

Dryland Training for the Short Axis Strokes

Vern Gambetta

[introduction] I am Mary Anne Gerzanick-Liebowitz. I am the Assistant Coach at Oregon State University for our women's program and I am the First Vice-President of ASCA and I welcome you here this morning. Vern Gambetta is director of the Gambetta Sports Training Systems. He is recognized internationally as an expert in training and conditioning in sports and has conducted many clinics around the world including Canada, Japan, Australia and Europe. He has worked with Major League Soccer, the US Men's World Cup Soccer Team, the Chicago White Sox and the New York Mets. He has written more than a thousand articles as well as seven books. He received his Masters Degree from Stanford University in Education with an emphasis in Physical Education and he is a wonderful speaker and we are lucky to have him back. Please help me welcome Vern Gambetta.

[Vern Gambetta] Thank you very much. Some of you that heard me speak before – I am afraid this might be an ongoing drama. I am going to try to do a little bit of demo-ing at the end, but I forewarn you: I think the best way to stay on track is to use this device. You are going to hear that beep every ten minutes. I am bound and determined I am going to stay on path and not go over. When you get to be 61 that is what you have to do and you have to write the kids' names on your hands and things like that.

I am going to try to do just a little demo and I understand that it is going to be difficult for you to see so I won't do a lot of that. The theme today is to talk on the short-axis strokes, but it is still going to be a lot more about the philosophy and the foundations of dryland training and sharing with you some of the things that I think I have learned in the last year with the teams that I have worked with. I will put a full outline of this on my website and this actual presentation is going to be on the ASCA website, but I will put references and all of that so if you want you can email me or call me. When you call, I will answer the phone – you are looking at Gambetta's Sports Training Systems. I am

the chief cook and bottle washer and all of that. People always get surprised.

Just a couple of commercial advertisements. This is not a new book anymore. It has been out a year, but this might finance part of my retirement at about 75 so it has gotten some pretty good reviews and I think a lot of the foundations for the things that I am talking about. It is not sport specific. It is about the foundations for making better athletes, and the swim coaches that have read it and used it have really enjoyed it and it has been well received. You can get it at the Human Kinetics booth or at the Perform Better booth. I am going to be demo-ing these exercises at the Perform Better booth – right between the Perform Better booth and the Finis booth when we are done. I will be over there for a couple of hours so if you need me to go through some particular exercises I will do that. That is the end of the commercial announcements – now let's get to the nitty-gritty.

Over the last year, since I spoke at ASCA, I got to work with a couple more swim teams and got to travel more extensively – in the UK, Abu Dhabi – a couple of other places like that and I beg to differ with Mark Schubert when he said the other day that the world isn't catching up. The world is catching up and they are going to pass us like a freight train leaving a tramp - not just in swimming but in everything. And that is globalization. That is the reality of the world that we live in. But the simple fact is that this is a serious message. This is not about Olympians – this is about quality of life and health. Go look. When you go back to your clubs and back to your town, go look at the 12-year olds today and look what they look like. You can tell me what they look like. They are overweight. They are out of shape. They are unmotivated. They spend a lot of time in front of the Internet.

The speaker just before me said – go on Flow-track. Get the kids off the damn Internet. Get them outside. Don't watch workouts on the Internet. Go out and do them. That is what is wrong – I am sorry. I know I am swimming against the tide and I am an old man and

getting older by the day, but we have got to turn the clock back. You can talk all you want about Olympians. I do not mean to be un-American or anything like that, but – and the other countries have the same problem – it is not just the US problem. So recognize that if you think and you were challenged the other day to produce Olympians as high schoolers - which is – there are some questions I have seriously about that, too, but recognize that if you want to coach Olympians in 2016, those are your 12-year olds right now. You had better get them fit first and I am going to talk a lot about that today so enough editorial comments.

To ensure success, regardless of the stroke – and I am talking to those of you who are working with age groupers and developmental athletes – you have to eradicate physical deficiencies before they reach the elite level. Once they reach the elite level it is too late and you can talk to the coaches that work at the elite level. I have the good fortune to work at the developmental level in some sports and at the elite level at the same time in other sports and once you get to the elite level there isn't enough time – the edge is too fine. So, you have got to work on creating good core strength and stability, good flexibility, good basic body awareness, all those foundational athletic skills that are going to go to make your swimmers better and prevent injuries. These are things that were done in physical education previously.

Now, there is a basic assumption I am going to make here today for all of you. We all do stuff – how many of you do stuff? What about the rest of you? What do you do? Do you do better stuff? I don't know. We all do stuff. And I come to these things and I go to coaching clinics and I hear... you know... I wrote about two pages of new stuff last night when I went back to the room – different things that I heard and saw. And the question I have is: What kind of stuff do you do? Is that a fair question to ask? How do you do this stuff? How do you teach it? How do you implement? When can you put it into your program when you have 15 minutes extra a day out of the pool? Pool time is limited, so when do you do it? Whom do you do it with or to? Hopefully, you do it with – not to. And then last, but most important: Why do you do the stuff that you do when you do it?

