Ultra-Efficient Freestyle Workbook

A Practical Guide for Learning *Better, Easier . . . Faster*

Terry Laughlin

Founder, Total Immersion Swimming

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For more information about Terry Laughlin's Total Immersion swim workshops, call 800-609-7946.

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About the Author

Terry Laughlin, the founder and Head Coach of Total Immersion Swimming, is considered by many to be the world's leading authority on how to swim efficiently. He was credited with "revolutionizing how the Navy Seals teach swimming." The Army Rangers, Air Force Pararescue team, Coast Guard Rescue Swimmers, and U.S. Border Patrol have also sent instructors to Terry for Total Immersion training.

Terry showed little promise as a swimmer from age 12 to 20. In the fall of 1963, he was the only swimmer cut during tryouts for his grammar school team at St. Aidan's in Williston Park NY. After completing the Red Cross 50-Mile Swim Challenge the next two summers at his village pool, he was better prepared when his high school, St. Mary's in Manhasset NY, started a team two years later.

Terry Laughlin being congratulated by St. John's coach, Dick Krempecki. (1971)

Terry could never 'escape the slow lane;" his times were never good enough to qualify for the Catholic league championships. As a senior, he swam in the Novice championships, and earned his first medal, which remains a valued memento 45 years later. From 1968 to 1972, Terry swam for St. John's University, enjoying modest success in distance events, but his final season was disappointing, and he felt almost relieved to 'retire' as graduation approached.

Several months later—though lacking in any obvious qualifications—Terry was offered the position of head coach at the U.S. Merchant Marine Academy in Kings Point NY. He became the youngest head coach in the NCAA at age 21.

From Day One, Terry displayed an instinct for helping others succeed where he had failed—primarily by emphasizing technique to a degree rare among swim coaches.

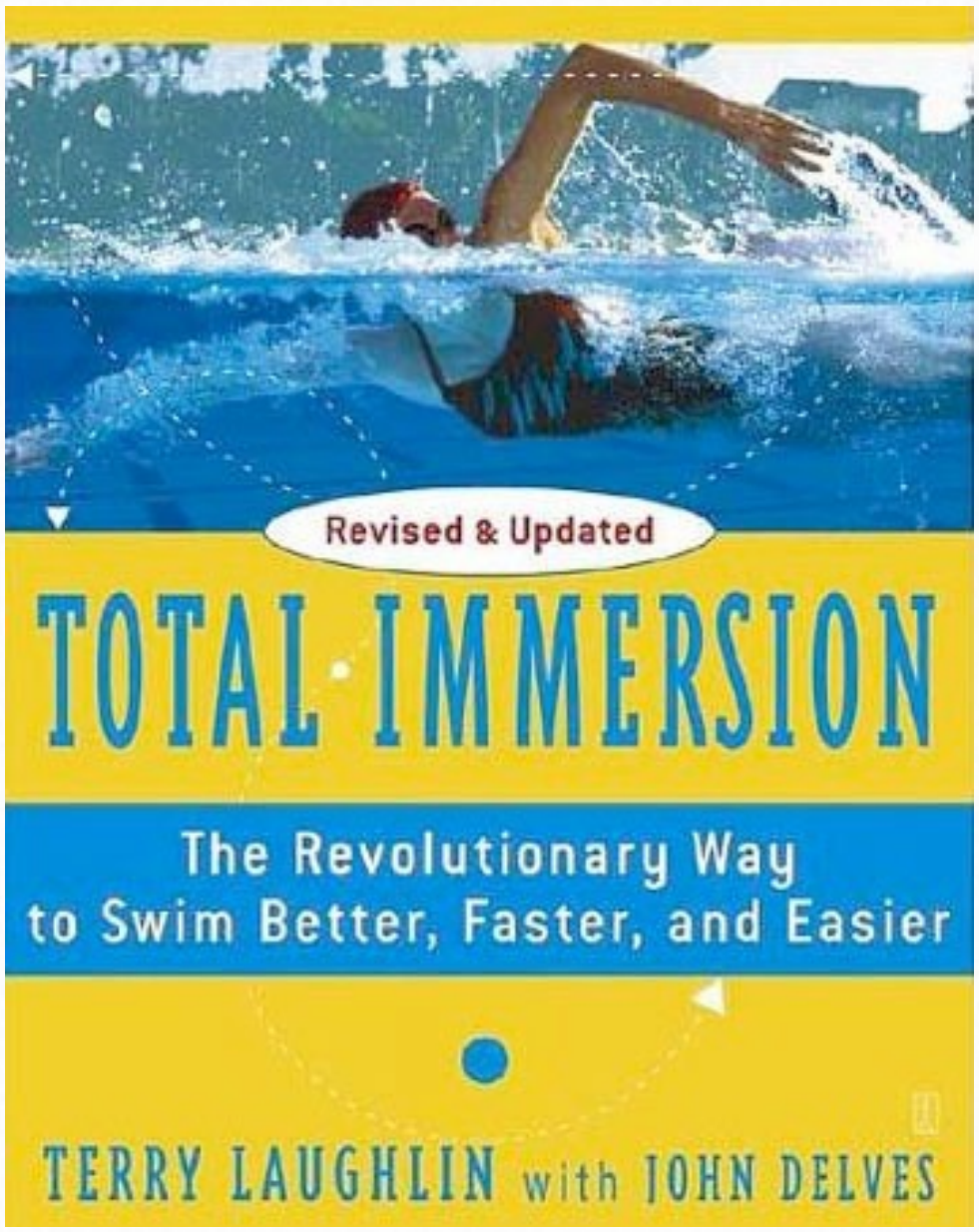
At the 1973 Metropolitan Collegiate Championships. Kings Point swimmers swept all freestyle events—five individual and two relay—shattering league records in each, won nine of 18 events overall—more than any other school—and placed 2nd among 15 teams, despite having fewer swimmers than other schools. This performance earned Terry selection as Coach of the Year—at the same meet where he'd finished far back in the pack as a swimmer just one year earlier.

Terry Laughlin was awarded in 1973, Coach of the Year, by his former coach, Dick Krempecki.

In 1975, at age 23, Terry coached his first national champion—and national record-holder—at the NCAA Division III Championships, This was the first national champion in the history of the Merchant Marine Academy, and the first of 24 national champions—in virtually every event and at all distances—Terry would develop during his years of coaching club and college teams. Several of his swimmers also achieved World Top 10 rankings.

Terry left competitive coaching in 1989 to found Total Immersion, and has devoted himself to coaching adults—mostly new to swimming—ever since.

In September 1988, Terry met the innovative coach Bill Boomer, whose unconventional ideas—capsulized in the maxim "the shape of the 'vessel' matters more than the size of the engine in swimming" would become the chief influence on how Terry would swim and coach forever after. Watch for the many references to 'vessel-shaping' in the chapters that follow.



Terry also resumed swimming after a 17-year layoff, to synthesize the many lessons he'd learned as a coach with this intriguing new idea of vessel-shaping. The success of these experiments was reflected in several Top 8 placings in distance events at Masters Nationals from 1989 to 1992—a level of success far beyond what he'd attained 20 years earlier. He also swam faster at age 41 than he had at 18, while training only half as much.

Terry stepped away from competitive swimming in 1992 to focus on developing Total Immersion techniques and managing a growing business. In 1996, he wrote the book *Total Immersion: The Revolutionary Way to Swim Better, Easier, and Faster*, to share the methods employed at TI workshops more widely. It has been the world's top-selling book on swimming ever since.

Terry devoted 10 years to *shaping his own vessel*, acting as the primary 'guinea fish' for refining the techniques taught at TI workshops. During this period he made a distinct shift from 'working out' to *practicing*, and experienced marked gains in efficiency, insight, and self-perception. This led him to embrace the ethos of *kaizen*—a Japanese philosophy that no skill is ever static or fixed, but can be improved continuously—and make it a TI core value.

In 2002, to celebrate having turned 50 a year earlier, Terry swam the 28.5-mile Manhattan Island Marathon. His decade of work on efficiency was reflected in completing a loop of

Manhattan in 26,000 strokes (8 hours and 53 minutes at an average of 49 strokes per minute)—compared to an average of 39.000 strokes for the rest of the field. On the strokes he saved, Terry could have *swum another length of Manhattan*! He completed the swim pain-free and felt fully recovered the next day—despite training about five hours, and 15,000 yards per week—a fraction of the training others had done.

After his Manhattan swim—and a decade of *vessel-shaping*. Four years later, at age 55, Terry's transformation as a swimmer culminated in a 4-month stretch of accomplishments that would have seemed wildly improbable 35 years earlier.

In May 2006, at U.S. Masters Nationals, he recorded pool times faster than he'd seen in 13 years. During the open water season, between June and August, he completed his second Manhattan Island Marathon, much faster than before (and in 25,000 strokes); won four National Masters Open Water championships, from 1 mile to 10km; broke national records for the 1- and 2-Mile Cable Swims; and placed 8th in the World Masters Open Water Championship.

At 63, Terry is focused more on swimming for health and happiness than competition—though he maintains a full schedule of open water events in the summer, including a swim across Gibraltar Strait—synchronizing TI strokes with two friends—in Oct 2013. One thing is unchanged: Terry still begins every swim (even the Gibraltar Crossing) with an explicit intention to *improve his swimming*—believing fully that he can be a better swimmer at the end of practice than at the beginning.

Introduction

Streamline your *Learning*

Total Immersion is known for techniques that emphasize streamlining your body. But TI methods also streamline your *learning* in three ways—teaching the skills that have the most dramatic impact on efficiency and are easiest to learn; teaching them via fewer steps; and by minimizing opportunities for error as you learn.

The 80:20 Rule

The 80:20 Rule (also known as the Pareto Principle) states that for many events, 80 percent of the effects come from 20 percent of inputs or causes. In business, for instance, the lion's share of profits often comes from a few 'high value' customers.

The 80:20 Rule applies in the TI learning method too. If your goal is to swim farther and faster with less fatigue, three high value *skills* will help you achieve that with unmatched ease and speed. Many self-coached TI students have progressed—in as little as 30 hours of practice—from struggling to complete a lap or two to swimming a continuous mile—and feeling as if they could do another. They did so by focusing on the right skills—which we call, the *TI Skills Pyramid*.

A Pyramid of Essential Skills

Foundation: Balance and Stability (1) These give you *physical control* over your position in the water. (2) They enable the *mental calm* to develop the awareness and focus needed to learn effectively. (3). They provide the *sense of well-being* that makes swimming a pleasure; motivates you to practice regularly; and creates positive expectations about future progress.

Intermediate Level: Streamlining (aka Vessel-Shaping) Learn Streamlining in two steps. (1) *Passive* Streamlining: Consciously align head, spine and limbs, and engage core muscle to transform your profile in the water from human-shaped to *fishlike*. (2) *Active* Streamlining: Use arms and legs more to minimize resistance than to maximize power—and stroke with a minimum of waves, turbulence, bubbles and splash.

Final Level: Core-Powered Propulsion We base our approach to Propulsion on two principles: (1) The human body is a *system* with all parts designed to work together—rather than a muddle of disconnected pieces working at cross-purposes. (2) Core muscle is strikingly more powerful, fatigue-resistant, and energy-efficient than arm and leg muscles.

You'll apply these principles by striving to swim with your *whole body*—not just arms and legs.

Human-shaped to fishlike

What about Breathing? Breathing is obviously essential; our fourth group of learning activities is designed to help you breathe with comfort and ease. However, body control, drag avoidance and integrated propulsion are all integral to that goal. Consequently *every* learning activity in this program contributes in some way to easy, *effective* breathing.

What's the Straightest Path to Efficiency?

We designed this program to guide you to efficiency by the shortest, simplest path—four skill groups, with three drills or learning steps in each. Each lesson will strikingly increase efficiency, but their combined efficiency is far greater than the sum of the parts. Step-by-step, you'll sense your stroke becoming a *system* as elegant as the human body itself.

A simpler learning process, with fewer steps, will help you:

1. Perform every key skill better, more consistently, and more accurately.

2. Understand and retain key ideas—and how each skill relates to others.

3. Maintain unerring focus on your ultimate goal—an *ultra*-efficient whole stroke.

These are the four major skill groups:

Group One: Comfort and Body Control

The 'non-negotiable' first step in learning to swim well is to feel at home in—or harmony with—the water. You achieve this by learning Balance (feeling *weightless* in the water) and Core Stability. This step offers a proven way to (i) experience how a *land-adapted* human body behaves in an *aquatic* medium; and (ii) learn the most efficient way to gain control over it. This will bring *immediate and significant* energy savings . . . as well as a sense of calm and well-being. Group One includes three steps:

1.1 Torpedo

1.2 Superman

1.3 Superman+Strokes (This is designated as a separate lesson in this workbook, but is included with 1.2 Superman in the video series.)

Group Two: Controlled, Stable Recovery

'Recovery' is the common term for bringing the arm forward over the water to begin a new stroke. We teach this immediately after balance because a body part moving through the air weighs 10x more than it does in the water. Thus, a poorly controlled recovery has enormous potential to de-stabilize your core body. Learning good recovery habits (and sta-

bilizing your core) early will ease the path to every other skill. Group Two includes three steps:

2.1 Elbow Swing

2.2 Paint a Line (Rag Doll Arm)

2.3 Hop-and-Slot

There aren't any drills, in the traditional sense, in this sequence. You learn critical skills via rehearsals, paired with *no-breathing* whole-stroke reps.

Group Three: *Vessel*-Shaping (Passive and Active Streamlining)

Vessel refers to my mentor, Bill Boomer's maxim: "The shape of the vessel matters more than the size of the engine"—which is true of anything that moves through water. Here, you'll learn to extend, align and rotate your body into the sleekest position possible in freestyle. It will also radically reshape your concept of freestyle technique: From Upper-Body-Pulls/Lower-Body-Kicks to Streamline-Right-Side/Streamline-Left-Side. Group Three includes three steps:

3.1 Skate

3.2 Skate+Strokes

3.3 Slot-to-Skate (and Slot-to-Skate+Strokes)

Group Four: Breathe Easy

Skills and habits learned in the first three groups are essential to breathing with comfort and ease—to seamlessly fit a breath into your stroke rhythm, while maintaining highly efficient form. Skills familiar from previous steps—balance, body-length, alignment, and

core-body rotation—are key focal points in each exercises presented here. We make this challenging skill easier by dividing the learning process into more, smaller and simpler steps. The three primary drills in Group Four

4.1 Nod

4.2 Whale-Eye

4.3 Popeye

are complemented by four breathing rehearsals and two 'basic skill' drills.

Never Practice Struggle

One of our favorite maxims for smart swimming is: *Avoid imprinting 'struggling skills.'* This is especially true when you begin learning a new technique. A common trap in practicing stroke drills is to practice good movement quality for about 10 meters . . . then spend 15 meters undoing the positive effects of what went before.

This happens when the swimmer's objective shifts from *imprinting a skill* to finishing the lap. We avoid this through a cutting-edge approach which dramatically increases learning speed while minimizing the risk of imprinting incorrect movements. The companion video for this workbook illustrates four steps:

Step 1: Rehearse

Stand comfortably in shallow water to isolate a small, but critical, part of a new movement or mini-skill. Repeat the new movement pattern with pinpoint accuracy, while concentrating on the *kinesthetic* sensations associated with it. This preparatory step will greatly increase your chances of getting it right as you progress to a drill or whole stroke. [You generally need to rehearse only while familiarizing with a new position or movement before the key sensations become ingrained.]

Step 2: Drill

Glide into the drill. Continue for only 6 to 8 meters—or seconds. Stand for a breather and mental reset then repeat. (Revisit the rehearsal if you like.) Perform 4 to 8 brief drill repetitions. Your primary goal (in rehearsal and drill) is to *sharpen awareness of new sensations* that will guide you during *whole-stroke repetitions*.

Step 3: Transition

Maximize retention from drill to whole-stroke by performing several repetitions of Drill+Strokes. Drill b-r-i-e-f-l-y to 'check in' with new sensations, then transition directly into a few swimming strokes. Compare sensations from rehearsal, to drill, to whole stroke. Generally 3 to 5 strokes is sufficient. Repeat this transition four or more times.

Step 4: Whole-Stroke

Finally, swim a little farther . . . but don't automatically swim a full pool length. Continue stroking as long as it feels easier, smoother, more integrated. Stop when it doesn't. Patiently and incrementally add a few 'successful' strokes (and breathing cycles) at a time. Repeat four or more times.

* * *

Three Rules for Learning Success

Swimming has more opportunity for error—and a much narrower range of correct choices—than any other movement skill. We may also struggle with old habits (or *terrestrial* instincts) as we learn. To minimize error and maximize success, observe three 'rules' while introducing any new or challenging element:

Rule 1: Short Repeats—No Struggle. Resist the instinct to *finish the lap*. Stop for a breather and mental reset whenever appropriate, wherever you are in the pool (without inconveniencing other swimmers.) Better yet, plan to swim six or fewer strokes. This maximizes focus, and minimizes potential to imprint bad habits, while learning a new position or movement.

Rule 2: Minimize Breathing. It's much harder to perform any new skill while taking a breath. Bypass this by standing for a breather between repeats (as shown in the companion videos). In Skill Groups Two and Three, you might breathe through a snorkel—we recommend the Finis Swimmer's Snorkel—to allow more *correct* repetitions.

When the new skill feels unforced and consistent, introduce breathing gradually. Start with four to six *non-breathing* strokes, then try one or two breath cycles. If the new skill holds up during and after a breath, continue adding breath cycles. If not, pause for a breather and mental reset, then try again.

Rule 3: Focus on Focus. At the end of each repeat, assess both movement quality *and* how well you paid attention during the repeat. Did you stay 'on task' for each stroke? The more you *notice* (and the less you overlook) the faster you'll learn. You'll soon realize that a *laserlike focus* is as learnable as a *weightless head*—and just as critical to success!

* * *

Learn with a Partner

The Essential Skills program introduces another innovation pioneered by Total Immersion—*partnered* learning. Other than learning from a TI Coach, the absolute fastest way to learn any new position, movement, or element of timing is with a partner observing *and* assisting. This is illustrated in the companion videos, and in revealing images herein. During every assisted-learning exchange, both partners gain valuable understanding. The partner performing the skill receives accurate guidance in subtle or complex skills. This minimizes error and reduces mental overload. The partner assisting learns nearly as much by observing—and *feeling*—the errors that commonly occur while you *feel your way*, during initial attempts.

SKILL GROUP ONE:

COMFORT AND BODY CONTROL

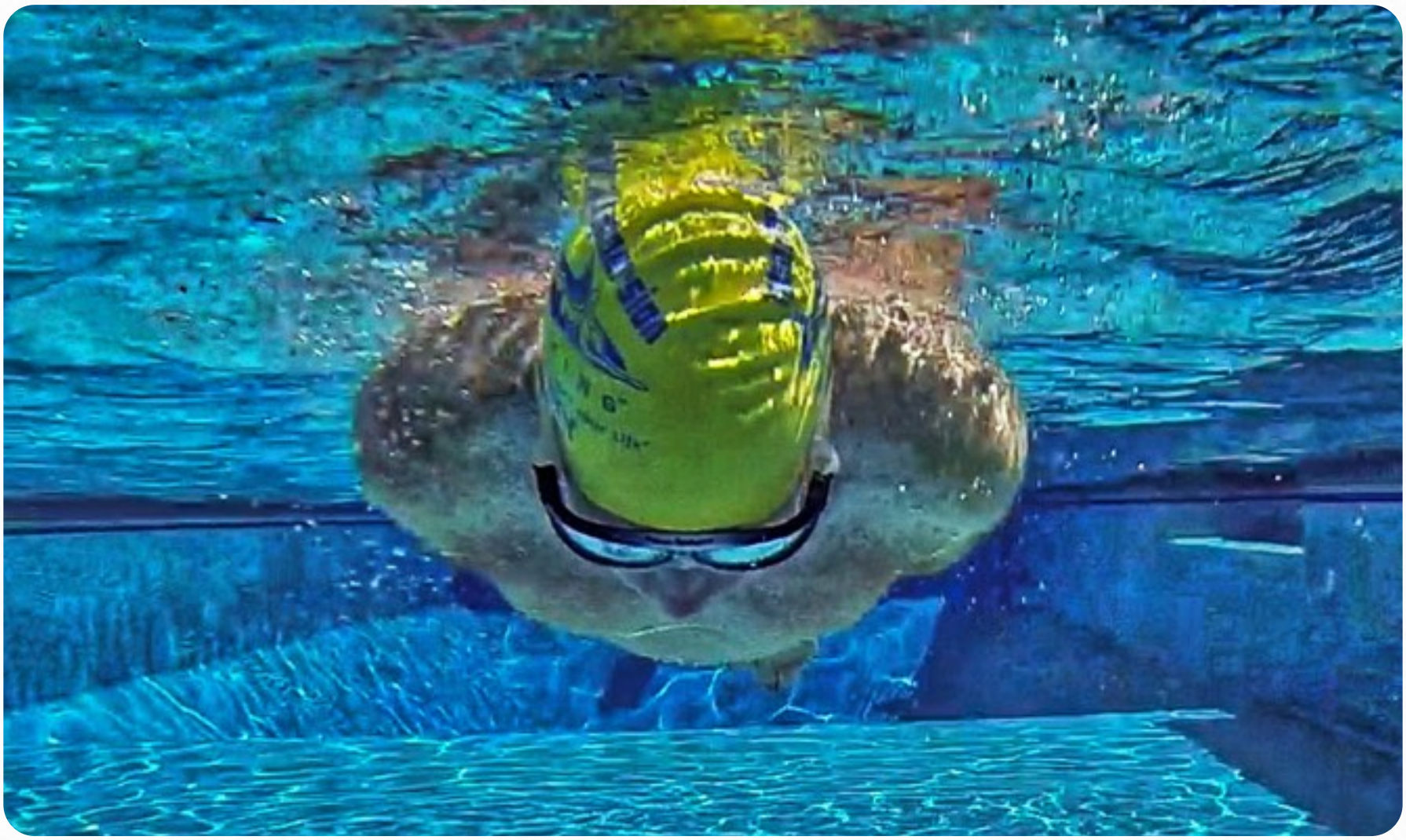
This group of drills and skills imparts three qualities essential to ultra-efficient swimming—and to creating the conditions for continuous long-term improvement:

1. Immediate energy savings from a weightless and stable body position.

2. The body control necessary to learn all subsequent skills.

3. The focus, sense of calm, and habits of self-perception that will make your swimming more satisfying and effective for decades to come.

1.1 Torpedo



Click here for Video

Torpedo practice repeats are briefer than any other drill. Though you may only practice it a few times, it will create invaluable and enduring body awareness that improves Balance and Core Stability—the indispensable foundations of an efficient stroke.

The greatest benefit of Torpedo is that it has few ‘moving parts.’ This allows pinpoint focus on several key mini-skills—a ‘weightless’ head, head-spine alignment, and an engaged core:

Isolating your head in front will heighten awareness of when you’ve achieved an aligned and neutral head position, preparing you to maintain that position in every step that follows.

You'll also have better awareness of activating core muscle. Both skills are essential to maintaining a sleek, stable body position when you begin moving your arms and legs.

Torpedo: Rehearsal

Stand tall with feet together in your best posture. Keep shoulders relaxed.

Keep head neutral. Don't lift or tuck your chin.

Imagine you're wearing 'cargo' jeans with pockets on the front. Reach hands down thighs as if to reach deep into those pockets. (We'll reference 'Cargo Pockets' several times in our lessons.) Pull navel to spine. Lightly press legs together.

During rehearsal, memorize the feel of a straight, strong bodyline with engaged core. Maintain those sensations while practicing Torpedo.

Torpedo: Practice with a *Glide*

Push gently into a surface glide. (Don’t plunge underwater.) Your legs will sink gradually as glide slows. Maintain head-spine alignment as they do.

Hold legs together to increase glide and slow legs from sinking.

When you lose momentum (in a few seconds) stand for a breather and mental reset. Then push into glide again.

