Acta Orthop Scand 56, 433–435, 1985

Rupture of the quadriceps tendon

Twelve patients operated for fresh rupture of the quadriceps tendon were re-examined after 5 (2–11) years. The tendon was sutured end-to-end or to the patella. The result was good in seven cases, fair in four and poor in one case of re-rupture, left unrepaired.

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Siwek & Rao (1981) collected from the literature 69 cases of rupture of the quadriceps tendon; 65 of these patients were over age 40. As factors contributing to the rupture were mentioned overweight (DePalma 1954), arthrosis (Scuderi 1958), hyperparathyroidism (Preston & Adicoff 1962), gout (Levy et al. 1971) and systemic lupus erythematosus (Wener & Schein 1974).

We investigated the results of operative treatment of ruptures of the quadriceps tendon in 12 patients.

Patients and methods

During 1972–1981, 18 patients in our unit were operated for fresh rupture of the quadriceps tendon. Twelve patients were re-examined in 1984. Two patients could not be located, three refused further examination and one patient had died. The mean age of the patients at the time of injury was 57 (41–79) years. The mean observation time was 5 (2–11) years. Both right and left tendons had been operated on six times. The cause of the rupture was in all cases indirect violence (Table 1).

Six patients were overweight. The rupture was palpable in all cases but one. The tear was situated at the muscle-tendon border in four cases, near the insertion of the tendon in six , and in two cases the

Table 1. Clinical data in 12 patients with rupture of the quadriceps tendon

Case	Sex	Age	Side	Site of rupture	Follow-up time (yr)	Range of movements (degrees)	Muscle loss (cm)	Muscle strength (Newton) Oper.	Intact	Combined strength	Result
1	M	76	L	l	11	90–115	5	–[a]	–	–	P
2	M	59	R	u	11	0–110	1.5	170	150	195	S
3	M	52	L	u	10	0–115	0	175	200	300	G
4	M	54	R	u	6	0–125	0	135	110	185	G
5	M	49	R	l	5	5–115	0	125	100	165	S
6	M	48	R	l	5	0–120	0	250	265	300	G
7	M	53	R	u	5	0–120	0	–[b]	–	–	G
8	M	41	R	l[c]	3	0–105	1	100	100	130	G
9	M	47	L	l	2	0–110	1	95	110	120	G
10	M	56	L	l[c]	2	0–110	1.5	100	260	300	S
11	M	72	L	l	2	0–120	0	90	80	140	S
12	F	79	L	l	2	5–110	0.5	65	90	105	G

u upper part, l lower part.
G good, S satisfactory, P poor.
[a] muscle strength could not be measured (re-ruptured tendon).
[b] the patient declined measurement of muscle strength.
[c] the tendon had torn with an avulsion fracture in the patella.
Case 3–6, 8 and 9 were overweight.

tendon was torn with an avulsion fracture in the patella.

Six tendons were sutured end-to-end, with non-absorbable sutures (Supramid®) in four cases and with biodegradable polyglycolic acid sutures (Dexon®) in two. Scuderi's plasty (1958) was used as reinforcement in two cases, and in one case additional fixation with steel wire (McLaughlin & Francis 1956) was performed. In six cases the tendon was fixed to the patella through drill channels, with non-absorbable material (Supramid) in five cases and with Dexon in one. The fixation was reinforced with steel wire in two patients. Mobilization was started after 6 weeks' treatment in plaster.

At re-examination the subjective result and the level of physical activity were recorded. Using the intact limb as control, the range of movement, muscle loss and joint effusion were examined. The strength of the quadriceps was measured with the patient half sitting with the back supported, with the hip joint in 90 degrees and the knee joint in 30 degrees flexion; first each limb was measured separately and finally their combined strength.

Radiographic examination comprised antero-posterior, lateral and tangential views of the patella in 20 degrees of flexion (Laurin et al. 1978). The postion of the patella was determined according to Insall & Salvati (1971). The lateral angle of the patellofemoral articulation (Laurin et al. 1978), and the lateral displacement of patella (Laurin et al. 1979) were recorded. In addition, the patellofemoral articulation was studied for the presence of arthrosis.

Results

The subjective result was considered good when the patient was painfree and the level of physical activity was unchanged (seven patients). Two of these patients showed slight weakness of knee extension.

A satisfactory result implied slight pain on exercise and a decreased level of physical activity (four patients). One patient (no. 1, Table 1) had a poor end-result. Seven weeks after suturation and Scuderi's plasty, a re-rupture occurred; it was left untreated.

Muscle loss of the quadriceps was noted in six patients. The range of movement of the knee joint was over 100 degrees in all patients except one. Slight effusion was present in one case. The strength of the quadriceps muscle was less than in the intact limb in five patients, while in four the muscle was stronger on the injured side (Table 1).

Figure 1. Case 4. The quadriceps tendon was sutured with biodegradable suture material. Six years later there was much tendinous calcification. The knee was asymptomatic.

Radiographic examination revealed a normal Insall index score and normal lateral angle of the patellofemoral articulation in all cases. A lateral displacement of the patella exceeding 4 mm but without instability was present in three patients. Tendinous calcification was observed in four patients in one of whom the deposit was large (Figure 1).

One patient developed a deep lower limb venous thrombosis 7 weeks after injury. One case was infected with hemolytic streptococci and *Staphylococcus epidermidis*. Fistulation persisted for 8 years. Two revisions with removal of sutures cured the infection.

Discussion

Immediate surgical treatment of a ruptured quadriceps tendon is important (DePalma 1954, Scuderi 1958). The recommendations for the repair of a fresh rupture include suture alone (DePalma 1954), or combined with steel wire reinforcement (McLaughlin & Francis 1956) or plasty (Scuderi 1958). Our observations suggest that end-to-end suture alone is sufficient, and that re-rupture must be operated.

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