.

Anatomy

Though the elbow acts principally as a simple hinge joint, it is a relatively complex structure comprising three separate articulations—namely, the humero-ulnar, the radio-humeral, and the proximal radio-ulnar joint. These three articulations have a common synovial lining and are enclosed by an articular capsule. The capsule is thickened medially and laterally to form the radial and ulnar collateral ligaments, which confer stability. Anteriorly the joint is well protected by the muscles and other structures of the antecubital fossa, but posteriorly the synovial membrane is easily palpable and fairly extensive, allowing a route for aspiration and intra-articular injections.

In considering the disorders of the elbow region the peri-articular structures are as important as the elbow joint. The olecranon bursa is a large and constant structure, while several smaller and less constant bursae may also occur. The main groups of extensor muscles acting on the fingers and wrist share a common tendinous origin from the lateral epicondyle of the humerus, while the flexor muscles have a similar tendinous origin from the medial epicondyle. The spaces between the olecranon process of the ulna and the medial and lateral epicondyles of the humerus are respectively known as the medial and lateral para-olecranon grooves. The medial groove is important because of the relationship of the ulnar nerve in a superficial and vulnerable situation, while the lateral para-olecranon groove

is a conveniently accessible site for aspiration and injection of the joint.

Clinical Examination

The patient should be sitting or standing, but if confined to bed the upper arm should be raised and supported and the forearm placed over the chest. From the position of complete extension there is usually a range of 150° to 160° flexion. The forearm is normally slightly abducted on the humerus, giving a valgus carrying angle of 10°, but congenital variations and the effects of injury or disease may increase the degree of cubitus valgus or even cause a cubitus varus.

Swelling and redness of the olecranon bursa are easily observed because of its subcutaneous situation. Nodules may be seen or, if small, detected by palpation over the olecranon process or the adjacent extensor surface of the ulna and in the wall of the olecranon bursa. The elbow region is the commonest anatomical site for nodule formation, and the identification of nodules is of importance in the differential diagnosis of polyarthritis—for example, in a child suspected to be suffering from rheumatic fever or in clinical confirmation of the diagnosis of rheumatoid disease. The nodules occurring in about 30% of patients suffering from classical rheumatoid arthritis may be small, fixed to the periosteum, and evanescent.

Effusion in the elbow joint or synovial thickening will show as swelling posteriorly, especially in the para-olecranon grooves. The detection of small effusions may be aided by the examiner keeping his thumb and index finger over the lateral para-olecranon groove while slowly extending the patient's arm. In the medial groove, the same manoeuvre is used to feel the ulnar nerve, which may be normal or thickened.

The four ranges of movement at the elbow joint are flexion, extension, pronation, and supination. The latter two occur as a combination of movements between the superior radio-ulnar joint of the elbow and the inferior radio-ulnar joint at the wrist. The active movements should be tested first, and then the passive ranges cautiously measured if painful limitation is present. When the elbow is arthritic, irrespective of the type of arthritis, there is limitation of both flexion and extension and the joint is held in flexion at rest, the extent of the deformity being dependent on the severity and duration of the arthritis. Pronation and supination are restricted when the elbow disorder is severe and well advanced. Resisted movements of the elbow are also studied, especially when lesions in the upper arm are suspected—for example, damage to a biceps tendon or muscle. Resisted movements of the wrist joint must also be studied, since the principal muscles to the wrist and fingers take origin from the epicondyles, and painful lesions near their origin will cause symptoms in the elbow region.

X-ray examination is essential whenever a deep-seated condition is suspected and advisable in many cases of extra-articular

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disease, especially recurrent or refractory cases, when it may show up an old injury or underlying disorder. This was illustrated recently when a patient who had successively suffered from a tennis elbow, olecranon bursitis, and bicipital tendinitis was found to have gross osteoarthritis of the elbow joint demonstrable on x-ray even though the only sign on clinical examination was minimal limitation of extension.

