

GRIP STRENGTH IN PATIENTS WITH TENNIS ELBOW INFLUENCE OF ELBOW POSITION

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We measured the grip force in 20 chronic tennis elbows :

- The grip strength, measured with the elbow in 90° flexion as well as in full extension, was significantly less ($p < 0.001$) on the pathological side when compared to the other, uninvolved side.
- on the pathological side, the grip strength measured with the elbow in full extension, was significantly reduced when compared to the grip strength measured with the elbow at 90° flexion ($p < 0.0001$).
- on the normal side, the grip strength measured with the elbow in extension was not significantly different when compared to the grip strength measured with the elbow in 90° flexion.

Keywords : elbow ; epicondylitis radialis ; grip strength ; tennis elbow.

Mots-clés : coude ; épicondylite externe ; force de pré-hension.

INTRODUCTION

Lateral epicondylitis or tennis elbow is the most common source of elbow pain in the general population. It is a chronic tendinitis of the extensor muscles, primarily the extensor carpi radialis brevis, caused by overuse, both in intensity and duration. The diagnosis is based on physical findings. On examination, there is pain with passive wrist flexion and active (and resisted) wrist extension. The most tender spot is located 1 to 2 cm distal to the radial epicondyle. Grasping or pinching with the extended wrist (the coffee cup test) usually reproduces the pain precisely at the point of tenderness.

In this survey we wanted to quantify this coffee cup test by measuring the grip force in patients

with tennis elbow with the elbow extended and with the elbow flexed. This could serve as an additional physical test in patients with questionable symptoms of tennis elbow.

MATERIAL AND METHODS

We measured the grip force in a consecutive series of 20 patients (11 males, 9 females, mean age 47.7 years, ranging from 21 to 65), with the diagnosis of chronic tennis elbow.

The complaints were present for at least 6 months, and had been treated conservatively but without success. They all had responded temporarily to at least one injection with xylocaine and corticosteroids but then relapsed. They all were scheduled for surgical treatment. We excluded all patients with bilateral pathology, all patients with doubtful diagnosis, with medial and lateral symptoms, with previous operations and those with abnormal findings on radiographs.

The grip strength was measured with a Jumar type of dynamometer, once with each elbow in flexion, once with each elbow in extension. Each measurement was repeated twice, the highest score being retained. We compared the grip strength on the pathological side with the one on the normal contralateral side (control side). Owing to the large spread of the absolute data (high standard deviation) the loss of grip strength from flexion to extension was computed as a relative value (% loss) :

$$\frac{\text{grip strength in flexion} - \text{grip strength in extension}}{\text{grip strength in flexion}} \times 100 =$$

The paired Student's t-test was used for statistical analysis.

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Table I

Case	A	B	C	D	E	F	G	H
1	M 42	R	31	17	45	32	33	- 3
2	M 51	R	18	12	33	38	37	3
3	M 65	R	18	11	39	26	25	4
4	F 21	R	21	17	19	26	26	0
5	M 50	L	19	9	53	38	37	3
6	M 44	L	27	21	22	41	40	3
7	F 62	L	14	7	50	16	15	6
8	F 40	R	17	7	59	32	30	6
9	M 59	L	29	8	72	41	39	5
10	F 44	R	11	7	36	11	11	0
11	M 50	R	23	11	52	31	34	- 3
12	M 54	R	34	28	18	34	38	- 12
13	F 41	L	17	10	41	27	30	- 11
14	M 48	R	35	24	31	36	34	6
15	F 44	R	14	5	62	29	28	3
16	F 44	R	11	4	64	24	23	4
17	M 52	R	8	1	88	27	23	15
18	M 53	R	29	11	62	45	46	- 2
19	F 38	L	5	2	60	10	11	- 10
20	F 52	R	23	8	65	23	21	9
Mean	47.7		20.2	11.0	48.25	29.3	29.2	2.6
S.D.			(8.588)	(7.138)	(18.8)	(9.592)	(9.671)	(4.982)

A : gender and age

B : involved side

C : grip force on the pathological side with flexed elbow (in kg)

D : grip force on the pathological side with extended elbow (in kg)

E : % loss of grip force on the pathological side

F : grip force on the control side with flexed elbow (in kg)

G : grip force on the control side with extended elbow (in kg)

H : % loss of grip force on the control side

(+ when the grip force with flexed elbow is higher

- when the grip force with extended elbow is higher)

RESULTS

All results are summarized in table I. The grip strength in extension was significantly different on the pathological side compared to the control side ($p < 0.001$).

There is a significant correlation between the grip strength in flexion compared to the grip strength in extension on the normal side ($r = 0.976$, $p < 0.0001$) as well as on the pathological side ($r = 0.83$, $p < 0.0001$).

The relative difference between grip strength in flexion and in extension was highly significant on the pathological side compared to the normal side ($p < 0.0001$); on the pathological side there was a mean loss of 48.25% compared to a mean loss of 2.6% on the control side.

The difference in grip strength measured with a flexed and with an extended elbow was significant on the pathological side ($p < 0.001$) but not on the normal side.

DISCUSSION

The influence of elbow position on grip strength has been evaluated previously; some have indicated that the grip was stronger with the elbow flexed, compared to the straight elbow (3). Others found it stronger in full extension (1, 2, 5). In this survey we found no significant difference in the grip strength when measured with an extended or a flexed elbow.

A reduction of grip strength has also been described in patients with tennis elbow (4). This is confirmed in this population, and the difference is highly significant ($p < 0.001$).

Although the diagnosis of tennis elbow is usually straightforward, lateral arm pain is not always specific enough to make a crystal clear diagnosis. In litigation problems, work-related pathology and compensation patients a new additional measurement can be used for diagnosis and follow-up.

With this survey we could demonstrate a significant reduction of grip strength when the elbow is straightened, only on the pathological side.

In this survey a bias is present: all patients were treated previously but did not respond to the various conservative measures. One could hypothesize that a strengthening regime for the extensor muscles should be included in the treatment program.

Another application to be proven is the prognostic value of this test. In previously nontreated patients it is worthwhile to see whether patients starting with a symmetrical grip force in both extension and flexion respond better to conservative therapy.

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SAMENVATTING

L. DE SMET, G. FABRY. Grijpkracht bij patiënten met tennis elleboog: invloed van de elleboogstand.

Bij 20 consecutieve patiënten werd de grijpkracht gemeten. Deze is merkkelijk minder aan de pathologische dan aan de normale zijde. Echter is er aan de pathologische zijde een significante vermindering van de grijpkracht wanneer deze gemeten wordt met een gestrekte elleboog t.o.v. de meting in standaard 90° flexie stand. Deze reductie in grijpkracht is eveneens significant verschillend t.o.v. de contralaterale zijde.

RÉSUMÉ

L. DE SMET, G. FABRY. Force de préhension chez des patients atteints d'épicondylite radiale : influence de la position du coude.

La force de préhension a été mesurée chez 20 patients souffrant d'une épicondylite externe chronique. Du

côté pathologique, la force était réduite par rapport au côté opposé ; il existait également une nette réduction de la force de préhension mesurée le coude en extension, par rapport à sa valeur mesurée en position habituelle de flexion à 90°. Cette différence ne se retrouvait pas du côté normal.