



**Electromyography (EMG)
Muscle Activity
COMPARISON RESEARCH**

**Basic/beginner use of Booty Bounce Jogger VS.
SQUATS, LUNGES TREADMILL, INDOOR CYCLE,
and a MINI TRAMPOLINE REBOUNDER,**

Test Site Location:
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From:

OC Testing Center

Sponsor:

Tweebaa Inc.

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Abstract

Seven screened volunteer subjects agreed to take part in this muscle activity research study. These volunteer subjects were examined to assess the muscle activity effects of beginner level use utilizing an exercise device known as the Booty Bounce Jogger™ vs. a motorized treadmill workout, a spinner type indoor cycle workout, squats, lunges and a mini trampoline.

Testing protocol was approved and administered by Dr. Bob Girandola Ed.D, a Department of Kinesiology Associate Professor at the University of Southern California.

7 subjects were tested for the EMG activity from the same 5 muscle areas while performing an exercise utilizing the Booty Bounce Jogger™ device and compared to various other traditional workouts such as a workout utilizing a mini trampoline AKA rebounder, motorized treadmill, indoor cycle and squats.

Surface electrodes, used to collect the muscle activity signals, were placed on the targeted 5 muscle areas.

Subjects were instructed to perform the exercises for approximately 3 minutes. A one minute sampling of the workout was used for the tests. The subject was not aware of when this sample would be taken during the 3 minute period. Subjects performed each workout with a ten minute rest period in between.

INTRODUCTION

The Testing Center conducted a Booty bounce Jogger™ research study for Tweebaa Inc. designed to document a user's level of muscle activity while performing specific styles of workouts. The results of this study will help Tweebaa document effectiveness of the product.

Product Photo: The Booty Bounce Jogger™ Device:



The tested Booty Bounce Jogger™ Exercise utilizing the Booty Bounce Jogger™ device was the Lateral Heal Press Jog

Test subjects were instructed to begin in the starting position with feet wider than shoulder width apart and toes pointed slightly inward, knees bent and begin to lift and press each heel to acquire a side to side jogging motion in rhythm with the bounce effect of the Booty Bounce Jogger. Shift body weight from side to side while lifting and pressing the heels into the surface.

SUBJECTS:

7 subjects attended the test day. 3 men and 4 women. The initial characteristics/measurements for the subjects were the following:

TABLE 1:

Subject #	Gender	Age	Height	Weight	BMI	FIT level
901	F	52	5'5	123	20	Excellent
902	M	26	6'3	223	28.5	Fair
903	M	57	5'6	159	26	Good
904	F	51	5'3	132	23	Good
905	F	37	5'3	130	23	Good
906	M	50	6	198	27	Fair
907	F	50	5'2	113	21	Good

As can be noted above, the group represented a broad spectrum of ages and fitness levels, with ages ranging from 26 years to 57 years, and fitness levels ranging from fair to excellent. BMI ranged from 20 to a high of 28.5. The National Institute of Health defines overweight as having a Body Mass Index of 25 to 29 and obese as 30 or more. The above characteristics indicate the group represented normal and overweight.

Objectives:

The key objectives of this study were to:

