SWIM SPEED STROKES
FOR SWIMMERS AND TRIATHLETES

MASTER BUTTERFLY, BACKSTROKE, BREASTSTROKE, AND FREESTYLE FOR YOUR FASTEST SWIMMING

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4-TIME OLYMPIAN AND TRIATHLON WORLD CHAMPION
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HAVE YOU HEARD of the 10,000-hour rule? It’s the rule that says the key to mastering a complex task is to practice it for 10,000 hours. The quick math on this is if you practice 50 weeks of the year, for 20 hours per week, then you will have logged 10,000 hours at the 10-year point. At that point you should—or could—be an expert at whatever you are practicing. The concept was popularized by Malcolm Gladwell in his best-selling book *Outliers*.

In *Outliers* Gladwell cites numerous examples of the rule. He points to the fact that the Beatles performed in Germany more than 1,200 times over the span of five years in the early 1960s, helping to boost their total playing time to over 10,000 hours before they became a worldwide sensation. And Microsoft founder Bill Gates had access to a computer lab at the local high school and spent countless hours as a teenager—at least 10,000—programming on it. Gladwell cites grand master chess players and elite violinists who have also put in the time.

K. Anders Ericsson, the Florida State University psychologist whose research on the topic of expertise is the basis for Gladwell’s book, explains that
skill acquisition is not just about logging the hours, however. Those who master a complex skill—whether it be swinging a golf club, playing the piano, or becoming a surgeon, teacher, or accountant—achieve their mastery through what Ericsson terms deliberate practice. They engage in highly structured activities and practice tasks that are specifically intended to improve performance. In other words, expert performers don’t just show up to practice and go through the motions; they understand their domain and train with great purpose.

Competitive swimming is definitely a complex task. The arms pull back and recover forward; the legs kick; the core moves in momentum with the stroke; and in the midst of it all, the swimmer negotiates clearing the head from the

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### MY 10,000 HOURS

When I read Gladwell’s book, I was curious to calculate how many cumulative hours I spent swimming before making my first Olympic team, and I was surprised to find that I fit snugly into the 10,000-hour rule. I based my calculations on practicing 50 weeks of the year and came up with the following:

<table>
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<tr>
<th>AGE RANGE</th>
<th>HOURS/WEEK</th>
<th>HOURS/YEAR</th>
<th>AGE-RANGE TOTAL</th>
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<tr>
<td>6–10</td>
<td>4</td>
<td>200</td>
<td>1,000</td>
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<td>11–15</td>
<td>10</td>
<td>500</td>
<td>2,500</td>
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<tr>
<td>16–25</td>
<td>15</td>
<td>750</td>
<td>7,500</td>
</tr>
<tr>
<td>26–27.5</td>
<td>20</td>
<td>1,000</td>
<td>1,500</td>
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TOTAL: 12,500

**Age 16:** first junior national cut-off time (after ~4,000 hours of training)

**Age 17:** first senior national cut-off time (~5,000 hours)

**Age 18:** finals, Division 1 NCAA Championships (~5,750 hours)

**Age 21:** U.S. national team selection, for the World University Games (~8,000 hours)

**Age 27:** 1996 Olympic team (~12,000 hours)

I enjoyed every hour of it (well, almost every hour).
water to take a breath. If the thought of swimming for 10,000 hours to master this complex sport has your head spinning, take comfort in the fact that the 10,000-hour rule is a generalization (there are many examples of those who reach expert level in less than 10,000 hours), and it’s not 10,000 hours or nothing. High levels of competency are reached in 3,500–6,000 hours, and we can even become quite good at complex tasks in 1,000–2,000 hours, or less.

The key, and the main qualifier in Ericsson’s research, is that the practice be deliberate and purposeful.

