

Primary osteoarthritis of the elbow

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SUMMARY Sixteen patients (14 male, two female; mean age 61, range 49–75 years) with elbow osteoarthritis (OA) unassociated with nodal or crystal related OA were studied. None had received obvious trauma. The dominant elbow was affected in 14, the other in 12 (mean symptom onset in these 26 elbows 53 years (range 31–63), mean symptom duration 7 years (range 1–20)). Joint fluids (six patients) were non-inflammatory: biopsy (two) showed non-specific synovitis. Radiographic changes occurred in humeroulnar (25/26, 96%), humeroradial (100%), and radioulnar (22/26, 85%) compartments: uniform narrowing with hypertrophic changes predominated and osseous bodies were common (18/26, 69%). Thirteen had OA elsewhere, notably 2nd/3rd metacarpophalangeal joints (10/16, 62%), knees (6/16, 38%), and hips (5/16, 31%). A good clinical outcome was observed in 22/26 elbows. In our experience symptomatic 'primary' OA of the elbow particularly affects middle aged men, commonly associates with metacarpophalangeal OA ('Missouri metacarpal syndrome'), and has a favourable outcome. Contrary to previous reports a major role for trauma is difficult to substantiate.

Although osteoarthritis (OA) of the elbow occasionally occurs in the setting of nodal generalised OA and pyrophosphate arthropathy,^{1–3} involvement at this site, particularly the humeroulnar compartment, is otherwise considered uncommon.^{4–5} When it does occur it is usually reported as 'secondary' to mechanically derived occupational or traumatic factors—for example, in pneumatic drillers,⁶ chipping and grinder operators,⁷ foundry workers,⁸ handball players,⁹ baseball pitchers.¹⁰ We studied 16 consecutive patients referred with symptomatic elbow OA unassociated with nodal or crystal related OA. Findings in this series are presented and discussed, particularly in relation to clinical and radiographic features, outcome, predisposing factors, and association with OA at other sites.

Patients and methods

Sixteen patients (14 male, two female; mean age 61, range 49–75 years) were culled from 225 patients (7%) referred to a rheumatology clinic over a three year period with non-nodal 'uncomplicated' large joint OA—that is, no Heberden's/Bouchard's nodes,

polyarticular interphalangeal OA, chondrocalcinosis, or synovial fluid calcium pyrophosphate dihydrate crystals.

Each underwent a full history and examination, with specific inquiry for trauma or occupational/recreational factors likely to affect elbows. Plain radiographs were taken of elbows, hands, feet, knees, and pelvis (and other clinically involved joints). Laboratory investigations included calcium, alkaline phosphatase, ferritin, magnesium, thyroid function, creatinine, uric acid, rheumatoid and antinuclear factors. Joints with overt synovitis were aspirated and fluids examined for cells, birefringent crystals (polarised light microscopy), calcium staining particles (alizarin red¹¹), and complement activation (C3dg).¹² Synovial biopsy was undertaken in two patients with persistent synovitis, and routine histology performed.

Results

Osteoarthritis affected both elbows in 10 patients, the dominant side alone in four, and the non-dominant alone in two. The mean age of symptom onset in these 26 elbows was 53 (range 31–63) years, with mean symptom duration of 7 (range 1–20) years. In all 10 patients with bilateral OA the dominant side was affected first (mean age onset 50,

range 31–60 v 55, range 45–63 years) and showed longer symptom duration (mean 8, range 2–20 v 6, range 1–15 years). No patient had antecedent trauma to the elbow, and only three (men with bilateral OA) had 'manual' occupations (builder, plumber, taxi driver): the plumber was a keen

Table 1 *Compartmental distribution of radiographic abnormality in the 26 affected elbows*

Radiographic findings	Compartment		
	Humeroulnar No (%)	Humeroradial No (%)	Radioulnar No (%)
Abnormality	25 (96)	26 (100)	22 (85)
Narrowing	18 (69) (uniform mainly, 4 (15%) eccentric)	20 (77) (uniform mainly, 3 (12%) eccentric)	3 (12)
Osteophyte	23 (88)	23 (88)	20 (77)
Cysts	5 (19)	5 (19)	—
'Loose' bodies	10 (38)	11 (42)	—
Marked bone attrition	1 (4)	2 (8)	—