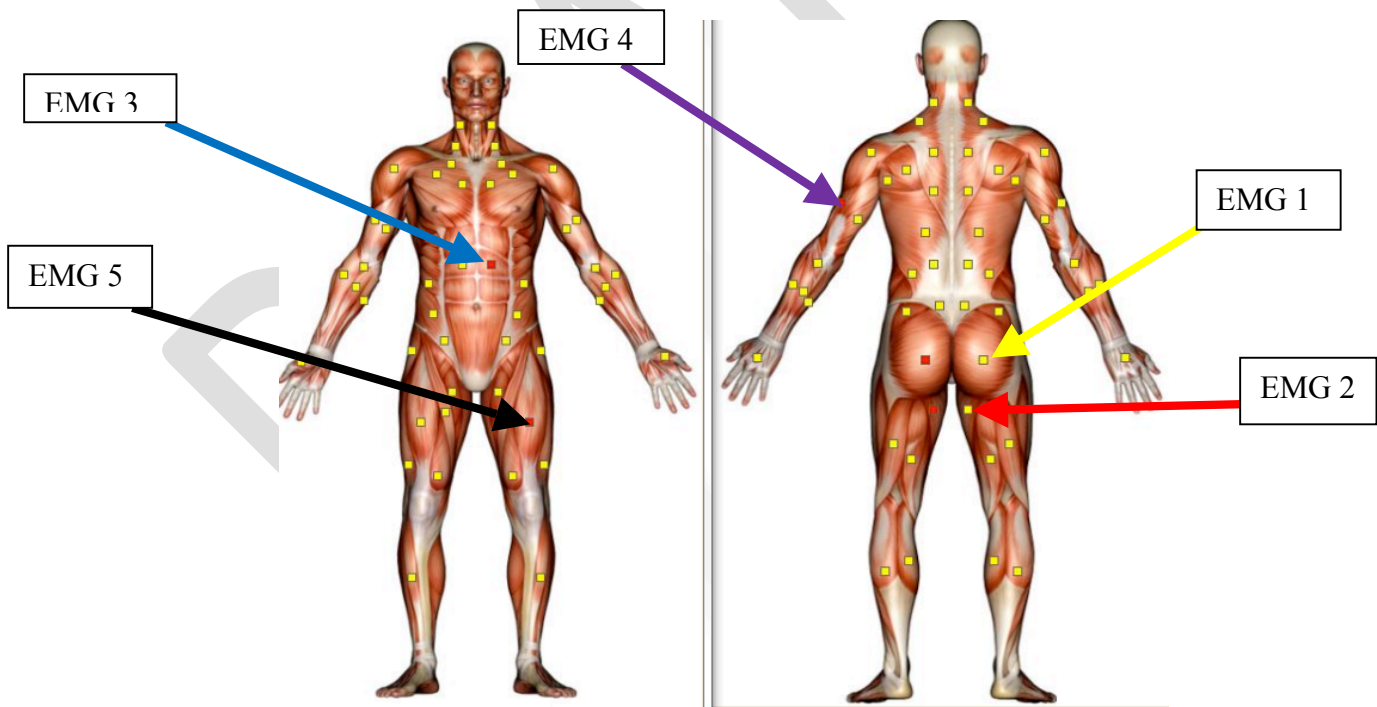
- 1) Capture Electromyography (EMG) readings as it relates to muscle activity during the tested workouts to be compared.
- 2) Determine if there are any statistically significant differences.

METHODS

Study Methodology

Testing protocol was approved and administered by Dr. Bob Girandola Ed.D, Director of Exercise Science at the OC Testing Center and a Department of Kinesiology Associate Professor at the University of Southern California.

7 subjects were fitted with surface electrodes on the right buttock (EMG 1) the right inner thigh (EMG 2) the top left side of the Rectus Abdominis (EMG 3) muscle, the left triceps (EMG 4), and the left quadriceps (EMG 5). The Test subjects were examined for EMG activity while using the Booty Bounce Jogger™ device and while doing 5 other exercises considered to be effective.



Subjects were instructed to review a brief description for proper Booty Bounce Jogger™ exercise form and were instructed to perform the first basic jog and bounce motion for beginners. Subjects performed each workout for approximately three minutes with a 10 minute rest period in between.

The Booty Bounce Jogger™ exercise was compared to:

1. A motorized treadmill workout, a commonly accepted cardio machine. The treadmill pace was set at 3.1 miles per hour with a 1.5% grade.
2. A spinner style indoor cycle set at approximately 35% (light/medium) resistance and a pace of approx. 75 to 85 revolutions a minute.
3. Common squats conducted repetitively with no weight and as the subject would normally do – no instruction of proper form was given.
4. Jumping repetitively on a standard mini trampoline (also known as a rebounder) as the subject would normally – no instruction of proper form was given.
5. Common lunges conducted repetitively with no weight and as the subject would normally do - no instruction of proper form was given.

The individual mean data is listed in Tables 2,3,4, and 5. The primary comparison of EMG activity can be seen under the mV/RMS column (Root mean square of EMG activity).

Equipment

BTS FREEEMG RT represents a generation leap in the diagnostic device technology for biological signals analysis. Based entirely on wireless technologies, BTS FREEEMG RT uses miniaturized probes with active electrodes weighing less than 9 grams for signal acquisition and transmission for EMG, angles, velocity, acceleration and pressure assessment.

BTS FREEEMG RT satisfies researchers and clinicians requirements who need to rely daily on a highly efficient system easy to configure and use.

The probes amplify the signals, digitize them on board and communicate with the USB receiver connected directly to the computer. The complete absence of wiring not only minimizes the patient distress during the preparation but also grants full range of motion during the task without restrictions. The probes variable geometry and the dramatically reduced size and weight allow them to be used on any body segment and during all types of movement (walking, running, jumping, etc) on a variety of subjects without affecting in any way the motor pattern.



