Sports And Performance Nutrition

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Lecture-13: Minerals- Calcium, Magnesium Zinc and Selenium

Of the important minerals which athletes have high demand, calcium is a very important. What is the function of calcium? Where can you find calcium in food? Let us find out. 99% of the calcium in the body is found in bones and teeth and that remaining little 1% is needed for some very important function. From bone ossification which is making of the bones to its maintenance, calcium has a role from birth and all the way till you leave this world and what the little bit of calcium is available you cannot do without for an athlete, a working muscle can determine his physical activity and here I am not just referring to the muscle contraction or the skeletal muscle which is very important for training. Even the heart that pumps the blood needs calcium for its contraction. For all the nerve impulses that need to be transmitted, calcium can also play a role and if you get a cut or you wound it for you to stop bleeding, calcium ions play a very important role in blood clots.

As I just mentioned, bone structure is very dynamic. When calcium intake is adequate, all the calcium that is absorbed from the stomach can be pushed into the bones to strengthen them thereby giving you better bone mineral density and just like the way we discussed on the topic of iron, calcium is equally an intricate metabolic pathway. Calcium is synergistically working with several other nutrients like phosphorus, vitamin D for its absorption, magnesium, vitamin K and many of these nutrients together can strengthen bone. If there is inadequate calcium intake, the body also maintains homeostasis and a balance of calcium in the blood for these important functions where the calcium gets pulled out from the stove from the bone and is brought back to daily bodily functions.

Growing children in their prime puberty ought to focus on adequate calcium intake. The maximum bone formation can occur through adolescence and can stop as they reach early adulthood. Another way to optimize this bone formation is to ensure you practice weight bearing or resistance form of exercise. As with muscle, the bone also can benefit with impact exercise and on many several occasions I have seen athletes worry about consuming calcium even through supplements when they don't address vitamin D. It is like saying I have a huge saving kept in the bank but if I don't have an ATM card to withdraw that money it may be futile.

So you may have enough calcium in your diet but if you don't have the ATM card as vitamin D, the calcium cannot be taken into the bone and that defeats the purpose. We will anyway discuss the function of vitamin D in detail and there you will understand how vitamin D can be deficient among the majority of us. So addressing vitamin D through the diet and the right supplement protocol especially in growing children can be very important to strengthen bones. I am sure you have already been reinforced to drink a glass of milk emphasizing the need for

calcium for your bones. The reason being daily which is milk and milk sources are a very rich source of calcium and like the way I discussed with the metabolism of iron you could replace iron with calcium and the absorption is in a similar analogy consuming oxalates with dark green leafy vegetables or consuming tea coffee with meals and of course teeming calcium rich foods with iron for example Palak Paneer may be counterproductive.

Other than milk any other dairy product be paneer, cheese, dahi, buttermilk are all good sources of calcium but you're somebody who does not enjoy milk then there is some solace in learning that there is only 30% absorption of calcium from dairy and the good news is there are lot of other foods other than milk and milk products that can offer you calcium. In the protein chapter when I was discussing soya based products I would have highlighted that the raw soya bean has lot of anti nutritional properties and also very high fat content. So processing or processed soy options like the soya paneer which is called the tofu is a better option because the process as defatted soy products are obviously lower in the fat composition they can offer not only protein tofu tempeh can also be a good source of calcium from till to the poppy seeds and the badam they all offer good sources of calcium and if you have noticed the traditional practice in India the badam or the almonds are soaked and this soaking process can lower the tannins which is found in the skin and also the phytates which is found in nuts. Overnight soaking and peeling these almonds can actually provide you more calcium for those who enjoy food sources from the sea. Marine fish is an excellent source of calcium even more if you enjoy sardines and anchovies with the bones that's even better.

Here's an interesting thing to note about these leafy greens that offer calcium as seen in these photos kale and bok choy are two green leafy vegetables that have even higher bioavailability of calcium than milk so you could use these vegetables in stir fry or you can make a subsea out of it and that can be a very good source of calcium. Who needs more calcium? I've already mentioned the maximum bone formation is occurring in adolescence so other than growing children the ones who may also need to focus on calcium are the athletes who can be very restrictive of their food or calorie intake. Low energy availability and relative energy deficiency in sport as I have been emphasizing can lead to several other challenges calcium is also equally important for those athletes who have a bone injury and need bone healing. For those athletes who are concerned about their bone mineral density a taxa scan is a gold standard to evaluate your bone mineral density. Dual energy x-ray absorptiometry obviously exposes athletes to x-ray radiation so it's best to limit their use.

For an athlete who has had a bone injury or those athletes with a very strenuous training load can use a calcium supplement which should be ideally advised by a qualified sports nutritionist or a dietitian. As per the IOC consensus statement and the Australian Institute of Sport a calcium supplement it comes under the umbrella of a group A evidence-based supplement list. So periodized to the time of either a peak competition cycle or during the rehabilitation period for bone healing calcium supplements along with vitamin D can be very helpful to aid the process. Let us move on to the next mineral magnesium what calcium is for the muscle contraction magnesium is for the exact opposite the relaxation of the muscle Fibers. Magnesium is coined the anti-stress mineral because it has a direct impact on the neurotransmitter serotonin thereby improving mood however do note the Australian Institute of Sport has concluded that there is a need for further studies and has parked magnesium under the group three supplementalist.