Torpedo Checklist

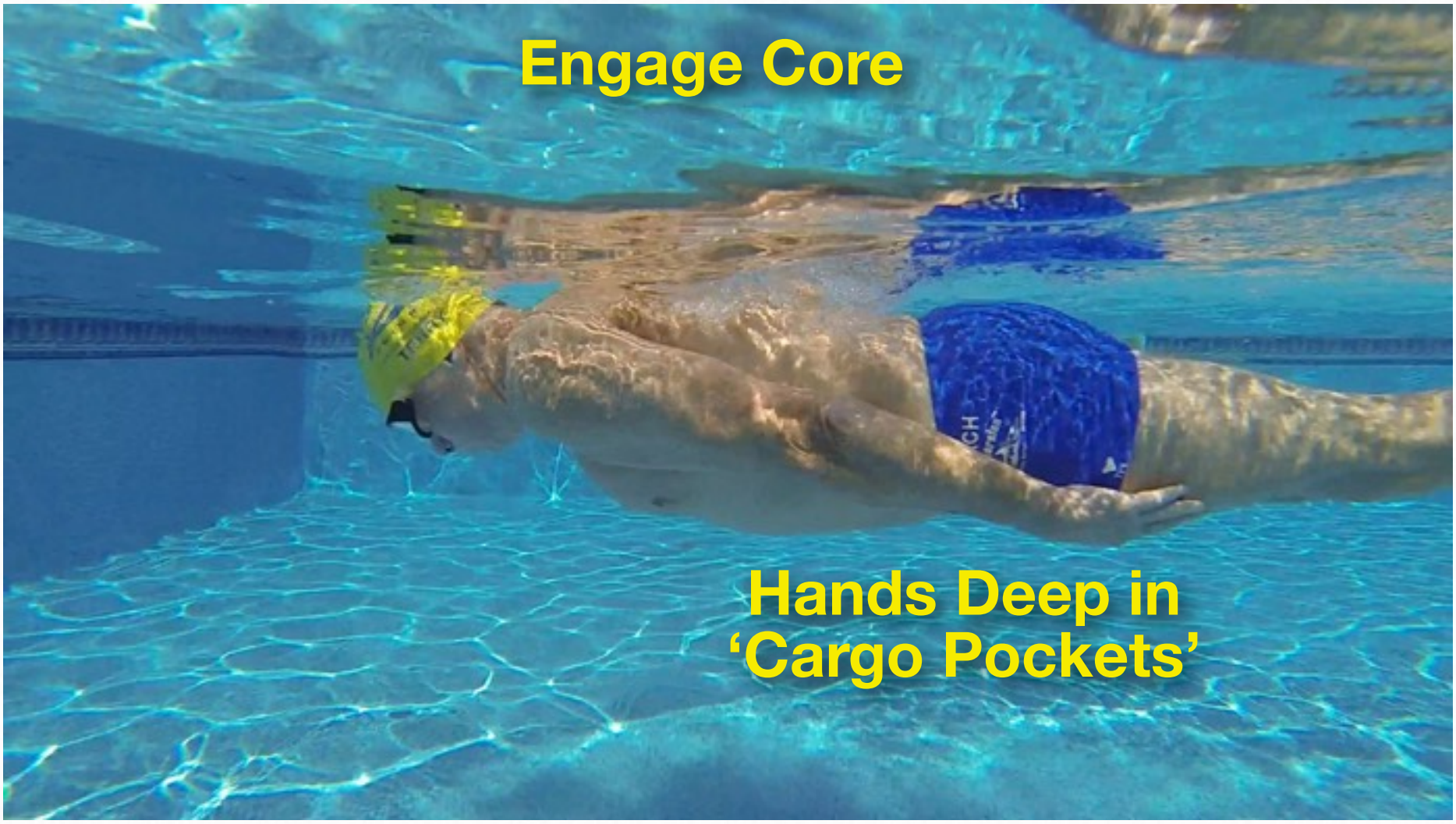
Head: Release its weight so you feel the water support (or cushion) it.

Arms: Push hands deep in Cargo Pockets.

Core: Pull navel toward spine.

Legs: Press together and lengthen.

Bodyline: Maintain the strong posture from your rehearsal.



Torpedo: Practice with a *Flutter*

By adding a flutter kick to Torpedo, you’ll gain a few seconds to memorize key focal points and sensations. *Do not turn this into a kicking exercise!* Keep kick small, gentle and *quiet*.

Torpedo: Partner Practice

Assisted practice with a partner can greatly ease and accelerate the acquisition of key skills because:

The assisting-partner's hands-on cues provide the most accurate feel for correct positions.

Being towed or supported allows the practicing-partner more time to memorize key sensations.

There are two ways to assist:

Tow from Head

Cradle head as shown and:

Check that *only the rear third* of the head is visible above surface.

Gently waggle head (and/or lightly massage neck) to release any tension.

Walk backward while towing at pace sufficient to keep body balanced.

Support Feet

Lightly support (don’t lift) feet and:

Stand briefly to observe head-to-toe alignment.

Ensure that legs are pressed together . . . then push into glide.

Watch to see that legs remain together after release.

Torpedo Practice Tips:

Repeat Gliding Torpedo four or more times. Strive to glide a tiny bit farther each time. Keeping head and spine aligned and legs together should help increase glide distance.

Then repeat Torpedo with Flutter two to four times. As you do, perform a head-to-toe scan of items on the checklist.

When you've memorized the feeling of weightless head, engaged core, and streamlined legs, proceed to Superman. Revisit Torpedo any time to refresh those sensations—either between repeats of Superman, or before Whole Stroke repeats.

1.2 Superman

Click here for Video

Because your bodyline is longer, you'll travel farther in Superman than in Torpedo. Yet these reps are still fairly brief—about 8 to 10 seconds. However, a strong and targeted focus will help you imprint essential sensations and habits, even in brief repeats. Unlike Torpedo, Superman is worth practicing hundreds of times, over many months, creating invaluable insights each time. Because both drills are exceedingly simple, you should be able to easily apply new insights to whole stroke.

Essential habits taught by Superman include:

A weightless, stable head position. This is always the starting point for achieving a stable balanced body position.

A fully extended bodyline. This increases support by extending your body over the maximum water surface area. A longer bodyline also reduces drag. You'll travel farther *effortlessly* with a 'lighter' body and less drag.

Relaxed hands (helps Balance) and a *Wide Track* arm position (improves Core Stability.)

Calm legs *drafting behind* your upper body (reduces drag.)

Maintain these habits in every drill . . . and *every stroke you take from now on*.

Superman: Rehearsal

Start in Torpedo position, then:

Extend arms on shoulder-width *Tracks*.

Relax hands. Hands should be slightly below shoulder height, so arms slope down as shown.

Extend hands farther by opening underarm/axilla.

Tuck tummy.

Memorize these sensations. Check in with them while practicing Superman.

Superman: Practice

Extend arms with relaxed hands on Wide Tracks. Then push into glide.

If legs sink as glide slows, let them.

To glide farther, engage core, and press *streamlined* legs together.

Stand for a breather, self-assessment, and mental reset.

Repeat.

Superman

Checklist

Choose *one* focus from checklist. Repeat several times.

After each repeat, assess body position and strength of focus.

Choose a new focus from list and repeat. Progress focus from head to arms, then core, and finally to legs.

Superman: Partner Practice

You have three options for towing or support:

Hold wrists. Lengthen arms, ensure they are on parallel shoulder-width tracks.

Cradle head. Ensure absence of tension in neck. Draw forward for a sense of *spine-lengthening*.

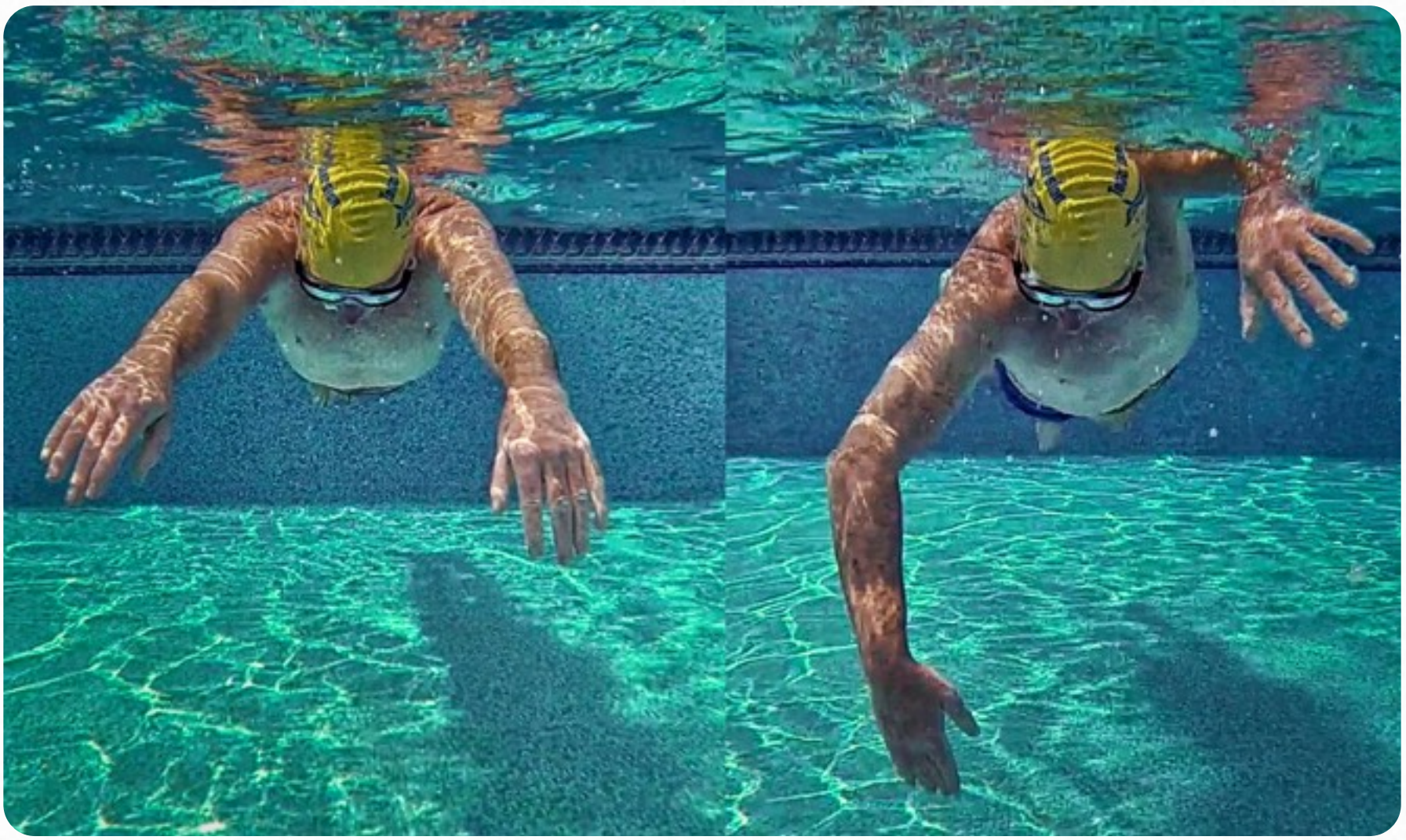
Support feet. Check head-spine alignment, arm extension, and leg streamline.


Tow Gently From Head
Release Neck Tension


Support Feet—Don’t Lift!
Check Alignment


Push Away . . .
Check That Legs Stay Together

1.3 Superman + Strokes



Click here for Video

Immediately bring new habits and sensations into your whole-stroke swimming by adding a few strokes to Superman.

Practice Superman+Strokes

Choose a mini-skill focus from those you practiced in Superman.

Push into Superman. Glide long enough to check your chosen mini-skill. Begin stroking before glide slows.

Swim three to five *non-breathing* strokes with same focus, then stand for a breather. Repeat four or more times

Choose a new Focal Point and repeat the process.

Note: To increase the number of strokes you can take, use a Finis Swimmer's Snorkel. Increasing the number of *correct* repetitions will accelerate learning.

Suggested Focal Point Sequence

For a simple but systematic way to organize Focal Points to cover all key skills, use the 'head-to-toe body scan' method, as follows. Focus on these stroke thoughts in this order

Head. In Superman, feel your head 'hanging' (like a dead weight) between your shoulders. Maintain that sensation as you begin stroking. (Alternatively, focus on feeling the water *cushion* your face, or visualize a *laser* projecting from your head-spine line . . . in Superman *and* while stroking.

Arms. Extend arms on Wide Tracks during Superman. Reach on the same Wide Tracks on each stroke. Also, note where hands are in Superman. Reach to the same place while stroking.

Underarm. Open underarm in Superman. In each stroke, extend forward until you feel underarm open.

Core. Feel core engaged in Superman—and as you stroke.

Legs. Lengthen legs and press together lightly in Superman. Begin stroking by reaching forward (not kicking) and let legs follow your body. Keep legs calm, quiet, and streamlined.

How Much Whole Stroke Practice?

We encourage you to practice whole stroke swimming at regular intervals throughout the lessons. However, if you're learning these techniques for the first time, we recommend you limit whole-stroke practice mainly to the short, non-breathing repeats prescribed in 1.3 Superman+Strokes.

If you find it difficult to stroke as described in the Focal Point sequence just above, proceed directly to the Group Two Recovery exercises that follow. We promise you'll feel markedly more comfortable and coordinated upon completing the skills and drills in that lesson.

However, if you already have fairly extensive TI experience, feel free to spend time becoming more deeply familiar with any new sensations or insights gained so far, by employing them in your normal practice routine.

SKILL GROUP TWO:

CONTROLLED, STABLE RECOVERY

Group One (Balance and Body Control) exercises rely entirely on *gross-motor* skills. These involve large body parts and major muscle groups. They're relatively easy to coordinate—and to sense when you're performing them correctly. This makes them ideal as the first step in improving efficiency.

Group Two exercises introduce many fine-motor skills, requiring the coordination of many more, and smaller, muscles. There are nearly limitless opportunities for error and a *very* narrow range of effective solutions. This greatly increases the difficulty of coordination and requires much deeper sensory awareness.

To reduce the learning curve, we've broken this section into many 'bite-size' skills—some in rehearsals, some in whole-stroke—and devised new forms of partner-assisted practice. But, these challenges can also be an opportunity—to develop *Super-Learning* habits that prepare for years of continued improvement . . . and will apply to learning *any* skill.

As noted earlier, moving an arm through the air—where it weighs 10 times as much as in the water—has enormous potential to create instability in your core body, making it much harder to learn skills and swim efficiently.

Control these destabilizing forces by imprinting three qualities in your recovery:

Symmetry. Each arm should be a mirror image of the other. This equalizes the forces affecting the body.

Relaxation. This gives arm muscles a 'rest break' between strokes. It also averts the creation of ballistic forces in recovery—which can divert your body off its intended path . . . forcing you to do constant *course correction*.

Direction. Any body part moving through the air should move in the same direction you wish to travel. This channels energy and momentum *forward*.

And finally, besides closely complementing the lessons learned in Group One, providing a solid foundation for efficiency and skill development, Group Two skills are also the most important for *injury-free* swimming.

* * *

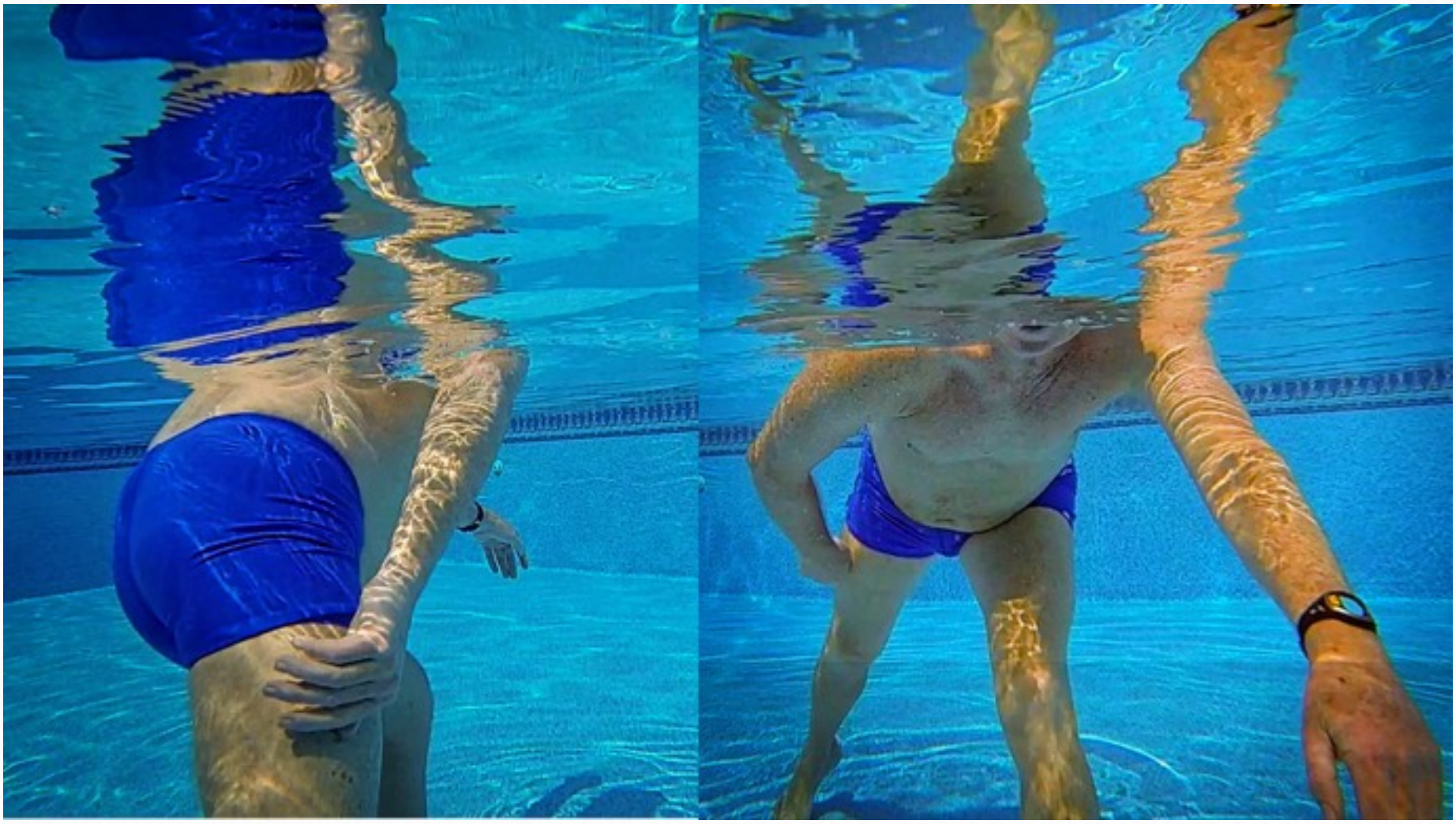
2.1 Elbow Swing

Click here for Video

Lifting the elbow, or pulling it back, as the hand exits the water is an extremely common instinct. This causes the hips to over-rotate, diverting the hands to ‘steadying’ actions (which undermine propulsion) and causing legs to splay (which increases drag). It also increases injury risk. This exercise teaches you to swing the elbow outwards on exit. This brings it into the ‘scapular plane’ – the healthiest and most relaxed range of motion for the arm.

Elbow Swing: Rehearsal

Perform this rehearsal in two steps. Do both while leaning forward as shown, with lead hand positioned as if to start the next stroke.



Step 1: While keeping thumb on thigh, move elbow as far from your side as possible. This brief and tiny movement will teach your muscles (and kinesthetic awareness) a new and unfamiliar action. Heighten awareness of the change by *lifting* your elbow (i.e. the *incorrect* motion) several times. Notice the tension in your shoulder. Then swing your elbow away. Memorize the *absence* of tension.

Step 2: Release thumb from leg and gently swing elbow past shoulder. Imprint two key mini-skills:

Use *only* shoulder and upper arm muscles to bring elbow forward. Hang forearm from elbow like a *dead weight* (or Rag Doll.)

Elbow should pass the shoulder line slightly before hand. Let water resistance hold the hand back, while elbow leads.

These rehearsals help eliminate ballistic forces from recovery.

Elbow Swing: Practice

Starting with a brief ‘Superman’ glide (release head during glide), swim six or fewer *non-breathing* strokes. Focus on on:

Swing elbow *super*-wide—and as low as possible.

Lightly drag fingertips or knuckles over the surface, in a gently-curving line.

Do eight or more short non-breathing repeats—or use a snorkel to lengthen repeats. You should feel the following as you swim:

Your stroke seems ‘short.’ Ignore for now.

Your elbow feels ‘crazy wide.’ If not, swing wider.

You use noticeably less muscle than before.

Progress to 2.2 when these new sensations feel consistent, natural, and unforced.

Elbow Swing: Partner Practice

Walk alongside, as shown, as your partner swims six non-breathing strokes. With your palm, gently brush the elbow away—and forward. It will be easier, at first, to brush away the far arm. On one repeat, walk on the right, brushing the left elbow away.

On the next repeat, walk on the left, brushing the right elbow away. Both partners should strive for steadily lighter contact, as the swimming-partner responds to the helping-partner's guidance. When the elbow moves away consistently and naturally, switch roles.

2.2 Paint a Line

Click here for Video

This step helps channel momentum from the arm, and save energy, by imprinting two critical mini-skills:

It brings the arm directly forward, eliminating sideways motions. This channels energy and momentum *forward*.

It imprints ‘deep’ relaxation of hand and forearm, This gives muscles a ‘rest break’ between strokes and eliminates de-stabilizing ballistic forces.

Paint a Line: Rehearsal

Perform this rehearsal in two steps. Imprint the Rag Doll sensation first, then moving hand and arm forward via a wide, straight line.

Step 1: *Rag Doll*

Stand as shown, with lead hand positioned as if to start the next stroke. Then:

Hold arm outside shoulder at a right angle. *Hang* forearm like a ‘dead weight’—*or Rag Doll*.

S-l-o-w-l-y inch elbow forward. Pause several times to check Rag Doll sensation . . . and to release any tension in shoulder.

Find the most forward position at which you maintain Rag Doll sensation.

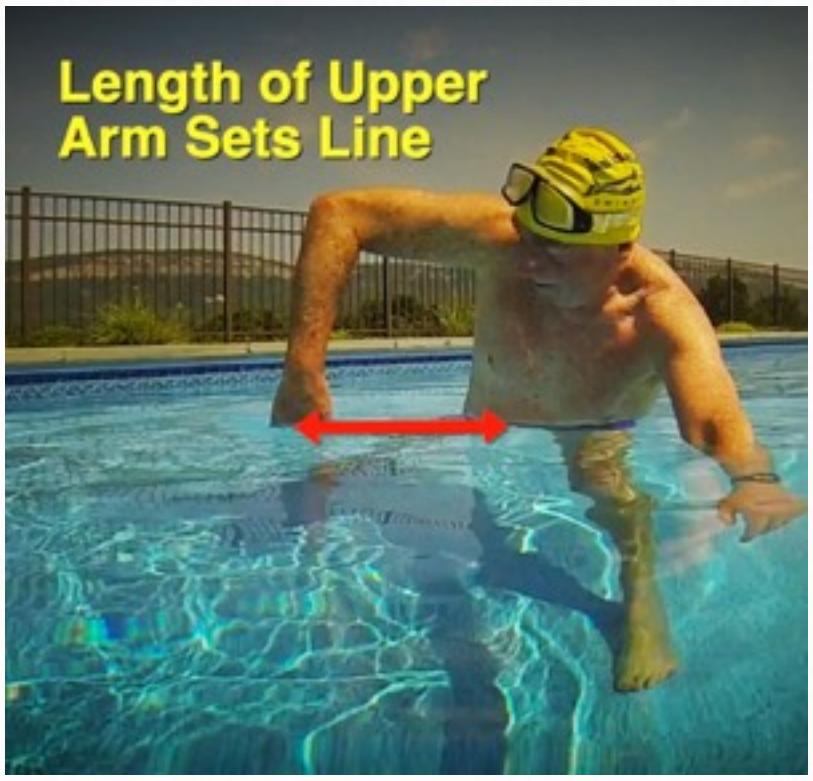
Do this 8 or more times with one arm, shifting gradually to a continuous movement. Repeat the process with other arm.

Avoid this!

Don’t rotate hand inward. This increases impingement in shoulder.

Don’t hold forearm outward. This needlessly tenses arm muscles.

Step 2: Paint the Line



Visualize a wide, straight line from exit to entry. Length of humerus (upper arm) bone determines how far the line is from our shoulder.

‘Paint’ the line with fingertips or knuckles. Focus on:

S-l-o-w-l-y trace a line on the water with fingertips. (‘Painting’ with knuckles will imprint deeper relaxation of wrist and hand.) Watch hand to en-

sure that line is straight. Avoid curving inward as you pass the shoulder.

‘Paint’ until fingers are parallel with wrist of lead arm. Dip hand several times to memorize that location.

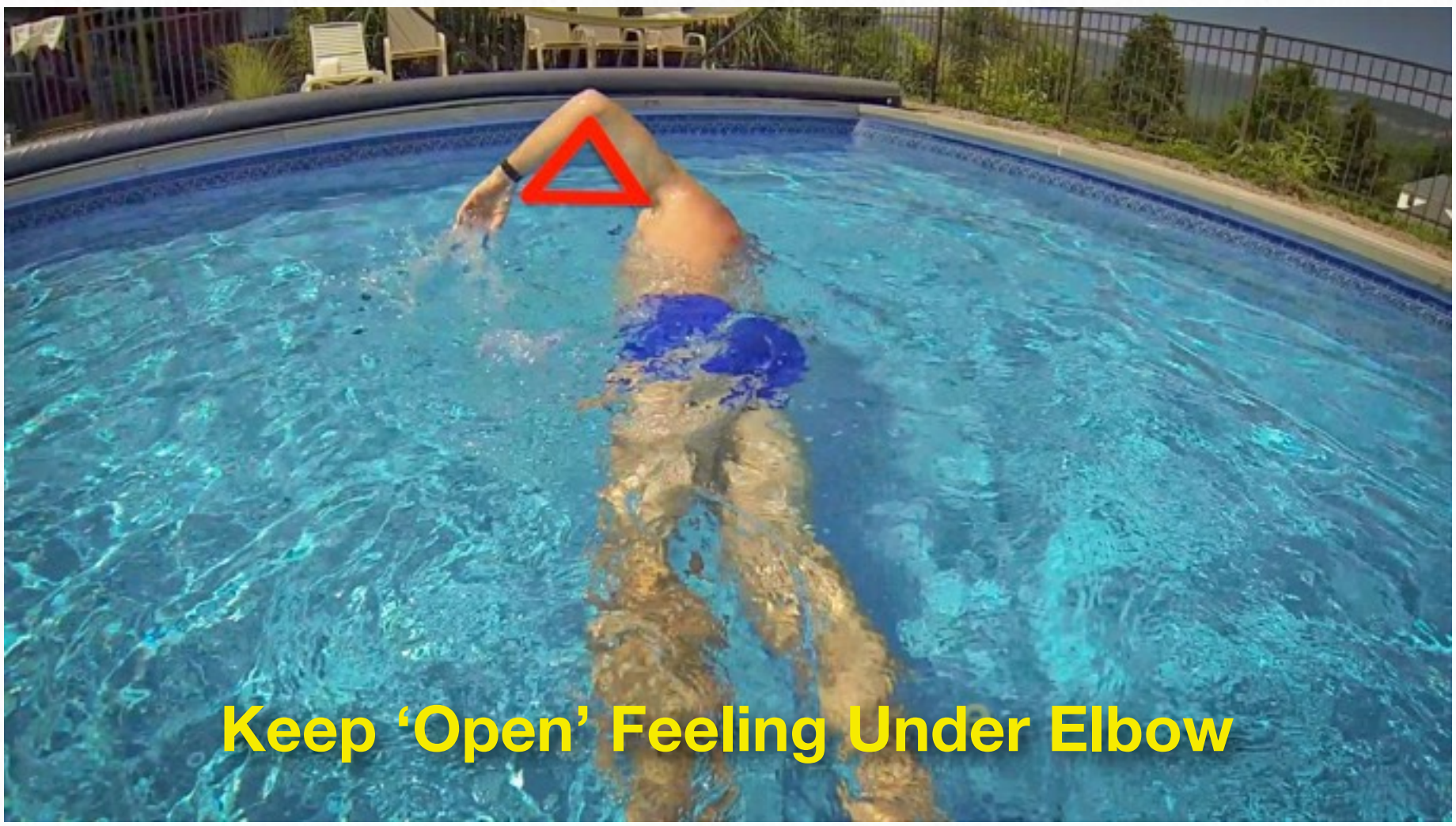
Repeat 8 or more times with each arm, then with alternating arms, taking a ‘mini-stroke’ with the arm that goes back as you drop into water at wrist.