What I am going to present to you is a lot less stuff. I feel strongly that it is a lot more effective to go hunting with a rifle than it is with a shotgun. So the range of exercises that have evolved in the programs that I would espouse in regard to dry-land training for all strokes isn't a whole lot of exercises. They are very specific exercises directed toward the swimmer first, and the stroke, and then the distance that they are swimming. So that answers some of the why, when and how.

Is your stuff better than my stuff? I don't know. I have some people take the exact same workouts and the same exercises and call me two weeks later and say, we have three kids in the hospital – one died and it is a bunch of crap, okay? I mean – sorry – so my stuff isn't as good as your stuff – I don't know. So a lot of it is how you apply it. And that is hopefully the message and what I will help you to understand better today.

One thing that I learned the hard way, and that I learned about 20 years into my 40 years of coaching, is that there isn't one way. If you think there is one way, don't stay, because you are going to find out that there is more than one way. What happens when you think there is one way is that you get to a dead-end.

I have done it and -- be honest with me – you have done it where we have gotten so wrapped up into medicine ball training or machine training or all these modes of training that we forget what our goal is in terms of dry-land training and then you get to that point where you get to the end of the dead-end street and now, where do you go? That is what we have to be really careful of.

To me, everything that we do on dry-land should connect with what you do in the water. That is why we are all here – to make better swimmers – not to make body builders, weight-lifters, Pilates practitioners, whatever it may be. It is to make better swimmers and we can't lose sight of that. To train better athletes it needs to be principle driven, based on principles of good sound pedagogy and good sound sport science. Those principles are your true north. If you understand that there is a magnetic north and there is a true north. Magnetic north shifts. True north doesn't. So if what you do in your dry-land program has a good foundation in principles, then it is going to have a better chance of connecting to what you do in the water, so that is going to be the thrust of what we are going to do.

How many elements are there now? I kind of lost track last week – are there 113...120? I don't know. When I was in chemistry in high school I think it was 98, so it shows where we have progressed. Well, the most important element is HU -- the human element, right? One thing to recognize is the human element is smarter than any computer ever made. It is extremely adaptable and it is highly self-organizing and the message that I want to give you right away is – there is not necessarily a correct way to do the exercise. It took me a long time to figure that out. There is not necessarily a groove or a correct way that everybody is going to swim the butterfly or whatever – it is self-organizing. Each person will figure it out. If you don't believe me, read stories about survival situations and see who survives and who doesn't, okay?

The body is pretty smart. It is always smarter. It is always a step ahead. You always gotta go with the winner. Movement must be mindful – not mindless. I hate just work. That is why I don't like machines okay? If you want to see mindless work, go in a gym and watch somebody sit on a machine and pump out 10 reps. They don't have to think. They don't have to be engaged. I think we owe it to the athletes that we work with to make the work mindful. That gives them a chance to be better swimmers when they get in the pool. The water environment – the performance environment – we can't forget that is what we are striving for – to improve the human body's performance in the water and that presents unique challenges for us.

Michael Phelps doesn't have gills, you know. He might have a lot of dolphin-like attributes but he doesn't have gills so we have to recognize that our job then is to try to create a body that is going to be more adaptable to that environment. Be clear with that now so that philosophy is going to change a lot to determine about what we are going to do in our dry-land training. It is going to take us a little bit more away from weight training and a little bit more toward strength training and other aspects and this is my opinion. When I started working extensively with swimming, my first goal was to try to re-create the water environment on dry land and after doing that for about two years and adding stress to stress – I go (I talk to myself a lot and I answer myself) and I go – Vern, that was pretty stupid. And I go – yeah – that really was stupid because you really can't re-create the water environment on dry land, so we have to figure out what is happening in the water and then how we can sculpt the body or whatever we have to do to make that body more efficient in the environment in which it has to work. So that is the philosophy.

If you look at all the human bodies lined up on the blocks in all the events in Beijing, they look pretty homogeneous don't they? At the absolute elite level, you don't generally see too many 5' 1" hundred-meter freestyle swimmers – male or female. You know, they are going to fall within one standard deviation of the mean and that is just an evolutionary process as you get higher and higher up the food chain, so to speak, in terms of being competitive.

So we know what the absolute elite swimming body looks like and hydro-dynamically what we have to do, so that is what we are going to try to create. Our goal is to develop the best swimming athlete possible, regardless of the stroke. And I emphasize "athlete." Recognize that if you swim 4 hours a day, you are on land (and fully affected by gravity) for 20 hours, even when you are sleeping. I think sometimes we tend to forget that and we have to recognize the effect that gravity and the environment have upon us during those

other 20 hours. It's going to be really profound, okay? And I think that can help us.

Let's look briefly at our short-axis strokes and then look at why we would select certain exercises and where we might emphasize these in our overall dry-land program throughout the year. Because there are going to be a lot more similarities of what we are going to do in our whole program of crawl strokes and then look at certain things that we will do with these particular events in terms of specialization and preparing them for those events.