Pathology

The situation and structure of the elbow region render it particularly prone to various forms of trauma, which may be major, trivial, or repetitive. This article is principally concerned with medical disorders of the elbow and excludes consideration of major fractures, dislocations, and their direct sequelae such as Volkmann's ischaemic contracture and myositis ossificans. Nevertheless, it is well recognized that minor injuries and strains are responsible for such conditions as bursitis, tendinitis, and synovitis, and both major and repeated minor trauma are conducive to the development of osteoarthritis. Furthermore, such conditions as osteochondritis dissecans and osteoarthritis may be clinically silent until an injury provokes signs and symptoms. The liability of the elbow joint to neuropathic arthropathy (Charcot's joint) and to haemarthrosis is a further reflection of the importance of trauma in provoking and aggravating pathological changes in this joint.

In common with other synovial joints the elbow is liable to arthritic conditions characterized by synovitis—for example, rheumatoid arthritis, rheumatic fever, psoriatic arthritis, Reiter's syndrome, arthritis associated with ulcerative colitis and other chronic bowel disorders, and ankylosing spondylitis when it affects peripheral joints. Gout rarely causes crystal (urate) synovitis in the elbow joint, but tophi may occur in or near the olecranon bursa, and this disease may also involve the common tendinous origin of the extensor muscles at the lateral epicondyle.

Superficial infections near the elbow are fairly common and may lead to suppurative bursitis or suppurative arthritis. Tuberculous infection of the joint, though rarer than it used to be, must also be considered in differential diagnosis.

The elbow is also liable to degenerative changes in middle age and beyond, which may be related to previous injuries or develop as part of a generalized process of osteoarthritis. While usually painful and evident, the condition can develop silently until an episode of traumatic synovitis or fragmentation of an osteophyte causing joint "locking" may bring it to light. Anatomical changes in the medial part of the elbow resulting from pressure, trauma, or degeneration can cause compression neuritis of the ulnar nerve as it passes behind the joint or through the cubital tunnel.

Common Disorders

Some of the commoner disorders in the elbow region, including those amenable to treatment in general practice, are now considered separately.

Osteochondritis Dissecans

This condition occurs most commonly in adolescents, particularly in boys, and involves the elbow joint as frequently as the knee. It is usually unilateral and commoner in the right elbow than the left, though bilateral cases do occur. The lesion is an area of aseptic necrosis comprising a portion of articular cartilage and adjacent bone, which often becomes detached and disintegrated to form one or more loose bodies in the joint. It is most probably the result of impairment of blood supply to an articular area during the period of

epiphyseal fusion and is commonly related to trauma. The clinical course is usually one of progressive pain, stiffness, inability to extend the elbow fully, synovitis, and effusion. Silent cases can occur, or the patient may present with an acute, painful effusion and locking of the joint, especially after a strain or injury. Small lesions may heal, but larger areas associated with loose fragments in the joint will provoke persistent or repeated symptoms and predispose to the subsequent development of osteoarthritis.

In minor cases immobilization for a short period in a sling with the additional protection of a cotton-wool pad and bandage should allow the symptoms to subside. The patient must then avoid heavy activity and trauma during several months of observation, with serial radiographs of the joint. The more severe cases, and those in which symptoms persist and no healing is shown on x-ray, will require surgical exploration with trimming of the crater area of necrosis and removal of any loose fragments in the joint.

Synovitis

Synovitis of the elbow with effusion is frequently due to trauma, and even a minor injury or strain may provoke acute symptoms and signs when degenerative changes are present. Loose bodies in the joint, such as fragmented osteophytes or cartilaginous flakes, may also cause painful "locking" and effusion. Synovitis is an integral feature of several common inflammatory types of arthritis, notably rheumatoid arthritis. Mild cases usually settle satisfactorily with the application of a firm wool pad and bandage and the use of a sling, aided by mild analgesics. More severe cases will, provided infection can be satisfactorily excluded, require intra-articular injection of a corticosteroid compound. Hydrocortisone acetate 50 mg., or prednisolone acetate 25 mg. in 1-ml. suspension, have been proved suitable and can be mixed with an equal volume of 1% lignocaine hydrochloride.

