GOLF BIODYNAMICS INC.

GBD Newsletter

VOLUME 2, ISSUE 2 FEBRUARY 10 2008

SPECIAL POINTS OF INTEREST:

- Sequencing and Timing in Golf
- GBD Portugal

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Sequencing and Timing in Golf

by Robert Neal

When performed by experts, the golf swing can look simple and efficient. Yet when the average golfer attempts to hit a golf shot, the distance the ball travels often belies the effort that they put into the shot!

One of the key differences between the expert player and the average golfer is the sequencing and "timing" of their body movements.

Advanced golf technologies, such as Golf BioDynamics, allows golfers and their instructors to evaluate the timing and efficiency of their golf swing. Based on sound golf engineering principles, a single graph or chart can quickly summarize the difference between a 'well-timed' and 'poorly-timed' golf shot.

In simple terms, the downswing movement of the body involves the sequential movement of the hips, upper torso, arms and finally club. Sensors attached to these body segments give their position, orientation and speed of movement throughout the swing. The sports scientist or "golf tech" savvy coach uses these data to garner a profile of when each segment speeds up, reaches its maximum speed and then slows down (the slowing down is important to create a whip-like action).

The key to an efficient golf swing is to have the hips reach their peak speed before the upper body, which in turn, must reach its maximum velocity before the arms and hands. The club should attain its peak speed at impact. This sequence of events is known in golf engineering circles as the *kinematic sequence* or the *timing sequence* and it is key to developing an efficient golf swing.

Understandings of the sequencing and timing of body segment involvement in the golf swing are still evolving and until recent times we have had to rely on principles taken from other sports. For example, the ideal

New GBD Team Member...

Rui F. Raposo is our new GBD Team member in Portugal. Rui is a qualified Physiotherapist & Fitness Consultant who manages his own private practice in Algarve called GOLF FiT Injury Clinic & Performance Institute. He has been specializing in golf since 2005. More about Rui:

- Responsible for the Physiotherapy Unit at the Lexus PGA Portugal Tour 2007.
- Physiotherapist and Golf Fitness Consultant to:
- Portuguese National Teams (Portuguese Golf Federation).
- Professional Golfers Association Portugal (PGA).
- Oceanico Golf Team Portugal (Professional National Team)
- A contributor to Best Golf TV (Portuguese Golf Channel)
- Writes for the Portuguese edition of the Golf Digest, and PGA Official Magazine.

Welcome to the Team Rui!

Rui's contact details:

M: +351 960 118 596

Address: Academia Supergolf Vilamoura – Vilamoura/Algarve/Portugal

E-mail: r.raposo@golfbiodynamics.com

Http: www.mygolfitness.com

GOLF FiT

Pictured Left to Right are Rui, Alvaro Zerolo (GBD Spain) and Rob Neal.

Cont. Sequencing and Timing...

pattern of body segment involvement in an over-arm throw was postulated by Bunn (1972). This idea was called the summation of speed principle.

In an over-arm throw, the first segment to reach its peak speed is the torso (trunk). Once it has reached its peak speed, the shoulder starts to accelerate past it. Similarly, once the shoulder attains its peak speed, the elbow begins extending, and so forth until the ball is released from the fingers when the body can no longer move fast enough to keep up with the ball. Similarly long game golf swing biomechanics follows a similar pattern.

To investigate the timing sequences of highly proficient golfers is important, since we want to be able to develop strategies (drills, exercises etc) to alter the timing of body segment movements in the golf swing in order to improve the mechanics and therefore the efficiency of their swings.

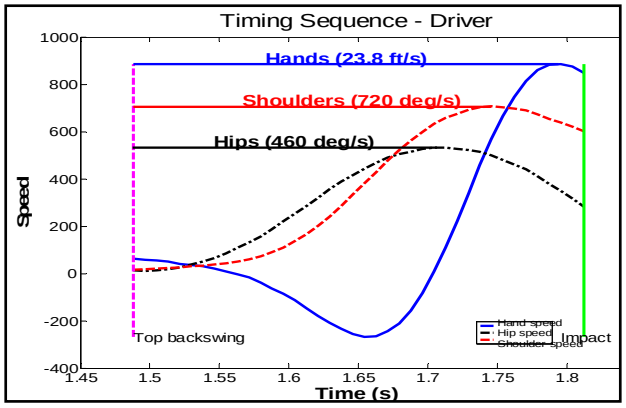
In the model that we currently use to capture and describe the body mechanics of the golf swing, we have 4 sensors of a real-time 3D motion measurement system attached to the body at the pelvis, upper torso, head and left hand (right-handed golfer).

The data obtained from the sensors allow us to calculate the speeds of the various body parts. In our research work, the method of quantifying the timing and sequencing in the swing relies on determining the peak speeds of the various body parts, as well as the time delays (lags) between these peaks.

