

# **Introduction to Exercise Physiology & Sports Performance**

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**Lecture - 22**

## **Exercise Prescription and Training principles - Part 2**

Welcome to this NPTEL course on Introduction to Exercise Physiology and Sports Performance, and this session on Exercise Prescription and Training Principles, with me, Dr. Chandrasekara Guru, Sports Medicine Physician from the Armed Forces Medical Services.

So, in the previous session we saw about the motor qualities and some basic terminologies. In this part 2, we will be covering about the principles of training, exercise prescription components, and how you apply in your day-to-day practice.

To revise what we saw in the previous session, we saw about the importance of exercise training, how it incorporates positive adaptations in the body for better exercise capacity and performance. We saw the difference between the motor quality and the skill, the nature versus the nurture arguments and the important motor qualities that are required for better performance, that is, the muscular strength, the muscular power, muscle endurance, anaerobic versus the aerobic power, and various basic terminologies which are commonly used in the exercise prescription, namely the FITT protocol including the frequency, intensity, the type of exercise, and the timing or duration of the session. And we also saw about certain common terminologies that are used in exercise prescription, namely the rating of perceived exertion which is subjective tool rated from scale of 1 to 10, with 1 being no exertion and 10 being maximum exertion. We also saw about the metabolic equivalent which is again a common tool that is used in lab-based performance assessment or prescription or also in various clinical scenarios. So, having known about some basic terminologies and the importance of motor qualities in exercise training and prescription, let's focus on some principles of exercise training.

There are 5 principles of exercise training. They are principle of specificity, principle of individuality, principle of reversibility, principle of progressive overload, and principle of variability. If you remember these 5 principles while prescribing any exercise, you will not go wrong and your exercise training will definitely give positive adaptation and positive

outcome and improve the performance. That's what the importance of principles of exercise training. Let's see one by one.

Principle of specificity, as the name denotes, it is the specific type of demand or the manner in which you impart the training will give you specific adaptation to the stimulus. So, it's commonly referred to as principle of SAID, SAID is nothing but Specific Adaptation to Imposed Demand. So, let's see what are the different ways in which the specific training can give that kind of outcome. So based on the energy system, so if your sport is based on a specific energy system, say it can be divided as fast glycolytic, fast oxidative glycolytic, or oxidative, depending on the involvement of the energy fuel. So that is the energy system which is specific for that particular sport. So, your exercise training should adhere to the way in which you could stimulate these specific activities. Say for example, I'll give an example of a sprinter. So sprinting is a short duration activity which will involve stimulation of the anaerobic system. So, your training should involve activities which are shorter in duration and better in increasing the power of the individual, especially the lower limb. So, such kind of activities that simulate the duration as well as that can stimulate the type of energy fuel system will have specific outcome to the particular type of training that you give. So, that is what you mean by principle of specificity. Based on the muscle recruitment also. So, if you have sprints, for example the same event sprint, so you will have to work on the same group of muscle which are going to be activated during the sprint. So, it's a lower body activity. So, lower body group of muscles have to be worked upon during the same kind of training program so that you have specific group of muscle getting activated and the type 2 kind of would be activated for such kind of cases. Say if it is a long distance or a marathon, you will be working more on an endurance group of muscles that is the type 1 group of muscles so that the energy system there will be more of an oxidative system. That's the specificity with respect to the muscle group aspect. The specificity also would mean with respect to the phase of training. So, if the individual is in pre-season or you know if the individual is in pre-season, you start with the resistant training for example, then gradually increase the, decrease the resistance training and move on to more of a sports specific training when the individual goes into in-season so that you are simulating the similar type of sports activity during in-season so that you will have better performance which is specific to the demand that you are giving during the in-season. So that's what you mean by specific adaptation to imposed demands.

Let's see a case scenario. You have a shot-putter who is practicing medicine ball throw during his practice. And you have to tell me what principle of training is emphasized here by his coach by practice asking the shot-put thrower to practice medicine ball throw. What is the prime motor quality in this particular sport that the individual has to be trained specifically? So, it's very easy since we have just covered obviously the principle of specificity or specific adaptation to imposed demand is being employed in this particular case because it's a shot-put thrower so you will throw using his upper arm so you are also including, including activities in this exercise training or practice with upper body medicine

ball throw which is simulating the same activity and activating the same group of muscles. That is what we are considering here as the principle of specificity.

