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My Golf Journey – A Year in Review: 2004

By Ramsay McMaster

Golf Physiotherapist

2004 has ostensibly been the busiest and most interesting on record.

In January, we had the opening of the Australian Institute of Sport Golf Unit at the home of Australian Golf, Moonah Links.

We had our first AGU Golf Camp and some of the US Tour players came down for intensive training.

In February, we had a great opportunity to meet and work with Mary MacKay, Nick Faldo's physiotherapist and were allowed to sit in on Nick's 3D Golf Swing Analysis at the Heineken Classic Tournament. It was very interesting to see the results Nick achieved using the biofeedback and then using this information in his physical preparation.

US Open winner, Alison Nicholas, attended an intensive training camp at Moonah Links. Alison was great to work with and an inspiration to some of our elite Australian golfers.

We also had Ghannin from the Qatar Golf Association training on a part time scholarship at the AIS. Ghannin now has a significant role in working with junior Qatar golfers and their development with the knowledge and systems he acquired at the AIS. This would not have been possible without Qatar Masters Operations Manager, Gary McClinchey.

I worked at the European Tour in Newcastle and had the great honour of meeting and treating Sandy Lyle. Sandy supplied us with some words of inspiration and goal setting for our juniors and elite golfers if they want to win a British Open or a Masters.

The next stop was the first meeting of the Titleist Performance Panel at Ocean Side. It really is the Disney World for serious golfers. It is an amazing golf facility with some of the “great golf brain” in the world working there.

I also went down to the World Matchplay and caught up with some of the Aussies at La Habra.

It was then onto the Southern California PGA Coaching Summit where we were well looked after. Steve Bann and myself were guest speakers.


From there I went down to the Doral Tournament in Miami where I caught up with more players and coaching “guru” Jim McLean. Jim’s work is well known around the world. I was most impressed with Jim at the tournament and his approach to people. Although Jim was busy he spent as much quality time with his amateur golfers as he did his players.

It was onward to Belgium where we did a workshop with the Belgium Golf Federation and Belgium PGA.

Next stop was Amsterdam where the Dutch PGA had us as keynote speakers at their conference. We were well looked after and the response in the room was exceptionally positive. The Dutch had some great speakers and their officials Wim, Jimmy and Frank should be congratulated on the high standard on information presented.

In March it was off to Hong Kong Golf Club to present the first ever PDP program between the Australian and British PGA.

Ian Roberts, the Head Coach Hong Kong, is a real trail blazer in this part of the world and is really looking at World Best Practice in Asia.



In April we also got an opportunity to work alongside Peter Fowler. Peter gave an outstanding presentation to the AIS Golf Athletes on life on the Tour and a short golf workshop.

In May we attended the Australian PGA Coaching Summit. The standard of presentations was really top shelf. We got the opportunity to present our new GUR Program (Golfers Under Repair/Rehabilitation) which I feel is the future for all service providers to golf.

I also got the chance to meet and screen the elite Texas coach Kevin Kirk and the legendary coach, Chuck Cook. It was great to have that unique time with them.

In July I had another great opportunity to meet and spend time with world renowned coach, Peter Cowen at the Scottish Open. Pete is a very modest person but his knowledge of golf is excellent.

It was back to the US and I then got the opportunity to work for the US First Tee Program.

This was an enormous opportunity and honour, I learned so much from their camp. It's pretty tough seeing 103 juniors but I got to be part of such an intelligent, forward thinking and caring team.

Through the First Tee I was introduced to Series player and US Major winner, Jim Colbert. Jim is a very interesting man and was a great model to show you what the golf swing does to your body after 40 years.

In September we set up a GUR Program at Hong Kong Golf Club. This was a great success thanks to the Hong Kong team of Alec Pettigrew, Ian Roberts and Liam Fitzpatrick. I also got the opportunity to go back to Titleist for the second meeting.

There will be some interesting systems and information coming out of the Performance Centre in the next few years.

I also went up to the Nationwide Tour to catch up with and serviced some of the players on that tour. This has to be the toughest tour in the world. It is so competitive.

At the Clinic we were fortunate to have Orlaith Buckley, the Irish golf team physiotherapist. It was great to have her over here for the month to exchange ideas.

Additionally we had the opportunity to do some presentations for the Golf Channel and CNN on the Golf Fitness Systems.

This month (November) we have had the First Tee program representatives visiting Melbourne and Pete Cowen is coming to present and share ideas and systems in regard to European Tour presentation and performance enhancement. This is being reinforced with our trip.

In December we return to Hong Kong and Dubai to do an intensive golf camp with Pete Cowen's European Tour players. Arguably this is the first time at this level that a coach has taken players away to do an end of year camp with physiotherapists, coaches and trainers.

Moving Forward: 2005

We are looking forward to seminars in Sweden, UK, Spain and Hong Kong in April and will be presenting our new program GUR to coaches, therapists and trainers.

Please enjoy some interesting articles in our magazine this month.

Regards,
Ramsay McMaster

Mobility Stretching and Warm Up

By Lyn Booth

Physiotherapist to English Ladies Golf Union

Mobility, Stretching and Warm-up

“Mobility allows us to attain and modify general and local posture in order to perform the skills of any sport, and improve the aesthetic impression of many” (Hartley O’Brien, 1980).

Stretching is an important aspect of a golfer’s general conditioning programme. However, why and when this type of programme should be undertaken is open to debate. Herbert and Gabriel (2002) concluded that stretching before or after exercise did not prevent muscle soreness and that stretching before exercise did not reduce the risk of injury or improve sporting performance. Other authors have failed to show evidence that stretching reduces injury (Balyi and Hamilton (2003), Bird, Black and Newton (1997), Herbert and Gabriel (2002)). Nevertheless, stretching to reduce injury remains a commonly held belief within sport.

