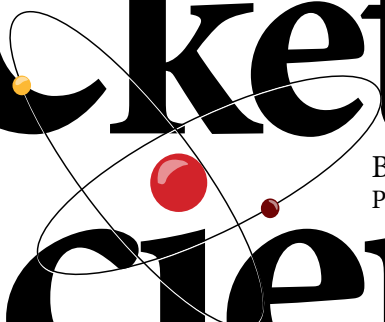
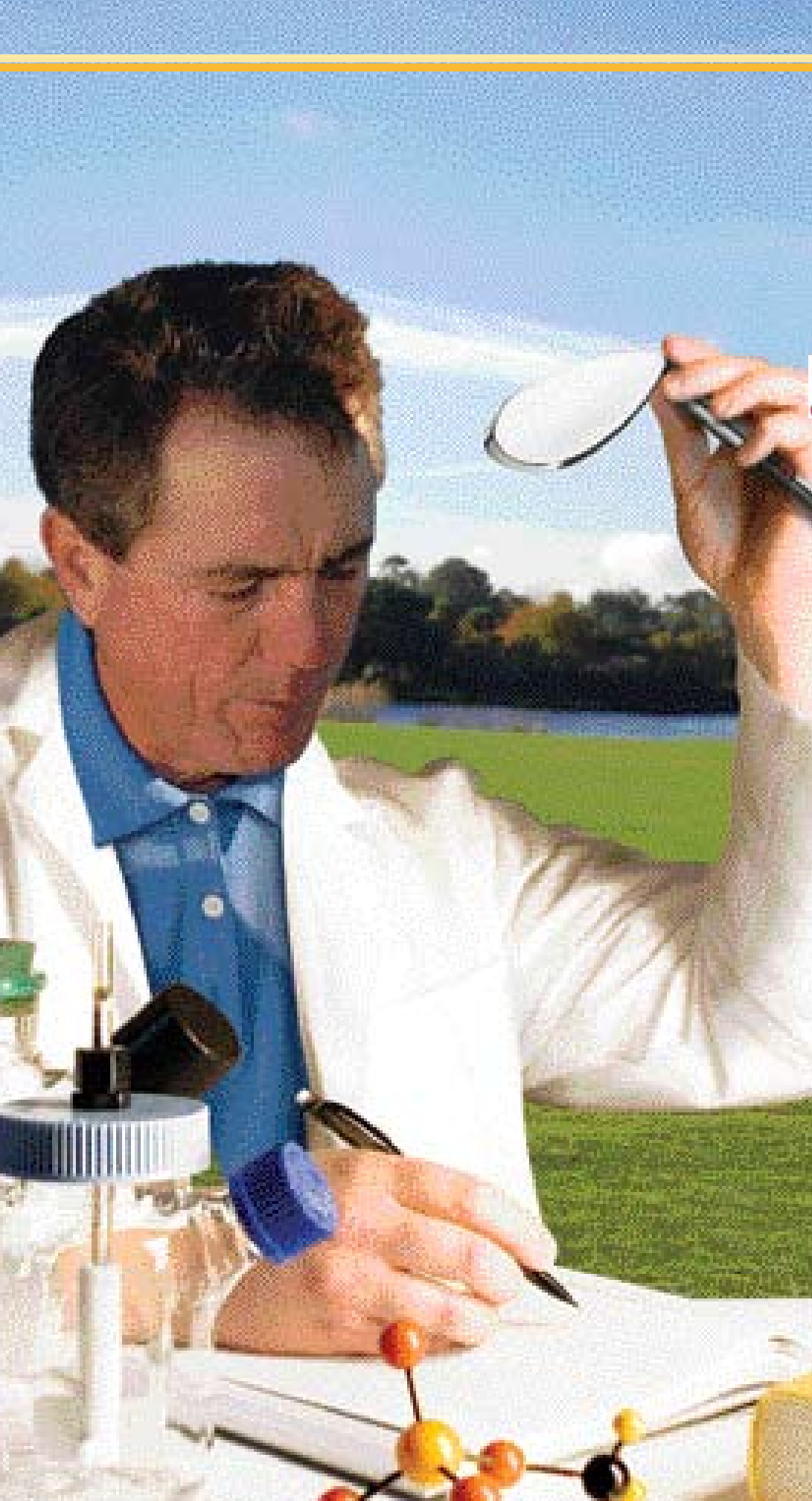


A good Golf Swing isn't Rocket Science (or is it?)



By I.J. Schecter with Doug Weaver
Photos by Rob Tipton/Boomkin Golf

Mastering the golf swing is by no means a simple task. However, the frustration experienced by many weekend hackers stems from the lack of knowledge as to the science of golf as it does the application of precise mechanics. Once you know how a golf swing is supposed to behave, you can begin to try to perfect and emulate it. Until you know how the relationship between ball, club and science is supposed to work, you won't know what you're trying to execute.



