



FIBA
We Are Basketball

MANUAL FOR BASKETBALL REFEREES' PHYSICAL TRAINING



Dear referee,

The purpose of this Manual for Basketball Referees' Physical Training is to provide fitness and training guidelines for all basketball referees. The Manual provides information and instructions on setting up a routine fitness programme designed to prepare officials for the physical demands of basketball officiating. The information is a guideline and may vary depending on the facilities and equipment available.

Please do not hesitate to contact me if you have any questions.

Sincerely yours,
 Alejandro Vaquera



FIBA Referees Fitness Coordinator
referees.fitness@fiba.com

TABLE OF CONTENTS

TERMINOLOGY & SYMBOLS	3
HEART RATE & PERSONAL DATA	5
WORKOUT EXERCISES	8
TRAINING PERIODS.....	25
TRAINING PRINCIPLES	27
INJURY PREVENTION	29
INVISIBLE TRAINING.....	31

TERMINOLOGY & SYMBOLS



TERMINOLOGY & SYMBOLS

This section will define the terminology and interactive icons (symbols) used in this Physical Conditioning Manual.

Workout	Training session, a commitment of time which may include any physical training (strength, aerobic and/or weight training).
Intensity	It is the grade of effort in the different workouts. We can talk about easy, medium, hard and maximum intensity depends on the % of this effort. Easy intensity will be between (50-60%), Medium intensity will be around 60-80%, Hard (80-90%) and Maximum (90-100%).
Training Load	It is the combination between quality (intensity) and quantity. Depends on the part of the season we will need to focus more in one of them to look for the specific benefits.
Recovery	<p>The rest time between exercises and repetitions. Usually it is given in minutes or seconds.</p> <p>Complete Recovery: Your heart rate has returned to normal and you are prepared for the next repetition or exercise.</p> <p>Incomplete Recovery: Your heart rate has not returned to normal prior to your next repetition or exercise.</p>
Rest	No workout. The rest can be complete (no workout) or can be also an active rest (moderate intensity activity to maintain our physical levels).
Repetitions	The number of times you repeat an exercise
Aerobic & Anaerobic Capacities	When working on the endurance we can talk about these two capacities. We need the anaerobic endurance to be able to repeat sprints during all the game and we need the aerobic endurance to maintain the recovery during the game and to repeat those sprints. Both of them are crucial for your physical performance during the games.
Endurance Workouts	<p>Running exercises to increase our aerobic and anaerobic levels. Fitness can be achieved through different exercises such as: running, *Fartlek, *RSA,</p> <p>*Please check the Workout Examples Section for definitions.</p>
Speed Workouts	The exercises that will help to be faster in the game are the speed workouts. We can work in our sprints with complete recovery (Sprints) or with incomplete recovery (Repeat Sprints Ability). *Please check the Workout Examples Section.
Strength Workout	<p>Exercises that include weight bearing or stretching activities. Strength building exercises can improve overall performance and help prevent injuries.</p> <p>General Strength workouts; to be done in a fitness room or in a hotel room using our own body weight.</p> <p>Elastic Bands Workouts: Exercises with elastic bands that work different muscle groups</p> <p>Weight Training: The use of free weights and machines to develop muscle strength.</p>
Oregon Workout	A total training workout that includes speed, strength and endurance. The mix of sprints, strength exercise (sit ups, push-ups,) and endurance.
Stretching Workout	Exercises to stretch our muscles prior to or after a workout or a game



ADV
 Advance
 studying
 material
 available to
 download



VID
 Video
 material
 available to
 download



EXT
 External
 material
 available to
 download

HEART RATE & PERSONAL DATA

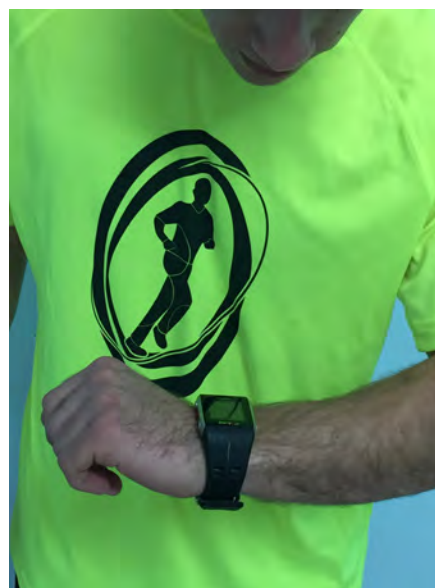


HEART RATE & PERSONAL DATA

Heart rate is one of the easiest and most common ways to control the training process (normally using a pulsometer).