When there is a substantial effusion, aspiration will be necessary. The routes for injection or aspiration are posterior or lateral. The posterior route is through the triceps tendon above the olecranon with the joint bent to a right-angle. The lateral route is through the lateral para-olecranon groove. The forearm and elbow are supported on a pillow, the joint flexed to as nearly 90° as possible and slightly pronated. The lateral humeral epicondyle and the tip of the olecranon process are identified, and the groove lies between them (see Fig.). The needle is pointed forwards in the direction of the antecubital fossa, and the joint capsule is superficially situated and easily entered. Injections are repeated as required up to three occasions at seven- to ten-day intervals.

Lateral aspect of the elbow joint illustrating sites of injection for tennis elbow and for aspiration and injection of the elbow joint.

Physiotherapy has little to offer in the early treatment of acute synovitis. Any form of heat will increase congestion and aggravate symptoms, but ice-packs could relieve pain and stiffness. In subacute and chronic synovitis superficial heating—for example, by radiant heat, infra-red lamp, hot-packs, or baths—is helpful in providing temporary relief of pain and stiffness and facilitating the practice of maintenance exercises. More powerful and deep-heating methods, notably short-wave diathermy and inductotherm, may aid the resolution of a persistent synovitis but must be administered with caution and gradually increasing dosage, as they can exacerbate synovitis.

Analgesic and anti-inflammatory compounds are also prescribed according to the severity of the case, preparations such as paracetamol, aspirin, or mefenamic acid being sufficient for mild cases, while phenylbutazone, oxyphenbutazone, indomethacin or flufenamic acid may be needed in more severe cases. Ibuprofen (Brufen) is useful when dyspepsia is a limiting factor.

Nodules

Rheumatoid nodules, found over pressure sites in the olecranon region, may be small and evanescent, but occasionally they enlarge and coalesce to form a craggy mass, prone to ulceration and infection. Necrotic patches may also occur in nodules in patients suffering from rheumatoid vasculitis. The skin is atrophic in many patients with rheumatoid arthritis, and especially so in those on steroids. Pressure sores of the olecranon area are common in bed-ridden and chair-bound patients and may occur in those using elbow-crutches. Indolent infection may develop and spread, causing cellulitis or even suppurative arthritis of the elbow joint. These features should be sought and excluded before local steroid injections are given into the elbow joint or related structures. When ugly nodular masses are present and constitute a potential hazard, their surgical removal is advisable. Nodules may recur, but avoidance of pressure on the olecranon will reduce this risk.

Olecranon Bursitis

A common condition, this is often provoked by injury or chronic pressure and friction, and it varies in severity from mere thickening of the wall to bursitis with effusion, sometimes haemorrhagic. The bursa is also involved in various rheumatic disorders, notably rheumatoid arthritis and gout. There is a considerable risk of infection from skin sepsis or infected nodules. Suppurative olecranon bursitis is typified by the "beat elbow" of miners, the result of repeated injuries, friction, abrasions, and skin sepsis.

Mild bursitis is best treated by rest in a sling and protection from friction, pressure, and trauma. An effusion can be easily aspirated under aseptic conditions, and, provided infection can be confidently excluded, a local steroid injection will expedite recovery. If infection is suspected the fluid must be aspirated and microbiological investigations undertaken to identify the organism and its sensitivity to antibiotics. Locally instilled and systemic administration of the appropriate antibiotic can then be given, but in frank suppurative bursitis there is usually need for incision and drainage, with excision of the bursa either then or later.

Tennis Elbow

Though this common condition, with its notorious liability to chronicity and recurrence, has been recognized for nearly

a century, there was doubt about the cause until comparatively recently. It is now generally attributed to traumatic inflammation from injury to the common tendinous origin of the wrist extensor muscles at the lateral epicondyle of the humerus. This lesion occurs most commonly at the tenoperiosteal junction at the tip of the lateral humeral epicondyle, but may also occur in the tendon itself or even more distally at the musculo-tendinous junction.

The name "tennis elbow" has little bearing on its cause. Though cases do occur in tennis players, the majority result from domestic or occupational strains. The healthy, resilient tendons and ligaments of most young people can tolerate considerable strains before they rupture. The more friable and inelastic musculo-skeletal structures of middle age onwards are easily torn by heavy work, unaccustomed exercise, and even by repetitive but previously tolerated activities—for example, polishing, digging. This liability applies to musculo-skeletal structures throughout the body. Even mild injury can provoke traumatic inflammatory response, which is then increased and perpetuated by the continued use and friction of mobile musculo-skeletal structures.