So, the athlete here is practicing medicine ball throw which simulates the throwing activity, thereby activating the same specific group of muscle and also performing the same type of activity within the specified duration. So, acting the same kind of energy system as well. The prime motor quality here which the athlete should be trained for is upper body explosive strength, that is the muscular power that needs to be focused here.

Let's proceed further. The second principle is the principle of individuality. What do you mean by individuality? It's just, remember this phrase one size doesn't fit all. So, if you have multiple athletes in your gym, you cannot make a same training program for all these individuals and even if you make a same training program you cannot expect the same type of outcome for the same training program from these individuals. So, every individual is unique that one needs to remember. So, if the individual is unique obviously the program also should be tweaked as per the principle of individuality. That's what the principle of individuality means. So, the response and adaptation to training varies with individual. So, one of the important factors here is because of the hereditary. So, the genetic factor plays an important role in terms of the principle of individuality. So, accordingly you will have a group of people with same exercise training program. Some may respond very well some may not respond. So, accordingly you grew them as high responders and low responders. So now you will have to focus on low responders. Why they are not responding to the same program which the others are going, the high responders are able to respond well that's maybe because of the genetic potential or the motor quality which is naturally inbuilt. So, now you will have to tweak your exercise training program to bring the low responder to at par with the high responders. So, 25 to 50 percent is generally genetically determined. So, the training program which you consider must cater to this principle specifically and if you have a group of people with two group having high responders and low responders you will have to group them and at least try to kind of tweak the program for the low responders so that they come at par with the high responders. So, that is for coaches who have multiple you know athletes in a particular game. For example, a football coach with some 20 to 25 kids. So, there you need to employ this particular methodology to identify the high responders and low responders based on the principle of individuality.

Moving ahead with the third important principle, that is the principle of reversibility. What do you mean by reversibility? The simple term only reflects that if you use it, you will maintain it, or if you don't use it, you will lose it. So, just remember by the phrase "use it or lose it." So, what happens is that adaptations acquired by the training have to be persistent; you will have to maintain that particular stimulus. So, if the stimulus is not persistent, then this may result in disuse of that particular muscle. So, this particular aspect is called detraining. So, the individual is not training during that period, so the stimulus is not maintained properly, so there will be a reversibility of whatever training that has been

accrued by adaptation, that has been accrued by training. So, it can be partial or complete depending on the time duration and the stimulus that is being given. So, for example, if the individual is on a 20-days break, so I have an athlete who has been training well for say 6 months or so, and the individual has to travel abroad. So, he has gone abroad for 20 days and not under my supervision not doing any particular exercise training. In such an individual, you will find maximal oxygen, or the aerobic power capacity dropping by almost 27% from the last train level. The cardiac output, as well as the stroke volume, decreases by almost 25%, becomes three fourth of what it was before. The training program must have some concept of something called as maintenance part so that even during the off-season when the individual is not training some amount of stimulus is there so that this particular detraining effect is minimized, kept to minimum. And if you see with respect to the various motor qualities, power loss is far more as compared to strength. So, in such sports, it is more important that they continue to maintain their stimulus even during the off-season period.

The fourth important principle is the principle of progressive overload. Two concepts which are important to have some positive outcome, that is one is by increasing the load during the training, and the increase in the load should be progressive in nature, so that you have a sustained progression or improvement in your outcome or the training effect. So that is very important, with a systematic increase in is the key word here. So, it has to be increased systematically incorporating the scientific principles. So, increase in load is guided by two important factors, one is by the volume, the other is by the intensity. So, if you increase the volume, the volume increase would mean in terms of increasing the number of sets and repetitions. So increasing volume will increase the endurance part, whereas if you increase the intensity, it will increase the maximum strength and power, thereby increasing the anaerobic capacity. So, volume increase will increase in the duration, so obviously it will increase the endurance aspect of it. If it is more of intensity and less of volume, it will end up in increasing or stimulating your anaerobic capacity. It is generally advised to follow a 2 for 2 rule wherein if the athlete can perform two or more repetitions over the assigned repetition goal for a given exercise in the last set in the previous set or two consecutive workouts, then you should add, you know, the weight in the next training session. So thereby you can gradually increase the progression of the loading. So, the load should be the individual should be able to maintain that for at least two sessions. So thereby you have increase in the load after two consecutive sessions. So that is the progressive overload 2 by 2 rule. There are also other regimens which are used for therapeutic progressive, you know, exercise training. They are the famous ones are the DeLorme and the other one is the Oxford regimen where it uses progressive way of increasing the resistance exercises. They are commonly used in rehabilitation programs.

