

Concept and Method of Performance Enhancement for Golfers

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A good golf swing must have a repeatable swing plane, a stable axis of rotation, and high velocity at the club head. It requires neuromuscular coordination to make a simple swing plane, while increasing angular velocity of the golf club. Muscle strength is required to mobilize several joints create pelvic rotation (i.e. horizontal plane) while stabilizing other joints. Lack of sufficient joint range of motion causes compensatory movements, resulting in unstable swing plane and/or potential injuries. For example, it requires nearly 180 degrees of neck rotation during a golf swing, which most of amateur golfers do not have. Therefore, a conditioning strategy for golfers must be designed to improve range of motion, muscle function, and neuromuscular coordination.

KEY WORDS: conditioning, golf swing, range of motion, muscle function

INTRODUCTION: A good golf swing must have a repeatable swing plane, a stable axis of rotation, and high velocity at the club head. It requires neuromuscular coordination to make a simple swing plane, while increasing angular velocity of the golf club. Muscle strength is required to mobilize several joints create pelvic rotation (i.e. horizontal plane) while stabilizing other joints. Lack of sufficient joint range of motion causes compensatory movements, resulting in unstable swing plane and/or potential injuries. For example, it requires nearly 180 degrees of neck rotation during a golf swing, which most of amateur golfers do not have. Therefore, a conditioning strategy for golfers must be designed to improve range of motion, muscle function, and neuromuscular coordination.

Improving range of motion requires adequate skeletal alignment. For example, improving thoracic rotation requires adequate thoracic alignment, intra-thoracic mobility, sagittal alignment of the thoracic spine. Static and/or dynamic stretching as well as functional exercises may contribute to increase the overall rotational range of motion of the thoracic spine. However, modification of the thoracic alignment and improvement of intra-thoracic mobility in adult is sometimes difficult. Another joint that requires greater range of motion is the hip joint. Hip range of motion may be limited by various soft tissues such as subcutaneous tissue, superficial fascia, deep fascia, inter-muscular adhesions, or adhesions of bursae around the hip. Therefore, a manual release of these adhesions may be necessary to improve hip range of motion. Therefore, a special attention on malalignment and soft tissue adhesion is required.

The Realign Concept (Gamada 2014) was developed from rehabilitation of injured athletes and is applied to therapy for joint injuries, athletes' training, and injury prevention. It emphasizes the importance of realigning each joint and restoring normal joint kinematics. For example, many female Japanese do not have normal screw-home movement of the knee due to a limitation of tibial internal rotation range in knee flexion. This abnormal kinematics may be insidious until the knee is injured, and affect functional recovery by preventing the knee from restoring normal knee kinematics, resulting in delayed return to sports. Accordingly, the first step of the Realign Concept is called the realigning phase which emphasizes the restoration of the normal joint alignment and improving range of motion. By achieving these two components, optimal joint motion is restored, so that the muscles around the joint works without compromising abnormal joint function. The second step is called the stabilizing phase, in which the muscles are trained to maintain the acquired normal joint kinematics under strenuous activities. The third step is called the coordinating phase, in which neuromuscular control is retrained while maintaining optimal joint alignment, mobility and stability.

The Realign Concept can be directly applied to the golf conditioning and we developed the Realign Golf Project (www.realinegolf.com). It consists of an educational program for trainers, conditioning program for golfers, and devices to help achieving optimal alignment. The

certifications are provided by Japanese Society for Wellness and Preventive Medicine (JSWPM) and the conditioning program is organized by a private company.

METHODS: The ReaLineGolf program was developed based on the Realign Concept and designed specifically for golfers to enhance performance and prevent injuries. In the realigning phase, the foot, ankle, knee joints as well as the sacroiliac joints in the pelvis are realigned to improve stability with small motion during a golf swing, whereas hip, thoracic spine, shoulder joints are realigned to improve alignment and range of motion. We use exercise devices as well as manual release techniques as used as necessary. The goal of the realigning phase is to restore the range of motion that is sufficient for the optimal golf swing, so that the compensatory movements are minimized. In the stabilizing phase, the hip rotators (i.e. the gluteus maximus, piriformis, etc.) and thoracic and cervical rotators (i.e. multifidus) are the primary target among movers, while lower abdominal muscles are the most important stabilizers to prevent spinal extension or side bending during the back swing. Before advancing to the coordinating phase, inhibiting the muscles that causes abnormal kinetic chain is required as a part of the stabilizing phase. For the right handed golfer, inhibiting the left shoulder abductors while extending the elbow during the downswing is important to prevent chicken winging or early separation of the left upper arm from the trunk. Similarly, inhibiting the right hip abductors is necessary to prevent pelvic sliding to the left during the downswing. Instead, activation of the right gluteus maximus is required. Once the mobility is improved and optimal muscle activation and inhibition patterns are acquired, the coordinating phase would be straightforward.

SUMMARY: Improving the golf swing may be considered an art of coaching. The ReaLineGolf project made it a step-by-step process that can be achieved by a trainer, therapist, or coach. The art of ReaLineGOLF lies in correcting malalignment and eliminating soft tissue adhesion. Although the devices help to restore alignment, adhesion must be manually taken care of, which limits standardization of this concept.