American Swimming Coaches Association

Dryland Training for Swimming by Vern Gambetta (1995)

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Coach Gambetta is currently Director of Conditioning for the Chicago White Sox. In addition he heads his own consulting firm - Optimum Sports Training. Previous to this he worked as a conditioning coach working with both the Chicago Bulls and Chicago White Sox. He is recognized internationally as an expert in training and conditioning for sport. Coach Gambetta's coaching experience spans 25 years at all levels of competition. He has coached both cross country and track and field. At Santa Barbara High School he coached boys and girls to a combined record of 81 wins and 12 losses. From 1977-82 he headed the women's track and cross country program at the University of California, Berkeley. In cross country his teams won three Region 8 titles and finished in the top ten at Nationals four consecutive years. In 1982 the track squad placed second at Nationals. He has coached national record holders in such diverse events as the Mens indoor Pentathlon, the Girls High School Distance Medley Relay and the Boys High School Ten Mile Run. In addition

Coach Gambetta served as the first director of the TAC Coaching Education Program, an innovative program designed to upgrade the standard of track and field coaching in the U.S. He has achieved certification as a Level II Sprint/Hurdle coach as well as being Level II Lead instructor. He currently serves on the advisory editorial board of the I.A.A.F. Technical journal, New Studies In Athletics. He was the editor of the TAC technical journal, Track Technique from 1980 through 1988. He edited the TAC Coaching Manual and has authored three books, Hurdling and Steeplechasing, How Women Runners Train and The Complete Guide To Medicine Ball Training. He is currently on the faculty of the National Coaching Institute in Canada. Coach Gambetta received his BA from Fresno State University in 1968 and his teaching credential with a coaching minor from U.C.S.B. in 1969. In 1973-74 Vern attended Stanford University and obtained his MA in Education with an emphasis in physical education. He is also a member of NISCA, American College of Sports Medicine, and AAHPER.

I want to share some things we do in professional baseball with you. You may not realize the relationship to swimming but I tend to make relationships between sports. A baseball player, a javelin thrower, a tennis player, a swimmer — they are all related in the movements that occur at the core and the movements that occur at the shoulders. I have had the opportunity in the last five years to work with a physical therapist friend of mine and we have evolved a real practical concept at looking at the unity of the body that can really help you in reducing the amount of shoulder problems. I am going to give you a paradigm that will really help.

I don’t think you can talk about performance in sport without talking about the core. I got interested in kayaking and I figured I would just get in the

kayak and paddle like hell with may arms and shoulders but it didn't take long before I got tired. I started to use my hips and trunk and all of a sudden it became a whole lot easier. You may say, "Well, that's obvious." But it isn't obvious. I hear coaches in baseball, I hear coaches in swimming, I hear coaches in all different kinds of sports talk about the arms and hands. Folks, it's the hips, the abdomen, and the low back — that's where it's at. There is a terrific article in Swimming Technique in May-July 1993 called "The New Swim Paradigm" about how swimmers generate power from the hips. That was reinforcement of all the things Gary Grey, the physical therapist, and I had been working on and it was a reinforcement of a long conversation Nort Thornton and I had in Anaheim back in 1992. It's in the hips. That's the center of action. That's the core.

In 1990 when I brought this concept up coaches would say, "Well I work the core. We do a thousand crunches a day." No, that's not working the core. It's only working one aspect of the core which is the abdomen. We've got to work the hips, the abdomen and the low back in several different planes. We have to remember that the body is a kinetic chain. It is a link system. You cannot ignore any one link. We all know the cliche about the strength of any chain is only as strong as the weakest link.

Nothing could be more true in the body. We need to examine each aspect of the link when we're trying to improve performance. Today we'll talk about the core and then the shoulders. Nort alluded to this in his talk yesterday.

