Nutrition and Training for the Elite Gymnast

The rigors of training 30-40 hours per week on a young body require special efforts at balancing body chemistry, emotional integrity and structural components. The protocols differ slightly for girls verses boys, but the science behind the following topics will make the difference between average and champions. The athletes will also be preventing injuries and ensuring a healthy future beyond gymnastics, and leave no room for regrets.

We will start with the structural body and the type of injuries that commonly occur. There are the obvious injuries that are acute/sudden trauma associated, and then there are those that are based on wear and tear trauma. This second group is what has been the most challenging for orthopedics. Unless the kinesiology (the study of muscle and skeletal motion) of the body is understood and the related biochemistry balanced, this type of injury WILL end a career prematurely, usually after many expensive medical procedures have been done. We know there is always an exception story of someone who had a surgery or two and then went on to some great feats, but even then, what happens to that individual 10-20 years down the road?

The secret to controlling repetition (wear and tear) injuries lies in the understanding of why upper level gymnasts usually mature several inches short of their genetic height potential. Bone grows at specific sites called ossification centers. In a long bone (ex: leg), new bone is laid down in a zone called a growth plate, which consists of cartilage-like material fed a fairly rich blood supply. In a more complex bone (spinal vertebra, pelvis, or foot bone) the growth areas are in several locations, and have different time scales within the bone to complete their mission.

The forces of gymnastics on an unbalanced and malnourished body will pull or compress various bones in manners that draw the attention of immune system components, creating a localized inflammation. In the short run, this is a good thing, because it will repair any damage done to the cartilage/bone at that location. The process of repair requires just a few days in most cases to stabilize the problem enough to diminish pain. However, if the training schedule has the area restressed again too soon, an imbalance begins in the repair zone. Too many immune inflammatory components begin to accumulate and blood flow begins to stagnate. This process is universal in the body whereby chronic inflammatory processes **will** lead to blood congestion, coagulation, and eventually a type of scarring. So, our young gymnast may develop an area of bone, around a growth zone, that is starving for blood, chronically inflamed, and affecting performance due to PAIN. On top of that, the bone can begin to degenerate and crumble in a process called osteochondrosis, or worse, osteonecrosis.

The body will only tolerate this situation so long. The next process is to accelerate the closing/maturation of the bone growth area allowing strength and stability to come back to the bone. The result is of course that the bone was forced to stop growth months to years before it would have without the inflammatory stress.

The solution is to provide two components for the body. One, a complete structural

work-up of the total body, not just the inflamed area, to ensure the muscle, ligament and bone dynamics are in balance. Chiropractors, trainers or physical therapists who are specially trained in the science of body kinesiology know how to accomplish this. The techniques are predominantly hands-on, but may involve equipment such as isometric, isokinetic and isotonic devices. There are many theories evolving in this area, and most athletes benefit from a mixture of several philosophies. Ultimately, they all involve finding the right order and ratio of balance between exercises that promote:

A) aerobic/endurance capacity
and/or
B) strength/resistance
and/or
C) flexibility/speed of muscle and connective tissue.

In general, studies on general exercise reveal the following:
1) Any athlete who works out more than 3 times a week has a markedly increased risk of musculoskeletal injury than working out less than 3 times a week. Also, shorter sessions twice a day are better than one long one. How many sports besides gymnastics work out more than 3 times a week? The answer is many!
2) During weight training, a single set of exercises per muscle group produces the same result as compared to 2 or more sets, but lowers the risks of wear and tear injury! This is describing the "slow burn" workout technique.
3) Consuming water during workouts has the same benefit as consuming water before and immediately after a workout. Either way, do not dehydrate! To calculate proper fluid intake, divide your weight (in pounds) in 2 and this is the amount in ounces of water you need, plus 30 additional ounces for each hour of training activity.
4) Train at least 90 minutes after a "meal" and 60 minutes after a snack for optimal utilization of the food's energy. Never skip breakfast, otherwise morning workouts will burn your body's own muscle protein for energy!
5) The extensor muscle groups (generally on the back/rear side of the body) tend to be tighter than the flexor group (generally the front side of the body). Therefore, this leads to shortening of the flexors as a means of compensation, and emphasis should be placed on adequate stretching of the front of the body in addition to the back of the body. This brings home the differences between a "short" muscle and a "tight" muscle. Generally the tight muscle will injure more frequently, but usually as a result of the opposing "short" muscle!
6) During a pull-up on a bar, as you rise, the arm muscles contract "concentrically". As you descend, the contracting muscles lower you "eccentrically". During work-outs, most soreness is produced from eccentric contractions verses concentric contractions. Therefore, if getting post workout massages, emphasis should be place on the muscles doing most of the eccentric work.
7) Isokinetic training (the resistive force will exactly balance the force applied) is an excellent way to rehab an injury as well as train. Think of moving your arm through water, the faster and harder you move, the more the water resists! Therefore, the use of water to rehab is very safe because it is Isokinetic. Certain machines such as Life Fitness, Cybex 2 and Hydro Fitness are other examples of Isokinetic workouts.

