

GET TO KNOW GOLF!

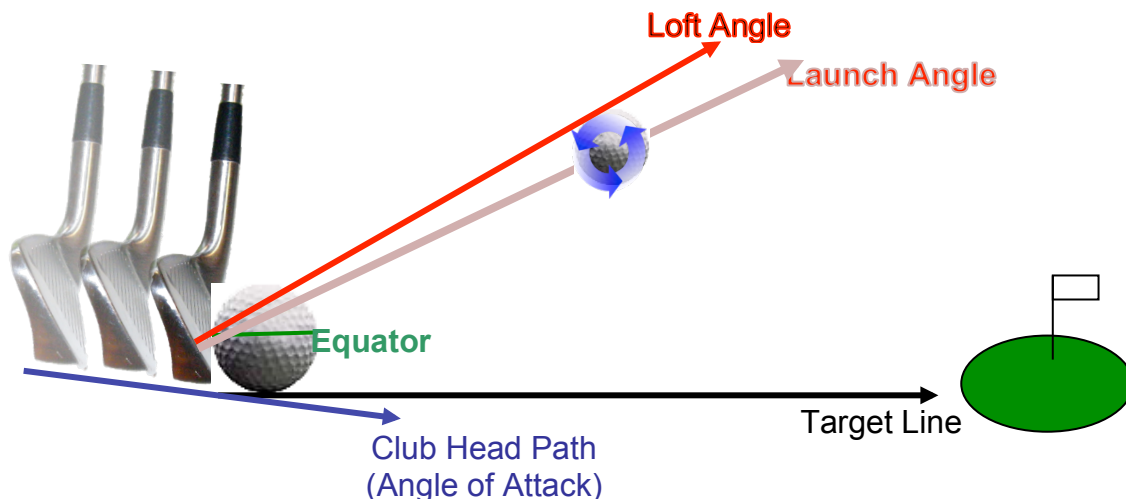


JOHN DUNIGAN

Get to Know Golf is an initiative designed to promote the understanding the laws that govern ball flight. This information will help golfers develop the most important skill in golf: Ball Control.

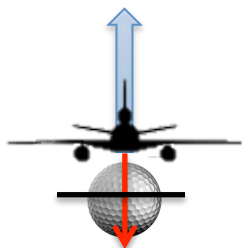
WHAT MAKES THE BALL GO UP?

During impact, if the leading edge of the club is below the equator of the ball, the ball will rebound upward at an angle that is between the club head path (angle of attack) and the club's loft angle. The ball compresses, slides and rolls up the face, creating backspin (lift), which keeps the ball climbing upward and gives it "hang time." The reason why we need to hit somewhat down on the ball is to ensure that the leading edge is below the equator of the ball at impact so that the club can work as designed.

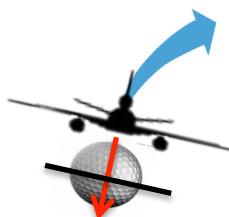


SPIN AXIS

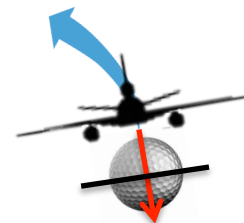
The backspin imparted to the ball by impact rotates around an axis called the "spin axis (black line below)." It is important to understand spin axis because curving golf shots are the result of a tilted spin axis. A straight ball flight has a horizontal spin axis. We call that zero. Like the wings of an airplane, when the wings are parallel, the plane flies straight. When the spin axis tilts to the right, just like an airplane banking in the air, the ball will curve to the right. And when the spin axis tilts to the left, the ball will curve to the left. The red arrow shows backspin.



