Part 1

The problem with the golf swing

Solitary struggling with a recalcitrant club is essentially a good thing …. It is likely to become a deleterious process if it involves a reconsideration of all the theories proposed by all the pundits, followed by a trial of them all in turn. … It is this conflict of ideas, the constant wondering if we might not do better some other way, which undermines the confidence and loses half crowns.

—Bernard Darwin, 1911[1]

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Dazed and confused

Bernard Darwin's observation suggests that information overload has existed in golf for more than a century. And in the 100 years since, overload levels have increased inexorably, as we further develop technology to scrutinise the golf swing in evermore forensic detail. Today, the amount of information about 'what moves where' during a golf swing is simply overwhelming. The volume of material disheartens us, its contradictions perplex us, and the jargon frustrates us. The big problem with today's golf swing is—it's too big a *problem*.

Unfortunately, humans don't have learning systems that can cope with large amounts of information. In fact, the human brain works in exactly the opposite way – to learn physical skills, it requires *simplicity*. But now, when we strive to improve our swings, where should we start? Should we swing on one plane or two? Should we stack or tilt? Or double shift? Is the thumbs-up swing better than the hammer or biokinetic swing? How do we supinate

our left wrists? How do we know whether our power accumulators are accumulating? Should we check our L factor, O factor, R factor, S factor, X factor, Triple X factor, Y factor, Z factor, crunch factor, mind factor, or smash factor?

Like a dissected animal, the golf swing's organs – together with innumerable systems for fitting them back together – fill the pages of magazines, books, and websites. And something new appears every week: an unremitting torrent of secrets, breakthroughs, discoveries, 'proven' new theories, and revolutionary methods—even 'magic' solutions. This state of confusion has prompted one swing coach to comment:

> *Today's golf swing is a mechanical jigsaw puzzle, in which one attempts to put together innumerable parts in a preconceived way …. There is always another piece of the puzzle to be found and worked on …. We are trapped in a web of mechanical complexity.*
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> —Peter Lightbown, 2010[2]

Professor Butt's self-operating napkin

Professor Butt raises a soupspoon to his mouth and spills some soup down his chin. Luckily, he has a system for cleaning it up. Tied to the soupspoon is a string that jerks a ladle, throwing a firecracker past a parrot. The parrot jumps, tilting its perch, upsetting a bag of seeds into a bucket. The bucket drops and pulls a cord, lighting a cigar lighter, setting off a skyrocket. This causes a sickle to cut a string, causing a pendulum with a napkin attached to swing back and forth, wiping Professor Butt's chin. The self-operating napkin features in a cartoon by Rube Goldberg, famous

for his complex devices that perform the simplest tasks in highly convoluted ways.

Is this where we are with the golf swing? Have we created a hugely complex swing, when in reality it's much simpler? It seems strange that we add ever-more layers of detail and complexity, believing that we'll somehow make it easier to perform. For example, in a recent TV programme, a well-known coach explained the 'essential fundamentals of a simple golf swing'. The 15-minute session included over 150 references to body parts, positions, angles and movements. Our problem is that while all these positions undoubtedly occur in a golf swing, humans have no capacity to use them for learning. So while the programme *described* the swing, it had no value in helping us *learn* it. During one golf swing, we might round up one or two 'perfect' positions, but the other 148 will usually escape.

We'll see shortly in Chapter 3 that trying to learn the golf swing as a long sequence of positions conflicts directly with the way humans learn physical skills. We learn best when we think as *little* about technique as possible. We've learnt walking, bike riding, shoelace tying, and thousands of other equally complex skills without knowing anything about their detailed mechanics. And not only have we learnt these skills—we've mastered them. We clearly have innate abilities to master highly complex physical skills. So why do we approach the golf swing so differently?

The way forward

Golf swing evolution has reached a point where we need to take stock. Swinging a golf club is difficult, but we make it even harder. We've travelled down a high-tech path (admittedly one

that is fascinating) without knowing where it would lead. But it's led to confusion and we need an injection of clarity and simplicity.

One way forward would be to extract all the high-quality material from books, magazines, and websites, put it together and create a 'best way to swing'. But we can't do this, because we have no way of identifying high-quality material. Any swing theory or method may or may not be better than the rest; we simply don't know. Unfortunately, the golf swing has existed in an evidence vacuum – we've never had sufficient scientific evidence to support or refute anybody's claims or opinions about how to swing a golf club.

But we're at an exciting juncture. In recent years, a large amount of high-quality research has been published, addressing both golf swing mechanics and effective learning strategies. So for the first time, we can establish a scientifically grounded approach to learning and developing an effective swing.

There's light at the end of the golf swing tunnel.

Golf swing science

Science works—that's what it's for. When we want to know the facts about something, we use science to find them. Science works by continually rejecting false ideas and opinions, to take us progressively closer to the truth. So we can be confident that well-conducted, highly scrutinised research gets close to the truth about the golf swing. Scientists start with an opinion – a hypothesis – that they test rigorously, to the stage where they can accept it as fact. Only when the original opinion has been scientifically proven, is it considered fit for purpose. Science is, in effect, the process of selecting explanations that make fewest assumptions,

discarding explanations that lack evidence, and replacing information based on opinion with information based on fact.

We can now do this for the golf swing, but many of us shy away from grappling with science, because we feel it's too complex and we won't understand the concepts or the jargon. And we may be right – for non-scientists, science *is* hard to understand. Also, the golf swing is itself highly complex – a three-dimensional movement, involving virtually every limb and muscle in the body, controlled by a sophisticated brain-body communication system. The laws of physics and the limits of human physiology control its mechanics; the human brain controls execution. Faced with such a complex movement, analysed with complex science, of course we shy away.

But fortunately, we can make it simple – we can translate the science into a language we can all understand. In fact, an important principle of science is that scientists should *always* simplify things. This book does that. The complexities and jargon of the underlying science have already been dealt with, high-quality research findings have been extracted, synthesised, and interpreted, and the results are presented in our language.

The book is based on research findings selected from more than 200 scientific articles, collected from the fields of physics, biomechanics and physiology (how the golf swing works), together with psychology and neuroscience (how to learn it). It may be surprising that such a wide range of sciences are relevant to swinging a golf club, but it demonstrates that the golf swing is more than just a mechanics problem. If we want a better swing, we not only need to understand the mechanics, but also how those mechanics are controlled. We need a *multidisciplinary* approach to understanding and learning an effective golf swing.

This approach is common in other sports. Modern-day, high-performance sport typically involves not only coaches, but also support teams of scientists drawn from many fields, who continually scan the scientific horizon, seeking new information that can push the boundaries of performance in their sports. In doing this, they maximise the performance of elite athletes and optimise the effectiveness of coaching at all levels.

This book adopts the same approach – it's a multidisciplinary analysis of the best way to *improve* a golf swing, combining effective swing mechanics and effective learning strategies. And luckily, the science shows that the simplest approach is best.

TAKEAWAYS

- Golf swing complexity is a major barrier to learning.
- A multidisciplinary, scientific analysis will identify the best way to learn and develop an effective golf swing.
- Knowing *how to learn* a physical skill is at least as important as knowing the *mechanics* of the skill.