

# One Iron Golf

...the common-sense approach to better golf.

by

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U.S. \$21.95

# I ACCURACY

There are only three principles to follow in golf:

- **1. GOLF IS A GAME OF ACCURACY.**
- **2. GOLF IS A GAME OF ACCURACY.**
- **3. GOLF IS A GAME OF ACCURACY.**

Based on the 2004 PGA Tour season, the average of 190+ players hit 64.08% of the fairways and 68.35% of the greens in regulation. Think about this for a second. The best players in the world, players who practice constantly and hit hundreds of golf balls every day, hit only 64.08% of fairways and only 68.35% of greens in regulation. In contrast, the average weekend golfer probably hits 35% of the fairways and 25% of greens in regulation. **GOLF IS A GAME OF ACCURACY.**

Let's talk for a second about statistics in golf because they can be very misleading. For instance, the #1 ranked putter on the PGA Tour during 2004 averaged 1.609 puts per hole. This statistic could lead you to two conclusions: 1) this golfer is a great putter, or 2) this golfer is an excellent iron player who leaves his approach shots close to the pin for an easy one putt. The same applies to percentage of greens hit in regulation. A golfer may be an exceptional iron player but have a low percentage of greens hit in regulation due to inaccuracy off the tee.

What it boils down to is this:

- Accuracy off the tee leads to:
  - More greens hit in regulation, which leads to:
  - Lower scores.

The current philosophy in golf teaching is to learn the game backwards. That is to gain proficiency with the short irons and then progressing to the mid irons and then on to the long irons and lastly the woods. The tee shot in this philosophy is of very little importance, which is ludicrous. The potential score on any hole is determined by

the tee shot; consequently, an accurate tee shot leads to lower scores. A long drive may satisfy your ego, but trying to hit an approach shot from high rough or from behind a tree deflates your ego very quickly. **GOLF IS A GAME OF ACCURACY** and the tee shot sets up all shots that follow. To take this concept one step further, accuracy is of first importance with all shots and with all clubs.

What are the determining factors of accuracy? There is only one - **Consistency**. A consistent shot is an accurate shot. It does not matter if your shots fade, draw, or are straight. It makes no difference if you hit a high or low trajectory shot. As long as the shot pattern is consistent it can be accurate. Why? If the shot pattern is consistent it is predictable. If your consistent shot pattern is a fade, then by consistently lining up left of the target your shot will predictably fade to the target, and so on for other types of shot patterns. However, if there is no consistency to the shot pattern then there will be no predictability as to where the shot will end up. In order to achieve accuracy you must develop consistency. There is only one way to develop consistency as to your shot pattern and that is practice. As was mentioned before, professional golfers hit 500 to 1,000 golf balls a day, and even then they will not hit every shot on the golf course perfectly.

Another often-overlooked factor of consistency is the golf ball itself. Every different brand and type of golf ball has unique characteristics. For instance, a balata golf ball produces a high spin rate; a two-piece golf ball produces increased distance, etc. In addition, different brands of golf balls will produce different results based upon their method of construction. Playing with different golf balls from round to round will defeat any hopes of developing a consistent shot pattern. One ball will travel farther than another, will fade more than another due to its spin rate, will feel differently when putted, etc. Do yourself a favor and pick one brand and type of golf ball and stick with it. Don't even think about picking up lost balls on the course and putting them in your bag. And never pull out a "water ball" when trying to hit a tee shot over a pond. If you want consistency in your shot pattern then use the same brand and type of ball consistently.

**Outside factors that affect consistency.** Everyone is capable of developing consistency as to shot pattern. However, there are outside factors that affect consistency that are beyond our control. You develop consistency at the driving range on a level surface that is in good condition. On the golf course you will be faced with uphill lies, downhill lies, side hill lies, bare lies, rough lies, etc. You will be faced with wind at your back, wind in your face, cross fairway wind, and innumerable other factors that can affect your consistency and are completely out of your control. What is the answer? Address only those factors that are in your control. The factors of consistency that are in your control are:

1. Developing a **consistent shot pattern**. This is achieved through practice.
2. Consistently using the same type and brand of **golf ball**. It is imperative that you find a type and brand that you like and stick with it.
3. Using properly fitted and well designed **golf clubs**. You are essentially wasting your time if the golf clubs you use do not fit properly (unfortunately, the vast majority of golfers use ill-fitting equipment).

The above factors are of equal importance in developing consistency. We have already discussed the importance of a consistent shot pattern. The use of the same brand and type of golf ball is obvious. The specifications of golf clubs as they relate to consistency are the subject of the rest of this book.

By concentrating on the consistency factors that are within your control you will develop accuracy and this will lead to lower scores.

## II CURRENT GOLF CLUB DESIGN

Do the conventional golf club designs that you see advertised and displayed in your pro shop or retail golf store provide consistency? The answer is **no**. There are many variables in club design and most golfers do not have a clue as to what they are. If the intent of a golfer is to improve his or her game then they must be aware of the parameters of the equipment that dictate their performance. In studying golf clubs offered by the numerous manufacturers it becomes apparent that there is little standardization in the golf industry. One manufacturer's "stiff" flex shaft might be the equivalent of another manufacturer's "regular" flex shaft; one's #6 iron loft angle might be the same as another's #7 iron loft angle; the club length of one's #5 iron might be the same as another's #7 iron; and the lie angles used by different manufacturers are all over the place. Indeed, between the clubs within a set there can be numerous inconsistencies. Don't forget to throw into this mix the fact that most golfers purchase their golf clubs "off the rack" with little, if any, chance of the length of the golf clubs fitting them properly. The fact is that ideal golf club specifications and proper fitting are vitally important if the goal of the golfer is game improvement. Would you purchase a pre-drilled bowling ball "off the rack" or a "standard size" pair of shoes? The answer is **no**, yet everyday golfers spend their hard earned money on top-of-the-line golf equipment when all they are receiving in return is inconsistency. Do not be fooled into believing that the clubs the pros use and endorse have the same specifications as the ones you purchase in a pro-shop. The pros are properly fitted and the specifications of the golf clubs are adjusted to them individually. In addition, when we speak of pro endorsements let us not forget that these fellows are being paid millions of dollars to use specific golf equipment – makes you kind of question the validity of these endorsements does it not? The point here is that there is virtually no consistency in the design of golf clubs throughout the industry.

The average specifications for golf clubs are as follows, and I use the term average loosely:

<u>Woods</u>				
	<u>Club</u>		<u>Loft</u>	<u>Lie</u>
<u>#</u>	<u>Length</u>		<u>Angle</u>	<u>Angle</u>
1	45.0"		10.5°	56.0°
3	43.0"		15.0°	57.0°
5	42.0"		19.0°	58.0°
<u>Irons</u>				
2	39.5"		18.0°	57.0°
3	39.0"		20.0°	58.0°
4	38.5"		23.0°	59.0°
5	38.0"		27.0°	60.0°
6	37.5"		31.0°	61.0°
7	37.0"		35.0°	62.0°
8	36.5"		39.0°	63.0°
9	36.0"		44.0°	64.0°
PW	36.0"		48.0°	64.0°

Bear in mind that these are averages. Every golf club manufacturer uses varying specifications. For instance, the change in loft angle progression between clubs may vary anywhere between 3° and 5° degrees depending on the manufacturer.

**Shaft types.** Currently there are two basic types of shaft materials that are used in golf clubs:

- 1. Steel.
- 2. Graphite.

There are two main differences between these materials that are of importance to the golfer. **The first** is weight. Graphite is much lighter than steel and the use of a graphite shaft will lower the overall weight of the golf club. **The second** is torque. Torque is the expression in degrees that is used to describe the twisting of a golf shaft around its axis. For example, take the grip of a golf club in one hand and the head in your other hand and twist in opposite directions. That is torque. Graphite shafts typically have a high torque rating in

comparison to that of a steel shaft. A steel shaft has a torque rating of approximately 2.5° compared to a graphite shaft that has torque ratings of up to 7.0° or 8.0°. If a shaft has too much torque, and in my opinion any torque greater than 2.5° is too much, the result will be an open clubface at impact resulting in a slice or push of the golf ball. As you can see, the higher the torque rating of a shaft the less consistent and accurate that shaft will be. **There is a third difference** between steel and graphite shafts, and in my opinion, the most important. This is flex plane stability. Every golf shaft has a unique flex plane, one in which the shaft tries to deflect when placed under load. This flex plane is dictated by numerous factors including shaft wall thickness and the seam that runs from the tip to the butt-end of the shaft. This seam is created during the manufacturing process when the shaft material is wrapped around a blank and the edges welded in the case of steel or overlapped in the case of graphite. The seam is less flexible than the rest of the shaft causing it to flex differently in relation to its orientation when placed under load. A steel shaft has only one seam, and therefore, only one inherent or stable flex plane, whereas, a graphite shaft, due to the overlapping of material that creates the seam, does not possess a singular stable flex plane. The result is more stability and consistency of play with a steel shaft once the inherent flex plane has been oriented correctly. It is interesting to note that very few players on the PGA tour use graphite shafts in their irons, and this is due to the inherent instability and subsequent inaccuracies of this type of shaft.

In the shafting of golf clubs we find a built in problem. As the irons progress from the low lofted irons through the high lofted irons the tips of the shafts are trimmed in increasing 0.5" increments prior to installing the clubhead. For instance, a #2 iron might have 0.5" trimmed from the raw shaft tip prior to installing the clubhead, and a #9 iron 4.0". The butt ends of the shafts are then trimmed for final club length. It must be understood that tip trimming increases the stiffness of a golf shaft so that with each 0.5" incremental tip trim the shafts become stiffer and stiffer. Assuming that a set of irons is shafted with "regular" flex shafts, the high lofted irons will play much stiffer than the low lofted irons due to this progressive tip trim even though they are built with shafts of the same stated flex. Supposedly,

these progressive tip trims and subsequent stiffening in shaft flex from the long irons through the short irons is offset by a progressive weight increase that is designed into the clubheads. Clubheads are typically designed having incremental weight increases of 7gm from the lowest loft clubhead to the highest loft clubhead within a set. The idea being that the lower head weight coupled with the longer shaft length and reduced tip trim of the low lofted irons will result in the same shaft flex as the heavier head weight coupled with the shorter shaft length and increased tip trim of the high lofted irons. Theoretically this makes sense, but in reality it is ridiculous. Regardless of how clubheads are weighted there is absolutely no way that flex can be matched throughout a set of golf clubs when the shafts are of varying lengths. In essence then, a standard set of golf clubs will have shafts of varying flexes ranging from “weak” in the long irons to “stiff” in the short irons.

Does this relate to consistency? **No.**

**Club head weight.** As noted previously, there is a weight progression between iron club heads of approximately 7gm from the low lofted irons through the wedges. A #2 iron head typically weighs 233 grams and a PW typically 289 grams. There are two theoretical reasons for this:

1. The theory that a progressive weighting of the club head will produce a constant shaft flex as the shaft length incrementally decreases from the low lofted irons through the wedges.
2. The theory of a consistent swing weight between clubs or the feeling that all clubs within a set weigh the same during a golf swing. The idea that a longer length iron with a lighter weight clubhead will feel the same as a shorter length iron with a heavier clubhead during a golf swing.

