PERFORMANCE CYCLING CONDITIONING

A Newsletter Dedicated to Improving Cyclists

Volume 15, Number 4

WHAT'S INSIDE?

IMPORTANT ANNOUCEMENT

Performance Conditioning Cycling going Digital

After the next two issues Performance Conditioning Cycling will be delivered to you via e-mail.

Why the change?

- USAC coaches want it. Based on the survey results in Volume 7 #1 issue of the USACCA SpokEmail an overwhelming majority, 6 to 1, prefer the electronic version.
- Chain-links. The electronic version will offers instant access to links that will provide additional information on a specific topic or issue at your finger tips. This will enhance your educational experience. Be sure to watch for more information.
- Better appearance- the electronic version will be in 4-color.
- More environmentally friendly.

What Do I need to do?

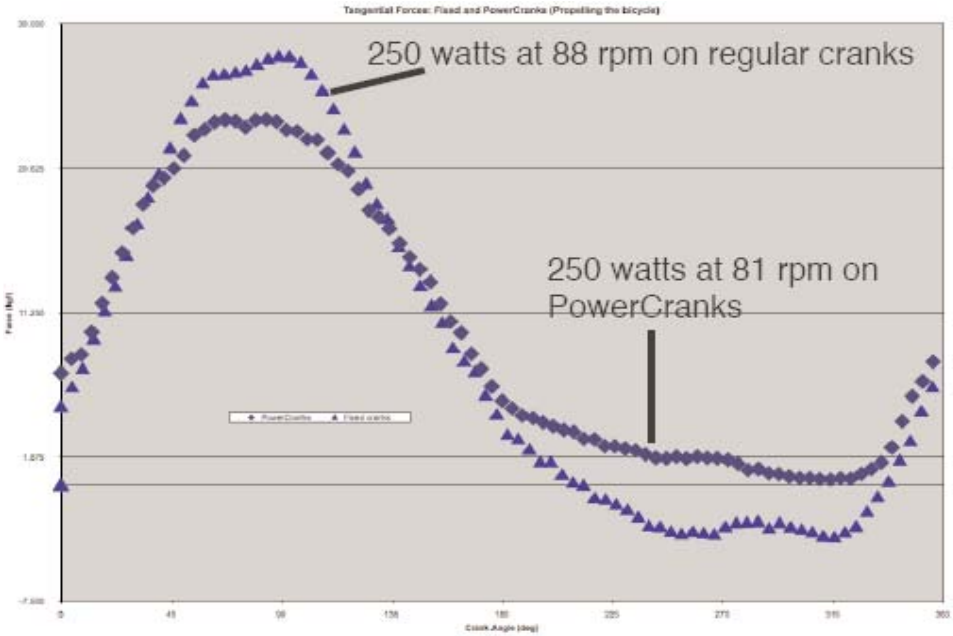
- If you are a current USACCA member-nothing! In fact if you move, don't worry, we'll follow you via email. We only need to know if and when you change your e-mail address.
- If you are not a USACCA member and subscribe you need to contact us with your e-mail address. You can do this by letting us know at condpress@aol.com or calling 402-489-9984 during business hours.

We hope this change provides you with better service and a greater learning experience.

Ken Kontor, Publisher
Performance Conditioning Cycling

Do you want to improve pedaling effectiveness for your clients?

Below is a graph of actual tangential pedal forces around the entire pedaling circle for one person riding at 250 watts comparing regular cranks to PowerCranks. On regular cranks he is riding at 88 rpm and on the PowerCranks he is riding at 81 rpm.



Note that there are zero negative forces on the upstroke when riding PowerCranks. Removing this inefficiency allows the rider to push much less on the downstroke to maintain the same power. Here he is required to push less despite riding at a 10% slower cadence. Think what he could do with his power if he just pushed as hard as he is capable!

This rider reverts back to a more standard pedaling style on regular cranks because he hasn't been on the Power- Cranks long enough to fully retrain his unconscious pedalincoordination. He reverts because he hasn't fully retrained his unconscious coordination and his cranks allow him to do so. It is possible to retrain the nervous system to pedal in the PowerCranks fashion, but it takes time and effort to do so and it is almost impossible to do so using regular cranks. This graph helps explain the 10% improvement in cycling efficiency documented by Luttrell* that came after equivalent training with PowerCranks compared to regular cranks.

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*MD Luttrell and JA Potteiger, Effects of Short-Term Training Using PowerCranks on Cardiovascular Fitness and Cycling Efficiency, The Journal of Strength and Conditioning Research: Vol 17, No. 4, pp 785-791

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Coaching Busine$$

The Untapped Market in Cycling - Seniors

Fred G. DeLaCerda, PhD, USA Cycling Level 1 Coach, Stillwater, OK

Currently baby boomers are turning 60 at a rate of about 5000 per month!

*Fred hold certifications with USA Track and Field Endurance Coach, Sports Physical Therapist, FFA flight instructor and Power Training Coach. He has been a coach and educator for over 40 years. He brings years of experience to an every growing market for coaches-seniors, yet cycling senior competition numbers lag far behind its counter parts swimming and running. The cycling coach can play a pivotal role in closing this gap and improve their bottom line in doing so.**-ed***

BEG INT ADV MSR MTB

In the one great race of life, there is one unavoidable truth, Old Father Time never slows down, affecting every human, male or female, regardless of race or color, no one is immune. At first, you never notice the presence of aging until one day you become aware of faltering ability and the inevitable becomes a reality. You are old and getting older with every heartbeat!!!!

Aging Overview

While it is said age is just a number, aging is not a number, but it is a reflection of a decline in physical performance, and, for an athlete, be elite, recreational, pro or amateur, there is the loss of physical ability to perform in sports as in the past. When the decline becomes noticeable depends on the individual and the sport, yet the overall decline begins during 40 years of age. While slow at first it becomes more rapid in the 50's, accelerates rapidly in the early 60's with a drastic rate of decline in late 60's, and continues with a steep rate of decline in the 70's. It ends at the average age of 76 for men and 81 for women with death. In addition, medical issues become prominent in the mid to late 60s contributing to the rate of decline.

What happens to the human body as it ages that results in such a rapid decline in physical performance during the mid to late decades of life? Examine the major human systems and it illustrates the process.

Musculoskeletal: Both men and women reach peak strength in their late 20's and early 30's, but a gradual decline begins primarily due to loss of muscle mass. The fast twitch muscle fibers are lost at a faster rate then slow twitch. At this point, however, the ability to use oxygen does not change because capillary density and oxidative enzymes stay relatively constant.

In the 30's and continuing thereafter, there is a loss of joint flexibility and muscle elasticity, leading to stiffening of joint capsules and ligaments, hence, muscle and joint injuries increase and healing time is slower. The lining of the joint, the synovial membrane, slows in production of lubricating synovial fluid making joint cartilage, particularly knees, hips and vertebrae, more susceptible to trauma and overuse damage.

While the loss of bone density starts in the 30's and is well known in women, but males, too, must contend with this problem, especially if their diet is lacking in vitamin D and calcium. Loss of bone density is related to the lack of weight bearing exercise. Loss of bone density is a factor in a higher incident of stress fracture with increasing age.

Note: these declines start in the second and third decades of life and will continue thereafter, some more rapid than others and, to some degree, will vary with individuals. How it affects

Symbols to Success
Articles preceded by

BGN indicates author believes content is for beginning-level athletes with training age of 0 to 2 years.

INT indicates author believes content is for sport (intermediate)-level athletes with training age of 2 to 4 years.

XTP indicates author believes content is for expert-level athletes with training age of over 4 years.

MSR indicates author believes content is for master-level athletes over 30 years of age.