So let's forget swing

planes, hip turns and wrist hinges for a moment and examine the three most crucial scientific aspects of understanding the golf swing — the trampoline effect between the ball and clubface, the way a clubhead gets into proper position and the importance of gravity.



The Trampoline Effect

If you're standing on a trampoline and you push down with your legs, what happens next? The trampoline pushes you back up. Keep this in mind the next time you're standing over a golf ball. When a club comes down and its face makes contact with the ball, two things occur. First, the ball compresses, and then the clubface compresses. When the face then trampolines back out after compression, the ball is launched slingshot-style into the air.

Because the ricochet action between the ball and clubface happens at a speed too fast for the human eye, it can be difficult to trust. As a result, recreational golfers often try to "sweep" or "scoop" their shots, because they do not understand or trust that the trampoline action occurs as a result of a downward strike.

A good drill to help you understand the trampoline effect is to place a ball and tee in the ground as you normally would if preparing for a drive. Then swing with an iron and focus on striking the tee, not the ball. This will force you to maintain a downward trajectory instead of inadvertently scooping at the ball. Move the tee a little lower with each swing, still focusing on striking the tee, not the ball. Continue doing so until the tee is essentially buried, then shift your focus to the ball but take the same downward swing. You should see the results in a

stronger ricochet and greater distance.

If you still aren't convinced of the trampoline effect, grab a basketball and place it on the ground. Using one hand, try to sweep or scoop the ball into the air. Now pick up the basketball, throw it against the ground as hard as you can and watch it bounce. Which motion produced greater velocity and distance? Obviously it was the second motion, in which the ball responded to its collision with the ground by launching itself upward. In the first motion, you were using only the strength of your arms. In the second, you borrowed the energy of the ground.

Just as the basketball compresses against the ground and ricochets upward, the golf ball compresses against the clubface and trampolines outward. In the basketball example, velocity and distance result not from the isolated strength of your arms and hands, but from forcing the right kind of collision between the ball and ground.

With a golf ball, the situation is similar. It isn't the strength of your arms and hands that creates distance and velocity, but the converged elasticity of the ball and clubface.



The Design Of A Golf Club

Recreational golfers spend endless hours trying to get their club into the right position at impact. They read in instructional magazines and are told by

teaching professionals that their swing plane is off, that they are swinging inside to out or outside to in, that they are opening their hips too early or that they are guilty of a myriad of other actions that cause their ball path to be inconsistent.

Part of the reason for this is that many golfers don't understand a club is designed to automatically be in the correct position at impact if the arms and hands are properly extended through natural body rotation.

Tiger Woods discusses this in his book, *Golf My Way*, in a way many golfers may have never thought about. In a nutshell, the concept is when you rotate your body, the centrifugal force created automatically causes your arms to extend. When your arms are extended, the club will fall naturally square to the ball when it gets to impact.

This relationship between body rotation and arm extension is often ignored. Golfers focused instead on manipulating their club into the right position do not let their arms extend naturally, as a result ending up in precisely the wrong position.

It's important to remember that swinging in a relaxed, easy manner will promote natural body rotation and therefore proper arm extension, which will in turn force your clubhead down through the ball naturally. When you're tense, you work counter to your body's natural rotation, focusing mistakenly on the force of your arms and hands. As a result, you

The Smashing Tees Drill

By "smashing tees," you can prepare yourself to better enable the trampoline effect to work its magic. Place a tee in the ground as though you were preparing for a drive. When you swing with an iron, focus on striking the tee. This will force you to maintain a downward trajectory instead of inadvertently scooping the ball and losing the trampoline effect. Move the tee a little lower with each successful swing, still focusing on striking the tee. Continue the drill until the tee is essentially buried. At this point, a ball placed in the same position will be ricocheted with greater distance because of the trampoline effect.





Compress And Ricochet

With a basketball, velocity and distance result not from the isolated strength of your arms and hands, but from the right kind of collision between the ball and ground. With a golf ball, the situation is very similar. It isn't the strength of your arms and hands that creates distance and velocity, but the converged elasticity of the ball and clubface.

punch at the ball or try to scoop it into the air.

Here's a simple, but illuminating exercise. Stand up straight with your arms hanging at your sides. Pivot your lower body to the right, then to the left. Do this repeatedly, gradually increasing the speed of the pivot. Let your heels come off the ground a little, which you'll see will increase the pivot even more.

Observe how your arms lift as a result of the centrifugal force created through body rotation. They don't lift and extend through some voluntary exertion. The movement is a natural response. Remember this the next time you prepare to swing. Focus on creating body rotation, thereby creating centrifugal force, in turn causing your arms to extend. When this happens, the clubhead will follow the path it's designed for and the clubhead will arrive at impact square to the ball.