Since we have already examined the first myth for progressive clubhead weighting let's take a look at the second. Swing weighting has been a buzzword in the golf industry for years, the idea of having all of the irons within a set feel the same during a golf swing. The reality is that it is impossible to achieve this with conventional golf clubs simply because there is no way to mask the fact that each club is



a different length and, hence, will feel differently during the swing regardless of weighting.

Does this relate to consistency? **No.**

**Club length and swing speed.** Why is there a club length progression throughout a set of golf clubs from the #9 iron through the driver? It is based upon the assumption that the standard 0.5" incremental club length increases throughout a set of golf clubs will result in higher swing speeds and thus greater distances. Theorists will point to the radial arm length in a golf swing as being the prime determinant of swing speed; stating that the longer the radial arm, the greater the swing speed and resultant distance in a golf shot. A common misconception however, is to use club length alone as the determinant of the radius of a golf swing. Regardless of how many hinging points and resultant secondary arcs/planes are involved, the true center of a golf swing is a point somewhere between the golfer's shoulders (this center point moves laterally between the shoulders during the swing). Therefore, you must include the golfer's arm length into the radial arm length equation for any meaningful analysis. As an example, assuming a 37" #7 iron length and a golfer's arm length of 24", the radial arm in the golf swing is 61". This means that a 0.5" increase or decrease in club length results in a radial arm length change of only 1/122nd or 0.008197. Obviously, this small change has no affect on either swing speed or distance. In fact, the only thing that incremental club lengths do is to make it harder to hit each progressively longer golf club.

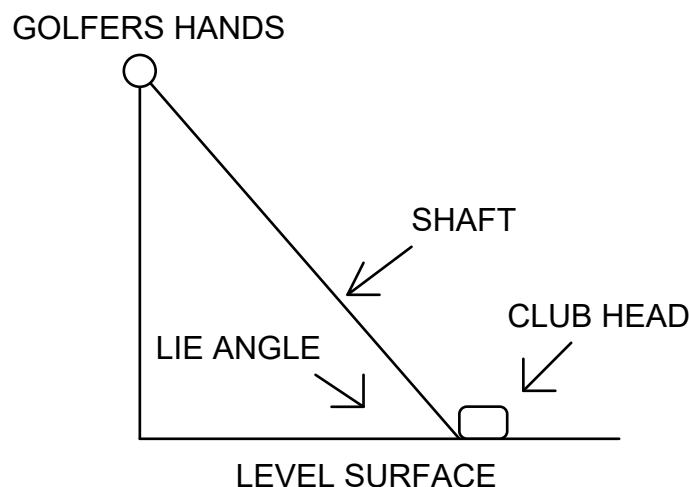
Does this relate to consistency? **No.**

**Loft angle.** The loft angle of a golf club determines the launch angle of the golf ball at impact. The greater the loft angle, the higher the trajectory of the ball. Consequently, a #9 iron produces a high trajectory shot while a #3 iron produces a lower trajectory shot. Make no mistake, the degree of loft change between clubs is what produces the distance gap between them, i.e.: 10 yards between successive irons. It would follow then that for a consistent distance gap between irons there would be consistent loft change between them. Such is not the case. In a standard set of golf clubs there is generally a 2° loft angle change between long irons, a 3° loft change between mid irons,

and a 4°-5° loft change between short irons.

Does this promote consistency? **No.**

**Lie angle.** This is the angle formed between the golf shaft and the ground at address with the clubface square to the ground. Lie angles are properly determined based upon trigonometry since the golfer's wrists, the clubhead, and the shaft form a right triangle at impact. The vertical side of the triangle represents the wrist-to-ground distance of the golfer at impact, and the hypotenuse representing club length. This right triangle is shown below and from this the proper lie angle can be determined given a particular club length and the wrist-to-floor measurement of the golfer which can be mathematically translated into the wrist-to-ground distance at impact.



As you can see in the specification of conventional golf clubs, for each 1/2" decrease in shaft length, there is a 1° increase in lie angle for the irons. This is because as the shaft length decreases the golfer is forced to stand closer to the golf ball, which produces a more upright shaft position.

The importance of proper lie angles cannot be over emphasized. The sad thing is that most golfers do not appreciate this importance or ignore it completely. If you have trouble hitting the long irons, improper lie angles in relation to club lengths are probably to blame.

There is no consistency between golf club manufacturers when it comes to the relationship of lie angle to club length. For instance, one manufacturer's #5 iron might have a lie angle of 60.0° while another's might have a lie angle of 63.0°, both using the same club length. In fact, the latest trend in golf club design is to make the lie angles in the long irons more upright. The manufacturers claim that this will help the golfer make a more upright swing, which will improve his long iron play. This is ridiculous. There is a direct relationship between club length and lie angle and this cannot be ignored, although it is by any golf club manufacturer who offers sets of clubs "off the rack" where one size fits all. Current golf club design does not promote consistency between clubs with regards to lie angle and it completely ignores the basic relationship of club length to lie angle.

Does this promote consistency? **No.**

**Club head design - perimeter weighting.** Other than the shift from hickory shafts to steel, the most important change affecting golf club design is the development of perimeter weighted club heads.

Generally referred to as cavity back in the irons, the idea is to move the weight from behind the clubface and redistribute it around the perimeter of the club head. The result is a more stable club head that resists twisting when hit off center. Club head designers have gone crazy with the possibilities created by perimeter weighting, and although this has resulted in many good club head designs, enough is enough. The fact is that most manufacturers use club head design to promote new models each year as opposed to determining the best design and sticking with it. Madison Avenue has invaded golf and it has become the norm for manufacturers to come up with "new and improved" designs each year in order to increase sales.

Unfortunately, quite a few of these designs are cosmetic changes only. The variety of perimeter-weighted designs is enormous, each promoting certain ball striking characteristics. For instance: more weight on the sole of the club to lower the center of gravity creating higher ball flight, more weight on the toe of the club creating a higher moment of inertia and assisting to keep toe hits on line, etc. There is even a switch now to removing some of the peripheral weighting and placing it behind the club head's sweet spot in order to provide more

stability in the impact area. The change in driver and fairway wood heads to steel and other metal alloys has allowed the benefits of perimeter weighting to be applied here as well. Probably the biggest difficulty that golfers have with the driver and fairway woods is the ability to get the ball in the air. Club head designers solved this problem through perimeter weighting. By moving weight to the sole and rear of the club head, they effectively lowered the center of gravity making perimeter-weighted woods extremely easy to get airborne.

**Offset.** Offset refers to the relationship of the hosel of a clubhead to the leading edge of the clubface, and is expressed in degrees. For example: on a clubhead with offset, the hosel of the club will be in front of the leading edge of the clubface. In other words the shaft of the club will be in front of the clubface at address. The purpose of offset is to help ensure a square clubface at impact.



**Consistency in relationship to current golf club design.** As you can see, there is none:

- ✓ Different club lengths.
- ✓ A different address/swing plane with each club.
- ✓ Varying shaft flex within a set of golf clubs.
- ✓ Varying weight and weight distribution between clubs.
- ✓ Inconsistent loft angle progressions within a set.
- ✓ Inconsistent treatment of lie angles in relation to club length.

The fact is that current golf club design promotes inconsistency. Is there a better design? **Yes – Single Length Golf clubs.**

### III

## ONE IRON GOLF SYSTEM – Single Length Golf Clubs

As we have seen in chapter 1, accuracy is determined by consistency. The three factors affecting consistency that are in our control are:

1. Shot pattern
2. Golf ball
3. Golf clubs.

Achieving a consistent shot pattern is done through practice. Using the same type and brand of golf ball takes care of the second consistency factor. What about the third factor, golf clubs? From the previous chapter it would seem that there is no consistency in golf clubs, and this is true, at least in regards to current golf club design.

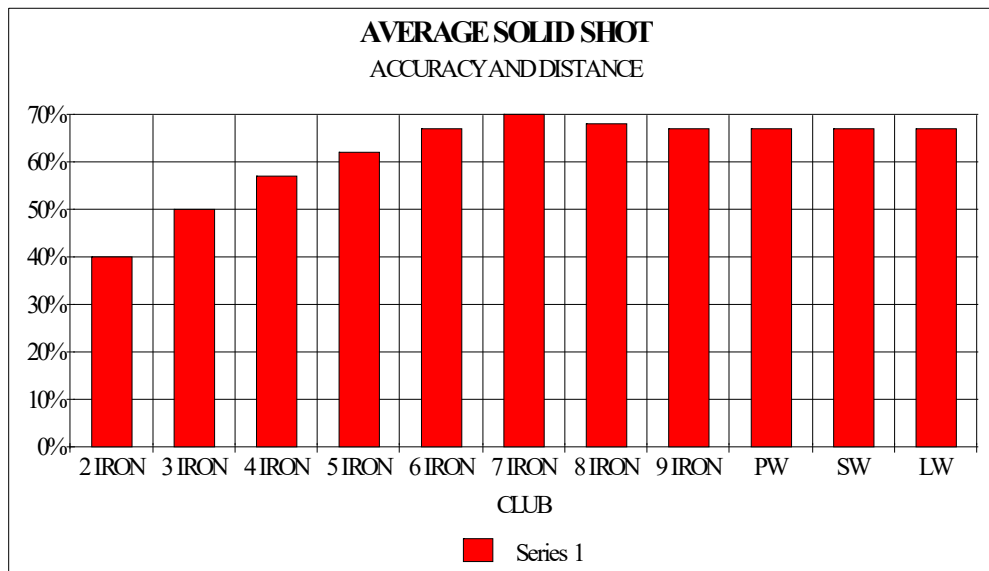
Ask yourself this question, "Out of ten #7 iron shots how many would you hit solidly?" Now ask yourself the same question but substitute a #3 iron in place of the #7 iron. You will probably come up with two very different answers regardless of your skill level. The fact is that the longer the club, the harder it is to hit. It seems ridiculous that we would play a game of accuracy with inconsistent equipment.

**Distance.** We are led to believe that longer golf clubs produce greater swing speeds on a linear scale and thus more distance. This is the logic used in the concept of a 0.5" increase in length between irons throughout a standard set of golf clubs. My testing showed that the only static factor that results in the increased distance between irons within a set is the difference in the loft angle of the clubheads. There is absolutely no measurable difference in swing speed for a 0.5" incremental shaft length increase. The only effect of the standard 0.5" length increase between the irons and the fairway woods is to make each successively longer club harder to hit.

**Accuracy.** In accuracy tests I found that the short irons did not out-perform the mid irons. As a matter of fact, on average the most accurate iron was a properly fitted #7 iron (bear in mind that very few golfers have ever played a properly fitted #7 iron). The lie angle and club length of a properly fitted #7 iron (based upon a golfer's wrist-to-floor measurement), best utilizes the muscular and skeletal functions

of the human body when making a golf swing - not too upright so as to constrict the body's natural movement, and not too flat so as to require a longer shaft and standing further from the ball at address. It is important to note that the further you stand from the ball at address the less likely you are to hit a solid shot, and accuracy demands solid ball contact.

