

A clinical study of 21 male golfers assessing swing speed and hip translation with use of a hip strengthening device.

Dr. Erin Markel, DPT, CSCS Performance Rehab Associates Charlotte, NC

Abstract

BACKGROUND

SpeedCore is a rotational hip strengthening device focusing on an increase in hip girdle strength as well as a gain in IR and ER ROM of the pelvis around a fixed femur. The SpeedCore is made up of a waist belt, loop & hook closures, metal loop hooks, and resistance bands with buoy for anchor into the doorway. For the purpose of this study we are defining the hip girdle as the following musculature: Obturator Externus, Obturator Internus, Piriformis, Superior Gemellus, Inferior Gemellus, Quadratus Femoris, Glut max, Glut min, Glut med, Adductor magnus, and Tensor Fascia Lata. Hip rotational strength and ROM have been linked to increased swing speed and accuracy in golfers from recreational to professional. To evaluate the patterns of swing speed and hip translation among golfers with the use of the SpeedCore device, we undertook a clinical study of 21 male participants.

METHODS

21 participants were ascertained through local golf clubs in the Charlotte Metro Area with most participants members of Ballantyne Country Club. Consent and a questionnaire were completed by participants beforehand and 7 baseline assessments were taken at initial evaluation for inclusion criteria. Swing Speed was obtained by a golf swing speed radar (Sport Sensors, Inc.) as participants used their own driver, hit foam/practice golf balls off turf and tee into a large sport net. Participants were filmed using Spark Motion Pro software and hip translation in the frontal plane measurements were calculated. Hip frontal plane translation was calculated by pubic symphysis (center of mass) pelvic marking at backswing or maximal body coil and at through swing or release of energy (past impact of ball). Swing speed and hip frontal plane translation measurements were taken monthly for a total of 6 months, with all participants compliant for 4 months. Participants were expected to use the SpeedCore daily performing 2 sets of 20 reps (approx 10 min daily) moving to every other day at 60 lbs or higher. Participants started at 20-40 lbs and increased accordingly up to 80 lbs. A follow up phone assessment at the end of study was provided.

RESULTS

21 (100%) of participants increased their overall swing speed from the initial session. An average of 7.3 mph swing speed improvement was seen for each participant. This equates to approx 15 yard distance on the golf course with use of a driver. (Sherman, 2019) 19 (90%) of participants provided subjective feedback stating accuracy improved as well. 18 (86%) of participants increased in frontal plane hip translation, playing a significant role in improved accuracy and speed of golf swing. 3 participants had unilateral or bilateral hip replacements at least 2 years post op. Of these participants, 2 (67%) increased hip frontal plane translation and 3 (100%) had an increase in swing speed and accuracy. (Table 1:1)

CONCLUSIONS

The SpeedCore device can be used to increase swing speed and accuracy in golfers, create

more strength of the hip girdle musculature, and improve hip rotation and frontal plane translation needed in daily and sport activities.

Clinical Study:

INTRODUCTION:

As of 2020, American golfers are estimated to make up 101 million (Golf Industry Facts, 2020) of the population. With a sport this large there are many injuries that can occur. If the hips are unable to rotate adequately to provide force for the swing this can lead to low back, and lower extremity injuries.

Throughout a golf swing the pelvis has to rotate in the transverse plane and translate in the frontal plane over a fixed femur, providing load and weight shift of center of mass from back leg to front leg to gain power and club head speed. It is extremely difficult to conventionally measure pure rotation of the pelvis during a golf swing as this is only one of the movements the pelvis goes through to complete the movement accurately. During the SpeedCore clinical study, frontal plane translation was measured. If the hip girdle musculature can co-contract to create powerful hip rotation through the transverse plane this will create adequate frontal plane transfer of body mass, thus more swing speed. Many golfers have difficulty with pelvis rotation and translation and therefore are unable to provide enough strength and ROM to complete a golf swing in a powerful and accurate motion. This leads to premature “pop up” or early lumbar extension causing a decrease in swing speed and overall accuracy.