Spin Axis = 0



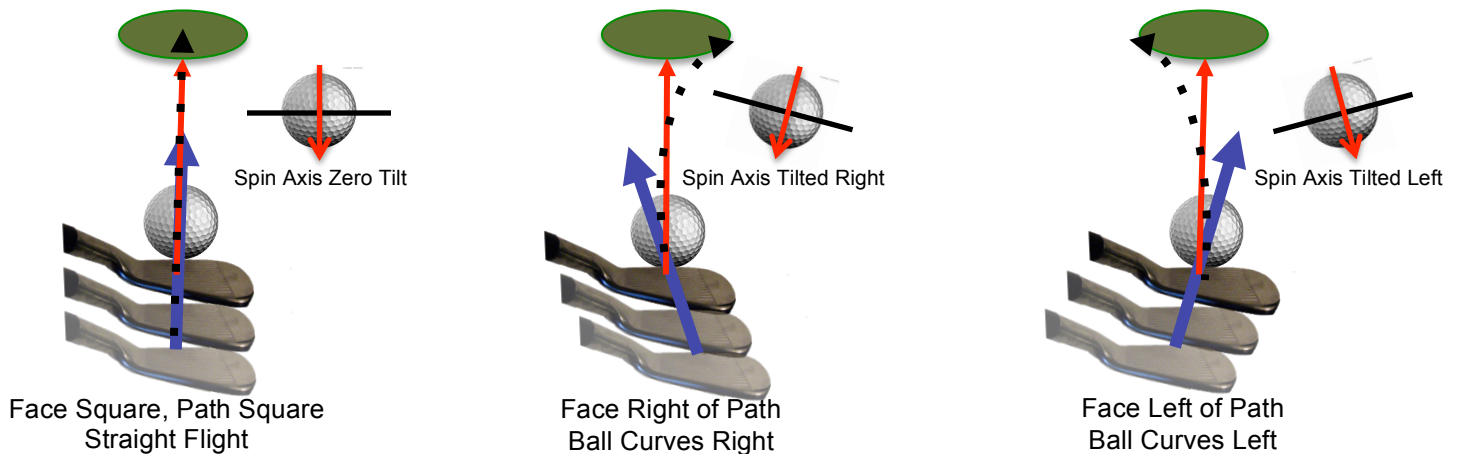
Spin Axis Tilted Right



Spin Axis Tilted Left

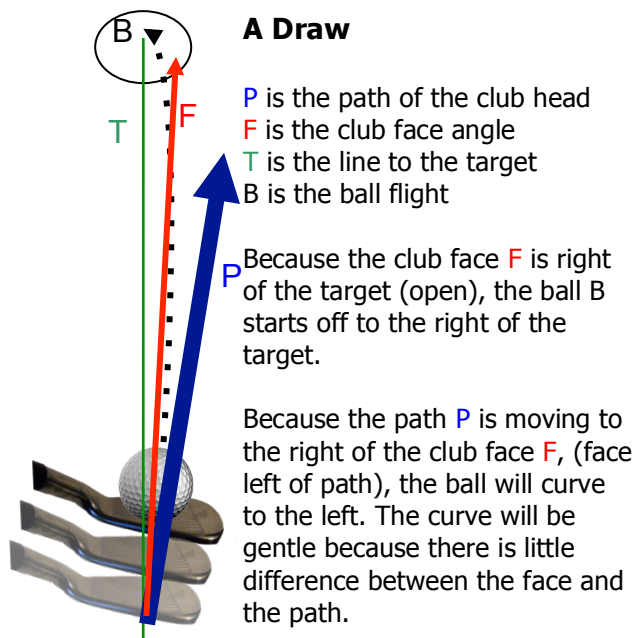
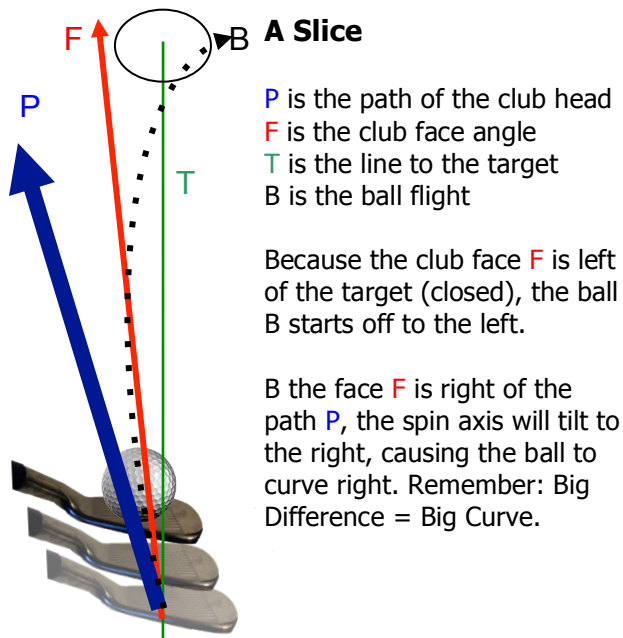
WHAT MAKES THE BALL FLY STRAIGHT OR CURVE?

