bobo

CLINICAL TRIAL

HADASSAH UNIVERSITY HOSPITAL. JERUSALEM, ISRAEL.

Hadassah Medical Center

The purpose of this study is to demonstrate the correlation between variety of balance exercise protocols, with and without using bobo, and the specific muscles activation in each protocol. Using a wireless EMG sensors on the main 4 muscle groups of the lower limbs.

The major findings of this research indicates that:

The lower limb muscles activities are higher while using the bobo.

BACKGROUND.

Physiotherapists frequently use unstable platforms to improve and restore balance. The "UNSTABLE PLATFORM" method is considered for decades as the top method to treat patients following trauma or surgery, elderly individuals at risk of falling, and even when preventing obesity in young children. In order to achieve the desired outcome using these platforms, the patient must practice several times a week. However, most off-shelf products intended for this training method, offer an extremely monotonic sessions, and therefore patients get bored and unmotivated very quickly.

The “BOBO” board (Fig. 1a) contains micro processors with accelerometer which transfers data via Bluetooth to the Smartphone, tablet or smart TV (Fig. 1b) connected to it. Every movement made by the patient standing on The BOBO board is monitored and transferred to the game. The data monitored are collected into a meta-database. An Advanced learning algorithm is used to record of the patients' progress and present the trainer and the patient the main key features of the treatment progress.

BACKGROUND.

(a)

(b)

Figure 1: (a) The Bobo system can be attached to different unstable platforms. The system can be used to control various environments as smartphones, tablets and (b) TV screens.

OBJECTIVES.

The purpose of this study is to demonstrate the correlation between variety of balance exercises protocol, with and without using bobo, and the specific muscles activation in each protocol.

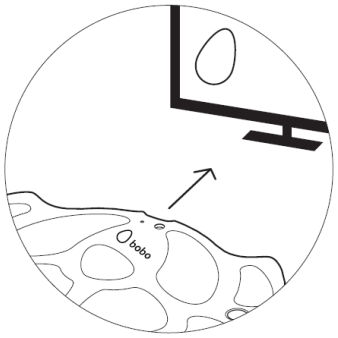
By doing that – to prove the advantages of using the bobo, not only in terms of engagement and data analysis, but also in terms of improving quality of the training and its effectiveness.

STUDY DESIGN.

Data was collected by EMG system – "TRIGNO TM Wireless System (Delsys, MA, USA)". 8 wireless EMG sensors were attached to the 4 main muscle groups of the lower limbs. N=14. Each user conducted 3 different exercises on the balance board – One time without the bobo and the other time with the bobo.

1. Bobo is turned off.
Three different exercises, while standing on a bobo board on a standard balance cushion.

VS



2. Bobo is turned on and connected to the app.
Three different exercises while standing on a bobo board on a standard balance cushion. The task: Try to keep the white ball within the green circle in the center.

STUDY DESIGN.

1. The Exercises

Mini-Squats

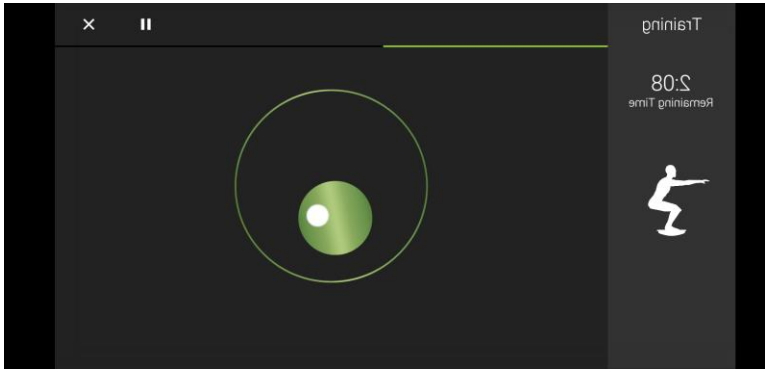
Side flexions

Hands up and down

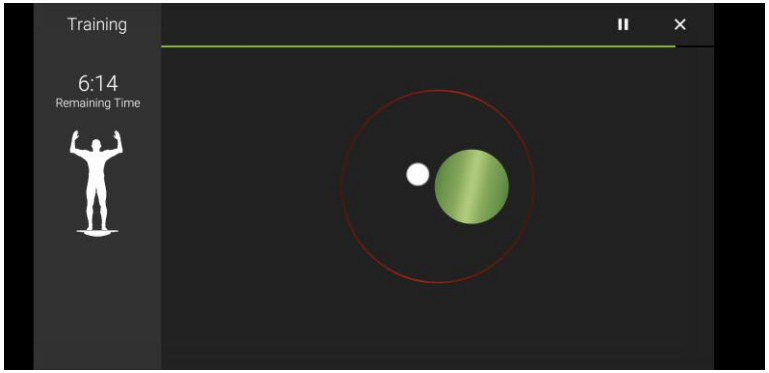
STUDY DESIGN.

