



# Correlation between dynamic balance and gait parameters in patients with ischemic stroke in the chronic period



Danche Vasileva<sup>1</sup>, Daniela Lubenova, PhD<sup>2</sup>, Marija Mihova, PhD<sup>3</sup>,  
Ivan Maznev, PhD<sup>4</sup>, Lence Nikolovska, PhD<sup>1</sup>, Zhu Jihe, PhD<sup>1</sup>

<sup>1</sup>Faculty of Medical Sciences, University "Goce Delchev", Shtip, Macedonia

<sup>2</sup> Department of Kinesitherapy and rehabilitation - National Sports Academy "Vasil Levski", Sofia, Bulgaria

<sup>3</sup> Faculty of Computer Sciences and engineering – University "Ss.Kyril and Methodius" – Skopje, Macedonia

<sup>4</sup> Department of Sports medicine - Faculty of kinesitherapy, tourism and sports animation, National Sports Academy "Vasil Levski", Sofia, Bulgaria

## OBJECTIVE

The aim of the study was to trace the correlation between dynamic balance and gait parameters during the application of specialized kinesitherapeutic methodology (SKTM) in patients with ischemic stroke in the chronic period (ISChP)

## MATERIALS AND METHODS

The study was conducted with 56 patients with ISChP. The Berg Balance Scale is used for the evaluation of the balance reactions. Tracking changes in gait before and after the applied treatment is evaluated cadence of gait and maximum speed of movement. To determine the cadence, the number of steps is measured for covering 6 meters and 10 meters. The maximum speed of the gait is determined in m / min by dividing undergone distance (m) / time (min), for which they have walked it. All indicators were assessed at the baseline, on the 10th day, 1st month and 3rd months after the beginning of the kinesitherapy. The patients studied were treated with a specialized 10-day kinesitherapy, which later continues to be performed by patients as an adapted exercise program at home for a period of three months.

## RESULTS

After applying SKTM, the highest tendency towards improvement in dynamic balance and gait is established in the 1st month, with a level of significance  $p=0.000$ . The correlations between the studied parameters were most visible on the 10th day after the start of the applied SKTM with a significance level of  $p<0.01$ .

## CONCLUSIONS

The applied specialized kinesitherapeutic methodology continued later as an adapted exercise program at home, significantly improving the dynamic balance and gait parameters in patients with functional impairment due to ISChP.

## KEYWORDS

Dynamic balance, Gait, Ischemic stroke, Neurodevelopmental treatment, Kinesitherapy



Address for correspondence:

Danche Vasileva, MSc

Email: [dance.vasileva@ugd.edu.mk](mailto:dance.vasileva@ugd.edu.mk)

