

The Fundamentals of Putting

Episode 3 – Putter Path and Impact Spot

The consequence of hitting the ball outside of the sweet spot of the putter is poor ball contact with corresponding direction and distance errors. The sweet spot is the point on the putter face where the center of putter the maximum of the head mass is directly behind, and is often indicated by a line on the top of the putter head. To exactly hit the ball at this spot a regular and repeatable swing path is necessary. The consequences of hitting the ball outside of the sweet spot also depends on the specific putter design. The higher the weight of the putter head and the more weight is distributed at the heel and the toe of the putter head, the higher is the moment of inertia (MOI) of the putter, which prevents rotational skewing of the putter as a consequence of mis-hits.

[Click here to see a YouTube video about the Effect of an off-center hit to the putter head](#)

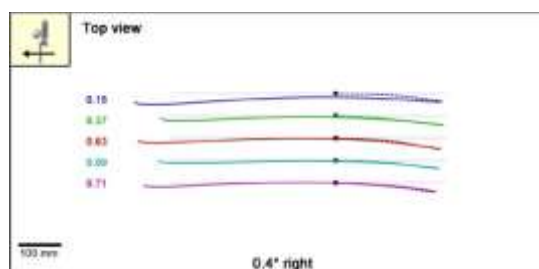
Basics

Path geometry

If the putter is moved inside of a tilted swing plane then the path as seen relative to the target line is an ellipse. Relative to the target line the putter will naturally move slightly inside in the backswing, then match the target line through impact and will again move inside in the forward swing. The more the swing plane is tilted, the more this ellipse will be curved inside. If the swing plane would be theoretically vertical, then the complete path would match the straight target line.

The proper length of the backswing is very important. Using a constant swing timing (as Tour players do) the length of the backswing is directly determining the length of the putt. Consequently, consistent length of backswing means consistent distance control. Very often amateurs neglect the end of the forward swing. Consistent length of forward swing is also important for a solid stroke as it helps to reduce the importance of impact and stabilizes impact position.

The following graph shows the putter path of a PGA Tour player in a top view. The black dot represents the start (& impact) position. The dotted line represents backswing. The solid line represents forward swing. The different putts are indicated by different colors, beginning with the first putt at the top.



Putter path of a PGA
Tour player in a top view

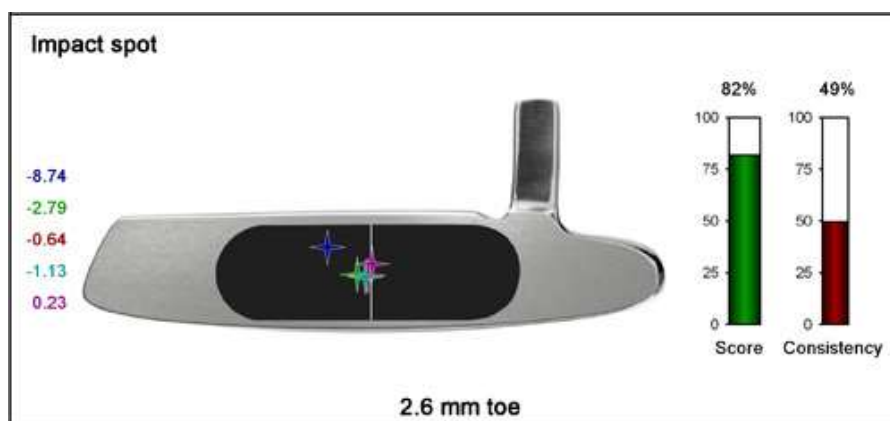
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The length of the backswing of an average PGA Tour player matches 35% of the complete length of the forward swing. Not even one Tour player hits the ball in the center of his stroke. Why is that? Hitting the ball early in the stroke allows to naturally accelerate through impact, because maximum speed which is located in the middle of the stroke then lies after impact. We will explain this in more depth in chapter 6 of the SAM Putting Fundamentals.