The SpeedCore device was developed by avid golfers, Quresh Sachee, Dr. Jerry Cooley, and John Bumgarner. The SpeedCore is a device that consists of a waist strap with loop & hook closures, metal loop hooks, and progressive resistance bands (from 20 lbs- 100 lbs) with bouy on end to close in door. The objective of the use of the SpeedCore is to increase overall hip girdle strength and increase IR and ER ROM. For the purpose of this study we are defining the muscles in the hip girdle as: Obturator Externus, Obturator Internus, Piriformis, Superior Gemellus, Inferior Gemellus, Quadratus Femoris, Gluteus maximus, Gluteus minimus, Gluteus medius, Adductor magnus, and Tensor Fascia Lata.

The aim of this study was to assess if the use of the SpeedCore device for at least a four month period (17 weeks) in male golfers would increase swing speed as well as hip frontal plane translation from maximal body coil at backswing to release of energy at through swing. This will lead to greater accuracy of swing and club head speed, which in theory should lead to increased distance.

METHODS:

21 participants were obtained from local golf clubs in the Greater Charlotte Area. Most of these participants were members at Ballantyne Country Club. Participants were all male mid 30's to mid 70's in age. Each golfer was asked to complete consent and an intake questionnaire with handicap, amount of play, history of injury and surgeries. Upon initial assessment, 8 stations were completed. These stations consisted of : Shoulder 90/90 test, Ankle Rocker test, Torso Rotation Test, Lower Quarter Rotation Test, Supine 90/90 Hip IR and ER ROM, Prone 90 Hip IR and ER ROM, Swing Speed with radar (Sport Sensors, Inc) and Hip Frontal Plane Translation - filmed and measured with Spark Motion Pro.

1. **Shoulder 90/90 Test:** (Performed in standing and in a normal five iron posture) The golfer stands tall and holds their right arm out to their side with 90 degrees of flexion in their elbow and 90 degrees of side abduction at the shoulder joint. Now without letting them bend their torso backwards, have the golfer try to externally rotate (rotating hand back) as far as possible. This was performed on both sides. The golfer must be equal to or more than the spine angle to pass test. (Rose, 2013)

(Picture 1:1)

2. **Ankle Rocker Test:** The golfer stands facing a wall and places their hand horizontally at the wall. The golfer then puts the tip of their toe up to where the hand meets, as they are to line up foot one hand's width away from the wall. Keeping Bilateral ASIS facing the wall, the golfer places the opposite foot backwards in a step stance position. Keeping the front heel down, the golfer must touch the front knee to the wall. This was performed on both sides. The golfer must translate 2/3 of the motion or hit the wall to pass test.





(Picture 1:2)

3. Torso Rotation Test: The golfer stands in a normal five iron posture with their arms crossed over their shoulders. Feet should be shoulder width apart and hands resting on front of each shoulder. The golfer is to try and rotate the upper body without moving the lower body. If minimal movement was noted below the waistline the golfer passed this test. (Rose, 2013)