So just a small trivia about the progressive overloads, a very interesting thing, wherein in the older times when we had these Olympic games and you know the Greek and the Romanians participating, there was this Greek wrestler called Milo. So, this guy was a 6-time medal winner at the old Olympic games and during the preparation of the event, he used to carry a calf on his head daily. So, it was wonderful to know that the calf grew in size, right. But he was able to carry the calf every day. So, as he started doing it every day as the calf grew in size, Milo becomes stronger and stronger. So, probably, this was the first time which is kind of credited for following the principle of overload during the practice and probably that is the first time where he has scientifically used, you know, the principle of progressive overload.

So, let's have a case scenario here. You are training Miss Malini. She is an amateur, and you find out that her 1RM in bench press is only 25 kg. So, you design a program wherein you advise 3 sets of 10 repetitions for 2 weeks. And when you, the question is when you will increase the load and how much will you increase. So, to answer the question when to increase, you will apply 2 for 2 rule, which I had discussed earlier, wherein if she is able to perform, say 12 repetitions in the third set, the last set with 2 conservative workouts then in the next training session you increase the load. To answer how much should be the increase, you apply something called the rule of 10%. It's a rough estimate, wherein you increase the load by 10%, where if, previously the individual was able to lift about, say 30 kgs, now you increase to 33 kgs. So, now she will be able to perform 8 to 10 repetitions gradually over multiple workouts, that will be increased to 12 repetitions, and then you follow a 2 for 2 rule. So, that's how you will increase the weight of the individual, weight of the, you will employ the principle of progressive overload.

So, it's very common you would find it out in your gyms as well as in fitness centers, where the advice that is given by the coach is represented in a very unique way for you to follow. So, it is important to know that. So generally, the loads are, the load which the weight that you must lift is, you know, represented in the numerator with the number of repetitions that you need to do in a set, is represented as a denominator, and on the side, you will have the number of sets.

Load/#Reps x (#Sets)

So, if an individual has to lift 100 kgs and do 8 repetitions and 4 sets. So, the coach will represent in the board as 100 by 8 into 4.

$100/8 \times 4$

So that is common representation of a, you know, the load that you need to carry or lift during a session in a resistant training program. It can also be kind of represented in the way it is shown in the table where you also mention about the rest interval and the rhythm at which you have to carry. Say, for example, exercise of leg press. The coach here is

advising the individual to lift a load of 80 kgs to 20 repetitions and 3 sets. And he wants the individual to do it as a moderate rhythm with a rest interval of at least 90 seconds and during the rest activity also you can advise what the individual has to do. Well, relaxing, as to maintain the rest interval period. So, this is another way of representing the resistant training plan.

So, the last principle that is important is your principle of periodization or principle of variation or variability. This is a systematic process of changing one or more variable. It may be the frequency, intensity or the type or the duration. So that is how you modulate based on the mode or the volume or the intensity and then you make a systematic change in that. So why it is important because this allows for you know challenging the system as well as gives the time for recovery as well. So, this is found to create better adaptations in your physiological system. So, there are various methods of periodization. What generally is followed in classic periodization is to increase the volume and reduce the intensity when you are in the initial phase. So, where you are increasing the endurance aspect or increasing the volume but load is low. So, gradually once your neural adaptation happens and you get trained then you go on with the during the competitive phase or the in-season phase you go in with decreasing the volume more of intensity and you also employ the principle of specificity where it will be more of a sport specific activity during the competitive phase. So, you again divide the period, the entire cycle into that is called as a macro cycle. Generally, in Olympic thing it is a four years is a macro cycle and you divide them into different competitions will be your meso cycle and how you train to compete in that particular competition you can divide it into different micro cycles. So, it is a kind of a longitudinal plan that you make for a major goal and then you divide them into multiple milestones and accordingly systematically vary the training program. The concept of periodization I believe would be discussed in detail in other modules of load training and strength and conditioning. So, the variability principle is more important because the in the beginner you need more variation however in terms of elite athletes there will be more of specific training with less variation. So, there you do not want more of variability. So that is how the variability principle differs between a beginner and a elite athlete.