Breast and fly are pulsing strokes with simultaneous arm and leg movements, so we are not working in opposition. Consequently, a certain percentage of our work for the specialists in those events is going to emphasize more simultaneous arm and leg movements as opposed to reciprocal type of movements. That being said, we have to be careful for injury prevention and recognize that the right side of our brain controls the left side of our body and vice versa and when we do things bilaterally, we cause circuits to go haywire and smoke to come out of our ears and things like that, so we don't want to just train bilaterally.

Recognize also that there are major decelerations within the stroke cycle. The energy cost of the breaststroke is the highest of all the strokes, right? So let's figure out what can we do in terms of dry-land to help solve some of that.

Obviously, you need to know the strokes. And I think this is a quote that I got out of Roger Enoka's book, *Neuromechanics of Human Movement*. He is Professor of integrative physiology at the University of Colorado. And it really has become my mantra –and he said the function of a muscle depends critically on the context in which it is activated. So, for example, let's use the good old bicep. If I go in the weight room and put a dumbbell or a barbell in my hand and I do a preacher curl like that – what is the bicep doing? The bicep is working to flex my elbow. But let's say I go outside or I go in the pool and now I am doing a swim stroke – or I am going to throw – the bicep is really going to work a lot more at the shoulder. It is going to work to stabilize the shoulder isn't it?

Take quadriceps, for example. If I get on a leg-extension machine and I do leg extensions, my quads are working to extend the knee. But when I am walking and my foot hits the ground, the quad stabilizes the knee. So it depends on how we utilize the muscle and I think a whole vista in terms of performance enhancement is going to open in the next few years because I think, from physical therapy and from biomechanics, we are starting to understand that we don't work in an anatomical position. You are only in that position one time in your life and that is just before

they close the lid on your coffin, okay? And we don't swim in that position. We do not play – or live -- in that position. So the function of a muscle depends critically on the context in which it is activated. That means that we can simulate certain movements when we do dry-land – the moves are similar -- but they're not the same – okay? I think that is important to remember.

This is from an old book – Logan and McKinney. Everybody who has ever heard me talk – I cite it all the time. The last edition was 1973 but they first talked about this in the 1940s – about aggregate muscle action and muscle synergies. Folks, there is no place and I have heard it time and again over the last three days – people talking about individual muscles – great. Your body cannot recruit individual muscles. The brain does not recognize individual muscles. The brain recognizes muscle synergies and patterns of movement. So, therefore, when we train and when we want to be efficient, we want to train muscle synergies and patterns of movements rather than isolate. Rather than try to pick out what muscle is most important in a stroke, let's think about how that muscle plays in the whole symphony of movement. That is really important and so what that enables you to do in terms of organizing your training is to be very time-efficient. Instead of trying to have an individual exercise for every muscle involved in breaststroke, let's talk about how the muscles link together and how they work together, and it is not as complicated as it sounds, believe me.

So, in terms of dry-land, we understand that the key movements in the two short-axis strokes are going to be what? Flexion and extension and undulation. Now it is pretty tough to get undulation on a dry-land environment, but I will show you. There are some things that we can do with the rings or the jungle gym, or things like that where we can get some simulations of that – at least the beginnings of the linkage of doing that. We can definitely get flexion and extension.

I think the other thing that we have to remember is something that I learned as a track coach. My background is as a track coach and that is where my heart is. I love swimming and I love being around swimming coaches and as a track coach I learned a tremendous amount from swimming coaches, but recognize that we are trying to get straight to the end of the pool that way and we are looking at two short-axis strokes.

Let's say I am running toward the exit sign toward that door, right? And people would say – well that is sagittal plane – that is straight in line. NO. I've got rotations that I am controlling so that doesn't mean, with the short-axis strokes, that we don't do rotational

work to help us control and stabilize and be stronger in terms of flexion and extension. Is that concept clear?

Now the percentages of the work that we do are going to change at various times and we will dominate with flexion and extension at certain times. So, we are always thinking – linkage and connections. There were a couple of coaches in here for teams that I have worked with – you know – we are always trying to preach that – what are we linking? What are we connecting? And the basic concept is -- and I heard this in several of the different talks...I heard Terry Laughlin say it a whole bunch yesterday...you swim from toenails to fingernails. We still want elongation, don't we? We want it at certain parts of the stroke and in all the stroke, so movement occurs from toenails to fingernails. We have got to look at how are we making those connections.

So, let's get to the nitty-gritty now. What are some of our training components? First of all we have to recognize that we can isolate out. I love you all as swim coaches, but I always chuckle when I look at your charts and they say we are in the red zone today. You know, it is a heart-rate set. Well, can I ask you a question? I may not understand physiology real well, but if it isn't a heart-rate set, we are in deep shit, right? If my heart isn't beating, I am in big trouble. I think that is a fair question to ask. The body does not work in these neat little compartments, okay? All the systems work together, okay? And the neuromuscular system, the endocrine/hormonal system, the cardiovascular system, all of those systems work together.

