Scand J Plast Reconstr Hand Surg 35: 323–328, 2001

ARTHROSCOPIC FINDINGS IN PATIENTS WITH PAINFUL WRIST GANGLIA

Bo Povlsen and Will R. C. Peckett

From the Department of Orthopaedics, Guy's & St. Thomas' Hospitals, London, UK

(Accepted for publication 31 March 2000)

Abstract. The aetiology of painful dorsal wrist ganglia remains obscure. In a prospective study we investigated the link between a painful dorsal wrist ganglion and wrist joint abnormality with wrist arthroscopy before excision of the ganglion. Of 16 wrists arthroscoped 12 were abnormal, 10 had an abnormal scapholunate joint, and two had abnormal lunatetriquetral joints. We think that painful dorsal wrist ganglia, like popliteal cysts in the knee, are markers of underlying joint abnormalities. Surgeons who treat painful ganglia should be aware of a possible underlying cause so that they can target treatment more accurately, particularly in recurrent cases and those patients with persistent wrist pain after excision of the ganglion.

Key words: painful, wrist, ganglion, arthroscopy, ligament injury, joint pathology.

Hippocrates offered the first recorded description of ganglia as "Knots of tissue containing mucoid flesh". Despite this early recognition, their frequent occurrence—together with numerous ultrastructural, surgical, radiological, and epidemiological studies—the aetiology of dorsal wrist ganglia remains obscure (1, 13, 15). The mucin found within the cyst is thought to be mucoid degeneration of the wall of the cyst or to be secreted from fibroblasts after injury (1, 15). Trauma to the wrist, synovial herniation, primary development of a tumour, and myxoid or mucoid degeneration of periarticular connective tissue have all been implicated (18).

There is, however, one clinical feature that is consistently associated with dorsal wrist ganglia: they are nearly always associated with an attachment to the underlying scapholunate ligament (1). Indeed, in one series of 500 dorsal ganglia *all* were attached to the underlying scapholunate ligament by a pedicle (2).

Although several reports refer to pain as being a symptom of wrist ganglia (between 25%–87%) (6), it is not a consistent feature; indeed many ganglia are painless or cause only an occasional mild ache. Gunther (10) described that painful entity, the occult scapholunate ganglion, and explained that this pain resulted from increased pressure in the scapholunate ligament. Several workers have noted that the smaller ganglia are generally more symptomatic than the larger ones. Dellon and Seif (8) suggest that this is a result of pressure on branches of the posterior interosseous nerve. There is no consensus as to the aetiology of the wrist pain associated with the dorsal wrist ganglion.

Instability about the scaphoid associated with excision of the dorsal ganglion has been suggested as a consequence of resection of part of the scapholunate ligament during excision of the ganglia (7, 9, 11, 14, 16, 19). This is an unlikely event as the scapholunate ligament is short, deep-seated, and attached over an extensive area to the two bones (3). One previous report suggested that primary injury to the scapholunate ligament injury leading to rotatory instability of the scaphoid may be of possible aetiological significance in the development of dorsal wrist ganglia (19). Rotatory instability of the scaphoid is also known to cause pain over the dorsum of the wrist in the region of the scapholunate ligament (18). However, we know of no reports of wrist arthroscopy before excision in patients with painful dorsal wrist ganglia.

We therefore decided to investigate further the link between joint abnormality and painful dorsal wrist ganglia by arthroscoping the wrist before excision of the ganglion in patients with wrist pain.