The heart rate will guide us through our different workouts following the intensity that we have to obtain in the different exercises.

The most important thing is to obtain our Max HR (maximum heart rate). The Max HR is the highest heart rate an individual can achieve without problems and depends on age. The most accurate way of measuring Max HR is through a submaximal test using a heart rate monitor; for example running the FIBA Referee Fitness Test until you cannot maintain the speed of the test. Also you can estimate your theoretical Max HR using this formula: $220 - \text{age}$. Always is much better if you can obtain it with a submaximal test but at least you can have an approach of your Max HR with the theoretical one. It will be the indicator (%) of the intensity in the different training sessions.



You can see in the table below the different physiological effects depend on the intensity in the training session.

- For example; if we have to run 25' medium intensity that means that your heart rate has to be between 60-80% of your Max HR.
- If you Max HR is 185, you intensity range in this training session should be between 110-150 bpm
- In a morning training workout the intensity of the running is Easy (50-60% of the Max HR) and will be between 90-110 bpm.

Examples of the intensity in the different workouts:

- Jogging workout will be EASY intensity (50-60%)
- Running workout will be MEDIUM intensity (60-80%) or HARD intensity (80-90%)
- Fartlek training workout will be between EASY and HARD intensity in the different speed changes
- Speed and RSA workouts will be between HARD and MAXIMUM intensity

HEART RATE TRAINING ZONES	PHYSIOLOGICAL EFFECTS
90-100% Max HR (MAXIMUM)	INCREASES MAXIMUM SPRINT SPEED
80-90% Max HR (HARD)	INCREASES ANAEROBIC ENDURANCE IMPROVES SPRINT ENDURANCE
60-80% Max HR (MEDIUM)	INCREASES AEROBIC ENDURANCE
50-60% Max HR (EASY)	CREATES AN AEROBIC BASE HELPS IN RECOVERY

FIBA Referee Department plans training/fitness programmes for referees to prepare and maintain their fitness prior and during the basketball season. Each person is an individual and training programmes are much more appropriate if the input data of individual is at the disposal.

See example form with explanations below.

Personal Fitness Data Form includes following information (* = in case you have requested information)

Sex	Male / Female
Age	
Height / Weight	cm / kg
Years as FIBA Referees	
Leagues officiated in the current season	<p>Highest level of National Competition & International Competition.</p> <p>How many games per week do you usually have?</p> <p>How many times per week do you usually practice?</p> <p>Games officiated in 2014?*</p> <p>How many flight did you take in 2014?*</p> <p>This 2 questions will help us in order to study and understand your physical demands during your season.</p>
Injuries / Physical problems	Typical problems: ankle sprain, muscular problems
BMI*	<p>Body Mass Index; is a measure for human body shape based on an individual's mass and height. The BMI is used as a simple method to assess how much an individual's body weight departs from what is normal or desirable for a person of his/ her height.</p> <p>To calculate it please check this link: http://nhlbisupport.com/bmi/bminojs.htm</p>
Body Fat %*	<p>The body fat percentage is the total mass of fat divided by total body mass.</p> <p>The body fat percentage is a measure of fitness level, since it is the only body measurement which directly calculates a person's relative body composition without regard to height/weight. In order to calculate it you need to use a Body Fat Caliper, through biometrical impedance analysis, ...</p>
Max HR*:	<p>The maximum heart rate is the highest heart rate an individual can achieve without problems and depends on age. The most accurate way of measuring Max HR is through a submaximal test using a heart rate monitor; for example running the FIBA Referee Fitness Test until you cannot maintain the intensity of the test.</p> <p>Also you can estimate your theoretical Max HR using this formula: 220-age.</p> <p>Always is much better if you can obtain it with a submaximal test but at least you can have an approach of your Max HR with the theoretical one.</p>

WORKOUT EXERCISES



WORKOUT EXERCISES

Running:

Easy jogging (50-60% intensity) you have to be able to run and talk at the same time. Running is that you achieve a 60-80% heart rate of your maximum intensity.