According to research by TrackMan™, developers of a club delivery and ball flight monitor, the club face accounts for approximately 85% of the ball's initial direction with a driver, and 75% with an iron. The club path accounts for the remainder. When the ball starts out in the wrong direction, it's a good bet the problem is a club face error. When the path and face are heading in the same direction through impact, the spin axis is zero and the ball will fly straight. The spin axis will tilt whenever the face and path head in different directions. Hence, the club face and club path have an equal effect on ball curvature. When the club face is the left of the club path, the spin axis tilts left and the ball curves left. When the face is right of the path, the spin axis tilts to the right and the ball curves right. Understanding ball flight is confusing because the club face can be pointed square to the *target*, yet be right or left relative to the *club path*. For example, if the club face is 3 degrees right of target, the ball will start out to the right of the target, but if the club path is 6 degrees right of target, then the face is actually *left of the path*, so the spin axis will tilt to the left and the ball will curve left:



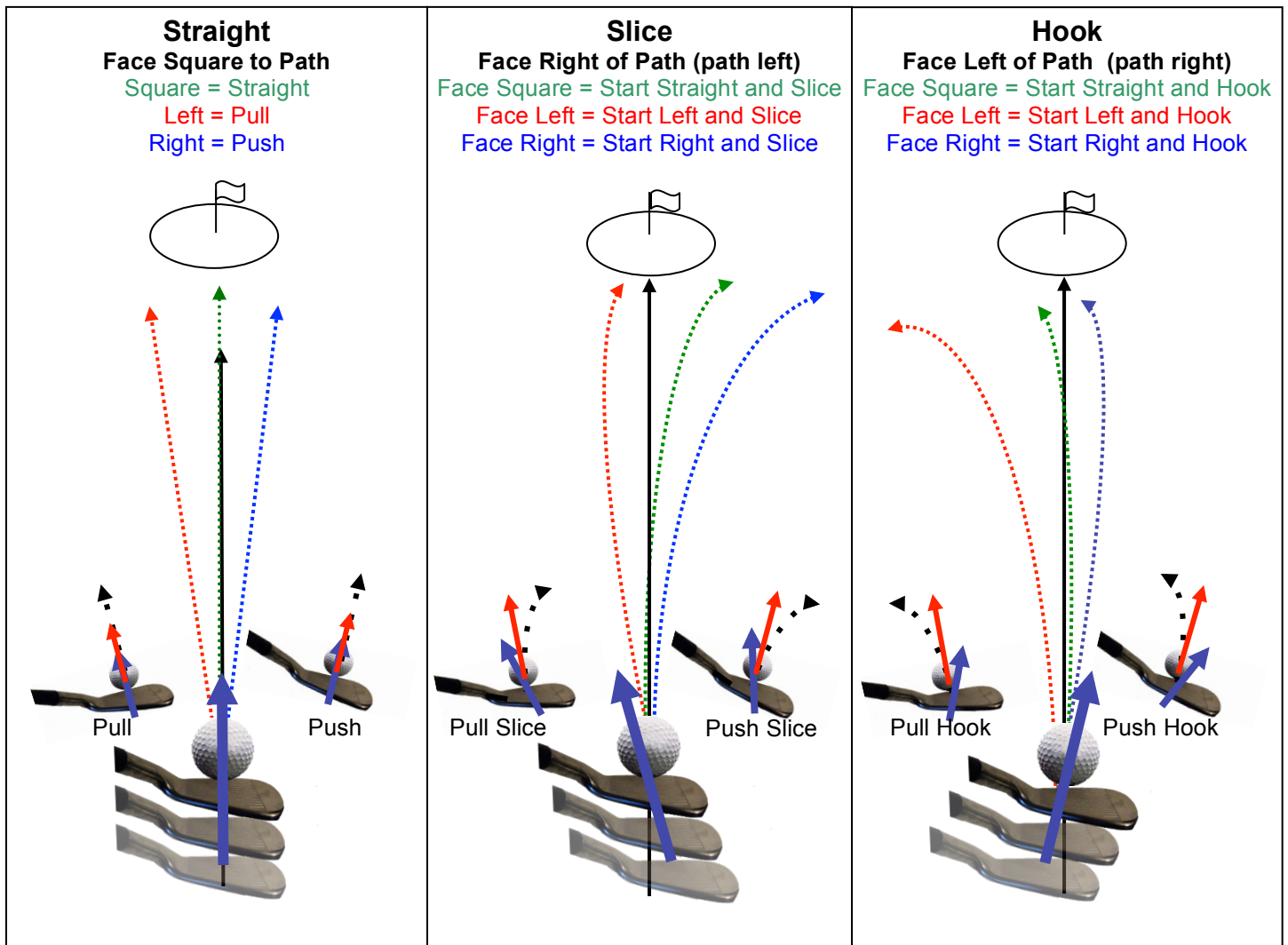
Above are shown the three possible path and face relationships. The red arrow represents the club face angle, the blue arrow is the club path direction, and the black dotted arrow is the ball flight. Please understand that you can rotate these diagrams in any direction, but the flight will be the same: The ball will end up in a different place relative to the *target*, but the curve will be the same. For example, a straight pull left of the target has the Straight Flight configuration, rotated to the left of the target.