As you increase rhythm, pause a moment before slicing down, to deepen ‘muscle memory’ of each arm’s position.

Paint a Line: Practice

Starting with a brief ‘Superman’ glide, swim six or fewer *non-breathing* strokes. Focus on:

Hold a long, stable line on one side, while ‘painting’ a straight line on the other. Screen shot @ 2:44 Text: *Aligned on Left Track — Paint Line on Right* Replace triangle graphic with green line ahead of hand to entry point.



Hold lead hand steady, until other hand passes head.

Drag Knuckles or Fingertips lightly.

Do four or more short non-breathing repeats (or use a snorkel to lengthen repeats) on *each* of the following Focal Points:

Feel long, aligned and very stable on the extended side of your body.

Keep the ‘crazy wide’ feeling from 2.1, but paint a laser-straight line.

‘Tickle’ the surface with fingertips the entire length of the line.

Keep elbow high (and Rag Doll sensation) the entire length of the line.

Progress to 2.3 when these new sensations feel consistent, natural, and unforced.

Paint a Line: Partner Practice

Assisted practice will encourage deep relaxation—and high mobility—in the shoulder. Assist as follows: Support under elbow as partner hangs arm outside shoulder. Gently massage shoulder to encourage relaxation. The arm should feel heavy in your hand.

Draw small circles with the elbow. Feel for tension or resistance. Encourage partner to relax completely, and let you do all the work.

Gradually turn those circles into oval or ellipse shapes by moving the elbow slightly forward, inch by inch . . . while arm hangs like a Rag Doll. Circle loosely back to begin to starting point.

At front of ellipse, keep elbow elevated with one hand, while dipping other hand parallel to wrist of extended hand. Repeat with other hand, then switch roles.

2.3 Hop-and-Slot

Click here for Video

This lesson teaches two small and distinct actions (think of them as ‘micro-skills’) that combine smoothly to save energy and increase efficiency. We call the first Ear Hop and the second Mail Slot. We call the combined action Hop-and-Slot.

Ear Hop

Visualize a laser extending from your ear. Hop your fingers barely over the laser on recovery. This teaches you to keep fingertips close to the surface on recovery. An arm in the air weighs 10x its weight in the water; every needless inch of clearance wastes energy.

Mail Slot

Think of the slot through which you slide letters at the post office. Visualize cutting such a slot on the surface with your fingers—then slide your forearm through the slot. This saves energy in three ways:

Reinforces the muscle relaxation taught by the Rag Doll focus.

Minimizes drag by teaching stroke timing that keeps your bodyline long as one hand takes over the lead position from the other.

Teaches a clean, *steeply angled* entry that maximizes the transfer of propulsive energy from the weight shift into your stroke.

Together, the Hop-and-Slot teach a movement that will enable years of pain-free, injury-free swimming. In this lesson, you rehearse and practice the Ear Hop first, then rehearse the Mail Slot and combine them seamlessly.

Ear Hop: Rehearsal

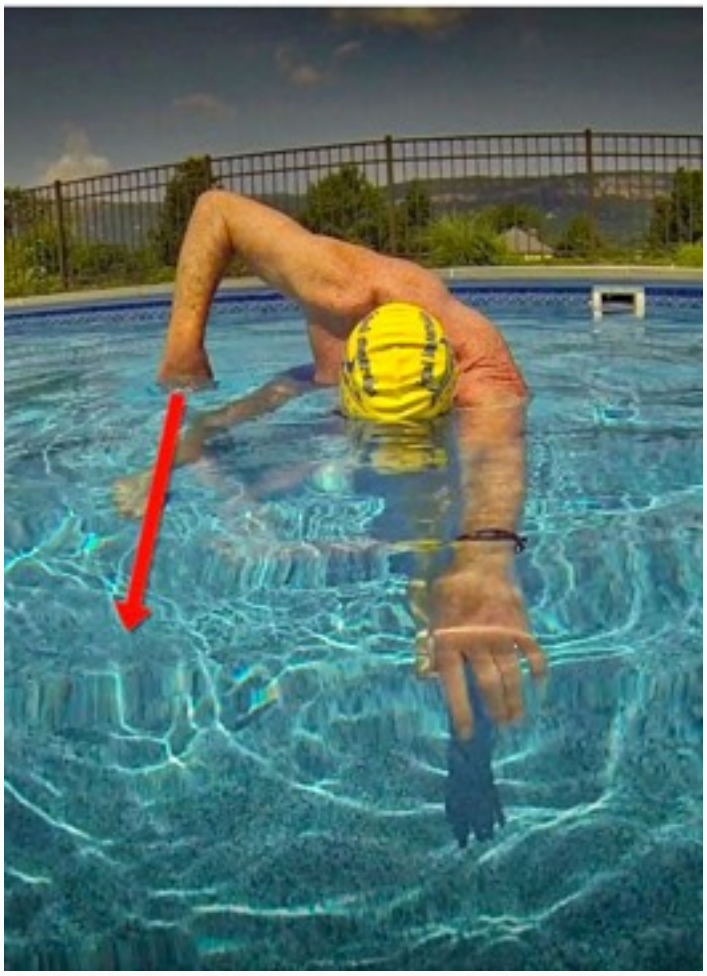
Rehearse the Ear Hop with goggles on and face in the water, as shown, to minimize distance from fingertips to surface. Practice as follows:

Extend left hand as if to start the next stroke.

Paint a Line with right hand (as in 2.2) dragging fingertips lightly over surface.

Hop over an imaginary laser from your ear and immediately drop into water.

Return right hand to your hip and repeat.



Repeat 6 or more times with each arm, then alternate arms in a rhythmic but deliberate ‘mini-stroke’ as shown in video. To complete more repetitions without interrupting for a breather, use a snorkel.

Ear Hop: Practice

Starting with a brief ‘Superman’ glide, swim six or fewer *non-breathing* strokes. On first couple of reps, swim exactly as in Paint A Line (2.2) practice for three to four strokes before hopping the laser for the first time. This will make you more familiar with the subtlety of the new movement you’re introducing. Then focus on the following:

Lightly drag fingertips in a *wide straight line*.

At your ear, hop *and immediately drop* into the water. Minimize clearance and time out of water!

Enter the water *silently and splash-free*.

Do eight or more *non-breathing* repeats. Progress to Mail Slot when these actions feel natural, unforced, and consistent.

Mail Slot: Rehearsal

Stand with arms extended and parallel—as in Superman rehearsal (1.2), hands relaxed with fingers in the water. Then practice as follows:

Lift one elbow—up, not back.

Then drop in—as if cutting a slot with fingertips—parallel to opposite wrist.

Repeat this action with one hand eight to ten times, then with other.

Finally, alternate hands, deliberately at first, then with a continuous, leisurely rhythm

Focus on:

Maintain a *Rag Doll* feeling in Forearm

Hand Relaxed—but Firm—on entry.

Mail Slot: Practice

Though you'll focus mainly on *cutting a slot*, it's almost certain you'll retain the other recovery mini-skills you've worked on up to this point. This may feel like a drill, but think of it as *swimming* . . . with efficiency habits you'll use the rest of your life.

Starting from 'Superman,' swim six or fewer *non-breathing* strokes. On first few reps, Paint A Line (no hop) for three to four strokes, before introducing Ear Hop . This will make you more familiar with the subtlety of the new movement you're introducing. Then focus on the following:

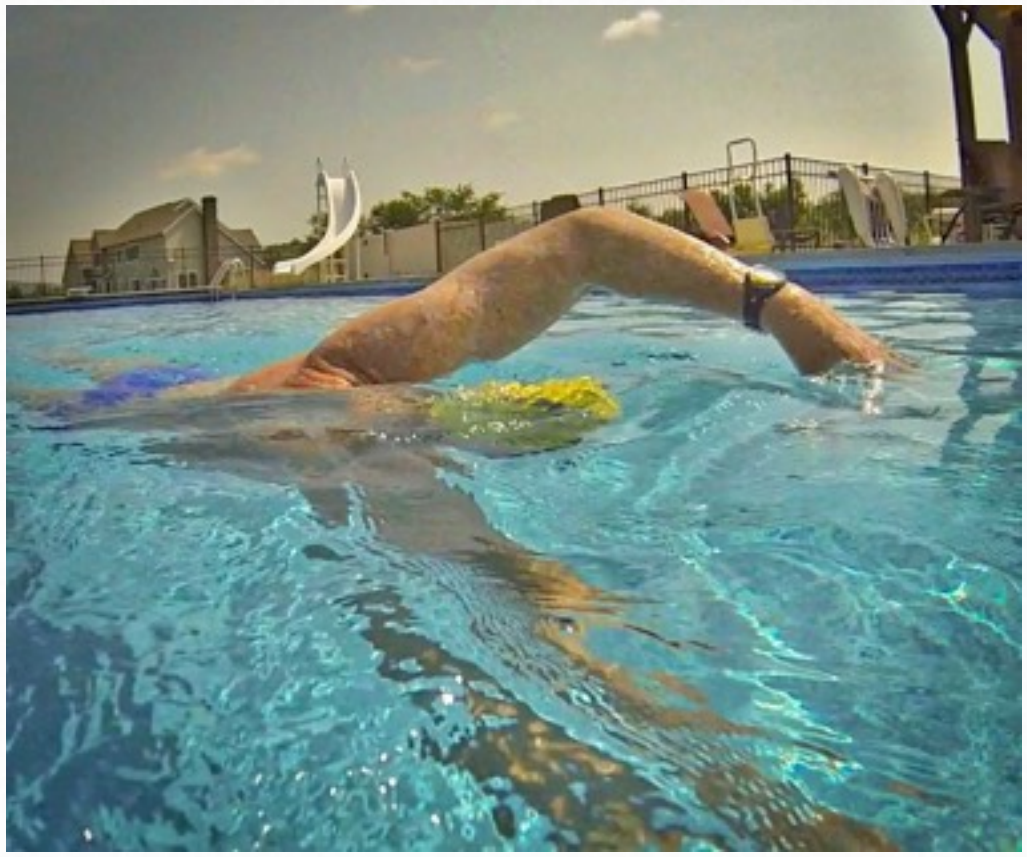
Keep hand super relaxed—fingers loosely separated.

Drop—don't thrust—through the slot. (Let gravity—instead of your muscles—do the work. Think of *ripe fruit dropping from a tree*.)

Enter *without disturbing the water*.

Maintain 'patient' lead hand—waiting for fingers of other hand to enter the slot.

Enter parallel to wrist of lead hand.



Mail Slot: Partner Practice

This is a two-step exercise, starting with a rehearsal, then progressing to ‘assisted’ whole-stroke swimming.

Step One: Mirrored Rehearsal

Stand facing each other—bowing forward slightly—with arms extended, relaxed hands, and knuckles touching just below the surface.

Lift elbow (right elbow for one partner, left for other) to *Rag Doll* position, to create a mirror image.

Together, drop hands through Slot and extend until knuckles meet . . . at same time lifting other elbows to Rag Doll position.

Do this *s-l-o-w-l-y* until both partners achieve coordination in all key movements and positions, then make it rhythmic.

Step Two: Assisted Practice

This is similar to Elbow Swing (2.1) Partnered Practice in that helping-partner walks alongside swimming-partner. Swim six to eight *non-breathing* strokes on each repeat.

Walking near front, lightly touch wrist of near-side arm to aid in dropping through the slot—and avoid overextending to a too-flat entry.

Swimming partner: Focus on keeping lead

hand in place until you feel wrist-tap.

Touch left wrist on one series, right wrist on next.

How Much Whole Stroke Practice?

We recommended that *Total Immersion novices* minimize or abbreviate (short repeats only) whole-stroke practice after mastering Balance and Body Control exercises. Whole stroke practice is a far better option after developing solid recovery skills. This is for two reasons:

With a relaxed, symmetrical recovery, your stroking skills (i.e. the pull and kick) should be much improved—and your chances of 'practicing struggle' far less.

This series didn't include any *drills*—in the conventional sense. Other than rehearsals, all your practice was actually whole-stroke swimming.

So the logical next step is to simply swim more. Which means breathing more. Thus, if breathing problems get in the way of maintaining the form you've developed thus far, we recommend you proceed directly to the next two groups of skill exercises.

However, if you have a good baseline of breathing skill already, you can spend some time integrating new recovery skills into your stroke. As you do be mindful of what you're putting to the test as you swim more and farther—movement skill *and* strength of focus. Make it a conscious goal to improve both together. Do that by using Focal Points in an organized way. Here's a summary of Recovery Focal Points for whole-stroke practice, in the order we presented them.

***Swing* the Elbow**

Swing the elbow to the side as hand exits. Avoid lifting.

Move upper arm *away* from body.

Your swing should feel strikingly low and wide.

Wide Straight Line

Lightly trace a straight line with fingertips from exit to entry point.

Make the line *as wide as possible* (without curving).

Maintain Rag Doll sensation in forearm and hand.

Cut a Slot

Cut a ‘slot’ in surface with fingers. Slide forearm through slot.

Make entry too short and too steep.

Keep entry *silent* and splash-free.

SKILL GROUP THREE:

VESSEL-SHAPING (PASSIVE AND ACTIVE STREAMLINING)

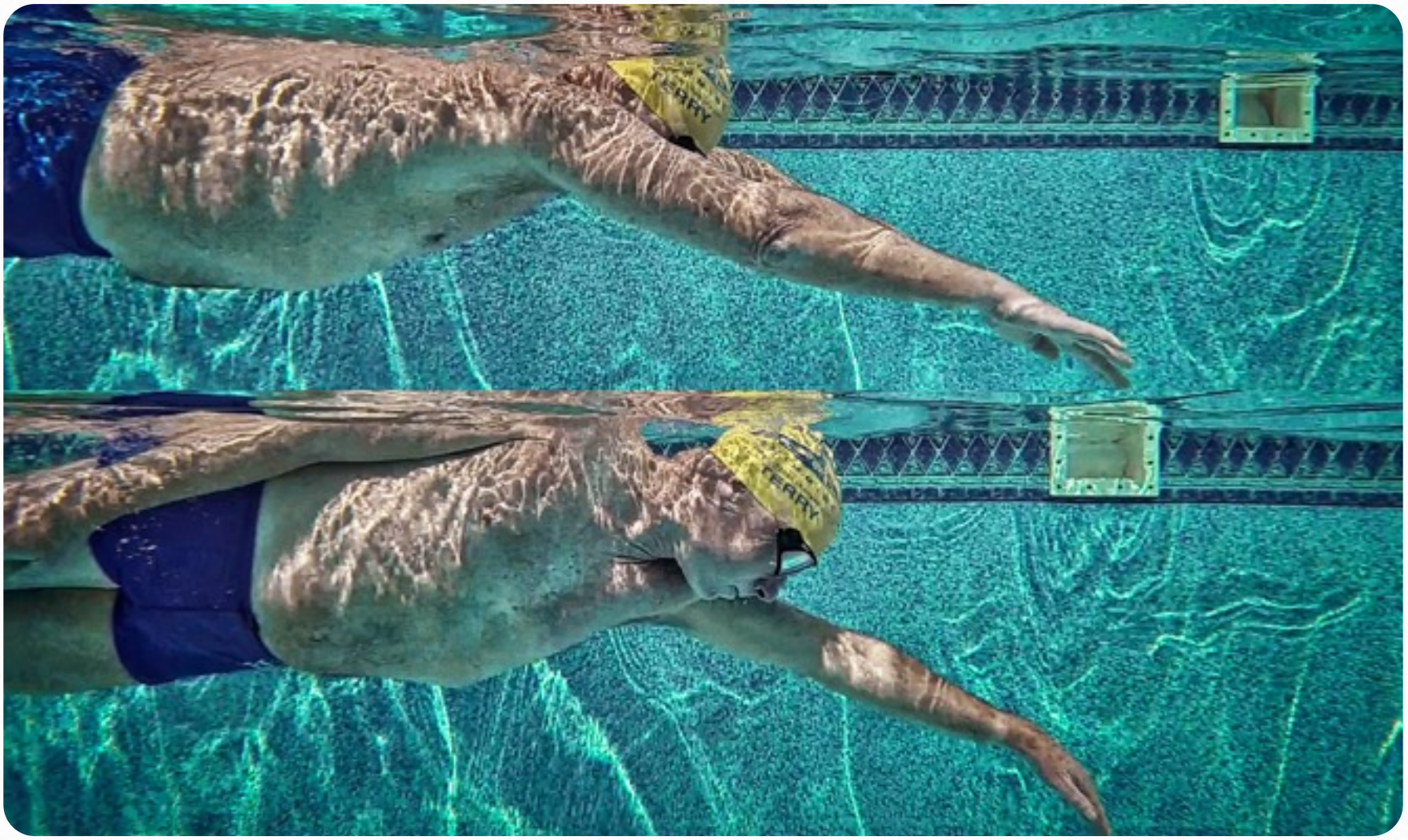
In the companion ebook, *Ultra*-Efficient Freestyle, I referred numerous times to Bill Boomer's maxim "The *shape of the 'vessel'* matters more than the size of the engine." Chapter 6 "How Streamlining Works" provides powerful supporting evidence, including:

Fish scientists and DARPA engineers learned that dolphins are over 2500 percent more efficient than human swimmers—and can swim 700 percent faster than their muscular power should make possible possible—because of "*a natural ability for active streamlining.*"

Olympic medalists generate strikingly less stroking power than slower and less successful swimmers, proving that their success and speed is primarily due to “*a superior ability to avoid drag*.”

This lesson teaches you the lowest-drag position possible in freestyle. It will also transform your idea of freestyle technique from Upper-Body-Pulls/Lower-Body-Kicks to Streamline-Right-Side/Streamline-Left-Side.

3.1 Superman-to-Skate



Click here for Video

The term ‘Skate’ refers to the long, *precision-honed* blade of a speed skate, which enables the skater to glide across the ice with breathtaking speed. In swimming terms, Skate is designed to imprint three mini-skills. Each improves the hydrodynamics of your body in specific ways.

Reach below your body. This turns your lead arm into a ‘trim tab’ that lifts legs toward the surface, cutting drag considerably. It also saves energy formerly wasted on leg-churning.

Rotate *just enough* . . . to clear one shoulder. This also reduces drag, while positioning you to access gravity as a source of ‘free’ propulsive power. Controlling rotation (roll *only* this far) is also essential to core stability, enhancing both streamline and propulsion.

Align your body . . . behind your lead arm. This reshapes your stroke from an instinctively human form (photo on left). . . to a distinctly fishlike form. (photo on right).

Among all drills taught by Total Immersion, Skate has the greatest long-term value and is thus worth practicing for years. Mastering its fine points with great patience and care will bring enormous payoffs. How efficiently, effectively—and *fast*—you swim will be heavily influenced by how well you master this position.

Superman-to-Skate: Rehearse

Start in Superman (1.2) pose. Visualize the hood of a VW Beetle.

Step—and lean—forward, sliding one hand *Across the Hood to the Bumper*.

Slide other hand deep in the *Cargo Pocket* (from 1.1 Torpedo).

Repeat several times on each side.


Right Hand to Bumper
Left to Cargo Pocket

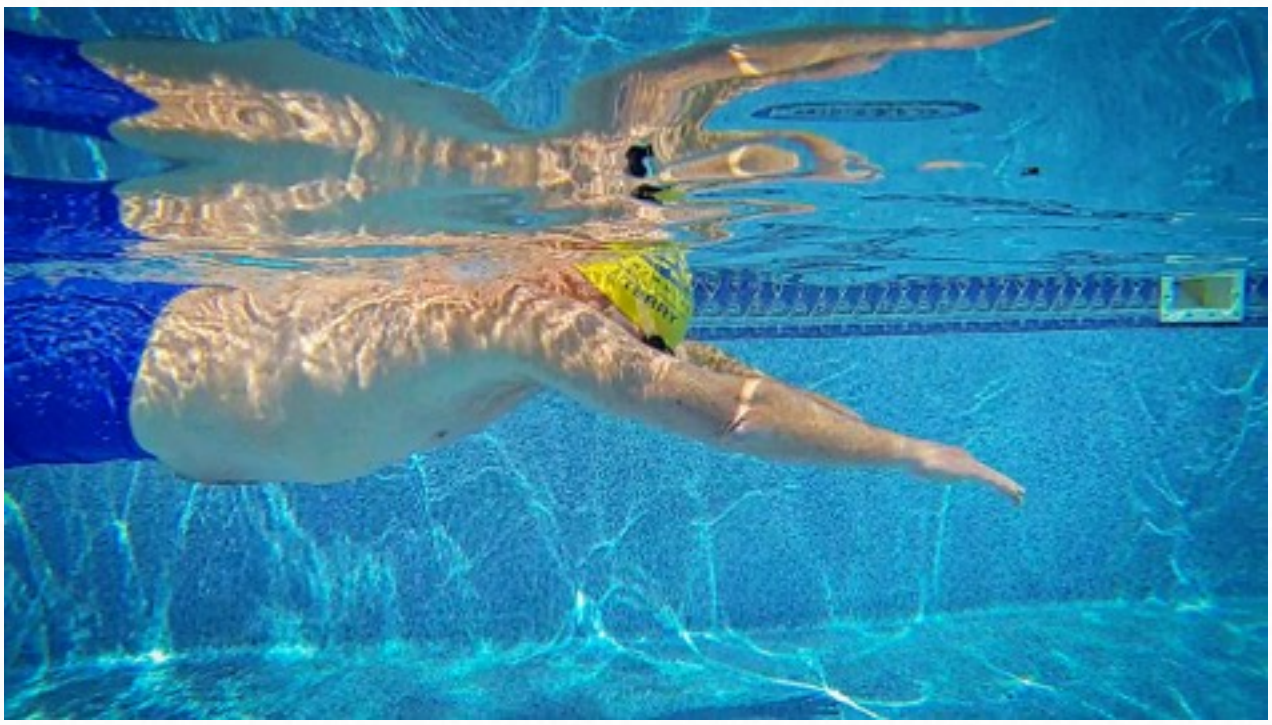

Slide Hand Over Hood
Stay on Right Track

Superman-to-Skate: Practice

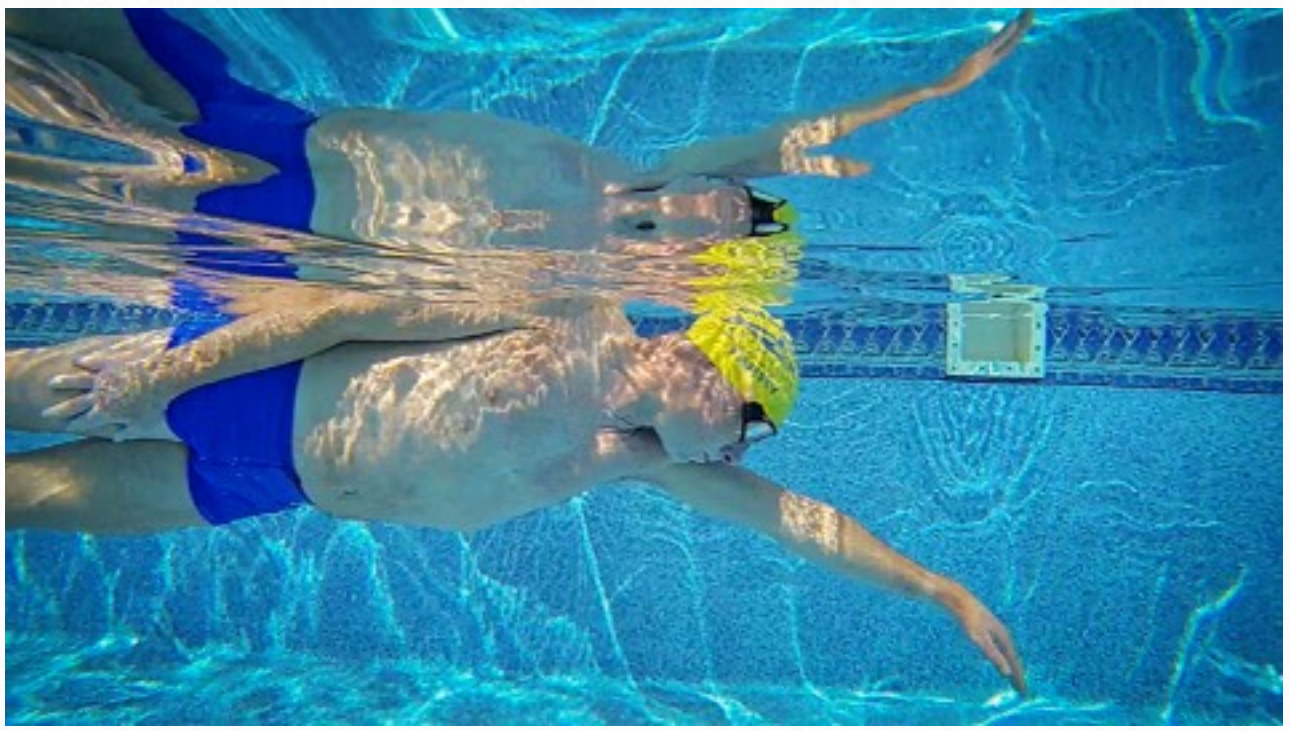
Starting with a brief ‘Superman’ glide, reach one hand forward—as if to touch the VW Bumper—while other strokes back. Travel a short distance in Skate, then stand for a breather, and repeat—reaching other hand forward. Compare sensations between the two sides.