One of the reasons for the controversy regarding the benefits of stretching may be in the terminology itself. As a definition of terms, mobility is the facility of movement and stretch is the elongation or linear deformation that increases length. Importantly there is a difference between "stretching" as part of a warm-up prior to training/competition, and "stretching" as a means of improving mobility/flexibility.

Joint and muscle mobility

Although trying to improve mobility should not be a part of warming-up, joint and muscle flexibility is an important part of a golfer's general conditioning programme. (Although neural mobility is very important, it will not be discussed in this article). Golfers need to be aware that although there are benefits from improving mobility there are also risks associated with

- using poor techniques,
- allowing non-essential structures to become hypermobile
- inadequate strength and control in the new range of movement.

It is important to differentiate between mobility exercises for joints and those for muscles. Increasing joint mobility may be ineffective if relevant muscles cannot move and work functionally through the new range. Ideally all mobility regimes should be golf-specific, encourage left/right symmetry and use golfing patterns of movement.

Body types differ and golfers should concentrate on maintaining and/or improving mobility rather than trying to be the best in the group. In particular, flexibility regimes for young performers in all sports take on more significance following the onset of peak height velocity (Balyi and Hamilton, 2003).

Exercises to improve mobility should be under the control of the golfer - another person must not force the joint or muscle into an extreme of position. The exercises must not involve unstable starting positions - which leads to increased muscle tension as the golfer tries to retain his/her balance, (an extreme example would be a hamstring stretch with the foot balanced on a high bar).

Joint Mobility

Full range of movement in a joint occurs when all the muscles opposite to the movement are in a relaxed position. Maintaining a good range of joint movement can have long-term beneficial effects on articular cartilage. Limited joint mobility may result in the periphery of the articular cartilage being denied nutrition, which may be related to joint "wear and tear" in older participants.

Muscle Mobility

Muscles that usually require most attention are the ones that pass over more than one joint or have a multi-action effect.

The most beneficial exercises influence the viscous properties of the parallel elastic components of muscle, resulting in plastic deformation (Sapega et al, 1981). The most suitable exercises are those which

- reduce the effects of the stretch reflex,
- take advantage of the inverse stretch reflex,
- occur at increased muscle temperature - enhancing the viscous stress relaxation of collagen tissue.

In other words, LOW forces for LONG duration at HIGHER than normal muscle temperatures.

Practically, the following regimes have been suggested:

- Perform the stretches immediately after training/competition or after a warm/hot bath or shower. (Sapega et al, 1981; Strickler et al, 1990)
- Hold the stretch for a minimum of 15 seconds (Roberts and Wilson, 1999) and optimally for 30 seconds (Bandy and Irion, 1994)
- Practice a minimum of four repetitions per exercise (Taylor et al, 1990)



The principles described above are very different to ballistic stretching exercises, which are repetitive, short duration, high velocity exercises that take muscles beyond their normal range of movement in an effort to improve mobility. Although ballistic stretching exercises may improve muscle flexibility, they cause muscle soreness as the muscle reflexly contracts to protect itself. Any stretching exercise that puts a "bounce" at the end of the stretch could be defined as ballistic and it is wise to avoid this type of exercise when trying to improve mobility.

Many sports now incorporate active and passive PNF (proprioceptive neuromuscular facilitation) techniques into their mobility programmes. These techniques are modifications of techniques developed to treat neurological conditions. However golfers would derive greater benefit if they also used PNF patterns of movement, which utilise all three planes of movement in one pattern and are therefore applicable to sporting actions. Waddington (1976) outlines PNF patterns from a medical perspective, but golfers can use the patterns during active exercise. Different areas of a muscle can be targeted by fixing either the proximal or distal attachments and by including rotation (or PNF patterns) during the stretch.

Stretching to improve mobility must be done at the end of training/competition when the performer is hot (sweating). Fitter golfers are more efficient at regulating body temperature, and may have to keep "topping up" their muscle temperature by further exercise as they change from one specific stretch to another. Alternatively, they could use artificial means to raise muscle temperature by practice a stretching regime after a warm/hot bath or shower.

When developing a stretching programme ensure that excessive mobility in one area of the body is not compensating for poor mobility and/or lack of strength in another area e.g. excessive protraction of the left scapula compensating for limited trunk rotation during the backswing of right-handed golfers.

Improving joint or muscle mobility without strengthening in the new range of movement can create injury problems:

- Ligaments can be strained as they try to protect a joint that is vulnerable due to lack of muscle strength in the new range.
- Muscles can be strained when they are too weak to protect themselves in outer range.

Discipline is required for mobility regimes and it may take several weeks to see an improvement. Be discriminating – don't design inappropriate and ineffective exercise programmes.

Warm-up

The warm-up is not an appropriate time to try to improve mobility. Golfers should only move joints and/or muscles through a range they are already capable of achieving. Trying to improve mobility during the warm-up is often counter-productive, with muscles feeling stiff and sore - the opposite of what the golfer hoped to achieve!

Warm-up routines should be golfer and course-specific. Not all the hamstring exercises that are suitable for a sprinter will be suitable for a golfer. Certain elements of the warm-up will be relevant to every golfer, but there should also be player-specific elements to the warm-up.

Prior to playing the warm-up routine should follow a set pattern - enabling golfers to focus on the event without having to worry about which exercises to perform. The time to experiment with new warm-up routines is on the practice ground.

