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POSTURAL DISORDERS THE TREATMENT AT HEMIPARESIS PATIENTS WITH THE MBT PHYSIOTHERAPY DEVICE, EVALUATED USING BAROPODOMETRIC PLATFORM

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Abstract: *Postural control disorders represent one of the biggest problems in the recovery of stroke patients. Lately attention is given to posture maintaining analysis and mechanism of movement initiation. So postural control is another area where research and controversies are extremely numerous.*

Hemiplegia as a result of a stroke means the occurrence of deficiencies in different systems, resulting in a complex disability structure which requires the necessity of establishing a rehabilitation treatment of the patient and the obligation of keeping a certain timetable in order to obtain favorable results, also improving functional status, prevention of sequelae and complications, achieving a higher degree of functional independence which represents a good postural control.

Keywords: *physiotherapy, assessment, recovery, postural control balance, physical therapy device.*

Introduction.

The ability to control body position is a fundamental condition in daily activities. Therefore, restoring the function of postural control after a stroke is a crucial objective in the recovery process [1].

Coordination possibilities are manifested in different forms, one of them being capacity to balance, with a major role in static, walking, daily activities of post-stroke patients. The conducted study aims to highlight the benefits that can be provided by a proper equipment and judiciously used in a post-stroke recovery, both to assess balance using electronic barapodometry and training (recovery) using MBT – Masai Barefoot Technology physiotherapy devices. (Figure 1) [4].

Figure 1. MBT physiotherapy device

An important difference between MBT and regular footwear is that the center of gravity is designed exactly on the balance zone in MBT (while in regular footwear the projection is in front). When walking, the shoe base touches the ground before the center of gravity projection, causing a faulty walk (bigger steps). According to the 3rd principle of physics – each action has a reaction – the force of the earth reacting to the body will be eccentric, stressing the joints. In MBT, because of instability and rolling motion, the center of gravity moves at the same time with the body and we are bind to do smaller steps, because of the support limb instability, in order to regain balance.

In standing, MBT produces a substantial increase in range of motion of the center of pressure, leading to increased muscle activity to maintain the body's postural balance. Prolonged use of MBT leads to gradual rise even to this area. In conclusion, MBT acts as a physiotherapy device [2].

While walking, MBT significantly decreases the body's forward tilting, subjects taking a more upright position.

In MBT there is significant increase in the maximum dorsal flexion angle and decrease in plantar flexion degree after the initial contact with the ground. [5]

Material and method

Bobath Concept – applied in post-stroke postural balance recovery [6];

Stabilography – objective tool used to evaluate quantitative and qualitative balance disorders [5];

Positional biofeedback on the stabilographic platform – used in post-stroke postural rehabilitation disorders, allows not only evaluation of the effectiveness of this method, but also clarification through it of possible development of postural

stability mechanisms in patients with post-stroke hemiparesis.

MBT physiotherapy device

MBT physiotherapy device, according to studies has significant potential to train the muscles needed in static and dynamic. This study aims MBT use as training therapeutic device in rehabilitation of patients with post-stroke in postural instability cases, medium and long-term results being superior to conventional therapies.

The study had 40 patients, aged 45-60 years. Of them 27 were men and 13 women. From the group under study, 28 patients had ischemic stroke and 12 – hemorrhagic, at 22 patients the pathological outbreak was located in the right cerebral hemisphere, and 18 in the left.

In order to determine therapeutic exercise complex, for each period of recovery, was evaluated the balance dynamic restoration in dependency of the patients' motor deficit. Motor deficit was evaluated by the scale of the Medical Research Council (MRC). Thus the examined patients were divided in 2 groups, as follows: 26 patients with moderate hemiparesis, which obtained F3; and 14 patients with mild hemiparesis which obtained F4

In order to accomplish the study, both groups of patients diagnosed with mild and moderate hemiparesis, were randomly divided into 2 equal groups: one of active treatment (with MBT) and the second, the control group (without MBT)

The group with active treatment followed for twice a day for 45 minutes, for a 4 week period, kinetic recovery sessions, in which MBTs were used for performing different exercises, positions. (Figure 2)

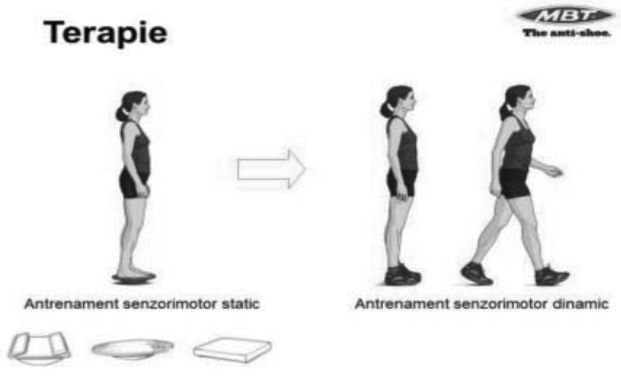

Figure 2. Active training in static (a) and dynamic (b)

To assess the evolution of orthostatic posture in terms of clinical and functional post-stroke subject, before and after using the MBT device, we recall some of the clinical scales used:

Assessment of motor shortage, after Medical Research Council (MRC) scale.