MTB indicates author believes content is for mountain biking.

NOTE: Training age year is continuous year-round conditioning.

R following articles indicates the content has been reviewed by the editorial board.

O following articles indicates the content is the sole opinion of the author.

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performance in sports depends on the physical requirements of the sport.

Cardiovascular-respiratory: Muscle strength is a major factor in explosive and speed performance, but it the cardiovascular-respiratory system that is the key for endurance performance. Aerobic capacity, how much oxygen the body uses to produce energy at a maximal workload, begins to gradually decline in the early 20's, the decline accelerating in the mid to late 40's and continues into the senior years. This decline is due to two key factors.

First, maximum heart rate drops about six beat per decade up to as much as one beat per year. The stroke volume, the amount of blood pumped by the heart per beat, decreases by three to four percent per decade. This combination of decline in heart rate and stroke volume means less blood is delivered to the working muscle resulting in less oxygen delivery and less energy production.

Second, the maximum expiratory ventilation (how much air you can inhale/exhale in one minute) begins to slowly decline from 20 to 30, and very rapidly after the 50's to about half of the peak volume by the 60s. Also, at age 55 there is approximately 10% less blood flow to the lungs, age 65 about 20%less, at 70 over 25% less as compared blood flow at age 20.

Aging Performance-The More Stress More Recovery Paradox

All the declines in the physiological systems result in a decrease in athletic performance. Again, how much age affects physical ability depends on the nature of the sport. Overall, it requires more work, more stress, more training to maintain physical conditioning. This is complicated because it also takes more time to recover from training sessions and competitions.

Yes, there are anatomical and physiological "abnormal athletes" that seem to be timeless. When considering the effects of the aging process on athletic performance, it is informative to examine athletes who seem to defy age with their performances.

One such athlete who has received a lot of media attention in the past several years is a woman Olympic swimmer, Dana Torres. Torres is naturally gifted, competing at age 7 years and establishing a world champion record at 16. Tall (6 ft), lean, with long hands and feet, physically a perfect example of a champion swimmer. A perfectionist with a self described "turbo" driven A+ personality, Torres thrives on competition. A four time Olympian swimmer having won a collection of medals, the quest for the Beijing Olympics began when she started regularly swimming to ease morning sickness.

Training started for the 41 year old with a master's coach since she was entering the decade of life where there is significant decline in physical ability. For example, as a college swimmer her weekly workout consisted of swimming 6500 meter per week with two workouts per day. As a master swimmer this was cut in half because of inability to recover between workouts. Due to the short time between racing events, recovery was a major issue at the Olympics. Torres's training involved a master's coach, event coach, stretchers, masseuse, and strength trainer.

Torres finished a close second in the 50m and swam on medal winning relays. Shoulder surgery followed the Olympics. In the recent World Championships she finished eighth, plagued by a knee problem. Her knee and shoulder problems are due to long term overuse associated with swimming. More recently her knee has undergone extensive surgery to repair years of overuse.

Another example is the French woman cyclist, Jeannie Longo who, just two months shy of her 50th birthday competed in the Beijing Olympics where she was the oldest endurance athlete. Despite high finishes in the road race and time trial she failed to win her fifth career Olympic medal.

A former down hill skier, Longo took up cycling in 1979, and, since then has over 1000 victories, winning her first Olympic road race and time trial (the first-ever women's Olympic cycling events) at the 1984 Los Angeles Olympics and has ridden every Olympic road race and time trial since. At the time of the next Olympics, Longo will be 53 and seems unsure of being there. Don't count her out!

Longo is not open with her training techniques, simply saying her success and longevity is the satisfaction derived from competition. That is her motivation and she uses it to focus on perfection.

Longo is not short on mental talent either, earning a bachelors degree in mathematics, master's in business administration and a doctorate in sports management. As a bike racer she is very smart and extremely aggressive. There is a love-hate relationship with her peers, has a "testy" personality, and is often at odds with the French cycling organization. This sounds much like an American male cyclist.

Of course, the male cyclist, Lance Armstrong, who at 37 years of age and four year absence from winning his seventh Tour de France, has returned to pro bike racing. Relative to the general population 37years is not old, but to pro tour racing he is old. While not the oldest man to ride the Tour, there have been several who have ridden when in their early forties. Raymond Pouilidor, age 40, finished third in 1976. There is no doubt that Lance Armstrong is genetically gifted, both mentally and physically, and this has been sharpened by his greatest victory, surviving cancer. However, the effects of age are unstoppable.

Being able to watch the Tour on TV allowed the viewing of his performance. It was very obvious on several occasions he lacked the ability to immediately respond to accelerations. This reflects the decline in muscles, particularly the fast twitch fibers, that takes place in the third decade of life. Also, his time trial results were sub-par for him, perhaps due to age, lack of fitness or both. Always able to recovery quickly, there were several times when it was lacking, not surprising since with age the ability to process lactate declines.

The 2010 Tour de France will test Lance's ability to deal with aging. Aging will be the toughest competitor Lance has ever encountered. In the history of the Tour the oldest cyclist to win was in 1922, Belgium's Firmin Lambot at the age of 36. Regardless, Lance's legacy will be his worldwide effort in the fight against cancer.

What are the key factors that enables these three athletes to combat the effects of aging on their performance?

1) Each is genetically gifted for their respective sport. This gift was evident early in their careers, and, while this gift is not necessarily the reason for competing well as they get older, it does set them apart as they age. However, their performance should not be the standard by which all senior athletes should be gauged.

2) Each are highly competitive, this being the force that moti-

vates them to excel. Competition provides a goal, the goal becoming the focus that directs them to perfection. The one single factor that compels them is the motivation to compete, not just swim or cycle, but to compete. Regardless of ability, all athletes, both men and women who compete in their senior years, will say competition is the motivating factor. USA Cycling should note this.

3) The level of success in a sport is specific to the requirements of the sport. Where strength is a major component in the second and third decades, it is precision and coordination sports that allow top level competition until the late decades. For example, the oldest women at Beijing, a shooter, were 56, the oldest woman to ever compete at the Olympics. The oldest man was a 67 year old equestrian.

What does the effect of age on these elite athletes tell the amateur recreational athlete?

1) Stay with a sport as long as possible. However, if your sport is strength or endurance it may be better to move to a precision or coordination activity unless you are in a sport that allows age group competition beyond age 50.

2) Recognize that your physical abilities decline with age. And, while age may be just a number, it does reflect the effect of the aging process on physical ability. Your performance at 65 years will not be the same as when you with 35, but, it does not keep you from competing and comparing your performance to those of a comparable age.

3) Motivation is the key to continuing the participation in a sport. It is competition that that provides this motivation. In some respects, you are competing against yourself, yet it is more critical to compete against those of comparable age. The competition must be on a "level play field." Recently, I competed in a National Senior Games regional championship. There was husband and wife, he was 94 and she was 92. Both rode the 5K and 10K time trial races over a rolling hill course with a 20 mph crosswind. When ask what motivated them ride, both replied, "The competition against others. Just wish there more competitors."

Seniors v. Seniors-A Way to Grow

Because of this physical decline, need for more stress and recovery, many sports have developed Senior and Master divisions to provide a level playing field as one ages.

One organization, the National Senior Games Association (NSGA) sponsors state and regional championships, and, every two years, a national championship in certain team and individual sports. Cycling is one of the sports. Starting at age 50, categories are in five year increments up to 90+ for both men and women. It not uncommon to find men and women in their 80's and 90's riding 5K and 10K time trials.

At the 2009 National Senior Games there were 4,043 track and field competitors, 3,332 swimmers and 1,562 cyclists. California had the most senior competitors with 1,312 and Texas next with 520.