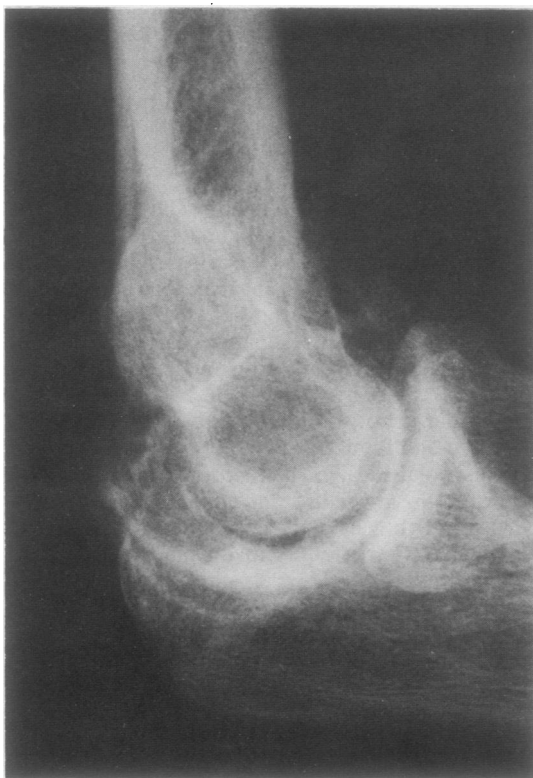


Fig. 1 *Lateral elbow radiograph of a 60 year old man showing large anterior 'loose' bodies associated with osteoarthritis.*

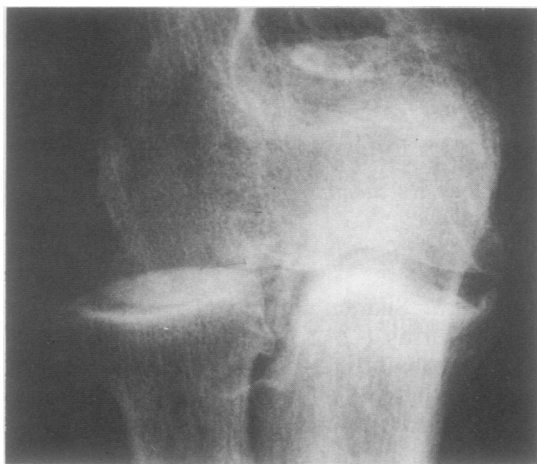


Fig. 2 *Anteroposterior elbow radiograph of a 59 year old man showing eccentric humeroradial joint space loss.*

amateur cricketer, but no other recreational activities could be incriminated. Only four gave a family history of OA (nodal generalised OA in two, knees in four, hips in two): examination of relatives was not undertaken.

Pain on use was the principal symptom (100%); early morning and inactivity stiffness were common, and marked in six patients (six elbows). All 26 involved elbows showed restricted humeroulnar movement (fixed flexion, reduced flexion); decrease in supination/pronation was present in only two. Crepitus was common in the humeroulnar (88%)

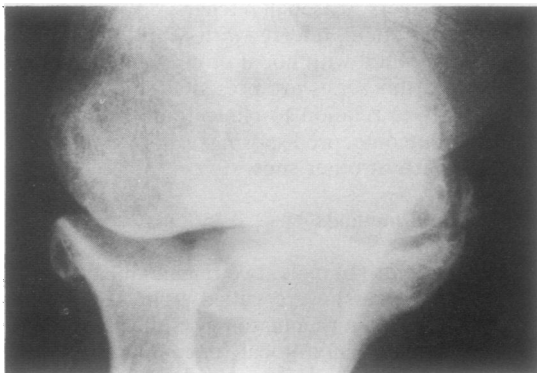


Fig. 3 *Anteroposterior elbow radiograph of a 64 year old man showing marked attrition with apparent increase in joint space in the humeroradial compartment, and concentric narrowing and osteophytosis in the humeroulnar joint.*