Many sports use dynamic warm-up in preparation for activity, rather than concentrating on improving mobility. Dynamic warm-up tends to follow a similar pattern and should use golf patterns of movement:


1. Easy aerobic work e.g. brisk walking to the practice ground.
2. Non-golf-specific full range movement of relevant muscles and joints e.g. arm circling, rotating the whole body whilst standing - without moving beyond normal range.
3. Practising the golf swing without a club, ensuring that all relevant joints and muscles are taken through the largest range of movement that will be required during the swing.
4. Hitting shots with a variety of clubs, using half, three-quarter and full swing, before moving to more player and course-specific shots.

Golfers must appreciate the difference between exercises used in a dynamic warm-up, when muscles and joints work within their current range, and ballistic stretching exercises.

Golfers using dynamic warm-up still require mobility/flexibility work in their general conditioning programmes.

Obviously it is important that the timing of the warm-up has been well thought out. There is no benefit in increasing cardiovascular output, enhancing blood flow to joints and muscles, making demands of neuromuscular pathways and mentally preparing for practice or play if the golfer then has to wait too long on the first tee.

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Body Parameters for Golf – The Left Hip

By Trevor Montgomery

BHSc (Physiotherapy)

Director – Golf Works




As a golf-specific physiotherapist I enjoy the challenge of building bodies for golf. This can be quite a task when the bodies that I often work with have injuries, dysfunctions and a raft of bad habits built up simply from just living life. If a golfer's body has gone down one pathway, and it should be going down another pathway you need to unravel the dysfunctions and compensations before you can send it down the correct path – you cannot cut across from one path to another. Trying to learn new motor programmes using old habits is doomed to failure.

So I guess as a golf-specific physiotherapist I spend a large amount of time rebuilding bodies for golf. And this is where it gets really interesting – when is a swing fault actually due a body fault, when does a swing fault cause a body fault, and when do body faults lead to swing compensations.

Now until recently 'golf' has been guilty of neglecting the role of the body in the golf swing. With good reason too, because it has only been recently that physiotherapists and biomechanists have been able to provide and explain how altered parameters in a golfer's body can affect the golfer's swing.

In this article I want to look at the role of the left hip in the golf swing and how alterations in its range of motion and position can lead to swing faults and swing compensations.

Biomechanics




First we need to identify the ideal parameters of the left hip. The general consensus, with coaches I have discussed this with, is that from address position to finish position the pelvis will pass through 90° (the pelvis is parallel to the target line at address and is perpendicular to the target line at finish). The rotation of the pelvis occurs around an axis through the left leg. Turning the pelvis about the left leg from address to finish mostly occurs as internal rotation of the left hip (plus approx 15° of internal femoro-tibial torsion and a small amount of foot supination/adduction). Now this is where the biomechanical parameters of the left hip becomes important. An ideal hip will internally rotate to a maximum of approx 50°. The normal values of hip internal rotation measured for the population are in fact 25-35°.

So if a golfer has the ideal 50° of internal rotation about the left hip, 15° of internal rotation at the left knee and sets up with the feet square (perpendicular to the target line), when the golfer finishes the swing, the pelvis will be 25° short of where it should be at the finish position. Ben Hogan talked about the left foot (via the left hip) being '.....turned out a quarter of a turn to the left'. Hogan goes on to clarify that he meant a quarter of 90°; around 22° (close enough to 25° for me). So if a golfer has the ideal 50° of internal rotation of the left hip, 15° of internal rotation at the left knee and sets up with the left foot turned 25 degrees out at address, then the pelvis will finish perpendicular to the target line at the finish.

However, very few golfers (professionals or amateurs) that I assess have ideal left hips. Most would have between 20 and 30 degrees of left hip internal rotation. So if a golfer has 30 degrees of internal rotation at the left hip combined with 15° of internal rotation at the left knee and the left foot turned 25 degrees out at address, the golfer is still 20 degrees shy at the finish position.

Swing Compensations



Now this is when the compensations start to come into the golf swing, effectively introducing unnecessary error and decreasing the repeatability of the golf swing. The body can compensate but it shouldn't have to. If a golfer's parameters are such that their pelvis will come up 20 or 30 degrees short of the ideal finish position (due to a tight left hip, the left foot square at address or both) then they can compensate in several ways to get their 'belt buckle' to the target.

The first compensation is to let the left foot screw in the ground through ball strike. You can always tell where players with loss of rotation at the left hip who use this compensation have been because they make 'screw marks' in the ground with their front sprigs. This increased torsional stress, by the way, is not good for the golfer's left knee (meniscal irritation, meniscal tearing and ligamentous laxity), left ankle (talocrural articular cartilage irritation and excessive ligamentous loading), left foot (excessive intertarsal joint stress), left sacroiliac joint (gapping, increased laxity and loss of force closure), lower lumbar segments (torsional stress on the disc, susceptibility to pars interarticularis fractures) or their left shoe (basically torsions them to bits).

The second compensation is to transfer the weight onto the outside of the left heel through ball strike. This in effect changes the weight transfer onto left leg from 'at the target' to 'across the target' line. This has a tendency to make the left hip clear out into rotation and because the body is now moving across the target line, not perpendicular to it, it creates sidespin on the ball and the tendency for the ball to fade or cut. The more talented golfer's among us who do this compensation are aware they are about to deliver an open clubface to the ball and will 'flip' their hands through at impact. However, flipping the hands relies heavily on timing (something our brain doesn't bless us with in equal amounts each day) which varies from day to day or shot to shot and occasionally this can lead to a large 'snap' hook.



A third compensation is for the golfer to subconsciously lift the front of the left foot during the start of the down swing and turn it out more and plant it just before ball strike. This compensation is an impressive feat (no pun intended) of timing alone. However, we are trying to eliminate extra moving parts to minimize error in the swing, not put more in.

A fourth compensation is that of avoiding the left side altogether and hitting off the back foot – enough said.