The Importance Of Gravity

Even when golfers come to grasp the trampoline effect and understand how the design of a golf club makes it square to the ball as a result of natural

body rotation, they still must overcome a final mental hurdle — allowing the clubhead to “fall” onto the ball with a rhythmic, easy movement instead of punching at the ball with a hand-led swing.

Remember, the weight in a golf club is distributed so that the majority is contained at the bottom

the movement if you let it. It's when golfers don't allow gravity to do its work that they get in trouble. Consider which is more constant and predictable, moment-to-moment athletic ability or the force of gravity.

In other words, your clubhead doesn't need much help getting to where it's going. Of greater benefit to you is to think about rotating well and letting

and frequent pushes. By slowing down your swing, even a bit, and allowing gravity to pull the club's head down naturally, you'll see truer flight paths and greater distance.

An excellent exercise to help clarify the concept is to get a hockey stick and a tennis ball, along with a golf club and a golf ball. Observe how the designs of the hockey stick and the golf club are similar.

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— in the head. This means that as you let the club fall from the top of your backswing down toward the ball, the clubhead (the part of the club with the greatest mass) will respond more strongly to the pull of gravity than the other parts of the club and will therefore work in harmony with the body rotation, creating centrifugal force.

However, your body will only lead

centrifugal force cause your arms to extend, which will get the clubface in the right position, as opposed to trying to use every ounce of strength in your arms to accelerate that clubhead toward the point of impact.

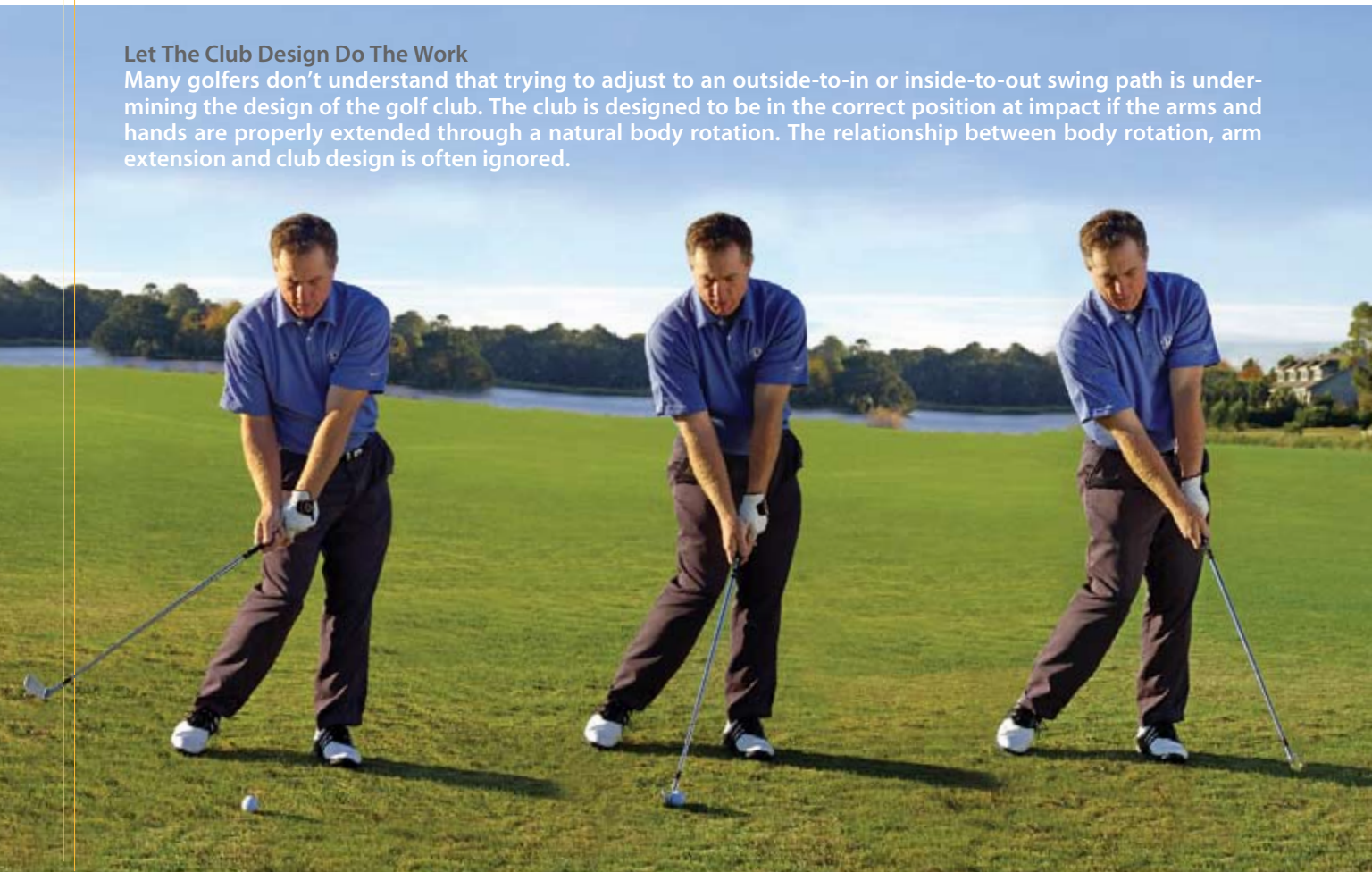
Swinging too fast, in fact, will hinder your swing, since doing so can allow your hands to get too far ahead, resulting in an open clubface at impact

