

Sports And Performance Nutrition

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Lecture-08: Introduction to protein and protein supplements

Welcome to this lecture where we dive deep to understand protein supplements. It's a real hot topic and I hope you will have some interesting learning here. What are protein supplements? Who needs protein supplements? What are the different types available in the market? And as we sometimes notice in our practice what can happen if at least over consume these protein supplements. As the name suggests supplement simply means in addition. So protein supplements are what we consume other than the protein foods which come from our food choices in our daily diet. So what can be the importance of consuming this protein supplement? For sports persons who spend hours in training a protein supplement can definitely augment recovery coupled with resistance training protein supplements can directly impact muscle protein synthesis and improve the muscle mass.

The microtears that can occur after intense strength training which is what typically leads to DOMS. DOMS means delayed onset muscle soreness. These microtears in the muscles have to be repaired and high quality protein can be very vital for this process. Since athletes have a very high demand for protein and we have discussed that in detail in the previous chapter on what is protein and what are the recommended protein amounts for athletes.

When an athlete sets a goal of consuming 2 grams or even sometimes a little more per kg body weight the values can go up to 120 grams or 150 grams per day and it may not be possible to get such large amounts from food always. In those scenarios protein supplements can be a very easy option to consume large quantities of protein in a very small amount. Thus protein supplements can improve athletic performance. An average scoop of a protein supplement can give upwards up to 25 grams of protein in one serving. Most important of all one scoop also contains high quality of amino acids.

The most important of these essential amino acids is leucine. One scoop of a protein supplement itself can offer the optimal intake of 2.5 to 3 grams of leucine easily and we have already learnt that leucine is the elixir of muscle protein synthesis. With resistance training there is not only a trigger to build muscle protein but there is also a breakdown of the protein known as catabolism. When you consume adequate amount of proteins you can ensure that this breakdown of the muscle protein can be avoided.

The three pillars of recovery for an athlete is to rehydrate, refuel and most importantly rebuild the muscle protein. We have discussed how good quality and fast digesting protein food options immediately after strength training can optimize the muscle protein synthesis. Within the same spectrum of the fast digesting dairy option is the alternative option of consuming the whey protein supplement. A whey protein supplement offers the full spectrum of the eight essential amino acids to ensure there is no further breakdown of these muscle protein and

thereby ensuring recovery process. That brings us to what is the best time to consume a protein supplement? Is it only after a workout? Not necessarily.

You could consume a protein supplement as per your convenience based on your athletic goals. If your demands are larger and you need high quality of protein through the entire day particularly if you have the sports specific training and strength and conditioning or strength training. You could plan to consume a protein supplement as you rise either before workout sometimes athletes even sip protein supplement in their workout. It can be taken immediately after the workout and today by a lot of research and evidence from the sleep protein typically casein only for the reason that most of these casein studies have been conducted around evening and bedtime. We know that consuming sleep protein also goes towards muscle building and not towards increasing fat percentage or the adipose tissue in the body.

To reinforce protein or protein supplements also work best when you have adequate carbohydrates planned in the diet. So who needs protein supplements? As we discussed the higher demands of protein intake in athletes protein supplements itself can be needed by athletes who have higher training loads. Protein supplements also become a very convenient option for a master athlete who can easily target about 20-25 grams of protein very easily consumed as a drink or a shake. For vegetarians too if there is a challenge to consume large amount of dals which we have discussed can lead to flatus bloating due to the high fibre content. The protein supplements can ease the challenge even athletes in injury or those who have been under the weather and recuperating in convalescence also can consume protein supplements.

Milk itself is made up of 80% of casein and that is the paneer that we get when we curdle the milk. It is a slow digesting protein and it is also the same paneer that is used to make rasgulla. The remaining 20% is the whey protein. Whey protein is the fast digesting protein. The whey was an accidental discovery of the cheese industry when the milk was curdled and all that water that was formed was just discarded.