So, having seen the various principles of training let us see employ this principle and use it in our exercise prescription. So, exercise prescription can be for endurance training as well as for a resistance training. So, in the endurance training you generally adhere to the principle of FITT protocol that is frequency, intensity, type and timing of the endurance training. In resistance training you will be using the exercise that needs to be selected, the frequency, the order in which you want the individual to do the exercise, exercise order pertaining to the body region or to the type of exercise that you want to do. You also need to prescribe the load how much the how much should be the load that one needs to carry and the repetition and the number of sets in terms of volume. And if you want you can also

specify the rest periods that one needs to undertake between the sets. So, these are the components that you will keep in mind when you prescribe exercise to your client.

Let us see some basic principles that you will have to consider when you are designing the exercise program. So, first thing would be the need of the athlete. What the athlete's requirements are. That should be considered when you design a program. So, you need to evaluate the type of sport the individual wants to. So, you need to first understand what is the dominant motor quality of that particular sport. The profile of that particular athlete. What is the kind of biomechanical requirement for that particular sport. Physiological profile here would be what is the status of the individual and is there an injury that the particular sport is predisposed to. That you must be aware so that accordingly you can incorporate or strengthen that group of muscles so that the injury doesn't happen during the course of the training. And you should also consider the position specific attributes. Say if you are training a group of footballers then you should know what type of motor quality is required for a striker or for a midfielder or for a defender. So, accordingly your training program also should incorporate such exercise training protocol. The other important aspect is about the athlete per se. So, before designing the program you will have to assess the athlete. So, what are the parameters that you look before with respect to the athlete is the training status. If the individual is novice or an adequately trained individual or if the individual you can easily get to know from the past history. What was the last time, what was the competition that the individual has performed or if the individual is not a kind of athlete who participated in competitive sports you can ask what is the timing of the previous run. So, that will give an idea about the training status of that particular individual. What is the level of participation. So, as I said you will have to incorporate the principle of specificity and variability based on the level of the participation. So, that needs to be considered before designing. You need to know what is the phase of training in which the individual is in. So, that is very important as an exercise prescription designer. So, phase of training is one important aspect which we discussed before even describing the training program or designing the training program you should focus on the pre-participation medical examination. So, that you get to know about the health status of the individual. You know the various injury prone, you know injuries that the individual has previously sustained so that becomes an important aspect for you to focus and rehabilitate and incorporate in the training program that particular group of muscle or the injured site. You need to also have a baseline physical testing as well as the physiological testing. So, you can do a field test for various motor qualities and then document them so that you know the baseline level and how your physical training or the exercise training that you are imparting is improving or progressing with the frequent assessment. I think this particular aspect is an essential component of exercise training and it is covered as a separate module in this course of exercise physiology and sports performance by Colonel Anup. And another important aspect is the framing the training goal. So, any program is not complete

without having a particular goal and the goal should be more of objective and measurable goal so that you can monitor the progress when you assess the individual subsequently.

We can discuss this with a case here. You have Mr. Chopra who is an athlete. He finished his season and he has done his all-time high performance. However, he sustained an injury, a small niggle but then he was able to complete with an all-time high performance. So now he has come to you during this off-season phase and he has approached you for designing his training program before starting the practice. So, what are the points that you will consider? So, he is in off-season phase. You have to refer him to a sports physician or a physician to get him evaluated to see the present status of this injury and what is his present health condition. To understand the risk factor of that injury. So as a coach or a trainer you need to know what would have predisposed that individual to such an injury. It might have been because of an overuse, because of improperly planned exercise training program or it can be because of a sudden acuity event that could have happened. So, it is important to identify what is the inciting event that would have resulted in that previous injury. And you need to assess what is the existing state. So, you need to undertake some field tests to find out what is the present level of that athlete. Then you will have to design a training program wherein you also need to include certain exercises in consultation with the sports physiotherapist or an athletic trainer to specifically include the rehabilitation exercises for that particular injured part. So that's how you will have to progress with specific focus on the basic foundation of motor quality because he is in the off-season phase. So, it's not to be more of a sports-specific activity, it should be more of a basic level foundation activity so that is the detraining effects doesn't creep in. So that should be the aim of your designing the training program in this case.

