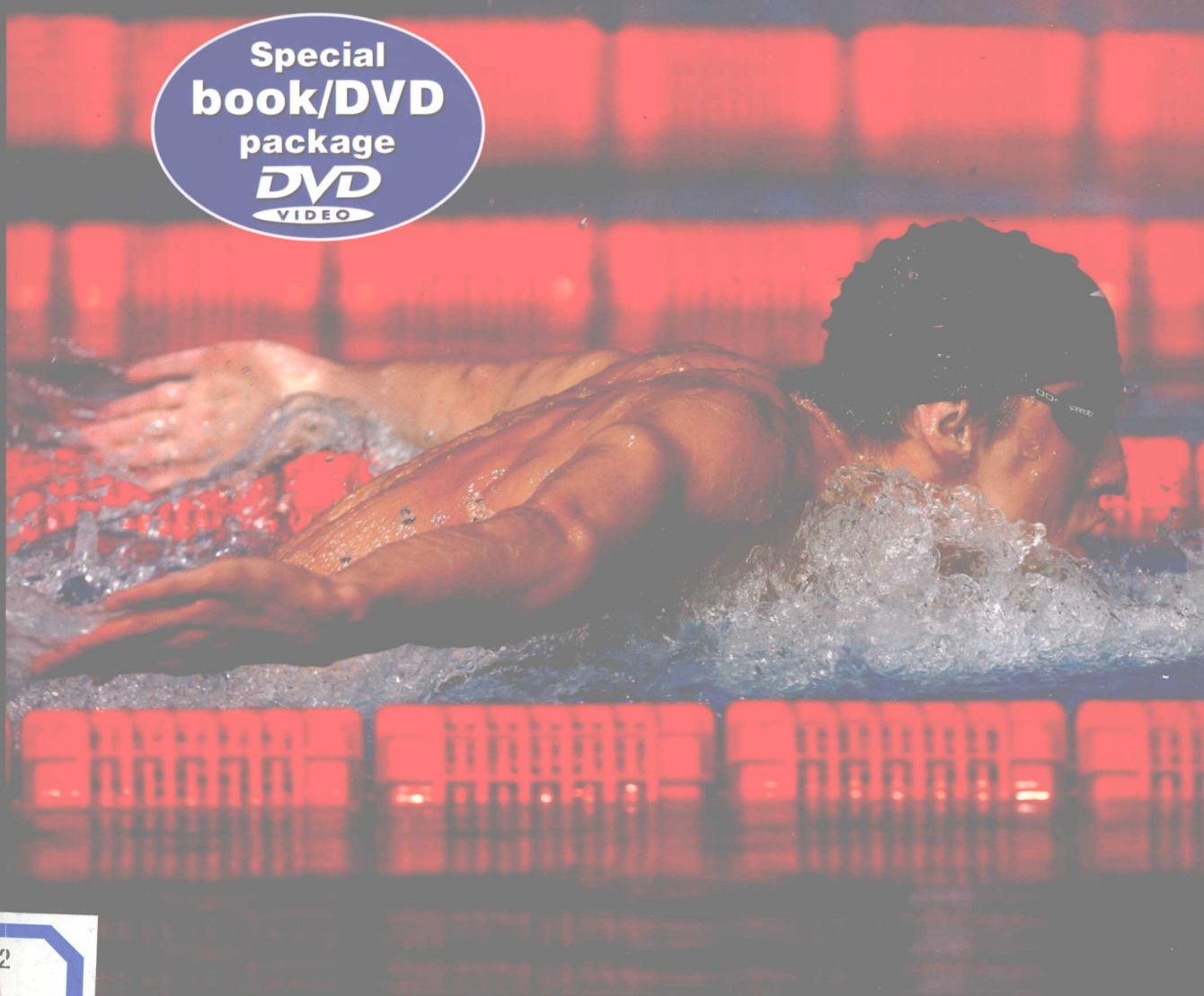
COMPLETE CONDITIONING FOR SWIMMING



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Dave Salo, PhD • Scott A. Riewald, PhD

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COMPLETE CONDITIONING FOR SWIMMING

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Human Kinetics

游泳训练

Complete conditioning for swimming.