Magnesium is also involved in the activation of vitamin D magnesium is also a coenzyme in several metabolic or chemical reactions that involves energy metabolism. So for an athlete who needs ATP magnesium aids that process of him getting that for his physical activity. As magnesium is a mineral that can relax the muscle Fibers it can help in maintaining and lowering the blood pressure perhaps if an athlete is consuming inadequate magnesium in the muscle by default due to his prolonged training requirement the magnesium requirement goes up and with sweat loss of magnesium particularly if the athlete is training outdoor or in a very or in a very hot climatic condition that will reiterate for him to ensure optimal intakes of magnesium in his diet or when there is a need even perhaps a supplement. So the deficiency of magnesium can also be determined by a simple blood test or evaluation for athletes with higher demand of magnesium ensuring adequacy can help performance. Let us take a few minutes to understand the role of zinc for an athlete.

Having adequate amount of zinc is important for you to taste your food for reproductive health to have adequate testosterone and zinc has a direct impact on the immunity of an athlete. It's also an enzyme cofactor meaning that it supports several chemical reactions in the body for athletes who can have a slight nick during strength training or through the training session. Zinc along with vitamin C can play a very important role for healing the wound. So from airing the muscle tissue repair to augmenting the athlete's immunity particularly when athletes have very high training load seasonal weather changes or athletes who travel back to back be it within the country or many times for my good fortune I do work with a bunch of international athletes they travel back to back internationally and that can be sometimes not just within Asian countries it could be as far as going to U.

S. That means they're going across time zones their flights can take about two days of travel with the air conditioning with the erratic food habit being away from home and sometimes these athletes have to adjust to all these uncertain parameters and still compete and if lucky win medals for the country. So with this extra stress on the body the athlete's immunity sometimes can get compromised that can make them very susceptible to upper respiratory tract infections. In that scenario taking care of zinc can help lower the symptoms of the respiratory distress. Also in those athletes who are fussy eaters and trust me we see quite a bunch of them if they're very finicky or don't take care of their diet but have a very high demand of prolonged workouts they definitely require additional zinc perhaps even from a supplement. I'm getting nostalgic now that we have thankfully overcome over a year post the pandemic just to remind you the community went berserk with consuming extra vitamin d overdoing vitamin c supplements and also zinc an athlete who is over trained and has poor immunity and has poor immunity may require additional supplement due to higher demand or to improve his health but we need to keep in mind to periodize even a zinc supplement a multivitamin can give about 10 mg of zinc and that too the multivitamin may be needed in small pockets of the entire training cycle.

A standalone zinc supplement can give a maximum of 50 mg zinc now if you had to overuse zinc on a day-to-day basis there is a nutrient-nutrient interaction and that can be more a harm than of health because it cuts the absorption of iron and copper so please do bear that in mind and be judicious of supplement use apart the oysters or the muscle which is the richest source of zinc if you eat a varied diet particularly even from the animal foods be it poultry or seafood

you don't have to worry and for the others pumpkin seeds a handful of it each day to snack on is a good option to take care of your zinc needs. Selenium is also a very important for athletes. Selenium supports an antioxidant enzymatic defence mechanism in the body called glutathione peroxidase. Selenium can lower the free radicals that can get formed with strenuous exercise and we will very soon learn about the oxidative stress and what are free radicals in the chapter antioxidants. Similarly selenium sinks with another antioxidant vitamin E to protect our body by preventing the damage of the cells selenium can ensure better recovery for athletes after a very demanding physical activity so for those athletes who have an intense training load morning evening with the gym session with the higher demand and the increased oxidative stress selenium can be of support to attenuate or lower the cell damage as depicted in this photograph the best way to get selenium is to eat one Brazil nut this is however an imported nut and it can get expensive but you don't need to overdo the numbers just one and for those who cannot purchase this expensive nut alternatively you can eat some cashews or pumpkin seeds that can also be an alternative option so to summarize athletes can maintain optimal immune status by consuming nutrient dense food options on a day-to-day basis that way they can eat healthy foods and that way they can ensure their requirement is met and they can avoid a deficiency I hope this lecture has given you an insight to some aspects perhaps which you did not know thank you for listening so hi I'm nabi nagpal I've been a runner for the last seven years the last two years I have been focusing on achieving my Boston qualification popularly known as BQ in the running community you're required to finish a full marathon within a certain time duration for my age category it was three hours 10 minutes and I was able to achieve it in three hours one minute in the most recent move by marathon as an endurance runner you're required to plan your nutrition really well whether it is pre-run during run and post-run no matter it is a practice or on the race day you have to plan your nutrition really well carbohydrates are one of the most important source of energy right it is easy to process for your body it's the most easy access to energy your body gets and it helps you know be agile it helps you stay alert during your workout it is equally important to plan your electrolytes like sodium. Sodium helps in absorbing your nutrients in your gut it helps you maintain cognitive functionality and helps your muscle in contraction a runner loses a lot of sodium during the workout through by sweating so it's important that you maintain that balance magnesium is another very important essential mineral that helps in relaxing your muscles that really helps in avoiding cramps during the race day so your body doesn't really produce all of them very easily some they don't at all so it's important that you source them through good amount of plant food and also through supplements I personally did a thorough blood check I do this every three to six months to identify where my body is deficient and plan my food and supplements accordingly