EXTENSOR INDICIS PROPRIUS TO EXTENSOR POLLICIS LONGUS TRANSFER : RESULTS AND COMPLICATIONS

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In a detailed analysis of hand, thumb and index function after extensor indicis proprius transfer for extensor pollicis longus rupture in 13 patients, we found 12 excellent or good results despite mobility restriction in most of them. The extension lag in the metacarpophalangeal and interphalangeal joint of the thumb and the metacarpophalangeal joint of the index was respectively 17°, 8.5° and 25°. Extension force of the index was reduced to 65%. Grip force and dexterity reached 90% and 115% of the contralateral side.

Keywords : thumb ; extensor pollicis longus ; tendon transfer.
Mots clés : pouce ; long extenseur du pouce ; transfert tendineux.

INTRODUCTION

Rupture of the extensor pollicis longus (EPL) tendon can have several causes. If the functional loss is severe, restoration of EPL function is indicated. The options are end-to-end repair, tendon graft, tendon transfer or interphalangeal arthrodesis.

The most popular tendon for transfer is the extensor indicis proprius (EIP). Results in the literature are quite good concerning thumb extension as well as independent index extension after this transfer.

The aim of this survey is to evaluate the mechanical function of the hand (force and dexterity), and of the thumb and index (mobility and force) in a consecutive series of patients with this transfer.

PATIENTS AND METHODS

Population

From 1990 to 1993 restoration of function with a transfer of the EIP was performed in 15 patients ; 13 were reviewed (6 males, 7 females). The mean age was 56 (ranging from 20 to 79). The causes for rupture of the EPL were quite different : 7 traumatic ruptures (of which 3 were wrist fractures) and 6 degenerative ruptures (of which 3 had rheumatoid arthritis). All operations were performed by the same surgeon (L. D. S.). All patients were right dominant (see table I).

Surgical technique

All procedures were done as an outpatient procedure, under Bier's block. A small transverse incision was made over the MCP of the index ; the EIP was identified and transected. The dorsal hood of the MCP was closed with 5-0 stitches. A second transverse incision distal to the extensor retinaculum was made, and the tendon of the EIP pulled out.

A curved incision over the thumb metacarpal was made, and the EPL was explored.

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Table I

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	M20	R	d	0	9	1	3	y	0/44	+5/70	-32/90	+	113	97	90	67	73	61	92
2	M63	L	ra	6	29	1	1	y	-30/40	-2/24	-30/78	-	185	98	83	82	70	30	125
3	M39	L	t*	0	36	3	4	n	-35/35	-30/38	-55/74	+	46	23	23	35	56	17	128
4	F79	R	ra	4	20	2	2	y	-32/50	-24/82	-16/82	+	96	122	110	108	113	ND	102
5	F79	R	ra	4	48	2	2	y	-34/50	-28/84	-18/84	+	104	81	91	93	88	ND	98
6	FS2	L	t	2	51	4	3	Y	- 12/40	-26/76	-30/76	+	50	35	21	60	54	13	179
7	M41	R	t	8	47	1	1	y	-2/16	0/62	-6/62	+	104	94	100	87	63	90	96
8	F67	R	t	4	34	1	1	Y	- 16/34	- 12/72	-8/72	+	100	98	105	47	58	89	90
9	F79	R	d	12	3	1	1	y	-6/38	0/75	-20/75	+	85	86	104	42	55	50	91
10	F68	R	t*	6	30	1	1	y	-8/50	-6/90	-15/90	+	123	108	115	75	93	106	107
11	M66	R	d	3	17	2	1	Y	-12/46	0/90	-34/90	+	93	92	98	50	66	56	109
12	F37	R	t	6	13	3	3	Y	-14/26	0/80	-30/80	+	75	78	78	56	77	21	103
13	M44	L	t	52	7	1	2	Y	-18/30	0/90	-30/54	+	17	40	44	42	57	54	105

A : gender and age
B : involved side
C : pathology (t = trauma, d = degenerative, ra = rheumatoid arthritis, * = + fracture)
D : interval between symptoms and operation (in weeks)
E : follow-up in months
F : pain (1 = none, 2 = mild, 3 = tolerable, 4 = frequent, 5 = continuous)
G : functional disturbance (1 = none, 2 = sometimes, 3 = frequent, 4 = continuous)
H : satisfaction (yes or no)
I : thumb MCP ext/flex
J : thumb IP ext/flex
K : index MCP ext/flex
L : active retropulsion of the thumb
M : grip force (in percentage compared to the opposite side)
N : key pinch (in percentage)
O : tip-to-tip pinch (in percentage)
P : extension force index (independent) (in percentage)
Q : extension force index (dependent) (in percentage)
R : retropulsion force thumb (in percentage)
S : dexterity test (in percentage)

ND : not done

The EIP tendon was passed subcutaneously towards this incision and sutured with a Pulvertaft stitch (5-0 nylon) to the EPL. The wrist and thumb were held in neutral position to adjust the correct tension. A cast was used for 4 weeks. Full mobilisation was allowed afterwards.