Next, perhaps more importantly, is to assess the body chemistry. Our main focus will be inflammation pathways. While balancing the musculoskeletal system is likened to upgrading hardware in your computer, the chemistry of the body is about the software. Like exercise, this area of science is constantly evolving. We will start with a simple principle: What does the body need more of, and what does it need less of? This can be likened to the principles of Yin and Yang.

First, the connections to the mechanisms of stress. Stress comes in many forms, and for our gymnast this is predominantly in the form of physical wear and tear, the emotions of competition, and of course the social component. The entire lifestyle of school and community for full-time gymnasts is vastly different than other kids their age.

Stress hits two systems in the body. Generally the first and hardest to be hit is 'serotonin' of the neurotransmitter/nerve system. This is followed by the catecholamines of the nerve/adrenal system. The biggest difficulty in addressing these chemicals is the fact that they go out of balance easily due to the fact we are genetically designed to handle much shorter periods of stress. So, how do we get around these genetic bottlenecks? The answer is in targeted foundational nutrition, not drugs.

The above-down-inside-out principle of the body dictates we start with the neurotransmitters. Serotonin is predominately an inhibitor of nerve chemistry (sort of a traffic cop) that can regulate diverse emotional swings from anxiety to depression. The drug companies have an enormous amount of research in this area and billions of drug profits at stake. As long as adequate B-vitamins and a few basic minerals are present, the nutrient 5-HTP is what we will utilize to help our gymnast. Normally, the protein in the diet is digested to its building block amino acids in the gut and liver, whereby one of them, Tryptophan, is converted to 5-HTP. From there the 5-HTP travels to the brain or gut nerve endings to be made into serotonin. The more 5-HTP we provide, the more we get our serotonin back to normal. Overdosing with this nutrient is nearly impossible unless a prescription drug was being used at the same time for a similar objective. 5-HTP is currently NOT on the 2007 USADA prohibited lists. Testing for any neurotransmitter (such as serotonin) or organic acids (to assess B vitamins) is done through urine.

As a side note, stress can certainly be bad enough in an athlete's life to warrant counseling. In addition, the use of sports hypnosis, biofeedback devices and Hemisync audio programs are excellent and safe alternatives to counseling. Even cross training exercises in yoga and tai-chi can be very relaxing and centering for the gymnast.

Once we have an athlete who sleeps well through the night, has minimal trouble controlling emotions at competition, controls appetite and shows no signs of depression, you may not need to supplement further. If any of these symptoms are still present, an adrenal product blend is taken to aide the adrenal stress glands to further regenerate or balance. Many herbs that address the adrenals cannot be used as they may violate drug testing policies. Ginseng and licorice root are not prohibited and easy to take as capsules or teas and are food grade herbs. An easy

way to assess the adrenals is to compare the blood pressure lying down to standing up (within 30 seconds of standing). If the pressure does not rise 8 points on both top and bottom numbers, but rather stays the same or drops below the lying down reading, then adrenal fatigue or exhaustion is evident. Saliva testing can also reveal the basic status of the adrenal glands by measuring cortisol and DHEA(s).

Adrenal fatigue is almost always accompanied by an over abundance of an adrenal steroid hormone (all steroid hormones are made from cholesterol) known as cortisol. It chronically elevates under any stress and has the reputation of slowing the healing process, weakening muscles, ligaments and bone or even robbing the nerve system of several transmitters. It will suppress the thyroid and destabilize blood sugar. This leads to unwanted weight gain and sometimes elevated or depleted blood cholesterol.

The fish oil blends, or straight fish oil of Salmon or Krill are excellent sources of substances known as EPA/DHA. A young gymnast can benefit from taking 2-3 capsules of the oils daily. The oil reduces inflammation of most origins and additionally the DHA aids the brain nerve receptors in utilizing any available brain transmitters more efficiently. Thus better focus, memory and control of emotions.

Next, beyond stress, what diet problems do we commonly encounter that affect body chemistry? The dedicated gymnast often doesn't have a diet with many bad foods in it, but rather a diet with too limited an amount of good foods. The greatest area of deficiency is in the fats/oils, followed by the proteins. This is likely under the premise that the dietary fats will make them fat. The fats they need more of are not man-made margarines, fried foods or beef and chicken in nature. They need more fish, eggs, nuts and seeds. These sources of fats/oils are critical at controlling inflammation and balancing their ever challenged steroid hormones, as well as promoting bone and muscle regeneration. They are the main sources to help the body maintain levels of Vitamin A, D and K. Fish should be consumed 2 times a week, and a fistful of nuts and seeds consumed daily. The better nuts include almonds, macadamias, pine nuts and walnuts. The better seeds include pumpkin, sesame, sunflower or flax. These foods are also good sources of protein. Eggs (free of hormones/ antibiotics) should also be eaten (if no sensitivities) about 4-6 per week. You can always use a protein shake made from a mixture of rice and whey protein to stabilize mid-day blood sugars or blended with fruit as an easy breakfast.