Running Workout Example

For 30' run can be done in two ways

3 sets of 10'

or

30' in a row.

The physiological benefits are the same.



Fartlek:

A training program that consists of running at 2 different speeds, one slow (50-60% of your maximum intensity) and one faster (70-80% of your maximum intensity). The session should include a warm-up (10-15 minutes) and a cool-down (5-10 minutes) at the end of the workout.

Fartlek Sample Workout

1. Warm up: 12minutes
2. Fast running : 1 minute
3. Slow running (recovery): 2 minutes
4. Fast running : 2 minutes
5. Slow running (recovery): 1 minute
6. Fast running : 1minute
7. Slow running (recovery): 2 minutes
8. Fast running : 1 minute
9. Cool down: 7 minutes



Speed:

The key in speed workouts is **QUALITY** of our speed.

Distances should be more (60-100 m) than a basketball court dimensions.

Body recovery should be **COMPLETE** prior to the next repetition. It is also important to stretch before and after each workout.

Speed Sample Workout:

- | | |
|-------------------|--|
| 1) 15' warm up | 6) 3 x 30 m |
| 2) 5' stretching | 7) 4 x 20 m |
| 3) 20' speed sets | 8) 5 x 10 m |
| 4) 1 x 50m | 9) Full recovery (between 1 and 2 minutes) |
| 5) 2 x 40m | 10) 10' cool down + stretching |



>> Speed

4744



Repeated Sprint Ability (RSA):

The RSA (Repeated Sprint Ability) is the key in our training program. It is the ability of your body to recover after a short burst of speed and the ability to perform subsequent sprints.

We need to be able to repeat sprints at the same intensity from the beginning to the end of the game. The difference with the Speed Workout and the RSA is that the recovery is NOT COMPLETE in the RSA workout.

RSA Sample Workout

- | | |
|-------------------|--|
| 1) 10' warm up | 6) 5 x 20 m |
| 2) 5' stretching | 7) 5 x 10 m |
| 3) 25' speed sets | 8) 5 x 5 m |
| 4) 5 x 40m | 9) The walk back period is the recovery time |
| 5) 5 x 30 m | 10) 10' cool down + stretching |



>> RSA
4755



Oregon Workout:

The Oregon Workout is a TOTAL TRAINING workout, which includes speed, strength and endurance. The workout consists of sets of 10x100 m sprints followed by a series of strength exercises with NO RECOVERY until you finish the 10 sprint set. The recovery between sets should be approximately 2 minutes.

Oregon Sample Workout

- 1) 10' warm up
- 2) 20' sprints (2 x 10 x 100m)
- 3) Recovery between sets: 2 minutes. Time of exercises: 30-40''
- 4) Exercises:
 Sit-ups, Push-ups, Jumping Jacks, Core Exercises (side abs), Half squats, Sit-ups (different types),
 Knees to chest, Push-ups, Lunges, Lower back,
- 5) 5' cool down + stretching



Game Day Workout:

The idea is to activate your body in the morning of the game day in order to be in a better disposition for the afternoon's game.

Game Day Sample Workout:

- 1) Activation (Easy jog): 3'
- 2) Running: 15'
- 3) 5x50 meters - Full Recovery
- 4) Stretching: 5'

Warm Up And Cool Down:

Warm up and cool down exercises are essential in a physical fitness program.



Warm up: A good warm up is necessary to prepare physically and mentally for a workout or a game. We can divide the warm up into two parts; General and Specific.

General warm up will take place in the corridor or in the locker room and the goal should be to activate our body for a physical activity. Will be followed by active stretching drills.

Specific Warm up will take place on the court 20 minutes before the game. Will consists on more specific movements (sprints, turns...) to really prepare your body for the game. By the rules we need to control the teams during their warm ups but we need to coordinate between the crew to find time for specific drills.



