

GARY STEBBING, PGDIP, CSCS

Golf has become one of the more popular sports across the world. From 2016 – 2021, the total number of golfers globally increased from 61 million to 66.6 million (7). This includes members and non-members of clubs, independent golfers using 9 or 18 hole facilities, and users of driving ranges; indications are the trend has accelerated as a result of the COVID-19 pandemic (7). The overwhelming majority of golfers are non-professional or amateur and golf is particularly popular amongst middle-aged and older adults (6). Data from the national golf foundation shows the average age of a golfer to be 45 years old (14).

The handicapping index is a unified system that categorizes golfers based on skill level and factors in the various elements of the game to give each player a personal handicap (16). This “enables golfers of different abilities to play and compete on a fair and equal basis, in any format, on any course, anywhere around the world,” (16). As a golfer improves their scoring, their handicap decreases, and equally the opposite can happen. In other words, the most skilled players have the lowest handicaps, and the least skilled have the the highest (3). The average handicap for males is 14.2 and for females is 27.5 (14).

To improve their skill level and lower their handicap, golfers typically seek out a teaching professional and work on skill development and course management. As awareness has grown of the physical fitness requirements of golf, the input of strength and conditioning coaches has increased and strength and conditioning interventions to improve golf fitness have become more common.

Although this influence of strength and conditioning in golf performance development has grown markedly, the precise benefits of golf conditioning programs on lower scoring and better golf remain contentious. While golf’s scientific and coaching communities have progressively analyzed golf performance development, effectively transferring their work into lower on-course scoring has remained elusive (11).

Advanced technologies at the elite professional level (e.g., Trackman) are now allowing practitioners and players to monitor a range of outcome factors relating to launch characteristics and impact factors of shots, particularly from the tee box (3). This technology is now becoming more widely available to amateurs (e.g., Toptracer) and with advancement of on-course Global Positioning System (GPS), it may now be possible to more effectively monitor a golfer over time. This development has the potential to help strength coaches better assess their interventions and allow them to refine the specifics of their program design as a result.

When working to improve the skill level of the golfer, a teaching professional is likely to prioritize different methods and means to match with the golfer’s stage of development. For example, with a high handicap player, fundamentals such as grip, stance, posture, and alignment may be the focus. In contrast, with a

more skilled low handicap player, refined video analysis of key moments in their swing may be prioritized. The strength and conditioning coach could follow the same logic when building a golf conditioning program and match their training prescription to the golfer’s current skill level and needs. All golf conditioning programs should consider both the physical level and the skill level of the player. To design the most effective golf program, specific goals and objectives must first be established. This requires a comprehensive pre-design process.

EVALUATION OF THE INDIVIDUAL

A range of options exist regarding evaluation of the individual, including the following:

- Age (biological/chronological) and gender
- Current training and health status
- Training background and experience
- Golfing history and current status
- Flexibility and mobility
- Performance testing

As ever, the precise approach remains the choice of the practitioner. This will naturally depend on skillset, training, time, and resources available to both client and coach. Additional analysis performed by allied professionals, such as physical therapists may be included. Data and feedback provided by a golf teaching professional can also be very useful.

EVALUATION OF THE MOVEMENT

The golf swing is considered to be a difficult, complex motion and a movement analysis shows that multiple physical elements interact to achieve effective performance. Force generation moves from the knees and hips to the trunk and upper body during the swing (1). The concepts of stability and balance are complex within the golf swing and must take place during both almost static and then very fast, explosive conditions. This involves both the proprioceptive and vestibular systems as the body moves through the various stages of the swing.

Balance, core strength, flexibility, peripheral muscle strength and power appear to be key to superior performance and the importance of lower body, trunk and upper body strength, and power are well recognized in the golf science community (9,12). Overall, the muscles around the hip joint (gluteals, abductors, adductors, and hamstrings), obliques, and pectoralis major should be the focus of the conditioning programming (2).

EVALUATION OF THE SPORT

Golf is often considered a low- to moderate-intensity cardiovascular exercise; however, the intensity of effort can vary considerably. Factors such as hillier courses, individual body weight, age, and fitness level are important. Evidence indicates

that a golfer will walk 6 – 12 km (3.7 – 7.5 miles) during 18 holes and achieve a step count between 11,000 – 17,000 steps (6). Energy expenditure can range from 264 – 450 kcal/hr during 18 holes and require between 46 – 85% of a person's functional capacity (6). Low skilled (high handicap) golfers will often be at the high end of these figures, hitting more shots and walking further because of greater shot dispersion. This differential in skill level might also influence the ratio of aerobic conditioning to strength training in programming (15).