Recognize, too, that all components of training must be worked at all phases of the training year: speed, strength, stamina, suppleness, skill. They are just worked in different proportions. You don't sprint your eyeballs out in September, but there has to be an element of speed. There has to be an element of strength and an element of power. But the analogy that I would give you is – I was trying to think of how to illustrate this and I was driving the other day and in our neighborhood they are putting in new coaxial cable. Do you all know what I am talking about? So you see it and it has got all those little different colored fibers? Well all those fibers are in that coaxial cable all the time, aren't they? Just like all our systems of the body are there, but at certain times, certain systems are dominant. Certain of those wires are fully engaged and fully working and at other times they may not be completely switched on, but they are always there and I think if we can recognize that analogy, it will help us to do a better job of designing our overall training program.

Here is a real different definition of strength training and I want to credit a terrific book – the title of it is real complicated – it is called *Running*, by Franz Bosch and

Ronald Klomp, two Dutch coaches and Sports Scientists. Franz Bosch, whom I spent a fair bit of time around, gives this definition of strength training: coordination training with resistance. It took a while for it to sink in. Think about it for a minute – that is beautiful. That is what we are trying to do. If it doesn't enhance coordination, don't do it. It is just work. I am not into stuff anymore, okay? I want to hunt with a rifle. I want to be able to say to you – what you do will make you better and you are going to see results and I think if we think of strength training in this way, we are going to get a lot better results.

Recognize, too, that all strength training doesn't have to be done in the weight room. Weight training is one form of strength training. It doesn't have to be done in the weight room. The majority of your work as swim coaches to get your swimmers extremely fast could be done on pool deck. Or if you have like Harvard has and like they do at Michigan, you have a mezzanine area. It doesn't have to be real big. It's just a place where you can hang some rings and you can throw and where you can take people as far as you need to take them. You don't need fancy machines and shiny white rooms and mirrors. In fact, I don't like those; they are too comfortable. I want the athlete closer to the environment that they are going to be in when they are trying to perform, so that literally there is a connection – a visual connection -- to what they are trying to do.

So these are our criteria to use when we select our exercises for all strokes. I call it full-spectrum training because if you understand the light spectrum you know that the visible portion of the spectrum is very small. There are X-rays and all these things off on the sides and we can't see them. In full-spectrum training there are a lot of ancillary benefits that go on that we don't necessarily see. When we spectrum strength train, we look at one part of the spectrum.

First of all, I want to train in multiple planes. All swimming strokes occur in multiple planes – sagittal, frontal, transverse. Now the axis of rotation in the short-axis strokes means that we move a little bit more in the sagittal plane and with flexion and extension. Again we are not working isolated muscles. We are working how joints work together. Full range of motion – do not isolate, okay? Again, there is no need to isolate, even in rehabilitation, and that isn't our topic today. Good rehab specialists only isolate for very, very small periods of time. They try to figure out how to integrate and how to get all the muscles working together. They design programs that are proprioceptively demanding.

What is proprioception? Just think of it as joint sense and position sense – and that is huge in swimming isn't it? Because you are in a foreign environment. You are trying to figure out where your hands are in relation to

your center and your feet, and position accordingly because that environment is always moving. So, we are trying to find still water to hold onto. So, that is a big criteria in terms of what we do. Can you strength train in the water? Yes you can and you all do it and people have different philosophies on it. I am not going to get into that. This is certainly viable if used properly – I think you want to marry this up with your other modes and means of training. If you are doing a lot of stuff here with paddles and what are you doing in dry-land that is compatible with what you are doing in the pool. If you are all writing right now – write that down. What I am doing in the pool must be compatible with what I am doing in dry-land. If it is dumbbells until you puke or push-ups until you pass out, that is not. You might see that in December if you are a Division I school, but that is probably not going to be real appropriate to getting you to swim fast in March. It is not appropriate at any time. That is just mindless work. So again, I think that is really important.

We just had a discussion with the University of Michigan, with Jim Richardson, about the use of the power rack and combining the power rack with some other methodology. And I had a talk with Jim Steen about that yesterday with some things that you could do and he invented it. We talked about what we could do to make that even more specific to the strokes that you are trying to enhance in the water. So, anyway, that is just one point.

We all do this, right? Everybody now does core strength and stability. I have a really good memory and it was about 18 years ago this week I spoke to ASCA the first time and the people were really rude and talking because who is this baseball guy coming to talk and in about five minutes everybody shut up because I talked about core strength and stability. A lot of people couldn't spell core. I said how many of you do core work and nobody put up their hand because they didn't know what it was. Now I see everybody doing core work and I am going what? If I am a Martian and I look at it – that is kind of stupid stuff too. I mean – I am putting myself in all these different positions and trying to – why do you try to isolate individual core muscles out when you won't do that with the rest of the body?

Is the core pretty important in swimming? Think so? Yeah, I hope so, but let's look at what the function of the core is and maybe the postures that we would look at in terms of why we do it. Do you all agree with that? No? Non-committal or what? It is the undecided that are going to determine the future of our country. I am asking you to make a decision right now. Vote for Me – okay? Fricking A – I will make a decision, okay? Yeah – you hear this all the time – build a swimmer from the inside out. Well, what does that mean? How do you do that? Does that mean we spend all our time

right in this area? I don't think so. I think we gotta look at – what is the function of that area, okay? It is the hips, abdomen, the back and including the upper back and neck.