Let's see another case. Mr. Chopra, again, he finished his season and he sustained an injury, so he will design the program for his off season. So, what is the training principle that you would incorporate in the resistance exercise as per the phase of training. So, based on the phase of training, you can divide the resistance training program based on the sports specific activities that you will include and the general resistance training that you will include. So, this depends on the goal of the particular season. So, let's say in this case you have off season, in off season, during off season as I said we will be including more of principle of variability and less of principle of specificity. So, the specific activities related to sport will be low, whereas the high resistance training of a general activity can be there. The goal is here mainly to improve the endurance of the hypertrophy in terms of maintaining the power because power is one thing which can immediately get lost during detraining activities. So, during a pre-season or preparatory phase, you gradually introduce the sport specific activity and reduce the general resistance training activities. So, in the competitive phase, when you reach into in-season level, you are wanting the individual to

perform more of sports related activities so that principle of specificity is more utilized and then you wanted to reduce the volume of that particular resistant activity by decreasing the other resistant activity. So, you have increased the sport specific activity, incorporated principle of specificity, and you have also over a period of increasing in the season, you have gradually increased the principle of progressive overload by increasing the sport specific intensity and reducing the volume. So, the high resistance training which was there has come down as the season progressed. So, you have focused more on the sport specific activities. Then, when the individual has completed the season and gone into recovery stage, you have kept both the sport specific and resistant training to a variable level and you just wanted to just maintain the training effect. So, you can involve the individual in specific other sports just to have a difference in the kind of mental fatigue as well. So, you can involve the individual in recreational games which are not specific to the particular sports. So, you have incorporated the principle of progressive overload as well as you progress the season. Okay.

So, few other important principles that one need to incorporate in the exercise prescription are, with respect to the resistance training, you can divide the muscle groups into core muscle groups and assistance muscle groups. So, the prime motive would be to focus on the core muscle group but you should also remember that you should not forget the focus on the assistant groups. Assistant groups here would be for an injured athlete, a specific group of muscle which is injured which needs to be kind of addressed or it can be a reconditioning of the specific group of muscles. So, that needs to be kept in mind. In case of if you want to modulate between the endurance, strength, and power, endurance here I would mean muscle endurance. So, that is mainly kind of managed using the reps velocity and the load. So, let us see it with this table wherein if you want to focus on endurance, the load should be minimum and the velocity should be moderate with high repetition. So, if you want to focus on muscle endurance then you should have a prescribed low load, more of a volume. So, you increase the repetition. You gradually increase the endurance capacity of the muscle. Whereas if you want to increase the maximum strength, the amount of strength to lift, say for example weight lifting or more appropriate would be body building. The individual is looking to build the shape of the muscle group. There what you do is you increase the load to the maximum or even supramaximal load and the velocity should be very slow. The individual should not be in a haste to lift faster. It should be slow velocity and the repetition can be moderate. So, such kind of modulation in the load and the velocity will lead to better hypertrophy and increase in the size. So, such is the way you manage for kind of maintaining the shape of the muscle. Whereas if you want to focus on power where you want to do certain activity in the lowest possible time. So, there what you will do is you will increase the velocity. So, you are focusing here on the velocity but then the percentage of load will be moderate. Now about 40 to 60% of the 1RM of that particular

group and you keep the repetition to minimum. So, that here you are focusing on the faster velocity aspect only but not on the repetition or the load. Whereas when you want to increase the power you are focusing on the velocity of by reducing the load and then you are keeping the load to the maximum. So, these are the various way by which by modulating the repetition velocity in the load you can create different types of adaptations in the muscle with respect to endurance, strength and power.

One more important aspect that one needs to keep in mind is the muscle balance as you are prescribing the training because exercises have to maintain a particular balance also between the group of muscles. Let's say, for example, there is the balance which has to be maintained between the opposing groups. So, in this particular animation, we have this, this is your biceps, and this is your triceps right. So, when this is happening, you have to prescribe the exercise in such a way that you have to develop both biceps as well as triceps so that the ratio between the biceps and triceps is maintained for optimal weightlifting using this particular activity. So that's important to keep in mind. And also, one important biomechanical principle that one needs to keep in mind is the balance that should be maintained between the force couple group. So, the force couple group would mean that to perform a certain action at a joint, you have multiple groups of muscles acting at certain angles in coordination so that you have a synchronous activity. So, let's say, for example, here you have these are the scapular muscles, and this is the movement at the glenohumeral joint. So, whenever the glenohumeral joint comes up to 90 degrees, it is predominantly more from the glenohumeral joint, but then beyond 90 degrees when you are trying to lift, there is coordination with the scapular muscles also. The scapula has to tilt upwards for the arm to raise beyond those 90 degrees. So, in any kind of sports throwing sports overhead throwing sports you have the involvement of the scapular group of muscles as well for optimal performance to create that optimal load or the power during the activity. So, for that, you will have to, your exercise training should include activities to improve the strength of the scapular muscles as such as well. So that's how you can maintain the balance between your the actual bulk muscle power muscle as well as the scapular muscle which stabilizes the scapula at that particular position. So, it is important to maintain that muscle balance when you are designing your exercise program.

