Sensomotor strength training with the TRX® Suspension Trainer® as primary prevention of back pain

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INTRODUCTION PURPOSE METHODS RESULTS

INTRODUCTION

The development of many low back disorders arises from a lack of endurance of the trunk muscles and spinal instability due to insufficient activation patterns of the local stability system.[1] A number of studies have demonstrated that performing an exercise while supported on unstable surfaces increases core muscle activation to a higher degree than does performing the same exercise under stable conditions. Exercises that require muscular stabilization of posture while performing the movement appear to provide greater activation of the core musculature than do isolation exercises. [2,3,4,5,6] Correct sensomotor exercise also leads to neural adaptation, improving the coordination and movement of muscles and joints, as well as activation patterns and intra- and inter-muscular coordination of the local and global stabilizers.

PURPOSE

The purpose of this study was to determine the efficacy of two different exercise interventions for the prevention of lower back pain.

METHODS

The study is a randomized, controlled trial, with a test–retest design. Twenty-nine subjects were randomly assigned to two experimental groups and one control group. The experimental groups underwent either a six-week instability (suspension) resistance training with use of the TRX® Suspension Trainer (TRX® group), or a six-week traditional ground-based, calisthenic-type training (MAT group). The control group did not participate in any kind of training program. The trunk extensors were tested with the back extensor endurance test (in seconds) and the trunk flexors with the flexor endurance test (in seconds).[7] A clinical measure of lumbopelvic stability was obtained using the Sahrmann core stability test.[8,9]

RESULTS

After the intervention only the two experimental groups showed statistically significant increases in strength-endurance of the trunk flexors and extensors, and lumbopelvic stability. The TRX® group also improved in flexor endurance relative to the MAT group (p = 0,025). They did not show significant differences in training effect of the trunk extensors and lumbopelvic stability, but still improved more than the MAT group.

CONCLUSION & CLINICAL SIGNIFICANCE

CONCLUSION

A functional training form that provides multi-planar resistive and neuromuscular exercises in a proprioceptively enriched state, like the TRX® Suspension Training, appears to be more effective than traditional ground-based exercises for increasing strength endurance of the trunk muscles and lumbopelvic stability. Thus, it may also be more effective for decreasing the incidence of lower back pain.

Clinical Significance for dancers and other athletes

The TRX® Suspension Training engages the entire body and trains the muscles predominantly in closed kinetic chains, therefore improving intermuscular coordination and strength. It also involves destabilizing components that activate the local stabilizers of the spine to a greater extent than does training under stable conditions.
As the TRX® Suspension training provides a variety of functional training exercises for dancers and other athletes, improves strength endurance and ensures that spinal stability is trained under a broad range of conditions, it should be included in the training program.

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Figure 1: Exercise example of ventral kinetic chain acvitvation and local stabilizer activation with the TRX ® suspension trainer (modified Myers[10], 2001).

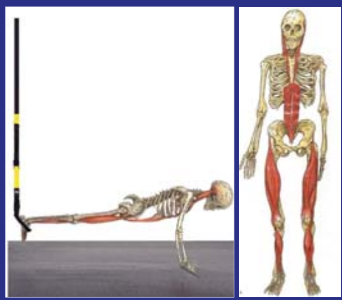


Figure 2: Exercise example of dorsal kinetic chain acvitvation and local stabilizer activation with the TRX ® suspension trainer (modified Myers[10], 2001).

