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The Analgesic Effect of Shockwave Application Frequency

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Introduction

For over ten years we have applied Radial SWT for chronic tendinopathies. We have found subjectively that using a progressive protocol starting with high number of repetitions per second and low energy, the patient feels less pain. This way, and using a two session treatment, we have been able to avoid the use of anesthetics, get the results we desire and match the data published in the literature. However, there are no reports of these findings, probably because pain control is a very difficult issue to analyze, and there is a great variability in evaluating this particular emotional sensation. We designed a simple case control study in normal subjects to determine the differences in pain generated by the application of Radial Pressure Waves on their hands, comparing a progressive protocol with a continuous protocol.

Methods

We performed a case control study on 104 volunteer subjects with no medical records. They were divided in two groups of 52. They all signed an informed consent. We chose the hypothenar region of the right hand, because it is easily available, and a well-innervated area, with submuscular bone and no major nerves or vessels in the nearby region. In all cases we used a Radial SWT generator (BTL 5000 Power – BTL Industries Checz Rep). All subjects were tested and evaluated by the ISMST & ONLAT Certified authors. In the Cases Group we applied a progressive protocol using 200 shocks on 15 Hz, 200 shocks on 10 Hz and 200 shocks on 5 Hz. In the Control Group we used a constant of 600 shocks on 10 Hz. The Pressure was constant in both groups, using 2.0 BAR. In order to determine any differences between subjects, both Cases and Control Groups volunteers were asked to try the opposite protocol on the opposite hand. We also recorded these data, as we wanted to determine if there were any differences within the subjects and avoid or find any placebo effect. We used numerical Visual Analogue Scale n/10, blinded for the patient. All data was recorded and analyzed using a One-Way ANOVA, and the P value was based in <0.01. We also analyzed intergroup differences, gender and age, and a Normalized analysis of differences at the beginning and end of the trials. We had 76 males and 28 females with and average age of 31.5 y/o (17-46 y/o). Al adverse effects were recorded.

Results

The progressive protocol group experienced 29% less pain as compared with the continuous protocol group at the beginning of the test, with a VAS of 7,9 and 5,1 respectively. At the end of the test the differences were of 57% with VAS scores of 7,25 and 1,54 respectively. There was an average of in 43% in total pain reduction (P<0.01). The normalized analysis comparing the differences in VAS scores at the beginning and end of each test on each group also showed a pain reduction of 34,6% in the progressive group as compared with a 7,2% in the continuous group, with a statistically significant difference of 27.4%. There were no significant differences in the data collected from the contralateral hands as compared with the primary tested hands. There were no differences in gender or age related data. There were no adverse effects in any subject.

Conclusion

The use of high repetitions with low energy seemed to favor pain control in normal subjects, as compared with a continuous protocol with the same energy and number of shockwaves delivered. The progression from high repetitions to low repetitions showed the best pain control in our series. Even though these results match our subjective clinical findings in tendinopathy patients, it calls our attention the lower progressive pain control in the continuous protocols. We have the feeling that there is also a good pain reduction in continuous protocols in our patients. We did not find a placebo effect in our study, and the results in primary or secondary tested hands were similar. We did not find any adverse effects. There was a clear and obvious apprehension in our subjects, being this pain study. All patients revealed they felt a discomfort sensation more than pain, but evaluated this sensation in very high VAS numbers. Our main limitation is having the tests done in normal subjects and not in tendinopathy patients. However, this solid data does show an effect with people that have the same pain baseline: none, something very difficult to standardize in symptomatic patients. Based on these results, we do recommend a progressive shockwave protocol in the treatment of tendinopathies, delivering a minimum dose of therapeutic impulses preceded by a progressive number of analgesic shockwaves. Further studies in clinical cases must be performed to determine these doses.

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