Now I have heard the argument from coaches and players that as long as the club face is square at impact then it doesn't matter what the left hip or foot is doing. Here is the problem – they have forgotten about the involvement of the subconscious brain in the golf swing. Up to 80% of the neurons in the brain that are involved in any golf swing will activate when a golfer visualizes the swing.

I would suggest that very few golfers will visualize their pelvis or belt buckle coming up short of the target at the finish position. This means that even before they have stepped up to hit their ball, their subconscious brain has planned most of the timing and sequencing of their swing, taking into account the body's biomechanical parameters that the brain knows inherently. (How does the brain know the left hip is restricted? For the same reason it knows that hopping on an ACL-deficient knee would be a stupid thing to do).

So if a golfer has a tight left hip and tees up with their feet square and just swings, odds are on that the subconscious brain has planned the swing based on the shortened finish position and will deliver the club face to the ball in accordance to that, hence the club face is delivered square but in the wrong direction – hence the golfer hits a block. Doesn't make sense? Try this – stand 50 metres away from a brick wall and sprint at it. I want you to stop 1 inch before you hit the wall. Even before you stand up from your chair your brain is calculating alterations in stride length and muscle recruitment to avoid hitting the wall.




Now if you add the conscious brain to the mix it gets even worse. A golfer with a loss of internal rotation at the left hip, for whichever reason (tight left hip or foot square at address), who is target orientated and has good feel will 'flip' their hands through impact in an effort to square the clubface up. As mentioned earlier, flipping your hands is a sign of talent, but when a golfer's body parameters are right then they shouldn't have to do it or rely on it. Golfer's who hit hundreds of balls a day and 'flip' their hands through impact (as a compensation for a swing fault or a body fault) greatly increases their risk of developing left wrist problems.

The parameters of a golfer's left hip can have a major bearing on the outcome of the golf swing and can dictate to a large degree whether unnecessary swing compensations will be built into a swing. My advice to coaches is to utilize the physiotherapists and biomechanists to determine if what you are seeing in a golfer's swing mechanics are true swing faults or swing compensations for a body fault. Realizing that a hip at its most ideal can only internally rotate 45 - 50 degrees requires some consideration to the left foot position at address. Remember, if the body parameters are more ideal, there is less need for the body to make compensations in the golf swing. The less compensation, the more repeatable the golf swing.

Other Considerations

My advice to physiotherapists is to assess and correct the cause of a tight left hip. A large number of golfers I assess present with functional instabilities of the pelvis. This is a loss of force closure of the pelvis, or in simpler terms – weak abdominals (particularly a loss of co-activation of internal obliques and transversus abdominus) and weak gluteals. A loss of force closure (as researched by Andre Vleeming, Diana Lee) can lead to an immediate loss of up to 50% of hip internal rotation due to alterations in neural firing sequences to the hip musculature. Remember, 29 muscles attach to the pelvis (excluding the pelvic floor), and a loss of functional stability can significantly compromise their ability to activate appropriately.



Relative flexibility issues are another consideration. A heavy fall onto the pelvis or laxity in the knee complex can lead to increased motion at these areas of 'give' and relative tightening of the hip because it doesn't have to move because everything else does. Obviously intrinsic hip musculature needs to be assessed (piriformis, gemellus, obturators etc) and strength issues (appropriate strength and length in gluteus medius, appropriate activation of gluteus maximus).

Those golfers who have a bony restriction to the hips from conditions such as osteoarthritis, Perthes disease, slipped capital epiphysis, and congenital hip dysplasia, will need to build some form of compensation into their set up to minimize the effects of this restriction in their golf swing. If I remember rightly Arnold Palmer teed up at the par 3 -12th at Augusta last year with his left foot turned out at least 60 degrees. I would put money on the fact that his left hip probably only has about 20 degrees of internal rotation.

Now I haven't discussed the strength issues and activation issues of the muscles around the left hip. These too, are important parameters to take into account during the golf swing. If the left side isn't strong enough to hit into, then the body can translate too much (pass a vertical line through the left foot) and again make the golfer build compensations into their swing. That is another topic for another article down the track.

Remember, always check the body parameters of the golfers you are assessing and coaching. If you can recognize and address the body deficits it will create far less frustration for the golfer and the coach when working with the swing mechanics. If the body parameters and swing mechanics in a golfer become more ideal, there will be less swing compensations and less risk of injury to your amateur golfers and touring professionals alike.

Golf Biomechanics:

Sequencing & Timing in the Golf Swing


By Ryan Lumsden

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The elite performers of the game have developed swings that produce distance, accuracy, control, and consistency. A common observation of many of these performers, with Ernie Els (“the big easy”) being the obvious example, is how effortlessly they seem to swing the club yet hit the ball with tremendous power - raising the question, how do they do it? One of the reasons is that they have developed a pattern of movement that produces high speed at the most distal end of a kinematic chain (the club head), in which there is a proximal-to-distal (PD) sequence of the body segments involved.

Why do golfers need to employ a particular pattern or sequence of movement in order to produce an effective golf swing? In a previous GolfMed article (Dr. R. Neal, Golfmed Newsletter, Vol 1, www.golfmed.net), the force-velocity relationship in human muscle was discussed, explaining that active stretching of muscles (i.e. eccentric muscle contraction) can increase the force of contraction during the concentric phase and that various factors mitigate it’s effect (the speed of the eccentric contraction, the length of the stretch, and the delay between the eccentric and concentric phases). This characteristic of human muscle may be the reason that PD patterns of movement are the ones that have emerged as effective in producing maximum speed at the distal end of a kinematic chain.



