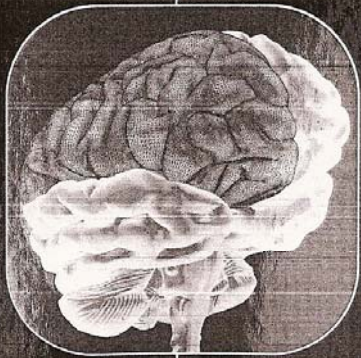


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Adapted eccentric training in chronic lateral epicondylitis rehabilitation

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1. Introduction

Lateral epicondylitis represents a common overuse disorder, caused by repetitive gestures through specific sports activity, industrial work or hobby activities (Ciccotti and Charlton 2001). Despite a wide range of conservative treatments, the optimal function of the elbow is not systematically restored. Eccentric exercises are increasingly prescribed in the management of tendon overuse injuries (Croisier *et al.* 2001). The purpose of this study was to assess the effectiveness of a newly designed rehabilitation model based on eccentric isokinetic training in the treatment of chronic lateral epicondylitis.

2. Materials and methods

Seventy six patients with unilateral chronic lateral epicondylitis were assigned either to a control group (CG, $n = 30$) or to an eccentrically trained group (TG, $n = 46$). The CG benefited from a conventional rehabilitation including ice, analgesic TENS, ultrasound, deep friction massage and stretching administered in a standardized manner. In addition to this program, the TG

performed eccentric exercises based on the repetitive lengthening of the active musculo-tendinous unit. That eccentric program started with submaximal contraction intensity and slow speed movement and modalities were progressively intensified over a long-lasting treatment (30 sessions). Respective program effectiveness was assessed through (1) pain score evaluation (visual analogue scale), (2) functional potential evolution on return to causal sport or occupational activities, (3) isokinetic measurement of wrist extensor and forearm supinator muscle strength and (4) ultrasonographic examination of epicondylar tendons before and after treatment.

3. Results and discussion

Compared to a classical standardized rehabilitation, the eccentric model specifically designed for the lateral epicondylitis treatment permitted: (1) a significantly more marked reduction of pain intensity graded on a visual analogue scale (figure 1), mainly after the 10th treatment session. From the 20th session, the pain score differed significantly ($p < 0.01$) between CG and TG; (2) the normalisation of forearm supinator and wrist extensor isokinetic profile through bilateral concentric and

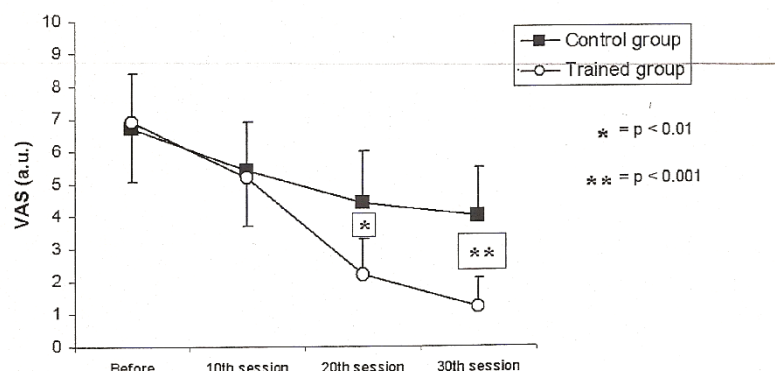


Figure 1. Subjective pain evaluated on a visual analogue scale (in arbitrary units, a.u.) before, during and at the end of treatment: comparative study between control and trained groups.

eccentric peak torque comparison; (3) a more regular improvement of the tendon image in echography: at the end of treatment, 89% of TG patients versus 60% of CG patients normalised or improved their tendon structure; (4) the return to the offending activity with marked or complete relief of symptoms in 74% of cases (versus only 33% following the classical intervention).

Our results confirmed incomplete effectiveness of a classical treatment failing to remove pain or to markedly alleviate symptoms upon return to the offending activities in 2/3 of cases. Conversely, the isokinetic eccentric training model combined with the classical treatment showed more convincing results.

Conclusions

These findings highlight the relevance of implementing an adapted eccentric training in the management of chronic lateral epicondylitis.

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