PATIENTS AND METHODS

This was a prospective study. Fifteen consecutive

 ISSN 0284–4311

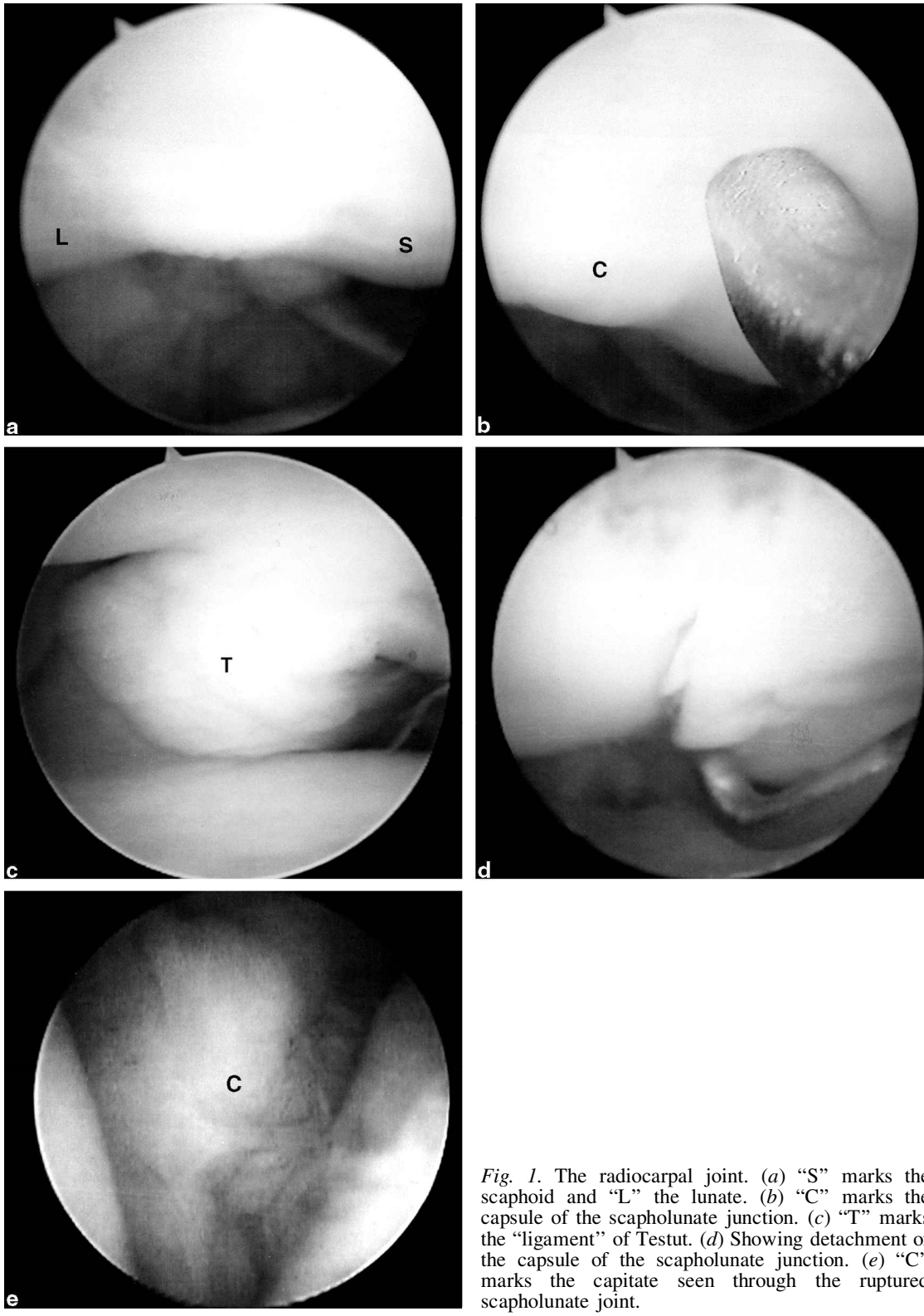

Fig. 1. The radiocarpal joint. (*a*) "S" marks the scaphoid and "L" the lunate. (*b*) "C" marks the capsule of the scapholunate junction. (*c*) "T" marks the "ligament" of Testut. (*d*) Showing detachment of the capsule of the scapholunate junction. (*e*) "C" marks the capitate seen through the ruptured scapholunate joint.