Cool down: It is as important as the warm up. The goal is to return muscles to a relaxed state. A good cool down will accelerate recovery, prepare our bodies for the next game/ workout and reduce injury. Ice and static stretching drills are recommended.

Strength Workout:

A strong well-conditioned body is required to officiate the fast paced game of basketball.

Examples of strength workouts

General strength (i.e. pushups, chin-ups and sit-ups)

Elastic bands

Weight training

Strength workout can be done before the workouts or in any other day of the week but it is better if you don't do it after the running exercise. Two days a week it is appropriate to maintain good levels of strength.

As you can see in the photos can be done also in a hotel room using the time that you spend in the different hotels when you travel.



General Strength (Strength Workout):

A general strength workout is to maintain a good muscular tone using your body weight.

As you can see in the photos below you do not need a lot of space and the exercises can be done in a hotel room. See the photos for number of repetitions and sets.

General Strength Workout:



1. Push Ups 2 x 15 repts



2. Core 2 x 20" each side



3. Half Squat 2 x 25 repts



4. Lower Back 2 x 15 repts



5. Core 2 x 25"



6. Calf 2 x 20 repts



7. Core 2 x 15" each side

Elastic Bands (Strength Workout):

Elastic bands are an easy and convenient tool to improve your strength.

They can be purchased at any sporting goods store, they are inexpensive and they come in different levels of resistance.

The photos below demonstrate the various exercises and the repetitions for maximum benefit.

The recovery between the exercises and the sets can be around 60-90''

Elastic Band Workout



Chest + Shoulder 3 x 10 repts



Back 3 x 10 repts



Shoulder 3 x 2 x 10 repts



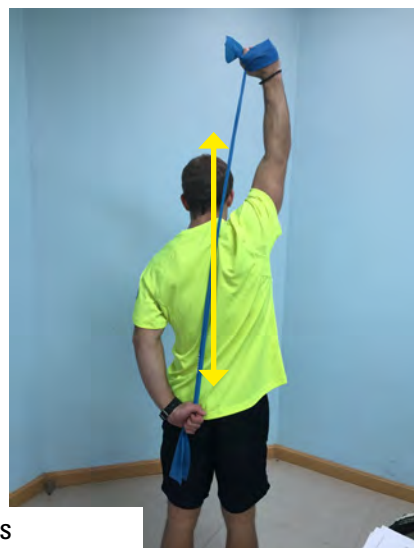
Quadriceps 3 x 10 repts



Quadriceps + Gluteus 3 x 10 repts



Triceps 3 x 2 x 10 repts



Biceps 3 x 10 repts





Hamstrings 3 x 2 x 10 repts

Weight Training (Strength Workout):

Weight training is the best way to develop muscle strength. The availability of a training facility, especially when traveling, can impact your workout program. Many hotels have weight training areas but may have limited facilities.

Find below a 2 day weight training programme help you develop and maintain your strength. If the suggested exercise equipment is not available use an alternate machine but focus on the same muscle group.

Remember to always warm up before you start lifting weights. If you are new to weight training use machines instead of free weights to avoid possible injuries.

Weight Training Example:

Day 1

3 sets x 10 reps
 Sit ups 3x35
 1' recovery between sets and 2' between exercises

Day 2

3 sets x 10 reps
 Sit ups and lower back 3x35
 1' recovery between sets and 2' between exercises

Day 1



Chest



Quadriceps



Chest



Sit Ups



Shoulder



Quadriceps



Triceps



Pullover



>> Chest

5054

>> Quadriceps

5068

>> Chest

5055

>> Sit Ups

5078

>> Shoulder

5057

>> Quadriceps

5069

>> Triceps

5065

>> Pullover

5060

Day 2



Back



Hamstring



Back



Sit Ups



Shoulder



Calf



Biceps



Lower Back



>> Back

5062

>> Hamstring

5070

>> Back

5073

>> Sit Ups

6283

>> Shoulder

5071

>> Calf

5067

>> Biceps

5064

>> Lower Back

6287

Flexibility:

Flexibility is important for good performance, it aides in overall fitness and helps avoid injuries.