There are 3 possible club face angles relative to the target: Square (straight), right (open) and left (closed). There are 3 club paths relative to the target: Square, Right (Inside-out), and Left (Outside-in). The key to ball flight control is mastering the club face / club path relationship, getting both moving in the direction required to make the ball fly the way you want. A slice and a draw are shown below.



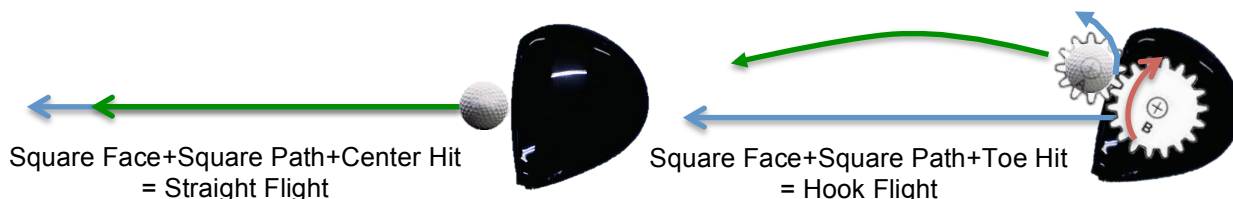
The 3 Basic Ball Flights

There are three types of ball flight; straight, slice, and hook. The ball can hook more or less depending upon the degree of difference between the club face and the club path directions: Big difference = big curve.



GEAR EFFECT AND OFF-CENTERED CONTACT

Centered contact on the sweetspot will result in the ball doing what the ball flight laws tell us it will. But when the ball is struck off-center, a “gear effect” is created, which can tilt the spin axis of the ball in the opposite direction it should, causing it to curve unexpectedly. The diagram below shows centered contact and toe contact. The club will rotate to the right, and the “gearing” action will rotate ball in the opposite direction, causing the ball to curve to the left. The opposite is true for heel hits. It is very important to take the centeredness of hit into account when analyzing your ball flight because gear effect can essentially make the ball “lie” to you. If you have a wonderful straight path and face, but you hit the ball on the toe, the ball will hook. You may be tempted to fix a perfectly good swing in a misguided attempt to correct the flight that was caused by off center impact. I recommend that you mark the club face with dry erase marker every practice session to see exactly where you are making contact with the ball. It will greatly help you understand and improve your ball flight.



Developing Your Essential Golf Skills

There are three skills you must develop in the full swing. These skills are independent of swing theory or style.

1. Ball-then-turf contact
2. Control the Club Path
3. Control the Club Face

Note: Please use an alignment stick when you practice so that you can be sure your setup is correct.