In the 1980's road racing began to attract runners and fitness joggers who still had a competitive drive. USA Track and Field capitalized on this interest and became the governing agency for these races. Realizing the effect of age on performance, the races are set-up with five year age groups starting at under 10 and going up to the 90s.There are overall champions for both men and women as well as age group winners. There is now even a National Running Day. Typical races are 5K, but have developed into marathons and various distances in between. Through out the year there is not a time when road races are not going on.

The annual USA Masters Outdoor Track and Field Championships had nearly 1000 competitors in 2009 with age groups in five year increments ranging from 30 to 95. There were two 95 year old runners and a long jumper. USA Track and Field has more the 24,000 registered Masters members ages 30 to over 100.

To illustrate the growth of road races, in 1990, 4,100 runners finished a road race; in 2000, 7,411 runners; and in 2008, 9,240 finished. With baby boomers turning 60 at a rate of about 5000 per month, this number is sure to grow.

Senior/Master in Cycling

Take a look at USA Cycling. I cannot locate any data on number of cyclists who finish races, but, have been told there are 63,273 licensed to race. USA Cycling races are based primarily on performance "categories" (CAT) levels 1-5 for men and 1-4 for women. Age grouping depends on who sponsors the race even though USA Cycling is the governing agency. Age grouping is random, failing to provide a level competition for those over 50. Usually it is simply 55+ or maybe 60+ implying that after these ages the riders have comparable physical ability. Nothing could be further from the truth. Instead, it is a significant handicap to the aging athlete and discourages senior cyclist participation. Most of the time there is limited age grouping for women and as expected discourages participation.

In 2008, the total number of cyclist licensed to race by age were as follows: 10-18, 7%; 19-24, 11%, 25-34, 21%; 35-44, 33%; 45-54, 21%; 65+, 1%. This lack of licensed racers in 65+ does not mean there are not senior cyclist interested in racing, but, indicates there are limited cycling races recognizing the age related decline in physical performance. Why should an senior purchase a racing license if there are few races that provide a level playing field based pm their age related physical decline? Considering the number of senior cyclist who are racing in the Senior Games, it would seem the cycling hasn't come close to its potential in senior participation.

Cycling for Senior- A Missed Opportunity for Coaches?

There is no doubt that America is aging, and this aging population is discovering, rediscovering and for some discovering for the first time the pleasure of athletic competition. This aging has brought attention to the master athlete. This is usually thought of as 55-and-over because those organizations that sponsor athletic competitions have arbitrarily made such distinction under the assumption athletics over 55 are equal in ability at this age. Nothing could be further from the truth.

For some unclear reason those competing at 55 and older are designated "masters" athletes. It must be remembered that the aging process is not static, but an ongoing process with significant physical changes becoming more pronounced in the fourth decade and declining rapidly thereafter. The effect on sports performance is specific to the sport. For this reason, I refer to master as beginning in the mid-30's and extending to 50 after which I

use senior athlete. For the purposes here I will combine these to be the aging athlete since it is a continuum and not a set point.

Presently, at age 72 I have been a competing athlete, coach, sport science educator, and sport physical therapist for over 40 years. During this time I have work with aging athletes that fall into one or more of the following groups. One group are those who are suffering from the effects of long term over use injuries, but still want to compete. Most of these are in their early 60's. A second group of aging athletes are those who have never competed in any sport. This is particularly true for women 55+ because they did not have the opportunity to participate in competitive sports when growing up. Then there are those, particularly males, who as youths participated in the traditional sports (baseball, basketball, football, etc) because these were the only ones available to them.

Why do people want to exercise?? Basically, it is to be physically fit, yet, fitness is not a single entity, but a continuum. Some people want the good feeling associated with regular exercise. Others want to be "athletic" fit. These usually being former amateur athletes having had experience at the high school level. Regardless, of the fitness level sought, many have the urge to compete, this being the motivating factor for continuing a long term sport related exercise program. A benefit of such a program is the health ramifications, particularly combating obesity.

At the current rate obesity (approximately 30+ pounds over health weight) will cost the USA about $344 billion in annual medical related expenses for the next ten years consuming over 20% of health care spending. Increase in body weight associated with aging is mostly from the lack of regular exercise. This extra weight increases the risks of diabetes, heart disease and certain types of cancer.

At this time the USA is struggling to find ways to curb medical costs with Congress heatedly debating health care legislation. Extra body weight is now and will continue to be a driving force in rising health care costs. Considering exercise is a major factor in developing and maintaining healthy bodies and controlling body weight, it seems any sport organization should come to the front as leaders in promoting the health benefits of sports activity for all age groups, but particularly the aging population.

Baby boomer athletes want different sports competition, and there are many choices now available, but the problem lies with the competition. Does the competition allow for the age related decline in physical ability?

While some of the aging athletes are only interested in the fitness aspect of sports, most want sport competition, the competition being the motivator, yet, it is only a motivator if providing a level playing field based on age differences. Sponsors who provide only a 55, 60, 65 plus age groups are totally ignoring the rapid decline in physical ability with age.

Over the years I have consulted with aging athletes, who because of long time over use, have developed chronic problems with ankle, knee and back. These athletes are looking for another sport. In many cases these athletes participated in road racing where, in addition to overall competition for all ages men and women, there is 5 year increments in age thereby providing age related competition. The 5 year age group categories are critical starting at 45 because the loss in physical ability starts going down hill rapidly after this point.

Since cycling is less trauma to the body as compared to running, physicians refer the athletes to me. I agree with the physicians; however, in most cases cycling does NOT provide a level playing field for age, simply providing 55+. After having been in age group competition such as running, they are aware of physical declines with age. Very seldom does the athlete want to competition without age grouping and simply opts for the sports that do. Having been a competitive athlete, being able to compete in appropriate age groups, the aging athlete is motivated to stay in the sport and to stay fit. Failure to recognize this, cycling loses the aging athlete to other sports.

Vern Gambetta, President of Gambetta Sports Training Systems in Sarasota, Florida, has been a long time athlete and, although no longer competing, still trains like an athlete. He recognizes that America is aging, and this aging population is discovering, some for the first time, the fun of athletic competition. This brings in the demand for coaches to work with aging athletes. This creates need for coaches trained to work with aging athletes, something that Gambetta encourages.

In some respects training an aging athlete is similar to working with young, developing athletes, there are, however, some critical differences. As has been pointed out, part of the aging process is the declines in performance due to anatomical and physiological changes. Even though fundamental movement skills show minimal changes, the human performance biological factors do change significantly.

The basic principles used in training the young population work with the aging athlete. There are, however, differences that must be observed. Overload is the progressive application of stress as the body adapts to the training stress. This overload is typically applied in terms of training volume. Frequently, the aging athlete's lack of progress is due to high training volume. This leads to injuries and burnout. For the aging athlete the better approach is to overload through intensity and density. This involves more frequent and shorter duration training sessions.

The most critical component of training is the recovery processes, both long and short term. The increasing number of older Olympic athletes can be largely attributed to recovery techniques. The United States Olympic Training Center's Athlete Recovery Center, run by sport scientist, Bill Sands, was established two years ago, the underlying philosophy being to train smarter, not harder. United States Olympic Center sport physiologist, Rand Wilber, indicates recovery techniques are "exponentially" more important for older athletes. This applies to any aging athlete, not just the elite, but to the amateur, recreational athlete be it for those who are want to improve fitness as well a those who compete.