Explosive power and increasing distance to drive the ball might be a priority of conditioning with elite or sub elite golfers who are capable of reproducing a consistent swing and ball strike; however, despite its emotional appeal to all golfers, it is not necessarily the most effective strategy with high handicappers who have much greater variability in these factors. Furthermore, although the swing itself is seen as a power-driven movement, many shots do not require a high speed full swing; in particular, pitching and chipping around the greens and putting take place at much lower intensities.

Improving putting and short game is likely to produce the greatest initial improvements in lowering the handicap of a high handicapper. Improved postural endurance and stability are likely to confer benefits when performing these shots, and for this reason conditioning to target the physiological demands can be an effective strategy.

EVALUATION OF INJURY

In terms of injury risk, professionals and amateurs should be treated as distinct groups (8). This can be attributed to different swing characteristics and biomechanics, as well as increased club head speed and playing volume in professionals (8). The most common causes of injury reported in professional golf relate to overuse type injuries from repetitive practice and playing (professionals may hit 2,000 or more balls per week). The lumbar and cervical spine are the most common locations for overuse injuries, followed by the elbow, wrist, hand, and shoulder (6). Additionally, the low back is consistently an area of major concern for golfers (2).

In amateurs, negative stress from the physical demands of high swing speeds and related poor swing mechanics appear to be the greatest challenge (6,8). Elbow, shoulder, lumbar spine, wrist, and hand injuries are most likely to impact the amateur player (6,8). These factors are an important consideration when assessing and conditioning higher handicap players. Although the relationship between improved conditioning and reduced injury risk in golf is still unclear, the training benefits of building a more robust individual are likely to provide the best conditions for withstanding the stresses of the game and minimizing the risk of injury occurrence.

SPECIFIC CONSIDERATIONS FOR THE HIGHER HANDICAP PLAYER

Rather than just focusing on the typical performance aspects of golf (e.g., driving distance), when working with higher handicap players, it might be wiser for the conditioning coach to focus on the individual, how training can be matched to their current skill level, and to emphasize the need to build a strong general conditioning capacity that helps withstand the rigors of the game and builds them a higher resistance to injury. In order to lower scores and improve, most golfers need to play regularly, take lessons, and also practice. This level of physical work requires a robust physical capacity, with a sound conditioning program at its core.

Although there is limited evidence so far in assessing the effect of balance training on golf performance, there is some evidence suggesting the balance of more skilled golfers is superior to less skilled (9). The golf swing requires careful control of weight shifts between legs as the swing motion progresses, as well as asymmetrical stance positions on undulating terrain. In the higher handicap player, improving balance ability may translate into better performance.

Leg power is important in golf performance. A stable stance or base from the legs is fundamental to an effective golf swing and allows the trunk and upper body to rotate more efficiently (9). A number of lower body training interventions have reported positive effects on club head speed and carry distance. Given the short duration of the downswing and speed generated, both strength and rate of force development appear to be important qualities to develop (2). The development of explosive power may be justified as a training objective over time, and as a goal may be as significant as developing muscular strength (9).

Three strategies are typically employed to manipulate the external load in training program, namely volume (sets and repetitions), intensity (load and resistance), and density (altering rest intervals). In the case of golf conditioning, approaches incorporating a “functional training” methodology are often employed, which leads to the emergence of a further strategy for creating progression, namely complexity (13).

A functional training approach employs resistance-based exercise designed to stimulate multiple component adaptations simultaneously (e.g., strength, balance, coordination) (13). Increasing complexity of an exercise can involve technical difficulty, specific execution patterns, and uncertainty or instability. All of these can increase or decrease the physical challenge while the volume, intensity, or rest periods remain stable. Not only can this broaden the repertoire of options for the strength and conditioning coach and provide an infinite number of variations to challenge the neuromuscular and motor control systems, but it can also allow training that integrates a number of the elements simultaneously that are useful to the high handicap player in particular.

STRENGTH AND CONDITIONING FOR GOLF— A FRAMEWORK FOR THE HIGHER HANDICAP PLAYER

SUMMARY OF PROGRAMMING OBJECTIVES

- Improve general physical conditioning
- Whole body balance and stability when standing (address/full swing/partial swing)
- Leg strength/power (swing)
- Postural endurance, ability to maintain steady position when partially upright (e.g., stance for all shots/chipping/putting)
- Upper body strength (swing)
- Cardiovascular conditioning (movement between shots)
- Movement skill development, build physical literacy

Below are three sample workouts designed to introduce strength and conditioning to a high handicap golfer. These are based on using a 2 – 3 times per week training frequency. While the exercises will be familiar to most strength and conditioning coaches, the precise versions selected and manipulation of variables over any given period are at the discretion of the strength and conditioning coach.