2. The Visual tasks: Keep the white ball within the static green circle.

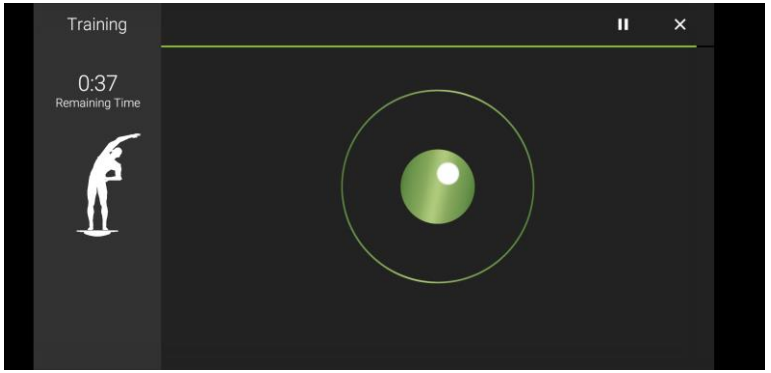
Mini-Squats



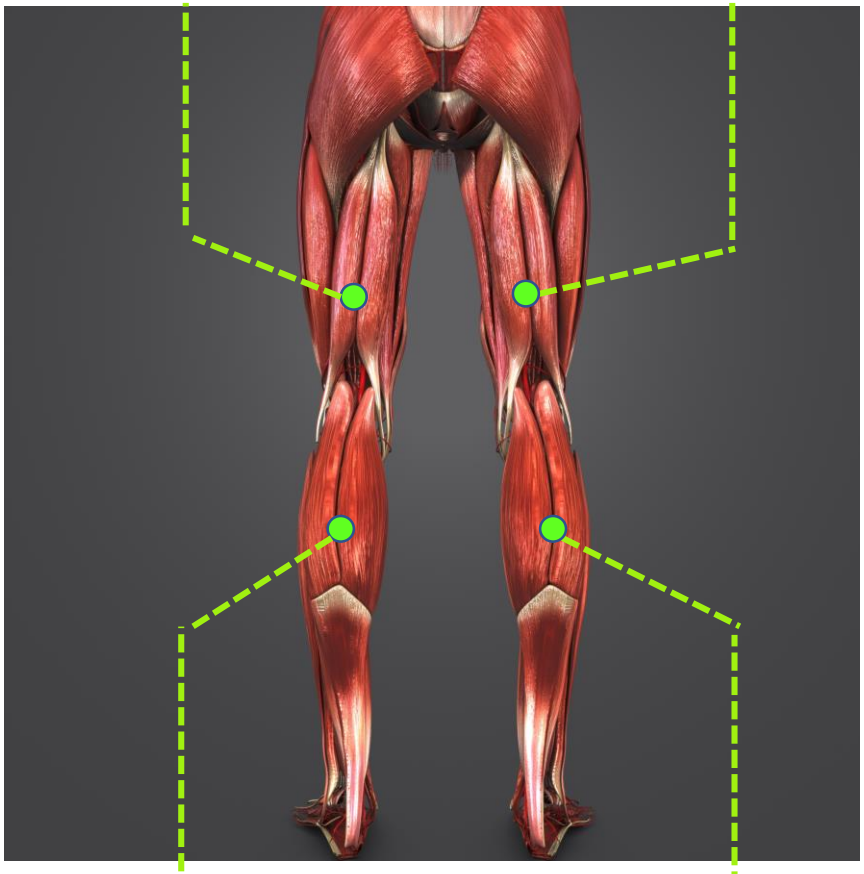
Hands up and down

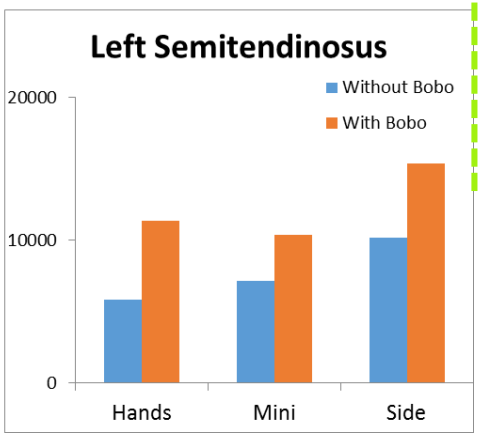


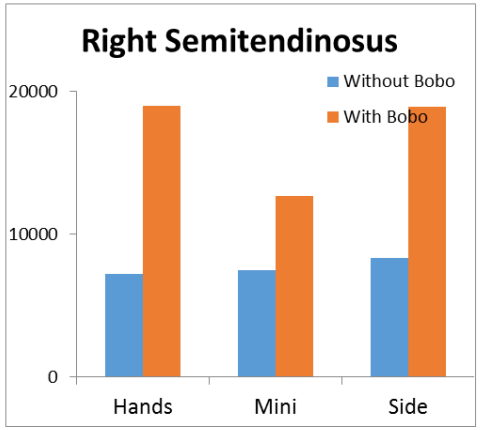
Side flexions

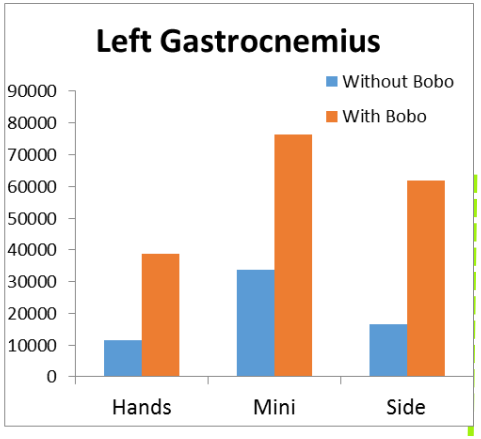


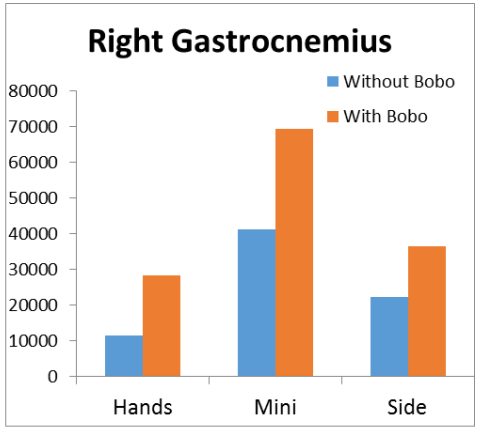
OUTCOMES