The aging athlete needs two elements. First, there is a need for coaches educated and trained to work with the aging athlete. The coach needs to understand the anatomical, physiological and psychological changes that affect the physical performance of athletes as they age, and, to understand the aging process, realizing the effects are not static. Second, for those aging athletes who want and need the motivation of competition the various organizations sponsoring athlete competitions must provide age related competition grouping. Promotion of a sport is not just done through the elite athletes, but through the participation of as many competitors as possible on an age level playing field. **O**

More Information Please! Contact Fred at AeroFD@aol.com

Elite
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Issues and Questions in Youth Cycling Development #3 - Keeping the Team

Ralph Frazier and Kelli Rogan- Frazier Cycling

Frazier Cycling's Atlanta-based Junior Development Program was developed by Ralph Frazier and Kelli Rogan. Ralph has over 35 years of cycling experience as an endurance and marathon racer and a coach. Kelli has 10 years experience of coaching juniors and masters as well as an impressive track and race racing career. Frazier Cycling has a mission to develop the next generation of cyclists with an appreciation for the sport, lifelong physical fitness, sportsmanship, teamwork and commitment. As the southeast's largest junior development program, they have been recognized by USA Cycling News as "an excellent model for other junior development initiatives" …focusing on "character as much as athletic ability." The 2008 Frazier Cycling Juniors team holds 9 state championships and 9 national medals, including 2 national championship titles.

Ralph Frazier

Kelli Rogan

As many of you know, starting a juniors road cycling program is not an easy task. Among the hardest obstacles to overcome in recruiting new juniors is contending with the popularity of "mainstream". In addition, many parents are resistant to involving their kids in road cycling mostly for two reasons: the expense and the concerns about traffic safety.

In the first of our series of articles, Creating and Nurturing a Youth Cycling Pipeline, we discussed several ways that you can overcome recruitment issues. But recruiting juniors is barely half the battle for growing our sport - keeping them on the team can be nearly as difficult.

Even though Frazier Cycling has been successful in sustaining our junior road team to more than 30 members, it has been challenging to maintain our numbers. We monitor our team to find ways to keep juniors in our program and more importantly involved in the sport of cycling. We at all times consider our mission: "Grow the sport by developing the next generation of serious cyclists. Groom junior cyclists with a focus on principles and values; good sportsmanship, attitude and teamwork. Promote a lifestyle of fitness and exercise to build a healthy environment for families." Growing our sport not only means recruiting new cyclists, but it means retaining the ones that we have. Consequently, we are always interested in information and/or suggestions that will enhance our program to keep juniors in cycling.

Recently we received an email from a junior cycling coach who is starting a team in Florida. Within his message, he included a PezCycling News article, "Toolbox: Beginner's Mind Part 1", October 12, 2009. The article contained information with regards to teenager sports psychology. We were very excited to read this article because information helpful toward understanding teenager psychology is crucial to any junior coach and parent!

http://www.pezcyclingnews.com/?pg=fullstory&id=7590

The PezCycling News article emphasized the importance of coaches knowing why their athletes are cycling, "Ask them! If you know what's driving them, you'll be better able to connect the value of mental skills with what your athletes care about the most."

Of particular interest was the author's reference to the book "Foundations of Sport and Exercise Psychology" by Weinberg and Gould. This book cites research that shows the top five reasons that boys participate in sports and the top five reasons that girls participate in sports.

Accordingly, the five reasons boys participate in sports are:

1. To have fun
2. To improve skills

3. For the excitement of competition
4. To do something they're good at
5. To stay in shape

For girls, it's
1. To have fun
2. To stay in shape
3. To get exercise
4. To improve skills
5. To do something they're good at

Asking your juniors why they are cycling is very good advice. Understanding why juniors choose cycling is good for recruitment and even better for keeping juniors in your program.

In August 2006, we issued a survey that asked the kids to list what they enjoyed about being on the Frazier Cycling team.

Here are the things that the kids considered most important to them about our team and program:
1. Friends - You make friends in cycling and that makes it 100 times cooler
2. Games - It's fun when we learn new cycling games
3. Parties - Team parties are fun. We get to see everyone and just hang out
4. Strategy - Cycling strategies can actually help in school work
5. Coaches - It's fun to learn cycling skills from our coaches

After reading the article, we decided to find out why our juniors choose cycling as their sport. We wanted to compare our team's results with the research documented by Weinberg and Gould in their book "Foundations of Sport and Exercise Psychology." Additionally, we thought it would be important to survey our parents to find out why they believed their children are cycling.

In late October 2009, we sent our juniors another survey asking them to list the top six reasons why they cycle. We sent the same survey to the parents asking them why they believe their kids cycle. We did not provide any suggestions for reasons in the survey - the reasons were purely voluntary. By the end of November, we received 34 surveys (12 teenagers, 8 preteens, 14 parents) from which we compiled results.

The information that we obtained was very enlightening on what attracts youths and their parents to our program. Also, it indicated what we should emphasize in our program to retain members.

Here are the five top reasons our boys participate in cycling:
1. To be with teammates, friends, and social aspects
2. To have fun
3. To stay in shape
4. For the excitement of competition
5. To be "cool" - identity factor

For our girls:
1. To be with teammates, friends, and social aspects
2. To stay in shape
3. To have fun
4. To get exercise
5. For the excitement of competition

Our juniors did not rate "fun" as the number one reason as compared to the list by Foundations of Sport and Exercise Psychology. Nevertheless, the top reason is certainly no surprise to us. Perhaps "To have fun" incorporates teammates and the social aspects of other sports, but with our team, "teammates/friends/social" is important enough to the juniors and their parents to be cited separately. In the articles that Coach Kelli and I have written, we emphasized the importance of social considerations for youth cycling programs. As stated in Creating and nurturing a Youth Cycling Pipeline - Series 3, "We have found that all team members share a connection and they thrive on peer associations. It is our observation that having a peer age group and having fun are crucial for most youth cyclists to progress in this sport. As a result, a training program must incorporate the social needs of the youth cyclist." The survey confirmed our perceptions.

By the way, here are the top five reasons our parents believe their kids cycle:
1. To have fun
2. To be with teammates, friends, and social aspects
3. To stay in shape
4. Family activity
5. To be "cool" - identity factor

You will notice that our parents' view is a combination of the junior gender results with a notable inclusion of "Family activity". Not surprisingly, our parents highly value family togetherness in cycling.

In looking at our junior survey results, there is a slight difference between the genders. The importance of "Individual and Team Identity" seems more important to boys. Girls rate "getting exercise" with more importance than boys.

The differences between the genders is very important to how your program is designed to address both sexes. We noted some behavioral differences between girls and boys in our article Creating and Nurturing a Youth Cycling Pipeline - Series 3. For example we noted: "Girls are more likely to quit the sport than boys". Naturally this issue is a concern for our program and something we are determined to solve. Participation by girls (and women) in competitive cycling is significantly lower than boys (and men) across the nation. We really cannot afford to lose any of those girls who have joined cycling. Within our own team, we have seen girls who have medaled nationally leave our sport. Typically, this has happened when the girls enter high school.

Obviously, we strive to find solutions to all issues related to keeping all juniors in cycling throughout their lives.

We plan to survey our team every year for their top reasons for cycling. Changes in our team dynamics may affect the reasons and what we need within our program. We suggest that you survey your team, too.

Hopefully, our survey results will be helpful to you. Also, if there is any information that you would like to share that could help keep juniors in our sport, please let us know and we can document it in a future column.