WORKOUT 1

Perform a suitable pre-exercise routine to prepare the individual for the work sets of the session.

A1 - 2-min brisk walk at 0 – 15% gradient/target 11 – 13 rating of perceived exertion (RPE) (match gradient and speed to client capability)

A2 - 4-point kneeling opposite arm and leg extension, static holds and progressions 4 – 8 repetitions each side

A3 - Supine bridge 12 – 15 repetitions

Perform each activity consecutively (A1, A2, and A3) then rest for 30 s and repeat for 3 rounds

B1 - 2-min brisk walk at 0 – 15% gradient RPE 11 – 13

B2 - Single-leg deadlift (using kettlebell, medicine ball, or dumbbell) 6 – 10 each leg (light to moderate load, slow tempo focus)

B3 - Medicine ball overhead side bends 10 – 12 each side (focus on control and management of weight shift)

Perform each activity consecutively (B1, B2, and B3) then rest for 30 s and repeat for 3 rounds

C1 - 2-min brisk walk at 0 – 15% gradient RPE 11 – 13

C2 - Split-stance single-arm cable pull and reach 12 – 15 each side

C3 - Split-stance single-arm cable press and reach 12 – 15 each side

Perform each activity consecutively (C1, C2, and C3) then rest for 30 s and repeat for 3 rounds

WORKOUT 2

Perform five speed walking intervals. Work interval targets RPE 11 – 13 (2 – 3 min work at up to 15% gradient/1 min recovery at 0% gradient).

Rest 1 min then:

Perform each exercise one at a time independently. Rest periods between sets should be 45 – 90 s; should be sufficient to ensure high movement quality throughout.

A1 - Barbell snatch grip Romanian deadlift (top down using rack pins) 3 x 8 – 12 (light to moderate loads, focus on slow tempo and technique)

B1 - Crossover cable half squat and cable reverse fly expansion 3 x 8 – 12 (light to moderate loads, focus on lower to upper body transition)

C1 - Reverse wood chop 3 x 8 – 12 each side (moderate load, focus on lower to upper body transition and weight shift)

D1 - Standing cable Pallof press 3 x 8 – 12 each side (focus on stable body position and control of spinal alignment)

E1 - Lateral lunges (bodyweight only) 3 x 6 – 8 each side (focus on technique and positional management)

WORKOUT 3

Brisk walk or light jog for 1 – 2 min, target RPE 11 – 13

A1 - Cable cross body pull 2 x 8 – 12 each side (light to moderate load, focus on scapula control and posture)

A2 - Bodyweight good mornings 2 x 12 – 20

A3 - Cable face pulls 2 x 8 – 12 (light to moderate load)

Perform 1 – 2 min of walking or jogging, and then perform exercise A1 with 45 s rest between sets of each exercise

Repeat with A2 and A3

Brisk walk or light jog for 1 – 2 min, target RPE 11 – 13

B1 - Pallof core shuffle 2 x 6 – 8 each side (light to moderate load, focus on management of weight shift)

B2 - Lying reverse trunk twist 2 x 6 – 8 each side

Perform the 1 – 2 min of walking or jogging and then exercise B1 with 45 s rest between sets of each exercise

Repeat with B2

Brisk walk or light jog for 1 min, target RPE 11 – 13

C1 - Standing single-arm landmine press 2 x 8 – 12 each side

C2 - Prone bridge 2 x 15 – 30 s

Perform 1 – 2 min of walking or jogging, and then perform exercise C1 with 30 s rest between sets of each exercise

Repeat with C2

Rest for 1 min then return to the start and repeat A, B, and C patterns

A THOUGHT ON ASSESSING PROGRESS WITH THE GOLFER

While the strength and conditioning coach can track the client with a battery of tests carried out in the initial assessment, it can also be useful to evaluate training based on how the client is likely to assess change and improvement themselves (e.g., performance on the course). The strength and conditioning coach must be pragmatic enough to appreciate that the client wants to see more than improved test results—they want to see improved golf results.

One possibility to consider is to use a subjective tool, such as a performance profile, which can be completed as part of a strength and conditioning coach's assessment schedule. The performance profile is a client-led assessment tool often used in the psychological support of athletes and by mental performance consultants (4,5).