This part of the vessel right here weighs maybe 16 pounds – mine is a little bit lighter – unless I put my weighted snorkel on or something like that. So that is going to be important -- how we link all these muscles together.

So, what is the function of the core? Some of you with dirty minds – don't go there, okay? The stiffness of the system. If you look at the work of Stuart McGill in Canada – a biomechanist – in that he talks a lot about stiffness and low back pain. Well, you think about what we are trying to do to create a more efficient position in the water. It is stiffness. We tend to think of stiffness as tightness – no. It is rigidity, okay? There is a certain point within each of the swim strokes that you have to have a certain amount of rigidity to allow what? And then, once we have that stiffness in the system – it is the relay center. It relays our position – the anchoring of our hands – the propulsive force from our feet, isn't it?

So, we want to look at how does it work as a relay center and then – its biggest job is – no pun intended – to help us position the limbs more effectively. That is why we do it and so we have got to think about it as what are we doing to enhance the core as a relay center. We are still not going to isolate out. This again, comes from Logan & McKinney and a lot of you have heard me speak before and I have mentioned this and I think it is really valid and they articulated this concept of how a serape is a Mexican garment. It is basically a shawl in Mexico and some place else it is a shawl, okay? And it is draped over your shoulders and conceptually your shoulders connecting with your hip.

After last year's ASCA convention I spent a couple of weeks working with some of the teams and just watching swimming. At Michigan we watched from way above the pool. And as I watched the swimmers swim away, I started thinking. It is beyond the serape; there is more to it than that. We have got to think about what I call the X-effect. How are we connecting, literally, my hand to my toe? Sometimes on the same side so it would be like a script-X if you could look at it like that, but more importantly the X crossing where? Right at my center of gravity – right at my belly button and look at – this is from a terrific book called *Anatomy Trains* – I don't know if there is a pointer on here, but if you can look up here you can see not just muscularly, but fascially how we connect across in a crossing pattern. Well, that tells us right away that a greater proportion of our work – in terms of core work – is going to be done in diagonal rotational pattern and probably not as much in true flexion and extension

positions. So we have to look at the percentage of distribution of our core work relative to that, even in the short-axis strokes.

So, when we look at exercise postures, the typical postures that we have done in traditional core work have been in prone and supine position, and in swimming – certainly in prone and supine because we swim in prone and supine positions. Now, hear my logic out – that is great. You spend two hours a day in prone and supine positions. When you sleep (let's say it's for 7 or 8 hours), you are in a prone or supine position so we will say 10 hours a day we are in a prone or supine position. For 14 hours a day we are either seated or on our feet, aren't we? So, consequently, I think when we look at being effective with our core work, we probably need to do more of our core work in a standing position to take advantage of gravity and have it help us learn how to activate the core to decelerate and to stabilize. The proof is in the pudding with the teams that have done this and the people that have worked this.

The simplest core work that you can do – those of you who work with age groupers – those of you who work with elites – is something you can do right on the pool deck. It's crawling. I found a Spiderman picture to show what I mean. The thing to use is something called wall bars, and I think they have gone out of vogue. Some of you know what stall bars are – they used to be all over gyms back in the 60s and if you go to Europe you still see them and in Australia. Climbing is vertical crawling. You are working in opposition. You can crawl. You can crawl bilaterally or unilaterally. If you want to take a large step toward eliminating shoulder problems, put in more crawling on the pool deck as warm-up before you swim. There are some definite crawling movements that you can do to enhance awareness of center.

I am going to show you some stuff with a combination of a push-up and an arm step-up that I think would carry over very effectively to your short-axis strokes. What you do is a regular pushup and when I get to the end of my pushup – I do my pushup here and then I push back so I am in an extremely locked-in position. Now what we will do with that – a variation of that – imagine I am in a horizontal position. We will do what we call an arm step-up 1 – 2 lateral. Come right here into a pyramid pushup so that has tripled. I have shoulder stability – linking to core – linking to the extension that I am going to get there. And again – you don't do that for half an hour. That is the other thing I want to tell you and it took me until last year to figure this out. On a lot of our upper-body work we are going only 6 – 8 – 10 reps, okay? I repeat – 6 – 8 – 10 reps, but we are doing multiple sets so we can get quality of effort. Just like what you want in the pool. Do you want sloppy strokes or do you want quality strokes?

Same thing here. With dry-land, we are going to make those connections with quality.

Next thing is rings. And if you have the appropriate place to hang rings – where you can hang vertical – this would be an example. I experimented with this with my volleyball girls. You can get an undulatory effect. When you get real strong you can have somebody hold your feet, okay? And I got a couple of high school kids – volleyball players -- who can do that because their position blocking at the net is no different from what you do in the catch in the fly. If you are like that you know – anybody can block through you. So if you don't want to get rings, you can attach this at your pool deck. It's just a jungle gym and you are looking at \$35 to \$75 per set so you have got to recognize what you are doing to invest in that okay?

