



**PHYSICAL TRAINING MANUAL  
FOR BASKETBALL REFEREES**

**VERSION 4.0 (MAY2019)**

Dear referee,

The purpose of this Physical Training Manual for Basketball Referees is to provide fitness and training guidelines for all levels of basketball officiating.

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



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# TERMINOLOGY & SYMBOLS



# TERMINOLOGY & SYMBOLS

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

<b>Workout</b>	Training session, a commitment of time which may include any physical training (strength, aerobic and/or weight training).
<b>Intensity</b>	Is the grade of effort in the different workouts. We can talk about easy, medium, hard and maximum intensity depending 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%).
<b>Training Load</b>	Is the combination between quality (intensity) and quantity. Dependant on where you are in your season will depend on the need to focus more on one element to achieve a specific benefit.
<b>Recovery</b>	The rest time between exercises and repetitions. Usually it is given in minutes or seconds. Complete Recovery: Your heart rate has returned to normal and you are prepared for the next repetition or exercise. Incomplete Recovery: Your heart rate has not returned to normal prior to your next repetition or exercise.
<b>Rest</b>	No workout. The rest can be complete (no workout) or can be also an active rest (moderate intensive activity to maintain our physical levels).
<b>Repetitions</b>	The number of times you repeat an exercise
<b>Aerobic &amp; Anaerobic Capacities</b>	When working on endurance we can talk about two capacities. Firstly anaerobic endurance to be able to repeat sprints all game and secondly Aerobic endurance to maintain recovery during the game and to repeat those sprints. Both of them are crucial for your physical performance during the games.
<b>Endurance Workouts</b>	Running exercises to increase our aerobic and anaerobic levels. Fitness can be achieved through different exercises such as: running, *Fartlek, *RSA, (* Please check the Workout Examples Section for definitions.)
<b>Speed Workouts</b>	The exercises that will help to be faster in the game are the speed workouts. We can work on our sprints with complete recovery (Sprints) or with incomplete recovery (Repeat Sprint Ability). (* Please check the Workout Examples Section.)
<b>Strength Workout</b>	Exercises that include weight bearing or stretching activities. Strength building exercises can improve overall performance and help prevent injuries. General Strength workouts; to be done in a fitness room or in a hotel room using our own body weight. Elastic Bands Workouts: Exercises with elastic bands that work different muscle groups Weight Training: The use of free weights and machines to develop muscle strength. Suspension Training: It allows to train the whole body and all the muscular groups.
<b>Oregon Workout</b>	A total training workout that includes speed, strength and endurance. The mix of sprints, strength exercise (sit ups, push-ups,) and endurance.
<b>Stretching Workout</b>	Exercises to stretch our muscles prior to or after a workout or a game. Dynamic Stretching: is a form of stretching beneficial in sports utilizing momentum from static-active stretching. Static Stretching: is used to stretch muscles while the body is at rest.
<b>HIIT</b>	High intensity interval training (HIIT), is a form of interval training; characterized by intense and intermittent execution of exercises alternating by passive or active rest exercises with low intensity.



Advance studying material available to download



Video material available to download



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 heart rate monitor).

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

The most important thing is to achieve our Max HR (maximum heart rate). The Max HR is the highest heart rate an individual can achieve without problems and depending 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, your intensity range in this training session should be between 110-150 bpm
- In a morning training workout the intensity of the running should be Easy (50-60% of the Max HR) and should 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.

Below is an example of the Personal Fitness Data form .

Sex	Male / Female
Age	
Height / Weight	cm / kg
Years as FIBA Referees	
Leagues officiated in the current season	<p>Highest level of National Competition &amp; 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 2019?*</p> <p>How many flight did you take in 2019?*</p> <p>These 2 questions will help us 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. To calculate it please check this link: <a href="#">BMI Calculation</a></p>
Body Fat %*	<p>The body fat percentage is the total mass of fat divided by total body mass. 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 depending 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: <math>220 - \text{age}</math>. Best method is to obtain with it 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). This is best explained when you can 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 (80-90% 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: 12 minutes
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 : 1 minute
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 your speed.