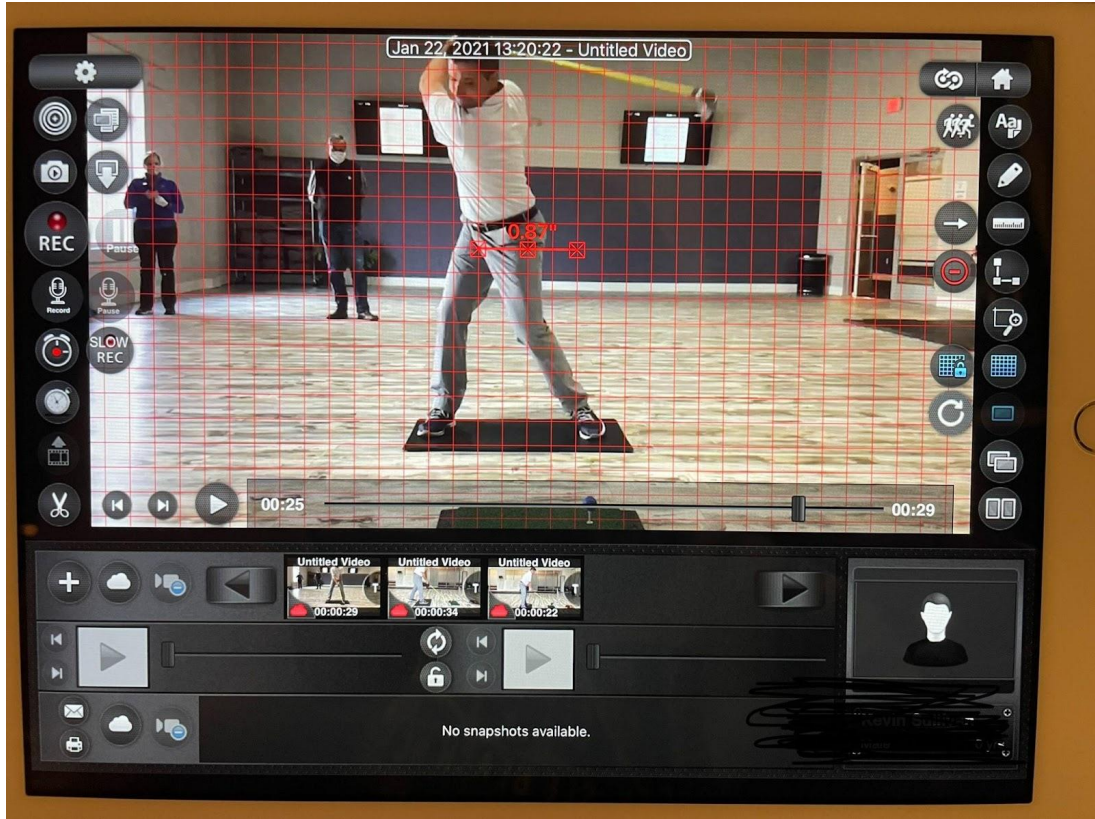
(Picture 1:3)

4. Lower Quarter Rotation Test: The golfer is to put all of their weight on one leg and bend the other knee, placing the toe on the ground next to the leg that is being tested. The golfer is to place their hands on their hips and is to try and rotate as far as possible in both directions. This was performed on both sides. 60 degrees of rotation was optimal. 40 degrees of rotation was needed to pass this test. (Rose, 2013)