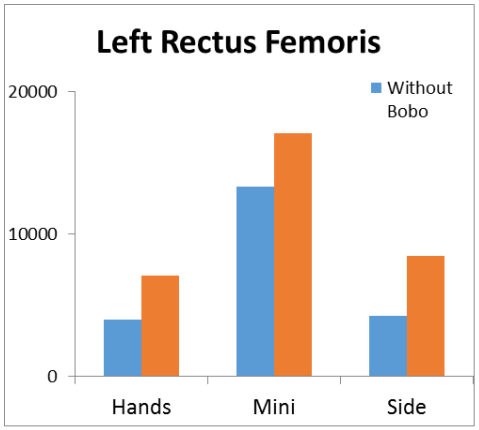

Left Semitendinosus
Without Bobo
With Bobo
20000
10000
0
Hands
Mini
Side

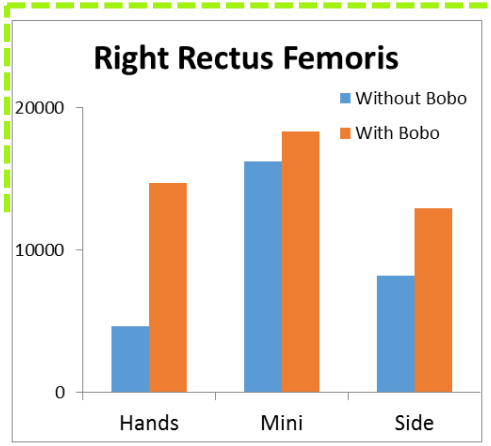

Right Semitendinosus
Without Bobo
With Bobo
20000
10000
0
Hands
Mini
Side

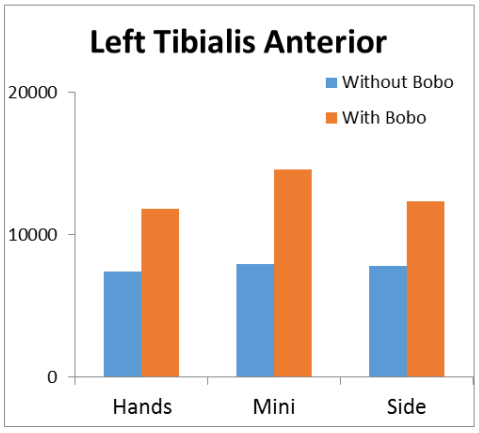

Left Gastrocnemius
Without Bobo
With Bobo
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Hands
Mini
Side