Another example would be – and we do a lot of this – I call the one on the left superman, okay? Where I have got to elongate out. You start on your knees and then you just manipulate – angle so the weakest swimmer on your team will be able to do it. You can actually do an imitation of the fly movement there and do your push-ups there. This is my 6th year working with Michigan women's swimming. About two months into my first year, Jim Richardson called me and said, have you seen these rings? We need to put these in and I roll my eyes and I am thinking – oh crap – here we go again, and he says, I think it will work. I went out and I bought a pair and we put it in and I think it has made all the difference in the world for the teams that have used it. You get more bang for your buck. Shoulder problems are going to disappear. I mean – you are going to have some kids who have shoulder issues because they came to you with them, but they are going to disappear and you are constantly linking your shoulder to your hips and to your core.

Every one of these exercises is core work so everything is core work, you see. We end up doing a lot less of directed specific type of core work. This is another – I mean – I am just giving you brands, but you can figure these out. You could make these things if you wanted. This is a TRX. Now look at that – I mean – there is again – a simulation position. A lot of people have done that on a physioball. I think it is better if your feet are suspended. And obviously you can turn over and you could do a similar position in a supine position. Look at the connection here and the extension you get through the shoulder. I think this is the type of work you want to put in – not just for your short-axis strokes – obviously those kids at certain times are going to do a little more of this -- but also for all your strokes to really emphasize the linkage.

Now, when we look at total volume, I like to design my menu so we look at core – we look at total body movements – we look at legs and then we look at upper

extremity. These are kind of gross generalizations, but we will live with that. The point here is toenails to fingernails. We will do simple activities. With a kettle bell you can do them one handed, two handed – whatever. With little kids you can start them with just simple high pulls with dumbbells and you must teach them how to do it correctly.

My volleyball kids call them Vern muscles. I don't know what the Harvard kids or the Michigan kids call them -- they are called trapezius – the traps are pretty doggone important in terms of shoulder elevation and depression and stability for the shoulder. Well, you do pulling movements – high pulling movements – preferably with a dumbbell not a bar – it is a lot easier to teach. You are going to get a lot of good trap development, which is a positive benefit on the shoulder.

So here are some of the pulling combination movements we use. One is dumbbell high pull. Imagine how I would have a dumbbell in each hand and I am just here, okay? Now, I can go alternate high pull – alternate high pull. I can rotate. Then there is Dumbbell snatch. I am going to go literally – toenails to fingernails right there or I can go squat to press.

When we get into the taper and want to be more efficient with our time, we will do combination movements: lunge and press – with a dumbbell – with a medicine ball – sometimes with a kettle bell. The mode is dependent upon what you are trying to achieve.

Let's look at upper body. A concept that I heard from one of the coaches that I work with and I think it is a really great concept is – the upper body we are always thinking elbow to elbow. What am I doing to connect from this elbow to this elbow – literally through my upper back – being able to catch and hold water and to hold an efficient position? Not necessarily for propulsive forces, but just to anchor. Nort's term that I like a lot is anchor. So, what we are always trying to look at with the upper body work is the question that I ask myself when I am designing a program is what am I doing to connect elbow to elbow. And that is your evaluative criteria for looking at that.

The one type of machine that most of the places that I work with don't have because they just aren't readily available – they are usually in a weight room – is some sort of a cable or a pull-down machine, but you can do dumbbell rows. The way I look at the lat is that it is your connector of your hip to your shoulder and the fascia that goes over that really connects as we showed – it connects right down through the opposite leg, too. So we want not only to strengthen the lat – but also to lengthen the lat. I will say again and I will show you in the exhibit hall – a simple way to stretch the lat will also help a lot of your shoulder problems. Everybody

does this exercise to stretch the lats. That is the cause of the problem. Find somebody who knows active release – your trainer or somebody that can release the pec minor -- and between those two things and doing the ring work, a lot of your shoulder problems will go away because it is tight pecs, which you don't get when you do all this stupid stuff that attacks shoulder integrity. Stretch the lats and pec minor and the pecs and doing that isn't necessarily stretching the pecs.

Do you use stretch cords? Here is the biggest mistake everybody does. I see this every place where I go swim – you see the stretch cord attached behind and they are doing some kind of mindless work there and it is truly mindless because there is no feedback from the stretch cord. Turn around – look – here is a real important action, okay? There – I call it cheerleader. I used to be a cheerleader advisor, believe it or not. A hellacious year. You haven't lived until you have broken up fights between two cheerleaders, okay? That is a whole other story. Well, I will tell you what I did. This is 1975 – you couldn't do this in 2008. After about three weeks, they were in the gymnastics room. I took roll. I locked the door. I sat outside. I said, you get in a fight and I will let you out at the end of the period. The fights stopped. So anyway – if any of you teachers – just try that now and we will visit you at San Quentin or something.

Dumbbells are really smart. Get away from using a bar...and a lot of you are hung up on pull-ups. As soon as you use a bar for pull-ups, your hand is fixed. The last time I checked, your hand moves in the water. That is why we use dumbbells. That is why you use jungle gym. It's kind of retro – let's go back to rope climbing, okay? If the kid can't rope climb – just have him start in a seated position and pull up to a standing position. Go back to a seated position. Go to a standing position until they can climb a rope, okay? You get to the point where they can inverse.