Specifically for golf, the force-velocity relationship dictates that to maximise the force-producing capacity of our muscles, we should involve them in actions that require them to contract eccentrically prior to acting concentrically (stretch-shorten cycles) and that we must sequence the action so that the muscles toward the extremities contract late in the swing (i.e. the rotations should proceed distally). Therefore, allowing us to advocate a particular pattern of movement that optimally meets the demands of the game.

Sequencing and Timing

So, how should the body segments interact during the swing to produce an efficient and effective movement pattern? The PD motion pattern, that is, the most proximal segments (with larger, stronger muscles) of the body starting or initiating the movement, followed in turn, by the next most proximal until the end segment (with smaller, weaker muscles) of the linked chain is used, optimises the use of the body's segments in that the speed of the smaller segment is added to the larger ones with the effect of producing the greatest possible speed of the final segment endpoint.

In golf, the downswing is commenced with the lower body (weight transfer and hip rotation), followed by rotation of the upper torso, arm rotations, and finally wrist rotation leading to high speeds of the club. As mentioned, this pattern allows the segments that are controlled by small muscles to build on the speed developed by the large muscles of the trunk and thigh and relates to what is known as the summation of speed principle, whereby the peak angular velocity of the proximal segment is of lesser magnitude and occurs earlier in the action than its contiguous, distal segment.



The real-time 3D motion analysis system used by Golf BioDynamics (www.golfbiodynamics.com), allows an assessment of golfer's swing dynamics to be made. With four sensors attached to the body at the pelvis, upper torso, head, and left hand (for a right handed golfer), we are able to calculate the peak speeds of the various body parts as well as the timing lags (the epochs between peak speeds) to quantify the sequencing and timing of the swing. Measures obtained are therefore, peak hip rotational speed, peak shoulder rotational speed, peak hand speed and hip-shoulder lag, shoulder-hand lag, and hand-impact lag. Data for what might be considered "ideal" sequencing and timing is presented in Figure 1 below.

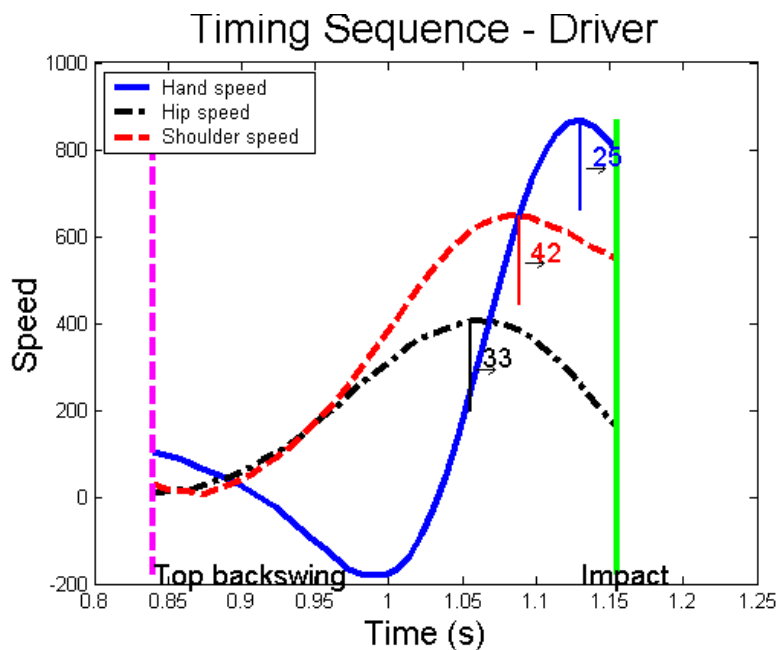


Figure 1. Ideal Swing Dynamics during the golf swing

This figure shows that the hips reach their peak speed first, as the downswing is initiated through the lower body by weight transfer and hip rotation (the X – Factor Stretch or “recoil” as is commonly referred to, and an example of a stretch-shorten cycle if we recall from Dr Neal’s earlier article), followed by peak shoulder speed, which is of greater magnitude, and then the hands as the momentum is transferred outwardly to the clubhead (of course, had we measured the motion of the club, it would be expected to reach it’s peak at the moment of impact).

This is the pattern of movement that has been evident in all the great ball strikers tested using the Golf BioDynamics system, and obviously, that which conforms to the theory presented above! Further, elite players produce less variable movement patterns and hence more consistent swing dynamics.

Current Research

Although it is recognised that PD motion patterns are optimal and much biomechanical research has been carried out in order to understand and improve this action, few findings have emerged that have been of practical significance to golf coaches.

We have yet to gain an understanding of how long the delays between the peak segment speeds should be and also of the differences in timing patterns between “well-timed” and “mistimed” golf shots, although there is theoretical evidence to support the view that relatively small changes to the timing of segment involvement can have a marked effect on club head speed.

Recently, Golf BioDynamics has been commissioned by the Australian Institute of Sport to identify and quantify ideal sequencing of body segment involvement during the swing using a five-segment model of the golfer (including the pelvis, upper torso, left arm, left forearm, and left hand (again, for a right handed golfer)). Importantly, following this work, from an applied perspective we want to be able to develop strategies to alter the timing structure of the swing, to improve the mechanics of golfer’s swings.

Summary

The golf swing is a complex sequential action involving rotation of the hips, trunk, and shoulders, and movement of the arms, wrists, and hands with one of the keys to the success of this action being the timing of the involvement of these body segments to produce maximum speed of the club at impact.

The force-velocity characteristics of human muscle, PD motion patterns, and the summation of speed principle are reasons as to why the correct sequence of body segment involvement during the swing is crucial for “efficient” technique.