Evaluation

Patients were asked about satisfaction, residual pain, and functional disturbance.

We measured the range of motion of the thumb and index : the extension lag is expressed in de-

grees, the flexion as a percentage of the contralateral side. The force of the retropulsion of the thumb, and the extension force of the index were also measured : once with all other fingers in flexion (independent extension), once with all fingers in extension (dependent extension). Grip, key pinch and tip-to-tip pinch force were measured with a Jamar type gripper and with a key pinch. The dexterity was evaluated by performing the "take-5-test" (8) : 5 matches must to be moved from one side of a cardboard to a "docking" areas at the other side. The time needed to perform this test is an indication of general hand dexterity.

Extension force of the index, retropulsion of the thumb, grip and pinch and dexterity were expressed as a percentage of the normal contralateral side.

RESULTS

Thirteen patients were reviewed. One moved to Africa, and one patient answered by phone that he was satisfied but owing to professional commitments he could not attend the follow-up examinations. The mean follow-up period was 26 months (range 4 to 51). Eight patients were very satisfied, 3 were satisfied, one was unsatisfied (a violon player), and one had no opinion. Ten were willing to have the same procedure again, 2 said maybe, and 1 never again. One patient had moderate pain, 5 very rare or mild pain, and 7 had no pain at all. One patient was severely limited in his professional and personal functions, 3 had some limitation, and 9 had minimal or no functional limitations. Paresthesias around the scar at the dorsum of the MCP of the index were noted 6 times.

Extension of the thumb was limited by 17° (range 0° to 35°) in the MCP, and 8.5° (range from 5° hyperextension to 30°) in the IP. An extension lag of 25° was present in the MCP of the index (range 5° to 55°) during independent extension. Flexion in the MCP of the index was 87° (range 80° to 118°). In the thumb the MCP flexion was 38 (ranging from 16 to 50), and the IP flexion 72° (ranging from 24° to 90°). Retropulsion of the thumb was possible in 12 of the 13 patients. The mean force of retropulsion was 53.5% compared to the contralateral side. The extension force of the index was 65% when the other fingers were flexed and 66% when they were extended.

The global hand force was 90% of the contralateral side, the key pinch 77% and the tip-to-tip pinch force was 75%. Dexterity (take-5 test) was 115% of the contralateral side.

Besides the previously mentioned paresthesias, only a few complications were encountered : one skin adhesion, one transfer was considered too loose, and 2 were considered too tight (see table I).

DISCUSSION

Transfer of the extensor indicis proprius for restoration of the extension of the thumb after extensor pollicis longus dysfunction is a standard procedure for a well-known, but not very frequent problem (3,6). Although most published series report good overall results, apprehension does exist concerning the index function. Independent extension of the index after harvesting the EIP is practically always possible (1, 3, 4, 5, 6), mostly with a slight extension lag. Alternative tendon transfers have been reported (2) to avoid this complication. This survey confirms the study of Noordie *et al.* (5) and reports the objective results of the EIP transfer for EPL rupture, on the thumb as well as on the index function. Despite the limitations most patients are satisfied and only slightly limited in the activities of daily living.

The dissatisfaction of the violon player in spite of the good objective measurements confirms the warning of Tubiana (7). He does not recommend this tendon transfer for patients with delicate manual tasks.

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SAMENVATTING

L. DE SMET, J. VAN LOON, G. FABRY. Transplantatie van de extensor indicis proprius pees voor reconstructie na rupturen van de extensor pollicis longus : resultaten en complicaties.

Wij evalueerden grondig 13 patiënten die na een extensorpeesruptuur van de duim een transfer van de extensor indicis proprius ondergingen. In 12 was het resultaat als uitstekend of goed te interpreteren.

Het extensieverlies in het MCP en IP van de duim en het MCP van de wijsvinger bedroeg respectievelijk 17°, 8.5°, en 25°.

De wijsvinger verloor 35% van de onafhankelijke extensiekracht. Grijpkracht en behendigheid bedroeg respectievelijk 90 en 115% t.o.v. de contralaterale zijde.

RÉSUMÉ

L. DE SMET, J. VAN LOON, G. FABRY. Transfert de l'extenseur propre de l'index pour rupture du long extenseur du pouce : résultats et complications.

Nous avons revu en détail 13 patients qui ont subi un transfert de l'extenseur propre de l'index pour restaurer la fonction d'extension du pouce. Nous avons observé un résultat excellent ou bon dans 12 cas.

La perte d'extension dans les articulations métacarpo-phalangienne et interphalangienne du pouce et dans l'articulation métacarpo-phalangienne de l'index était respectivement 17°, 8.5° et 25°.

L'index avait perdu 35% de la force d'extension indépendante. La force de préhension et la dextérité étaient respectivement de 90 et 115% du côte opposé.