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To the memory of Mike Nishihara, the former head strength and conditioning coach for the United States Tennis Association, whom I had the privilege of working with for three years before his untimely passing in September of 2007. I learned a great deal from him in those years, information that transcended strength and conditioning to include how to get the best out of people in general. Mike, you will be missed by all those who ever had the opportunity to meet you.

Scott Riewald

DVD Contents

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Core Training

Dryland Progressions

In-Water Progressions

Single Dryland Exercise

Power Exercises

Flexibility Exercises

Injury Prevention Exercises

Shoulder

Knee

Total Running Time . . . . . 80 minutes

Acknowledgments

When we first started this book project, I thought, *This will be pretty cool and shouldn't be that difficult.* I'd been involved in ancillary ways on several book projects before, and becoming a lead author seemed to be the next step. Well, as we got into it, I found writing a book carries a number of challenges—most notably finding the time to write while also working full time and keeping up with two young children. But we eventually got there, and many thanks to Human Kinetics—Tom Heine and Leigh Keylock in particular—for keeping things on track.

I would also like to thank the United States Tennis Association—Mike Nishihara, Paul Roetert, and Todd Ellenbecker in particular—for the many discussions we had on strength and conditioning and making training match the demands of the sport. Working with those individuals and the elite athletes helped test and solidify many of my philosophies on strength and conditioning.

I'd also like to thank all of the people and organizations who supported this project, specifically Phil Page and the Thera-Band Academy. They donated many of the elastic resistance bands and other products used in the photo and DVD shoots and have a diverse product line that makes strength training possible for anyone, whether they have access to a weight room or not. I'd also like to thank Haven Barnes, Kim Matz, Jane Rynbrandt, and Branden Rakita for serving as the models in the book and on the DVD, and Bob Seebohar for his contributions to the nutrition chapter.

Finally, and most importantly, I would like to thank my family—Suzie, Maddox, and Callie—for their support and encouragement during this whole process. If not for them, I would have given up on this a number of times. Thank you, and I love you.

Scott Riewald

Introduction

Welcome to *Complete Conditioning for Swimming,* a one-of-a kind book that will take you into the world of strength and conditioning and show you practical ways to use dryland and in-water strength training to improve your performance in the pool. The world of sport is changing as athletes are constantly looking for ways to gain an advantage over their competitors. Swimming is no different. Maybe you know of swimmers who have looked to new technology, such as drag-reducing full-body suits, to improve their performance. Or maybe you've seen other swimmers employ the services of a sport psychologist to try to gain a mental edge over their competitors.

It is great that swimmers can tap into all of these new advances, but sometimes they forget about the most important thing—training the body. Strength and conditioning, in particular, often gets left by the wayside. This book shows you how to bring strength training and conditioning into your swimming program and how to do it correctly to enhance performance and prevent injuries.

IMPORTANCE OF STRENGTH AND CONDITIONING FOR SWIMMERS

If you look at the top swimmers in the world today, most, if not all, engage in some sort of strength training. The swimmers we train at USC and the Irvine Novaquatics are no different. We have developed a structured strength and conditioning program for our swimmers that complements the in-water work we do. Notice we do not just use the term *dryland training* when talking about strength training. That is because our strength and conditioning program is a combination of dryland training and in-water strength training. We do this to ensure that any strength gains that swimmers make are transferred to the water. Our strength and conditioning philosophy is based on two principles that we believe are critical in swimming today:

1. *Strength and conditioning can help prevent injuries.* If nothing else, you should perform maintenance exercises to prevent many common swimming injuries, including swimmer's shoulder.
2. *Strength and conditioning can enhance performance.* Swimming requires a balance of endurance and power—and strength training can develop both of these attributes and improve your in-water performance. If you are not engaging in some type of strength training, you are falling behind your competitors who are.