Current research is being undertaken in order to understand from a practical perspective how coaching input, biofeedback, and altered physical properties (flexibility, stability, and strength) can change the timing structure of the golf swing.

Finally, relating to sequencing and timing in the swing, and highlighted by the movement patterns described above, is the importance of flexibility as a biomechanical parameter due to the influence of muscle and tendon elasticity on elastic energy storage and force production. This, and how it relates to the golfer, will be discussed in a future article.

Embracing an Integral Approach to Reaching Your Potential in Golf

By Pia Nilsson and Lynn Marriott


(More information about **VISION54 / Coaching for the future, Inc.** can be found on the website at www.coachingforthefuture.com).

The game of golf can have many different intentions/purposes. One intention that most of our students have is to learn how to get the ball in the hole in fewer strokes. We love the challenge as coaches to support the players to figure it out in a way that works best for them. We know from experience that the journey ends up being different for everyone who plays this game.

Playing the game involves many components. We like to break it down to these five elements: physical, technical, mental, emotional and social. All five of them influence how you score. All five of them need to be looked at if you want to realize your potential and score lower. If any of these areas are not in your field of awareness your potential is compromised.

We describe and categorize the five elements like this:

- **Physical:** your fitness, posture, nutrition, hydration, balance of rest and activity...
- **Technical:** your swing, grip, stance, aim, fundamentals, ball and club fitting, shot making ability...
- **Mental:** your focus, motivation, decision making, self-talk, goal settings, staying present...
- **Emotional:** your state and what you can do about it – nervous, angry, anxious, too excited...
- **Social:** your interaction with others – playing partners, spectators, family, coach, caddy, media...




Think about yourself. Which of these elements or areas do you focus on? What are you good at in each area? What can be better? Awareness requires honesty. Ask someone close to you to do an evaluation of you in each area. Compare their perception of you to your own.

We always observe and coach on the golf course, because that is the only place where we can see all of the five elements in integral action and how they work together. That's where we can support you to be a better player of the game, not only a student of the swing.

Unfortunately many players and teachers keep on insisting on a myopic view involving the "T" and maybe the "P". Both are important but certainly not the whole picture or truth. But it can be easy to be tricked. If my "M", "E" or "S" is weak it shows up in the swing, but it does not mean that my technical swing or stroke is the root cause of it. If a player feels fear standing over the ball, it might make the muscles tight, the player swings too fast and the turn of the swing never gets completed. Now the critical issue is what should the player go practice? If you only go to the range and work on making a better turn you are only working from one are of cause. This is limited perception.

If you want to play to your ability it is imperative that you no longer remain in denial that you are a mind and body and that you experience emotions as you play and that you have relationships in the culture of golf and life (you don't experience golf, or life for that matter, in a vacuum unless you choose to always play along). Empirical evidence is starting to convincingly demonstrate that an integral approach appears to be the most effective and most powerful method of human growth, development, and conscious evolution yet devised.



If you learn to spot these five elements in your own awareness – and because they are there in any golf event – then you can more easily appreciate them, exercise them, use them... and thereby vastly accelerate your own growth and development to higher, wider, deeper ways of being. And yes, you will shoot lower scores!


We continue to be inspired by the work of Michael Murphy, George Leonard and their Integral Transformative Practice. Ken Wilbur's animated and enthusiastic encouragement of an integral theory and practice is compelling. Ken's research, experience and categorizing of systems and models of human growth motivate us to a promising future.

As Ken says... it is incumbent upon us to integrate.

Aussie Golf Club... A Pathway to Private Golf

By Brett O' Farrell


Aussie Golf Club Director



The focus of golfing associations over the last five years has been to make private golf clubs more accessible to a broader range of people. Yet, even though almost 1.3 million people played a round of golf six times or more last year, only one third of these golfers are members of a golf club.

It isn't difficult to think of reasons why this is so. Not playing often enough to justify the large annual fees, not being able to pick a favourite club to join, or simply not ready to take the next step in your golf game. Well one club, Aussie Golf Club, has decided that these reasons shouldn't be a barrier in being able to get a handicap and compete in club competitions. They have been **set up to target the casual golfers who don't hold private memberships, aiming to give them a taste of traditional membership life at a fraction of the cost.**

Affiliated with the Australian Golf Union (AGU), Aussie Golf is part of the AGU's golf access program. This program aims to promote golf to a wider range of people by making it more accessible to play a round at the best courses our country has to offer. Operating exactly like a private club, Aussie Golf club works through establishing reciprocal benefits with other private and public clubs around Australia. These benefits include discounted green fees, equipment, private lessons as well as access to club competitions and annual tournaments. It's easy to join, the annual fee is inexpensive and there is no joining fee. After playing five rounds at any club, send in your scorecards marked and signed by a registered member of either a private club or Aussie Golf Club and you will receive an affiliate AGU handicap.



As Aussie Golf Club Director, I strongly believe that making private club golf more accessible for the social player is not only a great way to promote the game, but that it will lead to existing private clubs signing more members in the long-term.

Aussie Golf came about from the frustration my friends and I experienced – at 25 years old we didn't want to spend thousands of dollars plus a joining fee on a membership to a private golf club.... That meant we couldn't get a handicap. For most of the year we play golf regularly and at a number of different clubs, but we were never able to compete in any competitions. Even if we could afford a membership, at this stage of our lives we weren't ready to commit to one club – we are young, we are mobile. At any age in life Aussie Golf is perfect for anyone who finds themselves in a similar situation to me.

A question many people ask is how do you know which club to join? What about the person who wants to join a club, but can't decide which one suits them best? By experiencing a range of private golf clubs through Aussie Golf's reciprocal benefits, you can visit over 65 golf courses and join your favourite. A 'try before you buy' package, allowing golfers to explore all options before they sign on for what can be an expensive yearly membership and joining fee.

