

A. K. Burton

ANNOTATION

GRIP STRENGTH AND FOREARM STRAPS IN TENNIS ELBOW

A. K. BURTON, DO, MRO

*Ostopathic Association of Great Britain Research Unit,
30 Queen Street, Huddersfield HD1 2SP*

ABSTRACT

Twenty-seven patients who presented with tennis elbow had their grip strengths measured without a forearm strap, with an elastic strap and with an inelastic strap. Of these 85% displayed an increased pain-free grip strength with one or both straps. The increase in pain-free grip strength was statistically significant for both types of strap ($p < 0.001$) and the results showed no consistent difference between them. The possible mode of action is discussed.

Key words: Tennis elbow, Epicondylitis, Forearm straps, Grip strength.

INTRODUCTION

The condition known as "tennis elbow" was first described by Morris in 1882 and is commonly supposed to be an overuse strain of the origin of the wrist extensors at the lateral epicondyle of the elbow, leading to an inflammatory response at this point. Nirschl's (1974) view of a multi-factorial aetiology is probably the most popular view for its occurrence and whilst numerous treatments have been advocated, some controversy exists (Carroll, 1981). Corticosteroid injections have been shown to be more effective than saline (Day et al, 1978), but Binder and Hazleman (1983) have shown a high rate of recurrence. The use of an upper-forearm brace has been proposed as a remedy (Froimson, 1971; Ilfield and Field, 1966) but it has also been stated that these devices are ineffective (Gruchow and Pelletier, 1979). It has been shown (Burton and Edwards, 1982) that forearm straps do not affect the electromyographic activity in the extensor muscles of normal subjects. The study reported here used a previously reported method (Burton and Edwards, 1982; Fernando and Robertson, 1982) to quantify any increase in grip strength (and hence antagonistic extensor strength) in tennis elbow patients wearing forearm straps.

METHODS

Twenty-seven patients presenting with tennis elbow were instructed to grip a sphygmomanometer cuff, pre-inflated to 20 mm Hg, to the point of pain and a reading was taken from the scale (Fig. 1). They then gripped whilst wearing a commercially available elastic forearm strap and a further reading was



Fig. 1: Method of measuring grip strength.

taken. This procedure was repeated for an inelastic strap. The straps (Fig. 2) were applied and the readings were taken at consultation. This study was not designed to examine the therapeutic value of wearing forearm straps for extended periods. Six healthy volunteers performed maximum grip strength tests with and without straps.

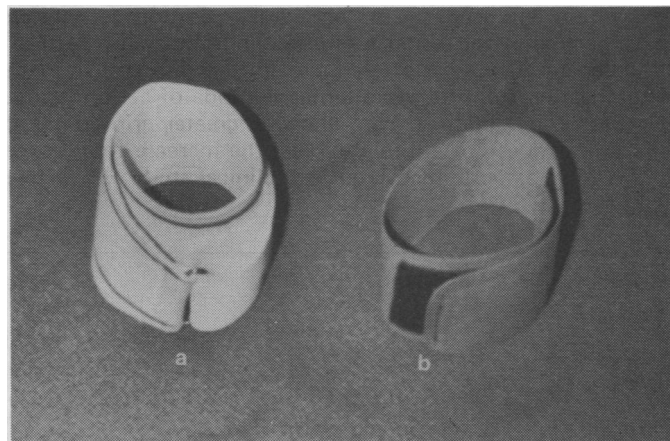


Fig. 2: Forearm straps — (a) inelastic (b) elastic

RESULTS

The pain-free grip strengths with and without forearm straps, are shown in Fig. 3 as means for all 27 subjects. Nineteen patients were considered to show unequivocal results in that they achieved an increased grip strength with both straps whilst a further four achieved this with one strap. Only three patients recorded a lower reading and one showed no change.

The statistical significance of the increased grip strength whilst wearing forearm straps was tested by means of the "t" test for the whole sample and was found to be significant for both straps ($p < 0.001$). The six healthy volunteers displayed

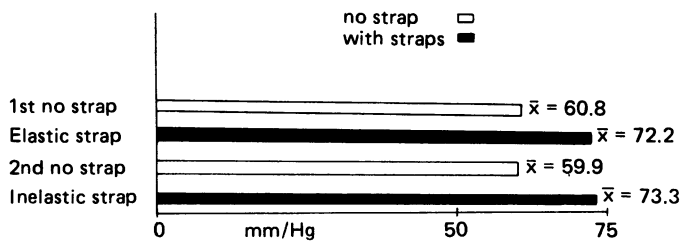


Fig. 3: Bar chart representation of the means of grip strength readings from Table I.

TABLE I

Effects of forearm strap on pain-free grip strengths in 27 epicondylitis patients.

Effect of strap	Elastic		Inelastic	
	Number	Proportion	Number	Proportion
Grip strength increase	22	81%	22	81%
Grip strength no change	2	7%	4	15%
Grip strength decreased	3	11%	1	4%
Patients with no change on both straps		= 1		
Patients with decrease on both straps		= 1		
Patients with increase on both straps		= 19 (70%)		
Patients with increase on one strap		= 4 (15%)		

no increase in maximum grip strength when wearing the straps.

DISCUSSION

The results of this study indicate that the use of forearm straps will increase pain-free grip strength in tennis elbow patients. Since there is a strong correlation between increased pain-free grip strength and symptomatic improvement during recovery from tennis elbow (Burton, 1984), it is reasonable to suppose that forearm straps may have some therapeutic value.

The mode of action of tennis elbow straps is supposedly that they protect the common extensor origin from further strain, thus allowing the inflammatory reaction to subside and a healing of the lesion to ensue. Whilst this may be true, the mechanical support offered did not increase grip strength in the healthy subjects. An alternative mode of action is that of a reflex reduction in pain allowing greater grip strength; though this does not entirely explain the increase found over time, whilst patients recovered in a clinical study, where the

measurements were taken without the straps in place (Burton, 1984). It would seem, from the available evidence, that any therapeutic value of forearm straps would arise from a reflexly-mediated pain reduction initially, combined with mechanical support to the common extensor origin to permit healing whilst maintaining function.

There remains, of course, a need to demonstrate that these forearm straps are an effective part of the long term treatment of tennis elbow and clinical trials are justified by the current lack of a universally accepted treatment for this condition.

CONCLUSION

Strap devices, worn around the upper forearm under moderate tension, are capable of increasing pain-free grip strength in tennis elbow patients. No evidence is apparent, from this study, to suggest a difference between elastic and inelastic straps. Though sound clinical trials are required, there is reason to suppose that the straps could be a useful part of the management of the condition.

ACKNOWLEDGEMENTS

Thanks are due to the practitioners who collected the data and to Cumbria Orthopaedic and Doylecroft Ltd. for providing the straps.

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BOOK REVIEW

Title: SURGERY OF THE SHOULDER
Editors: Bateman and Welsh
Publisher: C. V. Mosby (Blackwell, Oxford for U.K.)
 Price: £46 348 pages Index Many figs. Tables X-rays

This book is in fact a series of lectures from the Second International Shoulder Conference of 1983. An obvious consequence is the disparity of style and language, and a bewildering number of contributors. Only those with some knowledge of the subject will be able to pick the senior author; a frequent necessity if the value of the paper is to be judged.

However, the book is well sub-divided into sections and within these sections there are ample up-to-date opinions. The reader should have no difficulty in reinforcing his own prejudices but with selective reading! It is necessary to read a whole section at one time.

On the whole this is a useful well published collection of up-to-date opinions that is best read a month before rather than the day before dealing with the problem.