It is full of electrolytes and then they realize that that water could be evaporated and converted to a whey protein. Now what if you do not want to consume dairy based protein supplement? There are also other options. The egg protein supplement comes from the white part called the albumin and it also has the high leucine content. Plant protein also offers omega 3 and if you are looking for a plant based protein, the pea protein is a good option. However these plant based protein supplements as pea protein are low in methionine and many of them are available fortified with leucine.

Similarly a soya protein also is a good option for a plant based protein. There are some other grain based options like the quinoa, the rice protein. However, do note that they are low in one essential amino acid called lysine. So the best option to do is to choose a plant based protein with a grain based protein. So this complementation which we have discussed in the protein chapter balances both the missing amino acids of lysine and methionine thereby improving the protein quality.

There is another important protein with good amount of carbohydrates in them and these mass gainers are very useful for those athletes who find it challenging to eat large amount of food and can consume adequate calories from a protein supplement. For those athletes who are challenged to maintain their weight because they lose weight easily and have high training

demands, a mass gainer can be quite beneficial for them. The whey protein itself comes in 3 options concentrate, isolate and hydroxide. A concentrate typically forms the bulk of most of the commercially available protein supplements. Isolate offers 80% protein, it is also sweeter to taste because of the lactose content and of course is a reasonable option.

And isolate offers more protein of 90% and obviously is not very tasty because it has got a very low lactose content and hence may not be very palatable and of course there is an added cost to that. So an isolate can be very useful for those who want a lower calorie intake and are not looking for any additional carbohydrates. The hydroxide offer pure peptides but of course are expensive. So you can choose among these varieties of the whey protein. A quick digesting protein supplement is this can be very effective to support the higher needs of protein in athletes.

A protein supplement has high bioavailability and a scoop of a protein supplement already offers the ideal 5.5 grams of branched-chain amino acid leucine, isoleucine and valine. Apart the leucine which triggers muscle protein synthesis, the whey protein itself can support the immune system of an athlete. Intense training and prolonged exercise can lead to an exercise induced inflammation and more oxidative stress and sometimes athletes who are over trained can keep falling ill. These amino acids that come with the whey protein supplement therefore can be of additional use for an athlete to recover.

Similarly if you are already consuming a scoop of protein supplement, you do not need to take an additional glutamine as a standalone amino acid. The glutamine also takes care of your immune function. The amino acid tryptophan is the raw material to the neurotransmitter serotonin and if an athlete is challenged with the mental fatigue, keeping the protein intake high can be an additional advantage where the tryptophan can increase the feel good happy hormone and dairy being a source of calcium can support bone health. In addition to those who do not want to consume extra calories, who can choose low carbohydrate versions of the whey isolate to support their weight goals, a whey protein supplement such as the isolate can also be consumed by those athletes who have slightly elevated blood sugars that can also offer them a satiety or a feeling of fullness which can thwart their hunger pangs thereby avoiding unnecessary snacking. Now coming to the disadvantages of protein supplements.

There is obviously an additional cost to buying these expensive products. Most of these protein supplements come with added artificial sweeteners and if you are not careful to purchase a brand that is batch tested or a third party verified, there is always a risk of contamination and if you are not careful or not educated about the constituents that make a supplement. Sometimes I have had athletes who purchase the supplement on their own and when they start working with you and you discuss the symptoms. The first thing they dread consuming a supplement is due to the cramping and the bloating effect which happens after the consumption of this protein supplement. So some of them can be lactose intolerant and of course as with any other protein intake the digestion process does lead to some flatus or gas.

Whey protein also leads to the release of the hormone insulin and insulin regulates the oil glands in the skin called sebum and sometimes dairy based supplements can lead to a lot of breakouts and acne in some athletes. Unscrupulous and overuse of these protein supplements sometimes can also negatively impact your bone health and lead to calcium loss. And many times athletes forget that even protein supplements have calories. If you over consume them over food it will lead to weight gain. If you are prone to a history of kidney stones and in some

cases there can be a remission of these kidney stones and individuals who suffer from any liver or kidney disorder cannot consume these products and goes without saying that very young children do not need to consume these protein supplements.