This two-pronged philosophy underlies our approach to training, and we have seen improved performance when strength and conditioning is appropriately integrated into an athlete's overall training plan.

UNDERSTANDING THE DEMANDS OF SWIMMING

The importance of strength and conditioning becomes even clearer when you reflect on the demands of swimming. Consider the following:

- Competitive swimming events range in distance from 50 to 1,500 meters and last anywhere from 20 seconds to over 15 minutes—and that is not even including the open-water swimming events that can be as long as 25 kilometers. Consequently, swimmers will draw on various energy systems to fuel their performance depending on the length of the race. Strength training and conditioning will help you train the energy systems you need for the races you swim.
- Swimming is a full-body sport and requires the *coordinated* activation of muscles in legs, the core, and the upper body with virtually every stroke that is taken. A breakdown in any one area can have negative consequences—that is, it can result in injury and poor performance. Strength training will build core stability and develop coordination between the body segments that will reduce drag while improving propulsion.
- Even though swimming is a non-weight-bearing sport, and the legs do not take the pounding they do in other sports, the repetitive nature of the swimming stroke can lead to overuse injuries, such as swimmer's shoulder and breaststroker's knee. Strength training can address strength and flexibility imbalances and reduce the risk of injury.
- Swimming places unique demands on the core of the body that are unlike those seen in any land-based sport. Because you need to generate force and propulsion by pressing against a fluid surface, you need to be even stronger and more stable through the core than other athletes. Strength training, particularly exercises done in the water, can improve your feel for the water and improve your stroking and kicking power.
- There are very few sports in which the demands of a race differ so dramatically from those of a practice. Training sessions can last as long as four hours, and some swimmers engage in multiple practice sessions a day. Contrast that with competitions, which involve shorter periods of high-intensity activity, often separated by periods of warming up and cooling down. Making intelligent choices about warming up and cooling down, two important components of training and conditioning, will facilitate recovery and keep you primed to swim at your best all the time.

• Swimming encompasses four distinct strokes that use different muscle groups. Stroke-specific exercises will help you build the strength, power, and flexibility required in your particular events.

These are just some of the factors that make swimming unique in the world of sport. Take all of this into account, and you can quickly understand how swimming performance is dependent on so many factors.

Swimming in and of itself *will* build strength and power, but only to a point. A well-structured strength and conditioning program, one that prepares your body for the demands of the races you swim, will help you achieve those extra gains that will set you apart from your competitors in the pool.

STRENGTH AND CONDITIONING FOR EVERYONE

This book was not designed just for elite athletes. In fact, it was designed with all swimmers in mind. Whether you are a fitness swimmer or a top-ranked age-group swimmer, a triathlete or a masters swimmer, a coach or even a swim parent, the information in this book will help you integrate strength and conditioning into your training program.

We do want to take a moment to address the needs of young swimmers. Any time the topic of strength training is mentioned in the same sentence as young swimmers, several questions related to safety typically come up. Though it should be a concern of any coach or parent, in actuality, the risk of injury associated with young swimmers engaging in a strength training program is very low. While every exercise and activity carries with it some level of injury risk, both the National Strength and Conditioning Association and the American Academy of Pediatrics have issued position papers that state that youth strength training can be safe and effective if the following conditions are in place:

- Proper technique is taught and required in *every* repetition of *every* exercise.
- A coach who is skilled in program design and exercise technique supervises *every* training session.

A well-designed strength and conditioning program can enhance performance, even for young swimmers. While young athletes will not build large muscle mass, they will see improved strength and coordination, increased bone density, improved self-image and self-confidence, and a greater potential for preventing injuries. All of these should be appealing to young swimmers. Additional guidelines on developing appropriate youth strength training programs are provided in chapter 11, Year-Round Sample Programs.

