

The science behind the

PERFECT
STROKE

Dr Paul Hurrion is on a quest to discover the optimum putt and roll. Duncan Lennard went along to see if his findings could make putting easier for us all.

I'll tell you why putts go in," said 1959 US PGA champion Bob Rosburg. "Because the old National Open Champion in the sky puts 'em in."

Dr Paul Hurrion would beg to differ. Since 1997 – when he found time between getting down to scratch to complete a PhD in sports biomechanics – the 42-year-old has dedicated his life to proving there is a bit more to holing a putt than divine intervention. His application of science to a subject matter often associated with luck and superstition has led to golf's most sophisticated putting analysis software, Quintic Ball Roll Technology, and a better understanding of what makes a putt run true. It has seen him lecture the game's foremost minds on what actually happens when putter meets ball. Hurrion's work and approach has also helped some of the biggest names on the planet, including Rory McIlroy, Henrik Stenson and Padraig Harrington.

"My underlying philosophy is that I want to give the players I work with – pro or amateur – the ability to become their own coach," Hurrion explains. "With putting, that's not straightforward. If you slice a drive it is relatively easy to pinpoint why; but if a putt misses right it could be through anything from strike point,

sidespin, misperception of line to a misread or a spike mark. If we can grow the player's awareness of why it misses, they can start to become their own coach."

This principle is at the core of the Sutton Coldfield putting studio Hurrion has created. At its centre is a dead flat putting mat, designed to eliminate as many variables as possible. It is also very quick, stimping at around 16, "to tighten

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the margin for error," says Hurrion. As the player strikes the putt, Hurrion's Quintic software captures the action at 360 frames per second. The putter face is monitored just before and after impact, with the ball's roll tracked for 16 inches after the collision. Six other cameras, positioned around the room, film the golfer, ready to expose any sinister sway or pernicious pecking. Force plates are available to check stability.

"In this environment we can get to the

heart of why a player misses a putt," Hurrion continues. "The parameters captured by the system tell us exactly what went wrong. With time and application, we get the player to the point where their awareness of which parameter caused the putt to miss grows. One putt may miss left because of a slight heel strike, the next from the creation of a little hookspin. Eventually the player will be able to sense the differences between the two... and know what they need to work on."

Hurrion agrees Quintic Ball Roll Technology is basically a launch monitor for putts. "I think what Quintic has done is given us a very good understanding of the optimal launch characteristics of the putted golf ball, and what it needs to do to achieve true roll as soon as possible," he argues. "We know a degree of face loft at impact, giving a 1.5-degree launch angle into the ball, is about ideal, giving true roll within about 10 per cent of the ball's journey. We know the face contributes 92 per cent of the ball's starting line, and a face angle one-degree off square at impact is enough to miss from eight feet."

Of course, in the real world putts are holed under pressure and on top of grass; in some respects, the sterile feel of the studio appears to bear little relation to the reality of putting. It's a point Hurrion



HURRION TIP

"Focus on face aim first, path second. Face aim contributes 92% of the ball's starting direction. Check with a DIY laser."



HURRION TIP

"Line up balls at five, 10, 15 and 20ft from the hole. The line will appear straight if your head is in the correct position."



LEDs help the high-speed cameras capture the putting stroke.

THE SYSTEM

What can Quintic measure?

- Quintic ball roll software can chart the movement of the putter and the ball separately, and the interaction between the two.
- For the putter, it measures clubhead speed, face angle, its rate of rotation, path, acceleration and attack angle.
- For the ball, spin, speed and time to true roll are all measured.
- A broader version, using six more cameras, can also monitor body motion during the stroke.
- It's a technical system that produces lots of data, but Hurrión is an expert at quickly and accurately interpreting the numbers to identify your faults and suggest simple improvements.



Stability is crucial for putting, says Hurrión.

both accepts and refutes.

"Of course golfers need to be mentally tough. But in my opinion, confidence in your technique is going to put you in your best mental state, and give you your best possible chance to execute. I think any psychologist would agree with that. Look at the England cricket team; they worked for years on being mentally tough, but if you're playing across the line when Brett Lee is hurling it down at 90mph, what chance do you have?"

"After all, if you can only hole four out of 10 eight-footers in these perfect conditions, how would you expect to hole that putt when it matters?"

The physicality of putting

Hurrión's background in biomechanics ensures his focus is as much on the golfer as the putter and ball. "I like the putting stroke to be as natural as can be, with no manipulation," he asserts. "Probably 95 per cent of that is down to the quality of your set-up. Get that right and you can promote instinct and flow. Addressing the ball well means no need for manipulation during the stroke, which permits consistent quality."

For Hurrión, this starts with stability, and this is why he uses underfoot force plates to scrutinise the golfer's balance during the stroke. "We have some footage of Crenshaw, shot from overhead, and he just didn't move. Tiger, in his pomp and even now, looks physically impressive, so robust; good luck trying to push him over as he addresses a putt. If you start moving

around, up-and-down, back-forward or left-to-right, it's so much harder to return the club to a consistently correct impact position."