Got a Youth Development Question-
If there is a particular topic you'd like us to discuss or if you would like to share a junior coaching experience or ask a question, contact us at 770-513-8640 or info@fraziercycling.com. We will publish your requested information in the next issue as space allows. ●

Preventing Power Output Decline in Master Cyclists with Combined Sprint and Strength Training - Phase Two

Luisa Sullivan, USA Cycling Level II Coach, CEO Davanti Cycling

With a MS in Integrative Physiology, Luisa Sullivan, is a USAC Level II and Certified Power-Based training Coach and Serotta-Certified for Advanced Bike Fit. She has been coaching for several years from serious recreational to elite competitive athletes.

She worked in the Laboratory of applied exercise science at CU, Boulder, where she participated in several research projects and she conducted many performance tests (VO_2max and Lactate Threshold) and massive power and metabolic data analysis.

Luisa Sullivan founded Davanti Cycling, an integrated cycling coaching center is Boulder, Colorado.

Luisa is an avid cyclist herself and occasionally races in USA as well as in Italy.

Luisa Sullivan

BEG INT XTP MSR MTB

The aim of this article is to lay-out in details a plan for the second phase of each block of the protocol "Combined Sprint with Strength Training for Masters" explained in a previous issue.

Briefly, let's recall that the overall protocol is 18-20 weeks long, sub-divided in 2 blocks of 9-10 weeks each. Each block is sub-divided in sub-phases of 3-4 weeks each [Table 1.]. The second block repeats the same phases of block 1 just with variations in volume and intensity.

This first follow-up article described in details the first phase of block 1 and 2 and let's recall briefly, that phase 1 develops strength endurance enhancing the size of the cross-sectional area of muscle fibers.

The second phase, described in details in this paper, develops maximal and explosive muscle strength. In addition to the scientific evidence previously referred in support of the overall protocol, there is another research study [2] that found that 9 weeks of high resistance training (5 reps at 85% of 1 RM) improved aerobic performance in elite cross-country skiers. An increased muscle strength can be explained or by muscle hypertrophy or by neural adaptations. In order to train fast twitch fibers (let's remember: the main responsible for power loss in masters) subjects need to work against very high loads and, for the best results, with rapid movements. Other studies in early 1990s showed that few reps at high load (85% 1 RM) executed with explosive movement, increase rate of force development with none or very small amount of hypertrophy. Therefore "neural adaptation" plays an important role in strength gains. The term "neural adaptation" (adaptation of the nervous system to training stimulus) is a broad description that involves several factors such as selective and increase activation of motor units and muscle.

Typical week

In the second phase, as well as it was for the first phase, the distribution of the total training volume is still divided 50% and 50% between sprint training and weight routine. Strength Training should be performed two times per week as well as sprint training. Each strength and sprint session should be 60-90 min long.

An example plan would be: Monday and Thursday (or Tuesday and Friday) for the resistance training, and Tuesday and Friday (or Wednesday and Saturday) for sprint and speed drills on the bike. Coaches can leave 1 day per week, usually Sunday, for base building long distance and low intensity rides. It's more effective if there are full 72 hours between two weight sessions and the sprint session on the bike is performed the day immediate after the weight routine. [Table 2. Example of Typical week]

Maximal and Explosive Strength

Maximal strength indicates a protocol of 3 sets of 5-6 reps at 85% of 1 RM.

Explosive strength adds an explosive movement to the few reps against high load. In this protocol we will start from 5-6 reps at 65-75% of 1 RM (according to the athlete abilities) and progressively build to 5-6 reps at 80-85% 1 RM executed with fast movement.

Undulating periodization

This is may be the most innovative aspect of this program. The undulating (nonlinear) model of periodization enables variation in intensity and volume within the same cycle by rotating different protocols. As stated in the recommendations for resistance training of the ACSM [1] the undulating model has been shown to produce superior strength increases over 12 weeks compared to the traditional linear periodization. Practically in this program, maximal strength and explosive strength will be alternated within the same week. For example, in block 1, during week 5-9, on Mondays we will plan a session of maximal strength and on Thursdays we will plan a session of explosive strength. In block 2, during week 13-18, on Mondays we will add one or two sets executed with explosive movement to the sets of maximal strength. Plyometric exercises will be included in the session of the explosive strength or of the sprint training. In weeks 5-9 they will be executed only once a week, while in week 13-18 the plyometrics exercises will be executed two times a week.

The weight strength routine - Second Phase of each block - Weeks 5-9 and weeks 13-18.

This second phase is very similar between block 1 and block 2. The only difference is that in block 2, as the athlete progresses, the intensity increases and the volume of the explosive strength (few reps against high load with rapid movement) is greater than maximal strength (few reps against very high load with slow movement). In the first block, the rapid movement will not be performed against 85% of the 1 RM, but against 65-75% 1 RM and progressively the athlete should be able to work against 85% 1 RM with rapid movement in the last 3-4 weeks of the 18-20 weeks protocol.

1. Ratio Load/reps/sets for Phase 2. Example:
Week 5-9:

- Maximal strength session: for each exercise: 1 set of 10 reps at 65-70% 1 RM and 3 sets of 5-6 reps at 85% 1RM at slow-medium movement
- Explosive strength session: Plyometric exercises (2-3 sets of 10

reps for each exercise). For each strength exercise: 1 set of 10 reps at 65-70% 1 RM and 3 sets of 5-6 reps at 65-75% 1 RM with explosive movement especially in the concentric part of the movement itself.

Week 13-18: Higher Intensity and greater component of the explosive strength vs. maximal strength.

- First weight session of the week: Plyometric exercises (2-3 sets of 10 reps for each exercise). For each strength exercise: 1 set of 10 reps at 65-70% 1 RM +2 sets of 3-5 reps at 85-90% 1RM at slow-medium movement + 2 sets of 5-6 reps at 75-85% 1 RM with explosive movement
- Second weight session of the week: Plyometric exercises (2-3 sets of 10 reps for each exercise). For each strength exercise: 1 set of 10 reps at 65-70% 1 RM and 3 set of 5-6 reps at 80-85% 1 RM with explosive movement especially in the concentric part of the movement itself.

2. Foot distance/placement: shoulder width to simulate the same distance feet have when on the bike- Feet may also be slightly external rotated, especially during squats or leg press, to activate the adductors muscles and the vastus medialis.

3. Type of exercises

- **8 sets per muscle group.** Since we perform 3 sets for each exercise, we need to identify 3 exercises for each muscle group. Example: for muscle group quadriceps: lunges, steps-up and squats
- Give priority to **multiple muscles** (squats, leg press, chest press) vs. single muscle exercise (leg extension, leg curls, calf raise) and perform multiple joint exercises prior to single-joint exercise
- **Legs:** lunges, squats, leg press, steps-up
- **Upper body:** pull-down, rowing with free weights, chest press, cable chest fly etc…
- **Core:** back extension, curls up, crunches on horizontal and inclined bench, V-sits up, plunks etc…

4. Sprint Training Sessions- Phase 2

- **Difference with phase 1:** during phase 1, the focus was high cadence and producing power using more velocity and speed than force. In phase 2, the focus is producing power using more Force and start with short powerful accelerations (20-30 sec) where the athlete produces power with force and velocity.
- The focus of these drills on the bike should be **Force** after the maximal strength session and **"acceleration"** after the explosive strength session.
- For power-file analysis, these workouts, in this second phase of the program, should be more in the first and second quadrant of the force/velocity curve.
- Importantly, intervals should be performed so power is progressively increased to favor acceleration. The shape of the intervals on power files should be up-sloping and not down-sloping.
- Coaches can include their favorite workouts where the focus is force and short accelerations.
  - Few examples of workouts where force is the focus are :
  - 10-15 sec STOMPs using high gears, they should be in zone 7 power activating neuromuscular adaptation complimenting the weight sessions. They are very effective if started at the bottom of a hill ((or simulated hill if on trainer indoor), from an almost standing-still position.
  - Muscle tension intervals (3-8 min each at low rpm) of medium grade hill
  - Tempo intervals alternating low and high cadence on flat
  - An example of workout where acceleration is the focus:
    1. Sprints of 20-30 sec not at 90-104% of the functional threshold power in weeks 5-9 and up to zone 6 of power in weeks 13-18 and may be executed on hills rather than on flat.