USING THIS BOOK

Have you ever picked up a book on swimming and after reading a few pages asked yourself, "What does this mean, and how am I supposed to use this information to become a better swimmer?" *Complete Conditioning for Swimming* is a nice blend of theory and application: You get the science (in easy-to-understand language) but also receive plenty of information on how to put the science into practice.

This book has some attributes that make it especially reader friendly.

- Many examples of in-water and dryland exercises, complete with step-by-step descriptions and pictures, will improve your swimming performance. We realize swimming is a unique sport. Therefore, the exercises presented are somewhat different from what you might find in a book that is written for football players or track athletes.
- An accompanying DVD shows many of the exercises in action. A picture contains the information of a thousand words, but a video contains the information of a thousand pictures. Exercises seem to make more sense when you can see them being performed correctly. The exercises that are demonstrated on the DVD are listed on the DVD Contents on pages vi and vii and are marked with this symbol in the text: 
- Sample training plans can be used right out of the box or used as templates so that you can design your own program. The sample plans take some of the pressure off—you won't have to design your own training regimen right away.
- This book is based on science, but it is also easy to read. We take special care to put even the most complex science into layperson's terms and use special sidebars to highlight the most important points in each chapter.

Whether you are a swimmer who swims to stay fit or one who wants to get fit to swim, you will benefit from the content in this book. We're confident that if you make strength and conditioning a part of your swim training, you will see your performance in the pool improve.

We hope you enjoy this book. Have fun and get stronger!

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Contents

Chapter 1

Testing for Swimming Fitness

You're starting on an adventure, a journey into the world of strength and conditioning for swimming. You'll learn how strength training and conditioning drills can complement the work you do in the pool and elevate your performance. However, before you embark on this journey, you need a map—some idea of where you are, where you're going, and how you will get there. When it comes to swimming, one of the best ways to find out where you are and what you need to work on is to test yourself periodically. Luckily, there are several simple tests you can do with little or no fancy equipment to establish benchmarks that you can compare yourself to later and help you improve your performance in the pool and reduce your risk of injury. These tests include simply counting your strokes when you swim, performing test sets in the pool, and conducting orthopedic tests to evaluate strength and flexibility. Using the results of these tests, you can assess where you stand in relation to your competitors, identify strengths and weaknesses, assess improvements, and establish performance-based goals for the season.

If you are like most swimmers, you already test yourself whether you know it or not. Every time you step up on the blocks to race or watch the clock during practice, you are testing your swimming proficiency. Swimming is one of those sports, unlike football or baseball, where your performance can be measured directly against the clock—and time does not lie. But how much does a time really tell you? Sure, you can tell if you are faster than your competitors, but can a race time or a split tell you why your stroke fell apart on the third 50 of the 200 butterfly? Can it help you understand why you always seem to develop shoulder pain halfway through practice? Maybe it's a technique flaw that causes your