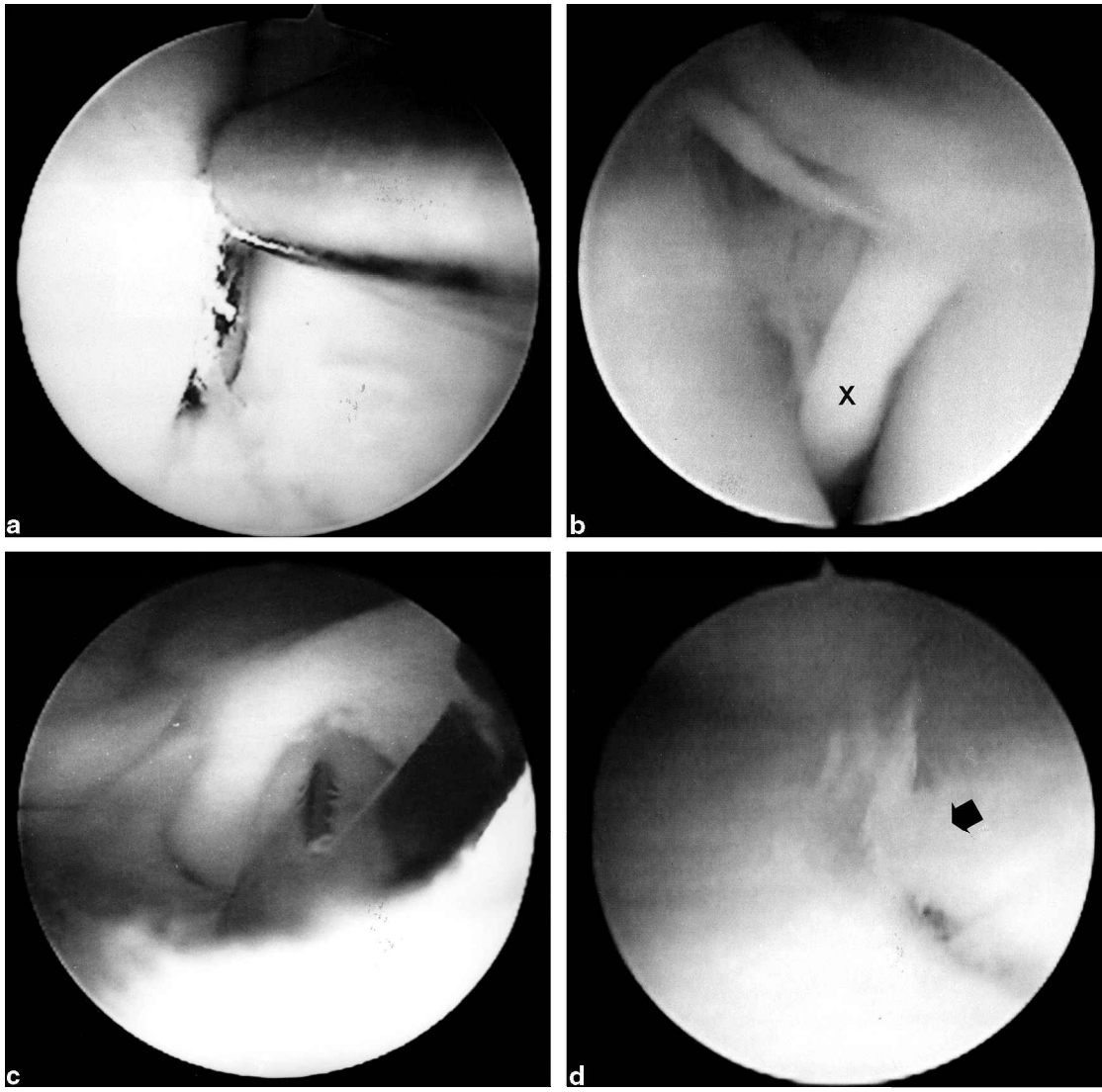

Fig. 2. Midcarpal joint view of (*a*) a normal scapholunate joint, (*b*) the ruptured ends of the interosseus ligament ("X"), (*c*) a pathologically "open" scapholunate joint, (*d*) early osteoarthritis of the scapholunate joint edges (black arrow).

patients (age range 16–47 years) who were referred with painful dorsal wrist ganglia were examined clinically and radiologically as part of their assessment before arthroscopy and excision of the ganglia.

The senior author (BP) did all arthroscopies. Both the radiocarpal and midcarpal joints were assessed arthroscopically using standard portals (the III/IV and midcarpal portals) with the wrist in a vertical position, the fingers being suspended with Chinese finger traps. Countertraction of 3 kg was used to facilitate entry into the joint. The patients underwent open excision of the ganglion after the arthroscopy under the same anaesthetic.

We used the definitions suggested by Stanley and Saffar (17) for normal and abnormal wrist arthroscopic findings as outlined below.

When it is inspected from the radiocarpal joint, the scapholunate joint usually looks like a "baby's bottom" (Fig. 1*a*, S and L) and the attachment of the capsule seems to fuse with the articular cartilage on both the scaphoid and the lunate. When probed the consistency of the capsule/ligament complex is solid and cannot be penetrated with a blunt probe (Fig. 1*b*, C).