The other important principle pertaining to the aerobic endurance training is that between the duration and the intensity. So, if you are increasing the duration, the intensity has to be less, and reverse is also true. Wherein if your intensity in the endurance training is more than the duration should be less. So, based on that there are different types of endurance training. The endurance training, say for example, of a long slow distance training is basically to build in foundation for an endurance activity irrespective of the time duration at which it is done. So here you are increasing the duration only and the intensity is kept to

a minimum level at about 70% of the maximum. So, the main foundation here is to increase the duration of the activity. And whereas if you see, for example, a pace or a tempo training here the duration is kept to about moderate 20 to 30 minutes. However, the pace is increased. As we discussed a pace of LT pace is nothing but a lactate threshold pace. So, lactate threshold pace is about 85 to 90% of the VO<sub>2</sub> max. So now the intensity has increased. When you increase the intensity the duration has to be decreased. So, as we see in this again another type of endurance training is interval. Where you maintain an exercise is to rest ratio of 1 is to 1. And here the duration is grossly reduced and the intensity is towards the approximately to a near maximal level of intensity. As we go to another level of endurance training that is HITT training which is again more trending kind of a workout to increase the entrance adaptations is the high intensity interval training where you have the exercise duration is only 30 to 90 seconds with a rest period of 1 is to 1. But the effort here is very high, supramaximal more than the your previous 100% of the VO<sub>2</sub> max. So, you are giving more effort. The intensity is very high here. So accordingly, the duration is very less in seconds. So that's how you modulate your exercise training based on the duration and intensity in case of endurance training. So, one more method of training is Fartlek where you are varying both the pace between the first and the second group. It can be anywhere between the LT pace and the slow leisure pace where you can maintain a 1 hour running or swimming or an endurance activity during this period. So, that's a Fartlek training. So, the main thing that you need to carry forward from this slide is that the duration has to decrease when you increase the intensity.

Another important aspect that one needs to consider or a very important aspect that one needs to consider in exercise prescription is recovery. Because if you don't have proper recovery, the individual will go into something called as overtraining syndrome and may end up in kind of burnout. So, it is always included as one of the compulsory part of the exercise training program and it should be mandatorily included. And this is, it should not be more than 10% per week in the variation in the frequency, intensity, and duration to have a proper recovery. So, you have to follow the rule of 10. And the recovery sessions commonly used are low-intensity aerobic exercise during the period or in any recreational game or it can also be a light-loaded resistance exercise during the period. Common recreation recovery sessions include swimming and recreational games or even you can include sessions on passive recovery or active recovery in terms of having a body massage or cold-water immersion therapies.

To summarize, principles of training are five which we discussed about the specificity, individuality, reversibility, progressive overload, and principle of prioritization or variability. The exercise prescription again varies with respect to your endurance training

or resistance training and it needs to consider the athlete needs, the sports needs and depending on the load and the goal of your training program, you will have to modulate between the intensity, volume, frequency, and the load component in terms of resistance training. And recovery session should be a mandatory part of your exercise training program to have optimum performance results. So, your take away from this session on exercise prescription and training principle are you need to know the motor quality that is specific for particular sport and prescribe the athlete based on the need of the athlete, the status of the athlete and the physical assessment is an integral part of your exercise training program and medical pre-participation is a must before even starting to design the program and that should be the first step. The two important aspects are the progressive overload and the principle of specificity if you want to have a key positive adaptation particular to those sports.

So, the exercise program should always encompass the protocol of FITT in terms of frequency, intensity, type and timing of the particular exercise that you are prescribing.

For those of you who are more interested in in-depth learning can refer to various you know materials that I had quoted in the previous session. Thank you so much.