



ORIGINAL RESEARCH PAPER

Physical Education

EFFECT OF PLYOMETRIC TRAINING PROGRAM ON GOLF DRIVE PERFORMANCE

KEY WORDS:

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ABSTRACT

The purpose of this study was to determine the effect of a plyometrics program on golf drive performance. Ten female golfers' full golf swing was analyzed for driving distance (DD) before and after an 6-week training program. The control group (n = 5) continued their normal training, while the experimental group (n =5)performed 2 sessions per week of weight plyometrics. Controls showed no significant ($p = 0.05$) changes, while experimental subjects showed a significant increase ($p = 0.05$) in DD. The changes in golf drive performance were attributed to an increase in muscular force and an improvement in order to acceleration of body parts contributing to a greater final velocity being applied to the ball. It was concluded that plyometrics training can help increase DD in golfers.

Introduction;

Physical fitness is viewed as a key component for optimum performance in almost every sport. By comparison, golf has usually focused on the technical, tactical, and mental aspects of the game. However, recently an increase in the level of conditioning of a number of top professional players has made golf conditioning of interest to many coaches and players. This is of particular relevance when we look at the clear physical differences between professional players and amateur golf players. Professionals are capable to rotate faster in their swing, while amateurs are less efficient in their skill (i.e., sequential acceleration), possibly due to inferior swing mechanics and physique. Thus, professionals can produce full swing driving action, a factor which appears vital in obtaining maximum distance from the tee. These physical factors would seem to be exposed to change with appropriate conditioning programs and could have a positive effect on golf performance.

The practical aspects of a full golf swing are well recognized and essential; as Lead better states, the correct linkage of various components of your body with your hands and club produces dynamic motion, with the torso controlling the direction and speed of the club head. The segmental sequence that makes up the golf swing is recognized to be the movement of the hips followed by the trunk, shoulders, arms, and hands (in the back swing). The down swing leads with the hips, trunk, shoulders, arms, hands and finally the club head go through sequential acceleration to arrive at the high velocities required at the club head to propel a ball maximum distances with control. The lower limbs act as stabilizers to allow torque to be applied to the club head, helped by the change from large body parts accelerating slowly, to smaller body parts accelerating more and more quickly. This has been likened to the process of coiling the body (back swing) followed by an unwind (down swing).

Golf swing performance is related to the segments of the body applied to the club head in order to hit the ball. If you lead with the hips, trunk, and then shoulder, the movement adheres to the summation of speed principle and therefore greater torque being applied to the club through the eccentric/concentric sequence of spinal rotators. The action of the golf drive can then be classified as a stretch shortening movement, which would be grouped as a plyometric action, because of the limited transition time between the eccentric (back swing) work and the concentric (down swing) action. With this in mind, the evidence strongly suggests that plyometric training or combined weights/plyometrics is the best form of resistance work to produce superior performances in this type of plyometric action. Incidentally, this type of training appears not to cause the excessive hypertrophy that many golfers are concerned about.

Few studies have investigated the effects of resistance training on golf performance, but each has shown a significant impact on increasing club speed. The aim of this study was to see the effect of a plyometric conditioning program on golf drive performance in club standard players.

Methods-

Two groups (control and experimental) performed a pre and post training designed intervention in which driving distance (DD) were recorded. The control group continued their regular training, while the experimental group completed a plyometric training program to see whether this type of training modality would have a positive or negative or no effect on golf driving distance performance.

Subject;

Ten young female golfers' full golf swing was analyzed for driving distance before and after 6-week plyometric training program. The control group (n= 5) continued their normal training, while the experimental group (n =5) performed 2 sessions per week.

Testing-

All subjects were assessed before and after an 8-week training program. Testing was carried out (after a familiarization session) 1 week prior and 1 week after the program. Each subject had 5 attempts to drive the ball as far as possible with their own driver, using their normal driving swing. The distance the ball carried was measured using a series of preset markers and a tape measure. The same driving range, club, model, and compression of ball was used in the pre- and posttraining measurements.

Table 1; plyometric training exercises.

Exercises	Equipment	Sets/rep.
Situps	Free hand	3x6
Back extension	Free hand	3x6
Twisting right and left	Medicine ball	3x6
Squat	Free hand	3x6
Lunge	Free hand	3x6
Pull-ups	Parallel bar	3x6
Planks	Free hand	60 sec
Wall press	Wall	60 sec

The training program required the subjects to train for 90 minutes 2 times per week on nonconsecutive days. A standardized warm-up and cool-down was used in each training session. This consisted of 10 minutes pulse raising and mobilizing/dynamic flexibility activities performed in a light circuit mimicking the movement patterns to be performed in the program (warm-up) and 5 minutes low-level cycling followed by a total body static stretch routine (1 set of 12 seconds per muscle group) for the cool-down.

Table;2 Mean (#SD) scores for driving distance for control and experimental groups.

	Control			Experimental		
	pre	Post	Change (%)	pre	post	Change (%)
Driving distance (m)	190.8 # 11	180.3 # 30.7	\$0.7	189.6 # 16	210.7 # 11.4	4.3

Figure 1; Graphical representation of pre and post driving distance performance in control group.

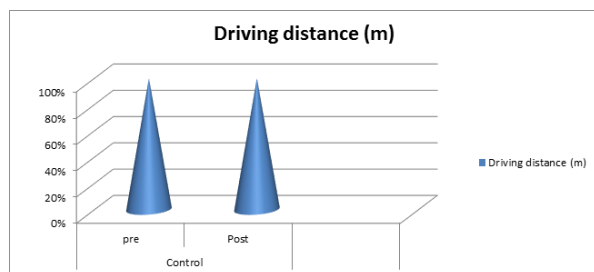
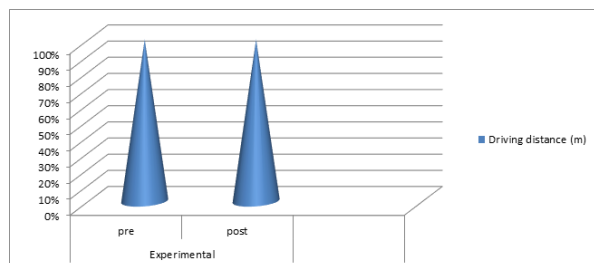


Figure 2; Graphical representation of pre and post driving distance performance in experimental group.



Statistical Analyses;

A mixed model repeated measures analysis of variance (ANOVA) was used to determine interactions between the trial (pre and post) and group (experimental and control) test results.

Results

Table 2 shows the mean scores and percentage changes for club head speed and driving distance for the control and experimental groups. The repeated measures ANOVA showed no significant changes between pre- and post training scores for drive distance ($p=0.05$) for controls. However a significant difference was shown between the pre- and post training scores for drive distance ($p=0.05$) for the experimental group.

Discussion;

The main findings from this study were a significant increase in golf drive distance ($p=0.05$) following an 8-week plyometric conditioning program. When confidence intervals (95% CI) were computed they showed the true increase in driving distance lay between 5.1 and 17.3 m.

The training program in this study was planned to affect muscular force to help in order of a golf swing while maintaining the distance forces act over (maintenance stretching). Each of these training modalities has been shown to be effective. The plyometric exercises in the training program were designed to take off the pre stretch during the back swing in golf, activating the arm extensors and shoulder abductors, stimulating proprioceptors to make possible an increase in motor unit recruitment over a minimal time frame. Therefore, stored elastic energy helped by muscle stiffening (pre stretch) may cause an increase in total work performed in the concentric phase (down swing) of a golf swing. Researcher found significant improvements in both modalities.

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