The 2007 USPGA Championship at Southern Hills featured some of the hottest conditions in major history; temperatures reached 39°C during the final round. The champion was Tiger; this was his analysis:

"When I walked up 18, I felt the same way as I did going off the first tee. I felt great. Other guys may have gotten tired and you see their shoulders slumping and dragging a little bit... physical fitness is always a huge advantage, especially when you play any sport and you have heat and anything that wears you down mentally and physically."

Although he wasn’t the pioneer of conditioning for golf, fitness trainers around the world owe Tiger a debt of gratitude for highlighting the benefits of fitness training for golfers. Golfers at all levels are being encouraged to explore the benefits they can gain from regular physical conditioning.

Designing training for any sport and individual begins with a comprehensive needs analysis. The needs analysis involves an evaluation of the sport (movement, metabolic, injury) and an evaluation of the individual (training status, physical performance, objectives). This creates the platform for establishing the goals of the training and subsequent programme design.

The benefits of fitness training for golfers aren’t often recognised as golf can be thought of as a leisurely sport but conditioning can improve your clients’ fitness and reduce the risk of injury.
An evaluation of golf indicates the primary motor qualities, or what Bompa\textsuperscript{1} refers to as “biomotor abilities”, required are:

- Strength
- Static strength endurance
- Power
- Flexibility/mobility

EMG analysis of muscular activity during the golf swing\textsuperscript{2} has broken it down into the following five phases:

1. Take away
2. Forward swing
3. Acceleration
4. Early follow through
5. Late follow through

In summary, using EMG data, observation and swing analysis, the following areas can be identified as fundamental to our conditioning programme design:

- Quadriceps, hamstrings, gluteals
- Erector spinae, obliques (entire trunk musculature)
- Rotator cuff complex, anterior deltoid
- Latissimus dorsi, rhomboids, serratus anterior, levator scapulae, trapezius

Identifying the primary metabolic demands involved with the golf swing helps guide us in selecting workloads, rest periods and intensities for our training. In doing so, it is important to consider the following questions:

1. How long does the event last?
2. Is the event performed continuously?
3. If not continuous, what is the balance between work and rest?

This analysis for the golfer highlights the importance of the anaerobic energy systems involved in golf performance. Each swing is a high-speed co-coordinative movement completed in around one second, this follows a short time “at address” of five to 30 seconds, dependent on the golfer. The golfer then rests (walks/stands) for three to five minutes before repeating the swing again; they also spend a number of seconds in static postures while preparing and completing their putting stroke. The game requires around four to five miles of walking over a four- to five-hour period; this at first glance suggests an aerobic demand.
The average speed of 1mph, however, indicates the challenge to aerobic energy pathways will be minimal, unless the individual is very sedentary or has very low current aerobic conditioning levels.

The final stage of your evaluation of the sport considers its injury profile. This provides an awareness of areas of common sites of injury during the game and may highlight areas of focus for specific preparatory and ongoing conditioning work.

The work of Theriault and Lachance and McCarrol indicates:
• Injuries originate from either overuse or traumatic origin
• Elbow, wrist, shoulder and lumbar spine most common sites
• In male professionals (wrist/hand ==> lumbar spine ==> shoulder)
• In male amateurs (lumbar spine ==> elbow and wrist/hand)
• In females similar pattern by anatomical site, but a trend for upper limb rather than lumbar spine injury

You complete your preparation with an evaluation of the individual you are working with, and should consider the following issues:
• Age (biological/chronological); gender
• Current training/injury/health status
• Training background/experience
• Flexibility/mobility (static and dynamic)
• Performance testing
• Fitness polygon/performance profile

A broad review of literature shows the methods and programmes used to improve golf performance through fitness training can vary greatly. It’s important to remember, however, when it comes to fitness, most golfers are just like most of the general population... unfit and seriously undertrained! This means before targeting training and exercise aimed directly at golf, the first challenge is to increase general all-round ability and function.

It is well understood that the first stage in the development of conditioning for sport is to establish all-round fitness or what conditioning experts refer to as general physical preparation. This requires the development of a person’s overall working capacity, and involves increasing capability within all the major biomotor abilities required in sport.

Qualities such as muscular strength, muscular endurance, cardiovascular ability, speed, balance, coordination and flexibility should be included in the training regime. Evidence and practical experience agree that the broader and stronger this base, the greater subsequent level of development possible.

Therapeutic or golf-related exercise can be used during this period if relevant, but only after a sufficient foundation or base fitness has been established should significant integration of more “advanced golf-specific fitness training” take place.

Use your needs analysis to guide you and consider the following when starting a basic conditioning programme with improving golf as its final objective:
• Consistently train a minimum two to four times per week
• Target whole-body resistance training using free weight exercises. Include at least one pulling and one pushing exercise for the upper body, a compound movement for legs and an exercise involving lifting from the floor.
• The resistance training should be performed through full range of motion but an additional daily mobility and stretch routine may benefit many.
• Include 15-30 minutes of cardiovascular training at an appropriate intensity. Perform this after your resistance training or on a separate day if needs be. If fitness levels allow, try using a fartlek or interval approach.

For a list of references visit www.fitpro.com/fitpro/references