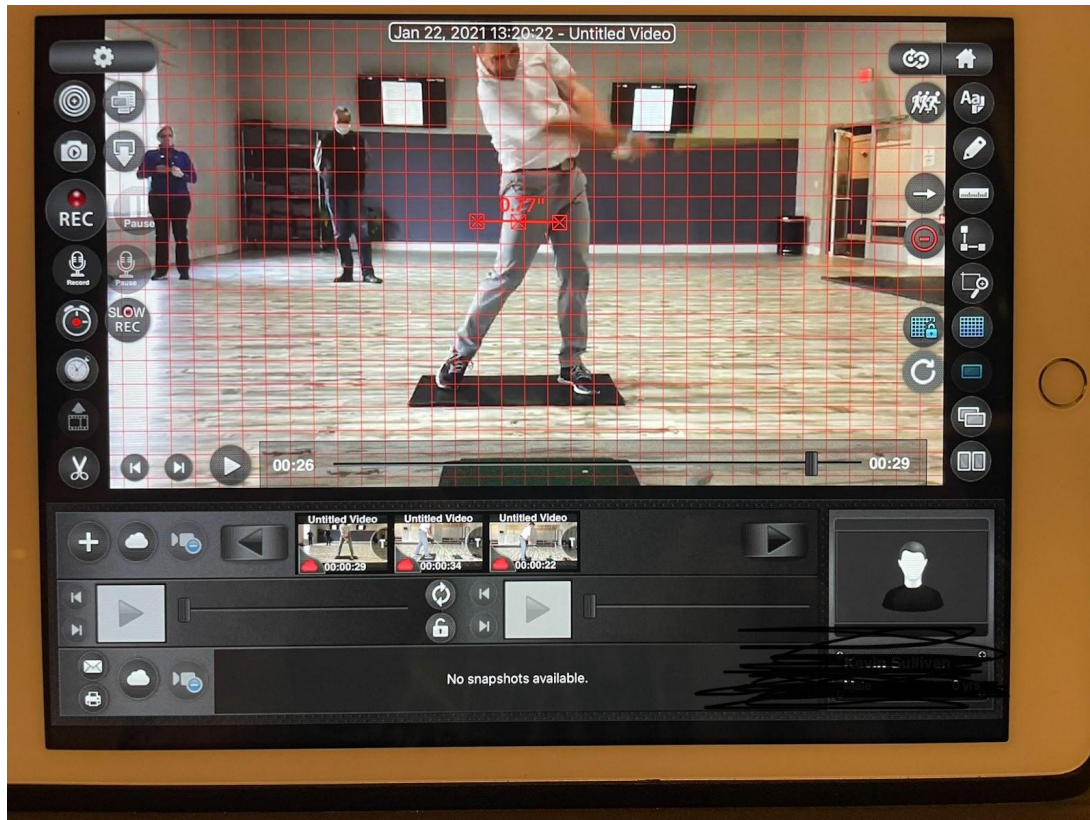


(Picture 1:4)

5. Supine 90/90 Hip IR and ER ROM: Golfer was to lie in supine on a treatment table. Doctor of Physical Therapy, manual brought golfer's hip up to 90 degrees of flexion with knee at 90 degrees of flexion. The golfer was cued to move the foot in or out and IR and ER ROM was measured by use of a goniometer. 30 deg or greater was used as inclusion criteria for the purpose of the study. This was performed on both sides.
6. Prone 90 Hip IR and ER ROM: Golfer was to lie prone with feet hanging off of the treatment table. Doctor of Physical Therapy, manually brought the client's knee into 90 degrees of flexion as patient was cued to bring foot inward or outward to measure IR and ER ROM, measured by use of a goniometer. 30 deg or greater was used as inclusion criteria for purpose of study. This was performed on both sides.
7. Swing Speed: Golf Swing Speed Radar was used and set up accordingly to measure speed in mph monthly. (Sport Sensors, Inc radar was used)
8. Hip Frontal Plane Translation: Golfers swings were videotaped by an Apple iPad device with the use of Spark Motion Pro facing the golfer and later pelvic translation calculated. Measurements were taken from the pubic symphysis at end coil or backswing through release of energy of pelvis (after impact of ball). (Spark Motion Pro) (Pic 1:5 and 1:6)



(Pic 1:5)



(Pic 1:6)

Numbers 1-6 were used as inclusion and exclusion criteria and Numbers 7-8 were tested monthly.

After passing inclusion criteria, participants were given a SpeedCore belt with 20 and 40 lb resistance bands. Each golfer was given a demonstration and shown proper use of the belt. The SpeedCore belt is applied around the waist. The resistance band with buoy is closed in the door so you can move away from the door against resistance. Each golfer was to walk forward until resistance was met. They were to start on their right side and move to their left side with a rotational motion creating an Internal Rotation force at initial movement of the hip and an External Rotation force at release. They were also sent an instructional video. Participants were instructed to start with either 20 or 40 lb. band that they could feel some resistance against them. They were to use the SpeedCore daily at 2 sets of 20 reps until moving up to 60 lbs or greater where they were instructed to use every other day.

(Picture 1:7)

Each participant filled out a chart to check off daily or every other day use of the device and weight of resistance. Swing speed was taken by radar (Sport Sensors, Inc.) in a gym space with a foam ball, turf and tee into a sport net. Each golfer performed the swing with their own driver for best consistency of result. Participants had a 5 min warm up, however they saw fit and were given 5 swings in which the top 3 swing speeds were recorded and average taken for top swing speed for that session. The highest swing speed of that session was recorded using Spark Motion Pro. This application was used to measure the hip frontal plane translation of each client.

The pubic symphysis (center of mass) was marked on video and translation was measured in inches from end coil on backswing to release of pelvic energy on through swing, or



past impact of ball. (Refer to Pic 1:5 and 1:6) Swing speed and hip frontal plane translation were measured monthly for 6 months. Participants included in study had at least 4 months of regular use and check in's.