What is deliberate practice in swimming? It first and foremost involves developing proper technique and mechanics. Swimmers are at the mercy of the laws of physics and fluid dynamics as they stream down the pool. The fastest swimmers in the world move in particular ways, and for good reason—the laws of nature demand it. Strength, speed, and endurance work for swimmers only if there is first a foundation of proper technique.

Technique is where most of the mystery resides in swimming. The better part of the sport takes place in what I call “the deep blue”—beneath the swimmer’s body. It is nearly impossible to see what is happening in the deep blue if observing from the pool deck or the spectator seating. And even if a swimmer goes underwater and observes another swimmer from below, the dynamics of the stroke are too much to process all at once. It must be slowed down and digested in pieces if it is to be even partly understood.

I am grateful to James “Doc” Counsilman, who pioneered the art of photographing the underwater elements of the swim stroke more than 60 years ago. His black-and-white pictures showed the strokes of Olympic champions freeze-framed at various phases and unlocked much of the mystery for me. It had a profound impact on my understanding of what to do in the water.

I want to do the same for swimmers today. I want them to see what the best swimmers in the world do underwater. With visuals of top-of-the-line technique seared in the mind, aspiring athletes can train deliberately to adopt the critical mechanics that are present in elite strokes.

I felt strongly, from day one of this project, that the athletes demonstrating the technique for readers should be the Beatles and Bill Gates of the sport: Each
Chapter features at least one world-record holder and/or Olympic medalist and is reinforced with photos of national team members and NCAA standouts. Why is it so important that the best swimmers in the world showcase the strokes? Other than for the obvious reason of being thoroughly inspired by superb human movement, there are many technical reasons why:

- The best swimmers in the world make very few mechanical mistakes. Swimming is a three-dimensional sport with depth components in addition to lateral and fore-aft components, and because of this there is much room for error. While the best in the world are not exempt from making mistakes, they operate on all three dimensions nearly perfectly. So, from a mechanical perspective, you are seeing the best that real-life has to offer.

- The best swimmers in the world are masters at feeling the water. Feeling or “holding” the water in order to gain traction and move the body forward is critical to swimming success, yet can be a difficult concept to grasp and apply. Coaches are even divided as to whether or not a feel for the water can be taught. I wholeheartedly believe it can be and know the impact that great photos can have on turning this concept from abstract to understandable. I took care to ensure the swim strokes in this book were photographed from a variety of unique angles to give readers a glimpse into this mysterious world.

- The best swimmers in the world are simultaneously propulsive and efficient. Every effort that moves an elite swimmer forward in the water is intertwined with a mental feedback loop that signals him or her to feel the flow of water around the body and minimize the resistance caused by that flow. In the photos you will see the art of this dual focus of maximizing propulsion while minimizing drag captured at specific moments in the stroke.

- Finally, the best swimmers in the world are athletes in the water. The two standards by which I measure a swimmer’s athleticism are tone and timing.
○ **Tone.** Elite swimmers stroke and kick with an ideal level of muscle tension in their arms, legs, and core. They are neither too rigid nor too relaxed. The photos showing this strong tone are my personal favorites.

○ **Timing.** I like to sing the praise of Aristotle here, who is credited with the phrase “The whole is greater than the sum of the parts.” Each part of the swim stroke—the pull, the kick, and the core movement—is a unique and powerful movement in and of itself, but it is the way in which these motions intertwine with one another and emerge as a whole that adds a power-packed punch to the swim stroke. The top swimmers in the world understand the connection and timing, and their athleticism in this regard should be noted, studied, and applied.

The photos are unquestionably the main feature of this book. They are almost strong enough to stand on their own—no words needed. But there are two other features in the book that I believe can impart a deliberate and dedicated training mentality for readers: swim science and stroke data.