Hurrión uses balance training aids like force plates and ProStance, but insists this is something any golfer can work on, any time. "You need strength to stay still," he argues. "Walking in bare feet – getting all those foot muscles working – is a good start. So are daft exercises like standing on one leg, eyes closed, for 20 seconds.

"Why not stand on one leg for a couple of minutes while you brush your teeth? Sounds silly, but these things help."

There are hallmarks of Hurrión's favoured address – seen in alumni like Stenson and Harrington. A wide stance gives a stable base; the putter shaft and forearms form a line. Hands fall below the pivot point, basically the rib cage. But there are a couple of areas where he feels flexibility is acceptable, or even desirable.

"I still believe in these rules, but over the years I've become a little less dogmatic about applying them," Hurrión accepts. "Take face loft at impact. We know one degree provides the ideal ball roll. Phil Mickelson, Pádraig Harrington and Zach Johnson all achieve that, but Phil does it with a forward-leaning shaft, Pádraig with a neutral shaft and Zach with a backward-leaning shaft – he has – 1 degree of loft on his putter. So long as their set-ups let them achieve consistency, I can accept it.

"Then there is probably the worst piece of putting advice – 'eyes over the ball'. Golfers see a straight line from different

HURRION ON...

Golf's best putting stroke

"David Howell's. For his consistency of set-up, his stability, and his ability to aim the face. We were able to work on his stroke for three months straight in 2005 after he popped a rib swinging Vijay's weighted practice club."

And its worst

"Well actually I wouldn't say worst, but Steven O'Hara has struggled to keep his card despite regularly being near the top of the greens-in-regulation stats. We did some work, and he never did the same thing twice. I think that's a lesson for young golfers."

The anchoring ban

"The ruling bodies haven't gone far enough. I believe they should have passed a very simple rule - to make the putter the shortest club in the bag. Matt Kuchar's stroke is still a mechanical advantage."

Curing the yips

"It is possible. Yips happen when the brain's perception doesn't match reality; it does X and gets Y, then it thinks it does X again and gets Z. If you can tie in what the brain sees to what actually happens, twitching won't happen. You may have to change your technique, but it is possible."

Counterbalancing

"I think you have to be careful when you put weight above the hands. It can encourage the club to work like a see-saw. That increases clubhead speed, which is the last thing I want you increasing."

Michelle Wie's stroke

"It's interesting. But as long as she has a clear line in her head as to where the ball needs to start, why not? She is very stable; and it has given her probably her best year."



Putting a laser on your putter will tell you exactly where your face is aiming.

head positions. Justin Leonard, for example, sees straight from inside the ball-hole line. Rory sees it from outside. Nicklaus was dead on top. Everyone is different, and this perception of square should govern your head position."

Today, Hurrion is considered one of the game's true putting experts. He gives regular putting clinics for the PGA and is a member of the Titleist Performance Institute's Advisory Panel. That a host of tour stars have sought his opinion has also lent his approach much credibility - none moreso than the first big name he worked with - Padraig Harrington.

"I began working with Paul in 2002," the triple major champion recalls. "I was already a good putter but I wanted to know more about what I was doing to make myself more robust. I realised straight away he was scientific, thorough and methodical in everything he did, and that's what attracted me to him."

"Originally, I'd create different feels in my stroke and he would calibrate them, telling me which worked and which didn't. From there, we have basically kept identifying and refining what works for me. I like the fact he is flexible; he doesn't preach a method, so much as focus on what makes a player line up the best and get their best roll. My own stroke is unorthodox - I hang back a bit because I see the line better that way, and use a relatively delofted putter. But when Paul's science says the function is good, it's easy to believe in it."

Harrington has just returned to the

winner's circle for the first time in four years after triumph at the Indonesian Open - a victory he believes is testimony to this approach. "I've actually struggled with my putting this year. But during the Dutch Open I went to see Paul and all my measurements were very good. It showed me my problems were not technical. The only place it could be going wrong was my mental processes. So I rededicated myself to those, and it's paid dividends."

But despite such heavyweight support - and the reams of data he has collated over the years - Hurrion is ready to admit that putting still has mystery areas. He has just completed a study using a camera that shoots a scarcely credible 50,000 frames a second. But when asked what he's learned from it, he looks a bit sheepish.

"Well, it's shown us the ball is on the putterface for just a quarter of a thousandth of a second," he reveals. "But it showed me something I can't get my head around."

"We know that when you strike a putt from the toe of the putter, the face angle briefly opens and sends the ball right. But this high-speed camera clearly shows that after the ball has left the putter - rolling to the right - there is a period where the blade is still square. The blade doesn't deflect open until after the ball has left the face. So why is the ball rolling right?"

"For now, that one has us stumped." **EW**

■ For more information on Dr Paul Hurrion and Quintic Ball Roll Technology, or to contact him, visit www.paulhurrion.com