Focal Points

Organize your checklist of focal points from front to rear, giving single-minded attention to each key *mini-skill*—in the order listed:

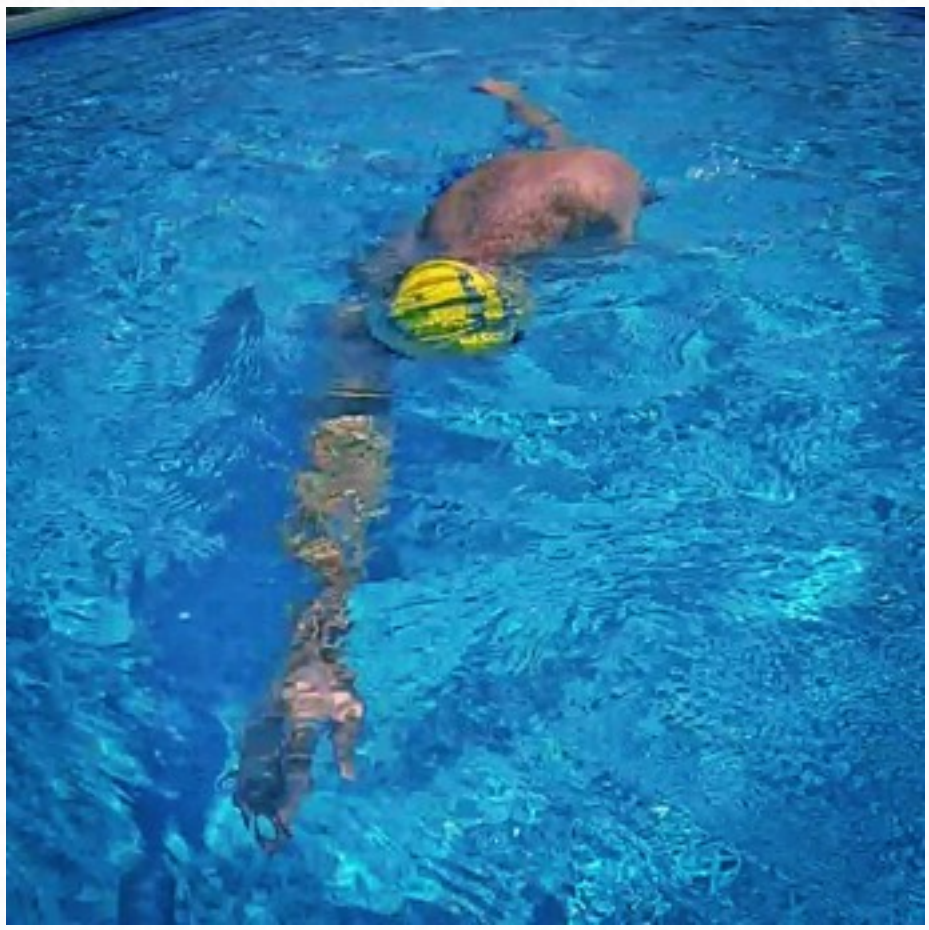


Slide Hand across VW Hood and Touch the Bumper (Other hand in Cargo Pocket.)



Keep Head Still (‘laser’ aimed forward) as you rotate.

Rotate your shoulder barely above the surface—then keep it still.



Align one side of body—fingers to toes—behind lead arm.

‘Rules’ for Effective Practice

Don’t rush. Take time in Superman to feel completely supported and stable, but don’t wait so long that momentum stalls.

Compare sides. Change sides on each repeat—this is how we swim. If one side feels less comfortable, or more resistant to change (*very* common), you might do several consecutive reps to that side. Strive to make ‘weak’ side feel more like strong side.

Keep it short. Remain in Skate long enough to evaluate, improve, and imprint fine points. But don’t turn this into a *kicking exercise*. Travel just five to six meters each time.

How much kick? The less the better. After rotating, try to *Skate* for a moment with legs streamlined . . . then flutter gently for a few seconds to sustain momentum from your weight shift. While kicking, keep legs within ‘slipstream’ of upper body.

Take new skills for a ‘test drive.’ When four key habits—hand at bumper, head aligned, shoulder barely out, and body aligned behind lead arm—feel somewhat natural and consistent, progress to 3.2 Skate+Strokes.

Superman-to-Skate: Partner Practice

Hands-on help—and an observant eye—can greatly accelerate mastery of critical *mini-skills*. Assist partner as follows:

Wait on the side that will reach to VW Bumper. If right side, lightly hold partner’s right wrist with your right hand during Superman.

As partner initiates rotation (on her own), draw her hand toward Bumper—on its Track, below bodyline.

At same moment, use your free hand on partner's shoulder to limit rotation. Front of shoulder should graze the surface. Avoid 'stacking.'

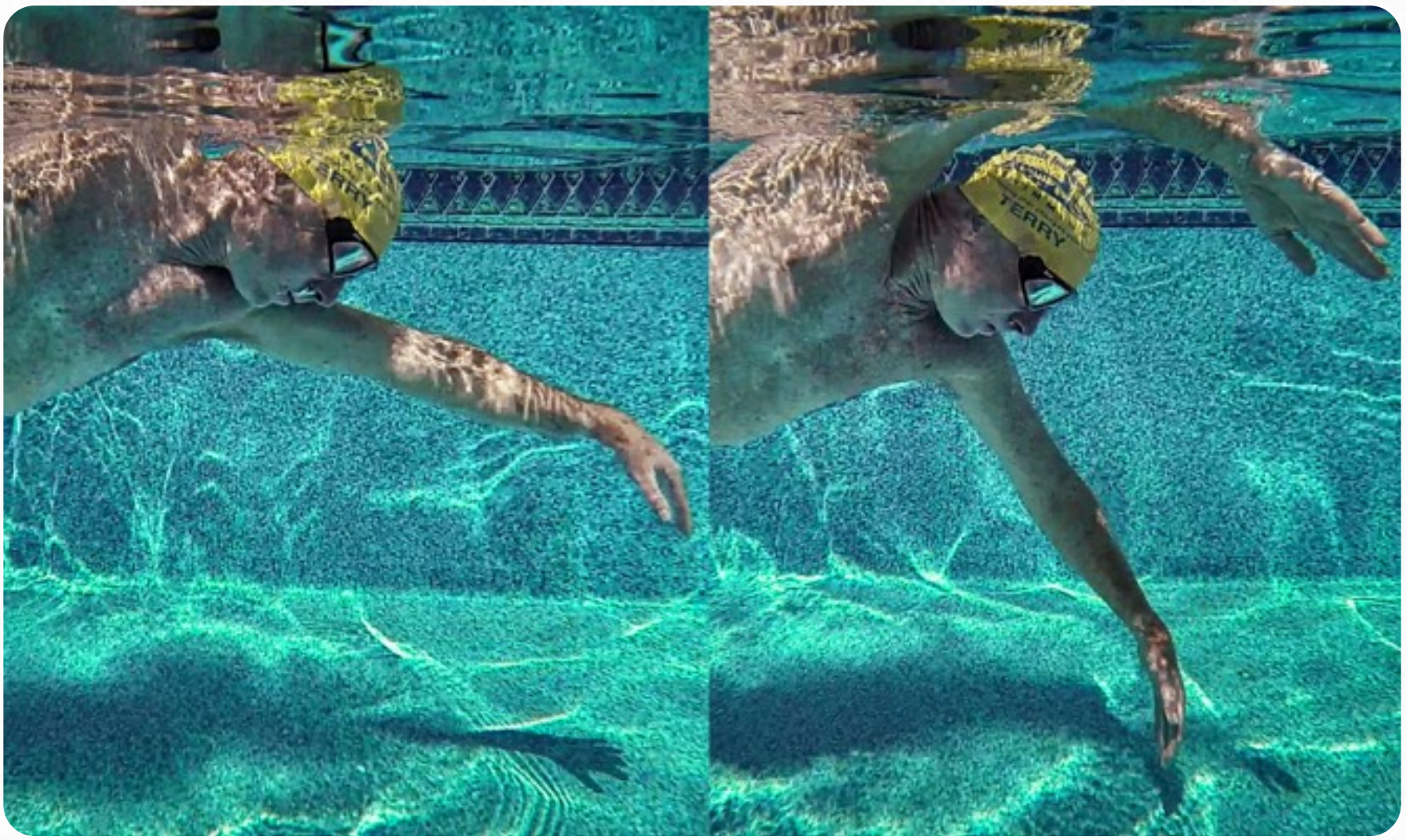
You Should Also

Check for tension in lead hand. Massage hand and wrist gently as you tow until she relaxes it.

Be attuned to whether partner is resisting (or relying on) you in achieving the correct positions. As partner works more *with* you, reduce your involvement. E.G. Release shoulder when she independently finds right degree of rotation.

Five to 10 assisted reps on each side is usually sufficient.

3.2 Skate + Strokes



Click here for Video

This step enables you to immediately ‘test drive’ new skills and awareness in whole stroke.

Follow this sequence:

Glide briefly in Superman, then rotate to . . .

Skate briefly (don’t ‘stall’) on Left Track then . . .

Transition smoothly into 3 to 5 strokes.

Finish in Skate on Right Track holding position briefly.

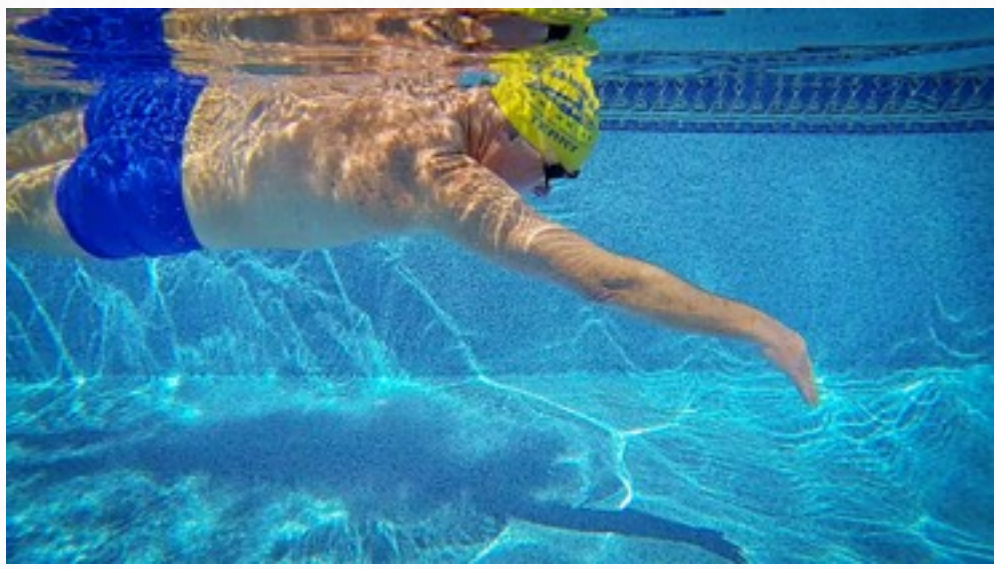
Compare each stroke—and final Skate—to initial Skate, using the Focal Point checklist below.

Skate+Strokes: Practice

Focus on same four mini-skills, in same order, as in 3.1 Superman-to-Skate. For each focal point, swim 4 to 6 repeats with highly targeted focus on doing the following in every stroke:

Touch Bumper at full extension.

Keep head aligned and still, while body rotates around it.



Control Rotation—shoulder just above water.

Align Bodyline behind lead arm.

Skate+Strokes: Partner Practice

You must be ‘nimble’ to match the timing of your partner’s stroke, while assisting in Skate+Strokes. Assist with two aspects of the drill

Guide her hand to the VW Bumper . . . then

Hold it there until other hand nears the Slot.

Assist only with the hand closest to you. Assist other hand on next repeat. Do three to five *assisted* repeats on each side.

Assist this way:

Guide Hand to Bumper on Initial Skate

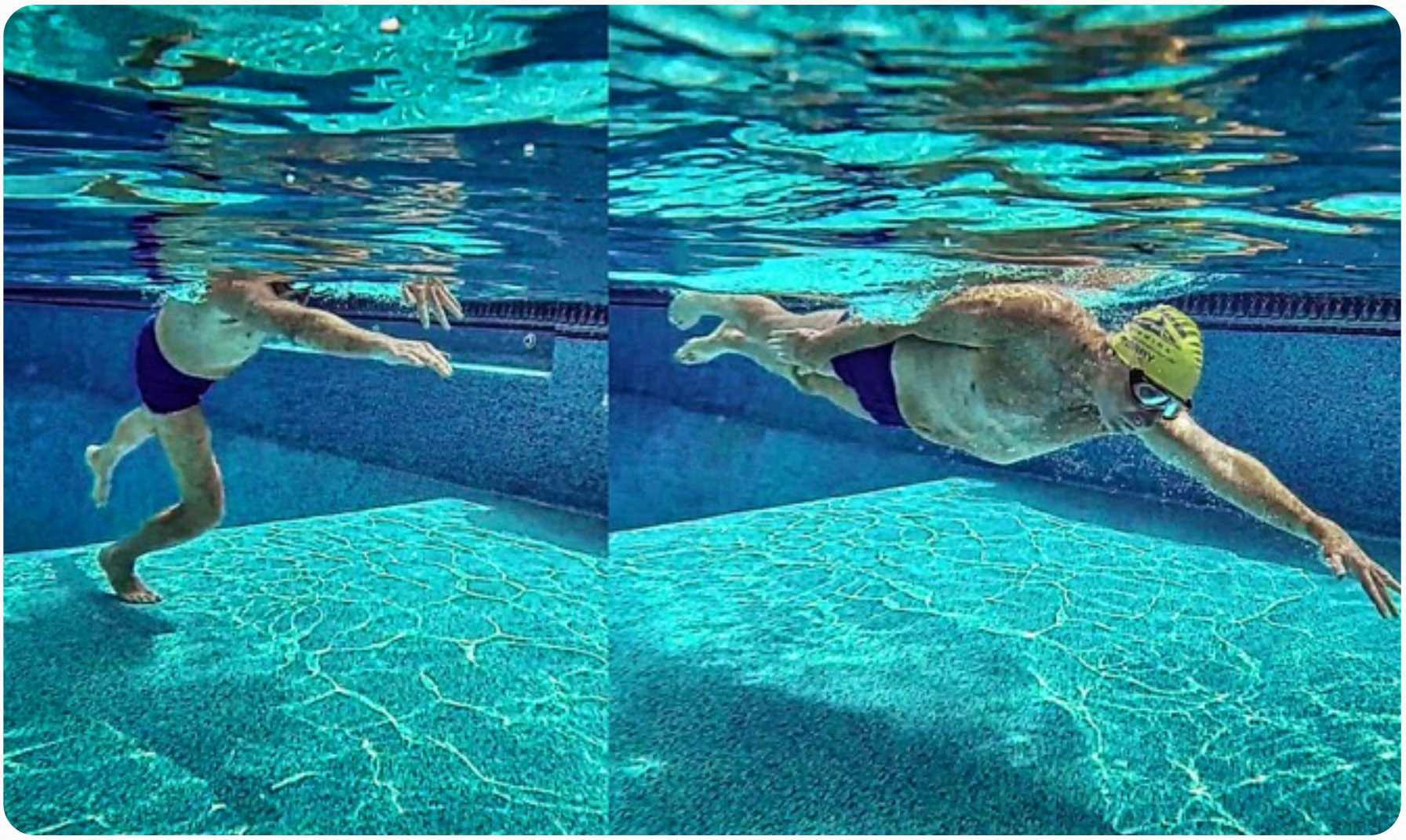
Then meet hand in air and guide to Bumper.

Or meet hand after it enters water . . .

And hold in place until other Hand Enters

Assist on first two to three stroke cycles, then let her continue unassisted, striving to maintain form on her own.

3.3 Slot-to-Skate



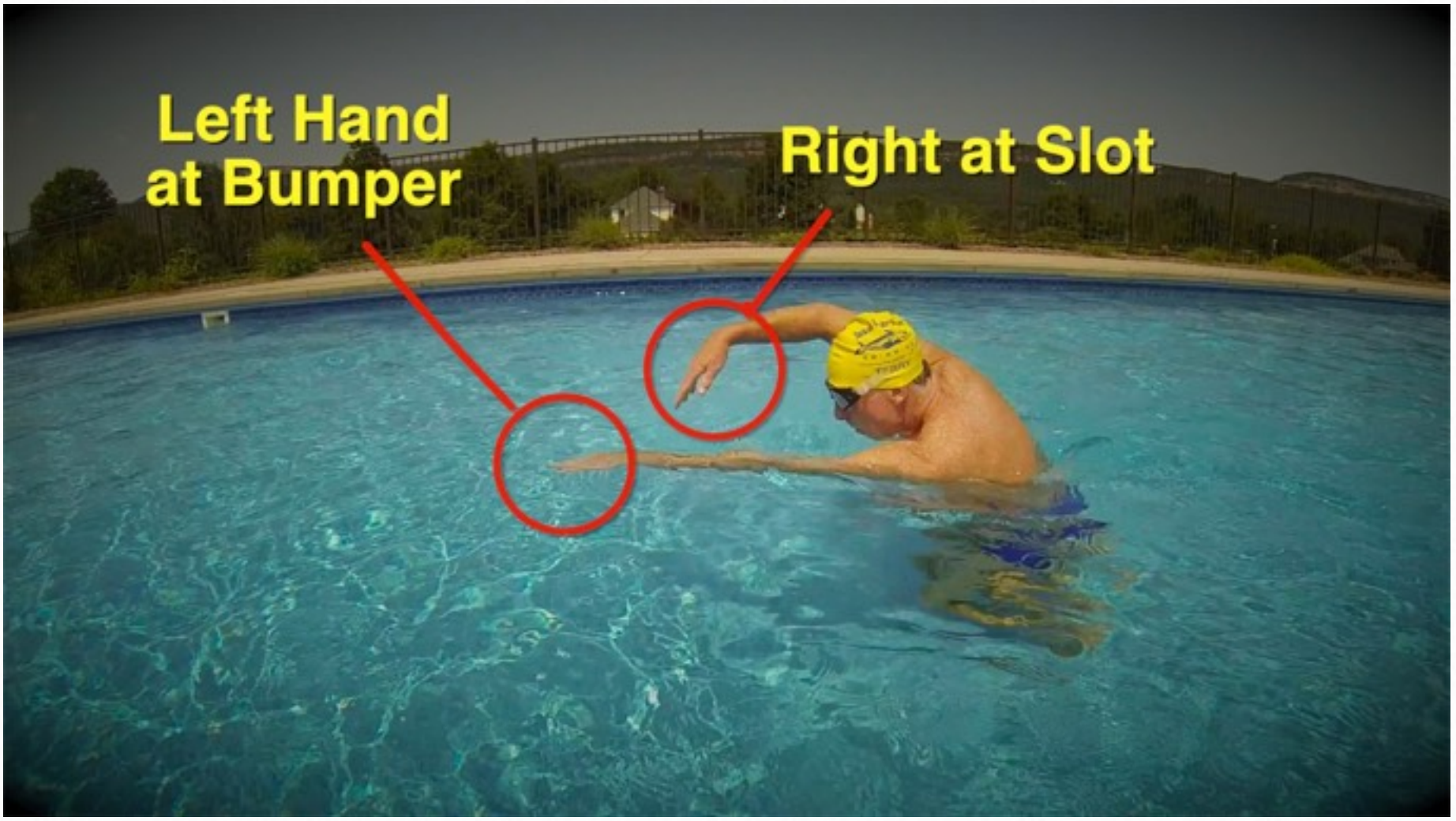
Click here for Video

This drill blends Recovery skills from Group 2 with newly learned vessel-shaping skills from Group 3.

Starting from a standing position—making full use of gravity and a weight shift—helps you enter the sleek, balanced Skate position with far more momentum.

Slot-to-Skate: Practice

If you wish to rehearse, revisit the Mail Slot 2.3 rehearsal.



Lean forward slightly with left hand at VW Bumper and right arm in Rag Doll position, poised above slot

Fall *Forward;* Drive Hand Thru Slot

Hold Left Shoulder Just Above Surface

Let it fall as Momentum Slows

When glide slows, body returns naturally to non-rotated position.

Slot-to-Skate+Strokes: Practice

In this drill, simply add three to five strokes to the faster, longer glide produced by the leaning weight shift with which you start.


Spear Forward to Skate . . .


Then *Flow* Into Swimming
Keep Lead Hand in Place Until Other Enters


Hold Skate B-r-i-e-f-l-y on Final Stroke

Next Steps

If you are working through Total Immersion technique for the first time, this is a good time to spend a few practice hours (over a week or more) consolidating and integrating skills and habits you've learned thus far. You can do this before moving on to Group Four, Seamless Breathing. Or spend 15 to 30 minutes doing so, during practices otherwise devoted to mastering breathing skills.

If you're a TI veteran, you can follow the prescription above. Or—if you breathe with considerable ease and comfort—allocate time now specifically to minimizing drag in whole-stroke.

For both groups, I recommend Skate-related exercises as a *'tuneup.'* They're especially useful during the first 10 to 12 minutes of practice (the part traditionally referred to as 'warmup') for heightening awareness and imprinting good habits on high-value skills you'd like to maintain throughout the practice. Or review them for a few minutes prior to any key set (sometimes called the Main Set) during practice.

Whether your goal is a new level of ease and control; or holding a high-efficiency stroke count (at a faster tempo, or for a greater distance) or a new best time at some distance; a more stable and streamlined vessel will greatly improve your chances of success.

This can be as simple as the following:

8 reps of Superman-to-Skate (or Slot-to-Skate)

4 reps of Skate+Strokes

2 x 25 y/m whole stroke.

As a pre-practice tuneup, repeat that sequence three times, focused on a different mini-skill (i.e. touch the Bumper, keep head stable, control rotation) each time. As a pre-set tuneup, you might repeat it only once, focused on a mini-skill you plan to emphasize throughout the set.

SKILL GROUP FOUR:

BREATHE EASY

While previous lessons included only three drill steps, we divide breathing into twice as many steps because of its great complexity. This lesson includes a series of breathing re-hearsals, two basic (no stroking) drills, and three drills-with-stroking. The rehearsals and basic drills will be invaluable aids along the way to *breathing in whole stroke*—the sixth and final step.

Breathing is often ruinous to stroke efficiency in freestyle because: (i) You must precisely integrate the breath into your stroke rhythm; and (ii) As you breathe, 10% of body mass (your head) turns sideways, while the rest of you is moving forward.

This lesson teaches three highly efficient moves:

1. Keep head and spine aligned. I.E. Don't *lift* your head.

2. Breathe with body roll. I.E. Don't *turn* your head.

3. Keep lead arm on Track and lead hand *patient* as you breathe.

Because breathing challenges are considerable—and the solutions non-instinctive—this lesson includes breathing several rehearsals, two basic-skill exercises, and three whole-stroke drills. The preparatory work will be invaluable when you get to the main drills.

Breathing Rehearsals

Rehearsals are more valuable for breathing than for any other skill because breathing requires a far more intricate coordination of many moving parts. If any part breaks down, overall efficiency can suffer significantly.

Breathing rehearsals incorporate two familiar skills—2.2 Paint a Line and 2.3 Mail Slot. Performing those skills correctly is critical to getting air efficiently and comfortably. These rehearsals also teach the precise coordination of rotating-to-air with the armstroke.