Tennis elbow may be diagnosed by the history of pain, chiefly located over the lateral aspect of the joint, an inability to hold a moderately heavy object with the elbow extended, and by special tests. Flexion and extension of the elbow are of full range and painless. *With the elbow in extension* the following tests are positive:

(a) Resisted extension of the wrist provokes pain over the lateral aspect of the elbow.

(b) Resisted radial deviation of the wrist provokes pain.

(c) Pronation at the wrist with ulnar deviation of the hand provokes pain at the elbow. This is Mills's manoeuvre and it must be done cautiously.

(d) With the hand lightly clenched the wrist is flexed, either actively by the patient or very gently by the examiner, when pain is induced near the elbow. This is painful in the healthy person, but the pain is felt over the dorsum of the wrist.

Most cases of tennis elbow will respond satisfactorily to injections of local corticosteroid (25 mg. hydrocortisone or 12.5 mg. prednisone acetate) mixed with 1% lignocaine hydrochloride. These injections are given into and around the most tender spot over the lateral humeral epicondyle. Sometimes one injection suffices, but usually two or three at intervals of 10 to 14 days are needed. Irritation after the injection is common when local steroids are given in tissues under tension; cold packs or analgesics may be helpful during the day after injection.

The patient should take care to avoid rotational and flexion strains at the wrist, as the majority of recurrent and refractory cases are due to failure to observe this or to resuming activities which provoked the trouble. The use of a cock-up wrist splint may be necessary to ensure protection, especially in sportsmen. Another factor to be borne in mind in refractory cases is gout, as there is evidence that gouty lesions may occur in tendons and tendon sheaths even in the absence of a history of acute arthritis, and the elbow is a favourite site. A radiograph may show an arthritic lesion or unsuspected condylar injury.

Manipulation and deep frictional massage were popular methods of treatment before the days of local steroid injections and are still occasionally used for chronic and recurrent cases. The rationale was the breaking down of adhesions and scar tissue and stretching of the tendon. Short-wave diathermy may help in healing the damaged area, and analgesic and anti-inflammatory drugs are sometimes helpful in addition in severe and difficult cases. The temptation to persist with frequent injections giving only transient relief must be resisted and the reason for failure identified. In a few cases surgical exploration with tenotomy of the extensor carpi radialis brevis tendon, combined with debridement of damaged tissue, is necessary, but they are exceptional.

Golfer's Elbow

This is due to injury of the common flexor tendon origin at the medial humeral epicondyle. Much rarer than tennis elbow, it is analogous to it in many respects, and diagnosis is confirmed by pain being provoked by resisted flexion at the wrist and by passive stretching of the wrist flexor muscles. Treatment is on the same lines as for tennis elbow.

Bicipital Tendinitis

Injury to the tendon near the elbow may occur at the musculo-tendinous junction or at the tenoperiosteal junction. Resisted flexion and supination provoke pain deep in the antecubital fossa. If the joint is flexed to a right-angle and the arm held to the side, resisted supination causes pain near the elbow if the lesion is in the lower part of the biceps and pain in the shoulder if the bicipital tendon is involved at that situation (Yergason's sign). Full pronation of the elbow may cause pain by squeezing the injured part if the lesion is at the radial insertion. Treatment is by rest in a sling and local steroid injections mixed with local anaesthetic, provided these can be accurately given to the injured area. Short-wave diathermy may be a useful adjuvant treatment. Deep frictional massage has also been used but is very painful in this situation.

Injury to Ulnar Nerve

The superficial situation of the ulnar nerve as it passes behind the medial humeral condyle renders it vulnerable to trauma. Fractures and dislocations may cause severe nerve damage, but even mild trauma and pressure sometimes cause an ulnar palsy, usually no more than a temporary neuropraxia. However, in bed-ridden and chair-bound patients more severe palsy may result from pressure of flexed elbows into a mattress or chair arm. Identification of the cause, and protection from friction and pressure, should suffice in mild cases, but when tests of neuromuscular function indicate more severe damage then such measures as splintage, electrical stimulation of the paralysed muscles, and re-educative exercises will be necessary.

