Jim Suttie *(left)* and Christian Marquardt play off each other well to help golfers make putts.

The putting men

How this unlikely pair, teacher and neuroscientist, is doing the math on golf's mysterious art / by Max Adler

This article is part of a series on technology in golf covering people and innovations that are changing the game.

The ball got rolling when a German pharmaceutical company contacted the University of Munich about devising a study to find out if the drug ginkgo biloba, extracted from the leaves of the ginkgo tree native to eastern China, could calm the human brain. Because many consider "the yips" an affliction of an overly active mind interfering with what the body already knows how to do, that's where professor Christian Marquardt and colleagues focused the study.

At that point, the neuroscientist had never played golf, so he can't be accused of doing what Golf Digest editors do: trump up reasons to go to the course under the guise of work.

Sadly, for the drug company and yipping golfers alike, ginkgo biloba was not shown to have any significant effects. However, the test provided the impetus for Marquardt to build one of the most advanced motion analyzers ever used in sport. He took pieces of high-tech hardware previously used only in medical environs, namely ultrasonic sensors for monitoring motor behavior, and clipped them to a lightweight bar along the puttershaft.

As a golfer makes a stroke, the sensors record the exact position of the putter every 15 milliseconds and wirelessly transmit the data to a laptop-like device, which can be placed on the practice green at the golfer's feet. Instantly available is everything there is to know about the putting stroke: aim, face angle, putter path, impact spot, face rotation, loft at impact, rise angle and timing. The system's accuracy margin is .1 millimeter. There's even a feature where a buzzer sounds if the putter violates parameters the golfer sets.

Thanks to the ginkgo test, and some experimenting and refining, Marquardt took his invention and founded Science & Motion to sell the

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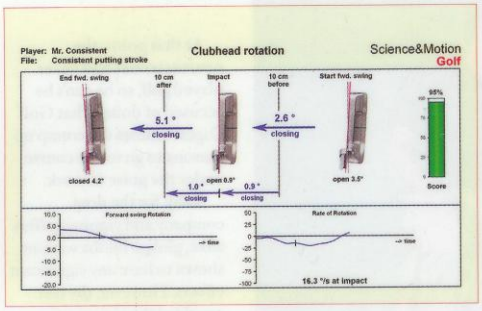

You can't get away with much using the SAM PuttLab, which takes readings every 15 milliseconds.

SAM PuttLab to teaching academies, fitting centers and even individual golfers. Padraig Harrington was one of the first to buy one, in 2004. Steve Elkington, Henrik Stenson and Tiger's teacher, Hank Haney, have also bought the system, which sells for about $5,900.

Says Elkington, "I love it because it gives me feedback that the naked eye can't see, like the face angle at impact and whether I hit the sweet spot."

For most golfers, getting tons of information about their putting stroke would be paralyzing. That's why Marquardt teamed up with Chicago-based instructor Jim Suttie, 2000 PGA Teacher of the Year, to develop the device into an effective teaching program. The two met at the 2005 PGA Merchandise Show, and right away Marquardt knew he'd found the perfect partner. Not only is Suttie, 61, a pioneering teacher—he was one of the first to use high-speed video for lessons, in the mid-1970s—he has also written a doctoral thesis in biomechanics. Marquardt, 47, who sounds and looks like a studious Bernhard Langer who devoted his youth to reading Einstein instead of hitting balls, says, "Jim is my favorite because he is the only one who knows what I am talking about."

THE APPLICATION

In putting, consistent aim is more important than perfect aim.

The recent invasion of math into golf instruction is a hot topic, but Suttie is adamant that the SAM PuttLab leaves much room for individual style. "We don't use the machine to teach one stroke. We use it to help people understand and repeat what they naturally do," says Suttie.

In fact, Marquardt and Suttie don't believe the "perfect putting stroke" exists. They've recorded the strokes of 150 PGA Tour players and countless top amateurs and have found a staggering variety in technique. In general, better players tend to make a shorter stroke with less face rotation and hit the ball on the upstroke, but this is by no means absolute. Even the best putters on the planet have geometric idiosyncrasies.

Marquardt and Suttie discovered that Brad Faxon, who from 1996 to 2000 led the tour in putting average three times, aims 2 degrees to the right at address. Loren Roberts, another former tour putting leader, rotates the face open against its path. In all, 55 percent of the pros they studied aimed the putterface outside the hole on the straight 12-footer used in the testing.

"A putting stroke is like a signature," says Marquardt, who has also done extensive research on writer's cramp. "Much like putting, handwriting is 90 percent rhythm. If you try deliberately to write your signature accurately, you can't do it. The mind interferes. We do best when we trust our instincts."

Suttie adds, "Brad [Faxon] has probably been aiming 2 degrees right for 20 or 30 years. Fundamentals are important to a degree, but after that it's all about consistency."

Now that Marquardt is making himself known in golf, speaking to tour pros on a first-name basis, he has finally taken up the game, right?

"Well, only a little bit," he laughs. "I've taken a few lessons in Germany, but I don't have a handicap. It is a very hard game."

Yes, it is.

TECH UPDATE / YOUR OWN LAUNCH MONITOR?

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