4.1a Single Arm Rehearsal

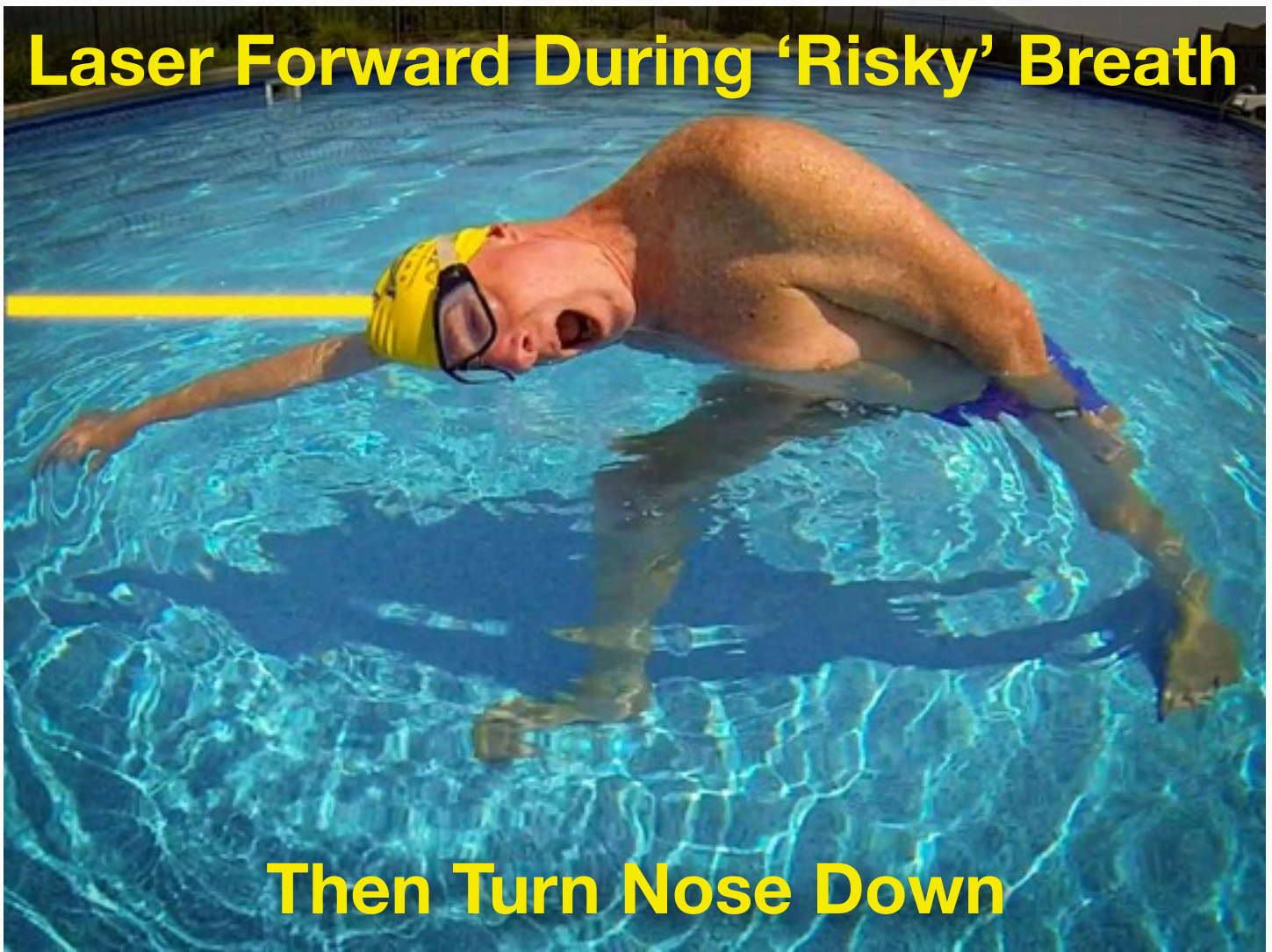
Click here for Video

As you did in Recovery Rehearsals, refine and imprint the action of one arm, before progressing to alternating arms. Because bilateral breathing is critical to stroke symmetry, perform this with each arm—both as a single-arm and whole-stroke rehearsal.

Step One Breathe *Without* Recovery

Repeat six or more times on each side.

Pause in each position to familiarize and memorize.



Step Two Breathe With Recovery

This step integrates a ‘stabilizing’ recovery with the aligned breath, long bodyline; and ‘gripping’ lead hand. It also introduces proper timing of breath-to-stroke.

Repeat on each side until movements and timing feel natural and consistent, then progress to alternating arms (whole-stroke) rehearsal.

4.1b *Whole-Stroke* Rehearsal

Click here for Video

This rehearsal coordinates both arms with breathing. Imprint same three skills—paint a line; Rag Doll sensation; drop through a slotwith both arms. You'll also work on coordinating the breath to the stroke. To strengthen awareness of critical moments in breath-timing, pause briefly with fingers at Slot. After eliminating pause, keep movements deliberate. Repeat on each side until new skills feel natural. Then progress to Bilateral Rehearsal.


Right Hand Entry Initiates Rotation to Breath


Chin Follows Shoulder . . .
Take ‘Risky’ Breath


Paint a Line;
Fingertips Graze Surface

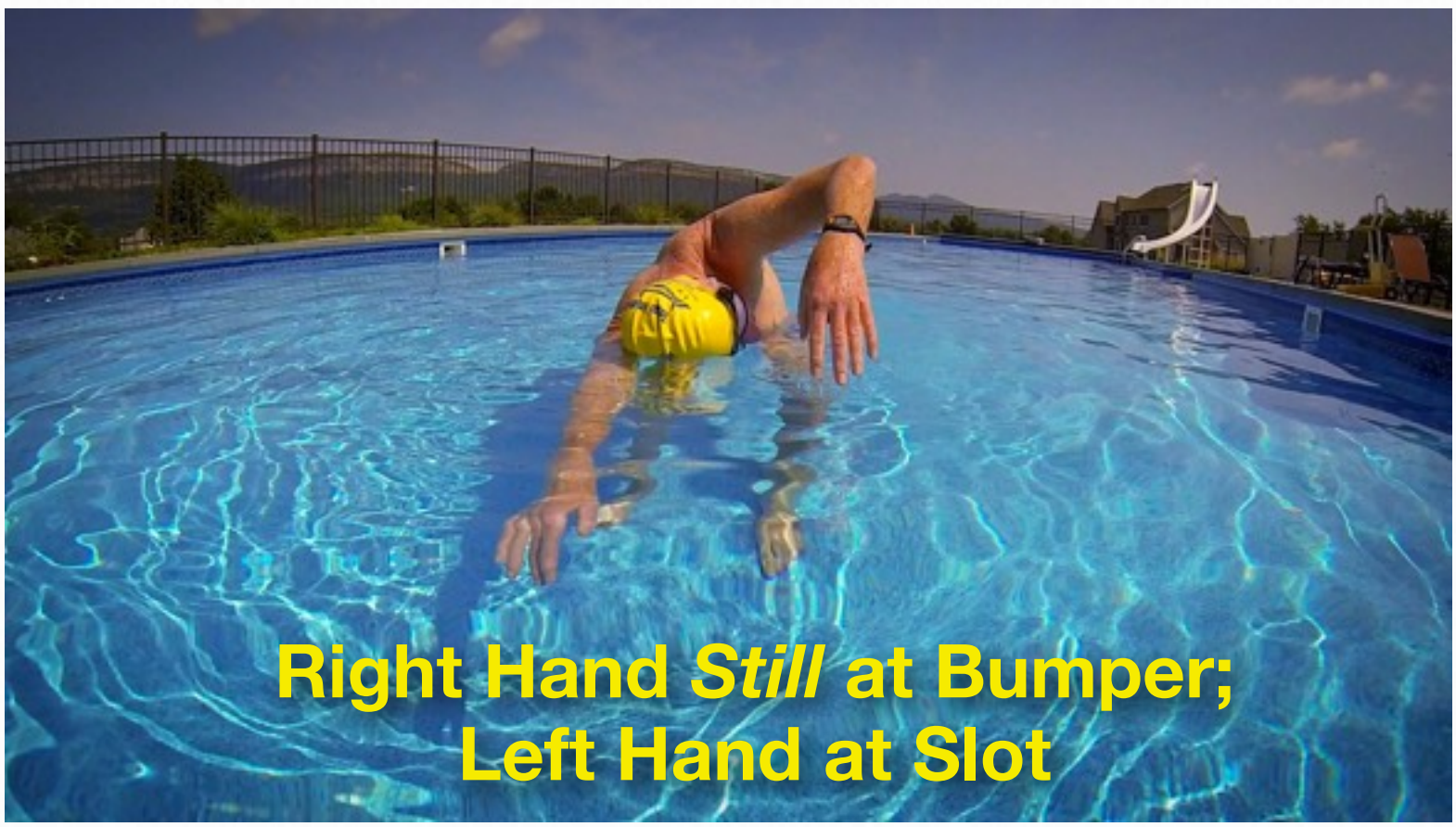

Right Hand at Bumper
Left at Slot


Head to Neutral as
Hand Goes to Bumper

4.1c *Bilateral* rehearsal

In this rehearsal, you breathe every third stroke, rather than every second one breath to the left, the next to the right. Bilateral breathing improves efficiency by encouraging *stroke symmetry*.

Click here for Video




Laser Aimed Forward
Left Hand at Bumper


Left Hand Paints a Line
Right Hand Holds at Bumper


Left Hand Holds at Bumper
‘Risky’ Breath; Paint Line on Right

4.2 *Simple* Role to Air

Click here for Video

Basic Breathing Drills

These drills imprint habits that are integral to breathing in whole stroke. Practicing them in simpler drills (with few moving parts) will improve coordination in the more advanced drills that follow.

Focus on imprinting three critical habits:

Rotate from hips. Initiate rotation from your hips let your head follow the body to air. Use lead hand as a ‘rudder’ to guide rotation.

Stay aligned. Rotate around head-spine line—keeping laser aimed forward. Travel through the water *like an arrow through the air* as you rotate up and down.


Right Hand at Bumper,
Head Aligned, Left Shoulder Out


Head Follows Body,
Lead Hand Crosses Over


Left Shoulder Out.
Calm Water at Corner of Goggles

Weightless head Feel your head resting on the water at all times—before, during, and after rotation.

Start in Skate:

***Simple* Roll to Air: How to Practice**

This drill was originally designed for novices (formerly called Sweet Spot), but has proven valuable for experienced swimmers too because it's so effective at teaching balanced, aligned rotation around the spinal axis. As with Skate drill, don't turn it into a *kicking exercise*.

1. Practice in sets of 3 breathing cycles (or half a pool length)with right arm extended (rotating to the left) going away from the end or the pool, and with left arm extended returning. Repeat this once or twice for each Focal Point.

2. Spend several moments in each positionnose up, and nose down. When nose down, review Focal Points for Skate.

3. Slip through the water with minimal disturbance while rotating up or down. Strive to kick with more ease: *Reduce drag and wavemaking*.

4.3 *Breathe in Skate*

Click here for Video

This is also called ‘Risky’ Breathing because you breathe with water touching the corner of your mouth. Mastering ‘risky’ breathing here will make it easier to do the same in our final step (4.6) because, here, you have less momentum—and thus little or no bow wave. This drill has three goals

1. **Minimize Rotation**. In 4.2 you rotate almost to your back, with nose pointing up. Here you rotate *just enough* to clear your mouthtrying to keep shoulder and hip just short of ‘stacked.’ This is far less rotation than in 4.2 . . . but considerably more than in the next three steps.

2. **Stay Aligned.** Even while rotating less, stay focused on moving through water like an arrow through air.

3. **Keep Lead Hand at Bumper**. This is a rare and high value skill in whole stroke breathing. You focus on it for the first time here, and reinforce in the next three steps.

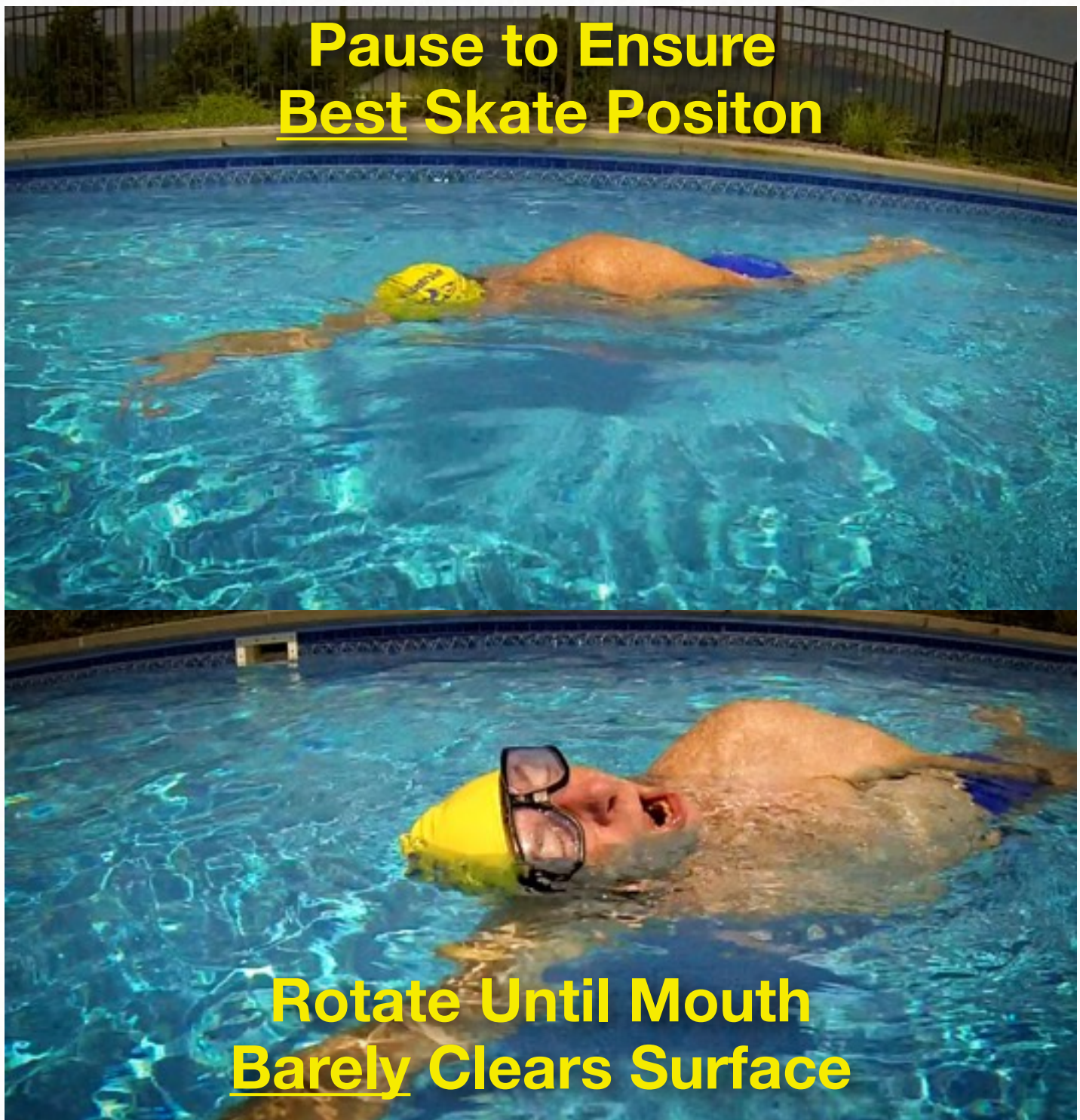
Practice as in 4.2. Keep repeats short. In fact, start by doing just <u>one</u> ‘risky’ breathing cycle: Start in Skate. Rotate to breathe. Return to Skate. Stand up.. Repeat one cycle on the other side. Proceed to two or three cycles when you feel comfort and control of all Focal Points for one cycle. Do *many* short reps with correct form, rather than continuing on *just to reach the other end of the pool*.

‘Risky’ Breathing: Rehearsal

Review Rehearsal 4.1a

‘Risky’ Breathing: Practice

Start with Superman-to-Right-Skate.




Minimize Shoulder Rotation


Keep Right Hand at Bumper


Return to Best Skate Position

The Easy Breathing Sequence

The 3-Step Easy Breathing Sequence

You swim whole-stroke at each step in this sequence. You rotate your head as if to breathe in all three steps, but actually breathe only in the final step. Removing the 'pressure to get air' in the first two steps makes it much easier to perform three skills that allow you to keep your stroke ultra-efficient when you do breathe.

Those (by now familiar) skills are:

Rotate to air with head low and *Laser* forward.

Breathe with body roll: Chin follows shoulder to air.

Breathe with lead hand at *Bumper*.

4.4 Nod *(Non-Breathing)*

Click here for Video

4.1 Nod (Non-Breathing)

In this step, you rotate as if to breathe, but keep both goggles submerged while looking to the side under the surface.

As you do check the following:

- **Head Aligned:** Is your laser still pointing forward?
- **Head Low:** Is the side of your head parallel to the surface?
- **Hand Patient:** Is extended hand relaxed and stable with palm facing back?

Practice Tips

Not breathing limits you to about four ‘nods’ per repeat. Nod to left side on one rep, to right on next.

Start ‘nod’ to left as right hand enters Slot.

Let left-side gaze ‘linger’ throughout left-hand recovery. What do you *notice* while looking sideways?

Side of head should feel parallel to surface . . .

And right hand should hold at Bumper.


Entry on Right Starts Roll to Air


Chin Follows Shoulder to Air


Align on Right Track
While Looking Left


While Looking Left, Paint a Line
With Fingertips


Left Hand and Nose Drop Together


Align on Left Track; Hand to Bumper

4.5 Whale Eye *(Non-Breathing)*

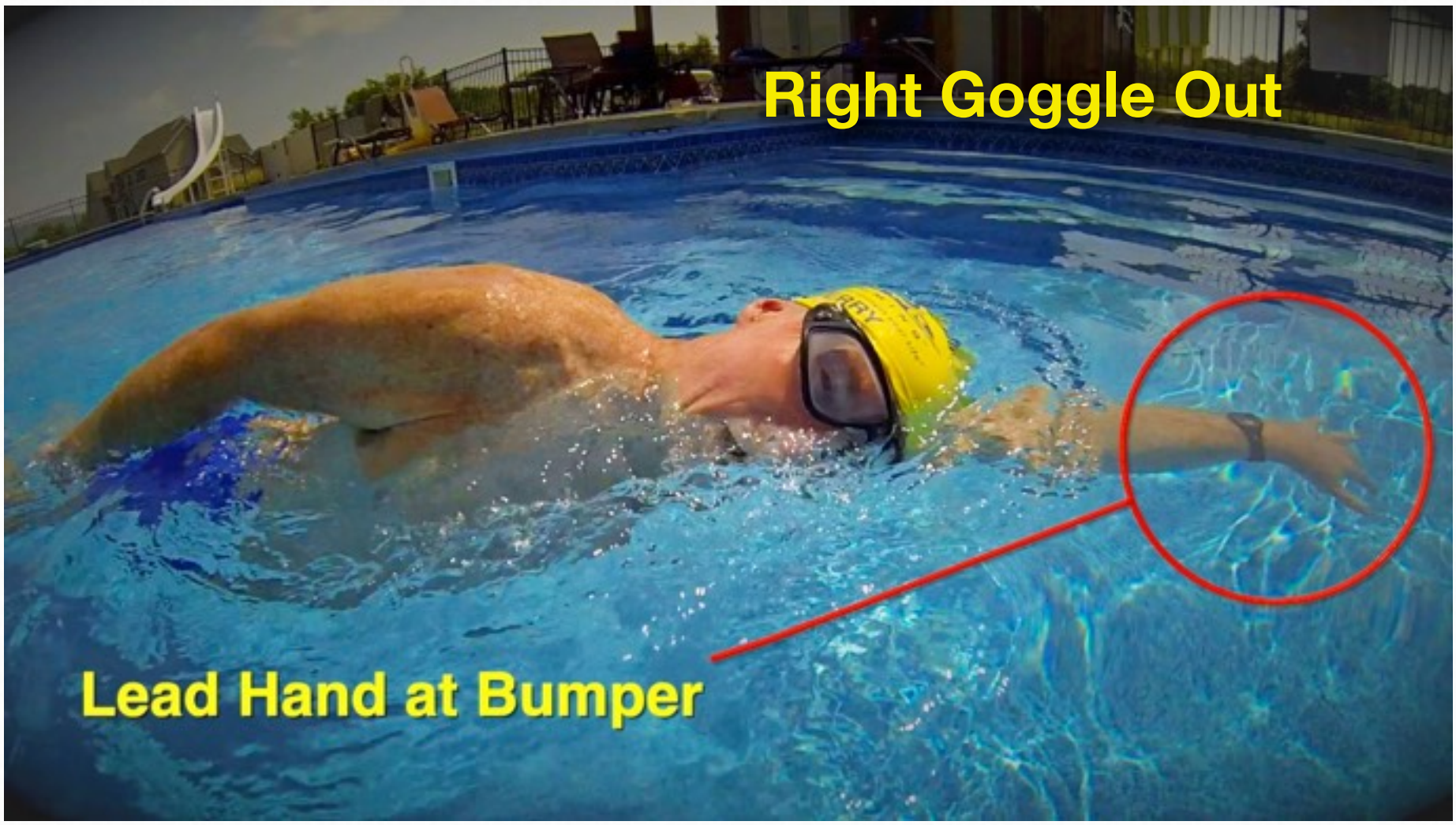
Click here for Video

This drill is named for the thrilling moment during a whale-watching cruise, when a whale glides alongside the boat, seeming to study you with one eye. Perform this exactly as Nod, but clear the surface with just one goggle. As in Nod, let your gaze ‘linger’ there a moment and notice the stereoscopic view—seeing just above and just below the surface.

Practice Tips

Practice Whale-Eye just as you did Nod. Devote at least one set of repeatsrotating in each direction—to each key Focal Point, in this order:

- Head neutral . . . and *resting* on water.
- Lead hand holds at Bumper
- Fingertips skim surface on recovery (see it pass your eye.)
- Head returns as hand enters.



Also notice that the surface is barely millimeters away. Think about how little you need rotate your head to get air! We'll do that next.

4.6 Popeye *(Breathing!!!)*

Click here for Video

This drill recalls the way *Popeye the Sailorman* stretched his mouth to 'inhale' spinach. You'll stretch your mouth to air as shown above.

Popeye: Rehearsal

Review Breathing Rehearsals 4.1b Whole Stroke and 4.1c Bilateral.

Glide briefly in Superman, start stroking—then just turn your head a *tiny* bit farther than in Whale-Eye. Bring your mouth above the surface on every cycle—but don't feel obliged to breathe right away. You might actually try for a breath on the third or fourth cycle. Rotate one way on one rep, the other way on the next. Is there water in your mouth? Air can still pass over it on the way to your airways.

After rehearsal, move on to practice...

Breathing Practice

At this stage you're no longer drilling. You're swimming whole stroke, integrated with breathing. Though you've completed the 3-step Easy Breathing sequence, you should continue practicing each of the steps for at least several weeks. There are two ways to do this:

As you've done so far, doing repeats of just four or so cycles of each breathing exercise. Stand for a breather between repeats. Choose a Focal Point for each pair of repeats.

Do four cycles of Nod or Whale-Eye at the beginning of a lap . . . then continue, breathing *consciously* the rest of the way. Alternate between drilling and breathing left on one length, and to the right on the next. Choose a Focal Point for each pair of 25s.

Exhale!

So far, our focus has been on the mechanics of breathing. But we shouldn't wrap up this chapter without some reminders about the process of exchanging fresh air for 'used' air. Here are four things to think about:

Put most of your focus on exhaling. Let the inhale 'happen.'

Make air exchange continuous – never *hold breath* at any time.

Expel air forcefully as mouth clears. Think of blowing the water away from your mouth. This helps make the inhale automatic by *creating a vacuum*. Air will *rush* in.

Finally, inhale just enough, and exhale just enough. Neither try to fill nor empty your lungs.

5.0 Whole Stroke: Video Study

Click here for Video

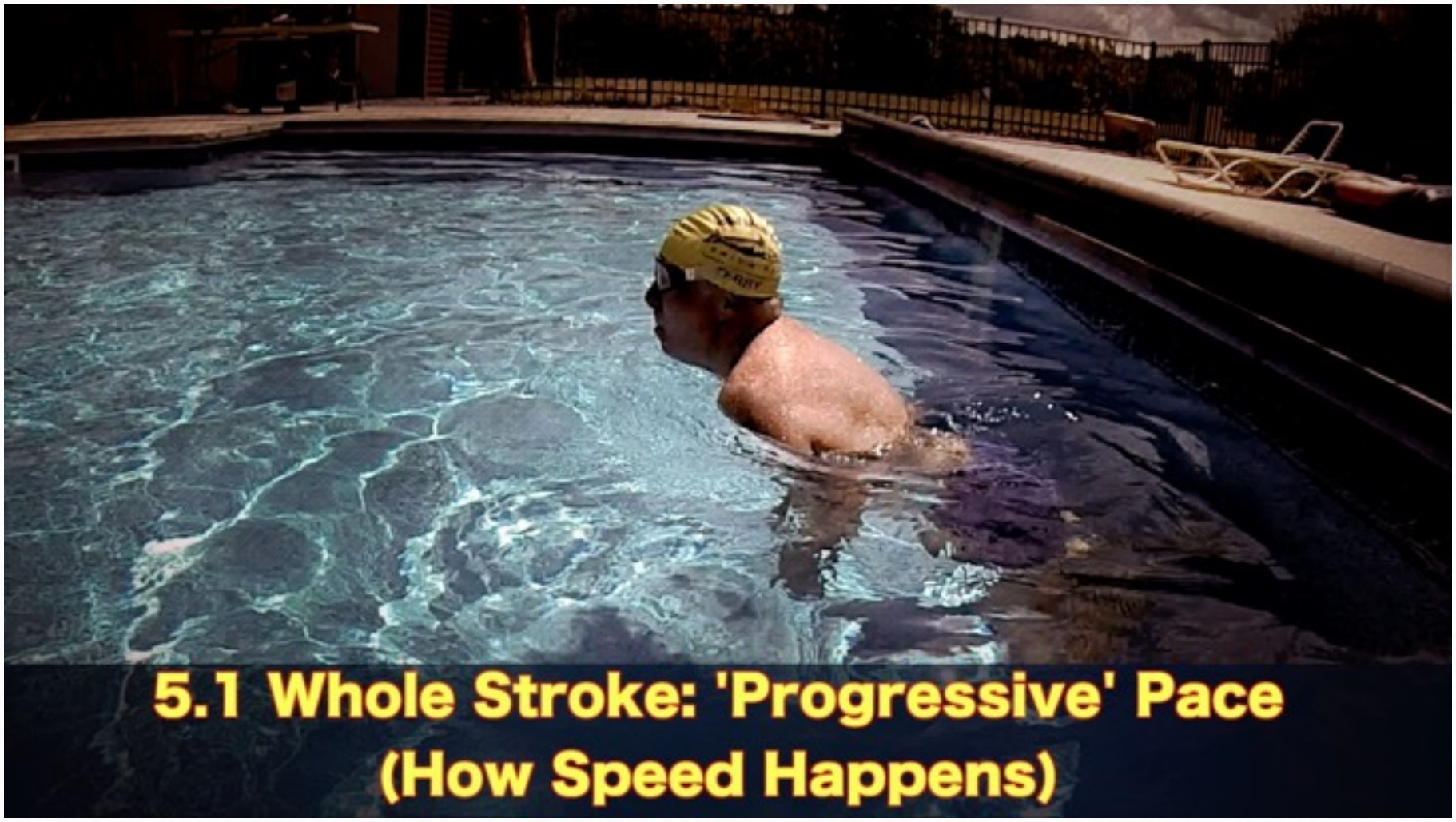
Study Guide

Lessons 1 through 4 of this video series illustrate a step-by-step method for increasing the efficiency of every key component of your stroke. This whole stroke study shows how all the pieces work together as a holistic system. We do that via a series of *stroke studies*, from multiple stroke views, to show each part of the stroke from it's most revealing perspective.

