

Exercise Physiology in Coaching: A Qualitative Interview with Rachel Watson

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Interview

1. What led you into the ex phys (exercise physiology) field?

My undergraduate degree is in Chemistry and my M.S. in Molecular Biology. During the time that I was pursuing my masters, I began teaching and coaching and fell in love with both. After teaching full time for six years courses including Microbiology, Biochemistry -Principles and Clinical, and Chemistry, I found out one day out of the blue that I had been awarded the NCAA postgraduate scholarship. Apparently I had been runner-up and the first recipient never went on to grad school. I decided that this would be a perfect time to continue my own education and combine the two things that I love most-science and coaching. I began a second masters in Exercise Physiology. However, after some time in the program, for several reasons, I chose to make a change to the doctoral degree program in education. I am currently working through this program now.

However, all of this said, I would still consider myself to be, in many ways, in the field of exercise physiology. I teach biochemistry and coach; the two naturally meld.

2. What specific kind(s) of ex. phys interest you the most?

I am most interested in application of physiological / biochemical principles to coaching. I am passionate about helping young athletes to understand all of the “whys” behind good training, resting and fueling strategies.

3. How does your knowledge of physiology help with your coaching?

Currently I am most passionate about teaching athletes about metabolism. It is one thing to be able to tell an athlete that alcohol has a negative impact on athletic performance, it is quite another to be able to explain that as alcohol dehydrogenase detoxifies alcohol, ratios of NADH/NAD⁺ increase thus inhibiting pyruvate

dehydrogenase, slowing the TCA cycle, impairing fatty acid oxidation and enhancing FA synthesis. The impact is so much greater when they know why! Also in terms of metabolism, I'm also passionate about explaining to athletes some of the negatives of processed foods. And because of my background in science I can do this not by simply saying, "Don't eat them, they're bad for you." Instead I can explain that they are packed with HFCS and that fructose enters the glycolytic pathway at a different point than glucose, at a point after the highly regulated step and thus a diet high in this energy source can lead to a fatty liver.

Recently one of our alums e-mailed with some trouble. He had recently become a vegetarian and started running more. He was concerned because he had quickly lost 15 pounds and didn't feel great. I was able to return his e-mail with advice about necessary amino and fatty acids. I was able to explain that linoleate (omega-6) and linolenate (omega-3) are essential fatty acids and to tell him where he could get these in a vegetarian diet. It made all the difference to me and hopefully to him to have some answers to his questions.

4. What are some issues you feel are important in ex phys right now? and issues in coaching? or skiing?

I am also extremely passionate about women's issues in sport and particularly the female athlete triad and anemia. Every year at least one of our athletes suffers from anemia and because Stage one and Stage two of the condition can't be diagnosed, it often puts us in a difficult situation. At the High School Camp I am able to explain these problems to young girls and hopefully make them aware of and happy with their bodies at a young age. My knowledge in this area is invaluable to me as I hope that it may spare

some young girls from ever dealing with any part of this.

5. Many skiers study exercise physiology or have some knowledge (or think they do) of the field- why (in your opinion) is there such a strong tie between competitive skiers and trying to learn about ex phys?

I think that a big reason for this is that in order to perform well, skiers must be in touch with their bodies. They need to monitor all facets of their being from workout intensity to quality of rest. In doing this, I believe that they just gain a thirst for knowledge. This may be even more palpable in skiers than in other athletes because of the intense demands of the sport and the need for cross-training.

I also believe that some of the gain in knowledge is out of self defense. There is not a plethora of health care providers who are extremely knowledgeable about the elite skier and thus many of our needs can go overlooked. For example, two years ago, one of our athletes began recognizing that she had an increased and steadily rising resting heart rate. She monitored her HR everyday and knew that it was out of the ordinary. We immediately advised her to see a doctor and she visited a cardiologist. After one visit, he told her she was fine. However, she continued to have an increased resting heart rate and we continued to be worried. We sent her to student health and she visited them several times to no avail. We finally demanded that they take a mono spot. It was negative. On the last visit they told her that she should go and see a counselor. Enraged, we sent her to Phil Steele. After one visit, he diagnosed her with viral myocarditis. If they had not caught it, it could have killed her. She spent a full year taking beta-blockers and was, at times, completely non-responsive. She is now completely well and trying to get back into training. Her awareness of her body and her knowledge of the importance of her resting

hear rate saved her life.