SKILL #1 Ball-then-turf contact

In this drill, you are going to learn to “hit the little ball first,” as I like to say. The ball you will hit is one grip length forward of the two balls that serve as feedback as to whether your club is hitting the ground behind the ball. The feedback balls are placed to either side of the target line, the object ball on the line. The ball closest to your right foot is *inside* the target line. You want to have the club head swing over this ball on the way to impact, which gets you started on the Second Skill—Club Path Control. When you can consistently miss the feedback balls and hit the object ball solidly with a divot *after* the ball, you have developed the first skill of golf. Hint: The more weight you have on your front foot at impact, the easier it is to move your divot forward (my left knee and left hip are both forward of my left foot in all three photos below, showing the forward weight shift).



A topped shot:

The club is too high, so the ball goes too low.

You didn't pick your head up. You didn't take your eye off the ball. You simply didn't get the club down enough!

Dunigan's Rule: if it's on the ground, you gotta hit down, so: Give me turf or give me death!

SKILL #2 Club Path Control

While you are learning Ball-Then-Turf Contact, you are only working on one of the three essentials of ball control. The ball may not go toward the target because we need to add club path and then club face control to the swing. The Gate Drill provides excellent feedback as to whether you are moving the club into impact from the inside-out to the ball.

Three balls are placed in a straight line at 45 degrees to the target line apart as shown. The balls are one club head apart (no more than four inches). And, as shown in the first photo, there is enough room for the club head to move straight through the gate or from inside-out, but no room for the club to move from the outside-in. You may want to remove the object ball and simply practice swinging through the gate at first. It's not as easy as it looks. Then introduce the ball.

An additional club path drill (not shown) using the sticks is to place the target line stick behind the ball by 6 inches and make sure the club head approaches the ball from inside the stick. You *can* see it. You just have to look for the blur of the club head and take your attention off of the ball. Hint: To control your club path, you have to be focused on what you are doing with the club rather than on the ball. Your job is to swing the club. The club's job is to hit the ball.



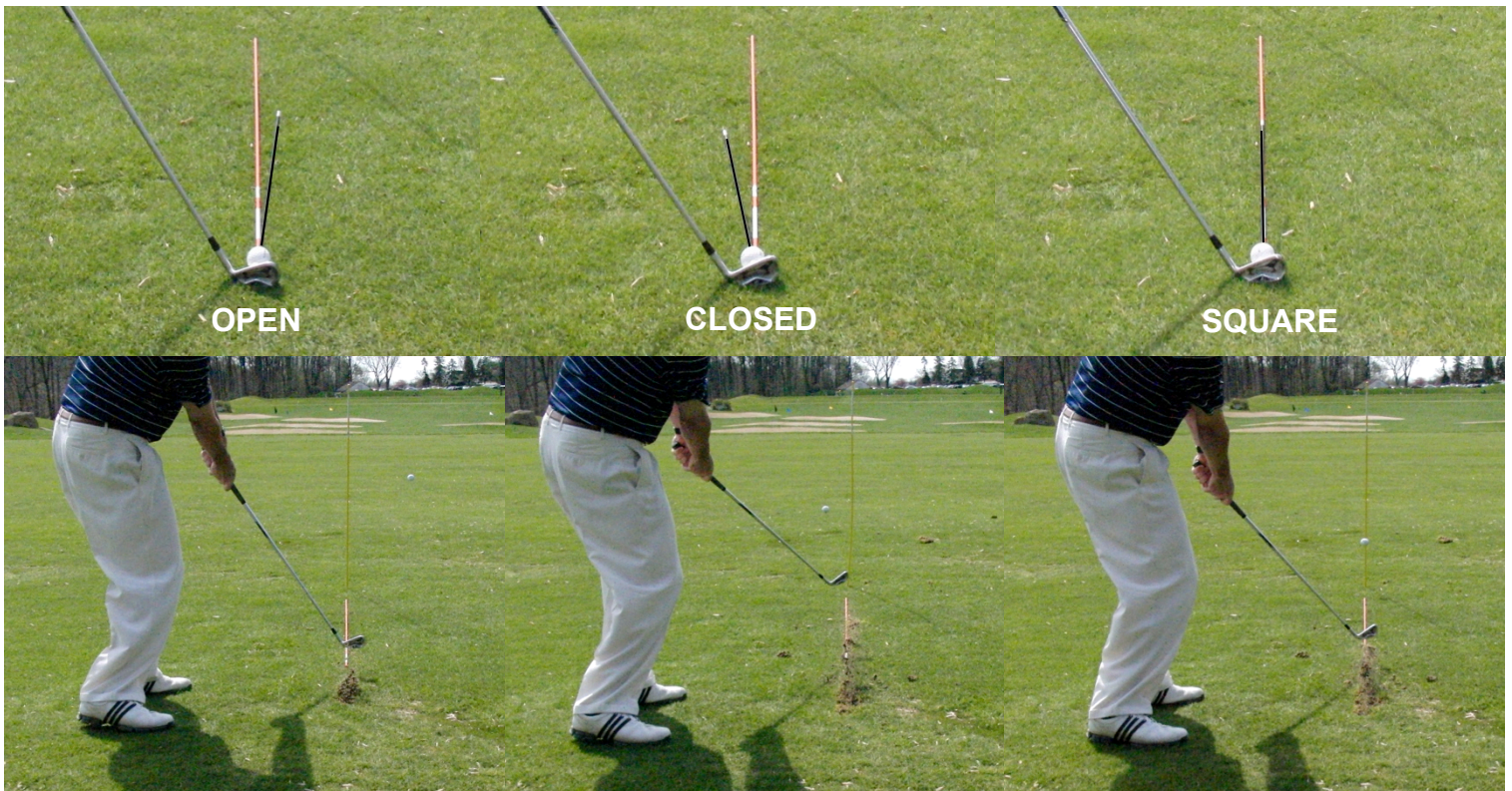
It can be helpful to keep in mind that the club path is simply the direction in which you swing. You are holding the club: you can and must control where you swing it! Practice swinging in whatever direction you wish. You may want to swing overtop of a tee that you place nearly all the way into the ground while you practice path control. Then place the ball on the tee and focus on the path you will swing the club into the ball, not just the ball itself. That sounds simple, but it's not as easy as it sounds.