Signs of pathological partial dissociation of the scapholunate joint, when inspected from the radio-

Table I. *Sex, age, and arthroscopic findings*

Case No.	Sex	Age (years)	Carpal ligament injury		
			Scapholunate	Lunatriquetral	Scaphotriquetral
1	F	32	Partial	No	No
2	F	35	Partial	No	No
3	F	24	Partial	No	No
4	F	39	Partial	No	No
5	M	47	Partial	Partial	No
6 (left)	F	44	Partial	Partial	No
6 (right)	–	–	Partial	No	No
7	M	43	Partial	Partial	No
8	F	29	Partial	No	Partial
9	M	40	Partial	No	No
10	F	31	No	No	No
11	M	31	No	No	No
12	M	19	No	Partial	No
13	F	21	No	Partial	No
14	F	24	No	No	No
15	F	16	No	No	No
Mean (SD)		32 (9.6)	–	–	–
Total			10	5	1

carpal joint, included: synovitis and thickening of the "ligament" of Testut (Fig. 1*c*, T); and detachment of capsule from either of the bones (Fig. 1*d*). Total scapholunate joint dissociation was classified only when the arthroscope could inspect the capitate through the ruptured scapholunate joint after insertion through the III/IV port into the radiocarpal joint (Fig. 1*e*, C). The scapholunate and the lunatetriquetral joints are not covered by a capsule when seen from the midcarpal joint and the articular edges can therefore be inspected directly. Normally the edges of the scaphoidlunate and lunatetriquetral joints are parallel, rounded, move synchronously, and the joint "gap" is empty and cannot be prised open with the probe (Fig. 2*a*). When the joint is abnormal, ruptured ends of the interosseus ligament can be seen floating up through the joint "gap" (Fig. 2*b*, X). In these cases instability of the joint will allow a probe to pass into the joint (Fig. 2*c*) and early sign of osteoarthritis can be seen when the adjacent articular surfaces have degenerated so the joint edges now are in direct contact with one another (Fig. 2*d*, black arrow).

RESULTS

Sixteen wrists were arthroscoped in 15 patients (one patient had bilateral ganglia). No patient gave a history of preceding trauma. The ganglia had been present for between five months and seven years (Table I).

Fifteen of the 16 radiographs of the wrist were normal, but one (case 9, Table I) showed evidence of scapholunate instability with a widened scapholunate gap and a flexed scaphoid (Fig. 3).

Twelve of the 16 wrist arthroscopies were abnormal. Ten wrists had evidence of scapholunate ligament injury in the form of partial scapholunate dissociation (Fig. 1*c, d*). In five wrists this was the only abnormality and in the other five this was associated with other intercarpal ligament abnormalities.

Five wrists had evidence of injury to the lunatriquetral ligament (Fig. 2*b, c*), and this was the only abnormality in two wrists and associated with other abnormalities in three. Abnormality of the scaphotriquetral ligament and midcarpal osteoarthritis were noted in association with other abnormalities in one case (Fig. 2*d*, case 9, Table I).

DISCUSSION

Although the scapholunate region is well recognised to be the site of origin of dorsal ganglia (1, 2) we know of no previous studies that have reported the underlying ligamentous abnormalities based on arthroscopic assessment. Our

Fig. 3. Radiograph of wrist showing a widened scapholunate gap and a flexed scaphoid.

findings of abnormalities in the scapholunate joint in 10 of the 16 wrists with painful dorsal ganglia are therefore interesting. Only one previous author has suggested that periscaphoid ligamentous instability may be of aetiological significance in the pathogenesis of the dorsal wrist ganglion (18), though that paper was not based on arthroscopic findings. Many authors have postulated that acute trauma or chronic stress about the scapholunate region may well be of aetiological significance (1, 2, 10, 18), though none of the patients in our study recalled any injury.

Most workers have found no radiological or clinical evidence of scapholunate instability before resection of the ganglion. Like Watson et al. (18), we think that rotatory subluxation or instability of the scaphoid is a general term for a "spectrum of disorders related to instability about the scaphoid" (18). In most cases of dorsal wrist ganglion there is therefore a mild chronic "sprain" of the scapholunate ligament which consequently does not give rise to the well-recognised radiological and clinical features associated with scapholunate instability. This is supported by our findings, which showed that only one of 16 wrist radiographs showed radiological scapholunate widening (Fig. 3). This also agrees with Gunther (10) and his suggestion of the aetiology of the painful occult dorsal ganglion. Furthermore, the abnormalities he describes in the scapholunate ligament in the occult ganglia may well be related to the abnormalities we have seen in this series. We therefore think that much of the pain associated with this condition is related to the underlying ligamentous instability and not to the ganglion itself.

The scapholunate joint is stabilised by both intrinsic and extrinsic ligaments. The intrinsic ligament is crescent-shaped, and thicker and stronger in its dorsal portion (3), so it is possible to hypothesise that one of the reasons for the high rate of success of excision of the ganglion may be scar formation in the region of the dorsal portion of the extrinsic ligament and capsule leading to an element of stabilisation of this joint. This would help to explain the need to excise the whole ganglion and its capsular/ligamentous attachment as described in most operative reports (1, 2).