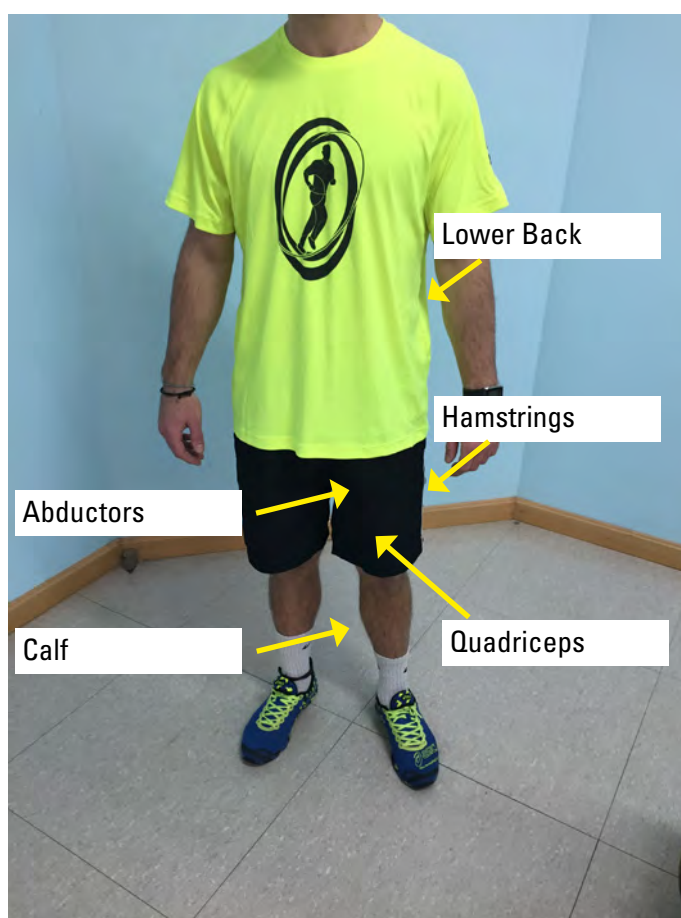
It is important to stretch before and after every workout or game.

Stretches should concentrate on specific areas such as abductors, hamstrings, groins, achilles, calf, quads and lower back.

There are 2 types of flexibility; Dynamic and Static.

Dynamic Stretching is a form of stretching beneficial in sports utilizing momentum from form, static-active stretching strength and the momentum from static-active stretching strength, in an effort to propel the muscle into an extended range of motion not exceeding one's static-passive stretching ability.

Static Stretching is used to stretch muscles while the body is at rest. It is composed of various techniques that gradually lengthen a muscle to an elongated position (to the point of discomfort) and hold that position for 10-20 seconds.

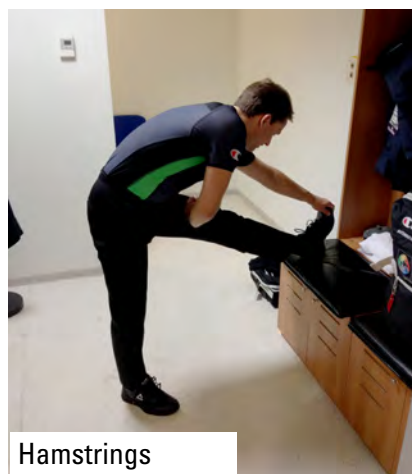


Stretching Drills Sample Workout

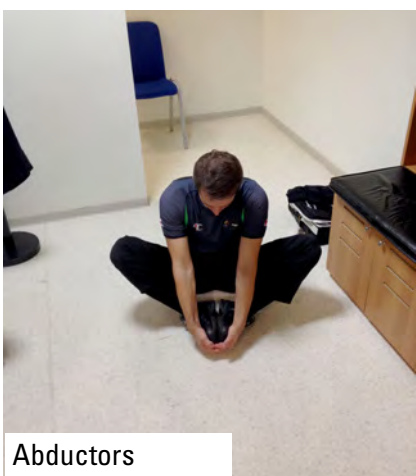
These stretching drills can be done after every workout but especially after every game.
Takes less than 2 minutes, 10-12 seconds each.



