

GRIP STRENGTH IN TENNIS ELBOW : LONG-TERM RESULTS OF OPERATIVE TREATMENT

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SUMMARY :

In a prospective study the grip strength was measured preoperatively in 17 patients with chronic tennis elbow and postoperatively after a minimum follow-up of 1 year. The grip strength measured with a flexed and extended elbow was significantly less on the involved side (28.4 and 17.2 kg) than on the normal side (36.4 and 36.5 kg) ; postoperatively it increased significantly (33.9 and 34.2 kg) and almost reached the level of the normal contralateral side. An increase of grip strength measured with an extended elbow was correlated significantly with a satisfactory clinical outcome.

Keywords : tennis elbow ; grip strength ; outcome.

Mots-clés : épicondylite radiale ; force de préhension ; résultats.

INTRODUCTION

A reduction of grip strength in patients with tennis elbow has been described (2, 5). In a former study the reduction was even more marked when measured with an extended elbow, rather than in the standard position (2). This has been seen as a quantification of the so-called cup test. The effect of surgical treatment on gripstrength has been evaluated in a prospective study.

MATERIAL AND METHODS

We measured grip strength in patients with chronic tennis elbow scheduled for surgical treatment. For this survey we excluded all patients with doubtful diagnosis, bilateral pathology, previous operations or trauma to the same upper limb, with medial and lateral symptoms, with tenderness over the posterior interosseous nerve and those with abnormal radiological findings. We examined 17 patients, 13 males and 4 females with a

mean age of 51 years (range 39 to 72). The measurements were performed with a Jamar dynamometer, with the patients sitting on a chair, the arm next to the chest. The grip strength was measured bilaterally, once with the elbow flexed to 90° and once with the elbow fully extended. Each measurement was performed twice and the highest score was retained. The patients were reviewed at least one year after a classical tennis elbow release and interviewed about their residual complaints. The patient's satisfaction was evaluated with a visual analogue score (VAS) (0 = not satisfied at all, 10 = very satisfied). The range of motion was measured with a goniometer, and the same grip strength measurements were repeated as preoperatively. Paired Student's t-test was used for statistical analysis of the preoperative and postoperative data. The patient's satisfaction was correlated with grip strength measurements (Pearson's correlation coefficient). The grip strengths in 2 groups of outcome patients (satisfied versus not-satisfied) were compared with an unpaired Student's t-test, with $P < 0.05$ taken as indicating statistical significance.

RESULTS

Thirteen patients were satisfied (VAS of 7 or more, mean 8.1) ; 4 were not (mean VAS of 4.22). The grip strength in flexion and extension was significantly less on the involved side compared to the contralateral normal side ; with flexed elbow 28.4 (S.D. 12.93) versus 36.4 kg (S.D. 8.83) ($p = 0.02$), with extended elbow 17.2 (S.D. 11.14) versus 36.5 kg (S.D. 9.94) ($p < 0.01$). At the latest follow-up these values increased to 33.9 kg (S.D. 12.12) with flexed and 34.2 kg (S.D. 13.13) with

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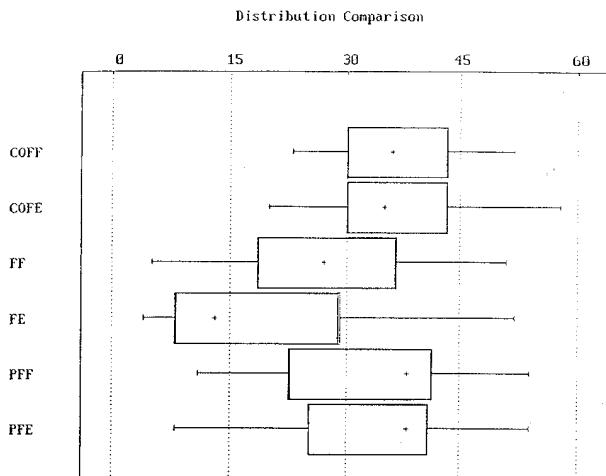


Fig. 1. — Mean values and distribution of grip strength on the contralateral side with flexed elbow (COFF) and extended elbow (COFE), on the pathological side preoperatively with flexed (FF) and extended (FE) elbow and postoperatively with flexed (PFF) and extended (PFE) elbow.

CO = contralaterale
 F = force in flexion
 E = force in extension
 P = postop.

extended elbow. These values are not statistically different from the values of the contralateral side ($p = 0.194$ and $p = 0.324$) (paired t-test) (fig. 1).

In all patients the range of motion was normal and symmetrical to the opposite side.

No significant correlation could be found between the different grip force measurements or their postoperative evolution and the patient's satisfaction score.

The mean values in the patients with a satisfactory result (group 1) were compared with those with an unsatisfactory result (group 2). The increase of grip force measured with the elbow in flexion ($6.85 \text{ kg} \pm 10.8$) in group 1 was not significantly different from the increase in group 2 ($1.0 \text{ kg} \pm 7.87$); measured with an extended elbow, the increase in group 1 ($19.0 \text{ kg} \pm 6.0$) was significantly different from group 2 ($12 \text{ kg} \pm 14.0$) ($p = 0.015$) (unpaired t-test).

DISCUSSION

Tennis elbow or radial epicondylitis is the most frequent cause of chronic elbow pain. The diagnosis is usually straightforward and based on

clinical findings. Several patients mention reduced grip strength of the involved arm. This could be proven in a previous study. The effect of treatment on this reduced strength has not yet been described. In this limited but carefully selected group we were able to follow the patients for at least one year. A recovery of the grip force could be observed.

The effect of elbow position on grip strength in a control population is still open for discussion (1, 3, 4, 6). In our previous survey a significant reduction of at least 30% of the grip strength was seen in patients with tennis elbow (2) when measured with an extended elbow compared to the measurement with a flexed elbow. Following treatment the ratio between measurement with the elbow in extension versus the measurement in flexion was reestablished. In the dissatisfied group this recuperation of grip strength in extension was significantly lower than in the satisfied group. This observation can be of importance for the evaluation of treated patients for scientific or medicolegal purposes.

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SAMENVATTING

L. DE SMET, H. VAN RANSBEECK, G. FABRY.
Grijpkracht bij tennis elleboog: resultaten na operatieve behandeling.

In een prospectieve studie werd de grijpkracht bij 17 patiënten met chronische tennis elleboog preoperatief en

na een minimum follow-up van één jaar gemeten. De kracht was significant lager zowel in flexie als in extensie (28.4 en 17.2 kg) dan aan de normale zijde (36.4 en 36.5 kg). Postoperatief nam deze significant toe (33.9 en 34.2 kg) tot een niveau dat niet significant verschilde van de normale zijde. Een toename van de grijpkracht gemeten met een gestrekte elleboog correleerde met een bevredigend klinisch resultaat.

RÉSUMÉ

*L. DE SMET, H. VAN RANSBEECK, G. FABRY.
Force de préhension dans l'épicondylite radiale : résultats à long terme après traitement opératoire.*

Les auteurs ont mesuré la force de préhension chez 17 patients présentant une épicondylite radiale chro-

nique, d'abord en préopératoire puis au moins un an après traitement chirurgical. En pré-opératoire, la force, mesurée en flexion et en extension du coude est significativement réduite (28.4 et 17.2 kg) par rapport au côté normal (36.4 et 36.5 kg). Après opération, la force augmente (33.9 et 34.2 kg) jusqu'à un niveau qui ne diffère pas significativement du côté opposé. L'augmentation de la force mesurée en extension du coude va de pair avec un résultat clinique satisfaisant.