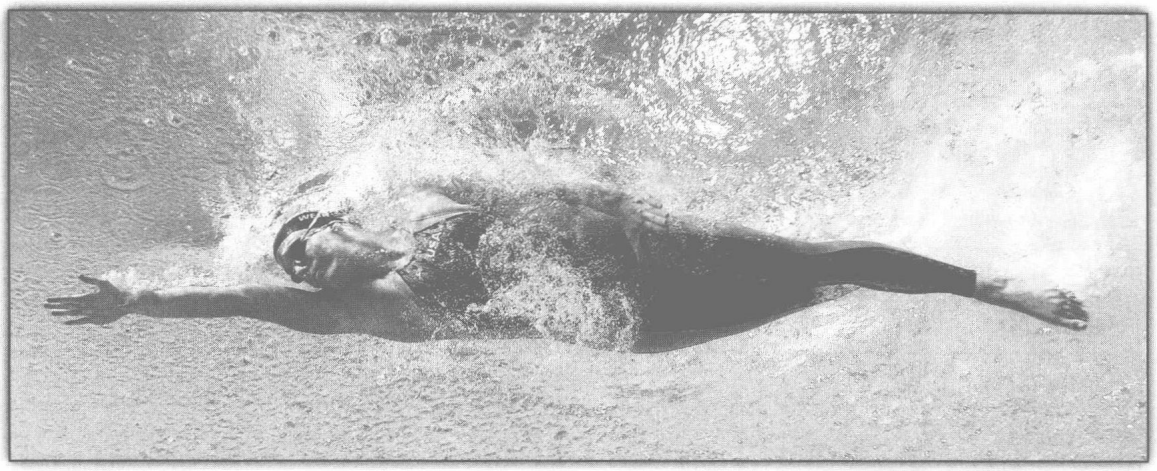
stroke to break down in the middle of your race. Maybe you have a strength imbalance that is contributing to an injury. Or maybe you're not taking care of yourself nutritionally and that is what's causing you to fall short of achieving your performance goals. This list could go on indefinitely, but the bottom line is that time alone rarely tells the whole story about a swimmer. To better understand how some of these other factors contribute to your performance, you should undergo periodic testing. Regular testing plays a vital role in understanding your strengths and weaknesses, particularly as they relate to strength, technique, injury prevention, and swimming efficiency.

MEASURING SWIMMING EFFICIENCY AND EFFICACY

Fast swimming is built on efficiency and efficacy. Efficiency means being able to swim fast while exerting little wasted effort and energy. Efficacy is the power to produce a result, which in this case means effectively using the forces you generate to get you down the length of the pool. Both concepts rely on the ability to generate the forces that propel the body through the water appropriately while also minimizing the resistance you experience so your body knifes through the water. The ability to do this is influenced by several factors:

- Stroke technique
- Strength, power, and flexibility
- Body position and streamlining in the water
- Level of fitness
- Body type and shape

So how can you tell your efficiency and efficacy in the water? Amazingly, there is a relatively simple test you can use: Count the number of strokes it takes you to complete each length of the pool. We'll call this your stroke count. The better you are at reducing drag and generating propulsion, the lower your stroke count will be. There is no magic number of strokes it should take a swimmer to complete a length of the pool when swimming at a given pace, and your stroke count will likely differ from that of your training partners. The key is to establish a benchmark of what you do now and set a goal of trying to improve on that number—both in practice and in races. As you become better at knifing through the water, or generating propulsion, you should find that the number of stokes it takes you to cover a set distance at a given pace should decrease. For example, you may swim 100 freestyle repeats on a 1:15 pace while taking 16 strokes per length. As you develop greater efficiency and become more effective at



AP Photo/Mark J. Terrill

Swimming technique that is efficient and effective enables you to slice through the water.

using the force to generate propulsion, you may take 15 or even 14 strokes per length while holding that same 1:15 pace.

With any test, you need to compare "apples to apples," and you need to keep some things in mind when you compare your stroke count.

- *Maintain your pace.* It is easy to lower your stroke count if you swim more slowly and really exaggerate the distance you travel with each stroke. Your goal, however, is to take fewer strokes while swimming at the same pace or an even faster pace than you swam before.
- *Maintain your stroke rate,* or how fast you turn your arms over, as you work on improving your stroke count. Again, it is easy to travel farther with each stroke when you slow everything down, but that does not necessarily mean you've improved your efficiency. At the University of Southern California, we place a lot of emphasis on swimming with specific combinations of stroke rates and speeds. Stroke rate and how to measure it in greater detail are discussed in the following sections.

One way to track your stroke count is to simply count the number of strokes you take per lap consistently during practice as well as in races. You do not have to count strokes on every lap, but if you start to see your stroke count increase over the course of a workout or a set, ask your coach what you are doing differently. It could be that your technique has changed or you have become fatigued. Also, keep a diary of your times and stroke counts from your races. Table 1.1 contains a sample diary that you can use to monitor your stroke count in races. Have a teammate count your strokes on each lap and enter the information along with your split times to see how you are progressing.

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