The Vasa trainer is a great tool. And particularly, I think, for the short-axis strokes, there are some really good things that you can do on the Vasa. So – and again – you can visit Rob Sleamaker at Vasa and we can go to his booth and look at that later. Again, just to reinforce – elbow to elbow. These are all pictures taken off nbcolympics.com. They had one where they showed – terrific pictures – from overhead and some from underneath – but you really see why we are looking at elbow to elbow in that picture aren't we? I know still pictures lie, but that tells us a lot right there. Well, that is a dark picture, but that is pretty extreme if you can get your swimmers up to that point on the rings or something like that where you can go elbow to elbow.

There is a simple drill that we are introducing this year and I am real imaginative with my names – it is called

“older head” and all we do is lean back and it is high and it is Y and it is fly, okay? All the kid or the swimmer has to remember is high – Y – fly and we do it and you do it 3 X 3 which the last time I checked was 9 and you do 9 reps and you do multiple sets of those. You see – again – we are getting that elbow to the shoulder connection.

Legs, legs, legs. Obviously in the breaststroke legs are really important. I think everybody has figured out that all the strokes are really important. The caveat to this is – and this is the ongoing dialogue with the coaches that I work with – when do we start to back off the legs with the breaststrokers and with the butterfly people. We have hit it a couple of times and it is really, really highly individual. In the program – in the periodization plan that I espouse – there is a tremendous volume of leg work. One of the coaches last week at one of the Universities I work with said, “that is worse than the hardest kicking set we do.” If you do leg circuit with a sandbag it is, but if you put that too late, they are never going to get their legs back, okay? So that is – and I don't have an answer to that. It is based on – you know – your swimmer and their recovery ability.

Single-leg squats – we will use single-leg squats with the dumbbell – real dark picture on the right – just an active rest thing – real good for ankle stability in that – just walking on old leather medicine balls okay – for proprioception. So those are all work that we would do, but notice the lateral lunge is lateral step-up slide board. I think those are going to be a lot more appropriate for your breastroker in terms of performance enhancement and also in terms of protecting the knee. And really the way that we are going to protect the knee is not – and that is the kind of flexibility that kind of swimmer has to have. My suspicion is he probably had that kind of flexibility the same the first day he came to the pool. Again – those are those endowments that the great ones have and the mortals have to work on. I don't know that for a fact, but one thing that I think is really important to remember is for the short-axis strokes – mobility in the hips and in the ankles is really important. I am not going to spend any time right now on the ankle, but on the hips I think that if you are at a university, you need to go to your track coach – your hurdle coach – and find out if there is a whole series of hurdle walk-over drills and under drills that are going to promote hip dynamic – hip mobility. That is what you want. For getting better hip mobility – if I understand the mechanics of the stroke will improve the efficiency of the stroke and take stress off the knee, okay? If you are tight in your hips, the stress has to be taken up some place and it is going to get taken up at the knee – if you look at what happens in the strokes. Now, there is just one example – hurdle unders – that is only a 32” hurdle – that is a pretty big guy, but you put hurdle unders on the same day that you do your leg work with your breaststroke swimmers and you are

going to do a lot to promote hip mobility. I also think there are some yoga postures that are really positive for impacting that also. Time does not permit us, unfortunately, to go into that. I mention this briefly and we are getting near the end here – hopefully there will be a couple minutes for questions and then there will be a break and I will go across the hall and if you want to try this stuff or demo it, we will set up a simple circuit if you want to see that.

One thing that I think is a real important principle to remember in all of this – don't forget the unity of dry-land to water and we have got to recognize what is the athlete's recovery ability. How well can they recover from the work that we are doing? If we are doing extremes in dry-land it is going to have a negative effect on the water. We have to recognize that there are certain things that when they are done in the water when it is high yardage in the water – it is going to be a lot tougher to do explosive work on dry-land so we have to make those phases match up and marry up in our periodization plan.

The other thing to remember – you are going to get more bang for your buck from your strength training and your dry-land work – probably for your female athlete than your male athlete. Very simple and with the female athlete – I know that I have said this every time that I have spoken in the last 8 years – I think with Michigan – they did their last dry-land workout on Monday – NCAA's – you guys did it on Tuesday of IVY's and you got to do it. You have got to keep it going. If you drop it off you can watch the power drop off and body composition change – literally before your eyes. With guys – it depends. You have got to assess the recoverability and the muscularity of your guys, but everybody is saying more and more – even with the men – that it is important to keep that thread on through to the taper. Now, that doesn't mean heavy lifting. It can be simple medicine-ball work. It can be some threat because there is an endocrine hormonal response that is very, very positive in terms of creating a good environment. I have already alluded to the 24-hour athlete concept. They are only with you 4 to 6 hours. What they do the rest of the time has a huge impact, so make sure you know what is going on. I believe very strongly to make our athletes better we have to give them homework. I tell my volleyball girls – you have homework in math and you are going to have homework in volleyball – that is yen.