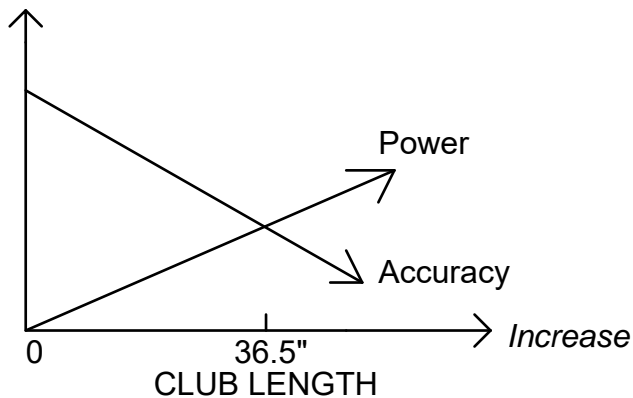
The results of my testing are illustrated in the chart below.



It is apparent that the longer the club, the less consistent solid ball contact is achieved. It is also apparent that the extreme upright swing plane produced by the shorter irons restricts the natural movement of the body and inhibits the golfer from achieving desired accuracy and distance.

There are certain relationships that cannot be ignored in the design of golf clubs. One is that there is a direct relationship between golf club length and power, which is due to the flatter swing plane required as club length increases. The flatter the swing plane, the more the larger muscle groups of the back become involved in the swing thus increasing power. However, there is an inverse relationship between

golf club length and solid ball contact. Consequently, as club length increases, power increases but solid ball contact decreases which results in lost distance and poor accuracy. There is, however, an optimum club length where both power and solid ball contact are optimized, and this is the length we employ in the **One Iron Golf System**. This club length is determined for the individual golfer based upon their wrist-to-floor measurement and can vary quite a bit between golfers. For illustrative purposes the diagram below uses a 36.5” club length.



This optimum club length, in conjunction with the appropriate clubhead lie angle and other specifications, produces the ideal in golf club playability as well as maximizing a golfer’s power and control.

What is this “Ideal” club length?

The determination of the ideal golf club length involved a three part analysis:

1. Golf swing mechanics.
2. The determination of a swing plane where muscle, tendon, and joint functions are optimized for power and control. This optimum swing plane would determine the correct lie angle of

the clubhead and the ideal corresponding club length based on the individual golfer.

3. Interviews with golfers of all skill levels.

After a complete analysis of the first two, the one “ideal” swing plane and corresponding clubhead lie angle for both the irons and woods was determined. Based upon the clubhead lie angle the proper club length for the individual golfer could be factored using their wrist-to-floor measurement.

During the third part of the analysis where the golfers were asked to identify their favorite iron the answers ranged from their #9 iron to their #5 iron. However, after taking their W-T-F measurement and then measuring the irons that they considered their favorite we found that in over 97% of the cases their favorite met our previously determined “ideal”. In the other 3% we found that the lie angles of their irons were so far off as to negate any comparison.

The correlation between the mechanical/skeletal analysis and the golfer’s interview analysis proved that our previously determined “ideal” clubhead lie angle and corresponding club length for the irons and the woods placed the golfer’s body in an address/swing posture to maximize power and close enough to the golf ball to ensure consistent solid ball contact.

It should be noted that the results of our testing showed that the ideal club length and lie angle for an iron was that of a properly fitted short/mid iron. That being said, it is unrealistic for a golfer to compare that to their current irons, as the chances that their current irons are properly fitted are extremely low.

Another consideration that we tested is eye coordination. The closer you are to the ball, and hence, the more upright the swing plane, the greater the eye coordination for aiming. In addition, the closer you stand to the ball, the greater the chance for consistent solid ball contact. Now obviously, you do not want power without accuracy, and you do not want accuracy without power. What we did was to perform test after test using various club lengths and associated lie angles in order to verify the results of our three-part testing in determining the ideal combination that would optimize these two



desired elements. After hundreds of tests with golfers of varying skill levels we found that the lie angle and associated length of a properly fitted #7 iron produced this optimization across the board.

In virtually all of the cases when we fitted the golfers with **1 Iron** single length golf clubs they stated that the lengths and lie angles were perfect for them and felt extremely comfortable.

In the case of woods, the overwhelming favorite was the length and lie angle of a properly fitted #7 wood.

### Consistency

The results of our testing over the years has proven that playing single length irons and woods leads to the development of a consistent and powerful swing that will truly maximize the potential of any golfer:

**A Single Length for all the irons and a Single Length for all the fairway woods within a set.** All of the irons within a set are the same length as are all of the fairway woods, proper club length being based upon the wrist-to-floor measurement of the individual golfer. For all intents and purposes this is a set of golf clubs composed of a single iron and a single wood, each having numerous loft angles.

Does this equate to consistency? **Yes.**

**One lie angle for all the irons and one lie angle for all the woods within a set.** All of the irons within a set have the same lie angle, as do all of the woods. This ensures the ideal address/swing posture with every club in the bag.

Does this equate to consistency? **Yes.**

**One weight for all irons and one weight for all the woods within a set.** All of the irons within a set of clubs and all of the woods within a set of clubs weigh the same. Not only do they weigh the same, but the weight distribution over the entire length of the club is identical. The result is the only truly swing-weight and Moment of Inertia (MOI)

matched set of irons and woods in the golf industry.

Does this equate to consistency? **Yes.**

The following table shows the specifications for a set of **1 Iron** single length irons:

Iron	Head weight	Length	Lie	Loft	Bounce	Offset	Flex
3	273 gms	Same (Custom fitted)	63.5°	19°	3°	.125"	Same
4				23°			
5				27°			
6				31°			
7				35°			
8				39°			
9				43°			
PW				47°			
GW				51°			
SW				55°			
LW				59°	3°		

**One loft progression between irons and woods.** Of great importance, you will notice that in a set of **1 Irons** there exists the same 4.0° degree of incremental loft change between successive irons and woods. This ensures that using the same swing throughout the set will produce the same yardage gap between successive clubs.

Does this equate to consistency? **Yes.**

**One address/swing posture and swing plane.** In the **One Iron Golf System** there exists only one ideal address/swing posture and swing plane. The swing with the #3 iron is the same as that for the PW.

Does this equate to consistency? **Yes.**

**One ball position for all irons and fairway woods.** Using a conventional set of golf clubs we are taught to move the ball incrementally forward in our stance with each successively longer golf club. Practically speaking, you could be using thirteen different ball positions throughout a set of conventional clubs. In the **One**

***Iron Golf System*** you use a single ball position at address with all of your irons and fairway woods, and this ball position is in the center of a shoulder width stance.

Does this equate to consistency? **Yes.**

The ***One Iron Golf System*** defines consistency throughout a set of golf clubs:

- ✓ Single length irons.
- ✓ Single length woods.
- ✓ One lie angle for the irons and one for the woods.
- ✓ One constant loft angle progression.
- ✓ One weight and Moment of Inertia.
- ✓ One address/swing posture and swing plane.
- ✓ One ball position.

## IV

### One Iron Golf Single Length Woods

You may be wondering why there is a difference in club length between irons and woods. The answer lies in their respective design functions. An iron is designed to pinch the ball against the turf using a descending swing arc requiring a more upright swing plane (hitting down on the ball). A wood is designed to sweep the ball from the turf which requires a flatter swing plane. Consequently, in order to facilitate these two different swing planes the length of these golf clubs must be adjusted accordingly, the woods being longer than the irons. It is also to be noted that irons are designed as scoring golf clubs, being inherently more accurate, whereas woods are primarily designed for distance.

**The driver.** Ask nine out of ten golfers and they will tell you that what they want most out of golf is to hit that giant 300-yard drive ala John Daly. This is fine, although it is certainly not golf. Marketing strategy in the golf industry focuses on the desire to hit big drives by offering larger and larger clubheads with longer and longer shafts. Some drivers also incorporate moveable weighting to supposedly correct your slice or hook. All of this is pure marketing hype and could not be further from the truth. As a matter of fact, these trends can reduce your driving ability. Let's face a few facts:

1. Only one out of every 200 golfers will ever hit a 300-yard drive in their entire life regardless of what driver they use.
2. Only one out of every 100 golfers is able to average 270-yards or better off the tee.

In fact, during the 2004 PGA tour season, only 14 out of 196 players averaged 300 yards off the tee, and these are the best players in the world. The truth is that these professional golfers could hit a 300-yard drive with a croquet mallet; the rest is just endorsement money hype. All of this being said, the true purpose of the driver is to put the ball in play and far enough down the fairway to allow for an easy approach shot on a par four hole. The optimal driver would be 42" to 43" in length for the average height golfer (actual club length being based

upon the golfer's wrist-to-floor measurement), with a 12° loft angle to maximize distance and to impart additional backspin to the ball for increased accuracy. Do not be fooled by the fact that the typical driver on the market today has a loft angle of 9° or 10°. These conventional drivers are designed to be played using a ball position that is well forward in the stance and teed up high. The result is that you contact the ball well past the lowest portion of your swing arc when the clubhead is moving in an upward arc at the beginning of the follow through. This results in an effective clubhead loft angle at impact of 14° to 15°. Also, do not be fooled by marketing claims of increased performance using the typical 45" – 46" long behemoths. The fact is that solid center face contact is the true determinant of distance and accuracy, and a driver of this length simply cannot produce consistent center face contact. The results of inconsistent center face contact are scattered tee shots and frequent miss-hits. Do not kid yourself, the pros play these types of drivers only because they are being paid handsomely to do so, and their low percentage of fairways hit reflects the truth. The PGA tour player who had the highest percentage of fairways hit during the 2004 season only averaged 77.2%. The overall average of fairways hit by 196 professional golfers during the 2004 PGA tour season was only 65%. Bear in mind that these are the best players in the world, but by using these long, oversized "*light sabers*" their accuracy suffers tremendously. Remember – Golf Is A Game of Accuracy, and the tee shot determines the potential score on any hole.

**The fairway woods.** As was noted before, woods are designed primarily for distance. The design of the clubhead produces a high trajectory for maximum carry distance and soft landings. Due to the low effective center of gravity of the clubhead a wood will get the ball up and into the air much more quickly than an iron with an equivalent loft angle. This offers several advantages for golfers:

1. Since a swing speed of 75+mph is required in order to effectively play a low lofted iron, those golfers with slower swing speeds can effectively replace the #3 and #4 irons with #5 and #7 woods. The woods will maximize their trajectory and distance potential.
2. Also due to the low effective center of gravity of a wood

clubhead, they outperform an iron clubhead when hitting out of the rough.

It is of interest that the golf industry is currently touting the benefits of the “new” hybrid or utility woods. In reality there is nothing new about them at all since they are only high lofted fairway woods that have been around for years. Nothing can be accomplished by the use of these utility woods that cannot be accomplished by using a #5 or #7 wood.