What about fruit? Eat at least 2 fruits per day. Use no fruit juices, unless diluted with water 4 to 1. Dried fruits are also excellent to consume during meets. Girls especially will benefit from dates and figs. Sugars to use are xylitol, mannose, ribose or honey (unfiltered cloudy quality). Stay away from using only commercial sports drinks. Make your own by using the diluted fruit juices of either Noni, Acai, Pomegranate, Goji, or Blueberry, with a splash of lemon juice and a tiny pinch of sea salt added.

Vegetables should emphasize the dark green and bright orange colors. The cruciferous vegetables (cabbages, broccoli, brussel sprouts, and cauliflower) are excellent sources of sulfur needed by the connective tissue, as well as the liver to maintain hormone balance. The cruciferous group generally digests better cooked.

Overall, 1-2 cups of vegetables per day minimum should be consumed.

Here is a typical example of what can be done for an inflamed growth plate in a lower spinal vertebra that is resulting in constant discomfort to the gymnast. First a fibrinase enzyme such as nattokinase will be used orally twice a day to restore proper blood flow through the growth plate regions of inflammation. Second, glucosamine sulfate and vitamin C will be taken orally twice a day to provide building blocks for the cartilage and bone matrix. Third, Fish oils will be taken once a day for reduction of inflammation. Next, diet will be adjusted to raise protein up to 35% of calories for a few months. The spinal area will be warmed with infared heat one hour per day in the evening. The spine will be chiropractically manipulated once a week for 4-6 weeks to stimulate nerve data input from the area and restore mechanical stability. Kinesio taping might be employed to complement the chiropractic. The training schedule will completely eliminate ANY strong compressive and traction forces for a few months. This will still allow many types of training, but perhaps not on the typical event pieces the gymnast competes. Trampoline can be utilized very effectively in this situation as well. Lastly, any additional nutrients the athlete needs based on clinical lab data will be added to the program. The few months that this may take is nothing in comparison to the lifetime benefits it will provide to actually fix the problem, rather than cover it up with over-the- counter or prescription anti-inflammatory and muscle relaxant drugs!

So, what can we conclude from all this?

- Whatever the long term gymnastic goals, the training regimes can certainly be tuned to minimize injury and maximize fun. Chiropractors trained in certain kinesiology techniques are some of the best bets for natural performance enhancements. The list of athletes in all disciplines of sports who rely on their chiropractor is a staggering who's who of champions.

- Nutrition plays a role more important than ever in performance. It will always be challenging to work within the ever changing rules of anti-doping. Today's nutrients when procured from trusted and certified pure pharmaceutical sources will at the very least keep an athlete's body in the balance they were genetically gifted with. This is primarily the main goal of proper eating and supplementation. Intensive training is stressful to the body and it will tear you down sooner or later if not addressed with nutritional chemistry. Use lab tests available to monitor key nutrient levels and have a professional trained in nutrition coordinate all the protocols. Usually an athlete may need only 2-5 special supplements to maintain balance.

- Be realistic in gymnastic goals. You must balance out the time, money and risks with the benefits. What are the benefits? The holy grail to some would be an Olympic competition, but to others a college scholarship. If neither of these is your expectation, then it must be the level of fitness or emotional discipline a gymnast will achieve. Think all of these through, especially the tremendous odds of making the Olympics. Even the college scholarship has to be honestly weighed against the fact you will probably have spent as much on all the years of

training as the scholarship will be worth. All of this can be put in perspective by honestly deciding if your gymnast needs a less rigorous program that only uses 10-20 hours a week. That change alone could allow them to return to public schools with its greater variety and number of students instead of mostly fellow gymnasts in private institutions. It might also slow down the growth plate maturation rate enough to get back on track for their genetic true height. I must point out here that if inflammation can be controlled at the growth plates from the above program, then 40 hours a week of training does NOT have to reduce height potential!

- Know your coach! This may seem like a moot point since many gymnasts know their coach more than their own parents. But what the coach expects from the gymnast can be different than what the parent or gymnast expects. Have face to face meetings with the coach at least a few times a year to discuss progress or problems. Many public schools schedule parent-teacher conferences through 6th grade twice a year, then school counselors are given the burden of playing the parent roll thereafter. This school protocol is likely what leads to parents taking a similar remote role in their child's athletic career. Ask yourself who makes the decision when to re-enter competition after an injury. The athlete, doctor or coach? Who is deciding what meets to attend? Who decides the training hours? Here is a good point to create comparisons to the many other sports our student athletes can choose from.

- Are there other sports with greater risk potential or frequencies of injury? Of course there are, but FOOTBALL is by far the sport with greatest risk verses benefit. But this is predominately a sport for men. Are there other sports that get greater support and sponsoring from schools than gymnastics? The answer is just about all of them! Once again we will see the school's football programs get the biggest budgets and reward the coaches the bigger salaries, often more than the rest of the teachers. If gymnastics were to become more important to schools, the type of day our full time gymnasts would experience would be very different. I don't expect schools to embrace gymnastics the way they have other sports for decades to come. This in spite of what gymnastics is all about. It's about millions of participants. It's watching a human fly and defy gravity. It's watching a youth stay strong and healthy with purpose and dedication, instead of fat and unmotivated playing video games all day. It's about commitment to goals and respect for authority. It is about conquering fear and most importantly, it should be about having fun!