PS073

Psychological Pain Treatment in Fibromyalgia: Systolic Extinction Training (SET) restores Baroreflex Sensitivity, reduces Pain Sensitivity and Clinical Pain Report

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INTRODUCTION.

Important components of intrinsic pain regulatory systems are modulated by cardiovascular dynamics that influence baroreceptor sensitivity (BRS). The present study evaluated the effects of extinction training combined with electrical stimulation administered during either the systolic or diastolic phases of the cardiac cycle delivered in a randomized order ("systolic extinction training", SET) in patients with fibromyalgia syndrome (FMS). SET was compared to treatment with extinction training combined with electrical stimulation delivered independent of the cardiac cycle a "placebo" condition (PC).

METHOD.

Forty patients who fulfilled the American College of Rheumatology criteria for FMS and showed an elevated blood pressure response to a laboratory stressor termed hypertensive stress reactivity were randomly assigned to SET (n = 20), or PC (n = 20). Assessments of clinical pain, pain threshold, pain tolerance, baroreflex sensitivity (BRS), blood pressure and heart rate, cognitive and behavioural variables as well as sleep architecture and sympathetic outflow measured by microneurography were performed pretreatment and post-treatment as well as at 6 to 12 months posttreatment.

Design of Systolic Extinction Training - SET

10 Sessions with 2 hours in 5 weeks

Figure 1. Design of SET

Hour 1: Structured *Extinction Training* with Training of Perception and Increase of physical Activity

Hour 2: *BRS modifying-Stimulation* by delivering pain-free and two different pain stimuli adjusted by individual pain tolerance dependent on cardiac cycle

RESULTS.

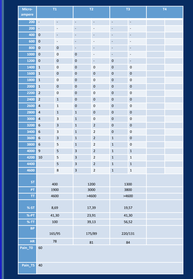

Table1. A single SP-protocol of Session 1 of SET

BRS-modifying Stimulation

- Assessment of ratings to define sensory and pain threshold as well as pain tolerance
- Calculation of 50% and 75% of pain tolerance
- First 8-minutes stimulation
- Assessment of ratings
- Renewed calculation of 50% and 75% of pain tolerance
- Second 8-minute stimulation
- Final assessment of ratings

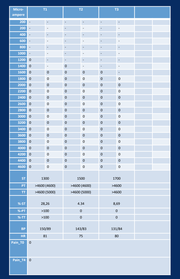

Table2. A single SP-protocol of Session 10 of SET

Patients receiving SET reported a significant reduction in **Clinical Pain Intensity** post-treatment (all Ps < 0.001). In contrast to the PC group, 82% of the SET participants showed a long lasting pain remission and 18% a pain reduction to 12.5 (VAS 0-100, P < 0.001).

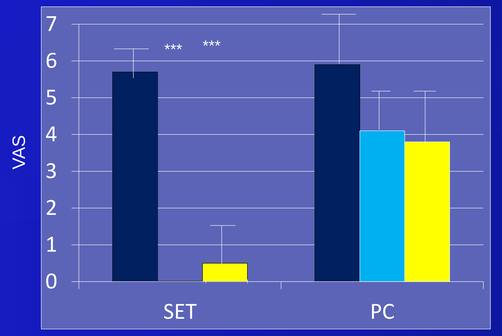

Figure 2. Changes of clinical pain immediately and 6-12 months after SET and PC

Both sensory and pain threshold as well as pain tolerance increased significantly immediately and 6-12 months after SET.

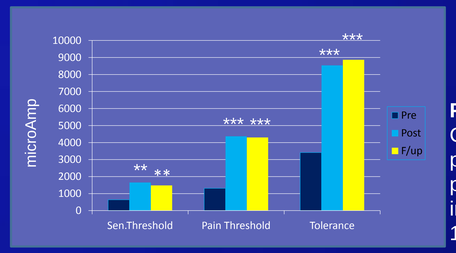

Figure 3. Changes of sensory, pain thresholds and pain tolerance immediately and 6 to 12 months after SET

The pain reduction was associated with a significant increase in **BRS**.

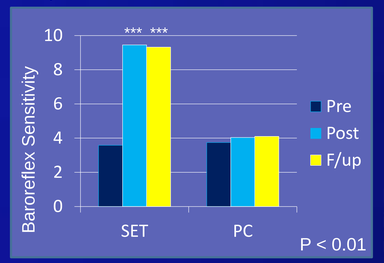

Figure 4. Changes of BRS immediately and 6 - 12 months after SET and PC

The remission of Clinical Pain was associated with a significant **decrease in Blood Pressure,** and an **increase in EMG and Physical Activity** measured in MPI (all P's<0.01).

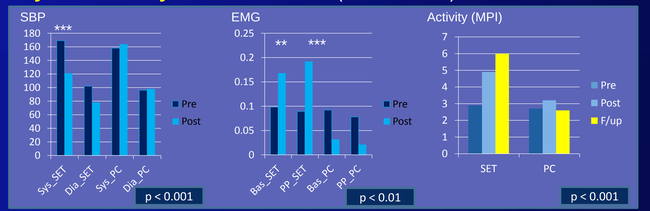

Figure 5. Changes in blood pressure, EMG and physical activity after SET and PC

In addition, the SET group demonstrated statistically significant higher improvements in central functions (all Ps < 0.001) as well as an improvement in sleep architecture (P < 0.01) and a reduction in sympathetic outflow (P < 0.01) compared the PC group.

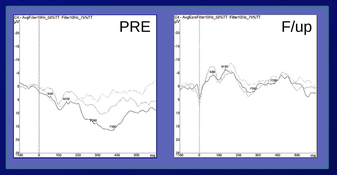

Figure 5. Cortical pain inhibition in C4 before and after SET

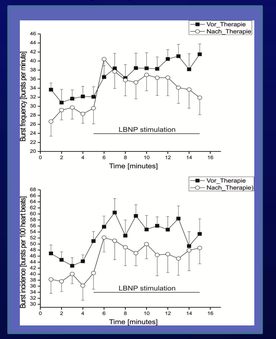

Figure 6. Decrease of the sympathetic outflow after SET

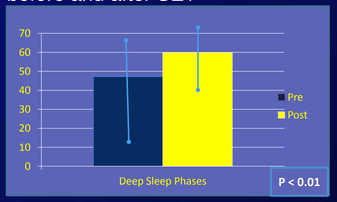

Figure 7. Restoration of sleep architecture after SET

CONCLUSION:

These results suggest that SET is effective in treating patients with FMS producing long lasting pain remission. Furthermore the findings show that the (1) greater blood pressure responses to stress predicts a greater reduction in clinical pain report and (2) increase in physical activity observed following SET is associated with a restoration of BRS, cortical pain inhibition, sympathetic outflow and sleep architecture. Even though baseline BRS is diminished in FMS patients, electrical stimulation delivered in a manner dependent on cardiac cycle phase when combined with extinction training is highly effective in reducing pain and restoring functions in a FMS subgroup characterized by hypertensive blood pressure stress reactivity.

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