TABLE 1

18 Weeks						
Block 1 - 9 weeks			Block 2 - 9 weeks			
week 1-4	week 5-9	make-up or recovery week	week 10-12	week 13-15	week 16-18	make-up week

TABLE 2. EXAMPLE OF TYPICAL WEEK - BLOCK 1 - PHASE 2

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Weight routine Maximal Strength	Force and sprint drills on the bike	OFF or recovery day	Weight routine Explosive Strength Plyometrics	Short accelerations and sprint drills on the bike	OFF or recovery day	Long Distance endurance ride
		Cross training			Cross training	

TABLE 3. EXAMPLE OF TYPICAL WEEK - BLOCK 2 - PHASE 2

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Weight routine Maximal & Explosive Strength	Force and sprint drills on the bike + Plyometrics	OFF or recovery day	Weight routine - Explosive Strength + Plyometrics	Short accelerations and sprint drills on the bike	OFF or recovery day	Long Distance endurance ride including some Tempo Intervals at low cadence
		Cross training			Cross training	

O

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More Information Please!

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Cycling Resource Advisory Team
Soft Tissue Specialists and Their Role in Bike Positioning and Performance

with Dr. Ernie Ferrel, Soft Tissue and Bike Positioning Specialist

USA Cycling Continuing Education Unit (CEU) #40

This program is designed to augment the clinics and seminars offered by USA Cycling and other organizations such as American College of Sports Medicine (ACSM) or National Strength and Conditioning Association (NSCA). Each test in Performance Conditioning for Cycling is eligible for 0.1 CEU in category. A maximum of 0.5 CEU from PCC self-tests can be accumulated in a calendar year toward re-certification.

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The conditioning process is defined as the elimination or the reduction of the severity of injuries and improvement of cycling performance, including speed, power and endurance specific to the needs of the individual and events raced.

The world of conditioning contains a vast ocean of information that is accelerating at an unprecedented pace. To navigate through the deluge of information, the person responsible for conditioning (the coach or the self-coached athlete) must rely on outside assistance.

It is impossible to have a good working knowledge of all areas of conditioning. To achieve success, the coach or the self-coached athlete needs to establish a Performance Resource Advisory Team to assist in areas in which the individual has limited knowledge. Depending on the conditioning specialist's own expertise, the team can take on many different forms.

Chis Kautz and I met through Chuck Wuster at CompuTrainer. John Howard, I and Chris are all bike positioning specialists. We bring a unique approach to the bike fit process, allowing for optimal potential for top performance in the riders we work with. We believe that the combination the three of us offer is a unique approach not offered anywhere else.

With my background in biomechanics, I'm always looking at the rider. The bike is the perfect machine. It doesn't really adapt. You can change parts, which is the only way you can adapt it. Real adaptation occurs within the individual. We make a determination on what more we can get out of that person, i.e. range of motion, flexibility and power output efficiency. To learn more about the process of observation see the sidebar, Biomechanical Observation of the Cyclist- The Checkpoints, accompanying this article.

Mobility/Flexibility Concepts

The rider who has reached an optimal range of motion through flexibility and suppleness will be able to fire more muscles fibers quicker, faster and longer than a person who is inflexible.

Here's an example. The psoas muscle is actually a hip flexor in cycling. It can do two things. If your foot is weight bearing it brings the hip down. If it is not it brings the leg up. Based on flexibility and orientation you have to determine the proper muscle balancing and strengthening to get the rider into the optimum position for this muscle. You have to understand that muscle involvement is a very transient state.

Muscles have memory. The longer you are in a certain position the longer your body and muscles recognize this position as the correct position. For example, you ask people to stand in a balanced, athletic position. But the position may feel uncomfortable, because they have an acquired stance that may not be correct.

If you go to a bike shop and get fitted for a bike, what happens? You look to make sure the step-over height is right. You are able to ride the bike from a generic standpoint. The bike is neither too big nor too small but it's not custom made. A bike shop is not a sports medicine center. They are retailers selling bikes.

To get a proper fit, we ask the cyclist to get on the table. We take a look at the mechanics of the body and identify any problems. From this information we are able to establish an end goal based on what the rider "brings to the table." From there you can customize an acclimation training program. Based on experience we can estimate how long this will take.

At first this is difficult for the rider to do. They'll have to stay out of the big chain ring and avoid climbing. The focus is on acclimating the body to new positioning.

Case Study-A working example of the proper bike fit in relation to soft tissue manipulation.

Let's show an example of this process. A rider walks into our office. After an examination, we do a complete orthopedics check, look at the neurological situation and, if necessary, take x-rays. We rule out all the chiropractic pathologies. We come up with a game plan. Most frequently I find tight external hip rotators, the muscles that tighten up under the glutes. This gives you foot flair. We ask a rider to take a few steps. If they are not in good cleated position with the feet spaced in pedal position and the heels slightly pointed out, we know they don't have good mechanics and are losing efficiency.

Try this self test. Take your right foot and flair it out at a 45 degree angle. Put your weight on it. Take your right hand and put it on the back of your knee. You can feel where the tendon of the hamstring is really tight. Now, bring your right foot in, stand straight up and feel the same area. The area is looser. When you turn your right foot out again, here's what happens. You collapse the medial longitudinal arch of your foot (pronate). When you pronate you get tibial rotation, your lower leg rotates. It goes up to your knee, (your femur and your hip), rotating the hip. When you stand like this you are doing an isometric contraction, shortening the hip flexor and external rotators in a cer-

tain position. You are constantly reinforcing this position every time you stand this way.

The first thing I do before I start working on the rider is explain how the actin and myosin cross bridges work to relax, contract and close down the muscles. When you injure these cross bridges through bad mechanics, trauma or overuse it's like these bridges are clumped up with super glue. You have trigger points, muscles with adhesions etc. Now the rider must recruit other muscles to get the job done. This is what happens on the micro level and it all costs you efficiency and power generation capabilities. Having gone through all this, having understood the rotational factor and the isometric contraction, the rider now becomes serious about standing straight in correct position. They say, "This makes sense because when I become really tired, my right knee comes out, etc." Our job is to work to get it in. When you stand with your right foot out you are reinforcing lateral muscles through isometric contractions and knocking out the medial muscles, such as the vastus medialis, one of the strongest cycling muscles. We test this muscle and show them that it's weak.

We reinforce the process. We have to give people the knowledge of what we are doing and why we're doing it. Otherwise all of this doesn't work. Some riders go back to their old habits immediately because it's comfortable. Changing a bad habit is not comfortable or an easy task to accomplish.

The next test is done seated. Take your right leg, place it on top of the other as in sitting reading the newspaper. To get into this position your external rotators have to rotate at their shortest and strongest point. Now, you take your right leg and move it out straight in front of you. If the biceps femoris one of your hamstrings is tight, you can't get a full extension on your leg. As a result you can't get proper rotation on the tibia during the pedal stroke. Now you have to consider the other two heads of the hamstring. As you see, the deeper you get into evaluating the rider, the more complex it becomes.