RESULTS: (see table 1:1)

Study Population:

21 male golfers were selected from the study for regular use and swing speed check in's. All golfers were members of local golf clubs in the greater Charlotte area and played golf at least 2 x a week or greater on average. Golfer age ranges from 38-76 years old with an average of 62.7 years old (SD of 9.996). 2 of the golfers were in their thirties, 4 of the golfers were in their fifties, and the remaining were in their sixties or seventies. 3 of the participants had unilateral or bilateral hip replacements at least 2 years post op.

SpeedCore Use:

14 (67%) participants started at 40 lb resistance or greater. 7 (33%) participants started at 20 lb resistance. Each participant used the SpeedCore daily as recommended 2 sets of 20 reps with a decrease to every other day use as resistance went up to 60 lbs or greater. 20 (95%) of participants ended at 60 lb resistance or greater after 4 months of use.

Swing Speed:

21 (100%) of participants increased their overall swing speed from the initial session. An average of 7.3 mph swing speed improvement was seen for each participant. This equates to

15 yard distance on the golf course with use of a driver. (Sherman, 2019) Of the 3 participants with hip replacement, 3 (100%) had an increase in swing speed.

Accuracy:

19 (90%) of participants provided subjective feedback stating accuracy improved as well. Of the 3 participants with hip replacement, 3 (100%) had an increase in accuracy.

Frontal Plane Hip Translation:

18 (86%) of participants increased in frontal plane hip translation, playing a significant role in improved accuracy and speed of golf swing. Of the 3 participants with hip replacement, 2 (67%) increased hip frontal plane translation.

Table 1:1

SpeedCore STUDY RESULTS					
	AGE	INITIAL SWING SPEED (mph)	HIGHEST SWING SPEED (mph) **	INITIAL HIP TRANSLATION (inches)	HIGHEST HIP TRANSLATION (inches) **
Participant 1	70 years old *	82	85	0.38	0.54
Participant 2	70 years old	79	88	0.44	0.57
Participant 3	68 years old *	81	85	0.47	0.55
Participant 4	53 years old	83	85	0.71	0.71
Participant 5	62 years old	88	92	0.54	0.56
Participant 6	73 years old	78	84	0.55	0.63
Participant 7	58 years old	89	99	0.52	0.63
Participant 8	38 years old	105	120	0.69	0.72
Participant 9	54 years old	83	94	0.64	0.65
Participant 10	67 years old *	81	96	0.57	0.57
Participant 11	62 years old	97	105	0.51	0.61
Participant 12	76 years old	83	91	0.42	0.55
Participant 13	58 years old	91	99	0.69	0.73
Participant 14	68 years old	77	83	0.44	0.53
Participant 15	67 years old	73	80	0.41	0.49
Participant 16	62 years old	97	103	0.58	0.6
Participant 17	75 years old	76	78	0.22	0.38
Participant 18	39 years old	96	105	0.72	0.78
Participant 19	61 years old	95	100	0.58	0.58
Participant 20	71 years old	68	78	0.42	0.62
Participant 21	65 years old	77	83	0.64	0.64
*	<i>total hip replacement</i>				
**	<i>after 4 months of use</i>				
Average	62. 7 years old	84. 7	92	0.53	0.6

CONCLUSION:

The SpeedCore device has shown to increase swing speed, accuracy, and hip frontal plane translation in golfers over a period of a consistent four month use. The SpeedCore device

localizes activation of the hip girdle (defined in background) over a fixed femur. This unique mechanism trains a specific pattern of muscles that presumably correlate with efficient hip rotation and body weight translation. We have shown in this study that this trainable mechanism directly correlates with golf swing speed, efficiency, and power. It is our opinion that the Hipster's unique isolation of the deep hip musculature has a positive effect on conservatively managed hip joint pathologies in a rehabilitation setting. We also believe, based on the results of this study, the usage of this novel and easy to use device will develop improved golf swing speed and improved overall play in golfers of all ages.

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