There's a book called Multiple Muscle Systems. It has an academic tone but there are some pearls in it. Read it about three times. There's a guy in there that talks about the spinal engine theory of movement. After discussing this concept with a number of people I've concluded that it's not the spinal engine but the pelvic engine theory. Picture me as a top notch swimmer,

thrower,jumper, runner. The force is going to be generated by rotation of the hips and basically that is the pelvic engine. So if you will conceptualize our topic of the core and the shoulders as the pelvic engine, this is not only the source of better performance but gives us information about the improper use of the pelvic engine.

Tightness, restricted range of motion in the core and shoulders leads to shoulder, low back and a lot of knee injuries. Gary Gray calls this “mostability,” which means mobility and stability which is really strength and mobility at that area. This is true at every joint but is essential at the hips and pelvis.

I want to tell you about the Serape effect. I grew up in a Mexican neighborhood in southern California so we knew what a serape was. It crosses you. What I am going to say now refutes what a lot of people are saying about you needing to do a lot of trunk flexion and extension. All you have to do is look at the anatomical structure of the body to see that the muscles cross in diagonal rotational patterns – serape. Performance occurs in diagonal, rotational patterns, therefore we must train in diagonal, rotational patterns. This is a key concept. If we’re not doing that then we’re not being functional and we’re not training our swimmers to be the best that they can be.

Everything that I do is based on principles. This has been from the influence of Dr. Vegil and other people. I’ve had to derive some principles for the system of training I use based upon scientific principles and other principles based upon what I call “coachease” which is determined from common sense through 26 years of coaching.

Basically, the first thing we want to do is to train movements not muscles. This is true both at the core and shoulder. We hear too much nonsense about the rotator cuff. It's a lot more important to train all the muscles that both internally and externally rotate the shoulder, not just the muscles that the anatomy books say. We must have core strength before extremity strength. For those of you that are age group coaches, it's imperative that you develop core strength first if you want to improve stroke mechanics, efficiency in the water and all of that. The extremity strength will follow. I work with young kids so I see how they grow. My twelve year old daughter is in soccer and has grown six inches in six months. She's quite a good athlete, so I've had my own laboratory at home to validate this concept.

Another principle is to work on joint integrity before joint mobility. In most joints, when strengthened and worked properly through a full range of motion, will give you joint integrity. I don't have to attack the joint to get more static range of motion which in turn will diminish the integrity of the joint.

Another principle is that I want to make sure that we train multi-plane movements: sagittal plane, dividing the body into right and left halves; frontal plane, which is front and back; and transverse plane, top and bottom. In each movement or exercise I select, I want it to move through at least two of these planes. That is my criteria for the exercise to be functional. Again, two or more planes are required to make it functional. Machines only work one plane usually, at one joint. I defy you to show me anything you do in swimming in which you only use one single muscle in a single joint movement in one plane. If you do, you're not a very good swimmer, or runner, or whatever.

We have a fairly popular machine in our Biomechanics Lab in Birmingham where we do a lot of our research. But this machine is designed for a total nonfunctional movement, where the pelvis and hips are locked. The athlete works one plane, the transverse plane. His feet are not anchored, so it's a nonfunctional movement. The movements we're going to use, if we're going to train movements, not muscles, at the core are: trunk flexion and extension. However, this is in a straight sagittal plane, so let's add a little rotation to move through two planes. Lateral flexion will give me trunk rotation.

I'd like to demonstrate something. This is essential. It relates back to my medicine ball video tape and I'm emphasizing it now as I feel it wasn't on the tape. Focus on my feet and notice the tendency to lock the ankles and feet when doing rotational movements. I've come to the profound conclusion that to make this rotation functional, I must release the opposite side ankle and hip. First, look at the increased range of motion that I get regardless of the plane that I'm going through. That is an essential aspect in your medicine ball and all your standing work.