SYMPTOMS RADIOGRAPHS

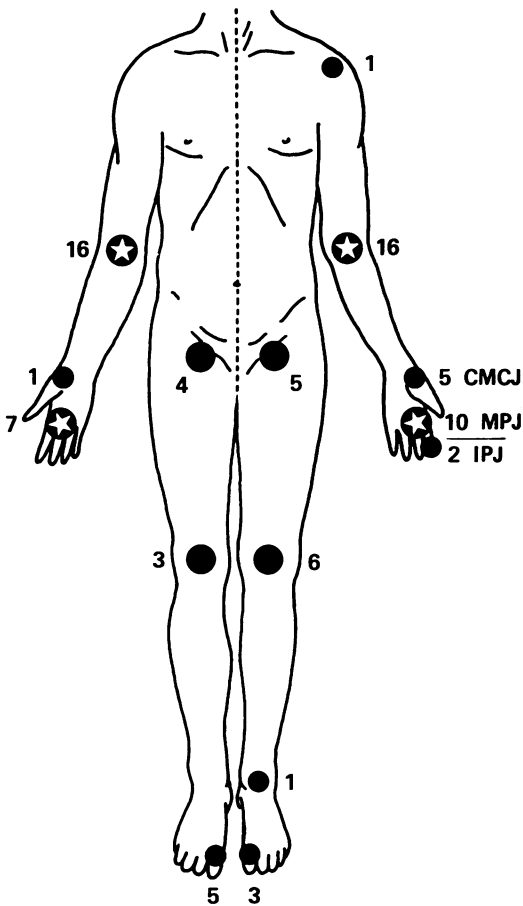


Fig. 4 Occurrence of symptomatic (left) and radiographic (right) OA at other sites in the 16 patients (represented as numbers of patients). CMCJ=carpometacarpal joint; MPJ=metacarpophalangeal joint; IPJ=interphalangeal joint.

and two radial (77%) compartments. Clinical synovitis (stress pain, warmth, fluid, and soft tissue swelling) was evident in the six patients with inflammatory symptoms: synovial fluids (six) obtained from five of these were 'non-inflammatory' with high viscosity, low cell counts (predominantly mononuclear), no birefringent crystals, only weak alizarin red positivity (three), and no increase of C3dg. Biopsy specimens (two cases) showed only modest synovial hyperplasia, no inflammatory cell infiltrate or prominence of macrophages, and no crystals or calcific particles. Haematological and biochemical investigations showed no significant abnormality in any patient.

Radiographic abnormalities were noted to varying extent in all elbow compartments (Table 1). Osteophytosis with hypertrophic remodelling was common and usually most florid in the humeroulnar compartment: associated 'loose' osseous bodies were frequent both anteriorly and posteriorly (18/26 (69%) of elbows; Fig. 1). Decrease in interosseous distance in humeroulnar and humeroradial compartments was predominantly uniform but occasionally eccentric (Fig. 2); marked attrition of bone was unusual but associated with apparent widening of joint space in two cases (Fig. 3). Cysts were not a prominent feature. Enthesal new bone formation in triceps tendon (olecranon spur) occurred in 4/26 (15%) elbows.

Three patients had isolated elbow OA but 13 (81%) had clinical or radiographic evidence, or both, of OA elsewhere (10 symptomatic; Fig. 4). Second and third metacarpophalangeal (MCP) joints were most commonly involved (10 patients; Fig. 5), followed by knees (six; three with patellofemoral OA only), hips (five: four superior, one medial), first carpometacarpophalangeal joints (five), and first metatarsophalangeal joints (three). Two had radiographic changes of mild interphalangeal OA (<3 rays each hand), but none had nodal generalised OA or chondrocalcinosis (in accord with inclusion criteria). Non-inflammatory joint fluids were obtained in 4/6 patients with knee OA; none contained calcium pyrophosphate dihydrate crystals.

