

# EFFECT OF KINESIO TAPING ON STANDING BALANCE IN SUBJECTS WITH MULTIPLE SCLEROSIS: A PILOT STUDY

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**INTRODUCTION:** Balance impairments and falls are commonly observed in subjects with Multiple Sclerosis (MS)<sup>1,2</sup> and are likely due to the combined effects of a lack of adequate postural control strategies, weakness, ataxia and a lack of reliable sensory information. In standing, it has become common to study the body as an inverted pendulum pivoting at the ankle where the body is balanced by the ankle musculature with primary role of the calf muscles<sup>3</sup>. The ankle has the double role of sway detection by somatosensory input and sway control by feedforward and stiffness control systems<sup>4</sup>. We hypothesized that for individuals with MS an improvement of the quality of somatosensory information could be achieved by the application of Kinesio Tex Tape.

**Objective:** the aim of this study was to assess the effect of Kinesio Taping on body stability in subjects with MS.

## METHODS:

**Clinical assessment** Berg Balance Scale (BBS), Visual Analogica Scale (VAS), 10 meters Timed Walking Test (TWT), stabilometric assessment was carried out with the Technobody monoaxial platform and were calculate the following parameters of the Center of Mass (CoM): SWAY antero-posterior (AP) (and medio-lateral ML), velocity (VEL) AP (and ML), LENGTH.

**Study group:** 15 subjects with MS was tested for 30 seconds in 2 experimental conditions on firm surface: Eyes Closed (EC) and Kinesio Taping (KTM background image), the subjects then wore the tape for 2 days. The day after removal of the tape the subjects were retested in the EC condition (RET). No treatment was allowed between assessments.

**Reference group:** useful for the learning effect, 10 subjects with MS were tested in 3 conditions: EC as baseline, as described for the experimental sample; a second condition EC, after a pause of 10 minutes (EC2), that substituted the KTM condition of the experimental sample; and the RET condition assessed 3 days later.

**RESULTS:** No statistically or clinically significant differences were observed among conditions in the mediolateral (ML) axis for SWAY ML ( $P=0.89$ ) and VEL ML ( $P=0.42$ ).

**Study group (table 1):** A statistically significant difference was found between SWAY AP EC and SWAY AP RET ( $P=0.02$ ). A statistically significant difference was found between VEL AP EC and VEL AP KTM ( $P=0.02$ ). With respect to LENGTH ANOVA showed statistically significant differences among conditions ( $P=0.01$ ). Statistically significant differences were found between LENGTH EC and LENGTH KTM ( $P=0.004$ ). A statistically significant correlation was found between the LENGTH in the EC condition and the changes in LENGTH obtained with the application of the tape ( $r = 0.57$ ;  $p = 0.03$ ). The same was true for the SWAY AP ( $r = 0.63$ ;  $p = 0.01$ ) and VEL AP ( $r = 0.64$ ;  $p = 0.01$ ). Thus subjects with worse performance on the initial assessment had better outcome from the application of the tape.

**Reference group (table 2):** With respect to the learning effect Table 2 shows the results of the control group obtained after repeated assessments without taping (EC, EC2, RET). No statistically significant differences were found among conditions. In contrast to the taped group this group tended to perform a little worse on the second assessment (EC2).

**CONCLUSION:** The preliminary results of this study showed that Kinesio Taping may improve quiet standing posture with eyes closed. The effects of taping were specific and axis dependent, reduction of sway performance was seen only in the antero-posterior axis. The decrease in length of sway is interesting because length of the path is mechanically related to energy expenditure. A reduction of energy expenditure is important because of the high incidence of fatigue in this population of subjects<sup>5</sup>. The improvement in gait speed and in perception of walking skills (VAS) scale suggested a clinical and functional effect of taping.

## BIBLIOGRAPHY:

- 1 Finlayson ML, Peterson EW, Cho CC. Risk factors for falling among people aged 45 to 90 years with multiple sclerosis. Arch Phys Med Rehabil. 2006;87:1274-9
- 2 Cattaneo D, De Nuzzo C, Fascia T, Macalli M, Pisoni I, Cardini R. Risks of falls in subjects with multiple sclerosis. Arch Phys Med Rehabil. 2002;83:864-7.
- 3 Loram ID, Lakie M. Direct measurement of human ankle stiffness during quiet standing: the intrinsic mechanical stiffness is insufficient for stability. J Physiol. 2002;545:1041-53.
- 4 Lakie M, Caplan N, Loram ID. Human balancing of an inverted pendulum with a compliant linkage: neural control by anticipatory intermittent bias. J Physiol. 2003;551:357-70
- 5 Rampello A, Franceschini M, Piepoli M, Antenucci R, Lenti G, Olivieri D, Chetta A. Effect of aerobic training on walking capacity and maximal exercise tolerance in patients with multiple sclerosis: a randomized crossover controlled study. Phys Ther. 2007;87:545-55

Variable	Condition	n	Median	Range	25-75th Percentile
SWAY AP [mm]	EC	15	11.20	5.60 - 24.25	7.25 - 14.55
	KTM	15	9.20	5.30 - 22.15	6.60 - 11.00
	RET	15	8.03	5.30 - 17.50	7.20 - 11.10
VEL AP [mm/s]	EC	15	32.57	14.90 - 57.05	19.65 - 42.80
	KTM	15	25.60	16.30 - 50.45	18.67 - 33.83
	RET	15	27.00	16.35 - 48.16	18.80 - 39.80
LENGTH [mm]	EC	15	894.33	468.00 - 1572.00	554.50 - 1423.00
	KTM	15	697.50	471.50 - 1426.00	550.50 - 951.00
	RET	15	751.50	508.00 - 1544.60	597.50 - 1092.00

Table 1: reports of study group

Variable	Condition	n	Median	Range	25-75th Percentile
SWAY AP [mm]	EC 1	10	10.73	4.90 - 19.45	7.30 - 12.30
	EC 2	10	11.05	4.70 - 25.55	8.08 - 12.05
	RET	10	10.63	5.25 - 26.45	7.85 - 14.45
VEL AP [mm/s]	EC 1	10	22.47	13.75 - 58.55	16.65 - 31.60
	EC 2	10	22.75	13.50 - 56.15	16.50 - 37.40
	RET	10	24.65	15.35 - 57.80	17.70 - 43.75
LENGTH [mm]	EC 1	10	702.75	396.00 - 1633.00	520.50 - 920.00
	EC 2	10	789.50	436.00 - 1566.50	498.25 - 1050.50
	RET	10	693.25	433.50 - 1522.00	545.50 - 1329.50

Table 2: reports of reference group