Medicine ball training has been around for a long time. It's almost embarrassing talking to swim coaches about medicine ball training because all of you in this audience that are around my age, give or take five years, know what medicine ball training is. To those younger, the medicine ball was that thing shoved into the PE class closet with mold on it. Bob Kiputh who was the swim coach at Yale years and years ago wrote a book containing a lot of medicine ball training. It never went out of vogue in the rest of the world like it did in the US. Everybody still thinks it's something new but it's not. I think the thing that has changed medicine ball training is the technology as now we have a ball that can bounce. This adds a lot of versatility. I can get a lot more stretch and a rebound effect from the ball. That's the new

technological improvement in a very old training method. If you don't have a medicine ball, use a rock, or a weight plate.

I'd like to give you some guidelines for medicine ball training. Why Medicine Ball? It's safe, easy to use, you can take it out to the pool deck or anywhere. It's versatile and adaptable. You can use a light ball or a heavy ball, a small ball or a big ball, you can do it with a seven year old, a 17 year old, someone who is very strong or someone who is very weak. So it's a versatile method in that regard.

We divide the training between two things: rotations and twists; and throws. Rotations and twists are anything where I am turning or using diagonal chopping patterns and throws would be passes and throws. You can mix them. I am going to suggest a scheme that will allow you some adaptations and offer some variety.

Selection of the ball is important. If you have to buy a ball I suggest one at about 3 kilos, or 6 to 6.6 pounds. They come in different shapes and sizes and it really depends on the age of the kids you have. At the White Sox they call us the Club Med Ball because we have 120 medicine balls. We have all different weighs and sizes. We have made a commitment to it.

Posture — I used to do a lot of stuff in a seated posture. The problem with a seated posture or a kneeling posture — which is a little better — is that your hip rotation is limited. You get better rotation in a standing posture. I have also gotten away from doing traditional abdominal work. I recommend

about 20 to 25 percent of your core program be ab work. It used to be 75 to 80 percent. You're going to work your abs tremendously in some of the med ball exercises.

Here is a training scheme in a non competition week. On day one, Monday, emphasize flexion and extension movements. The muscles of the core are more slow twitch so they recover more quickly. On day two, Tuesday, you go rotation, twisting and chopping exercises. On day three, Wednesday, do more of the throws. Then come back on Thursday and repeat the cycle. In a competitive situation where I only want to do it four days a week combine days one and two and keep three by itself. Use your flexion and extension movements, your rotation and twisting movements for warmups before swimming. Use your throws as a means for increasing muscular power, speed or endurance during a specific workout.

Number of exercises: For warmup or practice situations I would only do four to six. For a workout do 8 to 10, or even 12. We have a sequence we go through we call a wall series that Jack Simon used with Joe Houdepol in 1992 — overhead throws, soccer throw, chest pass, cross in front down the side and around the back. He built up to sets of 50 and worked down to sets of ten. Not only do you build a lot of core strength but you build a lot of muscular endurance.

Time requirement: For warmup, not more than 15 to 20 minutes. For workout, even with throws, I don't think you should spend more than 20 minutes.

Strength: To go strength go with a heavier ball and lower reps. If I am going to go strength-endurance I am going with a moderate weight ball and high repetitions — 30 to 50 or more against time. If I am going to go power I want to go with a lighter ball against time. For speed, use a volley ball or basketball against the wall. How many throws in 10 seconds or 15 seconds can you do? You have to fire and recruit. That's going to excite the nervous system and get you ready to fly — but don't do too many of those before you get in the water.

Some say that med ball exercises are boring especially if you do them everyday. But how boring can it be compared to staring at the bottom of the pool? I have seen pros do the same warmup, sometimes three times a day for twenty years. If that's what it takes to get to the awards stand then so be it. You can be creative with med ball exercises. Try closing your eyes. I'm not going to give you cookbook, that's not my philosophy. Be creative.

Shoulder: With working with the White Sox for the last eight years we have had to work with some shoulder problems. We average over two shoulder surgeries a year and I have learned a lot about rehab. We used to look just at the shoulder and we used to prescribe a lot of exercises for the shoulder. But the scapula is connected to the pelvis through the muscular system. The more we got away from the shoulder, the better the shoulder got.