6. Do you use your training and physiology background in other areas besides coaching? i.e. wellness clinics, newsletters, or even exercise advice to peers or coworkers?

Absolutely! In my teaching I use my coaching and exercise physiology. It makes a lot more sense to my students when I can relate Hemoglobin-O₂ binding curves and the effect of protons on the curve to my morning 800 m intervals -I did that just today in Biochemistry. It makes the science come to life. In another context, the High School Camp provided a forum for us to advice young athletes. This is invaluable to me.

7. What is most important to keep in mind for someone just starting an exercise plan?

Find activities that you think are fun. If you enjoy it, you'll continue to do it and adopt it as a lifestyle.

8. How does this compare to what you tell your athletes and/or the more elite athletes?

I tell my elite athletes exactly the same thing. In fact, with every passing year of coaching, I adopt more and more, the idea of individualized training plans. If an athlete is doing what she/he enjoys, their train well. It just works. For example, two years ago two of our athletes had kept training logs for the first time. We told them to write down exactly what they did even if it was hiking and sawing for hours when out on a fire. They did just that. We looked at the training and said, "Okay, looks like you're getting zone 1 and strength here, but you're missing the intensity." We asked them what they liked to do that was intense (e.g. playing pickup soccer games). We told them to add that twice a week on most weeks but to be sure the scheduled in a rest week every three weeks. I never could have guessed the effect. They both went from never placing top 10, to being consistently in the top 10 and one of them medaled in the skate race.

Interview Themes and Issues

Rachel Watson is one of two coaches for the University of Wyoming (UW) nordic ski team. She was a highly competitive NCAA skier at Denver University before coming to UW. When not coaching, she also teaches biochemistry at the University. A degree in Molecular Biology and a love for endurance sports led Rachel to pursue a master's degree in Exercise Physiology after earning the NCAA postgraduate scholarship. She has recently decided to extend her studies into a doctoral degree in Education. The purpose of this paper is cover themes and issues discussed with Rachel in a recent interview.

Rachel's interest in exercise physiology (the study of physiological responses to exercise) is based on a strong background in Biochemistry (the study of chemical reactions and molecular interaction within the body). Therefore, most of her physiological interest is focused at the molecular level. Currently, she has become passionate about stressing the importance of nutrition in metabolism. Endurance athletes require large amounts of energy and can negatively impact their health if they do not "fuel" themselves appropriately. Prominent performance-affecting nutritional issues in collegiate athletics are alcohol consumption, vegetarianism, anemia, and poor eating habits.

Vegetarian diets, though not unhealthy, can prove difficult to active individuals who are trying to include vital nutrients. Rachel tells of a specific athlete whose diet she helped adjust after the individual (recently turned vegetarian) noticed a concerning rate of weight loss. Rachel finds her biochemistry background helpful when explaining, step by

step, why too much processed food or alcohol can hurt one's performance. She also uses her knowledge of biochemistry and physiology to address more serious issues, such as anemia. Anemia can be a sign of a common and dangerous health problem in female athletes known as the Female Athlete Triad. The Triad is a combination of disordered eating, amenorrhea, and osteoporosis. Endurance athletes, such as skiers, can require a great amount of energy. Alarming, a women's body may stop menstruation and bone growth if more energy is being expended than created (from food intake). Rachel is an invaluable asset to her team because of her ability to explain such disorders to her athletes and help them to spot warning signs such as anemia and fatigue.