On the other hand, the postoperative rotatory instability as described by Crawford and Taleisnik (7), Duncan and Lewis (9), and Watson et al. (18) may indeed have been present before excision although not recognised. Recurrence rates after excision of ganglia vary, but may be up to 40% (12). The indication for re-exploration is often pain. It is pertinent in these cases in particular to define whether the pain is related to the ganglion itself or underlying rotatory instability of the scaphoid so that treatment may be more accurately targeted.

We think that a painful dorsal wrist ganglion is often a marker of underlying joint abnormality, particularly of the scapholunate joint, in much the same manner as the popliteal cyst (Baker's cyst) is associated with internal derangement of the knee (4, 5). Surgeons treating painful dorsal ganglia should be aware of this, so that they can target treatment for these and recurrent ganglia more accurately.

REFERENCES

1. Angelides AC. Ganglions of the hand and wrist. In: Green DP, ed. Operative hand surgery. 3rd ed. New York: Churchill Livingstone, 1993: 2157–2171.
2. Angelides AC, Wallace PF. The dorsal ganglion of the wrist: its pathogenesis, gross and microscopic anatomy, and surgical treatment. J Hand Surg 1976; 1A: 228–235.
3. Berger RA. Ligament anatomy. In: Cooney WP, Linscheid RL, Dobyns JH, eds. The wrist: diagnosis and operative treatment. Philadelphia: Mosby-Year Book, 1998: 78–104.
4. Burleson RJ, Bickel WH, Dhalin DC. Popliteal cyst: a clinicopathological survey. J Bone Joint Surg 1956; 38A: 1265–1274.
5. Childress HM. Popliteal cysts associated with undiagnosed posterior lesions of the medial meniscus. J Bone Joint Surg 1954; 36A: 1233–1237.
6. Clay NR, Clement DA. The treatment of dorsal wrist ganglia by radical excision. J Hand Surg 1988; 13B: 187–191.
7. Crawford GP, Taleisnik J. Rotatory subluxation of the scaphoid after excision of dorsal carpal ganglion and wrist manipulation—a case report. J Hand Surg 1983; 8A: 921–925.
8. Dellon AL, Seif SS. Anatomic dissections relating the posterior interosseous nerve to the carpus, and the etiology of dorsal wrist ganglion pain. J Hand Surg 1978; 3A: 326–332.
9. Duncan KH, Lewis RC. Scapholunate instability following ganglion cyst excision: a case report. Clin Orthop 1988; 228: 250–253.
10. Gunther SF. Dorsal wrist pain and the occult scapholunate ganglion. J Hand Surg 1985; 10A: 697–703.
11. Kauer JMG. Functional anatomy of the wrist. Clin Orthop 1980; 149: 9–20.
12. McEvedy BV. The simple ganglion. A review of modes of treatment and an explanation of the frequent failures of surgery. Lancet 1954; i: 135–136.
13. Nelson CL, Sawmiller S, Phalen GS. Ganglions of the wrist and hand. J Bone Joint Surg 1972; 54A: 1459–1464.
14. Palmer AK, Dobyns JH, Linscheid RL. Management of post traumatic instability of the wrist secondary to ligament rupture. J Hand Surg 1978; 3A: 507–532.
15. Psaila JV, Mansel RE. The surface ultrastructure of ganglia. J Bone Joint Surg 1978; 60B: 228–233.
16. Ruby LK, An KN, Linscheid RL, Cooney WP, Chao EYS. The effect of scapholunate ligament section on scapholunate motion. J Hand Surg 1987; 12A: 767–771.
17. Stanley J, Saffar P. Wrist arthroscopy. London: Martin Dunitz, 1994: 85–109.
18. Watson HK, Ashmead D, Makhlouf MV. Examination of the scaphoid. J Hand Surg 1988; 13A: 657–660.
19. Watson HK, Rogers WD, Ashmead D. Reevaluation of the cause of the wrist ganglion. J Hand Surg 1989; 14A: 812–817.

Correspondence to:
Mr. B. Povlsen
Consultant Orthopaedic Surgeon
Associate Professor in Hand Surgery
Guy's Hospital
St. Thomas' Street
London, SE1 9RT
England
Tel: 0171 955 5000 Ext.5607
Fax: 0171 955 2759
E-mail: bo@povlsen.u-net.com