Ball flight control requires all three essentials: solid impact, path control, and face control. In this drill, you are working on club path. The ball might not go to the target yet, and that's ok, because we have not yet concerned ourselves with club face control. That said, if your grip (the manner in which you place your hands on the club) is correct *for you*, the club face may take care of itself.

SKILL #3 Club Face Control

Once you can consistently make solid contact and control the club path, it is time to add club face control so that you can predict the flight of the ball. This drill should be combined with the path gate drill above to make sure your path is still approaching the ball from the inside. When doing this drill, please aim both your stance and the club face square at address on each shot. The orange alignment stick shows the target line, and the yellow stick shows the line to the target, showing you where the ball starts relative to the target line. Below, you will see an open club face, a closed club face, and a square club face. Using a 7 iron, start with twenty-yard shots and gradually progress to longer shots as you develop your skill. On the first shot, take your backswing and then intentionally bring the club face open into impact and hit the ball to the right of the target. On the next shot, bring the club face closed into impact and send the ball to the left. Then try to bring the club square into impact and hit the ball straight. You are learning to control the club to hit the ball where you want! Now try hitting the ball to a specific target.

Hint: Many club face control problems can be traced back to how you hold the club. When holding the club at address, The “line” formed between the index finger and thumb of each hand provides a great way to check your grip. As a *general* rule, when holding the club at address, these lines should point toward your right shoulder. As the lines point more toward your chin, the club face will be more open. And when they point more toward the outside of your right shoulder, the club face will be more closed. You can and should experiment with the placement of your hands on the club to find your own ideal way to hold the club. If your ball consistently takes off to the left of the target and you can swing through the gate, you might try moving your hands a little to the left on the club to get the face more open. Vice versa if the ball starts right.



The development of these skills is the very essence of good golf. Once you are hitting the ball solidly, you can combine the path and face drills to further your skills. As with learning anything, if you aren't making mistakes, you aren't learning, so be happily willing to struggle, and you'll get where you want to go much faster. Have fun learning, and hit 'em great!

John Dunigan