In a *holistic system* all parts are intricately interrelated. This study guide, in combination with the video studies, is designed to deepen your understanding of those relationships and empower you to make confident and knowledgeable choices about your own stroke.

Each view is shown first at normal speed to let you take in the natural flow of the stroke. Then it’s repeated at slower speed to allow you to look closely at fine points.

You will learn the most by using the cursor key or your computer’s mouse to advance or reverse the video one frame at a time, while following the study cues we’ve provided for each stroke view. These study cues provide a systematic way to understand the synergies between all parts of the stroke.



Click here for Video

5.1 Whole Stroke: Progressive Pace (How Speed Happens)

Most TI videos show our techniques done as correctly as possible, generally performed at fairly slow pace. This clip shows me swimming a continuous 100 yards at gradually faster speed.

I swam the first length at ‘cruise’ pace—a relaxed and restorative pace that feels as if I could swim indefinitely and never tire. This approximates the pace and effort I’ve used in marathon swims of 20 or more miles.

On each of the next two lengths, I increased tempo and stroke pressure slightly. On the last length, I swam at what I call ‘brisk’ pace—strong, but quite controlled. It equates to how I swim while racing 1500 meters in open water.

I counted strokes (as I do habitually) while swimming this 100. My plan was to take 13 strokes on the first length, 14 on the next two and 15 on the fourth. (My Green Zone in a 25-yard pool is 13 to 16 SPL.) I missed my target counts by one stroke, taking 15 on the

third length. As I increased tempo, pressure, and speed, I focused on keeping my stroke quiet and splash-free—as I always do when increasing pace.

From the video, I took split times, counted strokes, and timed tempo for each length. Here are seconds, stroke count and Tempo for each length:

1st 25: 21.7 sec., 13 strokes, 1.24 sec/stroke

2nd 25: 21.7 sec., 14 strokes, 1.20 sec/stroke

3rd 25: 21.6 sec., 15 strokes, 1.16 sec/stroke

4th 25: 20.2 sec., 15 strokes, 1.06 sec/stroke

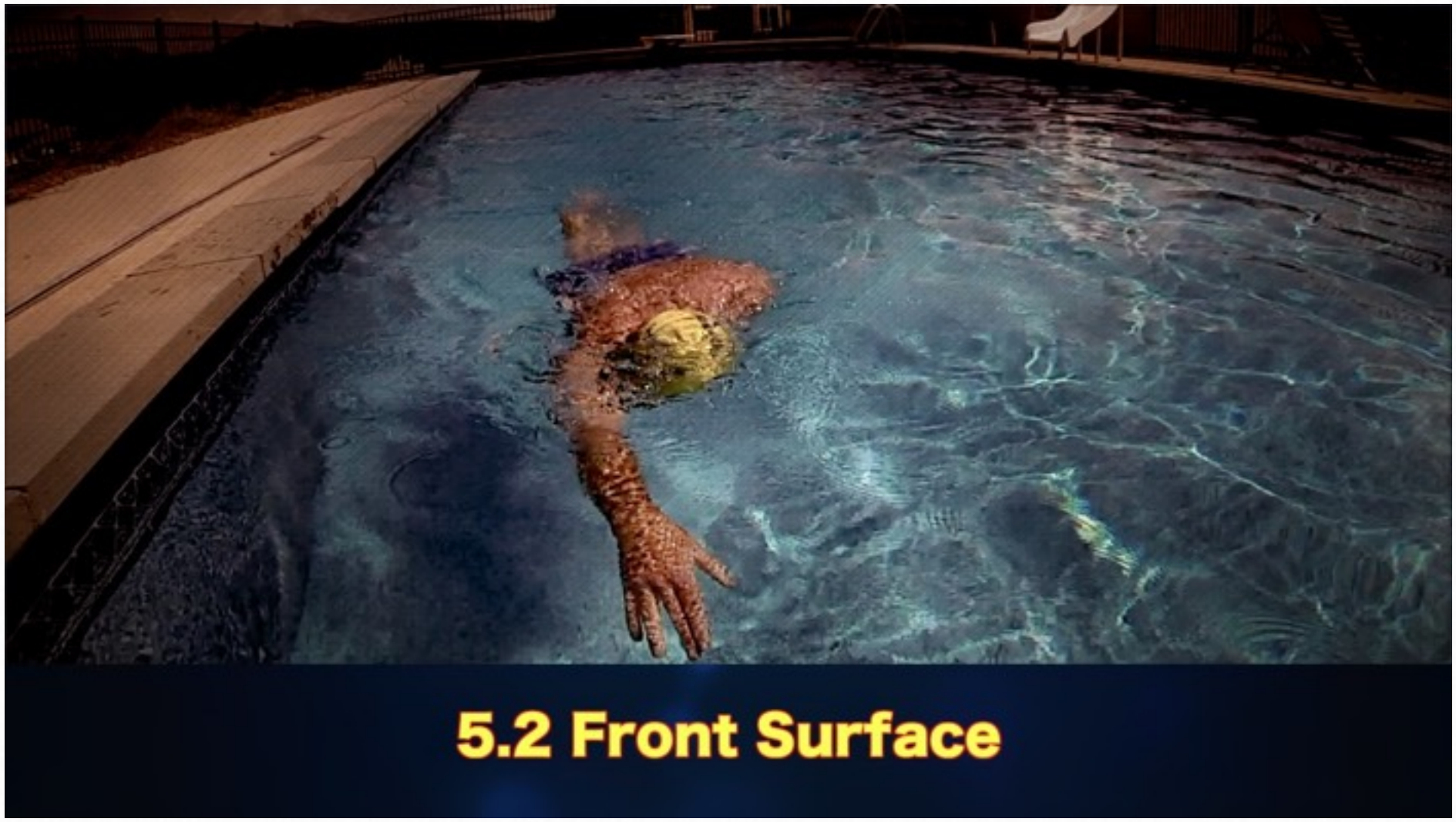
My 1650yd/1500m pool pace (calculated by multiplying 25-yard split times by 66) improved from 23:52 on the first length to 22:12 on the final length.

Besides the efficiency skills of balance, stability, streamline, etc., this swim also displays a high level of pacing skill, which is critical to racing success. Few swimmers can maintain or increase pace on each successive 25 of a continuous 100. Fewer still can increase pace by 6.5% from start to finish.

Both skills you see me display in this swim have come from tirelessly working on all the fine points of technique shown and described in 5.2 through 5.7—first at very short distances and quite slow tempo and speed, then for gradually longer distances and brisker paces.

What changes do you observe between first and final 25 on this 100?

And what changes do you note from this continuous 100 and the stroke views shown in 5.2 through 5.7? And what remains unchanged in both cases?



Click here for Video

5.2 Above Water Front Surface

This is a good perspective for observing:

- **Head is a *Still Point* . . .** while other body parts are in motion.
- ***Relaxed* Hands**: Barely clear the water, and enter without splash.
- **Core Body Rotation**: Controlled and symmetrical.
- **Path of Elbows**: During recovery, elbows travel straight forward (no lateral motion) outside torso.

Click here for Video

5.2 Slow Motion Study Cues

Click through video, one frame at a time, to study:

- As right hand enters, left hand is well forward of head. This reduces drag by maintaining a ‘long vessel.’
- Right hand extends on Right Track--directly forward of shoulder.
- As left shoulder and elbow lift clear of water, entire body is aligned from right hand to streamlined feet.

‘Click’ left hand forward through recovery and study:

- I maintain an extended *stable* bodyline on Right Track with right hand ‘anchored’ in place. Feet *barely* begin to separate only as left fingers enter Slot. This requires an engaged core.

As left hand extends:

- Head follows right shoulder toward the air.
- As I breathe *behind the bow wave* (i.e. beneath the surface), head stays perfectly aligned with only right goggle showing.
- On recovery, *relaxed* right hand follows a wide straight track forward. Fingertips graze the surface. (Don't lift 10x arm more than necessary.)
- Head returns to neutral (nose down) as right hand slices cleanly through Slot.
- Left hand remains forward of the head at this moment.

On next left hand recovery:

- Pause with left hand adjacent to ear and notice equilateral triangle beneath my arm. We call this the 'geometric recovery.' It's orthopedically-healthy, and biomechanically strong.
- Bodyline is extended, stable, and streamlined on Right Track.
- As weight shift begins, right hand moves slightly wider to hold water more firmly.

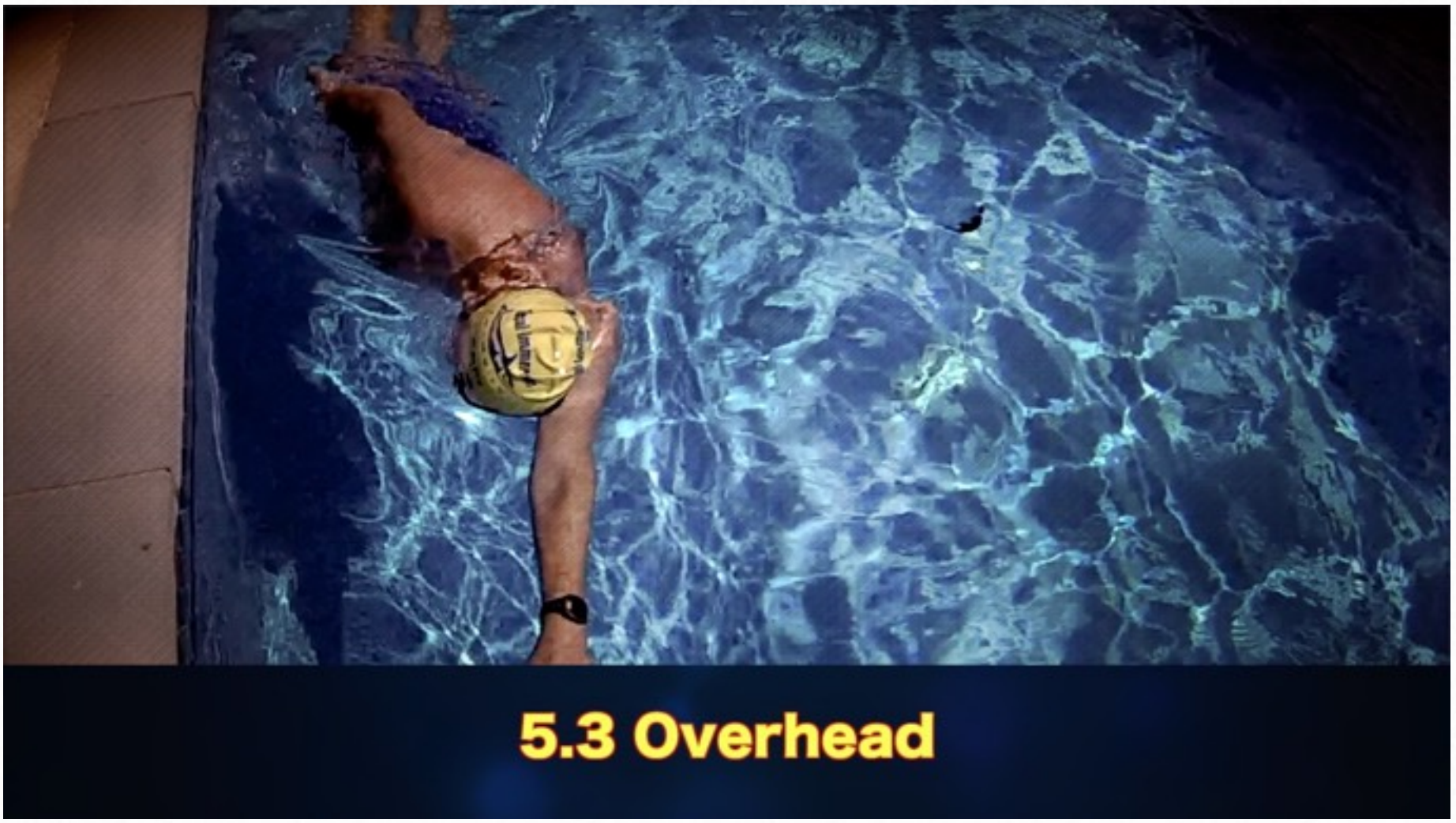
Right recovery is a mirror image of left recovery:

- Relaxed hand 'paints' a wide, straight line.
- Fingertips graze surface.
- Equilateral triangle as right hand passes ear.
- Left hand is firmly anchored as right hand approaches Slot.

On final (left) breath:

- Head is aligned with spine, but slightly higher. [**Note**: Left was my natural breathing side; I didn't begin breathing to right until I'd been swimming 25 years. Today (25 years later) my right-side breathing technique is better, because I hadn't practiced 25 years of improper breathing habits on that side.]
- Right hand is firmly anchored as I inhale to left.

Clip ends here.



Click here for Video

5.3 Overhead: Forming Lines

A key element in an *ultra*-efficient stroke is to form lines with your body as you move through the water. This angle displays the three lines the body should form and maintain during each stroke cycle:

1. **Spinal Axis**: Always moving forward, as rest of body rotates around it.

2. **Right and Left Tracks** Align body on these as you reach extension—then hold that line as other arm moves through air during recovery.

3. **Recovery Line** ‘Paint’ this with your hand. A wide straight line (and an engaged core) keep your extended side aligned on Track as your ‘10x’ arm moves through the air in recovery.

Click here for Video

5.3 Slow Motion Study Cues

Segment begins with left arm on its Track, and right arm following its Track forward (I notice it moves a bit toward centerline, which will make me more mindful of avoiding this.) Click through to study:

- I hold right-side line as left hand ‘paints’ a wide, straight line on recovery.
- Head-spine line continues moving directly forward as left hand enters and extends and as my head (10% of body mass) follows shoulder to right for a breath.
- Left hand ‘anchors’ and bodyline is stable and streamlined on Track, while right hand paints wide straight line and head returns to neutral.
- I then line up on Right Track. The body aligns itself on the same line my hand ‘painted’ during recovery.

- I maintain fingers-to-toes alignment on Right Track until left hand is poised to cut a Slot.

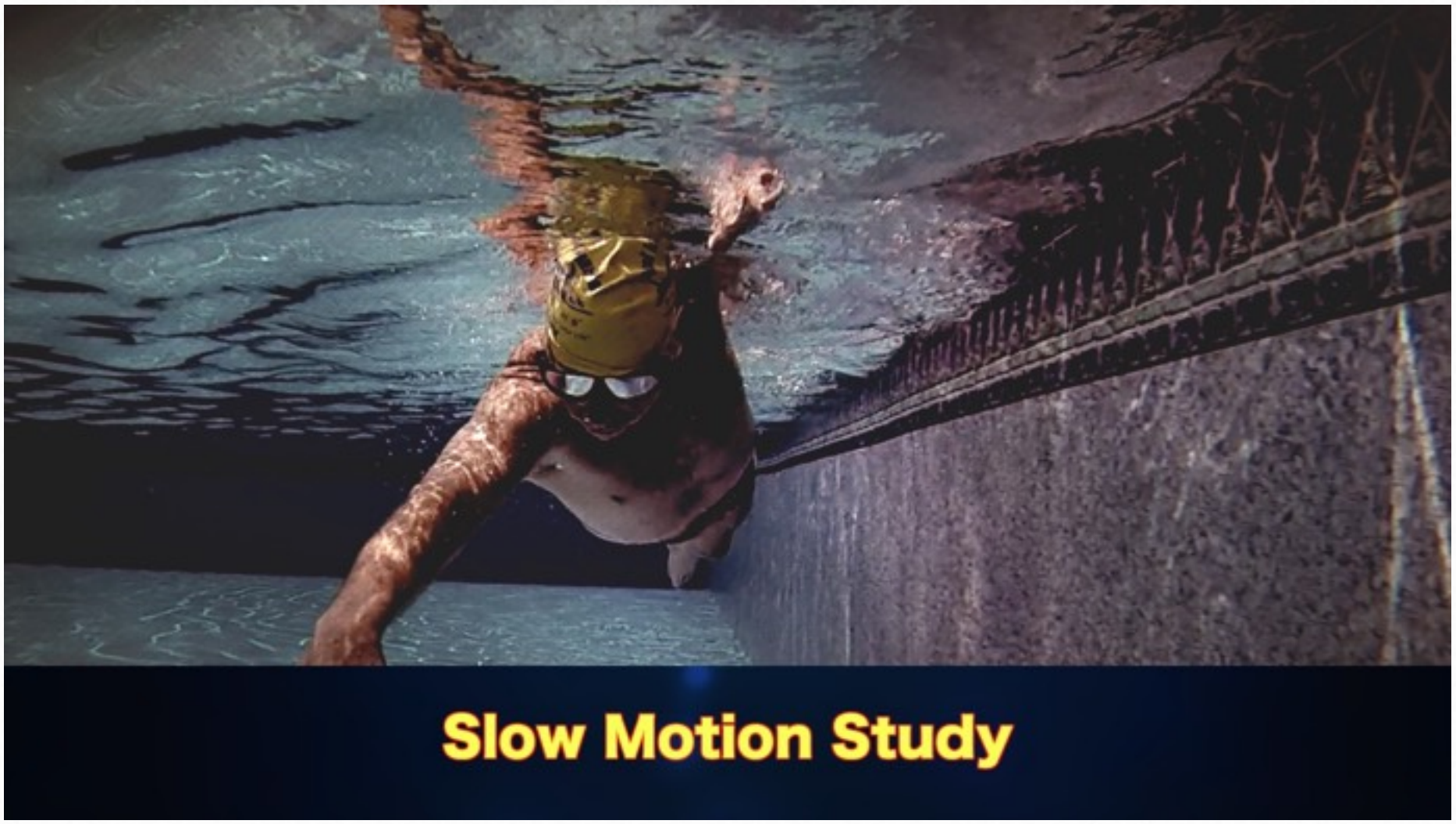
Clip ends here.

Click here for Video

5.4 Under Water Front

This is the best perspective for studying:

- **Stable Head**: Keeping the head still, and *always* moving forward--is critical to a stable core body--which stays aligned during the breath.
- **Controlled Symmetrical Rotation** I rotate just enough to maximize drag avoidance and effortless propulsive power, while avoiding ‘stacked’ shoulders which would destabilize my core.
- **Hands** move through the stroke via a nearly straight line—which closely follows the Track—with palms always facing back.
- **Legs** avoid drag by ‘drafting’ behind the upper body. Note that feet are mostly hidden from view.



Click here for Video

5.4 Slow Motion Study Cues

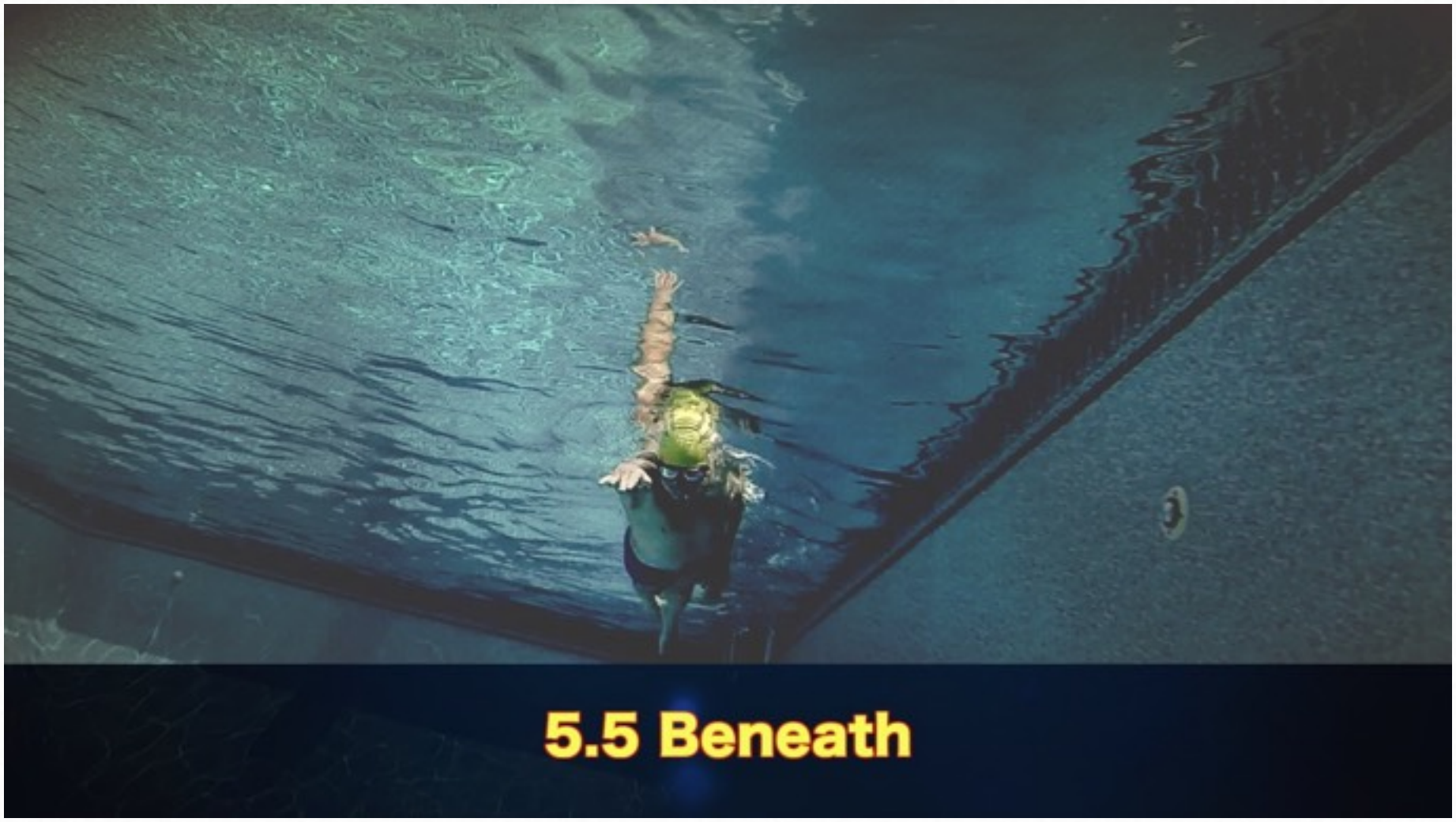
This clip begins with right hand (fingers separated) in position to hold water and left fingers just cutting the Slot. In the next moment, the extending arm—aided by gravity—will release propulsive energy via the weight shift.

Click through and study the following:

- Right hand presses directly back on its Track
- As weight shift begins (left hand fully below surface) right elbow flexes. This occurs *automatically* as weight shift accelerates forward velocity, increasing load on arm muscles. This position offers greater *natural leverage*. I don't consciously bend my arm. I simply continue to hold water with palm facing back.

- Body continues rotating onto Left Track. Wrist flexes to keep palm facing to rear as right arm straightens. I don't consciously flex my wrist. My hands have learned to instinctively find optimal position to hold water.
- Body aligns on Left Track, while left hand (fingers separated) follows that Track in pressing back.
- Chin follows shoulder to left breath as right hand cuts through Slot to fingers-down full extension.
- Right hand stays in palm-back position (and body stays aligned) on Right Track, as I breathe left--with head aligned and right goggle submerged.
- Head returns to neutral as left hand slices through Slot and I precisely replicate the previous stroke.
- At midpoint of rotation, right foot appears (barely below bodyline) adding leverage that drives left hand to full extension (in fingers-down position).
- Left foot appears barely below bodyline in midpoint of next rotation, contributing 'Diagonal Power' to propulsion.
- Body remains stable and streamlined on Right Track through left-hand recovery until left fingers appear in Slot.
- Chin follows shoulder to right breath, where everything that happened in left breath is precisely replicated.

Clip ends after one more *precisely replicated* stroke.