What do you see? That's the problem. It's all you see.

What's happening below there is really the key. This is the fundamental thing you must remember.

The shoulder is a strange joint. It is inherently unstable. However, it is also inherently mobile, too. You have a lot of swimmers who can range their shoulders through various ranges of extension, hyperextension, abduction and adduction. What we have to do is figure out a way to stabilize. Traditionally we said balance. Although an imbalance exists. The muscles in front anatomically are stronger and bigger; the internal rotators are already bigger. So what do we do is we get them in and do more bench press. We get them on tubing performing more internal rotation. Now you're just accentuating the problem. We need to work the posterior shoulder, the lats and above all, the "big house" or the glutes, the quadratus, the piriformis. That's where it's at.

This may sound odd, as you're thinking you came here to hear about the shoulder yet I'm talking about the "big house" (glutes) but that is where it's at.

What we want is proportional development. Traditional wisdom says work the shoulder, the game is over, get a beer, ice your head and shoulder, get in a whirlpool. This guarantees that you are going to get hurt. You have to stop this right now. I met with a high school baseball coach here this morning and he was aghast that our minor league pitchers don't ice after the game. There's no physiological reason to ice a normal, healthy shoulder. You should cool down, not shut down. You cool down in the pool and on deck with some tubing. You don't see the winner of the Kentucky Derby being iced down in the winners' circle. They keep him walking around. This is because the horses are real valuable just as our pitchers and your swimmers are real valuable.

The performance paradigm. This is what you have to remember: it is a constant interplay between force reduction and force production with proprioception being the glue that holds it all together. In everything we do, we must keep this paradigm in mind. Force reduction, an eccentric contraction followed by a concentric contraction. We want to look at the exercises we have and put them on a continuum of function. If I choose to do an isolated sidelying external rotation, on a scale of one to ten, how functional is that? Based on criteria, it's maybe a 2.3. But if all of a sudden, I get up here, and I take the stretch chord and do lateral type of move that starts to incorporate the "big house" and approximate the speed in the multi-joint movement. Now, I'm 7.5. Now I'm getting where I need to be to produce a better swimmer and to prevent injury.

Again, come back to the concept, train movements, not muscles. We don't want a joint isolation exercise. What we want is a kinetic chain exercise. We want to use as many links of the chain as we can. We can use free weights (mostly dumbbells), medicine balls, tubing, stretch cords, manual resistance with a partner, neurological stimulation like body blade and closed chain work. I like the upper body stair master machine. You all don't have machines but you have pool decks, you have hands, you have the greatest machine ever made — the human body.

Another axiom I believe in is that I use body resistance before I use external resistance.

Exercise criteria: you want to look at planes of movement. We want to do things that involve multi-joints. We want to go through as large a range of

movement as we can. We want a high proprioceptive demand — something that really challenges the athletes.

Progression criteria: we want to go simple to complex, easy to hard, and the key thing is to make sure the athlete can actually keep the exercise correctly before you increase the reps and intensity. Teach first. Teach first to prevent injury. I never want a training program to cause injury.

Read the book “First Things First” by Steven Covey. He talks about true north principles. You have to make sure to keep evaluating to make sure you are moving toward the direction you want to move. If you are not moving in the right direction you can be doing some things incorrectly.

External rotation in the shoulder is related to opposite side hip. Internal rotation in the shoulder is related to same side hip. If you have problems with the muscles of internal rotation look at the same side hip.

You should really never go heavy on the dumbbells. The rhythm, the range of motion, and the amplitude is more important than the weight lifted. We are going to start going against time rather than reps. We are going to go 15 seconds, 20 seconds, 30 seconds.

Pushup progressions: I am big on progressions for everything we do. That enables me to evaluate where the athlete is. We start against the wall, then

an incline, and then to a standard pushup, then I have a couple of types of pushups using blocks and incorporating trunk rotation.

The best thing about all these exercises is the tremendous about of variety it offers to the athlete and the coach. Be creative, have fun.