For EMG measurements (muscle activity measurements) a BTS Bioengineering wireless instrument was used. The BTS EMG is used in labs that study muscular activity in the fields of rehabilitation, sports medicine, ergonomics, clinical research, in the studies for the evaluation of functional abilities and muscular fatigue. The BTS EMG was used in conjunction with Myolab software specifically developed for EMG signal acquisition, visualization, and a first level of processing. A BTS Bioengineering certified technician administered the tests.

TEST DATA

Muscle Activity Results from the Research Study:

Table 2, 3, 4, and 5 displays the individual Mean values for the Root Mean Square (RMS). Using the values for the RMS, there was a Statistically Significant difference between working out with the Booty Bounce Jogger™ over squats, lunges, a common rebounder, a treadmill and a cycle workout. The mean data is listed in the accompanying tables. The primary comparison of EMG activity can be seen under the Mv/RMS column. This indicates that, almost all individuals, performing a workout with the Booty Bounce Jogger™, will generate more activation of the targeted muscle group than the tested treadmill, cycle, squat, lunge, and rebounder workouts.

In comparing the mean data for the RMS column for Booty Bounce Jogger™ vs. Squats, Lunges, a Treadmill an Indoor Cycle and a Mini Trampoline Rebounder, the Booty Bounce Jogger produced higher values for buttock, abdominal, and inner thigh than any of the other traditionally considered effective exercise.

Table 2:

Buttock EMG Mean Muscle Activity in mV/RMS	BBJ	Mini Trampoline Rebounder	Squats	Lunges	Tread mill	Bike
901	.029	.013	.01	.008	.007	.005
902	.013	.009	.008	.01	.005	.004
903	.01	.005	.007	.006	.005	.009
904	.02	.02	.008	.007	.009	.006
905	.036	.019	.016	.009	.009	.007
906	.011	.005	.007	.007	.006	.006
907	.012	.006	.007	.006	.007	.007
Ave RMS	.02	.011 (45%)	.009 (55%)	.008 (60%)	.007 (65%)	.006 (70%)

As seen in Table 2 the Booty Bounce Jogger™ beginner exercise generated more buttock muscle activity, on average, than the tested Rebounder, Squats, Lunges, the Treadmill workout and the Indoor Cycle workout. 45% more than the tested Rebounder, 55% more than the tested squats, 60% more than the tested lunges, 65% more than the treadmill workout and 70% more than the indoor cycling. In addition, a Statistically Significant result was registered for the Buttock using Booty Bounce Jogger™ over all of the above tested exercises. Rebounder $P \leq 0.02$ * Squats $P \leq 0.01$ * Lunges $P \leq 0.02$ * Treadmill $P \leq 0.01$ * Bike $P \leq 0.02$ *

Table 3:

Right Inner Thigh EMG	BBJ	Mini Trampoline Rebounder	Squats	Lunges	Tread mill	Bike
901	.02	.023	.009	.03	.012	.011
902	.043	.04	.046	.04	.033	.016
903	.04	.031	.018	.028	.012	.076
904	.021	.018	.012	.015	.016	.013
905	.056	.057	.03	.03	.023	.016
906	.035	.026	.01	.016	.072	.022
907	.01	.014	.012	.014	.017	.013
Ave RMS	.032	.03 (6%)	.012 (62%)	.028 (12%)	.026 (19%)	.024 (25%)

As seen in Table 3 the Booty Bounce Jogger™ workout generated more Inner thigh muscle activity, on average, than the tested Rebounder, squats, lunges, the treadmill workout and the indoor cycle workout. 62% more than the tested squats, 12% more than the tested lunges, 19% more than the treadmill workout and 25% more than the indoor cycling. In addition, there was a slight advantage of 6% more activity in favor of the Booty Bounce Jogger over the rebounder and a Statistically Significant result over Squats. $P \leq 0.03^*$.

Table 4:

Left Abs	BBJ	Rebounder	Squats	Lunges	Tread mill	Bike
901	.026	.021	.013	.01	.014	.017
902	.016	.01	.007	.007	.005	.006
903	.017	.012	.011	.009	.007	.007
904	.015	.011	.012	.013	.007	.007
905	.021	.017	.017	.018	.012	.014
906	.015	.013	.013	.012	.007	.009
907	.011	.022	.019	.015	.011	.011
Ave RMS	.017	.015 (12%)	.013 (24%)	.012 (29%)	.009 (47%)	.009 (47%)

As seen in Table 4 the Booty Bounce Jogger™ workout generated more abdominal muscle activity, on average, than the tested rebounder, squats, lunges, the treadmill workout and the indoor cycle workout. 12% more than the tested Rebounder, 24% more than the tested squats, 29% more than the tested lunges, 47% more than the treadmill workout and 47% more than the indoor cycling. Again, Statistically Significant results were registered for the abdominals using Booty Bounce Jogger™ over the treadmill $P \leq 0.001^*$ and indoor cycling $P \leq 0.001^*$.