Many skiers have a basic understanding of exercise physiology. Due to the intense physiological demands of ski training, it is crucial that an athlete be able to understand what is happening to their bodies. Rachel surmises that this need spurs a thirst for training related knowledge. Indeed, elite skiers often talk of "listening" to their bodies in order to train most efficiently. It is also out of this need that many skiers search out research literature. Original research is often the largest and most accessible source of information. Thus, skiers tend to have a solid grasp of principles of exercise physiology. Furthermore, it is well known to exercise physiologists that many elite endurance athletes have a better understanding of the affects of training on their bodies than most health professionals. Rachel evidences this common conception among physiologists with an inspiring story of one of her own athletes. This athlete knew her body well as a result of years of monitoring its response to training. The athlete insisted to unbelieving doctors that the ever-rising heart rate being experienced was not normal. Finally, a doctor well versed in exercise physiology recognized the skier to have a life threatening condition.

The athlete was lucky enough to fight her way back to health after many months of treatment and careful monitoring.

It is interesting to note that throughout Rachel's recounting of her advising athletes, she uses complex physiological terms and in-depth biochemical explanations. This is likely due to the knowledge that the interviewer is learned in these subjects and well versed in such terminology. However, the impression is given several times (e.g. "I can explain...that fructose enters the glycolitic pathway..., alcohol dehydrogenase detoxifies alcohol, ratios of NADH/NAD⁺ increase...") that she uses the same level of vocabulary with her athletes. I had feared that my question, "Many skiers study exercise physiology or have some knowledge (or think they do) of the field- why (in your opinion) is there such a strong tie between competitive skiers and trying to learn about ex phys?" was overly leading. The question seemed appropriate due to my experience strongly supporting the claim of skiers' physiology knowledge. Rachel also embraces this opinion with her own experiences with athletes and fully justifies the question with advanced terms she uses in their ski training education. These narratives show that Rachel is confident of her athlete's intelligence (or perhaps in her ability to teach).

Although never mentioned from her viewpoint, it is clear from the frequency and seriousness of problems brought forth by her athletes, that they hold Rachel's knowledge and advice in high regard. Furthermore, I would hypothesize that she must have an observable concern for her athlete's health in order for them to seek her out so often. Additionally, I would guess that athletes trust in her guidance due to Rachel's admission that she usually gives them a thorough, in-depth explanation of physiological events.

Certainly, Rachel's ability to communicate with her athletes on a high level has helped in the success of the Wyoming ski team. Over the years, the two coaches have assisted their athletes in winning numerous individual and national titles. Rachel confides that the key to results is an individualized training plan. Whether one is starting their first training plan or is an experienced athlete, her advice is the same. She feels that it is important to include activities that are enjoyable. Rachel has found that building a plan around an athlete's favorite activities leads to better results in the ski season. It is not a radical idea considering that most ski coaches and exercise physiologists agree that nordic ski training benefits from a wide range of cross-training activities. Furthermore, since skiing requires fitness in more muscle groups than other endurance sports, this cross-training approach can be as useful to the elite athlete as it is to one newly starting an exercise program.

Based on Rachel's interview answers and anecdotes, I determine that her coaching and teaching careers are very much interchangeable. She commonly uses her knowledge of physiology to help explain principles of training to her athletes. Likewise, she uses her own experiences and awareness of her body's physiology to help explain principles of biochemistry to her students. Furthermore, it is not surprising that many of her athletes have gained knowledge of exercise physiology along with that of ski training. It is common for endurance athletes, especially skiers, to have at least a basic understanding of their bodies' responses to exercise. However, I feel that Rachel also deems this knowledge is important to anyone trying to maintain and understand his or her own health (i.e. "Her awareness of her body and her knowledge of the importance of her resting hear rate saved her life."). UW has had no shortage of talented skiers. Perhaps this

is due the coaches' simplistic approach to training. The simple philosophy that is the basis for this approach is building one's exercise plan around their favorite activities and giving athletes a solid understanding of exercise physiology.

Appendix A

Interview questions

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i.e. wellness clinics, newsletters, or even exercise advice to peers or coworkers?
7. What is most important to keep in mind for someone just starting an exercise plan?
8. How does this compare to what you tell your athletes and/or the more elite athletes?
9. Anything else you want to rant/rave about ex phys, coaching, public health... ?