Stabilizing Exercises Increase Club Head Speed in Middle Aged Men Amateur Golfers

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August 1, 2023

Introduction

The United States golf course industry market in 2022 was listed at the value of $26.1 billion (Ariella, S., 2023). It's no secret that golf is an expensive sport, but middle aged men that golf are most likely the reason you will see an infomercial about how to improve one's golf swing in the middle of the night. The motivation behind this is to increase their performance and play golf just like the favorites they watch on television. There is associated research that can draw the conclusion that the same principles used in the game of golf can lead to an increase in performance and power/speed. Trained martial art practitioners produce and resist more forces through the use of better recruitment and neuromuscular activation of their respiratory, abdominal, and pelvic floor musculature (Walters, S., et. al., 2021). These same principles of using the neuromuscular activation of the respiratory, abdominal, and pelvic floor musculature in order to create intra – abdominal pressure is what I was taught through my courses of Dynamic Neuromuscular Stability by the Prague School of Rehabilitation. Through this program I was taught stabilizing exercises that encourage joint centrated positions in order to use muscle synergism and equal recruitment. Dr. Winchester explained that one can practice or feel what intra – abdominal pressure feels like by going, "YAH!" as if you were going to karate chop a wood plank in front of you. Velocity, force, and peak muscle activity during tennis serves and forehand strokes are significantly enhanced when athletes are allowed to grunt (O'Connell, D.G., et. al., 2014). Tennis, Baseball, and Golf are all ipsilateral patterns; Therefore, with these associated research articles finding that the use of stabilization through activation of their pelvic floor, respiratory, and abdominal musculature middle aged amateur men golfers may look forward to attempting stabilization exercises rather than purchasing some new gimmick from the midnight infomercial.

Nature of the Problem

Due to the lack of stabilization or muscle synergism through activation of the pelvic floor, respiratory, and abdominal musculature middle aged men amateur golfers aren't playing to their full potential. Muscle synergism is the activation of a group of muscle placed in the most efficient anatomical position in order to perform a particular movement. Many individuals perform poor loading strategies or poor movement strategies in order to perform the movement desired. With these poor movement strategies there is risk of injury and decreased potential of overall performance. Everyone wants to exceed at what they do; With a good movement strategy and proper use of the pelvic floor, respiratory, and abdominal musculature middle aged men amateur golfers will see an increase in their golf game, with increased club head speed, while decreasing the risk of injury.

Purpose of this Research Proposal

The purpose of this investigation or research question is to apply the use of intra – abdominal pressure or stabilizing exercises with middle aged men amateur golfers to improve their neuromuscular activation of their pelvic floor, respiratory, and abdominal musculature in order to improve club head swing. Through the use of intra – abdominal pressure or stabilizing exercises one can increase their performance and movement pattern by giving the muscle group a more efficient neuromuscular activation and biomechanical pattern.

Significance of the Research Proposal

There are some studies introducing the meaning and findings of intra – abdominal pressure and there are more studies showing how muscle activation of the pelvic floor, respiratory, and abdominal musculature can reduce pain. However, there aren't many studies on the use of intra – abdominal pressure or stabilizing exercises in order to increase performance in

golf. There are many associated studies showing how recruitment of intra – abdominal pressure or the pelvic floor, respiratory, and abdominal musculature can produce more force and resist more forces (Walters, S., et. al., 2021). There is supporting material produced by the Prague School of Rehabilitation and other associated articles like tennis players showing an increase in velocity, force, and peak muscle activity when using the same stabilizing strategy (O'Connell, D.G., et. al., 2014). This research or investigation will lead the literature in strategies or exercises in order to increase performance, club head speed, thus not just middle aged men amateur golfers will reduce their handicap, but potentially all golfers will have the opportunity to increase performance and decrease risk of injury.

Expectations

It is expected that this investigation or research question will be back by associated research that through the use of intra – abdominal pressure or stabilizing exercises middle aged men golfers will see an increase in their club head speed. The stabilizing exercises will be exercises instructed by the Prague School or Rehabilitation in their Dynamic Neuromuscular Stabilizing (DNS) courses. The exercises will be administered by an individual whom is certified in DNS and the exercises chosen will be three exercises that resemble the golf swing or ipsilateral movement pattern. This project will fill a gap in the existing literature by using a hypothesis and objective measurements to lead to real improvement on the golf course and the stat book.

Literature Review

When stating that stabilizing exercises can increase club speed with the use of intra – abdominal pressure it's important to state where intra – abdominal started and how it can be used for this purpose. When looking at the use of intra – abdominal pressure and increasing

performance motor control or the pelvic floor, respiratory, and abdominal musculature is important. It was found that the delayed onset of contraction of transverse abdominis indicates a deficit of motor control and is hypothesized to result in inefficient muscular stabilization of the spine (Hodges, P. W., et. al., 1996). The diaphragm is the 'secret ingredient' when looking at intra – abdominal pressure and it's use to increase performance or stabilization. It's been shown that with rapid flexion of the shoulder in response to a visual stimulus, electromyography activity in the costal and crural diaphragm occurred about twenty milliseconds prior to the onset of the deltoid electromyography. Also, the onset of diaphragm electromyography coincided with that of the transverse abdominis (Hodges, P. W., et. al., 1997). This anticipatory contraction provides definitive evidence that the human diaphragm is involved in the control of postural stability during sudden voluntary movement of the limbs.