Table 5:

Left Quad Mean Muscle Activity in mV/RMS	BBJ	Rebounder	Squats	Lunges	Tread mill	Bike
901	.026	.027	.015	.032	.01	.022
902	.047	.034	.065	.044	.026	.011
903	.033	.038	.049	.047	.011	.049
904	.03	.036	.033	.031	.018	.015
905	.042	.042	.019	.025	.014	.013
906	.025	.028	.014	.023	.05	.01
907	.01	.015	.013	.018	.01	.023
Ave RMS	.030	.031	.030	.031	.02 (33%)	.020 (33%)

As seen in Table 5 the Booty Bounce Jogger™ workout generated more quadriceps muscle activity, on average, than the tested, treadmill workout and the indoor cycle workout. 33% more than the treadmill workout and 33% more than the indoor cycling. The Booty Bounce Jogger also resulted in equivalent or close to equivalent to the front thigh (quadriceps) activity generated while conducting repetitive squats, jumping on a rebounder, and repetitive lunges.

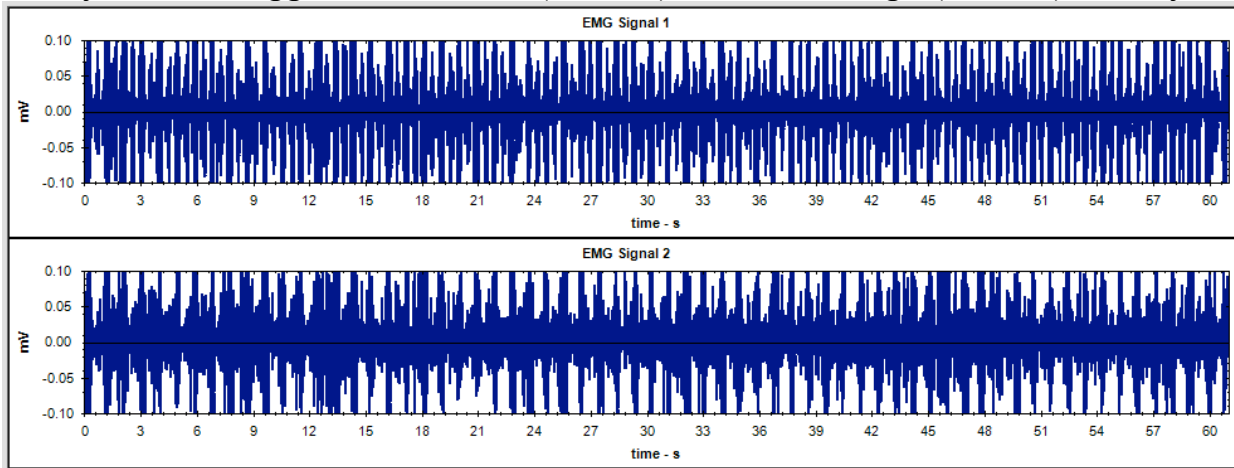
The RMS is the preferred value for this type of study because it provides a measure of the power of the signal (degree of activity). RMS represents the square root of the average power of the EMG signal for a given period of time

As Table 2, 3, 4 and 5 indicate the Booty Bounce Jogger proved to be more effective at generating targeted muscle activity than jumping on the rebounder, treadmill workout, indoor cycle workout, squats and lunges.

Sample EMG Graph Comparison Snippets.