Pattern of injuries. Recognize what the patterns of injuries are. It's big stress on the knee in the breaststroke – big stress on the shoulders, but where it all comes back to is the hip. So let's look at that. Training is cumulative. What you do today will not make you better today. In fact, it may make you worse tomorrow. What you have got to recognize is that you have to give something to get something. One workout

cannot make an athlete but one workout can break an athlete. And don't lose sight of the big picture.

I always sit in the back of the room. That is where I sat in history class and Spanish class in high school. I couldn't leave class in high school, but in college I could. I left more often than I stayed, but I watched and as soon as the coaches get up here and start talking about Michael Phelps' sets, everybody is writing like crazy. You know, you guys...get past that – keep the big picture in mind. Know who you are working with. Even the stuff that I show you – it works really well for the teams that I am working with. Some of them it works better because I can spend more time with those teams. The teams that I see less – it doesn't work as well. It is not because of me – it is because we give feedback. So keep that in mind.

You want to get positive results and if you recognize the training is cumulative, you will get a positive result. I think that the great people in the world are doing this – first of all – get functionally strong – right from the get go. I remember having this conversation and spending the time with – in Australia – Libby Linton's coach – Stephan – functionally strong – functionally fast. Now, you don't go just strong – just fast – you are threading these through. Functionally fit – notice where the fit came in. You know, if you are not strong you can't be fast. If you are not fast you can't swim well enough technically to get fit. Get specific – very specific to your event and compete and swim fast. That is what we are all here for is to take everybody you work with and help them to swim faster, right?

Okay and this is kind of a Zen-like philosophical term from a good friend of mine, but I think it is a great way to end. We want bodies that are adaptable – fully adaptable – not adapted and to do that you have to get them fit. You have to create an awareness of their body and awareness of center and awareness of correction. And folks – there is no magic formula – you can't buy a computer program to do it. You have got to invest some time. Get to know your system and get to know your swimmers and allocate the time to it. It is an important part of the puzzle. If dry-land training for any of the strokes is an afterthought – that is what you are going to get and there is only so much room for improvement to what you are going to be able to do in the water before you reach a point of diminishing returns.

Q/A: What is my take on cross-fit in regard to functional strength? I could be diplomatic and not answer the question. If you are using it I want to know why you are using it. I have to have more swim coaches. If your objective is to get tired, then do it. If you want to do something until you puke, do it. Is there a lot of stuff there? Yes. Is some of it good? Yes – with reservations. Don't do it. I do not have a cross-fit

franchise. Maybe if I bought and had a cross-fit shirt on – anyway. A real diplomatic answer.

Q/A: I didn't say isometrics – isolation. We will do beaucoup isometrics – I do not have time to show you. I believe very strongly in isometrics and eccentric work. That is one part of the spectrum. Recognize – you have a history of western civilization from 1650 to 2008 in 45 minutes. Isometrics and eccentric movements are really important. Notice I said movement – sorry. Yeah, because how do you do lat pull-downs? Okay – I will defend myself. I said rowing movements – I really didn't say lat pull-downs. Okay, I said the lats are real important. If you are going to do lat pull-downs do not do behind-the-neck pull-downs.

Q/A: Where does the dry-land fit in best? It really depends on the individual coach's philosophy. Some coaches like to do it before. I think there is a time of the year, particularly with your sprinters, when it is really important to do it before. But it really depends on each individual program and plan. I do not mean to be evasive, but I have seen it work a number of ways with the teams that I have worked with. Some people do it in the morning and come back with their most important swim in the afternoon.

Q/A: Duration of workouts? Oh my gosh – that is where it would blow you away and you can talk to Matta up here – you can talk to Jim Richardson or Jim Steen. The longest workout in the dry-land program that we have ever done – ever done – was one hour. One hour and I don't know if any of those Kenyon

swimmers are here, but that was the circuit, but you can ask them. Most of the time it is 30-35-40 minutes and when they get done with that workout – they know they have done a workout.

Q/A: Frequency? Six days a week – not 40 minutes six days a week. You do core work during certain phases 6 days a week. During the first phase it is a four-day split. The second phase it is a four-day split. Then it goes to three, then it will go to two, then it will go back to three so it could be anywhere from two to six days a week, but core work done every day – definitely.

Q/A: Are there things that you want to avoid on certain days like if you do a certain part – you do not do this when you are doing that? Yes, but not. That is a little bit of thinking body building again. Hear me out. If it is your high stress swimming day, I try to put my high stress dry-land day on the same day. I don't want my high stress swimming day – my high stress dry-land today and then try to come back with a hard – they never recover you know? I would rather put stress to stress together so there is a lot and it has to be really individual to the program and to your philosophy of training. I am really fortunate in the situations that I work with – I have a great dialogue with the coach. I am unfortunate in that I can't be there every day. That is just the nature of how I work. I wish I could, but they cannot afford to pay me that huge salary that I would take so – thank you very much and I will be over in the exhibit hall.

Copyright of *World Clinic Series* is the property of *American Swimming Coaches Association* and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.