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Effect of Spinal Manipulation and Exercises on Cinematic of the Trunk of Obese Patients with Low Back Pain: Preliminary Results of a Pre-Post Study

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1 Introduction

In a previous study we demonstrated an increased thoracic stiffness and reduction of thoracic ROM in obese women with chronic low back pain (LBP). Spinal manipulation is recognized as a treatment effective on pain in LBP aimed at improving ROM, especially useful when associated with an active specific approach with exercises.

The aim of our study was to evaluate the thoracic kinematic pre-post treatment in a group of LBP obese patients treated with osteopathic manipulation and exercises.

2 Methods

Assessment

Instrumental outcome measures: Cinematic of the dorsal and lumbar spine and pelvis during flexion, side bending and rotation (Fig 1-2). A VICON 460 A 6 TV was used.

Clinical outcome measures: VAS, Roland Morris Disability Questionnaire.

A Student's t test was performed ($p<0.05$).

Procedure

Due to the high cost of the evaluation used, we included 6 obese females with chronic low back pain (BMI 44,09±7,17 Kg/m^2; age 43,83±5,63) have been evaluated before and after a treatment with Exercises and Osteopathy. The treatment lasted 2 months and consisted of 4 session of osteopathy principally based on dorsal spinal manipulation and 10 sessions of 1h of exercises principally aimed at lumbar muscles strengthening.

A Student's t test was performed ($p<0.05$).

Figure 1. Marker setup. Markers were placed on superior posterior iliac spines (LPSI, RPSI), on superior anterior iliac spines (LASI, RASI not visible), on spine spinous processes (S1, L3, L1, T6, T1) and on acromions (LACR, RACR).

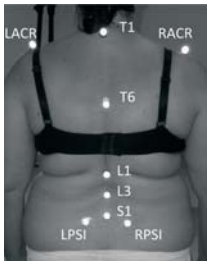
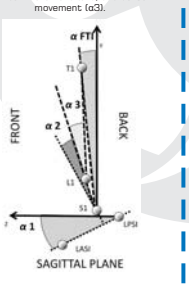


Figure 2. Representation of markers and angles in sagittal plane during forward flexion: frontal trunk inclination (αFTI), pelvic obliquity (α1), lumbar movement (α2), and dorsal movement (α3).



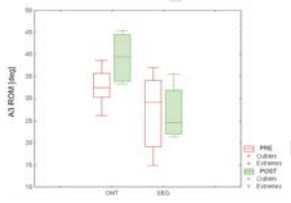
3 Results

A significant improvement of the dorsal ROM (from 32°±5 to 39°±5, $p<0.05$) and the dorsal kyphosis ROM (from 1°±4 to 5°±4 $p<0.05$) was observed (Tab 1, Fig. 3). Also clinical outcome measures improved: the Roland Morris score changed from 6±4 to 1±1 ($p<0.05$) and VAS changed from 45±10 to 18±18 ($p<0.05$).

Table 1 Median forward flexion angles and clinical scales with relative interquartile ranges: for each group were reported values before (PRE) and after (POST) treatment, and statistical significance of PRE-POST comparisons (* $p<0.05$).

		OMT		SEG	
Biomechanical parameters		PRE	POST	PRE	POST
Forward trunk inclination (αFTI) [deg]	START	6.4 (4.2; 12.7)	6.2 (5.8; 10.2)	6.4 (5.1; 9.7)	4.9 (4.1; 8.7)
	MAX	116.4 (113.9; 129.7)	122.0 (113.4; 126.0)	85.8 (84.8; 97.3)	91.3 (81.8; 100.8)
	ROM	109.6 (103.7; 115.8)	115.8 (104.7; 117.6)	84.6 (78.7; 88.7)	88.8 (75.0; 98.1)
Pelvic tilt (α1) [deg]	START	24.2 (15.8; 24.7)	17.2 (16.2; 22.8)	20.3 (15.8; 21.6)	24.7 (24.2; 27.6)
	MAX	80.9 (76.6; 81.0)	79.6 (70.9; 88.7)	61.4 (52.8; 74.3)	70.3 (53.7; 74.7)
	ROM	56.7 (51.9; 65.2)	62.5 (54.7; 65.9)	42.3 (37.1; 46.7)	42.6 (40.2; 49.8)
Lumbar movement (α2) [deg]	START	-10.4 (-17.1; 4.6)	3.0 (-11.5; 6.4)	-22.5 (-27.4; -9.7)	-21.3 (-30.2; -18.5)
	MAX	15.8 (16.3; 23.4)	20.6 (15.8; 26.1)	15.1 (0.8; 20.7)	2.5 (0.0; 8.9)
	ROM	30.2 (18.6; 33.4)	19.7 (16.7; 32.0)	23.7 (20.0; 31.9)	24.5 (16.8; 25.1)
Dorsal movement (α3) [deg]	START	-3.3 (-20.6; 3.6)	-14.7 (-25.0; 0.5) *	4.3 (-16.2; 9.8)	0.0 (-15.1; 16.0)
	MAX	31.2 (18.0; 34.1)	29.7 (19.5; 34.4)	28.6 (11.3; 36.3)	28.6 (14.2; 36.3)
	ROM	34.5 (30.5; 38.6)	44.5 (33.9; 45.4) *	25.1 (15.2; 34.1)	24.4 (20.1; 31.8)
Clinical scales		PRE	POST	PRE	POST
VAS		45.5 (36; 53)	14.5 (6; 21) *	62.5 (42; 70)	36.75 (21; 38)
RM		4 (2; 6)	0.5 (0; 2) *	5.5 (7; 12)	0 (5; 10)
OQ		7.5 (4; 10)	1.5 (0; 4) *	12.5 (8; 14)	11 (4; 12)

Figura 3. α dorsal movement Rom - Pre-Post.



4 Discussion

A combined treatment with exercises and osteopathy is effective in obese patients with chronic low back pain to improve biomechanical parameters and the dorsal stiffness. Moreover the treatment reduced disability and improved pain. Further studies are needed to compare these preliminary results with other treatments.

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