For more information, please contact Aussie Golf Club on 9671 3677, visit their website, www.aussiegolfclub.com.au or email aussiegolf@bigpond.com.

Endorsed by Australian Open Champion Bob Shearer, as well as PGA Tour Director of Tournaments, Andrew Langford-Jones, Aussie Golf Club has strong support behind it.

Total Training Approach to Coaching

Peter Knight

**State Coaching Director, NSW Golf Assoc., and Women's Golf NSW
Head Coach, NSW Institute of Sport Golf Programme**

The history of coaching in all sports has led to us adopting those methods that seem to work best. This evolution has occurred mainly through trial and error. In years past much the understanding of technique (for example) came from what was visible and also through what great athletes believed they did.

The advent of the use of video, force plates, biomechanical support, high-speed cameras, movement sensors that can be placed on the body and a range of other scientific interventions it is now possible to quantify and explain any outcome of a movement performance in terms of technique.

Having this understanding is at once comforting and limiting. Comforting because we can (with a reasonable degree of confidence) dissect any performance and highlight the visible movement patterns – both good and bad.

It is limiting because we can easily be lulled into thinking that we now know best how to deal with just about any situation. In golf coaching errors can be explained by analysing technique. However the underlying cause of the technical error could be a particular thinking pattern, compensation for poorly fitted equipment or something else entirely. The belief that everything can be 'fixed' once the technique is correct can prevent us from looking for other ways to enhance performance.


For the purposes of this presentation the historical progress of coaching thought has been divided into three sections; traditional, new and non-traditional. I will consider these sections as they relate to my sport, golf.



	Traditional	New
Physical	<ul style="list-style-type: none"> • Weight training is harmful to the golf swing. • Running is bad for golf as it tightens the muscles. 	<ul style="list-style-type: none"> • Medical and physio screenings • Strength training programmes • Core stability • High levels of fitness
Mental	<ul style="list-style-type: none"> • Jack Nicklaus said that if a player needed the help of a sports psychologist then they shouldn't be on the professional tour. 	<ul style="list-style-type: none"> • Psych tools such as High Performance Thinking System. • Post round debriefing • Individual psych consults.
Technique	<ul style="list-style-type: none"> • Based on what the best players in different eras thought they did. 	<ul style="list-style-type: none"> • Use of video, computer analysis, biofeedback, 3D models
Tactics	<ul style="list-style-type: none"> • This is historically a strong area of preparation but is limited to on-course strategies 	<ul style="list-style-type: none"> • Course yardages, pin positions • Professional caddies
Nutrition, Hydration	<ul style="list-style-type: none"> • A beer addresses both of these considerations at the same time. 	<ul style="list-style-type: none"> • Better education • Less alcohol • On-course snacks

Non-traditional

While there are considerable advancements to be made in traditional and new approaches to coaching areas it is arguable that the greatest advancements available to us occur in areas of coaching and performance that are non-traditional.



In recent years the catchphrase 'holistic' has been used to describe the approach taken to training and preparing athletes for competition. My generalised observation of coaches who take this approach is that planning attends very nicely to all the traditional and new training issues along with assessment modalities and attention to career and social issues. This of course is to be applauded.

Having an understanding of our athletes' learning styles is an extremely useful tool, but it has over the past few years been limited to pigeon-holing a person as a purely visual, audio or kinaesthetic learner. We actually learn in all three modalities constantly with some more prevalent at any one time.


I am sure that there have been innumerable occasions where you have realised the benefits of trusting your intuition. Like me you have probably also found ignoring intuition can come at a cost.

The field of NLP offers many ways to ensure enhanced communication with your athletes and ways to help them raise their levels of performance. At times what an athlete says to you and what they really mean may seem to be different. By asking questions correctly you may be able to gain information that may not have been immediately apparent – even to the athletes themselves!

I have found great benefit in understanding and using the principles offered by NLP in my coaching of both highly talented athletes and others who are less talented.

There are two tools I would like to offer to both assist you as coaches and also enable you to teach these tools to your athletes for their benefit.

Circle of Excellence



All exceptional performances occur when the athlete is in the right mental and emotional “state” or “zone”. While achieving this state seems to be a fleeting occurrence it is certainly possible to reproduce the state reasonably closely at will. There are two aspects to this technique. The first is to recall the sensations of a high performance state and the second is to set up ‘anchors’ so that this high performance state is able to be automatically reproduced.

Step 1

Imagine a circle surrounding the area in which you are going to perform. For a golfer this would be an area around the golf ball of sufficient size so that you could stand inside it comfortably. For a participant in a field sport it could include the entire field.

Step 2

Stand outside the circle and recall a time when you performed exceptionally well. Be sure to include all of the sights, sounds, feelings and even smells and tastes (if appropriate). Once you have a rich recall of this situation as if you are truly reliving it, step into the circle, taking all of those sensations with you.

Step 3

As you are experiencing those sensations make some type of movement that you will later use as a trigger to help recall those sensations. That movement will act as your anchor for that state. It could be something like how you move your shoulders, clenching a fist in a certain way, etc. Step outside circle as if you have shed those feelings and left them inside the circle.



Step 4

Repeat the above step, recalling a different time that you performed exceptionally and take those sensations with you into the circle, adding them to the existing ones. Repeat your anchoring movement with each example. Do this repeatedly so you have a minimum of four or five different examples.

Step 5

Test the state by stepping inside the circle and firing your anchor, allowing those sensations to return to you.

Next time you are at training, imagine your circle of excellence on the ground at your training venue and step into it while firing your anchor.