Now that it's established that the diaphragm is an anticipatory contractor to provide postural stabilization it's important to look how it is further involved. When looking at a slow walk, regular walk, transitional walk, and jog electromyography was recorded to quantify activity throughout the whole gait cycle and during periods of bursting. It was found that pelvic floor musculature bursting generally occurred during the single – leg support phase in both walking and jogging, suggesting that pelvic floor musculature activity may correspond to changes in intra – abdominal pressure. In addition to these bursting periods where activity often exceeded 100%, lesser intensity is observed throughout the gait cycle suggesting that the pelvic floor are consistently active during locomotion (Williams, A. M. M., et. al., 2022). It's important to look at introductory movements like walking when discussing the use of intra – abdominal or postural stability involvement. Pelvic floor musculature are likely recruited during walking to counteract smaller increases in intra – abdominal pressure (Dietze – Hermosa, et. al., 2020).

Furthermore, walking is seen as one of the most efficient movements performed in human movement and intra – abdominal pressure is still used as postural stability.

Going from walking and shoulder movements to the previously discussed collegiate tennis players. Velocity, force, and peak muscle activity during tennis serves and forehand strokes are significantly enhanced when athletes are allowed to grunt (O'Connell, D.G., et. al., 2014). This is important evidence to include because when Dr. Winchester teaches intra – abdominal pressure to patients by having them yelp, "YAH!" as if they're going to chop a wooden plank in front of them. This correlates to the trained martial art practitioners producing and resisting more forces through the use of better recruitment of their respiratory, abdominal, and pelvic floor musculature (Walters, S., et. al., 2021).

Robert Lardner stated, "Intra – abdominal pressure needs to be the minimal amount for the task at hand." The example that Dr. Winchester always used is someone is not going to use the same amount of intra – abdominal pressure to turn a door knob as they would to swing a golf club.

Hypothesis

Through the use of stabilization exercises or intra – abdominal pressure in middle aged men amateur golfers would see an increase in club head speed due to spinal stability.

Methodology

Study Design

The study design is going to be a randomized controlled experimental research design. This design would consist of a control group that would perform traditional strength training and then an experimental group where the intervention of stabilization exercises or exercises with the emphasis of intra – abdominal pressure. The independent variable or intervention being

performed is the stabilization exercises with an emphasis on intra – abdominal pressure used for the experimental group. The dependent variables are the assessed club head speeds from the golfers.

Participants

Middle aged men will be selected to participate in this study aging from 35 – 55 years of age. Solicitation for participants will take place at the Arkansas Golf Center in Conway, Arkansas and will be accomplished using word of mouth, their newsletter, and their email.

Methods/Measures

Participants will be randomly assigned to either a control or experimental group in this study design. The control group will follow the Center for Disease Control and Prevention exercise/physical activity recommendations of 150 minutes a week of moderate – intensity activity, or 75 minutes a week of vigorous – intensity activity, or an equivalent combination (Centers for Disease Control and Prevention, 2022). The experimental group will meet three times each week for the duration of twelve weeks on the days of Monday, Wednesday, and Friday from 8:00am to 8:50am. During the meetings we will be performing exercises targeting both the upper body and lower body while creating intra – abdominal pressure, thus using the pelvic floor musculature, respiratory musculature, and abdominal musculature. Clinician resistance will be applied mostly during the DNS exercise, with the exception of the substitution of a band for instructing or working with a bigger group. Also, there will be resistance provided by the golf forever band and bar throughout these meetings. Exercises included will be DNS 3M prone, DNS 3M supine, DNS 5M side lying, DNS 7M side – sitting/rocking, split stance chop with resistance, and squat front strike across the body. These exercises are the core exercises developed by the Prague School of Rehabilitation in order to train intra – abdominal pressure

while firing or strengthening the oblique slings. Furthermore, the golf forever program lists the split stance chop and squat front strike across body as good exercises in developing rotational power.

Measurements will be taken on both the control and experimental groups prior to the start of the twelve week meetings and again at the conclusion of the twelve weeks. Comparisons will be made between the two groups using the pre and post measurements. This measurement will include everyone's maximum club head speed after three attempts using a launch monitor at the Arkansas Golf Center.

Timeframe

The timeframe for the study will be:

A. Recruiting participants – Due to the recruiting being conducted through the Arkansas Golf Center newsletter, emails, and word – of – mouth, recruiting patients will be for the duration of one month.
B. An informational meeting will be held after recruitment comes to a conclusion. This meeting will be performed to review the study, gain medical clearance, and answer any questions or concerns. Once everyone has obtained medical clearance or has their medical examination/results provided there will be a date set to start the study.
C. The study will be conducted for twelve weeks.
D. Pre and post assessments of participant's maximum club head speed will be performed the following week at the conclusion of the twelve weeks. Results from the control group will be compared to the experimental group to test the hypothesis that through the use of stabilization exercises or intra – abdominal pressure in middle aged men amateur golfers would see an increase in club head speed due to spinal stability.

E. In summary, the study will take a minimum of 5 months to complete.

Conclusion

These findings could not only help middle aged men increase their club head speed in amateur golf, but it could take golf training and preparation to a new level. Furthermore, as discussed prior, the same neuromuscular activation is being used by martial artists to create more forces and resist more forces. Thus, by recruiting and training the same pelvic floor musculature, respiratory musculature, and abdominal musculature golfers could create more forces throughout their swing increasing their club head speed.

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