We try to explain proper mechanics by simplifying it. We tell the riders that the body is divided into three parts. The center, which is the core, is the abdominals, obliques and erector spinae muscles. The lower body is the legs, coming up to the pelvis, the hamstrings, the adductors and abductors, the quads and the glutes. The third part is the upper body. Here we may focus on the levaror scapula, traps and rhomboids. Research says that for every inch of anterior translation (shoulder and head forward stoop) there is a 10-fold force to hold the head up, much like holding a bowling ball in your hand. You can center it over the elbow holding it in the palm of your hand. As you move your arm one inch forward, it becomes much more difficult to control the ball. People in aero position commonly complain of shoulder pain. They keep searching for a "magic" position. In reality, they will never find it because their levaror scapula, traps and rhomboids are weak. They need to do a series of exercises to take the curve out.

You have to treat each of these three areas independently. All this is explained before we start to work on a rider. You tell them where we are going and why we are doing it. All this takes time. We could take the quick approach, do the manipulation and out the door they go, felling great but not knowing why. It amazes me that people will go out and spend thousands of dollars on their bike but not a penny on their body. This makes no sense to me.

Establishing Program

By going through this process the athlete will be able to know the needs of his/her body and keep a history of its development. This is important when establishing a program. Training is much more than going out and cranking the big gears. Training is not static; it's constantly changing. The rider must keep the soft tissue specialist updated on how things are going. Included in this information are factors such as life style and the type of job you have. The differences between a warehouse worker who is on their feet all day and a person who is in front of the computer all day are enormous. There are things that can be done to position the keyboard and monitor properly, to avoid problems on the bike. These all must be factored in to reach our goal of being as efficient and effective as possible on the bike. It's important to remember that it's not just a hamstring or a quad. You have to remember that each muscle and group of muscles has a unique role. Experience has taught me that it's important not only to identify which muscles to work on but in which order to work them and how to work them.

The psychological aspect is very important. You have to convince the rider that some life style change may make them a better cyclist. Much of the success is based on the compliance of the rider. Telling the rider "why" is so important because it reinforces compliance. For some riders it's like learning to ride the bike all over again. It has to be done in increments based on the individual's flexibility or inability to flex and any injuries and adhesions that are present. There is no set formula for how long the process takes. It's all individually based on the response of the rider to treatment, how long adaptation takes and adherence to training and proscribed exercises and attitude. We do know from the literature that physiologically it takes approximately six to eight week for a "training effect" to take place. This is a good starting point to tell a rider how long it will take to see the desired effects we are working toward. All this comes from a lot of experience and working with a lot of different riders.

Dynamic Motion Therapy

All these considerations have led me to develop a system in working with cycling athletes. I call it Dynamic Motion Therapy (DMT™). This is a method of physical mobilization and soft tissue manipulation. It is done to remove fibrous adhesions, thus enhancing the performance of the muscles directly involved in the motor actions of pedaling and aiding in reducing and/or eliminating biomechanical faults. Case in point is a muscle of 10 centimeters length which is restricted by three centimeters. You have lost 30 percent of efficiency from that particular muscle. This can add up and greatly effect performance. All this translates into maximum functional and optimal recovery from training and racing. It frees the body from biomechanical problems that slow down the generation of muscular force to the pedal.

Specific Positioning Considerations

For some events it's known that sitting lower and further back on the saddle activates the bigger more powerful muscles, which allows you more efficiency over the long haul. This position, however, takes longer to get up to speed. You lack the snap that allows for quick transfer into sprint situations. So, based on the rider's flexibility we have to move the saddle up and forward to achieve good force production and quick snap in sprinting, a blend of the two. For the flat surface time trial where the distance is shorter with an increased importance of the aerodynamic position, I may decide that the rider needs to move a saddle up seven millimeters. What I will do in reality is move it up nine millimeters and have them spin easy, not through any pain. What I'm trying to do, in effect, is get a little bit more range of motion out of that muscle. I'll have them pedal for a half hour and then move it down to seven. Now the rider feels more comfortable. If we would have stopped at seven, their active range of motion would have stopped right at seven. There is no leeway! This is where you might get an injury. This is a tricky technique that I use. You have to

know what you are doing and do it carefully. Increasing the flexibility within the desired range of motion is critical in preventing injuries. Yet, most cyclists would move it up to seven and stop there. It is a fine line between the right position for power and the most aerodynamically efficient position they can push.

The saddle is another consideration. It can dictate some lost efficiency as well. The difference between a padded vs. an unpadded saddle is the difference in achieving a few millimeters of flexion. But, you still have to consider comfort in making this decision. It gets down to how much do you want to fine tune the machine (the body). There are some long term considerations. I'm 51 years old. The type of saddle I use today is different from the one that I used when I first started competing. The key is that the transition is incremental and based on their bodies own flexibility as to where they are at.

I look at it from this perspective. How can I help a rider who does a century by creating an increased efficiency with the same power output? If efficiency improves by a half to five percent I'll have that rider further down the road by one half to five miles. John Howard calls it being the "maestro", fine tuning the engine to get peak performance out of it. The rider has their destiny in their hands. All I can do is guide them. Many "experts" proclaim that this is "the way". But this is a tunnel vision perspective. The more you can empower a cyclist with these skills and knowledges about their body and how it reacts to the bike, the better off the cyclist is.

This knowledge will elevate the potential of each and every cyclist, no matter at what level they perform.

Finding a Soft Tissue/Positioning Specialist

The best place to start is with the US Cycling Federation. Ask who their certified coaches are. Who in the area do they utilize and recommend. This is the best place to start. From there I believe it wise to work down to local clubs. Go to club meetings and ask their members about the bike shops they frequent. Who does the bike fit? Ask about their expertise, whether mountain or road. Based on the information in this article find out what they know about positioning. Find out who they would recommend if injury occurs, to whom they refer. Do they know any massage therapists, physical therapists or chiropractors who work with cyclists? You want to go to someone who is connected with cycling. Do they understand what you are talking about when you describe climbing, descending, mountain biking etc.? If you are a mountain biker and the expert is a roadie, you talk a different language, the more specific to your discipline in cycling the better.

Sample questions to ask are: What if I have a short leg? Do you use a fit kit? How many times will you allow me to come back to get fitted right? Why is this bike better than something else? Why is carbon fiber better than steel or aluminum? Do they see a problem without canting? Do they do canting of the foot? This is one of the first things you do in setting a bike up. If your foot is off and rotated and pronated everything else will be off. The people who buy into this and understand what you are asking and have the tools to work with you, are the ones you want to select. **O**

Biomechanical Observation of the Cyclist-The Checkpoints

In observing the cyclist biomechanically there are certain checkpoints to look for. Here is a list that I go through;

- Follow the rider. This tells me the most. The place to start is the overall pedalling stroke.
- The next is the shoes. How are they worn from usage? Are there any excessive wear "hot points"?
- Heel angle- what is the distance between the crank and the heel?

Are they the same or is one flared out ,the other in? Are they both flared out?

- Following the leg up the knee, I observe the knee on the stroke. Do we have a linear power stroke coming down from the hip? Do we have a leg that figure eights at the top? Does it go in or out? This leads me to look at the hips. If the knee is coming out I assume that will be pushing the hip off to the side. Is the hip rotation going side to side?
- Moving up the bike I look at the position of the arms. How symmetrical are they? Is one forward or back, higher or lower?
- Next is the shoulders and how they rotate. Is there a wiggle or are they fairly still? Is one higher or lower?
- Finally, the head position. Is it up or down? Is it rotated to the right or left?

Based on the body symmetry just observed I image the rider for a skeletal prospective. From there I look at the muscle pattern as to what is going on (muscle moves bone).

Policy Change Effective 1/1/10

- The cost of mailing in the self-test will increase to $25.
- The cost of doing the self-test on-line will be $15. You can pay and then access the online self-test through your MYUSACYCLING account.
- Value of the self-test will return to 0.1 per self-test.