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

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             |



## Repeated Sprint Ability (RSA)

The RSA (Repeated Sprint Ability) is one of the keys 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               |



## 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

Suspension Training

Strength workout can be done before the workouts or on 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.

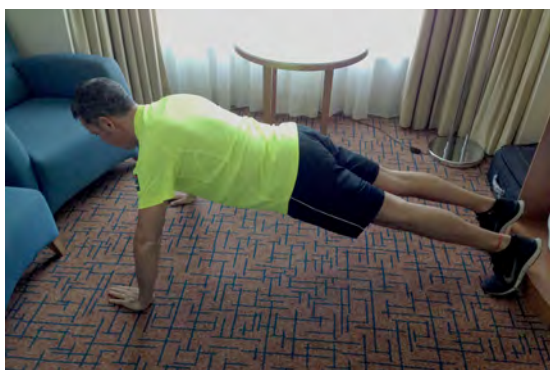
As you can see in the photos can be done also in a hotel room maximising the time you spend in the different hotels when you travel.



### General Strength (Strength Workout):

The goal of 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



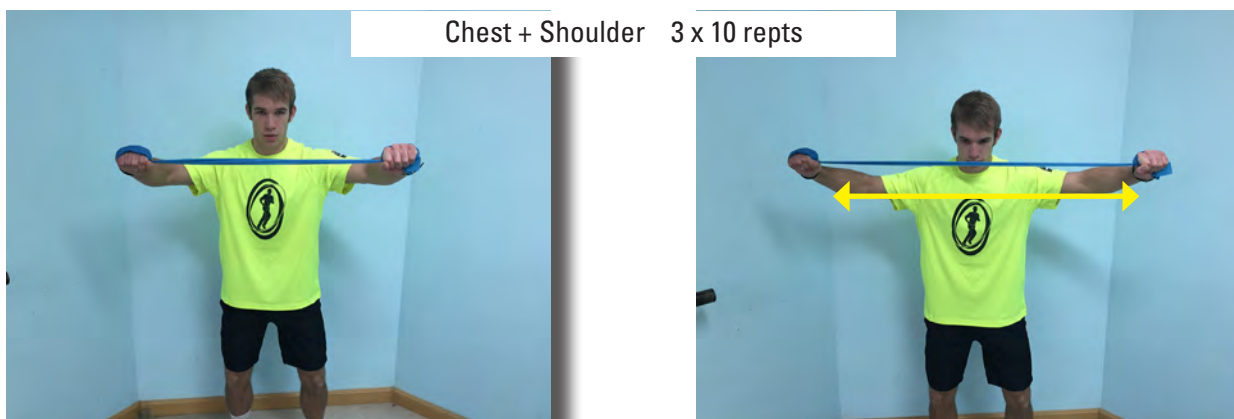
**Elastic Bands (Strength Workout):**

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



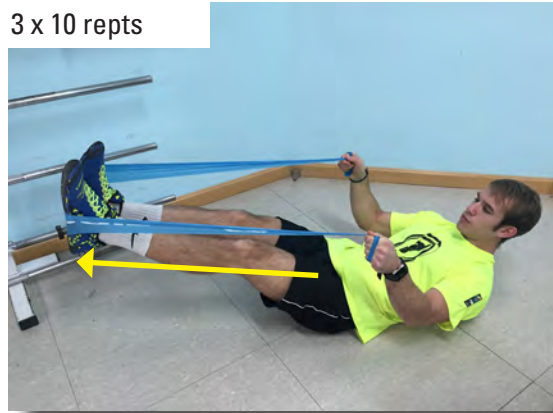
Shoulder 3 x 2 x 10 repts



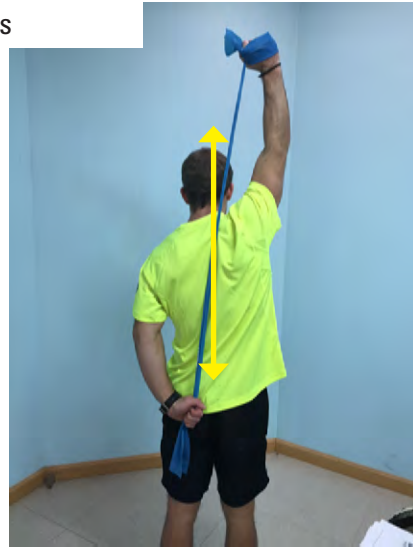
Quadriceps 3 x 10 repts



Quadriceps + Gluteus 3 x 10 repts



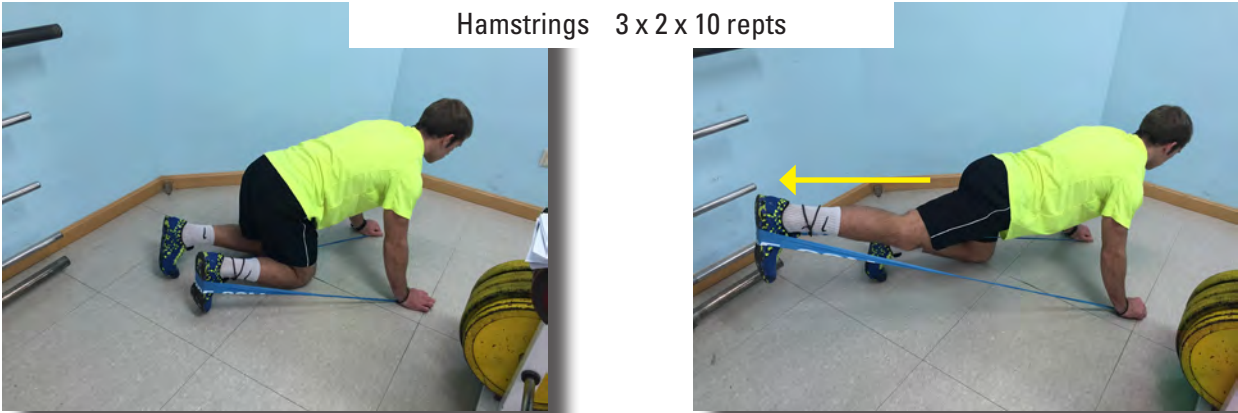
Triceps 3 x 2 x 10 repts



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 that will 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