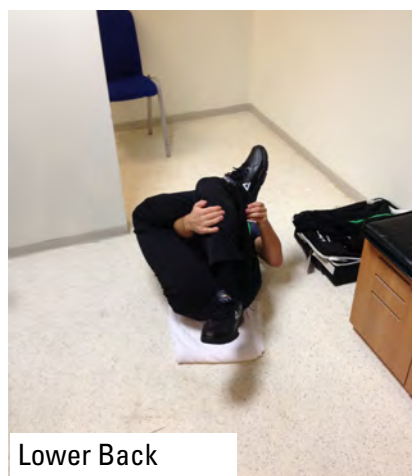
Calf



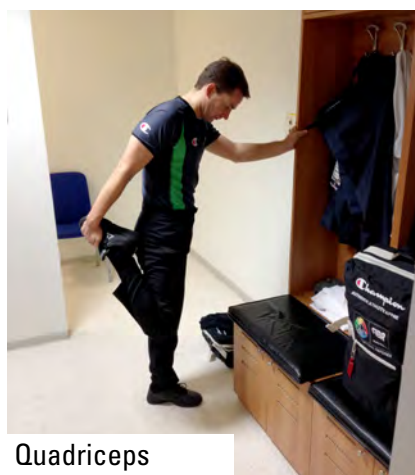
Hamstrings



Abductors



Lower Back



Quadriceps

ALTERNATIVE TRAINING METHODS

Treadmill: When distance running is not an option a treadmill can provide an excellent aerobic exercise. Always begin at a lower intensity and progress after a good warm-up period. Remember to stretch after the work-out.



VID
 >> Treadmill
 4975

Bike: Stationary bikes are a good alternative instead of running and are less stressful on the knees, but it is less intense than running.



VID
 >> Bike
 4974

Elliptical: Provides an excellent work-out and the cardio benefits are similar to running exercises. The elliptical is a less stressful alternative for officials with knee or ankle injuries.



VID
 >> Elliptical
 4976

Water Training: Consists of various types of exercises performed in a pool and is beneficial because of low impact.



Other Sports: Participating in other sports (tennis, swimming, football etc.) can support a fitness program as well as provide a relaxing alternative to maintaining your physical conditioning. Please be careful with contact sports to avoid any injury.

Roller Foam: Is a self-myofascial release technique that is used by athletes to inhibit overactive muscles. This form of stretching utilizes the concept of autogenic inhibition to improve soft tissue extensibility, thus relaxing the muscle and allowing the activation of the antagonist muscle. By applying pressure to specific points on your body you are able to aid in the recovery of muscles and assist in returning them to normal function.



It is accomplished by rolling the foam roller under each muscle group until a tender area is found, and maintaining pressure on the tender areas (known as trigger points) for 30 to 60 seconds (usually consists of a foam cylinder of various sizes).

TRAINING PERIODS



TRAINING PERIODS

Off-Season: The off-season is normally time to relax and recover from a long officiating schedule but it is important to try and maintain some form of physical activity. Participating in alternative sports is beneficial and will lessen the impact of re-starting your work-out program when the season begins.

Pre-Season: To prepare for the upcoming season it is necessary to start your training program 4-6 weeks prior to the beginning of the season.

Season: During the season it is important to maintain appropriate weight and the necessary physical fitness level to run the court for the entire game. It is the competitive period. The importance of a good physical training program will help officials maintain their performance level for the full season. During this season it is important to focus more on quality of the workouts and not on quantity.



TRAINING PRINCIPLES



TRAINING PRINCIPLES

Some of the training principles are more important than other especially for a basketball referee. We will try to give you some ideas about the training principles and how to use them during your season.

Training: Training is when we are physically and mentally prepared for the workout. Usually a training session is composed by different physical abilities; speed, strength,

We also need to respect the different parts of the training session because all of them are really important; warm up, principal part and cool down.

Training-Rest ratio: Obviously the first thing that we have to do is to train but sometimes we over train our body thinking that the only thing that matters is training. We have to listen to our body and sometimes if you feel tired the best workout is not to train.