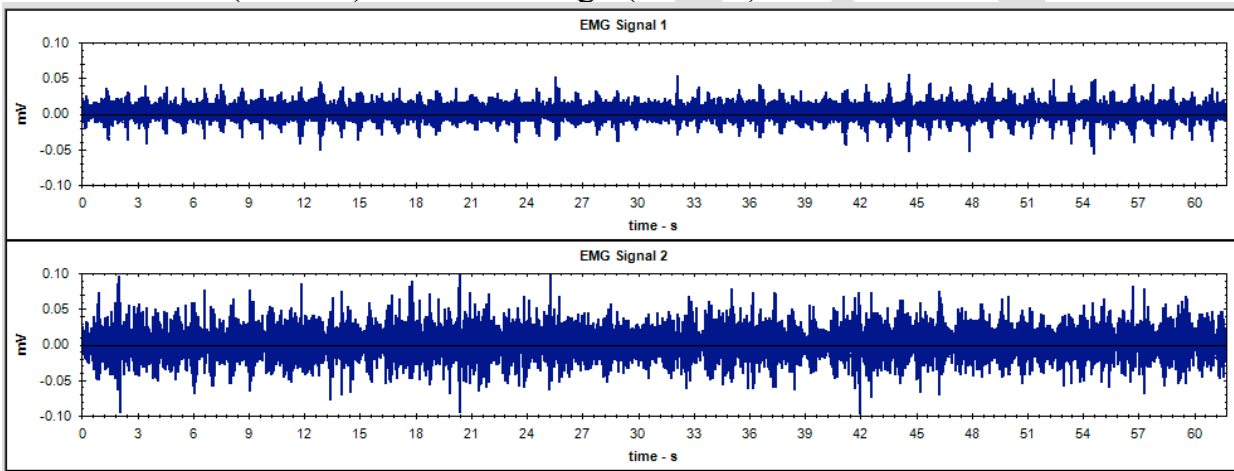
Subject 901 Examples:

Butty Bounce Jogger™ : Buttock (EMG 1) and Inner Thigh (EMG 2) activity.



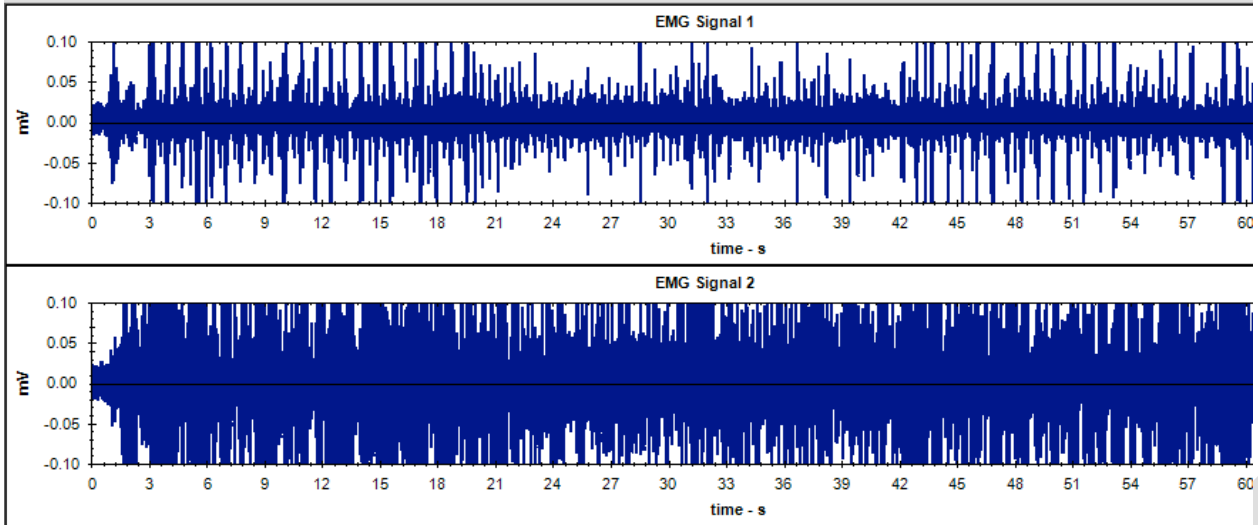
Subject 901

Bike: Buttock (EMG 1) and Inner Thigh (EMG 2)



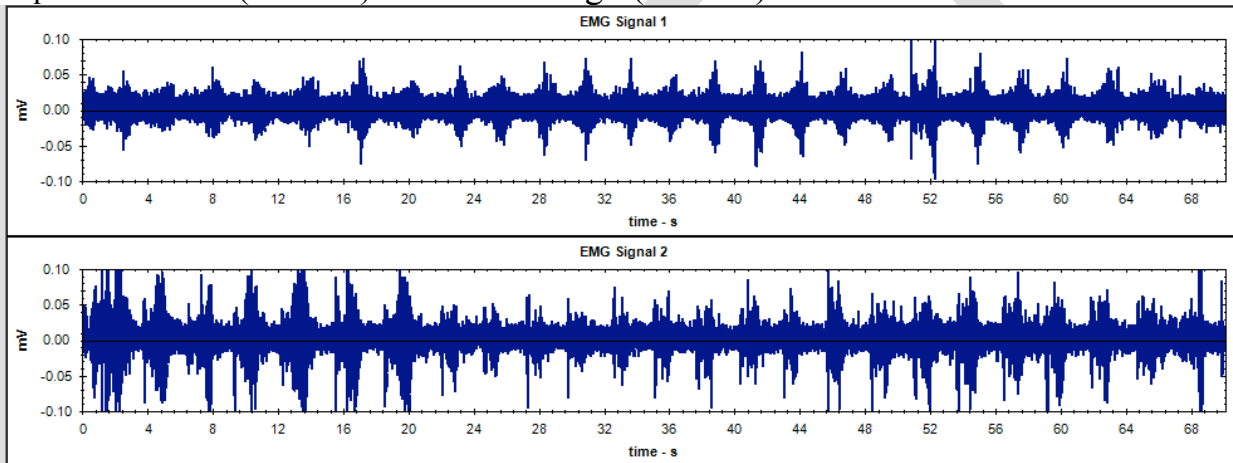
Subject 906 Examples:

Butty Bounce Jogger™: Buttock (EMG 1) and Inner Thigh (EMG 2)



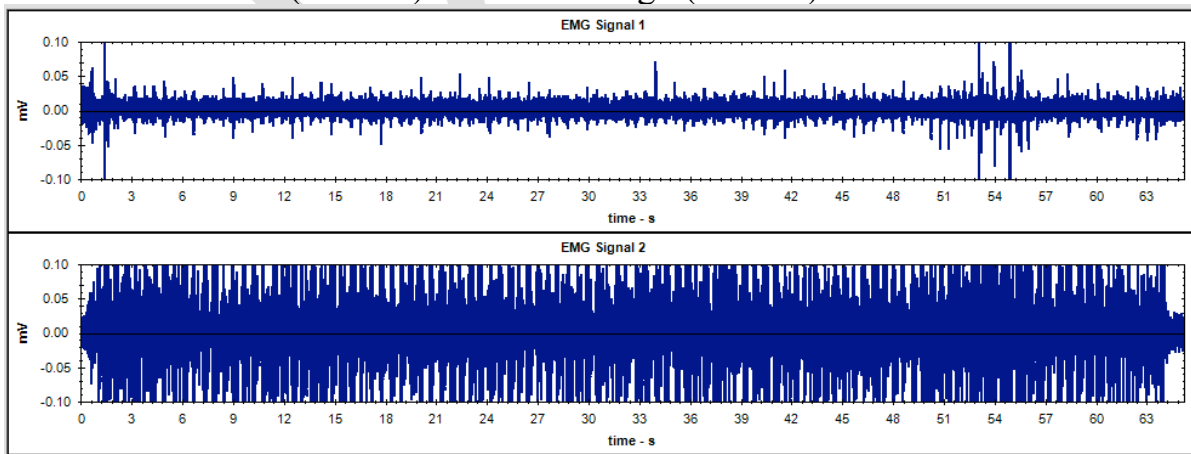
Subject 906

Squats: Buttock (EMG 1) and Inner Thigh (EMG 2)



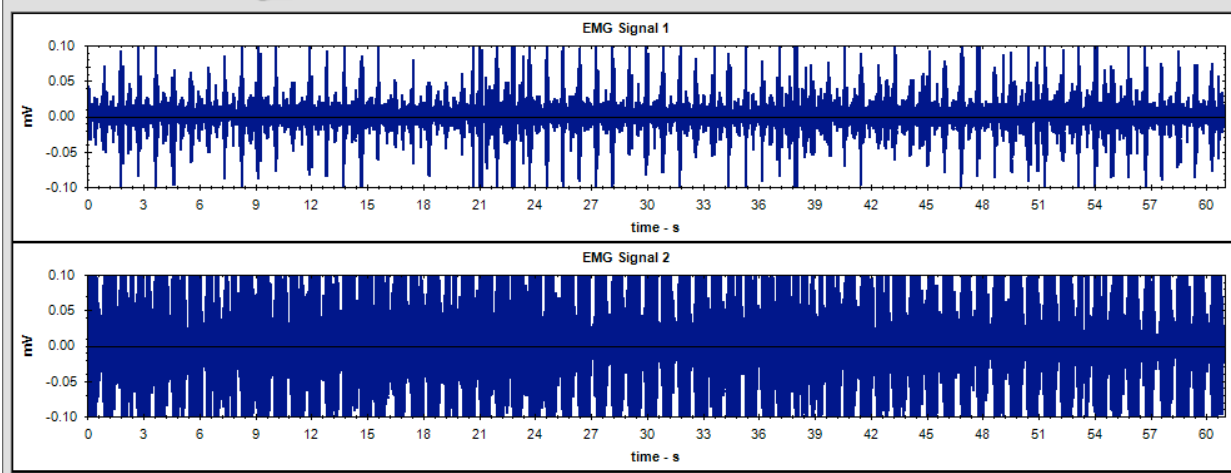
Subject 906 Example:

Rebounder: Buttock (EMG 1) and Inner Thigh (EMG 2)



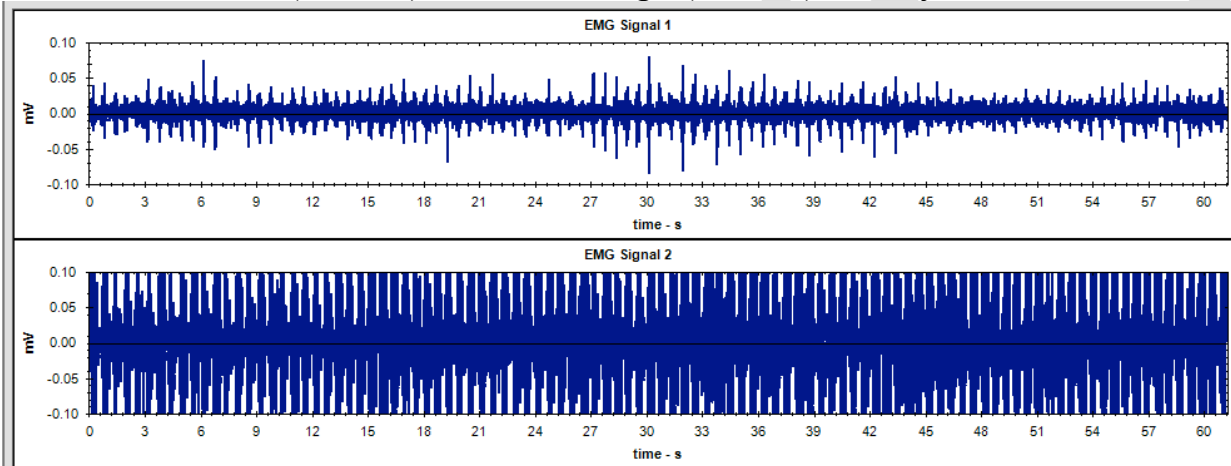
Subject 903 Example:

Butty Bounce: Buttock (EMG 1) and Inner Thigh (EMG 2) activity



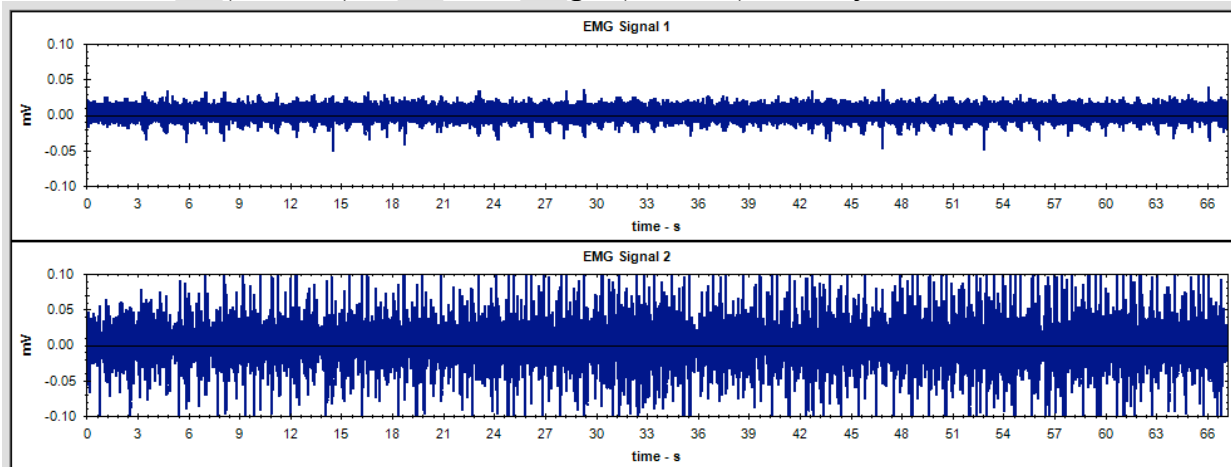
Subject 903:

Rebounder: Buttock (EMG 1) and Inner Thigh (EMG 2) activity



Subject: 903

Bike: Buttock (EMG 1) and Inner Thigh (EMG 2) activity



STATISTICS FOR EMG:

On average, one can see that the **Booty Bounce Jogger™** generated more activity in more categories than the other tested workout exercises, traditionally considered to be effective, in almost every category. What the statistics show (T Test) is that there were numerous differences found in favor of the **Booty Bounce Jogger™** that were close to or were Statistically and Highly Statically Significant.