Treatments given for symptomatic elbows varied but included intra-articular steroid injection (one to three occasions in six patients), analgesic and non-steroidal anti-inflammatory drugs, and physiotherapy; no patient received surgery. At the time of writing (one year after the three year recruitment period—that is, 0–16 year retrospective, 1–4 year prospective study) the clinical outcome for involved elbows has been favourable. Twenty two elbows have shown loss or amelioration of symptoms, three (dominant) have persisted unchanged, and only one (non-dominant) has shown symptom worsening. Although two of the manual workers lost time from work, all patients have continued employment and experienced only relatively minor, usually episodic, difficulties with daily activities. The associated MCP joint OA has uniformly shown good symptomatic and functional outcome.

Discussion

The elbow is generally considered a protected site for development of OA.^{4,5} Pathologically the humeroradial joint may show chondromalacic and age related change, but the humeroulnar compart-



Fig. 5 Anteroposterior hand radiograph of a 58 year old man showing eccentric joint space loss, sclerosis, and osteophyte of second and third metacarpophalangeal joints.

ment appears resistant to 'degeneration',⁴ this low frequency of involvement possibly being influenced by racial or ethnic factors.^{13 14} 'Primary' OA of the elbow is recognised to occur in nodal generalised OA and pyrophosphate arthropathy,¹⁻³ but even in these subsets involvement, which predominates in women, remains uncommon.¹⁻³ Most published series are restricted to men with elbow OA apparently secondary to repetitive occupational or recreational trauma,⁶⁻¹⁰ and such reports emphasise mechanical factors alone in pathogenesis. Reasons for relative immunity from OA at the elbow remain unclear, though hypotheses to explain uneven distribution of OA include differing mechanical forces¹⁵ and effects on joint design resulting from varying rapidity of evolutionary change.¹⁶ For the humero-ular joint mechanical benefits of a hinge movement have particularly been emphasised.⁴

In the present series we studied patients referred to hospital with symptomatic elbow OA showing no evidence of nodal generalised OA or pyrophosphate arthropathy and unselected in terms of occupational predisposition. Most were middle aged men, in whom overt occupational or recreational trauma could not be incriminated. Loose bodies were common, but none had associated osteochondritis.¹⁷ Metabolic screening was also negative, and such cases are therefore regarded as primary. Usage, however, may be an additional determining factor,^{18 19} as suggested by earlier involvement and longer symptom duration on the dominant side. Male predominance and good clinical outcome concurs with a French retrospective study in which 78% of

cases were considered to be related to occupation.²⁰ Clinically significant ulnar nerve entrapment, a common complication (16%) in the French series, was not observed in our study. If primary elbow OA is a relatively benign, often asymptomatic^{6 20} condition it may be more common than is generally supposed, and uncontrolled surveys in an industrial setting^{6 8} could be misleading in terms of relevant predisposing factors.

Previous reports of elbow OA have not commented on associated involvement at other sites, but in our series it was striking that 10/14 (71%) of men had MCP joint OA. As with the elbow, MCP joints are often considered an uncommon site for OA,^{5 21} though their involvement is recognised in nodal generalised OA²² and pyrophosphate arthropathy,^{3 23} particularly in association with haemochromatosis.²⁴ Metacarpophalangeal joint OA in men has recently been emphasised in relation to heavy manual work ('Missouri metacarpal syndrome'²¹), though it is noteworthy that all seven cases described had coexistent nodal generalised OA as a predisposing factor. Our patients are of interest in having predominantly isolated MCP joint involvement in the hand in the absence of nodal generalised OA, obvious trauma, or metabolic predisposition. All were reviewed at an age when nodal generalised OA might have been expected to have developed, though other characteristic joints—for example, first carpometacarpal joints, were additionally involved in some. It is tempting to speculate that predominant elbow and MCP joint involvement may reflect a male pattern of generalised

OA associated with good outcome at principally involved sites. Further studies are required to explain development and distribution of OA within individuals: although usage and trauma may be cofactors, constitutional determinants also appear important.¹⁹

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