The training-rest ratio is different for everyone but one of the first symptoms of overtraining is when you are too tired during the day. If this is your case your body is already under overtraining and it is important to visit a Doctor to recover your body before you start training again. Please contact us if you have any problems regarding overtraining.

Rest: We mentioned already the importance of rest. If you are well trained, rest can be more important than training.

We can find 2 types of rest;

Passive Rest: when the rest is complete and there is no physical activity. Once we finished the season we need at least one week of passive rest.

Active Rest: if we are not done with our season and we still have to prepare a Championship we may need 7-10 days of active rest. That means that you can do different physical activities to enjoy at the same time that you maintain your physical levels (e.g. playing sports). It is mostly a mental rest that will help our body to recover from the season.

Overcompensation: Overcompensation is when you train with a certain load and after the training program you need to have some rest or decrease the intensity of the workouts in order to see the benefits of this training.

During the season or when we prepare specifically any Championship we will have a few load phases where training quantity increases in order to decrease it later on to obtain the training benefits with a much better performance.

It is linked straight with the training-rest ratio.

INJURY PREVENTION



INJURY PREVENTION

Prevention:

The key is prevention. We need to prevent any problem that can get us out of the basketball games.

Usually the most common are the muscular problems.

The muscular problems can be prevented with: good flexibility and good stretching, taking care of the muscles after the workouts or the games (Ice) and controlling our food (for example banana is the best fruit to prevent muscular problems).

Once we have a muscular problem we are in trouble for the whole season and for this reason it is really important to work in prevention.

Creams:

Pre-competition cream

Warming - vasodilating effect. It stimulates and enhances blood flow, affording heat and preparing muscles and joints for physical effort, thus reducing the risk of possible injuries (contractures, fibril breaks, etc.)

Post-Competition Cream

Alleviates the sensation of tiredness in the limbs after physical exercise, reduces fatigue and favours a rapid physiological recovery.



Proprioception:

Another issue that the referees have usually is ankle problem and knees problem. This problems may come because of a traumatic injury or because overuse. In any case it is really important to work on proprioception because the information that we can give to our proprioception channels in knee and ankle is crucial to prevent any further injury.

Proprioception means certain exercises where we give extra information to our knee or ankle to make them stronger in case of injury.



INVISIBLE TRAINING



INVISIBLE TRAINING

Our habits will play an important role in our performance on the basketball court. If we have good habits and we follow a good training plan, the possibilities to succeed are bigger. There are some things that we need to consider about our habits.

Food: “We are what we eat”. This well-known phrase is really a big true. We need to control what we eat in order to eat what is good for our performance. You can eat everything but you need to know that every metabolism is different and probably will affect your body in a different way than to the others. Proteins, carbohydrates, vegetables and fruits need to be in your daily diet. We can have cakes and sugar but always being aware about the quantity that we can tolerate. Especially when you travel you need to take care of what you eat because it is not easy to control it.

Hydration: Our body is 70% water and for that reason we need to be hydrated to reach our best performance. It has been studied that a lack of hydration affects our performance in a big percentage. We need to drink at least 1.5 liters of water a day. Obviously during the games we need to take our water bottle to the court to make sure that our hydration is good during the game and especially at the end of the game. If the humidity is high or during summer time our hydration should be bigger. Try to have your own water bottle and not share the bottles with your colleagues to prevent contagion (flu, gastroenteritis)

Sleep: To have a good performance on the court at least we need to get 8 hours of sleep. Also, have a good nap before the game will help in our performance in late afternoon games or evening games. The suggested naptime is around 45 minutes. If we get more time of sleep our body will get too loose and will be against our later performance in the game.

Travels: FIBA referees are regularly called upon to travel large distances to participate in national and international competitions. Whether travelling domestically or internationally, travelling creates some unique challenges for basketball referees.

The long periods of inactivity during the plane journey may lead to the pooling of blood in the legs and in susceptible people cause a deep-vein thrombosis. Moving around the plane periodically during the journey, every 2 hours and doing light stretching exercises are recommended. Travelers should also drink about 15 to 20 ml extra fluid per hour, preferably fruit juice or water, to compensate for the loss of water from the upper respiratory tract attributable to inhaling dry cabin air. Without this extra fluid intake, the residual dehydration could persist into the early days in the new time zone. If you know that the flight is more than three or four hours, consider wearing support stockings during the flight.