## V One Iron Golf Wedges

The marketing forces within the golf industry have alienated wedges from the rest of the irons and nothing could be further from the truth. Wedges should be considered as nothing more than extensions of the rest of the irons. For all intents and purposes they could be numbered 10, 11, 12, and 13 instead of being identified separately as “wedges”. The inclusion of wedges within a set of irons allows golfers to customize the set to suit their own games.

**1 Iron** wedges are not designed in the same way as conventional wedges. **1 Irons** are the same single length as the rest of the irons within the set and provide the perfect complement by utilizing the same specifications. For instance: conventional pitching, gap, and lob wedges are designed with 5° to 8° degree bounce angles making them difficult to play off hardpan or close cut fairways. **1 Iron** wedges are designed using the same bounce angle (3°) as the rest of our irons. In fact, **1 Iron** wedges are identical to the rest of the irons in the **1 Iron** line. The reason is that there should be no difference in the playing characteristics of an iron just because it is called a “wedge”. All of the irons within a set should be designed to play exactly the same.

This brings us to the sand wedge. A conventional sand wedge has a sole bounce angle anywhere from 10° to 16°. This is fine if the only use for this iron is to play the ball out of a sand trap. However, most golfers will use their sand wedge from the fairway ten times more often than they ever use it from the sand. This creates a problem in that the higher degree of bounce angle, the more difficult it is to play an iron from a close cut fairway or hardpan. Realistically, it is almost impossible to play an iron with anything over an 8° bounce angle from a close cut fairway without sculling or blading the shot. For this reason, the **1 Iron** sand wedge is designed with only a 6° bounce angle in combination with a wider sole. This lower bounce angle allows for extreme playability out of a close cut fairway and off of hardpan, and coupled with the wider sole makes it extremely effective from the sand as well. The main thing is that this sand wedge is

designed with the exact same playing characteristics as the rest of the irons. The result is the utmost in playing consistency throughout an entire set of single length irons.



## VI DISTANCE

We are led to believe that longer golf clubs produce greater swing speeds on a linear scale and thus more distance. This is the explanation given for the 1/2 inch increase in club length between the individual irons and woods within a conventional set of golf clubs. In actuality, the only static factor that results in distance changes between clubs is the difference in the loft angle of the club-head. Our testing has shown conclusively that there is absolutely no measurable difference in distance due to the standard 1/2 inch incremental shaft length increases between clubs. The only affect of the standard length increases between clubs is to make each successively longer golf club harder to hit.

The armchair physicist will point to the radial arm length in a golf swing as being the prime determinant of swing speed stating that the longer the radial arm the greater the swing speed and resultant distance. A common misconception is that club length alone is used to define this radial arm length. Regardless of how many hinging points and resultant secondary arcs/planes are involved the true center of a golf swing is a point somewhere between your shoulders (this center point moves laterally between the shoulders during the swing). Hence, you must include your arm length into the radial arm length equation for any meaningful analysis. Therefore, assuming a 37 inch iron length and an arm length of 24 inches, the actual radial arm length in your golf swing is 61 inches. This means that a 1/2 inch change in club length results in a radial arm length change of only 1/122 or 0.008197. A 1.0 inch change in club length results in a radial arm length change of only 1/61 or 0.01639. Even a 2.0 inch change in club length results in a radial arm length change of only 1/30.5 or .0328. As you can see, these fractional changes in radial arm length will not produce any measurable change in swing speed or distance whatsoever.

Our testing of hundreds of golfers (including professional golfers) has shown that your highest swing speed with an iron is attained when you are hitting your favorite iron. Every time you switch to an

incrementally longer or shorter iron your swing speed will decrease. The reason for this is that you have the greatest degree of confidence with your favorite iron (the only one in the bag that comes close to actually fitting you properly) and this high confidence level allows you to make your most fluid and powerful swing. Every time you move up or down one or two golf clubs (increasing or decreasing club length from your "favorite") your confidence level decreases and you will unconsciously slow down your swing in order to make good ball contact. This decrease in confidence level translates directly into the unconscious decrease in swing speed and applied power. Since a set of **1 Irons** are custom built to fit you properly you will experience an overall increase in power as well as a decided increase in your control and accuracy. You will be as comfortable with your #3 and #4 iron as you are with your #9 iron or wedges and you will gain distance and accuracy with every iron in your set over your old irons.

Club-head weight. What most golfers do not realize is that in a conventional set of irons the club-head weight progressively increases in 7gram increments from the #3 iron through the wedges. Therefore, a conventional #3 iron club-head weighs approximately 240 grams while a conventional PW club-head weighs approximately 292 grams. Since the club-head weight in a set of **1 Irons** is 273 grams you will be hitting the ball with our #3 iron incorporating more mass than a conventional #3 iron for increased ball compression and additional distance.

Ball striking consistency. Regardless of what you may have heard through advertising concerning "expanded" or "extra large" sweet spots, in actuality the sweet spot on a club-face is only the size of a pin head (the intersection of the horizontal and vertical centers of gravity) and certainly cannot be artificially enlarged. The fact is that if you miss this sweet spot by 1/4" either way you will lose 10 yards in distance and have an off-line shot. When playing a set of **1 Iron** single length irons that are identical throughout the set and where you are using the exact same swing and ball position with every club and on every shot, your consistency in hitting the sweet spot increases dramatically.

The combination of using your maximum swing speed, hitting the ball with greater mass, and striking the sweet spot on the club-face every time guarantees an increase in distance with every club in your bag if you play a set of **1 Irons**. These same factors also contribute greatly in your ability to control shots. Using the exact same swing, ball position, and posture on every shot raises your level of ball striking consistency to levels you never thought possible.

**How to increase distance.** Consistent solid ball contact is the primary determinant of distance. We already know that the way to achieve consistent solid ball contact is to play a set of golf clubs designed for consistency of performance. We also know that by using only a single address/swing posture, ball position, and swing plane throughout a set of golf clubs our consistency will improve dramatically. And we also know that our level of consistency is proportional to the time we spend at the range. So how do we increase the secondary determinant of distance, swing force? The answer lies in the golf swing itself, and is covered in detail in the chapter “The Perfect Swing”.

## VII THE IDEAL GOLF CLUB DESIGN

There should be no difference between “Men’s, Women’s, and Senior’s” golf clubs. Let me repeat. There should be no difference between “Men’s, Women’s, and Senior’s” golf clubs. Human beings all have the same mechanical structure regardless of size, strength, age, or sex. This is why exercise machines at a health club can be used by anyone and produce the same results. The hinging points or axis are the same for everyone as well as tendon and muscle function. The only adjustment necessary in these machines is for the length of arms, legs, etc. Consequently, men’s and women’s golf clubs should be built to the same specifications, the only difference being the length of the golf club based upon the wrist-to-floor measurement of the individual golfer.

### **Is there one ideal golf club design?**

It is interesting to note that every year the golf club manufacturers come out with their “new” and “improved” golf club designs. This means that the \$800 or \$900 you spent on a set of “brand name” golf clubs last year was wasted. Obviously the set you purchased is defective since the manufacturer has made improvements to their line this year. The fact is that “new” and “improved” is nothing more than marketing hype. The golf club manufacturers are in the business of selling golf clubs and they cannot do this if golfers are satisfied with their current set. Consequently, each year they have to come up with a “gimmick” in order to create new demand so that they can meet their sales goals.

So what’s the answer? Golf is a game based upon mechanics. The golf swing is determined by the mechanics of the human body and the golf club is designed to produce a mechanical result when it strikes the golf ball. Using the logic that skeletal and muscle function are mechanically the same for all golfers it follows that there is one mechanically perfect swing for all golfers. If there is one mechanically perfect golf swing then there can be one mechanically

perfect golf club design. Bear in mind that a mechanically perfect golf club design is mechanically perfect for everyone.

It is a fact that the stronger golfer will achieve greater distance than the weaker golfer. This is the reason why golf courses offer varying tee box locations. This is just a function of individual strength that produces a higher degree of swing force but it does not alter the sound mechanical principles involved. For instance, the low loft angles of #3 and #4 irons require a swing speed of 75+ mph to be effectively played. For those golfers with slower swing speeds the answer is to substitute #5 and #7 woods for these irons. This allows golfers with a lesser swing force to maximize their distance potential, but it does not alter the mechanical principles involved.

### **The concept of greater loft angles in women's and senior's golf clubs is ludicrous.**

Increasing the loft on a woman's or senior's golf club is the equivalent of making their #7 iron the same as a standard #8 iron. This doesn't make a lot of sense. Golf club manufacturers do this in order to give the golfer the illusion of greater distance.

### **The myth of shaft flex.**

There is no standardization in the golf industry as to flex ratings and the variances between manufacturers are tremendous. Also, shafting based strictly on flex does not take into consideration the many design characteristics of the clubhead or the shaft itself. I found that shafting a golf club based on flex, which is what all golf companies do, was like coupling apples with oranges. In other words, the shaft did not perform in harmony with the design features of the clubhead, but in fact, tended to work in opposition. Based upon this discovery I decided to test shaft playability characteristics in relation to specific clubhead design features. What I found was a distinct relationship between the two that when optimized produced a golf club where the components worked together as a single unit and vastly increased playability. In short, the shaft optimization process that I developed

centers on the playability characteristics of the shaft (bend/deflection point, loading properties, and flex plane orientation), and the design specifications of a particular clubhead (loft angle, offset, moment of inertia, vertical and lateral center of gravity, weight, etc.). The result is a perfect mechanical marriage of the individual components that produces the ideal shaft loading and ball trajectory for the golf club regardless of the strength or swing speed of the individual golfer. The stronger golfer will hit an optimized golf club farther and with a higher trajectory than a weaker golfer, this being simply the result of applied force at impact. But the weaker golfer will still realize the maximum distance and trajectory potential that their individual strength dictates.

One of the components of our proprietary *Shaft Optimization Process* is the proper orientation of the flex plane of the shaft. We are the only company in the golf industry who does this. All golf shafts have a single inherent flex plane, or a plane that the shaft wants to deflect in when placed under load. It is a mistake to believe that a golf shaft will flex in the same manner in any plane around its axis. This inherent flex plane is created during the manufacturing process by variances in shaft wall thickness, by the manufacturing seam that runs all the way from the tip to the butt-end of the shaft, and by residual bends in the shaft (no golf shaft is perfectly straight). The manufacturing seam is created during the manufacturing process due to the shaft material being wrapped around a blank producing a seam where the sides of the material meet. The seam is then welded in the case of steel or over-wrapped and glued in the case of graphite. Determining the inherent flex plane of a shaft involves placing it under load and letting it rotate to its inherent plane of deflection. Once the inherent flex plane is determined it is orientated to its most stable position in relation to the face of the clubhead during the shafting process. If the shaft is oriented in a different plane it will try to rotate around its axis during the swing trying to locate this plane thus creating an oscillation of the shaft and clubhead. This oscillation results in the club-head literally wobbling through impact. When the shaft is correctly oriented in respect to its inherent flex plane it will resist twisting to any other position when placed under load and will remain stable through impact. It is as if the club-head is riding on

rails through the impact zone. Our testing has shown conclusively that playing golf clubs with proper shaft orientation greatly enhances ball-striking consistency and is the reason that over 85% of all tour players have a like process done to their golf shafts (SST Puring).