So, what is ideal body sequencing in golf? We think that the data illustrated in Figure 1 (below) show an ideal (downswing) sequence, where the hips reach their peak speed prior to the shoulders, which in turn reach their peak prior to the hands. Of course, had we measured the motion of the club, it would be expected to reach its peak at the moment of impact.

This pattern is evident in **EVERY** great ball striker we have measured using the GBD system. That is not to say that every tour player has a perfect sequence however!

In this newsletter and in subsequent issues we would like to present data from various golfers who exhibit distinctly different patterns of 'mistiming' or poor segment sequencing. For each case, we will also hypothesise about the possible underlying causes of the poor timing sequence. Most often, we find it is a combination of both technical and physical issues that are contributing to the sequencing problem.



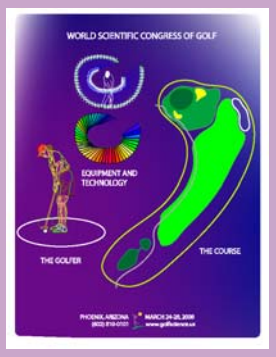
Don't miss it!

The World Scientific Congress of Golf

The Fifth World Scientific Congress of Golf will be held in Phoenix, Arizona in March 2008.

As with past Congresses, empirical and review manuscripts concerning three primary areas of the game of golf will be presented – The Golfer, The Golf Course and Equipment. The Fifth Congress will be held at the Crowne Plaza San Marcos Golf Resort in Chandler, Arizona. Check the website for the schedule, the list of the presenters and keynote speakers.

http://golfscience.us/



"NO MAN IS SO STUBBORN, SO CONCEITED, SO ARROGANT OR SO ACCOMPLISHED THAT HE IS NOT CONSTANTLY STRIVING TO IMPROVE HIS SCORE. HE MAY NOT ADMIT THIS TO OTHERS. HE MAY PRETEND THAT MEDIOCRITY IS ENOUGH FOR HIM. ... THIS MAN IS TELLING A WHITE LIE AND HE KNOWS IT." (HOGAN, 1957).

Scientific Journal for Golf

A new publication now exists for those seeking a top quality, continuing education resource with a golf focus. The new ***Annual Review of Golf Coaching*** is a technical, peer-reviewed journal that strives to bridge the gap between golf coaches and the experts in sports science. The first edition was distributed in October 2007. It promotes reflective practice in the golf community, encourages new research and has instituted an open review policy on all published articles. Simon Jenkins, the Editor-in-Chief has assembled an impressive array of experts in both the sports science arena and the golf industry to sit on the Editorial Board.

Look for: "*Body Segment Sequencing and Timing in Golf* "

Robert Neal (Golf BioDynamics, USA), Ryan Lumsden (Golf BioDynamics, USA), Mark Holland (Australian Institute of Sport) and Bruce Mason (Australian Institute of Sport)

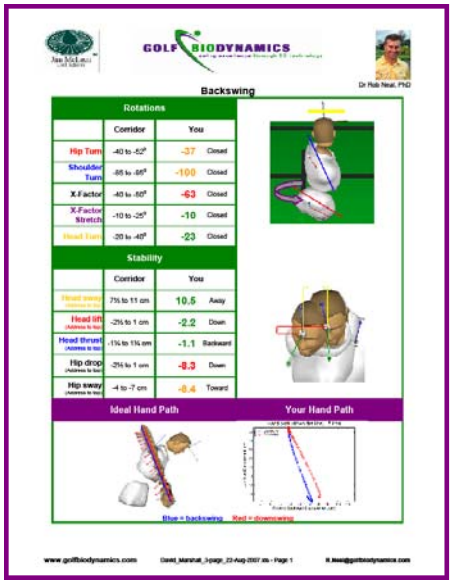
For more on upcoming feature articles and ordering details visit:

http://www.multi-science.co.uk/golf-coaching.htm

The "Ideal" Corridors

Rob, how did you develop the ranges or corridors for each parameter featured in your GBD 3D Reports?

Back in 2000, Golf BioDynamics initially tested approximately 75 golfers mostly from the Australasian and European Tours, measuring the 3D kinematics for each. Six of the best coaches/Teaching Professionals in Australia were asked to rank these golfers on their ball striking ability. The averages of the top ten ranked male golfers and female golfers were used as the starting point in an optimization program that I wrote. This optimization process had certain constraints (e.g., characteristic properties of muscles and the maximum torque a muscle can produce) and an objective function of MAXIMUM POWER, MAXIMUM CONSISTENCY and MINIMUM INJURY RISK. Once an optimal solution was derived, a set of corridors was produced based on this solution plus and minus the average variability of the data of the ten best ball-strikers. These corridors are based on the fact that there must be certain fundamentals present in a quality golf swing.



