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Lateral elbow ligamentoplasty by autologous tendon graft in posterolateral rotatory instability: Results in 18 cases at a mean 5 years' follow-up

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ABSTRACT

Introduction: Posterolateral rotatory instability is the most frequent form of elbow instability. This clinical entity, described by O'Driscoll et al. in 1991, concerns young subjects following elbow trauma. Diagnosis is founded on symptomatology and positive posterolateral rotatory instability test. Treatment is based on reconstruction of the ulnar bundle of the lateral collateral ligament. The present study assessed medium-term clinical and radiological results in lateral ligamentoplasty for posterolateral elbow instability.
Materials and methods: A retrospective continuous single-center series included 19 cases: 11 male, 8 female, operated on between 1995 and 2010; mean age was 37.8 years (range, 20–63 years). Surgery consisted in lateral ulnar collateral ligament reconstruction by autologous palmaris longus tendon graft following Nestor et al. (1992).
Results: Eighteen patients were assessed at a mean 61 months' follow-up. Mean time off work was 3.2 months (range, 2–7 months); all patients returned to work. No revision surgery was required. Mean range of motion in flexion, extension, pronation and supination was respectively 135°, 8°, 84° and 76°. Instability test was systematically negative at follow-up. Mean Mayo Clinic and Quick-DASH scores were respectively 90 (range, 60–100) and 21 (range, 0–63). All patients were satisfied or very satisfied with their result.
Conclusion: Lateral ulnar collateral ligament reconstruction by autologous palmaris longus tendon graft provided reliable and lasting results. We consider it to be the reference treatment for chronic instability, and sometimes in acute post-traumatic instability.
Level of evidence: IV.

1. Introduction

Instability is infrequent in the elbow, which is more at risk of stiffness [1]. Posterolateral rotatory instability (PLRI) is the most common form [2–5], often affecting young subjects following dislocation or fracture-dislocation, but also occurring after trauma without associated dislocation or fracture or after surgery to the lateral side of the elbow [2,3,6].

The pathophysiology and semiology of PLRI were described in 1991 [2]. It results from lateral collateral ligament (LCL) complex failure, mainly implicating the ulnar bundle [2]. Depending on the extent of capsule-ligamentous lesion, PLRI ranges from simple posterolateral subluxation to recurrent elbow dislocation [4].

PLRI induces lateral elbow pain, sometimes associated with snap or blockage sensations or subluxation. Symptoms appear with the elbow in slight flexion, and especially when leaning on the hand with the forearm in supination [6]. Range of motion is often conserved, although a moderate extension deficit is found in 30% of cases [3]. Grip is usually greatly impaired in comparison with the contralateral side.

Diagnosis is founded on positive lateral pivot-shift or PLRI test, which is the most sensitive test [2,4]. Subluxation is uncommon in an awake subject, but the test induces apprehension. In anesthetized subjects in 30° or 40° flexion, the test reproduces posterolateral subluxation of the proximal radio-ulnar complex. Increased elbow flexion reduces the subluxation, with a pathognomic snap sensation [2,3]. Screening for posterior drawer may

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also be contributive, inducing posterior subluxation of the radial head [4,6].

Treatment consists in LCL repair or reconstruction by tendon plasty [3–6]. Several series demonstrated that reconstruction provides better results than repair in chronic forms, and also in recent cases if the LCL structure is attenuated [6]. Nestor et al. described a ligamentoplasty that aimed to restore the ulnar bundle with an autologous graft from the palmaris longus tendon, when present [3].

We have used this technique since 1995. The present study sought to assess medium-term clinical and radiological results in recent or chronic PLRI.

2. Patients and methods

A single-center retrospective study included 19 consecutive cases operated on between 1995 and 2010 for symptomatic PLRI (Table 1): 8 female, 11 male; mean age at surgery, 37.8 years (range, 20–63 years). The right elbow was involved in 6 cases and the left in 13; the dominant side was involved in 7 cases (37%). There were 11 manual workers, 7 sedentary workers, and 1 retired patient.

Etiology was in all cases post-traumatic: recent in 3 cases and chronic in 16. Two of the 3 acute cases (patients 12 and 14) presented dislocation associated with type-1 coronoid process fracture with severe post-reduction instability; the 3rd case (patient 13) presented an open terrible triad injury with post-reduction subluxation; trauma-to-surgery intervals were 5, 8 and 14 days (mean, 9 days). Primary lesions underlying chronic instability comprised: 6 dislocations, 2 with associated radial head fracture; 2 Mason 3 radial head fractures; and 6 elbow traumas without radiologic lesion (patients 1, 2, 4, 11, 15 and 19); in 2 cases, patients had not consulted for the initial trauma (patients 6 and 8).