**Grips on a golf club perform one task - allowing the golfer to hold onto the club.**

If accuracy is the main tenant of golf then control of the golf club/consistency is the main tenant of accuracy. Through testing we have shown that larger grips provide increased control over the golf club. This is because a larger grip allows for a greater surface contact between the golfer's hands and the golf club. This increase in control and accuracy is immediate. The greater surface contact also allows for a much greater transfer of swing force for increased distance. The grips installed on our **1 Irons** are 1/8" over-size and have less taper than conventional golf grips for maximum grip/skin contact.

## VIII THE PERFECT SWING

Is there a perfect golf swing? A golf swing that is mechanically superior based upon the skeletal structure of a human being? If you watch professional golf you will notice one particularly important thing common to the top players. They all have virtually the same swing. With few exceptions, most noticeably Lee Trevino and a handful of others, professional golfers employ virtually the same swing, which includes stance and address position. These hundreds of professional golfers have different backgrounds, different coaches, etc., but in each case they have independently evolved the same swing. Why? The answer lies in the fact that through practice and experimentation these players were trying to achieve the same thing, the perfect combination of accuracy and distance. In each case they independently discovered the perfect swing that satisfied the objective, and this perfect swing is common to all of them. Is it hard to imagine this? The answer is no. The golf swing is a mechanical movement produced by the human body. All humans have the same mechanical hinging points or joints dictated by our skeletal structure. Now although our skeletal structure may vary between individuals, the mechanical properties of the skeletal structure do not. This results in a constant. In essence then, there can be a mechanically perfect movement produced by the human body in order to strike a golf ball, and this perfect movement is applicable to all golfers. The hundreds of professional golfers who independently developed virtually the same golf swing prove this.

Bear in mind that although these many professionals have evolved their swings into this perfect swing pattern, they use differing methods as to the delivery of this swing. For instance, a golfing method that has become very popular is the “Natural Golf” or single axis swing method. Although the swing is the same “perfect” swing as was discussed, the grip used in this method changes the delivery of the golf club to the ball. The single axis grip is a ten-finger grip with the shaft of the golf club running straight along the lifeline of the palms thus aligning the shaft with the forearms. The traditional grip is basically a wrapping of the fingers around the shaft creating an angle



between the forearms and the shaft. The lack of this forearm/shaft angle in the single axis swing does two things:

1. Eliminates the need to correct this angle during the swing making it much easier to control the golf club.
2. Allows for a greater transfer of swing force to the golf club at impact.

The single axis swing methods also advocate a larger grip than is standard. This only makes sense. The sole purpose of the grip is to provide the golfer a secure connection between his hands and the golf club. The focus being on increased control of the golf club which larger grips promote.

This being said, the perfect swing itself is still the same for any golfing method.

**The importance of a perfect swing.** The ramifications of the idea of one perfect swing, which as I noted before, include stance and address position, are vitally important in golf club design. To demonstrate this we need to talk about the adaptability of the human body. Our bodies are amazing mechanical contraptions capable of producing the most complicated of compound movements. Through practice our bodies can learn how to play the piano, master karate, lift tremendous weights, and perform the most delicate heart surgery. Given a required task our bodies will learn how to produce a compound movement that fulfills our objective. In addition, this will happen unconsciously. We don't have to consciously learn how to walk or ride a bike. These skills are developed unconsciously through trial and error. The same is true when learning golf. Our objective is to hit a golf ball. Assuming that we do not have instruction, our bodies will learn through trial and error how to hit that ball. This is good, but there is a potential downside. If we learn golf while using ill-fitting golf clubs, which most of us do, our bodies will unconsciously find a way to perform this task by adapting to the poor equipment. What this produces are the unconventional and sometimes laughable swings that we see every day on the golf course. However, these swings are necessary in order to compensate for the ill-fitting equipment. Our bodies have found the best swing capable of producing desired results

using poor tools, and these swings will become a part of our muscle memory over time. Later on as we become more avid golfers we will purchase a set of new clubs in order to help us improve our game, and if we are serious we will buy them from a custom club fitter or club maker. This creates a problem. The prevailing ideology of custom club fitters and club makers is to fit the golf clubs to your game, or more importantly, to your existing swing. This is wrong. If your desire is to improve, then why would you want a set of clubs designed around a faulty swing, a swing that was developed in order to hit faulty golf clubs in the first place? No, the clubs should be fitted based upon the perfect swing, the perfect mechanical movement that produces maximum accuracy and distance. Will you have immediate success with these correctly fitted clubs? No, but as before your body will unconsciously adapt to the new equipment over time and, hence, will evolve into the perfect swing. The bottom line is that to achieve the perfect swing you need properly fitted equipment.

Address/swing Posture. The most important part of the golf swing is the address position. It is what sets the golfer in the position to create a powerful and controlled swing. Studying the best golfers in the world it becomes clear what constitutes the proper swing posture:

1. An upright stance. As opposed to bending over and reaching for the golf ball. This means a slight relaxation of the thighs with unlocked knees – no squatting.
2. A slight bending forward at the waist – no hunching over.
3. A solid base. Use a shoulder width stance with all clubs and shots. This width provides the most stable and athletic base for the golf swing.
4. Keeping your left heel firmly planted on the grounded. Lifting the heel during the swing relieves all the built up torque developed during the back swing.

**1 Irons** are designed to place the golfer into the ideal address/swing posture through the combination of lie angle and club length (based upon the W-T-F measurement of the individual golfer).

**1 Iron** single length irons and woods are designed to be played with the ball in the center of a shoulder width stance.

**The Golf Swing.** I can give you one very important tip to master the golf swing: do not fall into the trap of over-analysis. We are constantly bombarded by golfing instruction, articles, new products, and training drills designed to improve our performance on the golf course. In fact, after learning the basics, the only true instructor is your own body. Given a task our bodies will unconsciously learn through trial and error how to perform it in the most efficient manner. If you are thinking about your swing and trying to analyze wrist position, swing plane, alignment, and so forth, you will never be able to swing a golf club. My advice is to simply let the swing happen. Trust your set-up and alignment and just swing the golf club. If left alone with no conscious interference, your body will learn to perform a perfect golf swing. There is one caveat however, and that is practice. When I was learning to play golf I would go to a field every night and hit 30 to 40 golf balls with my pitching wedge. Every time I went my swing and ball striking improved and I began developing a very comfortable, grooved swing. I did this constantly for about a month and my scores went down dramatically. If I were to have read instructional articles and consciously tried to incorporate these when I went out to hit balls I would have undermined all the progress I was making.

**Developing swing force.** Swing force refers to the power you develop during the backswing and apply during the downswing. Practically all of this power stems from the torque created as the torso is rotated around the hips during the backswing. When this torque is at its peak the downswing begins and unleashes this built up power to produce a powerful swing through impact. Although all golfers know this, it is very rarely applied correctly. In order to build torque between the torso and hips it is imperative that the torso actually rotate around the hips. This means that the hips and spine must remain in a stationary plane throughout the backswing. In other words, no swaying laterally to the right during the backswing or swaying laterally to the left during the downswing. It is impossible for the torso to rotate around the hips if the golfer is swaying laterally. Also, it is impossible for a golfer to bring the golf club behind him during the backswing when swaying laterally to the right. Instead of

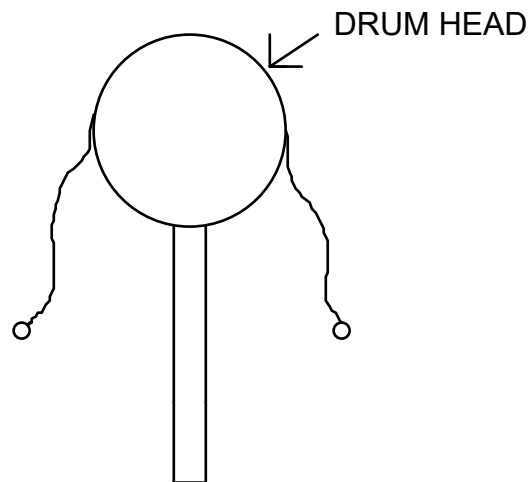
bringing the club behind, it is simply being pulled upwards and out to the right side resulting in an extreme outside to inside swing path during the downswing causing poor ball contact and a slice. It also causes the golfer to make a lunging motion towards the golf ball during the downswing that may feel powerful but is actually devoid of any effective power.

You may have heard the term “swinging in a barrel”. This is exactly what you should try to imagine during the backswing. Standing as still as possible, you should try to rotate your shoulders around a stationary spine until you cannot rotate them any further. Imagine that you have a pole stuck into the back of your skull that runs down your spine and is embed into the ground – all you are trying to do is to rotate your shoulders around this pole. Rotating around a stationary base will automatically bring the golf club behind you and not up and out to your right side. Keep your right elbow tucked in and allow it to circle your waist during the backswing, which assists greatly in bringing the club behind you. Remember – swaying to the right during the backswing is disastrous, whereas, swinging the golf club around the body results in the development of a tremendous amount of torque between the torso and hips. It is a very simple equation: the greater the torque, the greater the power. It is very important during the backswing that the left heel remain firmly planted on the ground. Lifting the left heel allows the hips to turn to the right eliminating any chance for torque to develop. Even the slightest lifting of the heel during the backswing will decrease your power dramatically.

The downswing begins by simply letting the built up torque release itself. Do not try to rush things by starting the downswing with the arms but rather just let the torso uncoil around the hips naturally. What you will find is that the downswing will begin slowly and then gain speed as the built up torque fully releases through impact.

Let me explain this further. Hold your arms straight out at your sides flexing your shoulder and arm muscles as hard as you can. Now bring your arms down to your sides as fast as possible. Do the same thing again but this time relax your arms and shoulders and let your arms fall naturally by gravity. Did you notice that your arms reached your

sides faster when relaxed? This should point out to you that the only purpose of the arms in the golf swing is to hold onto the golf club. The arms do not provide power in the swing; in fact, trying to provide power with the arms actually reduces swing speed and lessens control. Where does power come from? Have you ever seen the child's toy that has a drum on a spindle with two strings hanging down on the sides of the drum with balls at the end of the strings? When you rotate the spindle back and forth between your palms the strings fly around the drum striking the drumhead with the small balls at the ends.