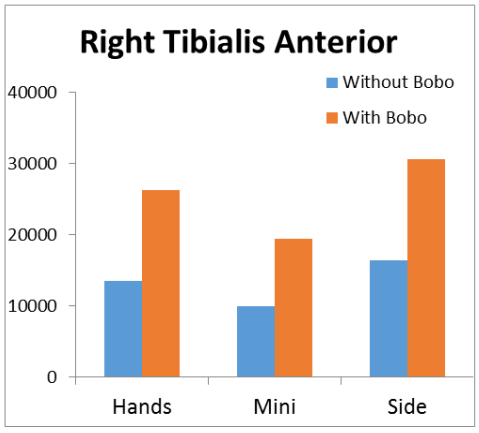

Right Gastrocnemius
Without Bobo
With Bobo
80000
70000
60000
50000
40000
30000
20000
10000
0
Hands
Mini
Side

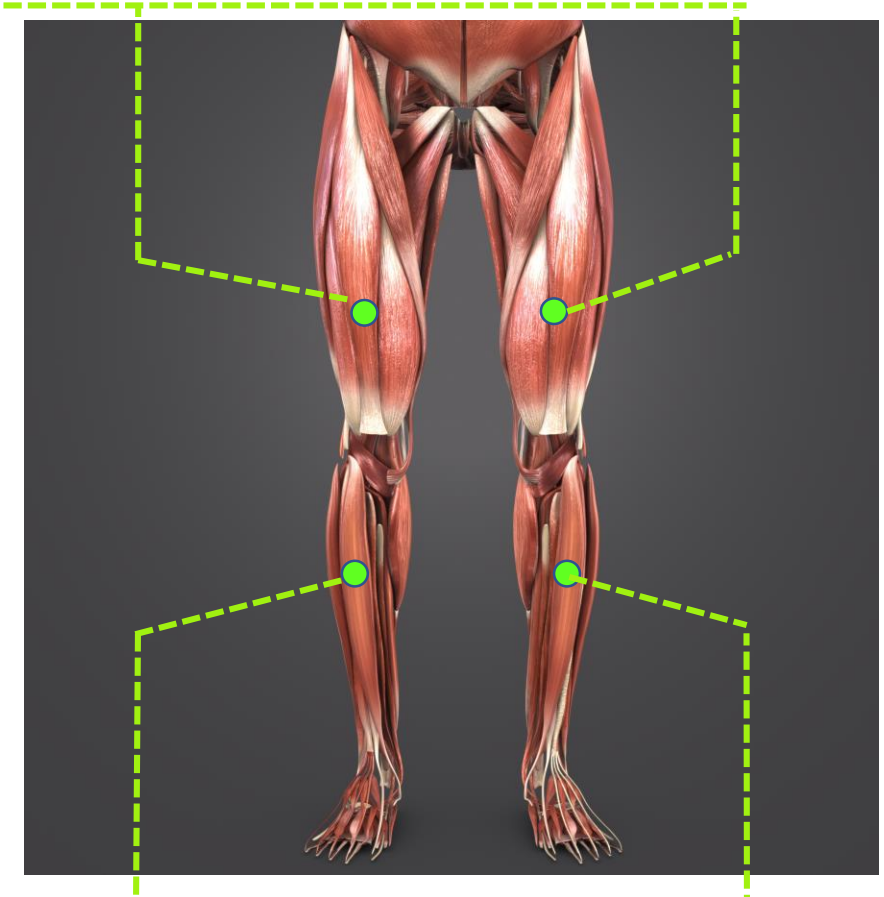
OUTCOMES


Left Rectus Femoris
Without Bobo
20000
10000
0
Hands
Mini
Side


Right Rectus Femoris
Without Bobo
With Bobo
20000
10000
0
Hands
Mini
Side


Left Tibialis Anterior
Without Bobo
With Bobo
20000
10000
0
Hands
Mini
Side


Right Tibialis Anterior
Without Bobo
With Bobo
40000
30000
20000
10000
0
Hands
Mini
Side



CONCLUSIONS

The correlation that was found between variety of balance exercises protocol, with and without using bobo, and the specific muscles activation in each protocol, indicates that:

1.The lower limb muscles activities are higher while using the bobo than using a standard balance training tool.

2. The quality and the effectiveness of the workout were improved.

3. Connecting real-time biofeedback to the training is effective.

4. The engagement factor when exercising on a balance training tool is an important key.