CONCLUSION

Achieving sustained performance in the higher handicap golfer requires the design and implementation of conditioning programs aligned to the specific on-course demands the player encounters (10). Training the higher handicap player should begin by establishing and maintaining a foundation of whole-body fitness, with supplemental golf-specific strength and flexibility activities integrated as required. A greater focus should be given to postural strength and endurance, as well as whole body balance and stability, as these may have the greatest impact on performance in this group.

REFERENCES

1. Bechler, JR, Jobe, FW, Pink, M, Perry, J, Ruwe, PA and Patrick, A. Electromyographic analysis of the hip and knee during the golf swing. *Clinical Journal of Sports Medicine* 5(3): 162-166, 1995.
2. Bishop, C, Brennan, A, Ehlert, A, Wells, J, Brearley, S and Coughlan, D. S&C for golf athletes: biomechanics, common injuries and physical requirements. *Professional Strength and Conditioning* 63: 7-18, 2022.
3. Brennan, A, Ehlert, A, Wells, J, Broadie, M, Coughlan, D, Turner, A, and Bishop, C. Monitoring Performance in golf: More than just clubhead speed. *Strength and Conditioning Journal*, 2022.
4. Castillo, E. A comprehensive and updated review of the performance profiling technique. *The Sport Psychologist* 36(3): 206-218 2022.
5. Johnson, DL, and Bird, MD. Performance profiling in strength and conditioning. *Strength and Conditioning Journal* 44(4): 62-69, 2022.
6. Murray, AD, Daines, L, Archibald, D, Hawkes, RA, Schiphorst, C, Kelly, P, et al. The relationship between golf and health: A scoping review. *British Journal of Sports Medicine* 51: 12-19, 2017.
7. Record numbers now playing golf worldwide (2021). Retrieved online 2023 from <https://www.randa.org/en/articles/record-numbers-now-playing-golf-worldwide>.
8. Robinson, PG, Murray, IR, Duckworth, AD, Hawkes, R, Glover, D, Tilley, TR, et al. Systematic review of musculoskeletal injuries in professional golfers. *British Journal of Sports Medicine* 0: 1-6, 2018.
9. Sheehan, WB, Bower, RG, and Watsford, ML. Physical determinants of golf swing performance: A review. *Journal of Strength and Conditioning Research* 36(1): 289-297, 2022.
10. Smith, MF. The Role of physiology in the development of golf performance. *Sports Medicine* 40(8): 635-655, 2010.
11. Smith, MF. Golf. In: Davison, RRC, Smith, PM, Hopker, J, Price, MJ, Hettinger, F, Tew, G, and Bottoms, L (Eds.) *Sport and Exercise Physiology Testing Guidelines Volume I: Sport Testing* (BASES Guide) London, New York: Routledge; 277-281, 2022.
12. Sorbie, GG, Glen, J, and Richardson, AK. Positive relationships between golf performance variables and upper body power capabilities. *Journal of Strength and Conditioning Research* 35(12S): S97-S102, 2021.
13. La Scala Teixeira, CV, Evangelista, AL, Pereira, PE, Da Silva-Grigoletto, ME, Bocalini, DS, and Behm, DG. Complexity: A novel load progression strategy in strength training. *Frontiers in Physiology* 10: 2019.
14. USGA. 2020. Retrieved online 2023 from <https://www.usga.org/content/usga/home-page/handicapping/handicapping-stats.html>.
15. Zoffer, M. Competitive golf: How longer courses are changing athletes and their approach to the game, *Nutrients* 14(9): 1732, 2022.
16. What is the world handicap system all about? Retrieved online March 2023 from <https://www.whs.com/faq.html#faq&questionId=1666798691&categoryId=-1551370519>.

ABOUT THE AUTHOR

Gary Stebbing is based in the United Kingdom. His primary areas of interest are building excellence and human performance design. He studied sport and exercise science as an undergraduate and performance psychology as a postgraduate. He has been a Certified Strength and Conditioning Specialist® (CSCS®) for 21 years.

MATRIX

DISCOVER A WINNING GAMEPLAN

BRANDING • CONFIGURATION • PRODUCT MODIFICATION



Your team is unique, and so are your goals. That's why we work with you to create a strength training system tailored to the needs of your athletics program. We offer three key categories of customization capabilities to optimize team spirit, space and functionality in your training room.

Contact us or join us at Booth #405 during the NSCA National Conference to discover all we can do for you.

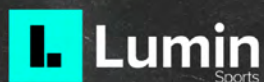




WHOOP INTEGRATION

Giving coaches a team view of athlete sleep & recovery data.
Now live for all **Arc Core** users.

Lumin Sports Is Your Digital HQ For Athletic Performance.



WHOOP®

Access a free
instant demo
now.