Where is the power generated in this toy? In the strings? No. In the drumhead? No. The power is generated in the rotation of the spindle. This toy is the perfect representation of a powerful golf swing. The power of a golf swing is generated by the rotation of the torso around the solid base of the legs and hips. The buildup of power is in the tension created by a maximum torso turn with minimum hip turn. If you wind up like a top from the feet up you will not create this tension. The legs and hips are the base for this tension and if the hips rotate with the torso there will be no tension created and thus no power. The hip rotation must be kept to a minimum. Most golfers will not be able to make a full back turn, with the golf club reaching a parallel position behind the golfer at the top of the swing, without

exaggerating the hip turn. This is fine because a full back turn does not generate power. The tension created between the torso and hips creates the power. A one half or three quarters back turn with this tension will create more power than a full turn without the tension. The propeller on a wind up airplane has its maximum power when the rubber band is wound to its breaking point. The same propeller has very little power when the rubber band is only wound two or three turns.

The idea of a full back turn has led many golfers to lift their left heel off the ground during the back swing. This is the only way that they can complete the turn. What this does is to relieve the tension built up between the torso and hips thus reducing power. It also lessens the control of the golf shot because it creates more mechanical movements in the downswing. If you wish to dramatically increase power in your golf swing keep your left foot firmly planted on the ground.

The muscles that directly create the torso/hip tension are the *external obliques*. These are the muscles that wrap around the sides of your waist and are responsible for torso rotation and bending from side to side. Obviously the weaker these muscles are the less tension they will produce. Let us face facts, what generates more tension, a steel spring or a marshmallow? Most golfers are trying to generate tension and power with a marshmallow. How do you correct this? Easy, exercise these muscle groups.

### The Ideal Golf Swing

First off let's talk about the way you grip the club. Every golfer I have ever met thinks that they have a good grip which, in fact, is only true in about 10% of the cases. Believe me, virtually all swing flaws are the result of a poor grip. The ideal grip is actually very simple - the back of the left hand (right-handed golfer) should face the target and the palm of the right hand should face the target regardless of whether you use a Vardon grip, overlapping grip, or ten finger grip. Most golfers make the mistake of taking far too strong a grip with their

right hand where the palm faces more skyward than down the target line. As far as finger pressure, I like to feel like I am holding the club with the last three fingers of my left hand and the middle two fingers of my right. The trigger finger of your right hand (right-handed golfer) should exert little to no pressure on the grip at all. I have seen many golfers ruin their swing by trying to control the club or add power by over exerting pressure with this finger. Whenever I start to experience a flaw in my swing the first thing I do is to lift my right-hand trigger finger completely off the grip and keep it off throughout my swing. Many times this one change will fix the problem.

The second thing we want to discuss is your address position. Your posture should be upright and not bent over or reaching for the ball. Your knees should be slightly bent and you should feel as if you are going to sit down on a tall stool. Weight should be evenly distributed between your feet and you should not feel as if you are leaning forward or standing on the balls of your feet, but rather, stand flat footed and balanced. Your lead foot should be flared out slightly toward the target and your rear foot should be square to the target line (this keeps you from over-swinging).

Your lead arm (left arm for a right-handed golfer) should be straight (no elbow bend). The elbow of your trailing arm should be tucked into your side so that it can circle your waist and fold inwards on your backswing.

One other very important point to mention is that you should try to have the insides of your elbows pointing skyward as much as possible. This is accomplished by trying to bring your elbows towards each other. You should be lightly squeezing the sides of your chest with your upper arms. What this accomplishes is to eliminate the *opposing muscle* swing flaw and will ensure that you maximize your swing speed (a full explanation of the *Opposing Muscle Concept* can be found in chapter X).

You should make a slight forward press of the club at this point. The reasoning for this is not what you might think. It is simply a move to put your wrists in the proper impact position where the wrist of your

left hand (right-handed golfer) bows slightly towards the target and will lead your left hand through the shot. To visualize this, make a fist with your left hand with the back of your hand and forearm in a straight line and then bend your hand slightly inward. This left wrist positioning will create the reverse affect to your right wrist. This is the position you want your wrists to maintain throughout the swing and through impact. You never want to change this positioning by breaking your wrists during your backswing or downswing.

Let's start the backswing, and we will do it from a right-handed perspective so as not to get too confusing. From the address position discussed previously, all you need to do is to turn your torso to the right so that your back faces the target. You want to keep your arms and hands/wrists in exactly the same position that they were at address in relation to your shoulders. In other words, move your shoulders and arms together as if they were one piece (hence the term one-piece takeaway) so that the triangle formed by your shoulders and arms at address now faces to your right. Viola! You are now half-way through your backswing.

A few important points:

- Do not sway laterally to the right when making your turn but simply rotate your torso around your hips.
- Try to keep your hips stationary and facing forward. The more stable the hips, the more torque you will create between them and your torso. This torque is where the vast majority of your power comes from in a golf swing and is the reason we said to have your right foot square to the target line at address instead of flaring out to the right. This helps to prevent the hips from turning.

If you feel that you can rotate your torso further than this then check your hips and you will find that they have rotated to the right – big mistake if you are trying to generate power. When your back faces the target and you shoulders and arms face to the right it is time to stop your torso turn and let your left arm keep moving around your chest



and to the back. This stretches the shoulder muscles and creates additional torque between your chest and left shoulder. Remember, keep your left arm as straight as possible (no bending of the elbow) and keep your wrists in exactly the same position as they were at address (do not break your wrists). Your right elbow will naturally fold in to your right side (like a chicken wing) allowing this additional stretching. A very important point here is to keep your right elbow in against your side with your right forearm folding backwards from the elbow. One of the biggest swing flaws (and the reason that 95% of all golfers slice the ball) is that they let the right elbow fly out to the side at this point. The two major problems with a “flying elbow” are:

1. Lack of power. If you watch a tennis player hit a side shot you will notice that his right elbow is folded in against his side and bent backwards to maximize stretching. When this forearm/upper arm position unleashes through a shot the power generated is scary.

2. A flying elbow always results in an outside-to-inside swing path which is the recipe for a slice.

Once your left arm is unable to stretch further around your torso and your right elbow is fully flexed you should have a momentary pause before starting your downswing. A few important points to keep in mind:

- Keep your left arm as straight as possible and do not break your wrists. One of the worst instructional tips in golf is to bring the club back until the shaft is behind you and parallel to the ground at the top of the backswing. Believe me, there may be only 1 out of 300 people in the world who have the suppleness to achieve this position without bending their left elbow and breaking their wrists. However, 95% of all golfers will try to attain this impossible position at the top of their swing by utilizing these two devastating swing flaws. The next time you watch a tournament on television watch where the majority of pros end up at the top of their backswing. Typically, with an iron, the shaft of the club is perpendicular to the ground or maybe a little further behind them but certainly not completely behind them and parallel to the ground. Also, you will note that their left arm is rigid

and their wrists never break.

- The reason that I stress keeping the left arm as straight as possible with little or no elbow bend is one of power and control. Once you bend the elbow you eliminate the torque created between the left shoulder and arm which eliminates the built up power of this torque. As you start your downswing with a bent elbow the first thing you will do is cast the club outwards to straighten your arm which throws your balance and swing plane off and always results in a slice or push to the right with little power.

- The reason for not breaking the wrists is the same: power and control. If you let your wrists break at the top of your swing (and you will feel it happen) you will automatically cast the club outwards when starting your downswing. In fact, you will cast it so far that your knuckles will be leading the heel of your hand through impact (just the opposite of the wrist position you were in at address). The majority of the time you will either hit the ball fat or top it and you will certainly have no power.

- Once you have stretched your torso and upper arm to the max with a straight left arm and no wrist break, you have achieved the highest level of potential power that you are capable of. Trying to artificially exceed this through the swing flaws mentioned will only destroy this power and result in a weak and off-plane swing. I have known many golfers who can only take the club half-way back due to their level of flexibility but they attain their maximum torque and stretch which allows them to generate considerable power and tremendous control shot after shot. Personally, I can only take my irons back a little over half way yet I can out drive most of my playing buddies with my #3 iron.

As mentioned, pause momentarily at the top of your swing before initiating your downswing. This is very important because it allows you to set your position. If you do not have this pause and the club is still going back when you start the downswing everything will get out of position and you be fighting to get back on plane throughout the rest of your swing. To start your downswing simply rotate your hips

fully to the left. Bear in mind that I said rotate your hips to the left, not sway them to the left. Lateral swaying has absolutely no place in a golf swing. By the time you reach impact your hips should be close to facing the target. This is why at address you should flare your left foot out somewhat which clears the way for your hips to fully turn. Personally, I like to have the feeling that I am hitting the ball with my right hip. As the hips start rotating to the left they will force your torso to rotate to the left as well. Due to the torque created between your hips and torso during your backswing, your torso will rotate exponentially faster than your hips (primary power move). As your torso rotates, the stretch created between your left shoulder and left arm will cause your shoulders to literally whip your arms around at an exponentially faster rate than your torso is travelling (secondary power move). As you approach the impact zone your stretched right elbow/forearm will unleash and, again, exponentially add to your speed (third power move). At impact, due to centrifugal force, your right forearm will roll over or literally whip over your left forearm (I refer to this as the “crack the whip” effect) which produces another exponential speed factor to your swing. In summary, your hips rotate first which causes your torso to rotate which brings your arms around. It is important here to stress the last sentence – read it again. Never, and I mean never, start the downswing with your arms which is exactly what all high handicappers do. Always think about swinging with your body while the arms just go along for the ride.

Past the point of impact everything will happen naturally. You should finish your follow through with your hips facing the target and the club raised high and pointing down the target line. To clarify this, if you were to let go of the club in the last moments of your follow through it would fly straight towards your target.

One final point that I should clarify, we have heard over and over about the unhinging of the wrists through impact. This is a misnomer that causes the high handicapper constant trouble as it implies that the wrists should break or unhinge through impact. The fact is that the wrists should never break or unhinge throughout the swing. The unhinging referred to is the natural act of the right forearm rolling over the left at the lowest point of the swing arc. This occurs naturally

due to centrifugal force and there is nothing that you can do to accentuate or delay it. We have all heard of the “late hit” and if you consciously try to do this you will certainly destroy any chance at developing the ideal swing. Remember that the downswing takes but a fraction of a second and there is certainly nothing that you are consciously going to do to affect any of it.

A few final tips:

1. As far as swing plane is concerned, you set this up at address. When you rotate your torso to the right to initiate your backswing remember that your torso is bent over slightly based upon your address position so that when you turn to the right your arms will actually be traveling in an upwards arc and continue to the top of your backswing.
2. Do not read this and try to incorporate it in your next round of golf as you will be wasting your time. The only place to initiate a swing change is on the range – never on the course. Numerous trips to the range are necessary in order to get the feel and timing down.
3. You should only consciously be thinking about your swing, position, etc. at the range and never on the golf course. Conscious thought on the first tee will destroy your whole round because it is impossible to think your way through a golf swing. The idea is to develop your swing at the range so that it becomes automatic and just bring it with you when playing a round of golf.

As a final thought I would like to touch on a point that has been brought up by a vast majority of our subscribers and **1 Iron** players. That point being that if you incorporate the ideal swing instruction from above while using conventional golf clubs you will have to learn and ingrain thirteen different "ideal" swings. Conversely, if you play a set of **1 Irons** you only have to learn and ingrain one. When playing conventional golf clubs with varying lengths, weight, flex, and clubhead lie angles your swing plane, address posture, ball position, and timing need to change from club to club and is the reason that the average golfer finds it practically impossible to achieve consistent

solid ball contact throughout their set. However, when playing a set of **1 Irons** this becomes automatic.