There is also a nerve-entrapment syndrome involving the ulnar nerve at the elbow. In its course from the medial epicondyle to the forearm the ulnar nerve passes between the two heads of the flexor carpi ulnaris muscle. These are united by a fascial sheath forming a fibrous roof to a tunnel (the cubital tunnel) through which the nerve passes. Several conditions may cause compression of the ulnar nerve in this tunnel, notably cubitus valgus deformity, either congenital or resulting from old injury, and arthritis, chiefly osteoarthritis with osteophyte formation. Surgical decompression of the nerve by division of the fibrous band is necessary, and in some cases anterior transposition of the nerve will also be required.

TODAY'S DRUGS

With the help of expert contributors we print in this section notes on drugs in current use.

Drugs for Cardiac Arrhythmias.—I

Despite the increasing use of direct-current shock therapy and electrical pacing, drug therapy continues to have an important place in the management of cardiac arrhythmias. Most antiarrhythmic drugs are potentially dangerous. An understanding of the indications, contraindications, and side-effects of these drugs is therefore essential for all clinicians.

Underlying Conditions

Many physiological and pathological states—for example, exercise, fever, anaemia, anxiety, and hyperthyroidism—may produce a rapid heart rate, usually sinus tachycardia. Correction of the underlying abnormality usually corrects the tachycardia, and specific cardiac therapy is not indicated. Occasionally, however, notably in hyperthyroidism and chronic anxiety states, the sinus tachycardia may respond slowly or poorly to conventional therapy. In these instances the negative chronotropic effect of propranolol (10 mg. t.d.s.) is of value. Sinus tachycardia may be secondary to an active carditis or cardiac failure, and then cardiac depressant drugs are contraindicated.

Sinus bradycardia may be caused by physical training, obstructive jaundice, and hypothyroidism, or it may follow viral infections. It is also found in certain individuals who have a tendency to faint. It calls either for no treatment or for correction of the underlying state. Anticholinergic or sympathomimetic agents may be temporarily required. The occurrence of this rhythm following a myocardial infarction usually needs correction, especially when it is associated with hypotension. Intravenous atropine (0.3–0.6 mg.) by repeated injection or continuous infusion is the drug of choice.

Premature systoles may result from nervous tension and the excessive use of coffee, cigarettes, and probably alcohol. The efforts of the doctor should be concentrated on the underlying factors and not the premature systoles. If the patient is still troubled by his symptoms a simple sedative or tranquillizer should be tried before resorting to the antiarrhythmic drugs. Drugs themselves may be the cause of the ectopic beats, particularly amphetamines, thyroid drugs, and digitalis. The importance of an adequate history of drug therapy, self-prescribed or otherwise, cannot be overemphasized.

Ectopic rhythms may also complicate intrathoracic infection, neoplasms, or surgery. The frequency of arrhythmias following myocardial infarction has been well documented. In these situations antiarrhythmic drugs are usually indicated.

Pain, anxiety, hypoxia, metabolic acidosis, and hypokalaemic alkalosis are all correctable conditions known to precipitate, aggravate, or perpetuate arrhythmias. The correction of these factors is particularly important following myocardial infarction or cardiac surgery.

Digitalis Preparations

The official preparations of digitalis are prepared digitalis, digitoxin, and digoxin. Digoxin differs from digitoxin in being more rapidly absorbed with a more rapid action and faster excretion. Digitoxin therefore has little place in the management of acute arrhythmias. Other cardiac glycosides like lanatoside C may be used if digoxin cannot be tolerated. Ouabain (strophanthin G) and strophanthin K are rapidly acting preparations which are given parenterally mainly when a rapid effect is required.

The most important use of digitalis is in the treatment and prevention of cardiac failure. It is also of value in the management of certain arrhythmias. This is especially true in atrial fibrillation, when digitalis slows atrioventricular conduction