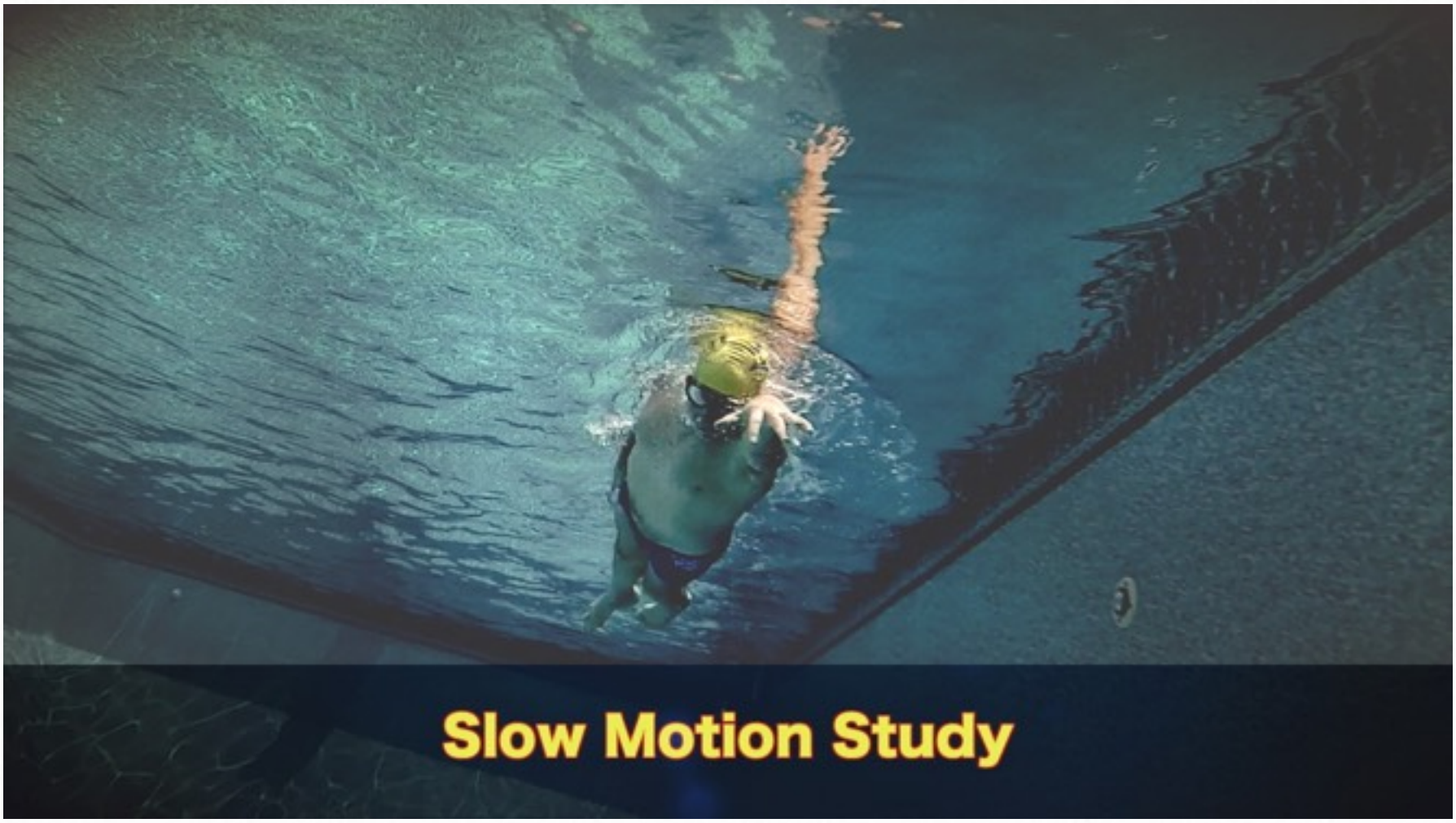
Click here for Video

5.5 Beneath: Forming Lines—from below

Similar to the overhead view, this is a great perspective for studying how I form and maintain lines while stroking. Two lines are the same:

- Head-spine line moves directly forward as body rotates around it.
- Each side of body aligns and travels forward on its Track.

One line is different: From below, you can watch the hands follow the Track, holding water during the propulsive phase.

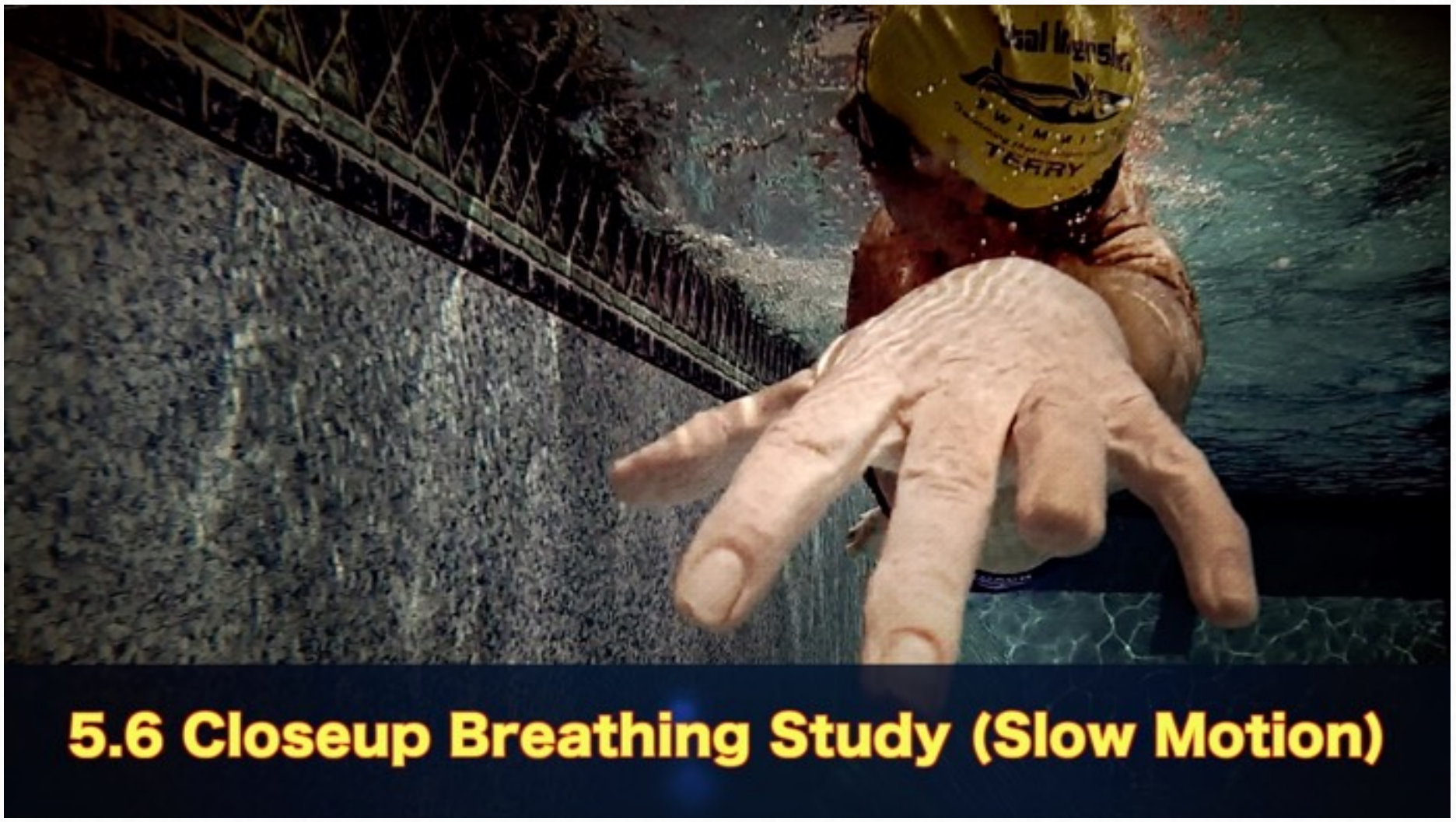


Click here for Video

5.5 Slow Motion Study Cues

Clip begins with body aligned fingers-to-toes on Left Track:

- Left hand follows Left Track in pressing back
- As right hand enters, right hip and left foot combine to drive body into long sleek position on Right Track
- I hold a stable streamlined Right Track position throughout left-arm recovery.
- Head follows right shoulder to breath as left hand extends to fingers-down position
- Body is aligned on spinal axis from top of head to toes during inhale
- Head returns to neutral as right hand cuts through Slot
- Left palm faces back to hold water as weight shift propels me into Right Track alignment.
- Head remains stable during rotation onto Left Track.



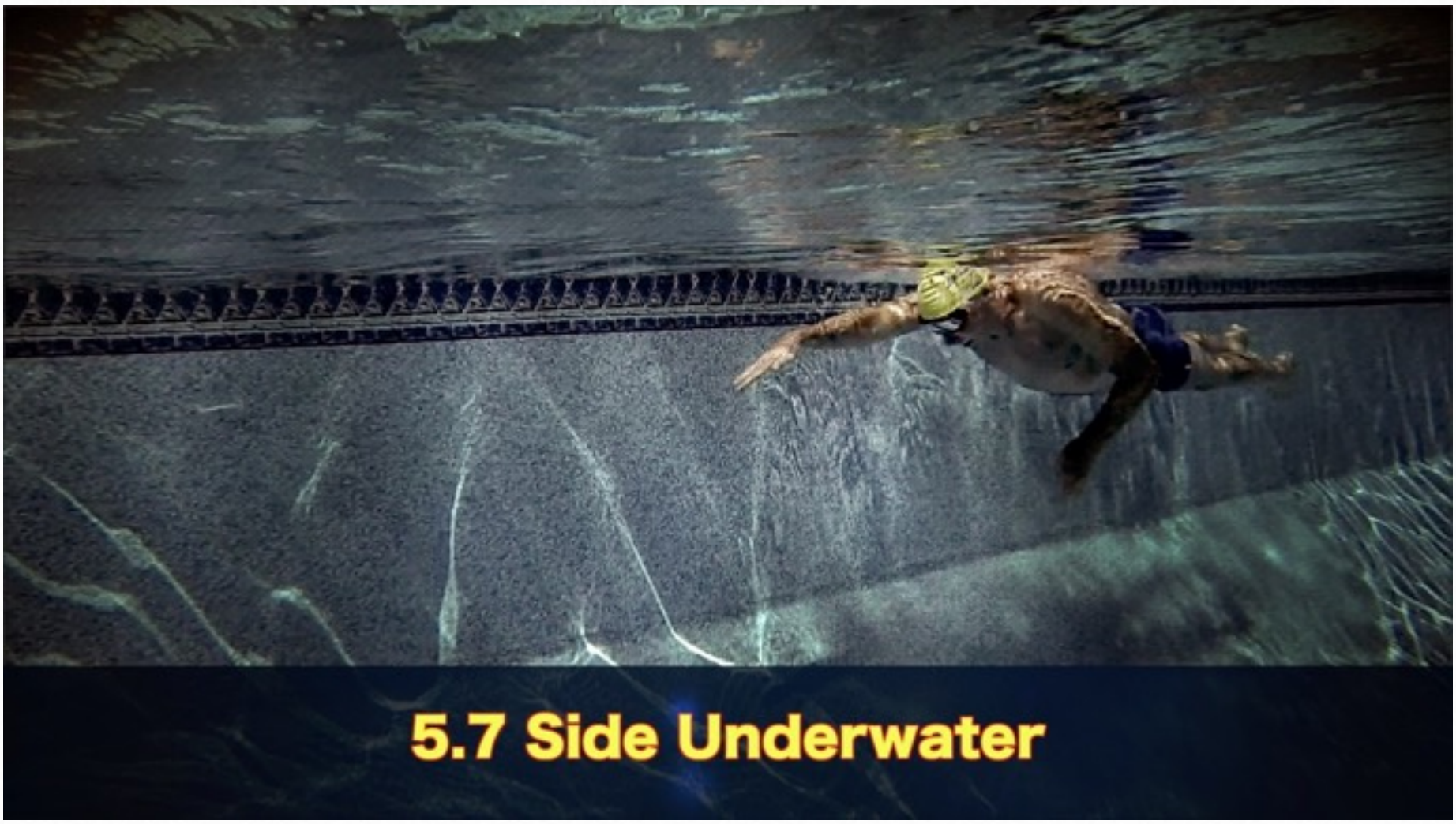
Click here for Video

5.6 Slow Motion Integrated Breathing Study

This brief clip of one breath to each side provides a close-up study of how head and hands move with body rotation throughout each breath. The clip opens immediately after I inhale to right. Click through to study:

- Head, torso, and hand move in unison as right hand cuts thru Slot--returning head to neutral. Left hand also moves with body rotation—not independently—as it presses back on its Track.
- Mouth remains open between breaths and head is stable through next stroke cycle.
- Notice right knuckles grazing surface at beginning of recovery.
- Then chin follows left shoulder to air.
- Head remains stable and perfectly aligned during left inhale. Right hand maintains hold on water with fingers-down, palm-back position during left recovery.

My proximity to the wall shows an interesting effect: The water between me and the wall ‘boils’ because it has to move aside for me to move forward, and the wall leaves it nowhere to go. This reminds us how important it is to slice—not muscle—through the water.



Click here for Video

5.7 Under Water Side: *Ultra*-Efficient Propulsion

This perspective is best for understanding how arms, torso, and legs work as a holistic system to create *ultra*-efficient propulsion.

Click here for Video

Slow Motion Study 1: Study Cues

Clip begins with bodyline extended and streamlined on Left Track, wrist flexed and hand below bodyline--so *any* pressure will produce forward thrust. Click through to study:

- Shadow crossing rib cage shows right arm moving forward through the air while my bodyline is shaped to minimize resistance. This requires an engaged core and symmetrical recovery.
- As right arm passes shoulder—initiating weight shift—left hand continues pressing back.
- Left foot begins to lift as right hand enters slot--positioning itself for downbeat. An engaged core makes this happen as an automatic result of weight shift.
- Midway through weight shift, downward leverage from left foot combines with gravity-aided drive of the body's 'high' side to propel me past left-hand grip.

- Feet come together in streamline and I maintain a long, stable bodyline to maximize distance and velocity during non-propulsive phase as left hand recovers.

- Right foot lifts (a little too far—need to correct that!) into position to drive down and help gravity and body mass propel me into Left Track streamline.

- As left hand cuts through Slot on next stroke, study path of right hand. Hand pitch adjusts to keep palm facing back (a learned habit, not consciously controlled). Forearm moves into vertical position to hold more water as weight shift initiates—the moment when propulsive power is maximized. Right arm flexes to accommodate this force, while maintaining firm backward pressure and maximum surface area for holding the water.

Clip continues for two more strokes.

Click here for Video

Slow Motion Study 2: Study Cues

This tighter shot, from a three-quarter front view, allows for a better study of the most critical part of the armstroke—how the hands move into position to trap and hold the water. The clip begins with right fingers cutting through the Slot.

- Right hand continues its trajectory from Slot entry slicing forward and below bodyline
- Hand remains fairly stable, anchoring leading edge of bodyline as left hand travels forward (you can see its shadow crossing upper left chest).
- Palm and forearm move into a position where they can trap more water behind them.
- Palm faces directly back as left hand cuts through Slot, triggering the propulsive weight shift. (Right foot presses down to help left hip rotate the body—generating tremendous forward thrust.)

- Left hand follows same trajectory from Slot to palm-back position below bodyline—prepared to hold water during next weight shift. (This is also the ‘trim tab’ position that lifts legs toward surface—making it easier to streamline them until next weight shift.

- Notice stable head position as right hand drives through Slot and weight shifts again. A stable head helps keep bodyline stable and streamlined while the arms apply force to water.

Clips ends as left hand enters Slot.

WHAT COMES NEXT?

SWIM SMARTER, FARTHER . . .*FASTER*

You probably didn't order this book only to swim more efficiently. We anticipate you want to *use* that efficiency to achieve meaningful goals—to swim farther and probably faster too. This chapter explains why technique-oriented training will always outperform traditional workouts. It also introduces you to the two forms of practice that should form the foundation of every swimmer's training—Focal Point and Stroke Length practice.

Chapter 3 of the book, *Ultra-Efficient Freestyle*, describes what we call the Universal Human Swimming Problem: After millions of years of evolution on terra firma, swimming is an 'alien' activity. As terrestrial mammals in an aquatic environment, we face three primary efficiency-robbing problems.

We're Heavier than Water. By nature, we have (on average) only 5 percent of body mass above the surface while swimmer. This isn't necessarily bad: Fish swim entirely submerged and are far more efficient. The problem is that our primal instincts interpret that as a *threat to survival* and we lift the head and churn arms and legs in response.

We're Unbalanced and Unstable. Your upper torso is mostly hollow; your lower body is packed with muscle and bone. Gravity pulls down on the lower body, while buoyancy pushes the lungs *up*, increasing drag. And the water is so unstable that nearly *any* movement (especially above the surface) causes the body to wiggle, wallow, or wobble. The brain responds by galvanizing the arms and legs to fix the problem.

Moving Parts Fish maintain a constant, highly streamlined shape as they move through water. We have many 'moving parts' and *change shape* virtually every microsecond while stroking. Sinking and instability (as well as any effort to swim faster set all our parts to working at cross purposes.

The result of all these challenges is that, as swimmers, we're *energy-wasting machines*. A study by Pentagon scientists and engineers showed that the average human swimmer converts only 3% of energy into forward motion. (Dolphins convert 80%.)

The main difference between average and elite swimmers isn't how strong or fit they are, but *how much less energy they use*. Elites are about 10 percent energy-efficient. That may seem surprisingly low (elite land athletes are 24% to 36% efficient) but it's over 300% more efficient than most swimmers.

It's obvious that all endurance or speed training should start with a focus on reducing energy waste. Decades of experience has shown that most "3 Percenters" can raise their efficiency to 5% or better within a few months by mastering the skills presented in this program. And while 5% efficiency may still seem pretty modest, it's an improvement of 66% from baseline! You'd have a hard time improving strength or fitness by that much in several years of grueling workouts.

The Pyramid of Efficiency

Chapter 4 of the *Ultra-Efficient Freestyle* book describes a proven 3-level 'pyramid' of skills that provides the fastest and most logical path to improvement.

Level One: Balance and Stability These give you control of your body. These skills require virtually no energy and *lead to immediate, significant energy savings*. Balance is also key to swimming at the equivalent of a runner's 'conversational' pace. You could well be swimming farther after 10 to 20 hours of balance practice than following *months* of endurance training.

Level Two: Streamlining These skills—which focus on lengthening and aligning the body and reducing wavemaking and turbulence—require only slightly more energy than those for Balance. And, because drag—and the power needed to overcome it—increase exponentially as you swim faster, minimizing drag can yield exponential energy *savings*.

Level Three: Propulsion Actions that move us forward have a greater energy cost than those for balance and streamline. And, until you're about 6% efficient, contribute much less to gains in endurance and speed. And finally, many skills that improve balance and stability, or reduce drag also help you propel more effectively. So you can't go wrong by giving more attention to improving body control and reducing drag, than to increasing propulsion.

A Smart Sequence of Focal Points

Here's a starter set of Focal Points, organized by skill category and body part.

Balance Focal Points

Head Position

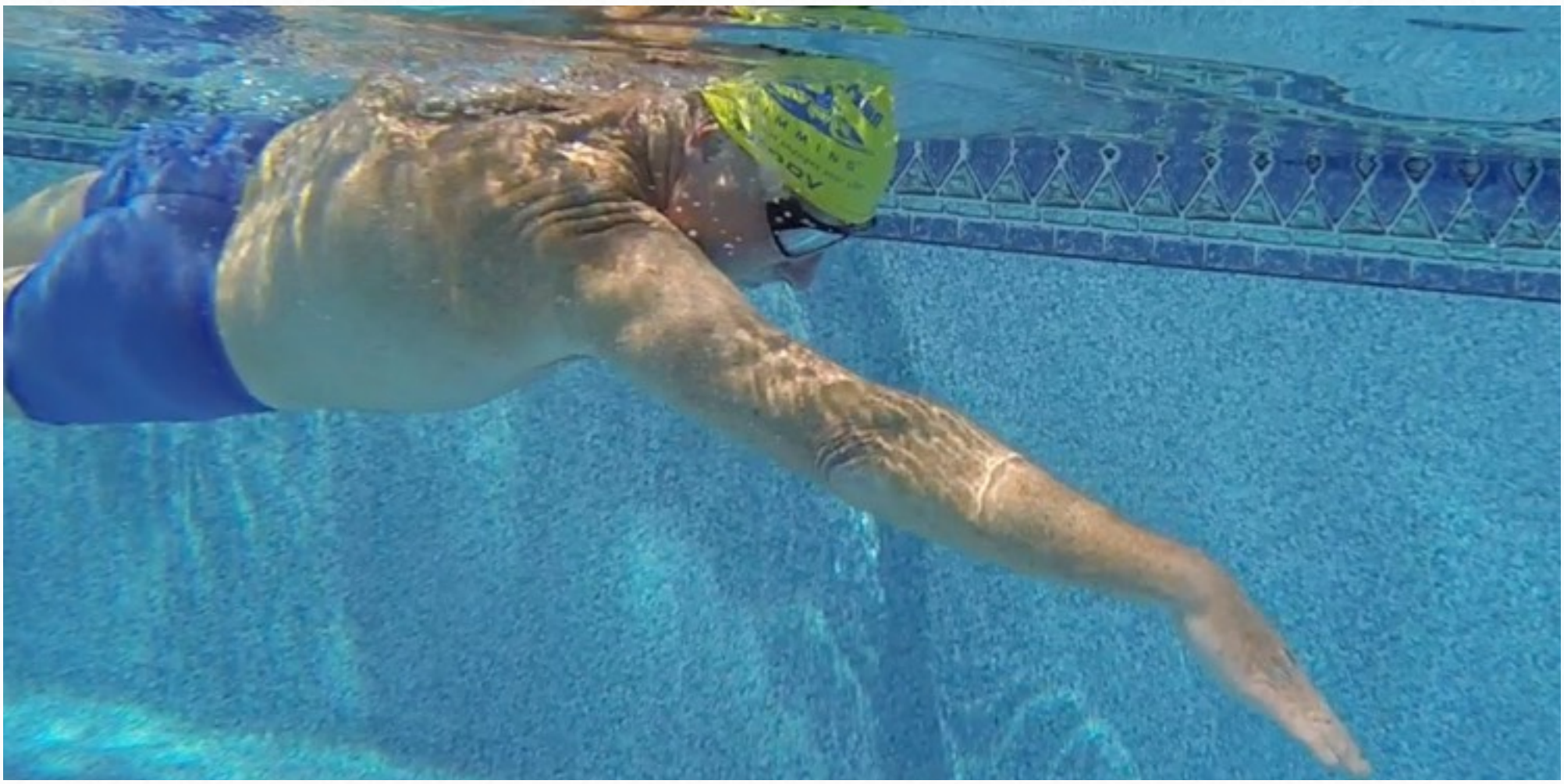
Release your head's weight to the water. Let it be *heavy* . . . until it feels weightless.

Rest your head on the water. Feel the thickness of the water acting to cushion your face (while looking down) and the side of your head (while breathing).

Visualize a laser extending from head-spine line. Your laser should always aim forward—while looking down, and while breathing.

Arm Action and Position

Reach below bodyline – as if sliding across the hood of a VW Beetle. Extending at a downward angle creates a trim tab effect which lifts legs toward the surface. Besides improving balance, it also reduces drag.



‘Hang’ your hand. (1) Relaxing *any* muscle tension helps balance. (2) Ensures downward extension. (3) Fingers-down, palm-back is best for holding water. *Never* close fingers.

Graze the surface . . . with fingertips during recovery. Arm weighs 10x in the air: The less you lift it, the better for balance.

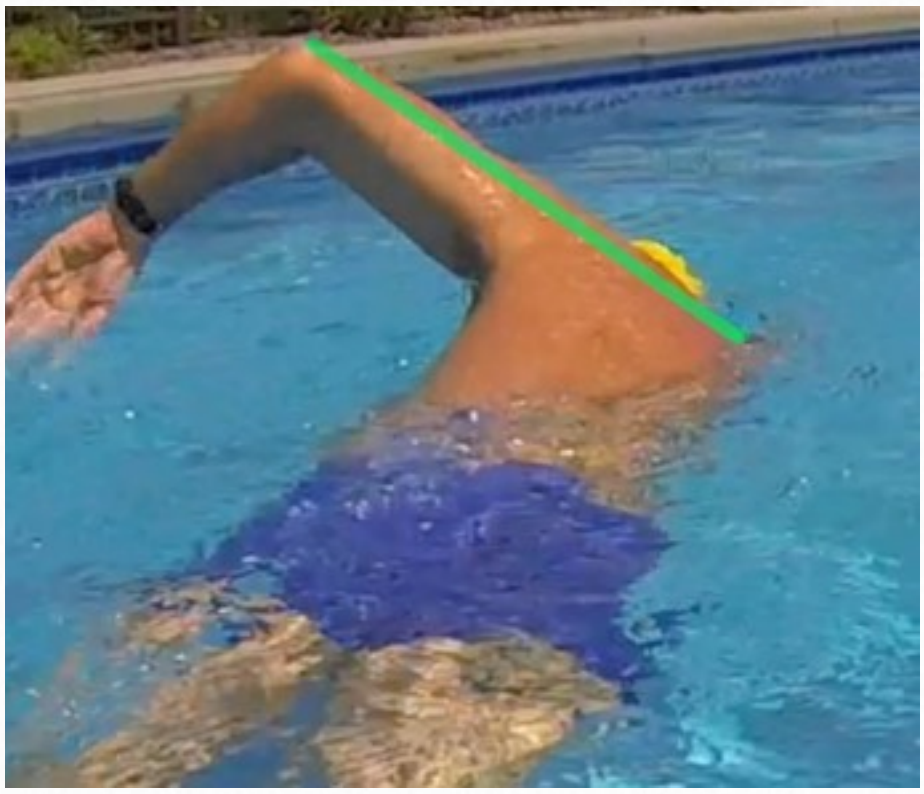
Stability Focal Points

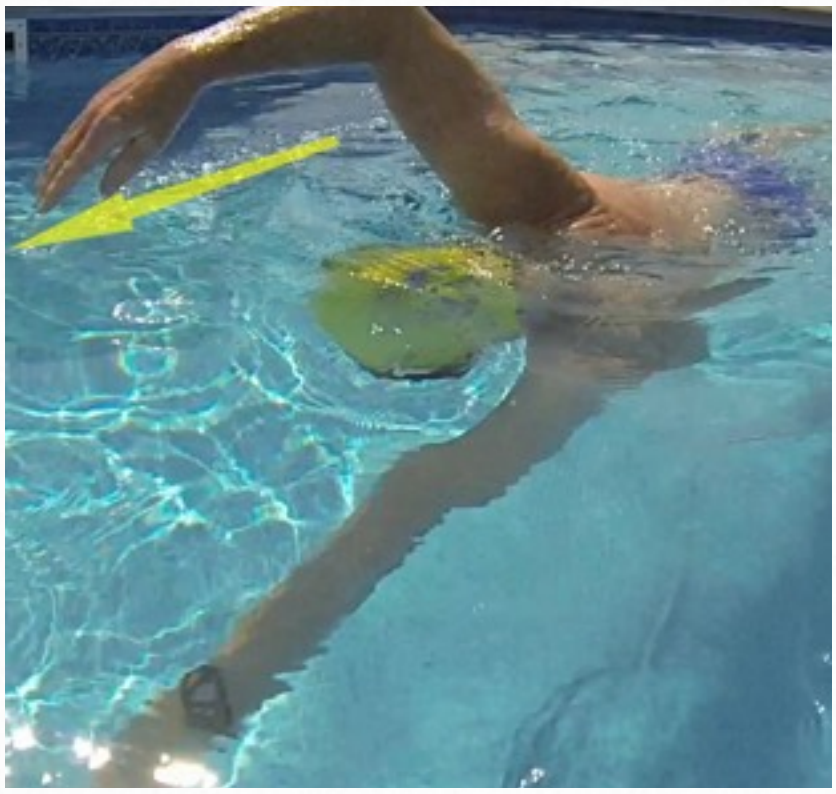
Focal Point practice is most effective when it's systematic. Simple way to create structure is 'scan' from front to rear of the body, as shown here.