The combination of the "ideal" swing and a set of **1 Irons** will definitely help turn your game around and you will enjoy golf like never before.

## **BALL STRIKING CONSISTENCY**

We have seen how to obtain consistency with the irons and the woods through golf club design. This chapter deals with ball striking.

**Angle of attack.** We have all been told to hit down on the ball, but what does this mean? The lowest portion of the golf swing occurs in the center of a shoulder width stance. By placing the golf ball in this spot you will make contact with the ball an instant before the clubhead touches the ground. This is in effect hitting down on the ball. Don't be miss-lead by the term "hitting down on the ball". This does not mean attacking the ball with a steep swing plane and leaving a crater. This simply means that you are hitting the ball before the clubhead touches the ground and leaving a small divot or a slight scar. This ball position should be used with all **1 Iron** single length golf clubs. The advantages of hitting down on the ball rather than trying to pick it clean or scooping it are numerous:

- Imparts more backspin to the ball, which aids in accuracy.
- Increases distance since the angle of attack ensures that you are pinching rather than scooping the ball.
- Allows you to consistently hit the ball from any kind of turf condition or lie.

Let me give you my own example. When I began playing golf, like most beginning golfers, I attempted to scoop the ball or come under it on each shot. Let's face it, on most golf courses the ball rests on top of the grass a half an inch or so above the ground. For all intents and purposes, you are hitting each shot off of a tee. For about a year this worked fine. Then I played a course with bent grass fairways. If you have never played bent grass, it is like the name implies, the grass lays flat on its side, flat on the ground, and so does the ball. I shot a 120 that day when I was used to shooting in the 90's. Literally every iron shot I hit was fat. It didn't take me long to decide to change my method of ball striking. In previous practice, when coming under the ball, I hit my PW consistently 70 yards. Once I became proficient at hitting down on the ball my PW distance jumped to a consistent 120 yards. My accuracy with that club increased tremendously as well,

and this was due to the extra ball spin I was generating. I played that same bent grass golf course a few months later and shot an 89. What you have to understand is that regardless of whether the ball is sitting up on grass or resting on hardpan, the shot you make by hitting down on the ball will produce the same result. The only way to gain consistency through ball striking is to hit the ball first and then the ground taking a small divot or leaving a small scar.

**The late hit.** The late hit simply refers to making ball contact prior to the full release of the wrists. What does this do? It adds power to your shot that translates into increased distance and more solid ball contact. This extra power is a function of wrist tension. I don't mean to say a tightening of the muscles, but rather the building up of power in that hinge just before release. Power builds in the wrist hinge due to the tendons being stretched by the rearward force exerted on the golf club during the downswing. This build-up of power or tension explodes when the wrists naturally release at the bottom of the downswing. Perhaps you have heard the term "casting". What this refers to is the releasing of the wrists at the beginning of the downswing; it looks like the golfer is casting a fishing rod. Once the wrists release, the power of that hinge is gone, the swing fault of casting causing vastly reduced distance. This is the reason you want to develop a late hit or late release. It is really nothing that you have to think about. Generally it will occur naturally as long as you consistently hit down on the ball. This ensures that ball contact is made before you reach the bottom of your swing where the wrists naturally release.

An often overlooked factor in swing consistency is that the same set-up and swing posture should be used on every shot regardless if it is a tee shot, fairway shot, pitch shot, or chip shot. This means that for a chip shot three feet off the green you should use exactly the same set-up, swing posture, and so forth as you would for a full shot from the fairway. The only difference is that you would not bring the club back as far or hit with the same amount of power. Personally, when I chip I only take the club back four or five inches depending on how hard I wish to hit the ball. The same is true for pitch shots where you normally see the golfer choking down on the club and bending way

over. You never want to choke down on any club or for any shot, but rather, take your normal set-up and address position and only bring the club back half-way or so. The reason is simple - consistency. Any time you introduce a new swing or set-up into your game you will lose the consistency/simplicity that is necessary for low scoring.

There is a secondary reason for never choking down on a golf club. Human eyesight has evolved over millions of years to judge distance and direction with the eyes in a horizontal plane toward a point of reference (in golf this would be your target). This is the way you look at your target in every sport or game known to man; i.e.: darts, bowling, archery, baseball, billiards, etc. In a round of golf, once you bend over after choking down on a golf club your eyes are in a vertical plane towards your target which greatly reduces your depth perception and accuracy in a golf shot. Prove it to yourself with this experiment: place a bucket ten feet away from you and toss tennis balls into it under-hand while facing the bucket with your eyes in the horizontal plane. Now try the same experiment facing sideways and bending over until you are facing the bucket with your eyes in the vertical plane. The difference in results is quite amazing.

Consistency also applies to club selection for your pitch and chip shots. Practically all golf instruction promulgates the use of different clubs for different length chip shots. For example: #4 or #5 iron for chips from the fringe or just beyond the fringe, #6 or #7 iron for chips two to four feet beyond the fringe, and #8, #9, or PW for chips five to fifteen feet beyond the fringe. The idea being to land the ball on the green as close to the fringe as possible and then letting the ball roll the rest of the way to the cup. This type of instruction and approach to chip shots is, in my opinion, disastrous from a consistency standpoint. First of all, becoming proficient at all of these shots using the numerous irons of varying lofts that are suggested would take a lifetime of practice. Secondly, the idea that you want to have the ball land on the green near the fringe and let it roll ten or twenty feet to the cup adds the complexity of a putt to an already intricate shot. Typical golf instruction follows the same logic for pitch shots suggesting the use of differing clubs and swings for varying distances. Again, the logic is disastrous from a consistency standpoint.



Personally, whenever I am within 90 yards to 20 yards of the green the only iron I pull out of the bag is my Lob Wedge. I used to practice with this club on a high school football field near my home in the evenings by hitting varying length shots to targets I set up on the field. It is quite amazing how quickly you can develop a feel for distance with just a little practice. Anyway, today I can drop the ball on a dime (albeit a large dime), with this club anywhere from 90 yards in. I would never have been able to develop this kind of consistency by using numerous clubs of varying lofts for my pitch shots. The same is true in my chipping game as I only use my #9 iron for all chip shots. The reason is simple - I know how far the ball will fly, its trajectory, and the distance it will roll when it hits regardless of my distance from the fringe. Again, I would never have developed any feel for this type of shot if I were constantly switching between clubs. As far as the idea of having the ball begin rolling on the green as soon as it clears the fringe, I disagree wholeheartedly. To my knowledge there is no break or undulations in the air so I want the ball to fly as far as possible towards the hole and then have minimal roll when it lands on the green. This is the reason I use my #9 iron for all chip shots - high trajectory and minimal roll.

## X

### A Few Random Thoughts

**Opposing Muscle Concept.** A crucial point to be observed in the development of a fluid and powerful golf swing is the concept of letting the arms just go along for the ride. What this means is that you want your arms to be relaxed and free of any tension throughout the entire swing motion – they should simply transfer the power generated by the rotation of your torso. The problem that most golfers have in trying to generate extra distance is that they unconsciously flex their upper arms and forearms at address which carries through their entire swing and actually reduces their swing speed as well as lessening their control. Admittedly, this flexing action feels very powerful but in reality it destroys the transfer of your true power which is generated by the rotation of your torso around your hips.

The culprit is what I refer to as the *opposing muscle* concept. In other words, the bicep and forearm muscles of your right arm are flexing in direct opposition to the bicep and forearm muscles of your left arm. In addition, the more one arm flexes the more the other arm flexes in response. This flexed muscle opposition has the effect of freezing your arms in place which does not allow for a free and fluid swing movement let alone the ability to act as a conduit of power from your torso to the golf club.

Try the following simple experiment to see exactly what I am talking about. Hold a book between your hands as if you were holding a golf club at address. You will notice that your elbows point out to the sides. Bring the book straight up in front of you and you will feel the tension in your upper arms and forearms as your hands push together in order to keep the book from falling. You will also notice the tension created in your chest as your arms are pushing towards each other. Now swing the book to each side and you will definitely notice the restricted and uncoordinated feeling that the movement generates. This is what is happening in your golf swing although you are not consciously aware of it because you have not concentrated on it before. You will also note that the tension in your arms continues to

increase because as the flexing of the muscles of one arm increases the muscles of the other arm respond in kind. It is important to understand that they flex in direct opposition to each other.

The solution to this power and control robbing problem is very simple. The key is to eliminate the direct opposition of your arms from your address position and swing. Take your normal address position holding a driver and note that your elbows tend to point out to the sides although not as prominently as they did when you were holding the book in the earlier experiment. Obviously, the more your elbows are pointing outwards the more the inside of your arms are facing each other which is the root of muscle opposition. Still holding the club, rotate both arms so that your elbows are pointing in more of a downward position. You will feel your upper arms pressing against and even constricting your chest on either side with the inside of your elbows facing upwards. You will also notice the lack of tension in your arms which is the result of the muscles of your arms not being able to flex against each other. This position drastically reduces the amount of muscle opposition and enhances the ability to make a fluid swing and power transfer.

Before we go any further let me make it clear that it is impossible to hold onto a golf club in a position where the insides of your elbows are pointing perfectly straight up and the outside of your elbows pointing perfectly straight down. However, to the extent that you can come close to this position the better.

This is something that you will have to practice at the range because your new fluid and powerful swing will definitely require you to develop a new feel and timing. Initially you will feel that this swing is not as powerful which is to be expected since you are not feeling the flexing action of the muscles in your arms. But believe me, your swing speed will immediately jump up five to ten mph and then increase beyond this as your non-opposing swing becomes more ingrained. And remember - just let your arms go along for the ride.

**Chipping.** Most golf instructional books suggest using different irons for chipping depending on the length of the chip and so forth. I could not disagree more. By the same token I would never consider using different putters for different length putts, and I do not know of anyone who would advocate doing so. Yet when it comes to chipping around the green it seems that logic goes out the window. The main problem with using different irons for different chip shots is the fact that it would be impossible to develop any degree of consistency. The golfer who uses a single iron for all chip shots knows exactly how hard to hit the shot, how far the ball will travel in the air, and how far the ball will roll when it hits the green. By using the same iron for all chip shots your consistency, feel, and confidence will develop very quickly.

**Pitching.** I am always amazed by the golfer who chokes down on a club when making a pitch shot of 30 or 40 yards. The question I always ask myself is: why? First of all, by choking down on the club you are placing yourself in the same bent over posture as that described previously which hampers your eye coordination. Secondly, by choking down on the club your hands are holding onto the thinnest portion of the grip, which results in a lack of control. And thirdly, the consistency you are trying to develop by using the same address/swing posture with all of your **1 Iron** single length golf clubs and for all of your shots is being undermined.

Playing the pitch shot is actually very simple. It should be addressed just like any other shot on the golf course, the only difference being that you make less than a full swing. By using this approach you will develop an amazing feel for this kind of shot very quickly.