Golf is a terrible, hopeless addiction, it seems: it makes its devotees willing to trudge miles in any manner of weather, lugging a huge, incommodious and appallingly heavy bag with them, in pursuit of a tiny and fantastically expensive ball, in a fanatical attempt to direct it into a hole the size of a beer glass half a mile away. If anything could be better calculated to convince one of the essential lunacy of the human race, I haven't found it. - *Mike Seabrook*

Since then we have measured more than 300 Golf Professionals (150 Touring Professionals) from around the world and found that 75% of them fall within the corridors of our "ideal model". In fact, having now measured over 5000 amateur golfers crossing the entire spectrum of skill level we are assured that the better the player, the closer they are to our "ideal corridors". These corridors are based on the fact that there must be certain fundamentals present in a quality golf swing; however, there is enough flexibility in the system to allow for individual idiosyncrasies. The corridors have now been modified so that they are age and sex dependent. This means that we can compare our clients with a realistic model and yet still know what the best players in the world are doing in their golf swings.

Spotlight on GBD Team Members

The spotlight is on our good friends and colleagues in London, England!

Golf Teaching Professionals Mark Bull and Stewart Corstorphine are the GBD representatives in the UK (London, England). They have recently relocated the headquarters of their company *Total Golf Analysis (TGA)* to the Selsdon Park Golf Academy. The premises are located at the Selsdon Park Hotel and Golf Club (www.selsdonparkgolf.co.uk).

The impressive property boasts an amazing English retreat house and golf resort that has survived many facelifts and renovations throughout its 1000 year history. Offering lessons and packages for clients of all abilities and ages, Mark and Stewart approach performance enhancement for golfers from a multidisciplinary perspective.

A few highlights :

1. Check out their updated website (www.totalgolfanalysis.co.uk) - it has some great features including video footage of biofeedback lessons and discussions of various case studies;

2. Most recent articles: *Today's Golfer* (UK's biggest golf magazine); a feature article in *Golf News* ; Mark Bull featured in a full page article in his local (Surrey) newspaper (circulation approx. a million people); The Manchester Evening News ran an article last month covering recent work done with local professionals and European Tour player David Horsey; Total Golf Analysis featured in the January edition of *Fairway to Green.*

3. Mark is currently completing the UK Strength and Conditioning course to add another string to his bow.

4. Stewart Corstorphine is the course co-coordinator in the UK for The Golf Athlete and Long Term Athlete Development seminar series.

5. Both Stewart and Mark recently presented with Rob Neal for the UK PGA continuing education series.

Great work guys!

Pictured Right to Left are Stewart Corstorphine and Mark Bull with a student.

For more information contact
Stewart on Tel: 07734 255075 or
E-mail: stewart@totalgolfanalysis.co.uk; or
Mark on Tel: 07834 213852 or
E-mail: mark@totalgolfanalysis.co.uk .

GOLF BIODYNAMICS
swing excellence through 3D technology

Golf BioDynamics Inc.

PO Box 226645
Miami, FL 33122-6645
USA

Phone: 305-951-3565
Fax: 305-599-2890
E-mail:
R.Neal@golfbiodynamics.com

www.GolfBioDynamics.com

New Website

Golf BioDynamics has just commissioned a complete rebuild of its website by a company called Above Creative. The site rebuild will be a step by step process beginning January 2008. The aim is to enhance the world recognized GBD brand build a more customer-driven, dynamic and refreshing web site that amongst other things increases the market awareness of the availability and functionality of products that GBD possesses.

Some of the features being considered:

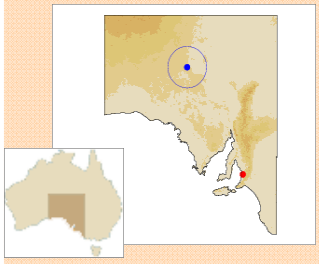
- **The consolidation of the current GBD database into an online database;**
- **The ability for users to sign up for newsletters – allowing for collection of geographic information;**
- **A restricted access area for GBD Team members – basically a resource area to download marketing information such as flyers, course notes, photographs as well as soft ware upgrades.**
- **Provide a forum for Team members to allow discussion of issues such as successful marketing techniques, problems etc.**
- **Provide a blogging area for GBD to discuss latest issues, research etc**

Your ideas are valuable so if you have any suggestions please call or email either Rob or Karen.

No wonder those Aussie golfers are so good!

Recent photos from a friend travelling through outback Australia...yes, this is an actual golf course!

This particular desert course is located near the opal mining town of Coober Pedy in South Australia (see blue dot on map below). With maximum temperatures in the high 30's (Celsius) during summer the majority of housing is underground.



Back in the early 1990's Rob competed in the Australian Sand Green Championships in St George (located in the western part of Queensland, Australia) and finished 4th! "Once you got used to the speed of the greens they were relatively easy to putt on—they are quite flat and of course very slow!".

As you can imagine, approach shots to sand greens are remarkably different to grass greens. Since the 'greens' are very hard, it is almost akin to landing the ball on hard pan. The ball must be landed short of the green so that it runs up. There is quite a lot of skill in learning how short of the green you need to land the ball.

Photos courtesy of Barry Cheales—Coober Pedy

Rob's fashion tip for playing on desert courses—don't wear white! The sand on the greens is actually mixed with oil!