Having arrived safely at the destination, the athlete may suffer travel fatigue, loss of sleep (depending on flight times), and symptoms that have come to be known as jet lag. This term refers to the feelings of disorientation, light-headedness, impatience, lack of energy, and general discomfort that follow traveling across time zones. These feelings are not experienced with traveling directly northward or southward within the same time zone when the passenger simply becomes tired from the journey or stiff after a long stay in a cramped posture. Jet lag may persist for several days after arrival and can be accompanied by loss of appetite, difficulty in sleeping, constipation, and grogginess.

It takes about one day for each time zone crossed to adapt completely. Sleep is likely to be difficult for a few days, but exogenous rhythms such as activity, eating, and social contact during the day help to adjust the sleep-wake rhythm. Arousal state adapts more quickly than does body temperature to the new time zone. Until the whole range of biological rhythms adjust to the new local time and become resynchronized, athletes' performance may be below par.

The direction of travel influences the severity of jet lag. Flying westward is easier to tolerate than is flying eastward. On flying westward, the first day is lengthened and the body's rhythms can extend in line with their natural free-wheeling period of about 25 hr and thus catch up.

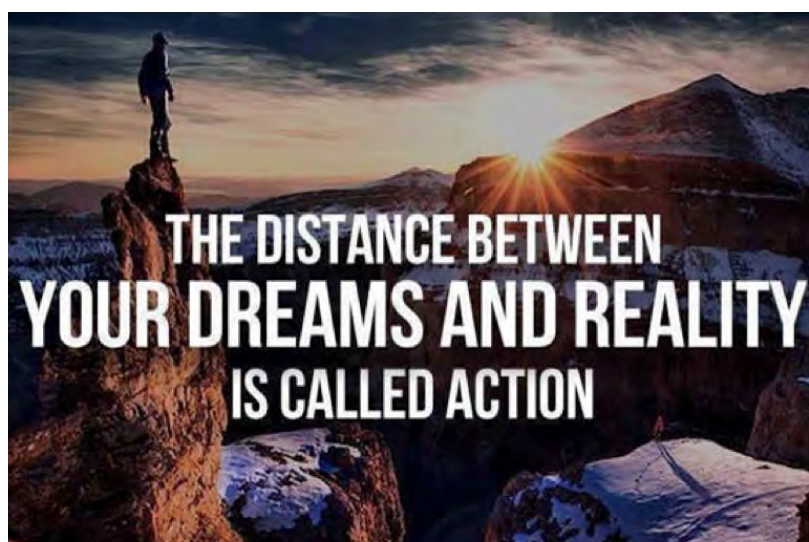
Sleeping pills have been used by some traveling athletes to induce sleep while on board flight. These drugs have not all been satisfactorily tested for subsequent residual effects on motor performances such as sport skills. They may in fact be counterproductive if administered at the incorrect time.

Exercise can hasten the adaptation to a new time zone, and a light training session after a flight has proved beneficial. Naps should be avoided for the first few days because a long nap at the time the individual feels drowsy (presumably at the time he/she would have been asleep in the time zone just departed from) anchors the rhythms at their former phases and so delays the adaptations to the new time zone.

Shoes: The running and game shoes are another big issue for basketball referees in order to avoid any kind of problem. You need to feel comfortable with them and if it is possible you may test the way you step on (pronator or supinator) to select the right shoes.

It is important for you to know when you have to change your shoes because sometimes the shoes look perfect from the outside and had been deteriorated from the inside (because of the use).

Physiotherapist: Sometimes visit the physiotherapist when you are not injured is the best time to do it (prevention). Because of the travelling or because the amounts of games you may have any small pain or any minor problem. The suggestion is to visit the physiotherapist once in a while to get your body in a good condition to keep going in your season.



STANDARD QUALITY

GLOBAL CONNECTION

International Basketball Federation
FIBA
Route Suisse 5 - PO Box 29
1295 Mies
Switzerland

Tel: +41 22 545 00 00
Fax: +41 22 545 00 99