The quality of the circle will be influenced by the purity of the state you elicited when creating your examples. With some practice you will be able to drop the idea of the circle and just fire the anchor. If you wish you can also retain the circle format.

Perceptual positions

When you are in conversation with one of your athletes and are mindful of what you are saying, hearing and feeling, you are said to be in first position with regard to yourself. If, while in conversation with that athlete, you imagine you are the athlete and speak, hear and have the feelings as they would you are said to be in second position with them. If you were an observer to you and the athlete while they are in conversation with your own self-talk, hearing the conversation and experiencing the feelings you would have as an observer, you are said to be in third position (with both you and the athlete).



To practice this drill, place three objects on the ground. One to represent you, the second to represent someone you are interacting with and the third is an observer position.

Recall a recent conversation with someone while you are in first position. Imagine you are really hearing what you heard at the time. Recalling what you said and having the feelings associated with that conversation.

Step into third position and watch the imaginary interaction between yourself and the other person. What do you observe about their interaction? How do each of the participants respond to comments from the other person?

Go to second position and sense what the other person is hearing, saying and feeling in response to what you say. Note what information you may gather.

Step again into third position and watch the interaction. You are now observing with information gained from both first and second position. Move back and forth between first and third, second and third and finally back to first.

What has changed about the relationship?

The perceptual positions exercise allows you to perceive a situation from the other persons perspective. It can be extremely useful to prepare for 'difficult' conversations you may be preparing for or as a review of those you have had. It may also give insight into athletes that you don't seem to relate to very well.



These are just two valuable tools that you can use to enhance your own current fine performance. They can also be taught to your athletes. You may wish to create your own coaching circle of excellence at your training and competition venues.

Use the perceptual positions when determining strategies for opposition teams. How might a rival coach counter your strategies? How will you respond to those counter moves?

The circle of excellence and perceptual positions concepts have enormous variety of application both on and off the sporting field.

I have been using these and other tools in my coaching for a number of years with results that I would otherwise have had difficulty gaining or perhaps not have been able to achieve. If you wish to pursue these ideas or discuss other applications for your sport, please contact me.

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National Sports Information Centre

The National Sport Information Centre, a program of the Australian Sports Commission has an extensive collection of golf books, journals and videotapes.

Listed below are articles and research papers that may be ordered from the NSIC.

Order form and prices can be found at the website -
<http://www.ausport.gov.au/nsic/docdel.html>

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Vision quest.

Mitchell, E.K.

Golf magazine (New York)

ISSUE: 45 8 Aug 2003 58

KEYWORDS: GOLF | VISION | EQUIPMENT

Describes a new product called Vizual Edge Performance Trainer that claims to help golfers aim, judge distance, read greens and shift focus. Includes price and website address. ACO-9919

Intra-individual variability in state anxiety and self-confidence in elite golfers.

Hassmen, P. Journal of sport behavior (Mobile, Ala.)

ISSUE: 27 3 Sept 2004 277-290

KEYWORDS: GOLF | ELITE ATHLETE | MAN | SWEDEN | PRE-COMPETITION | ANXIETY | SELF-ESTEEM

Precompetition anxiety levels are assumed to moderate athletic performance. Unfortunately, cross-sectional and nomothetic research designs have often shown non-significant findings; intra-individual variability may be a contributing factor. The extent of variability in precompetition anxiety and self-confidence responses as related to golf performance and trait measures were therefore examined using an idiographic approach. Individual patterns of variability were found for Cognitive and Somatic Anxiety and Self-Confidence scores yielded prior to the games player. Variability in Somatic Anxiety was significantly related to variability in golf performance. Players low in anxiety variability scored significantly higher on Private Self-Consciousness. The findings suggest the influence of anxiety and self-confidence on performance may be better understood when trait characteristics of the individual are also considered. ACO-9957

A cross-sport athletic performance rating scale.

Pedersen, D.M.

Perceptual and motor skills (Missoula, Mont.)

ISSUE: 97 3 Part 2 Dec 2003 1128-1132

KEYWORDS: SPORT | SKILL | ACHIEVEMENT | RATING SCALE |
COACH | BASEBALL | SOFTBALL | BASKETBALL | GOLF |
GYMNASTICS | SOCCER | SWIMMING | TENNIS | TRACK AND
FIELD | VOLLEYBALL | QUESTIONNAIRE | UNIVERSITY |
ATHLETE | FACTOR ANALYSIS | PSYCHOLOGY

An Athletic Performance Rating Scale, developed for comparing the characteristics of successful athletes across sports, was used by 17 coaches to rate 74 men and 83 women on 17 varsity collegiate teams. A 5-factor scale measuring Self motivation, Self-confidence, Emotional Stability, Athletic Ability, and Character was developed using principal components analysis. ACO-9739

Determinants of PGA Tour success: an examination of relationships among performance, scoring, and earnings.

Finley, P.S. Perceptual and motor skills (Missoula, Mont.)

ISSUE: 98 3 Part 1 June 2004 1100-1106

KEYWORDS: GOLF | ACHIEVEMENT | SKILL | SCORING | INCOME | CORRELATION | STATISTICS | PGA TOUR | SEASON | FACTOR ANALYSIS

Professional Golf Association (PGA) statistics for the 2002 season were analyzed to estimate the relationships between performance variables, scoring, and earnings. Two newly considered variables, Scrambling and Bounce Back percentages, showed meaningful correlation to Simple Scoring Average ($r_s = -.69$ and $-.40$, respectively), and each made a significant contribution to a regression model. While the full model of performance variables explained most of the variance in Simple Scoring Average ($R^2 = .94$), an adjusted scoring figure, accounting for the performance of the full field of players in each round, better correlated with Earnings over a PGA Tour season ($r = .77$). ACP-0540