Impact spot

The setup position and the characteristics of the putter path will determine where you hit the ball on the putter face. With stable balance and a regular swing path it is likely that the putter will hit the ball exactly where it has been aimed. Very often an inconsistent hit spot is directly related to poor balance and an irregular backswing. The horizontal sweet spot of the putter is often indicated by a marker on top of the putter. However the vertical sweet spot is not easy to be determined. Because the sweet-spot is associated with the center of mass of the putter head, also the hosel and the lower part of the shaft have to be taken into account. This effect pulls the sweet spot up on the putter face, although often more mass is already concentrated in the sole of the putter. For a normal putter design the vertical sweet spot can be still slightly above the geometrical center of the putter face.



Corresponding
hit spots of the
PGA Tour player.

This graph shows the corresponding impact spots of the PGA Tour player from above. The different impact spots are indicated by crosses in different colors. For the blue off-center hit you can see in the putter path graph, which the swing path in the forward swing was coming through impact slightly inside.

Frequent errors and consequences

Poor Balance

Often an inconstant impact spot is consequence of a corresponding inconsistent swing behavior. If the balance is too far at the heels or you are standing too far away from the ball, then the ball will be more hit at the toe of the putter. If the balance is too far towards the toes or you are standing too

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close to the ball, then the ball will often be hit at the heel of the putter. The balance can be checked if the putter is only slightly lifted and set back to the ground at setup position. If the putter is not exactly at the same position then the setup is presumably not well balanced.

Steered swing path and loops

Many players try to steer the putter through impact to hit the ball at the proper impact spot. Steering the putter is not a good strategy for many reasons because of a number of uncontrollable side effects that occur, such as a loss of proper swing tempo by slowing down the stroke. In contrast, to improve the impact spot the player should focus on improving his balance and swing path characteristics.

Long backswing

Problems with impact spot might also arise from a backswing which is too long. For a too long backswing it is difficult to smoothly swing the putter with a natural movement. Very often the putter is then decelerated to impact and additionally the hands are activated, which again results in steering and looping. In particular on short putts the backswing should be kept short with only 35% of complete swing length.

How to improve putter path and impact spot

Stable setup

To improve balance, set up must always be checked first. The stance should not be too narrow and roughly match shoulder width. In particular the correct length of the putter is important for a proper and stable stroke. The hands should hang in a balanced position under the shoulders, and the eyes should be over the ball. For more detail on a proper setup please check chapter 1 of the SAM Putting Fundamentals.

The trunk and the head should not be moving during the putt. If the putter is too long, we often see compensational movements during the stroke. To check for head movements a second person is standing in front of the player and touches his forehead with the fingertip. During the putt it can now be easily inspected if the head is moved left/right, or if the balance is falling to the back or the front. The efficiency of potential fixes can be tested accordingly.



Proper setup with eyes over the ball.

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Sweet spot gate

Because of the limited speed of the eye movements it is impossible to clearly identify the impact spot with the naked eye. But it is pretty simple to create accurate feedback of the impact spot by using two tees. The tees are positioned symmetric left and right of the ball to act as a narrow gate for the putter. The ball is then positioned exactly in front of the sweet spot of the putter. If now a normal putt is hit, the gate provides feedback of the putter position at impact. If the putter touches a tee, then the path deviates to this side at impact. The narrower the tee gate is the more accurate you need to be.



Sweet spot gate

As already mentioned before, the putter should never be steered to correct path problems. In contrast the origin of the problem should be evaluated and corrected by using this feedback. The same feedback can also be created if two rubber bands are positioned left and right of the sweet spot of the putter. Another option is the use of impact tapes which are stuck onto the putter face.

We hope you also enjoyed our third episode of 'The Fundamentals of Putting' and could give you some ideas on how to improve your training.

New episodes will follow soon. Follow our Facebook page  and Twitter  to stay up to date...

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