Evaluation of pyramidal hypertonicity (central motor neuron damage) was used Modified Ashworth Scale – MAS, assessment scale of al-

Postural disorders were measured by applying Berg scale – to assess BBS balance (Berg Balance Scale);

FIM, GIF, PASS rating scale (assessment scale in postural stroke disorder - Postural Assessment

Results:

Following the evaluation made through electronic barapodometry (barapodometric platform) were obtained data on the static print (static state evaluation). The relationship between the plantar surface and the supporting surface (Figure 3).

In the following, we have exemplified the values for patients in the control group with moderate deficenty (MM) on the right lower limb (MID) as initial testing (Table 1) and final testing (Table 2), at the same group in which case oscillation center of balance evaluation is presented on the right lower limb.

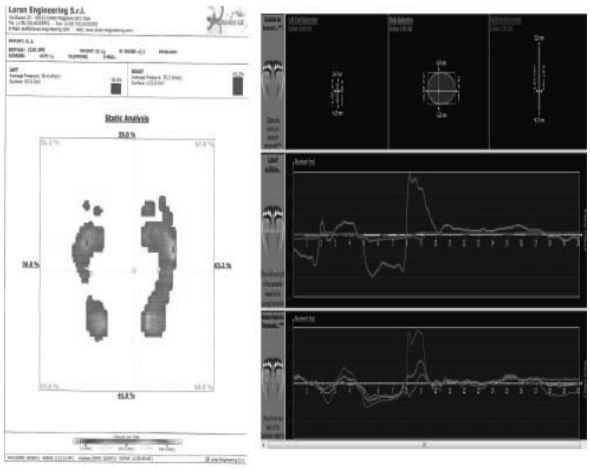

Figure 3. Baric pressure and center of pressure oscillations at MM – MID level

Table 1. Initial static values of MM patients – without MBT

MM – MID T.I			
OLS	OLD	OA	OP
-7,67	2,77	13,59	-9,24
-3,82	1,55	11,68	-5,77
-1,5	1,26	11,93	-17,72

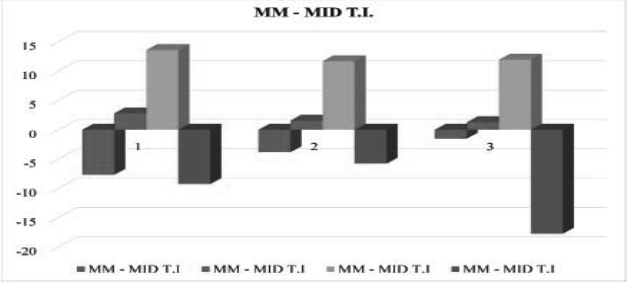

Figure 4. Dynamic of value oscillation evolution at MM – MID group – right without MBT

Table 2. Final static values of MM – MID patients with MBT

MM-MID T.F.			
OLS	OLD	OA	OP
-3,83	2,9	14,24	-12,95
-1,88	1,03	6,47	-4,56
-1,35	0,91	3,71	-3,18

After analyzing the recorded oscillation data it can be seen that patients who used MBT physiotherapy device in rehabilitation of postural control, post-stroke, the average percentage of oscillation exercised on the lower limbs (in our case MID) experienced an improvement in final testing from the initial one.

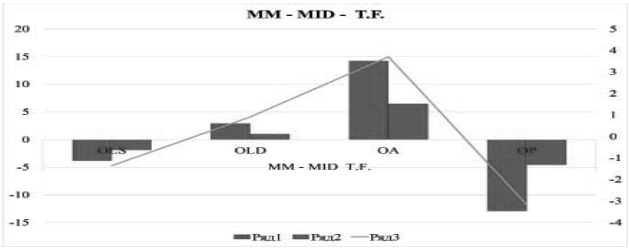

Figure 5. Dynamic of value oscillation evolution at MM - MID group – with MBT

In the case of the patients that completed the program without MBT device, the average percentage registered of inferior oscillation of the MBT by 3.8% compared to the experimental group patients.

Conclusions and Proposals

From these data we can conclude that the balance recovery with the MBT physiotherapy device is positive.

Through these methods can be evaluated and performed analysis on the parametric evolution dynamic or the regress of postural balance reeducation.

Recovering balance is particularly important in post-stroke recovery. Classic recovery is a mean available to everyone, but the modern means as "tele-rehabilitation", smartphones on which can be installed cholesterol, hypertension, triglycerides tracking apps, of different factors that can lead to stroke, which can be monitored daily so it could tend to a stroke drop, because it's easier to prevent than to treat.

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