Changes in dynamic balance - Berg 12

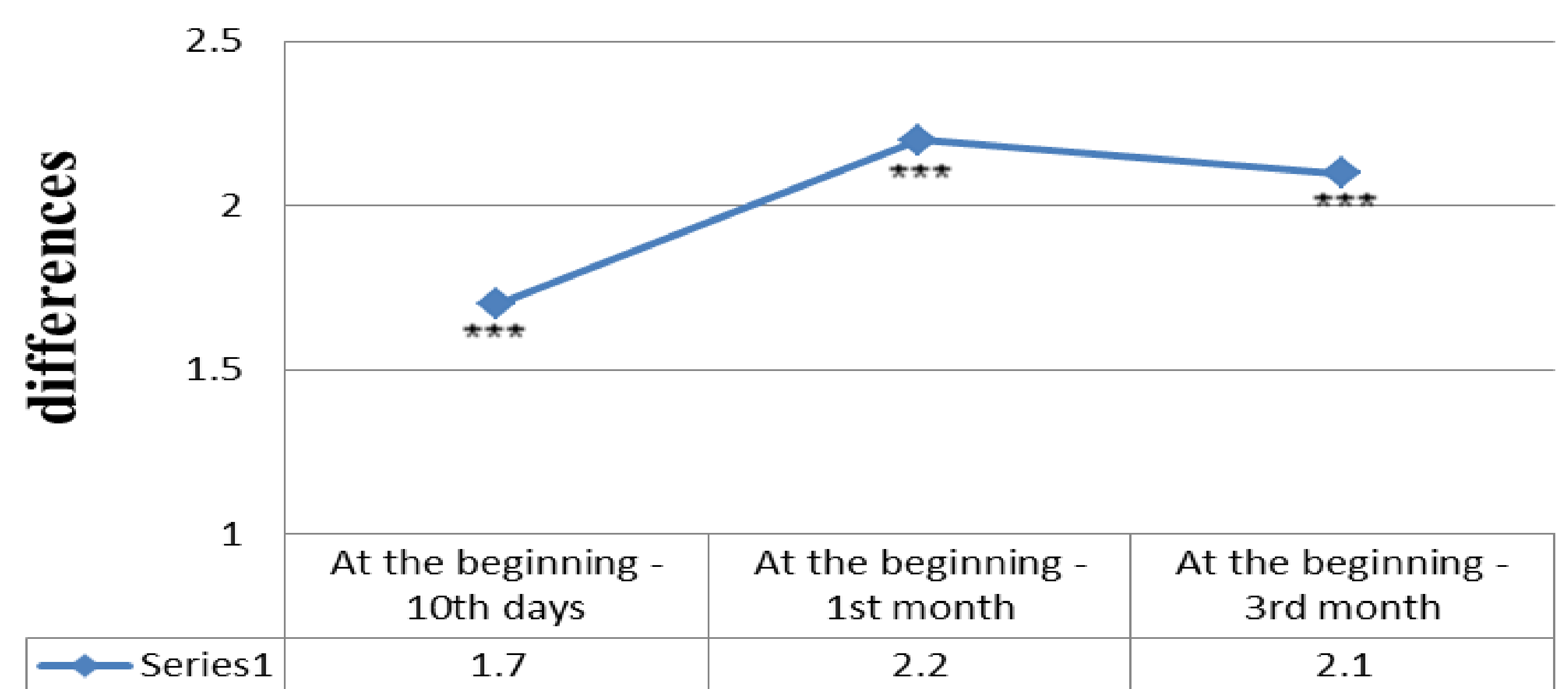


Fig.1 Changes in the dynamic balance - Berg 12, given as the ratio of results and baseline values; \*\*\*  $p<0.001$  - significant difference compared with baseline values.

Cadance of gait



Fig.2: Changes in gait cadence of 6 m, 10 m, given the difference between the results and the beginning of the study, \*\*\*  $p<0.001$  - significant difference compared to baseline.

Speed of gait

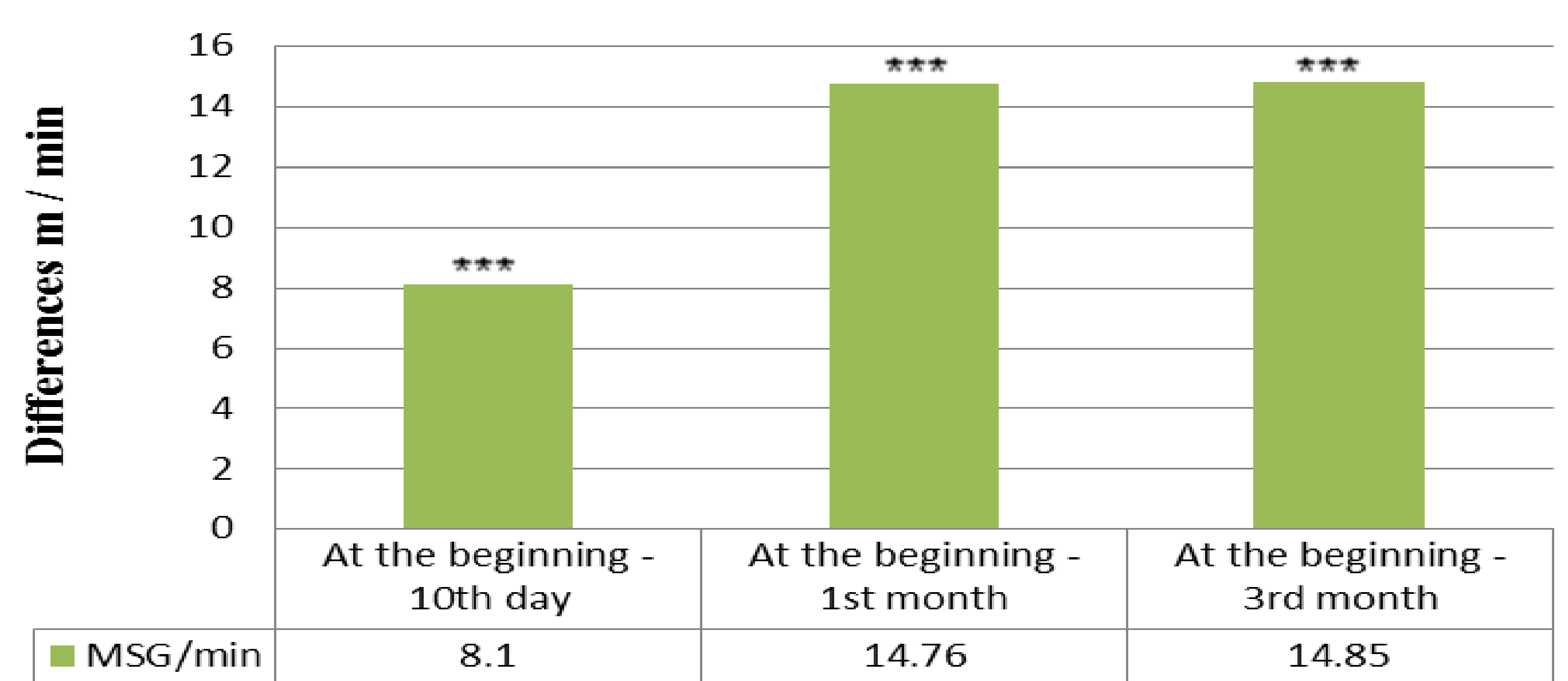


Fig. 3 Changes in the speed of movement, given as the difference between the results obtained and baseline, \*\*\*  $p<0.001$  - significant difference compared with baseline values

Correlation Berg 12 / number of steps on 6 and 10 meters	Of standing without support with hands stepping on block, consistent with both feet	
	6 meters	10 meters
10th day	$r = -0.815^{**}$	$r = -0.788^{**}$
1st month	$r = -0.536^{**}$	$r = -0.500^{**}$
3rd month	$r = -0.563$	$r = -0.545$

Tab.1 Correlation between Berg 12 and number of steps on 6 and 10 meters

Correlation Berg 12 / speed of gait	Of standing without support with hands stepping on block, consistent with both feet	
	10th day	$r = 0.824^{**}$
1st month	$r = 0.658^{**}$	
3rd month	$r = 0.767$	

Tab.2 Correlation between Berg 12 and speed of gait