And in some cases when athletes get very excited and overuse protein supplements along with high protein intakes there is definitely an extra burden on the kidneys to flush out the breakdown of these protein products. Flushing out these compounds itself requires water and the kidneys working harder to eliminate these unfavorable compounds. This can lead to dehydration especially if an athlete is not careful of the water intake. And this is reflected in some cases when we evaluate the blood parameters and you will see some very high levels of creatinine, blood urea nitrogen, many times uric acid. Glutamine is also available as a single amino acid for supplement.

What is the role of glutamine? It is a conditionally essential amino acid that is needed to support the gut health or the gut immunity. Do all athletes need to consume glutamine? We have already discussed if you are consuming a scoop of whey protein you are already getting glutamine in that scoop itself. So it is unnecessary to consume additional glutamine. So who needs an extra glutamine supplement? Perhaps in overtrained exhausted athletes this can be useful. In those athletes who have a challenge of exercise-enthused inflammation, who have poor immunity and who are falling sick often periodized glutamine consumption, periodized to that peak training season can be useful.

With the focus of sustainability a recent addition to alternative protein source is the insect protein. A very niche concept offering high quality protein we are yet to see how our Indian palate will adapt to this. Another popular practice among athletes is to consume bronchian amino acids during workout. What are bronchian amino acids? There are three amino acids which are essential amino acids Valine, Isoleucine and Leucine. There are studies to see the bronchian amino acids can prevent central fatigue in overtrained and endurance athletes where there is an increase in the serotonin.

This bronchian amino acid consumption during intense or longer workouts can prevent fatigue. However it is best to prioritize consuming high quality proteins in meals along with protein supplements which have the full spectrum of the essential amino acids. When you already consume adequate protein from diet and perhaps even protein supplements such as whey or even casein which already consists enough amount of bronchian amino acids in those cases just consuming additional 5 grams of bronchian amino acids may not be necessary. As per the IOC consensus statement and the Australian Institute of Sports the whey protein supplement falls under the evidence based practice of the group A supplements. So it is very safe and scientific to consume a whey protein supplement.

Of what we have discussed to summarize in my practice I would like to refer to this case study. In the case of a vegetarian athlete who is training very hard is sometimes challenged to get adequate protein from the diet and that can lead to a challenge of either delayed onset muscle soreness or poor recovery from the exercise and that often leads the athlete sore and in pain. Adding high quality protein in meals be it about 150 grams of tofu about 50 grams of soy chunks or sometimes even a 100 odd grams of tempeh in the meals can offer good quality proteins and increase the protein intake in these athletes. In addition to that a good quality of a protein supplement either a scoop or two based on the training load can bump up the protein intake from 20 to 40 grams each day. In due course of time the athlete can optimize

performance by increasing the muscle mass better recovery and also can notice the lack of body pain and soreness.

In another scenario using dairy based protein supplements be it whey or casein when you notice acne and you look at other alternative protein options be it a mixed protein using a pea or a quinoa blend you notice that over several weeks the acne dies down and sometimes we can also choose brands with added leucine to maintain the higher muscle mass. So to summarize protein supplements when used judiciously periodized to the training time can be very very helpful to meet the higher protein requirement. A protein supplement of course is very convenient and also can be easily carried around to the training without having to worry about the logistics of cooking a meal transporting and carrying tiffin boxes. Vegan and vegetarian athletes can also look at blended protein supplements to optimize their recovery and meet protein requirement. But the most important takeaway message is as dieticians we always say that please focus on the right practices of food intake consume your food right and then what is lacking you bridge that gap with the right use of supplement and add the protein supplements strategically to complement the training load.

Thank you for listening. My name is Ruchila I'm a competitor swimmer from the past six years I do sprints long distance and freeze that but the few options of protein in the vegetarian cuisine it was quite a challenge for Gita Ma since I don't even eat it. It was important to focus on quality protein in my diet which Gita Ma helped me with.