Statistics is the method of showing that the differences found in one group would be the same if another group of subjects was tested.

These values are Statistically Significant, for inner thigh $P \leq .03$ (vs. squats). In addition, Statistically Significant values for the buttocks muscles were registered when comparing the **Booty Bounce Jogger™** to the Rebounder $P \leq 0.02$ * Squats $P \leq 0.01$ * Lunges $P \leq 0.02$ * Treadmill $P \leq 0.01$ * Bike $P \leq 0.02$ *. Statistically Significant results were also registered for the abdominals using **Booty Bounce Jogger™** over the treadmill $P \leq 0.001$ * and indoor cycling $P \leq 0.001$ *.

Normally, what is accepted in comparing exercise equipment or programs is $P \leq 0.05$ (95 out of 100) or $P \leq 0.01$ (99 out of 100). Meaning that 95 times out of 100 we would obtain the same results with any other group of subjects.

A Statistically Significant result was registered for the largest muscle group, the buttock, using **Booty Bounce Jogger™** over all 5 tested exercises including the rebounder, squats, lunges, treadmill and indoor cycling.

Even though many exercise and fitness programs test on average to be beneficial to the user not many ever establish a Statistically Significant result over the traditional exercises such as rebounding and squats. The **Booty Bounce Jogger™** Statistically Significant results do strongly support that 95% or more of **Booty Bounce Jogger™** users will achieve the same result i.e. more targeted muscle activation than the compared exercises.

DISCUSSION:

In comparing the **Booty Bounce Jogger™** workout to the treadmill it is obvious that the mean (average) values are mostly higher than the treadmill. Comparing the values for EMG activity using Squats as compared to the **Booty Bounce Jogger™** exercise activity also shows an advantage when using the latter. Typically Squats are considered to be the primary means of activating the largest “fat burning” muscles while the treadmill or cycle is considered to be the primary means of “burning” calories. Thus, any activity that compares favorably to or EXCEEDS those values should be considered excellent.

CONCLUSIONS:

The results revealed that a **Booty Bounce Jogger™** exercise is highly more effective at activating more fat burning and body shaping muscle each second of use than other traditional exercises including squats, lunges, an indoor cycle workout and working out on a treadmill. The **Booty Bounce Jogger™** activated the abdominals, buttock, and quadriceps better than squats, lunges, an indoor cycle workout and working out on a treadmill.

In solidifying the **Booty Bounce Jogger™** and its exercises as an efficient and effective muscle activating device not only was the average activity higher in 90% of the tested exercise and muscle categories there was also numerous Statistically Significant differences in favor of the **Booty Bounce Jogger™** workout per the targeted muscle activity testing (EMG) when comparing use of rebounder, a treadmill the indoor cycle, lunges and even squats.

A core finding of this study is the low impact 1st stage beginner exercise on the **Booty Bounce Jogger™**

resulted in higher targeted muscle activity levels of the largest fat burning muscle group when compared to the workout on the rebounder, motorized treadmill, indoor cycle, squats and lunges all while still activating the core and upper body muscles.

The Booty Bounce Jogger™ Statistically Significant results over the other tested workouts do scientifically support that 95% or more of the Booty Bounce Jogger™ users will achieve the same result i.e. more targeted muscle activation than the compared traditionally considered effective exercises which in turn creates a more effective and efficient workout for the user.

The Booty Bounce Jogger resulted in Statistically Significant result over Squats. $P \leq 0.03^*$ for the inner thigh. Giving strong statistically proven evidence that the booty bounce Jogger is better than squats at activating the inner thigh. In addition, a Statistically Significant result was registered for the Buttock using Booty Bounce Jogger™ over all of the 5 tested exercises. Rebounder $P \leq 0.02^*$ Squats $P \leq 0.01^*$ Lunges $P \leq 0.02^*$ Treadmill $P \leq 0.01^*$ Bike $P \leq 0.02^*$ Giving strong statistically proven evidence that the Booty Bounce Jogger™ is better than all 5 at targeting the largest fat burning muscle of the body.

Combining the tested Booty Bounce Jogger™ with regular use we would anticipate a user to generate beneficial improvements in lower body and core (specifically the buttock muscle) toning and appearance more efficiently and effectively than the other traditional exercises tested in this study.

DRAFT