

## Introduction

Auditory sensory stimulation is a therapy (1) that influences cognitive, motor, emotional, behavioral and synchrony with motor functions that stimulates coordination, balance, flexibility, attention, improves muscle relaxation, improves creativity and body expression (2). When a stimulation occurs in the frontal lobe region of the brain (motor areas) it is possible to see through functional magnetic resonance imaging (fMRI), that it trigger a response in motor regulation (3). This approach therapy is referred to be effective in optimizing motor responses in neurological conditions (3). Stroke is a vascular disturbance associated with brain injury manifested by symptoms that persist beyond 24 hours. This vascular pathology assumes leadership in the main causes of death in the European Union (EU), characterized by motor, sensory and cognitive changes (4-5).

## Objective

The purpose of this study was to investigate the effect of an auditory neurosensory stimulus (music) on gait pattern in post stroke individuals

## Methods

We performed an observational cross-sectional study, in which 5 patients with ischemic stroke diagnostic participated. They were exposed to auditory neurosensory stimuli after stroke and it was measured the effect on gait pattern. Patients were assessed during the stance phase of gait cycle through 5-meter walking test, before and after the auditory neurosensory stimulus (music). STOMP was used to evaluate musical preference, cell phone camera to record gait pattern, speed and tibial angle in a lateral view and data was analyzed by Kinovea. All subjects signed an informed consent. This study followed all the principles of Helsinki Declaration

**Table 1. Subject characteristics**

Patients	n = 5
Gender	♂ 5
Age (years)	66.6 ± 14.1
Paretic side	Left =3 / Right = 2
Stroke etiology	4 ischemia 1 hemorrhagic
Stroke localizacion	3 ACM / 1 VB / 1 ACA

ACM - cerebral middle artery; VB - vertebrobasilar artery; ACA - anterior cerebral artery

## Results

In our study, post stroke individuals showed gait speed improvement ( $7.01 \pm 0.94^\circ$ ) with auditory neurosensory stimulus (preference music). Data analysis in a lateral view of stroke limb by Kinovea showed better results in tibial angle in initial contact with stimulation ( $74.0 \pm 8.0^\circ$ ) versus before stimulus ( $70.4 \pm 11.0^\circ$ ). Also during mid-stance, results in toes/ground angle with stimulation ( $37.6 \pm 16.1^\circ$ ) were higher than the results without stimulation ( $29.8 \pm 14.9^\circ$ ).

In this sample, as it can be observed in table 2, both angles and velocity had a positive correlation when post stroke patients were subjected to musical stimulus. This results indicate gait pattern benefits when used in an early post-stroke stage.

**Table 2. Mean values of outcome measures for stroke patients**

	Without stimulus M ± SD	With stimulus M ± SD
Angle Heel / Ground (°)	70.4 ± 11.0	74.0° ± 8.0
Angle 5 th Toe/ Ground (°)	29.8 ± 14.9	37.60° ± 16.1
Gait speed (seg.)	8.0 ± 1.0	7.01 ± 1.0

## Conclusion

Stroke gait pattern observed in these patients changed with auditory neurosensory stimulation (preference music) which suggests increase of the responsiveness of the paretic ankle flexion. Some previous studies showed that auditory neurosensory stimulation in stroke patients was efficient in gait pattern symmetry and is an important therapeutic strategy for gait pattern motor recovery (5-6). More studies are needed to verify this hypothesis with a larger sample and if the auditory neurosensory stimulus influences other gait characteristics, such as balance and involvement of the upper limb and trunk in post-stroke patients. These results seem to enhance that the auditory stimulation (preference music) should become an effective method to integrate the rehabilitation gait program for stroke patients.

## References

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