All patients had lateral elbow pain. Ten also reported sensations of snap or blockage. Two had proven recurrent dislocation (patients 6 and 7). Pivot-shift test was systematically positive, inducing notable apprehension. Preoperative arthro-CT was performed in 8 cases, and found posterior subluxation or lateral capsular pocket in 5 cases and coronoid process fracture sequelae in 3 cases. MRI was performed in 3 cases but was non-contributive. The mean interval between trauma and ligament reconstruction was 17 months (range, 5–29 months).

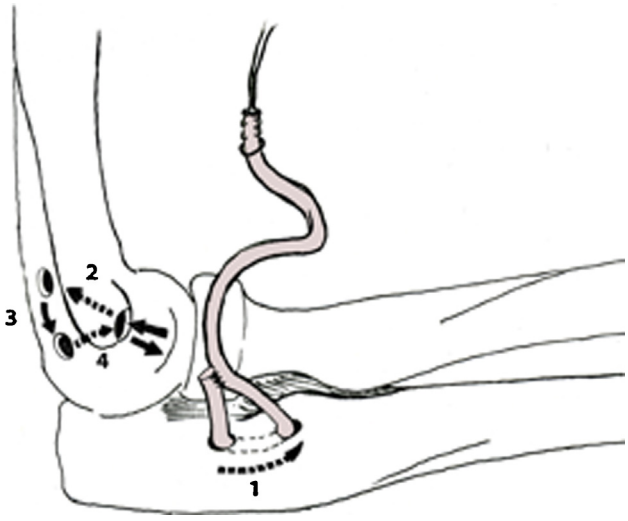

Fig. 1. Diagram of the ligamentoplasty technique used in the series [3].

Preoperative pivot-shift test under anesthesia was systematically positive, with clear snap and/or posterior subluxation of the radial head. The LCL and the ulnar bundle in particular were explored on a Kocher approach and proved systematically irreparable. The technique used (Fig. 1) was that described by Nestor et al. [3]. The palmaris longus was present in 18 cases and was used for grafting; in the remaining case (patient 7), part of the triceps tendon was used. Postoperative immobilization used a brachiopalmar splint, in 90° flexion and pronation, for 3 weeks. Rehabilitation was then initiated, avoiding complete supination and extension; between sessions, the elbow was immobilized in a posterior splint in neutral pronation-supination. After 6 weeks, the splint was removed and complete mobilization was allowed. A mean 15 rehabilitation sessions (range, 10–30) were performed.

Table 1
Main series data.

Population			Initial lesions and their treatment		Main subjective and objective results				
Case	Gender	Age (years)	Injury	Initial treatment	FU (months)	Range of motion (E–F; P–S)	QUICK-DASH	Mayo elbow performance score	Satisfaction
1	M	33	Elbow trauma	Functional	63	0–130; 85–80	23	90	S
2	M	35	Elbow trauma	Functional	14	0–140; 70–90	41	85	VS
3	F	53	Dislocation + RHF (Mason 2)	RH synthesis + LCL suture	66	20–140; 85–70	27	85	S
4	F	46	Elbow trauma	Functional	48	10–140; 85–70	30	80	S
5	M	27	Dislocation	Orthopedic	64	0–140; 85–90	0	100	VS
6	M	31	Elbow trauma	None	130	5–140; 85–70	13	100	S
7	F	35	Dislocation	Orthopedic	145	0–140; 85–90	0	93	VS
8	M	44	Elbow trauma	None	12	0–140; 85–80	38	100	S
9	M	40	Dislocation + RHF	RH synthesis	126	0–140; 85–80	36	85	VS
10	M	45	RHF (Mason 3)	RHP	77	20–130; 85–80	18	66	S
11	F	27	Elbow trauma	Functional	62	0–130; 85–70	6	100	VS
12	F	43	Dislocation + CPF	Reduction	85	10–140; 85–80	0	100	VS
13	M	47	Terrible triad	Reduction	28	20–110; 85–45	50	60	S
14	M	63	Dislocation + CPF	Reduction	12	20–130; 85–50	2	100	VS
15	F	36	Elbow trauma	Functional	60	10–130; 80–70	25	90	S
16	F	28	Dislocation (multiple trauma)	Orthopedic	36	10–140; 85–70	63	84	S
17	F	28	RHF (Mason 3)	RHP	38	10–135; 85–90	11	100	VS
18	M	20	Dislocation	Orthopedic	34	0–140; 85–90	3	100	VS
19	M	37	Elbow trauma	Functional	–	–	–	–	–

FU: follow-up; E: extension; F: flexion; P: pronation; S: supination; RH: radial head; RHF: radial head fracture; CPF: coronoid process fracture; LCL: lateral collateral ligament; RHP: radial head prosthesis.