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1. In cycling the function of the psoas muscle is:
A. Core Stability
B. Hip Extension
C. Hip Flexion
D. Knee Flexion

2. When muscles develop adhesions the end result in pedaling is:
A. Recruit other muscles to pedal thus decreasing efficiency and power generation capabilities.
B. Recruit these muscles to pedal thus increasing efficiency and power generation capabilities.
C. Recruit other muscles to pedal thus decreasing efficiency with power generation capabilities remaining the same.
D. Recruit these muscles to pedal thus decreasing efficiency with power generation capabilities remaining the same.

3. When seated the athlete takes their right leg and places it on top of the other as in sitting reading the newspaper than takes the right leg and move it out straight, if the biceps femoris is tight, the athlete will be unable to:
A. Rotate the right foot.
B. Get full extension on the right leg.
C. Plantar flex the right leg.
D. Pronate the left leg.

4. In establish a soft tissue management program two critical bits of information the soft tissue specialists needs to now are:
A. Life style and type of job.
B. Dates of major and minor competitions.
C. Type of bike ridden and seat position.
D. Number of individual and group rides in a week.

5. In establishing a soft tissue management program it's important not only to identify which muscles to work on but:
A. The load to work them and how to work them.
B. The order to work them and how to work them.
C. The number of repetitions to work them and how to work them.
D. The volume to work them and how to work them.

6. Dynamic Motion Therapy's mission is to:
A. To remove fibrous adhesions, thus enhancing the performance of the muscles directly involved in the motor actions of pedaling and aiding in reducing and/or eliminating biochemical faults.
B. To remove actin and myosin, thus enhancing the performance of the muscles directly involved in the motor actions of pedaling and aiding in reducing and/or eliminating biomechanical faults.
C. To remove fibrous adhesions, thus enhancing the performance of the muscles indirectly involved in the motor actions of pedaling and aiding in reducing and/or eliminating biomechanical faults.
D. To remove fibrous adhesions, thus enhancing the performance of the muscles directly involved in the motor actions of pedaling and aiding in reducing and/or eliminating biomechanical faults.

7. In sitting lower and further back on the saddle results in:
A. Activates the bigger more powerful muscles, which allows you more efficiency over the long haul.
B. Reduces the pain in the lower back.
C. Reduces the pain in the knee.
D. Deactivates the bigger more powerful muscles, which allows you more efficiency over the long haul.

8. What would you tell your clients to look for in selecting a soft tissue specialist and what would be your role in this process?

Answer Sheet and CEU Application Form

Question #1_____ Question #2_____ Question #3_____ Question #4_____ Question #5_____ Question #6_____
Question #7_____
Question #8 (please limit to 250 words) _____
_____
_____
_____

NOTE: This Answer Sheet is Valid for Volume 15 Number 4 ONLY!

1. Was the material ___new ___review?

2. Was the material: Presented clearly? ___(Y/N) Covered adequately? ___(Y/N)

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_____
_____

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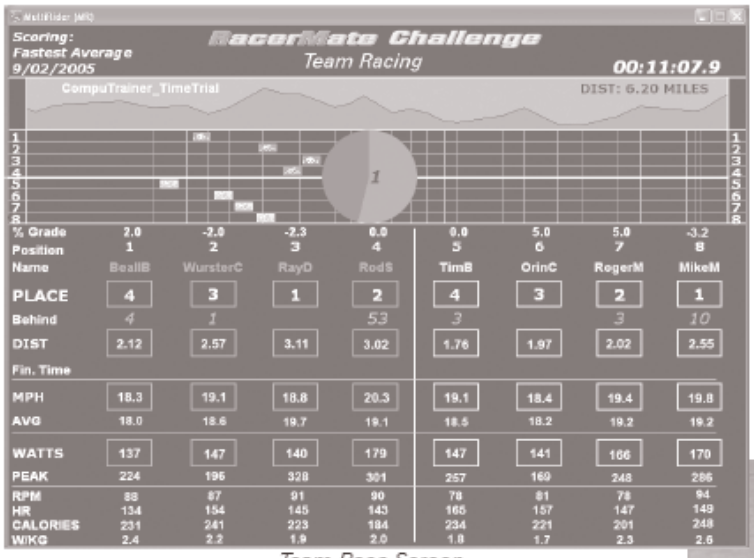

% Grade	2.0	-2.0	-2.3	0.0	0.0	5.0	5.0	-3.2
Position	1	2	3	4	5	6	7	8
Name	BealB	WursterC	RayD	RodS	TimB	OrinC	RogerM	MikeM
PLACE	4	3	1	2	4	3	2	1
Behind	4	1		53	3		3	10
DIST	2.12	2.57	3.11	3.02	1.76	1.97	2.02	2.55
Fin. Time								
MPH	18.3	19.1	18.8	20.3	19.1	18.4	19.4	19.8
AVG	18.0	18.6	19.7	19.1	18.5	18.2	19.2	19.2
WATTS	137	147	140	179	147	141	166	170
PEAK	224	196	328	301	257	169	248	286
RPM	88	87	91	90	78	81	78	94
HR	134	154	145	143	165	157	147	149
CALORIES	231	241	223	184	234	221	201	248
W/KG	2.4	2.2	1.9	2.0	1.8	1.7	2.3	2.6

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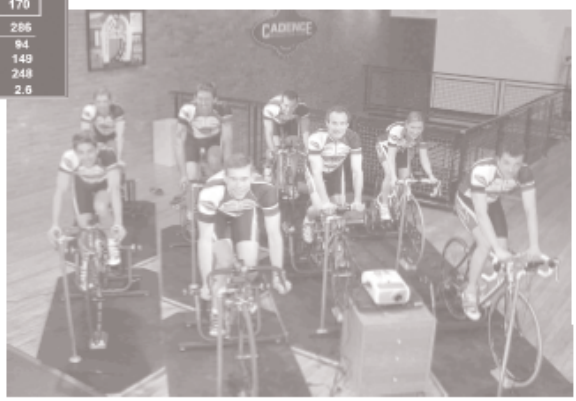
This new 3.0 edition of MultiRider Software adds a third screen for Team Racing which could become the most popular of all. It simulates the authentic, dynamic feeling of riding in a pack and adds a new tactical element to indoor racing. As one professional team manager commented: "FANTASTIC! SPECTACULAR! This is really where the road meets the lab, guys. I just did a pacing session by drafting an earlier tempo session. The drafting worked great and was very realistic in terms of requiring low power output, but rapid speed adjustments. It takes a bit of getting used to, but simulates exactly what we're after. MultiRider 3.0 makes it possible to hold tactics sessions indoors, to teach riders how to best utilize their efforts."

Jay Gump, Webcor Pro Team
Conway, Massachusetts



Cadence Performance Cycling Center • Philadelphia

From the USAC Coaching Education Department

If you are not currently a USA Cycling certified coach but would like to become one, you can find the answer to many of your questions on the USA Cycling website (www.usacycling.org) in the Coaching Program area. The entry level (USAC Level 3) is a home study course that includes the newly developed Introduction to Coaching Cyclists.

USA Cycling offers further certification and educational opportunities. The next level of certification is level 2. The level 2 certification clinics are held several times a year throughout the country. Information on the agenda and schedule can be found at the above referenced website. In addition to the certification clinics, USA Cycling offers a Power Based Training Clinic.

A recent addition to the USA Cycling Education program is webinars. These web-based seminars take advantage of computer and internet technology. The webinars cover a variety of topics. Information on the webinars can be found on the Coaching Program page of the USA Cycling website. Webinars are open to anyone. Some webinars are free; most webinars have a fee.

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