**Improving your Swing.** When the winter winds begin to blow and frost is on the pumpkin it is time to store your golf clubs in moth balls and patiently wait for spring - right? Wrong. This is the best time to improve your swing.

It sounds contrary that you can improve your swing during the winter months when you cannot go outside to the driving range or golf course; however, nothing could be further from the truth. If you have enough clearance in your garage or basement to swing a golf club then you have a golden opportunity to greatly improve your swing, including your distance and accuracy, prior to the beginning of next year's golf season. The fact is that it is far easier to develop a fluid and powerful swing in your garage then it is at a driving range.

*Let me explain:*

During the summer months when you are at the driving range or golf course working on your swing you have one single stumbling block to improvement - the golf ball. I know that sounds strange but it is absolutely true. Staring down at a golf ball produces a strong reaction in the brain of every golfer - it demands performance. As opposed to actually working on your swing (concentrating on your desired swing plane, your release, balance, etc.) your mind is engaged solely in hitting the ball to the exclusion of everything else. Consequently, any swing improvement takes much longer with much of the improvement coming by pure chance. For instance, if you are working on taking the club behind you instead of out to the side during your take-away (an extreme swing improvement technique) and you hit a few bad shots due to the fact that this movement is foreign to you, you will quickly revert back to your previous inefficient swing movement and dismiss any thoughts about changing it. The reason is simply because the presence of the golf ball demands immediate performance.

A much more efficient and powerful method of improving your swing is to eliminate this immediate performance criteria altogether which allows you to modify your swing without any initial negative feedback. Getting rid of the golf ball lets you concentrate on individual elements of your swing and really feel the movement which allows you to fully ingrain the elements of an improved swing in a fraction of the time.

In my garage I have a 4 foot x 4 foot piece of short pile carpet (industrial) with a 4 foot x 4 foot piece of 1/2 inch foam rubber underneath. On the carpet I painted a small circle the size of a golf ball in glossy white where I would normally position my golf ball.

Whenever I want to tune up my swing or correct any swing faults that may be present I simply pretend to be hitting shots off of the carpet ticking the white spot with the sole of my club-head through impact. What is very noticeable when you do this is that you can fully concentrate on your swing mechanics instead of concentrating on and having the pressure of producing a good shot. It is also interesting to note that you can actually feel the difference between a good swing and not-so-good swing allowing you to immediately identify and correct any swing faults that may be present. At the end of your practice session you simply roll up the carpet along with the foam pad and stick it in the corner. I personally practice my swing in this manner four or five times a week year-round and, believe me, it becomes scary how deeply you can ingrain a good swing.

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## XI OBTAINING A SET OF *1 Iron Golf* CLUBS

If you wish to have a set of your own **1 Irons** based on the specifications outlined in previous chapters they can be ordered through our website at: [www.1irongolf.com](http://www.1irongolf.com)

A note on custom fitting:

All human beings share the same skeletal, muscle, tendon, and joint functions. From a mechanical standpoint we are all the same regardless of height, weight, or sex. Non-mechanical differences arise in custom fitting. For instance, the height of a bicycle seat needs to be greater for a tall person than a short person. However, the mechanics of the bicycle remain constant for everyone. For this reason there is only one true “fitting” variable in custom golf club building and that is the wrist-to-floor measurement of the golfer. Based upon this measurement we adjust the golf shaft length to the ideal lie angle that we use to ensure that the mechanics of the ***One Iron Golf System*** are realized by each individual golfer.

### Golf Clubheads

There are a few design features you should always look for in golf clubheads:

1. Low center of gravity - helps to get the ball airborne and produces a greater transfer of swing force to the golf ball at impact.
2. High moment of inertia - aids in squaring the club face at impact.
3. Bounce - deters “fat” shots.

**1 Iron** clubheads have possibly the lowest effective center of gravity in golf. In addition they have an extremely high moment of inertia. There is a 3° bounce angle incorporated in all of the irons with the exception of the sand wedge which has a 6° bounce angle.

## Shafts

The design of our golf shafts in combination with our proprietary *Shaft Optimization Process* produces a perfectly balanced golf club (all other brands use stock shafts with no balance criteria whatsoever). Once this perfect balance is achieved the concept of shaft flex disappears and the golf club will perform at its peak performance level regardless of swing speed or strength. You can liken it to a precisely balanced bull whip where there is a perfect transfer of power along its length from the butt to the tip regardless of the strength of the person using it. Our golf clubs are played by professional golfers with extremely high swing speeds and played by women golfers and seniors with very low swing speeds. The results of our studies and testing over the past thirteen years have shown that our shafting method produces the highest level of performance for any golfer. Also, we are the only golf club manufacturer to perform shaft flex plane orientation as part of our proprietary *Shaft Optimization Process*. If a golf club is shafted without regard to its inherent flex plane the shaft will try and rotate around its axis to a position of stability during the swing which creates an oscillation of the shaft and club-head.

## Grips

Our tests have shown that more control and power is achieved through the use of oversize grips. The size of these grips promote a much stronger bond between the golfer's hands and the golf club resulting in more control, improved accuracy, and a greater transfer of swing force. We use oversize grips on all of our **1 Irons**.



## XII

### Frequently Asked Questions

**Q: Why are golf clubs made with different lengths?**

**A:** I have been asked many times over the past fifteen years how I came up with the concept of single-length golf clubs. The fact is that I did not come up with the concept at all since at one time it was the standard in the golf industry. I first became acquainted with the idea through an elderly gentleman whose father was in charge of MacGregor Golf Company's design team back in the 1920s and 1930s.

He explained to me that all sets of golf clubs were custom built to the same club lengths (irons all the same length and fairway type woods all the same length) prior to the introduction of steel shafts (invented in 1910 and legalized in 1926). Prior to that time hickory shafts were the norm and golf clubs were custom fitted/built to a single-length within a set based upon the static measurements of the individual golfer (wrist-to-floor measurement). The production and tuning of hickory shafts as well as the rest of the club making process was very time consuming and demanded the skills of highly experienced club makers. Obviously, this was an expensive process and could only be afforded by the wealthy which is why golf originally got the reputation as being a sport for the very rich and affluent members of society. The advent of the steel shaft changed all of this since sets of golf clubs could now be mass produced very cheaply in factories using unskilled workers. Large sporting goods manufacturers (including MacGregor), lured by the huge untapped market for inexpensive sets of golf clubs, jumped in to bring golf to the masses. The only stumbling block was that they could not mass produce these sets while providing single-length custom fitting for each individual customer.

The solution came when it was decided to abandon custom fitting entirely and instead incorporate a 1/2 inch incremental club length and lie angle progression between successive irons and woods. That way, regardless of the size of the customer, there would be one or two clubs

within a set that would come close to fitting them (a boon to mass production but a serious detriment to the unsuspecting golfer). In other words, the incremental lengths and lie angles in a set of conventional golf clubs today are the result of a profit motivated mass production decision made in the 1920s and not based upon any golfing performance criteria whatsoever. This is how the golf club industry has operated ever since. The fact is that the big-name brands rely on mass production and cannot possibly custom fit a set of clubs for every single customer. It should be noted that hickory shafted golf clubs were also mass produced to a much lesser degree and is why you may find some of these antique sets with varying club lengths.

You can study any book or other treatise on golf club design and find the reasoning for loft/lie angles, bounce angles, bulge/roll, and all other golf club design specifications, but you will never find a reason given for varying club lengths. Why? Because there is no valid reason based upon solid golfing criteria. It is simply a mass production remedy.

**Q: Can't I just cut my existing golf clubs to the *One Iron Golf System* recommended length or just grip down on the clubs instead of buying a new set?**

**A:** It is not possible to build or convert a set of golf clubs for single-length play using conventional club-heads. There is very little in common between our club-heads and conventional club-heads. Our club-heads are of equal weight (whereas conventional club-heads are progressively weighted in 7 gram increments from the #3 iron through the wedges) and ours have the exact same amount of offset (3.175mm) and bounce angle (3° bounce angle on every iron with the exception of the SW which has a bounce angle of 6°). As you are aware, bounce angles and offsets vary widely from club to club throughout a set of conventional irons which is disastrous when building a single-length set. Since you are dealing with a set of single-length irons it is imperative that you have a consistent loft angle progression between successive clubs (ours is 4° whereas conventional loft angles vary in progression throughout the set). Also, since you cannot adjust the lie/loft angles of conventional irons without creating stress fractures in the hosel, and certainly cannot

bend them over 2° without snapping the hosel, it becomes impossible to modify a set of conventional iron club-heads for single-length play.

**Q: You build your golf clubs using the wrist-to-floor measurement to determine the correct club length. How does this work?**

**A:** It is based upon trigonometry. At the point of ball impact in the downswing the golfer's wrist, ground, and clubhead form a right triangle. Assuming an ideal swing posture, there is a mathematical relationship between the golfer's wrist-to-floor measurement while standing and wrist-to-ground measurement at ball impact. We know the optimum lie angle for the irons and fairway woods as well as the length of one side of the right triangle based upon the mathematically factored wrist-to-ground distance at impact. This gives us the measurement of two angles and the length of one side. Therefore, we use trigonometry to solve for the hypotenuse (club length), for the individual. This is somewhat oversimplified as we factor in shaft deflection and numerous other factors. The fitting formula that we developed produces the correct golf club length for anyone regardless of height, arm length, etc.

**Q: You say that an oversize grip enhances the golfer's accuracy and power. Explain.**

**A:** Fly rod fishing is a sport dependent on extreme accuracy and the loading of power in the fly rod shaft. Fly rods are not built with the small diameter type of grip found on a golf club, but rather, with a grip that provides the optimum surface contact between the fisherman's hand and the fly rod to promote tremendous control and the transfer of force to the fly rod. The standard grips used in golf create a very weak link in the chain of power transfer as well as a distinct loss of control. In fact, there is no other sport that utilizes such a small grip when connecting the hands to the involved equipment for this very reason.

**Q: Since your irons are the same length, what are the distance gaps between the individual irons?**

**A:** They are the same as you would experience with any set of golf clubs based upon the individual golfer. Bear in mind that in a standard set of irons there is a 1/2" incremental length difference

between each successive club. This 1/2” has absolutely no affect on distance. The only factor that affects distance between irons is the loft angle of the clubface.

**Q: I play Natural Golf. They claim that the lie angle must be more upright and the length of the club longer. Also, they use a non-tapered grip. How does this relate to the *One Iron Golf System* concept?**

**A: 1 Irons** are not method specific and are played and recommended by conventional PGA instructors as well as single-axis, PPGS, Stack and Tilt, and other swing method instructors and advocates. Regardless of the swing method used the ideal position of the body, wrists, and arms are identical at the point of ball impact. Simply put, it is not important how you get to the ideal impact position as long as you end up in the ideal impact position. To give a perfect example, Jim Furyk has the most unorthodox swing in golf yet at impact he is in the exact same position as Tiger Woods, Fred Couples, etc., and is the reason for his success.

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