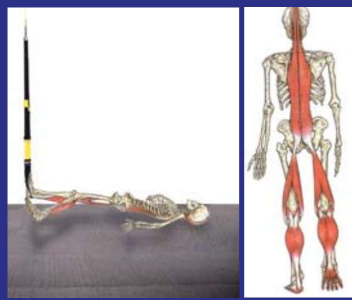


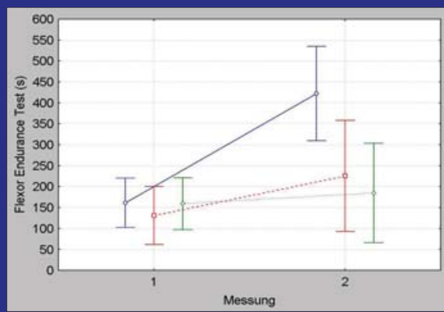
Figure 3: Exercise example TRX® group

VARIABLE	(n=29) GROUP(x̄±s)* TRX®	MAT	CONTROL
Age	32,91 ± 8,83	33,63 ± 12,06	35,3 ± 12,78
Weight(kg)	77,36 ± 10,29	70,75 ± 14,62	76,15 ± 10,13
Height(m)	1,74 ± 0,07	1,64 ± 0,06	1,73 ± 0,09
BMI (kg/m²)†	25,42 ± 2,69	26,29 ± 4,95	25,45 ± 2,29

Table 1: Sample Characteristics

*Results are presented as mean ± standard deviation
†Body Mass Index calculated calculated as weight/height² (kg/m²)

Figure 4: Between-group differences in program effects (Flexor Endurance Test)*

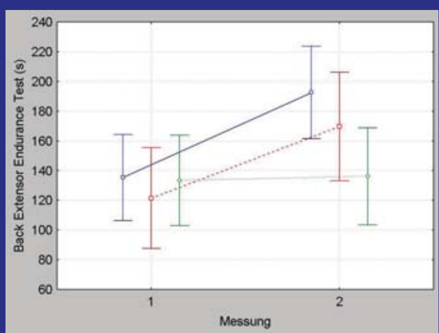


*Circles denote means and vertical bars denote respective 95% confidence intervals

Both groups, significantly improved flexor endurance (s) by an average of TRX (260,91 ± 178,57), MAT (94,75 ± 76,46)
(TRX pre = 161,27 ± 88,4, TRX post = 422,18 ± 245,62,
MAT pre = 130,75 ± 60,05, MAT post = 169,75 ± 48,02)

with significant group differences:
TRX vs. CONTROL (p < 0,001)
TRX vs. MAT (p = 0,025)
MAT vs. CONTROL (p = 0,022)

Figure 5: Between-group differences in program effects (Back Extensor Endurance Test)*

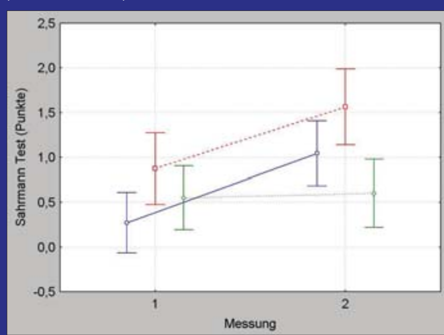


*Circles denote means and vertical bars denote respective 95% confidence intervals

Both groups, significantly improved back extensor endurance (s) by an average of TRX (57,18 ± 40,64), MAT (48,25 ± 27,92)
(TRX pre = 135,36 ± 59,56, TRX post = 192,55 ± 52,88 , MAT pre= 121,5 ± 26,91, MAT post = 169,75 ± 48,02)

and with significant group differences:
TRX vs. CONTROL (p < 0,001)
MAT vs. CONTROL (p < 0,001)
There was no significant group difference between TRX and MAT group but the TRX group showed greater improvement than the MAT group.

Figure 6: Between-group differences in program effects (Sahrmann Test)*



*Circles denote means and vertical bars denote respective 95% confidence intervals

Both groups, significantly improved lumbopelvic stability (points) by an average of TRX (0,64 ± 0,71), MAT (0,69 ± 0,53).
(TRX pre = 0,27 ± 0,41, TRX post = 1,05 ± 0,65,
MAT pre= 0,88 ± 0,69, MAT post = 1,56 ± 0,56)

and with significant group differences:
TRX vs. CONTROL (p = 0,022)
MAT vs. CONTROL (p = 0,002)
There was no significant group difference between TRX and MAT group but the TRX group showed greater improvement than the MAT group.