

GOLF AND BALANCE

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Brain injury results after trauma or injury to the brain tissue. The outcomes are variable and each person living with brain injury has a different presentation than the next. Post-injury, healing begins. This healing is directed by the activities we perform with our bodies and minds via neuroplasticity. Neuroplasticity is defined as the process by which new nerve pathways in the brain are created. Practice facilitates neuroplasticity.

Because our ability to balance depends on communication from many parts of the brain, it is commonly impaired after brain injury. Before balance retraining can begin, the systems that contribute to balancing must be assessed. Impairments in the motor or sensory systems, and in the brain itself can contribute to reduced balance. Lower extremity or trunk weakness makes it difficult to maintain stability. A loss of proprioception sense makes it difficult to know what position one is standing in and hence difficult to stay steady. Changes in vision can alter how we see the world around us and thus how we steady ourselves in it. Dizziness associated with inner ear changes, common after brain injury, also affects how we balance.

In order for a person to balance in standing or sitting, each system must work effectively and communicates with the brain. The information travels throughout the brain electrically and converges on the cerebellum. The cerebellum considers all this information and gives a final order for the body to stabilize effectively in the form of balance reactions. All of this happens quickly, sometimes before we even know we are losing our balance.

If any component of the balance connections has been injured, the result is difficulty with balance.

Rehabilitation of balance is effective in balance training. Activities in sitting and standing are incorporated. Freedom of trunk and spine movement can be improved with stretching and reaching. Leg strengthening may be necessary. Standing activities where weight transfers and reduced support further challenge balance and are effective. Gaze coordination can improve dizziness. Functional mobility such as walking is also important.

Golf is a sport that enhances all components of the balance system. The positions required to swing a club aid trunk flexibility, postural alignment and reaching. Weight transferring increases feedback from the joints and muscles to the brain. A focused gaze (VOR) increases stability. Rotation challenges the inner ear (vestibular system). The cerebellum, in the back of the brain, mediates this entire process.

Swinging a golf club requires moving from address position, to the top of the back swing, through impact to the follow through position. All this occurs in less than 1.3 seconds. And usually requires both arms and both

legs. Early and speedy balance reactions are critical. Arms must coordinate with legs and trunk must generate power. Weight is transferred from side to side through rotation of the trunk and momentum of the club. The weight transfers compress joints and activate muscles surrounding them. This information must be gathered quickly so the brain can successfully keep the body stable once the ball is hit, making golfing activities ideal for balance retraining.

Golf practice, prescribed exercise and swing drills facilitate neuroplasticity through learning, thereby creating new, faster connections within the nervous

system. This is supported by research demonstrating that older women golfers score higher on balance tests than non-golfers.

In a research project at the University of Western Ontario evaluating the benefits of golf-based physiotherapy, significant improvements on the Balance Scale (day to day balance) were accompanied by earlier stability reactions in the leg muscles in those golfers who participated, suggesting improved balance.

HOW TO PREPARE YOUR BALANCE REACTIONS TO OPTIMIZE YOUR GOLF SEASON

Since practicing golf improves balance performance, it stands to reason that practicing balance will improve golf performance.

The following activities are suggested as a pre-game balance workout to prepare your body for it's best golf performance. Ideally they should be practiced as part of a comprehensive golf exercise routine including stretching.

- Sit to Stand
- Rise on Toes
- Stand with Feet Together and Eyes Closed
- Neck Rotation
- Trunk Rotation



- Hip Circles
- Assume Address Position
- Weight transfers backswing to follow through & back
- Partial swings (1/4 swing, 1/2 swing)

Please refer to Table 1 for more information on some of these recommendations.

GOLF STRETCHES

In order to prevent injury while golfing, it is helpful to maintain a limber body. Start stretching at least one month before your golf season begins, and accompany it with a walking program. Cardiovascular endurance will prevent fatigue and accompanying poor performance on the course.

Regular stretching of the neck and back, shoulders and wrists, hips and ankles is recommended and should ideally be accompanied by a balance program. The following are some stretching suggestions:

- Shoulder horizontal adduction
- Wrist Flexion
- Wrist Extension
- Trunk Rotation
- Hip internal rotation
- Peronei
 - Soleus
 - Hamstrings
 - Groin

Therapeutic Golf Rehabilitation (TGR) is a program designed to improve balance while participants learn, practice and play golf. It has been reported that participants will experience some increase in their quality of life as an additional benefit.

The program is comprehensive and includes a detailed physical and golf swing analysis. A personalized program of manual therapy, stretching, strengthening, balances, walking, and coordination exercises are initiated.

Modalities such as ultrasound and TENS are used if indicated. TGR incorporates golf lessons at East Park with a CPGA professional, physiotherapy at Continuum, and exercise. Golf is an activity widely enjoyed in the London area and we proudly boast The Parkside 9, a Wheelchair Accessible Golf Course.

TGR has been lucky enough to have had support from local corporations such as London Health Sciences Center, London District of Ontario Physiotherapy Association, Physiotherapy Foundation of Canada, University of Western Ontario, School of Physical Therapy, The Downtown Clinic, Eastpark Golf, The City of London, and Continuum.

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