The book kicks off, in Chapter 1, with a review of swim science. I realize most readers don’t pick up a book on swimming because they want to brush up on science. The topic is complicated, lengthy, and admittedly boring. But as I have dug through it in the past few years, I have realized just how closely linked physics—mainly the concepts of fluid dynamics—is with the teachings of stroke mechanics, and I decided that if there was anything that could be done to bring forth the basic principles in a manner that was not intimidating, then it should be done. In this book I have made great effort to condense the science of swimming and present it in a way that I hope is easy for readers to understand. I believe that when swimmers understand the physics, they can capitalize on that understanding to craft a better stroke.

This book also places strong emphasis on a valuable analysis tool called stroke data. Stroke data reveals how well a swimmer translates mechanics and technique into speed and performance. Rather than simply clocking the time it takes to complete a swim, stroke data captures the details underlying the swim,
such as the number of strokes an athlete takes to cover a particular distance, and how quickly the athlete takes those strokes. The data is a perfect complement to a swimmer’s study of technique, because it is an objective measure of the effectiveness of technique.

While conducting interviews with elite swimmers for this book, I found that more than 90 percent of them could articulate an understanding of stroke data and how it relates to their performance. This high percentage indicated to me that a firm grasp of the tool is closely linked with results at the highest levels. Chapter 4 explains how to gather and use stroke data, and the chapters on butterfly, backstroke, breaststroke, and freestyle include charts that detail the stroke data underlying elite performances in that particular stroke.

There is another thread that runs throughout these pages, and it snuck up on me as I worked on the book: the propulsive similarities among the four strokes.

My first book, Swim Speed Secrets, focused solely on the freestyle stroke and the vital elements of the underwater pull—the few things swimmers cannot forgo if they want to get faster. I knew that the vital elements in freestyle are also vital and present in all strokes, but even I was shocked at the extent to which this is the case. My intent with this book was to photograph the underwater mechanics in each stroke, including the most critical elements of it, so swimmers could learn from the sport’s icons in their stroke specialty. As each photo session ended, however, and the images downloaded, I saw a striking resemblance among the strokes. I zoomed in on images—focusing on just one arm during a particular phase of the stroke—and noted that the strokes are not only similar, but they are indistinguishable from one another.

To show what I mean, here is a fun test: Each of the four strokes—butterfly, backstroke, breaststroke, and freestyle—is represented in the photos on page 7. Each photo captures the stroke during the catch phase of the pull. The arms you see in these photos are the arms of world-record holders swimming the stroke naturally. None of the photos were staged. Can you match the photo with the stroke?

How did you do? Not an easy test, right? If I wasn’t the one to select the photos I’m not sure how I would do. It’s a bugger. Don’t worry about how you
scored. The key is that you understand through this example how working on the mechanics of any one stroke reinforces the other strokes. I hope this inspires you at practice.

Many swimmers think of themselves as one-stroke, or maybe two-stroke, specialists. The majority of triathletes stick to freestyle, and competitive swimmers slip to the back of the lane at practice when the coach gives a set that involves their weaker strokes. We fall into the trap of thinking, *I’m just not naturally good at that stroke, so why try?*

The stealth message in this book is that putting forth effort in your nonprimary strokes will do you more good than you can imagine. Consider this quote from a triathlete who took a backstroke clinic I coached in the winter of 2014:

> What stunned me is that learning the correct catch and grab for the backstroke translated into my FINALLY figuring out the catch and grab for freestyle. Who knew that after all these years, it would take flipping me onto my back to get the most important part of the freestyle stroke?

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**NAME THAT STROKE.** Identify the stroke for each of the catch phases of the pull shown here.

A. BACKSTROKE.  B. FREESTYLE.  C. BREASTSTROKE.  D. BUTTERFLY.

*Note: The photo for backstroke was rotated but otherwise not altered.*
This triathlete now deliberately practices backstroke rather than using it as a stroke to take a rest.

So, let’s get going. Let’s look at what the best swimmers in the world do underwater. There is quite a bit to study and learn. As you digest the information and take it to the pool, keep in mind that 30 minutes of deliberate practice is more beneficial than 3 hours of thrashing.