Stable Head. Head (and spine) should be still point—around which rest of body rotates. When your head moves around—up, down or sideways—so does your body. When your head is *still* your body will be more stable.

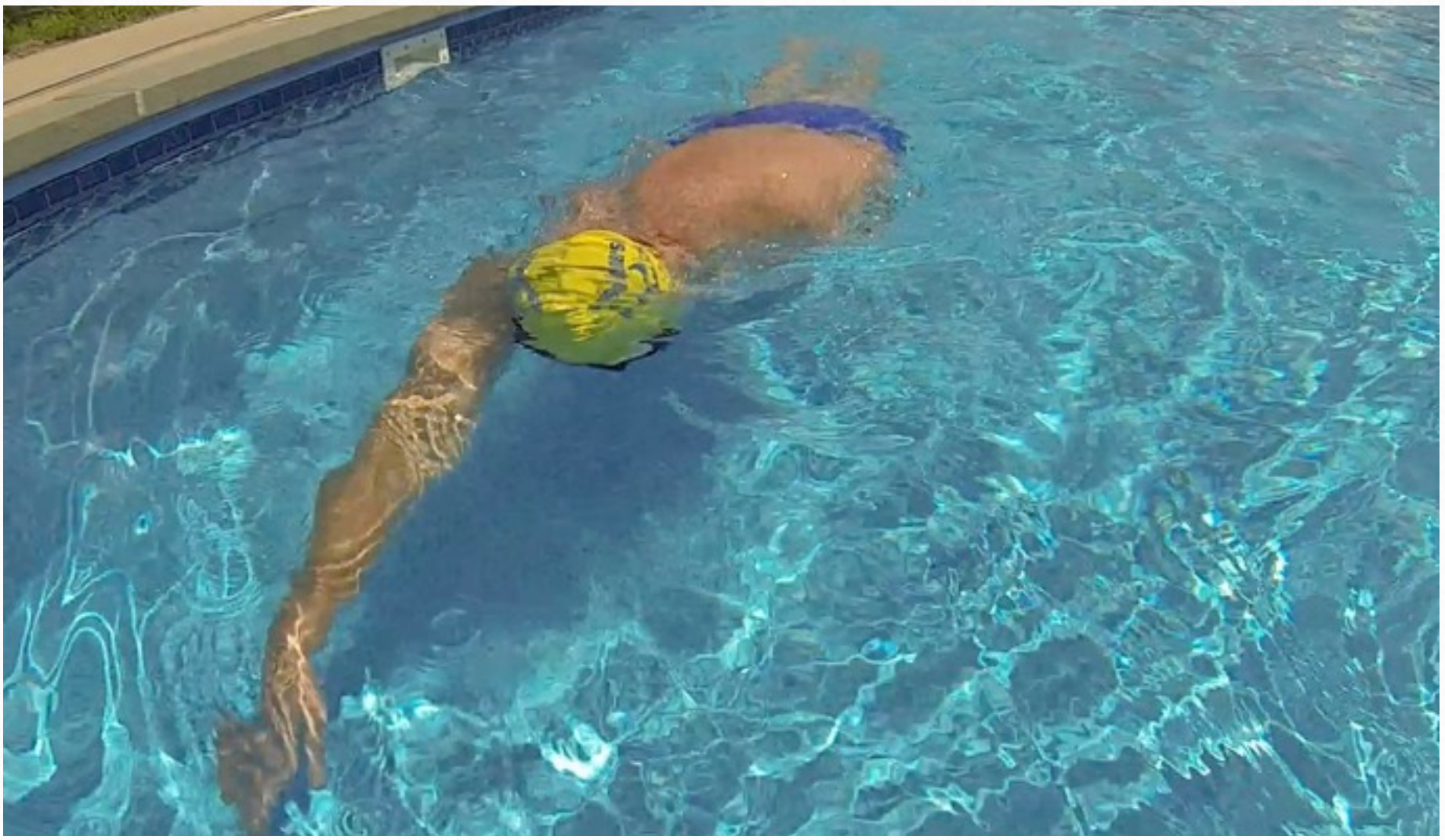
Follow Tracks. Follow shoulder-width Tracks as you extend forward. Avoid crossing to centerline.

Paint a Line – Follow a straight wide line with fingertips on recovery. Keep body aligned on Tracks throughout recovery.





Control Rotation. Rotate shoulders just enough to clear the water. Hips move *as one* with shoulders.



Keep legs close. Keep toes of one foot close to heel of other. Try this exercise: Brush one foot over the other as you rotate.

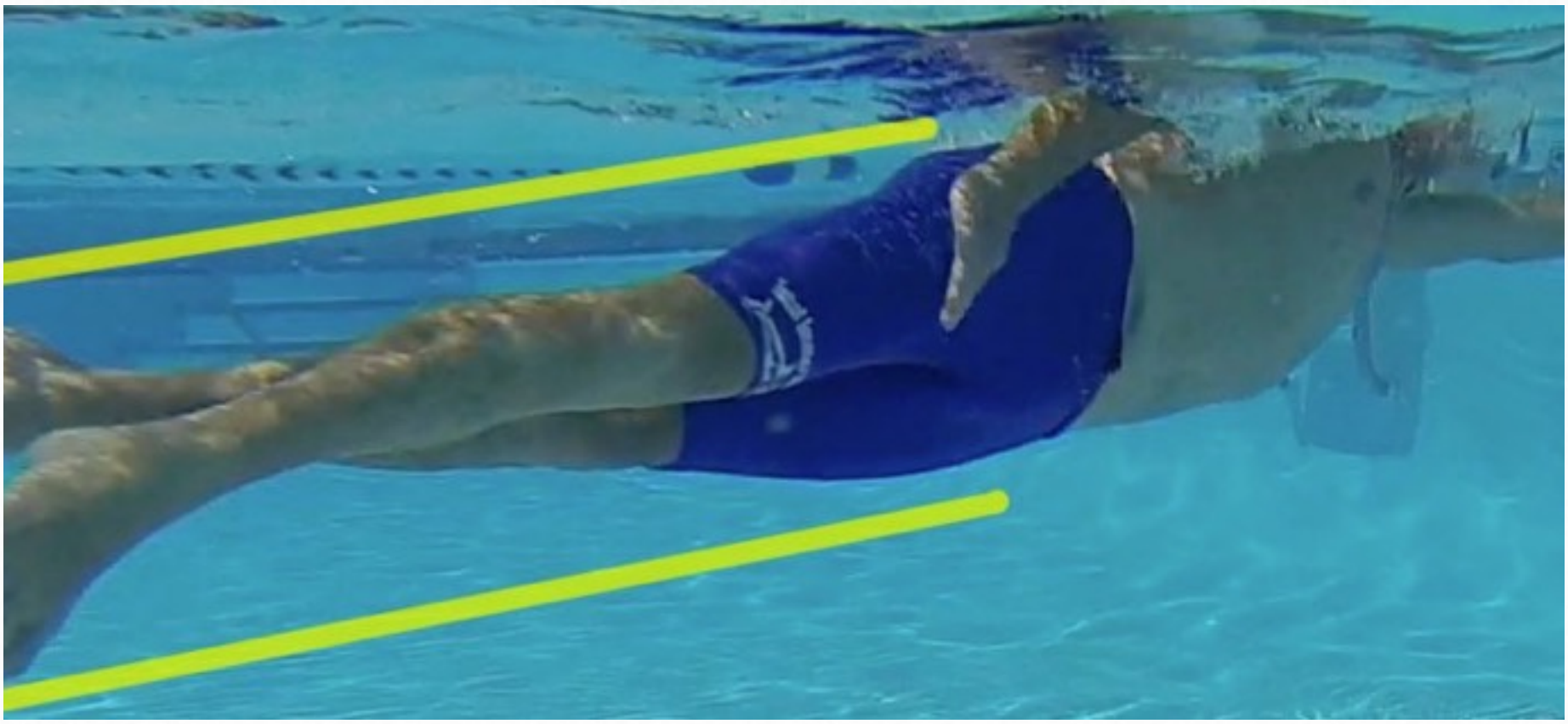
Streamlining Focal Points

Swim Tall. Finish each stroke in best Skate position. Hold that position until other hand approaches Mail Slot. Eliminate bubbles too.

Make smaller waves. Yes, it’s a subtle thought, and you can’t see your waves. Think about it anyway.

Rotate OFF Stomach. When shoulder clears the water, drag is significantly less than when flat—and water must move the breadth of both shoulders to make way for you. (Don’t rotate ON side.)

Keep legs in Slipstream. Job One for legs is to draft behind upper body.

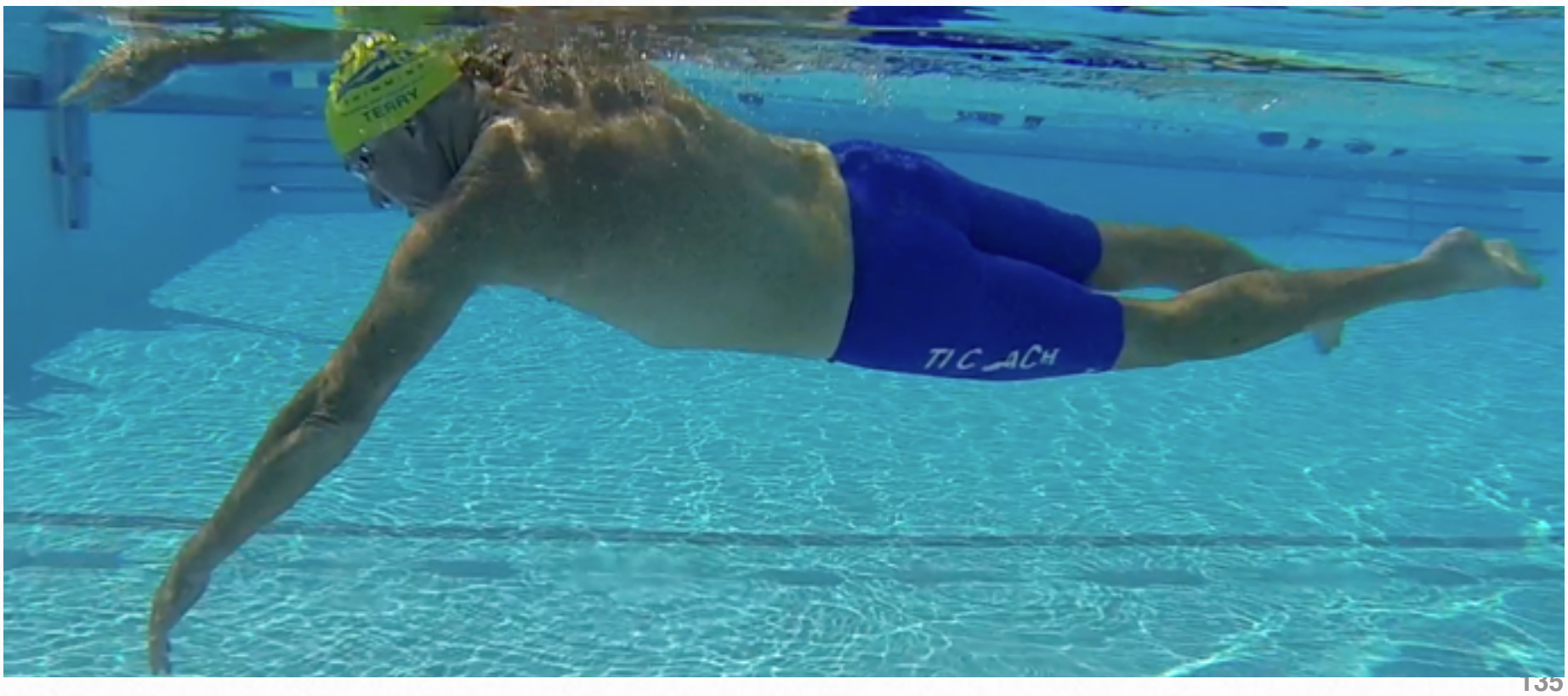


Propulsion Focal Points

Hold your place. Position hand and arm (as shown) to *trap water*. Then hold your place, instead of pushing back.

Drive the high hip. Use ‘high side energy (gravity + body mass) to move past your grip.

Diagonal Power. Left foot drives right hand to Bumper—helping right hip propel past left hand.



How to Organize Focal Point Practice

Don't think of Focal Point practice as a phase that you progress through and leave behind. Rather it should begin a lifelong habit: That, from now on, you begin every lap or repeat with a specific stroke thought.

Both times I completed the Manhattan Island Marathon Swim, I cycled continuously through a few favorite Focal Points. Besides keeping me efficient (who can afford to waste energy when you're swimming 28 miles?), it also kept me firmly *in the moment*. It's far better to be thinking about the stroke you're taking, than of all the miles ahead.

Here are a few suggestions for organizing Focal Point practice for more improvement and enjoyment.

1. Structure helps: Progress from Balance to Stability to Streamline to Propulsion. Also, work from front to rear of the body.

2. Start with one Focal Point and short repeats. As a Focal Point feels more natural and consistent—and you can stay on task for longer periods—swim longer repeats.

3. Progress from Block to Mixed to Blended Practice

    - Block Practice = 8 x 25 Weightless Head + 8 x 25 Swim Tall
    - Mixed Practice = 8 x 50 [25 Weightless Head – 25 Swim Tall]
    - Blended Practice = 8 x 50 Weightless Head and Swim Tall.

4. Check and Compare Stroke Counts with different Focal Points. What is your stroke count when focused on Balance? What is it when you emphasize Streamlining?

Stroke Length Practice

For a part of your practice, you'll occupy your mind with Stroke Thoughts. At other times, your brain should be engaged in counting strokes. The more you practice each, the easier it will be to do both at once. That will allow you to measure the effect on efficiency of one focus compared to another, as suggested in #4 above.

Measurable **Efficiency: Swim in your 'Green Zone.'**

Your objective in working through these lessons has been to become more efficient. At each step, you measured your gains *subjectively*—by a new level of ease, comfort or coordination in your stroke. Stroke counting introduces a completely *objective* measure—the number of strokes it takes you to swim a pool length. Shorthand for this is Strokes Per Length or SPL—counting each hand entry.

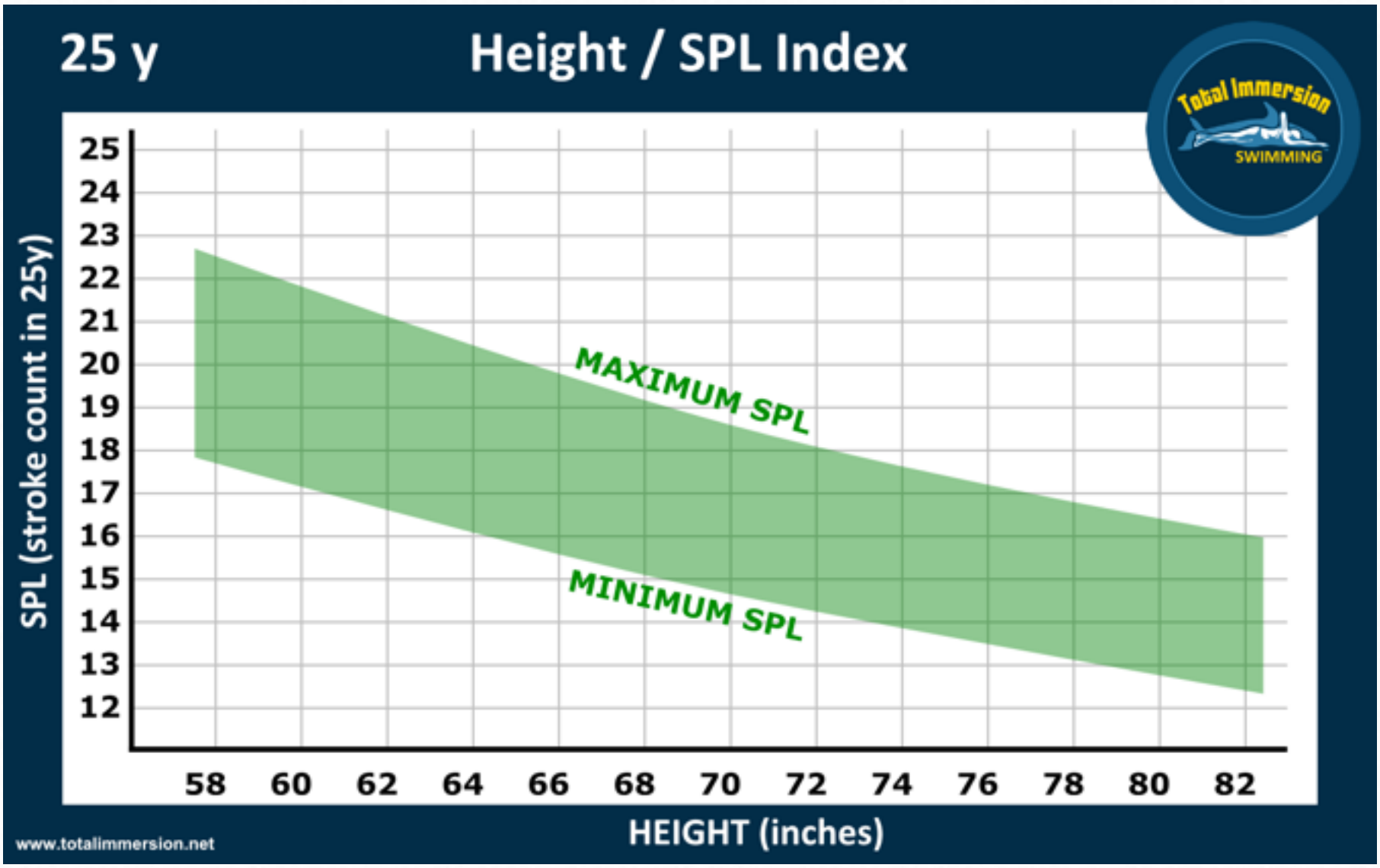
When your freestyle is efficient, you should travel *approximately the length of your arm* each time you take a stroke. I.E. Your hand should exit the water pretty close to where it went in. This tells you that your strokes are *moving your body forward*, rather than moving the water back. These height-indexed charts provide a personalized guide to efficiency for both 25-yard and 25-meter pools.

Elite freestylers travel 65% to 70% of height on each armstroke. (Sun Yang averaged 73% while breaking the 1500-meter world record.) On this chart, the highest count in the Green Zone for your height (I.E. 19 SPL if you're 5'8" inches tall and swimming in a 25-yard pool) is equivalent to traveling 55% of height. We chose this as a reasonable baseline for any swimmer who has completed the learning sequence in this book.

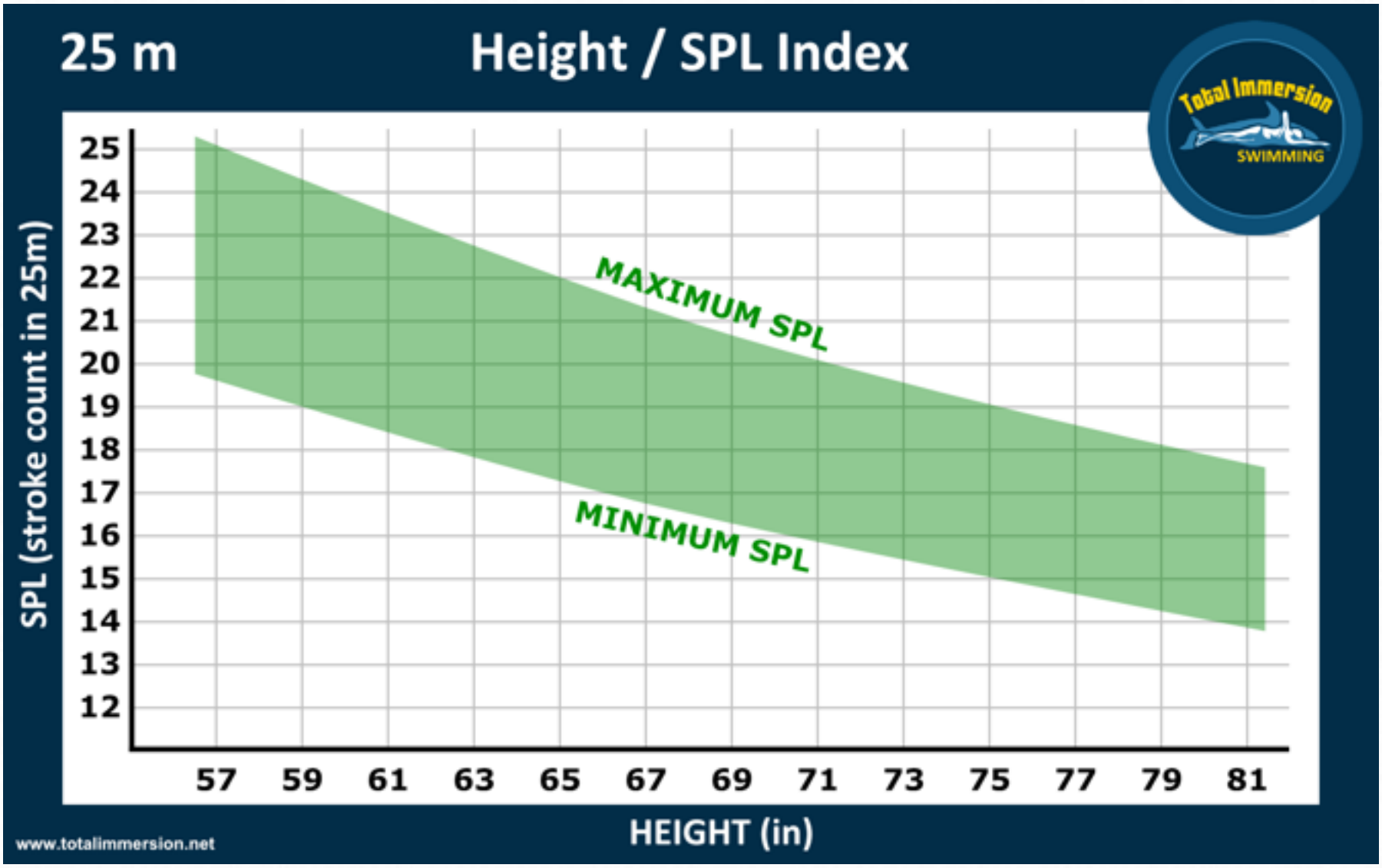
Going forward, your goal should be to keeping your stroke count consistently within your Green Zone—and carefully avoid exceeding the highest count. When you swim in your Green Zone, you **make every stroke count**.

If your SPL is higher than Green Zone, you're diverting energy into *moving the water*, instead of propelling you forward. To reduce SPL, try the following:

25 y Height / SPL Index



25 m Height / SPL Index



Check the 'shape of your vessel.' Align head with spine and get your legs to *draft behind* your torso. Extend full on each stroke. Eliminate bubbles, noise, and splash.

Swim shorter repeats. Start with 25y/m repeats. Progress to 50 y/m repeats when you can consistently and easily swim 25s in the mid to lower Green Zone counts. Progress to 75s or 100s when the same is true of 50 y/m repeats. *Always* emphasize ease. Never strain to reach a lower count—or a longer distance.

Slow Tempo. Begin practicing with a Finis Tempo Trainer(TT). If you find it difficult to stay in the Green Zone—for instance, as you swim longer repeats—experiment with doing so at slower tempo. As you gain the ability to maintain a Green Zone stroke count for longer distances, you can increase tempo for shorter repeats. E.G. If your tempo is 1.3 seconds/stroke for 100y/m repeats, you may be able to swim efficient counts at 1.25 on 50y/m repeats and 1.2 on 25y/m repeats.

Patiently and systematically expand the combinations of Tempo and Distance (make small changes in one or the other) at which you can swim within Green Zone. When you find a combination that you can *just* maintain with keen focus (but no physical strain), stay with that combination until it feels easier and more natural to swim that way.

Swimming consistently in your Green Zone, combined with consistent use of Focal Points, will build a robust and durable foundation for any goal you might set—to complete your first mile; or your first marathon; to set a new personal record—or even a national record. It's the way I've achieved each of those—including my first national record at age 55.

A Recommendation: If you don't have one already, we strongly recommend you order a Tempo Trainer. You can find them on the TI web site.

An Invaluable Resource: Become acquainted with the TI Discussion Forum. Browse for topics of interest, or post a query of your own. The Forum will also connect you with a network of fellow TI swimmers around the world.