Both have shafts that extend on an angle and a perpendicular part jutting out at the bottom. This is where the similarity ends, however. The physical principles are different, at least in terms of how velocity is created.

Pull the hockey stick back and let the blade fall naturally toward the tennis ball without putting any strength behind it. The ball doesn't travel very far. Now

Let The Club Design Do The Work

Many golfers don't understand that trying to adjust to an outside-to-in or inside-to-out swing path is undermining the design of the golf club. The club is designed to be in the correct position at impact if the arms and hands are properly extended through a natural body rotation. The relationship between body rotation, arm extension and club design is often ignored.



take the golf club, pull it back and let the club's head fall toward the ball. The golf ball travels farther than the tennis ball because the blade of the hockey stick is as light as its shaft, whereas the golf club-head is the heaviest part of the club. This weight creates greater velocity simply by virtue of your letting gravity exert its surprisingly powerful force.

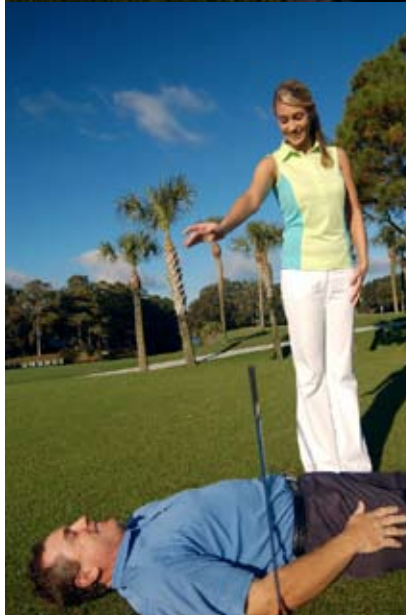
Not only is the power of gravity unexpectedly strong, it also increases significantly with small increases in distance. That is, gravity becomes a much bigger ally to you as you increase the distance you bring the club back.

To help illustrate this point, stand up, extend one arm about a foot in front of you and let it fall onto your thigh. Now hold the same arm out at shoulder height. Let it fall and slap your thigh again. Feel the difference in impact? Now hold that arm above your head and let it fall again. Compare the difference in impact with the first two positions.

Now think about your clubhead. An average golf club weighing 15 ounces and falling at a speed of 50 miles an hour creates a ton of acceleration. It doesn't need much help. Mostly, it needs not to be forced out of the correct position. Most average golfers resist this idea because they feel passive just letting the club fall toward the ball. They think to themselves, "How am I going to create energy if I'm not swinging hard?" Merely allowing the clubhead to fall feels counterintuitive, but all good golfers have accepted this concept and have learned how to work with it instead of against it.

If you feel like your body still isn't accepting the idea of gravity as a partner, try the following exercise. Lie down on your back and have a friend stand beside you holding a golf club. Tell that friend to hold the club out at the level of his knees and let the clubhead fall onto your stomach. Next, have your friend do the same exercise, this time letting the clubhead fall from his or her waist level, then shoulder level. Then, if you're still up for it, ask your friend to drop the clubhead from a point above his head. With each small increase in takeaway, the club's head generates considerably more velocity.

At the highest level of golf, players make constant micro-adjustments to their swing mechanics and learn how to manage courses like surgeons. But before you're ready to perform surgery, it's important to start with an appreciation of the basic science of the game. **GI**



Don't Believe Gravity Works?

If you still haven't sold your body on the idea of gravity as a swing-aiding partner, try the following exercise. Lie down on your back and have a friend stand beside you holding a golf club. Tell the friend to hold the club out at the level of his or her knees and let the clubhead fall onto your stomach. Next, have your friend do the same thing, but from waist level, then (if brave enough) shoulder level. You should feel the increase in velocity with each drop from a higher distance. Realizing how strong gravity is can help you understand how to let natural forces drive the swing.