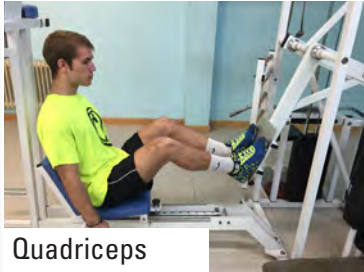
Day 2

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

Day 1  
(Weight Training Example)



Chest



Quadriceps



Chest



Sit Ups



Shoulder



Quadriceps



Triceps



Chest



>> [Chest](#)

[5054](#)

>> [Quadriceps](#)

[5068](#)

>> [Chest](#)

[5055](#)

>> [Sit Ups](#)

[5078](#)

>> [Shoulder](#)

[5057](#)

>> [Quadriceps](#)

[5069](#)

>> [Triceps](#)

[5065](#)

>> [Chest](#)

[5060](#)

Day 2  
(Weight Training Example)



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](#)

## Suspension Training

Suspension training is one of the most used training methods nowadays. Its characteristics give it a huge range of benefits.

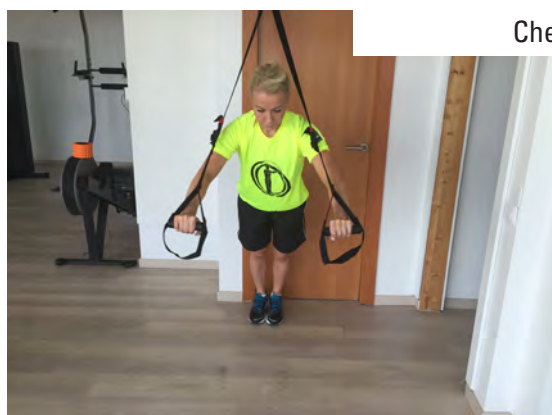
Some of the benefits are listed below:

1. It allows for training the whole body and all the muscular groups;
2. Movements used involve large muscle chains (functional training);
3. Increases strength, endurance (intervallic work), flexibility, upper/lower body coordination, etc. ;
4. You can work anywhere;
5. It optimizes training time and reduces the possibility of injury;
6. It is suitable for everyone

Please see below a routine example:

### Suspension Training Example:

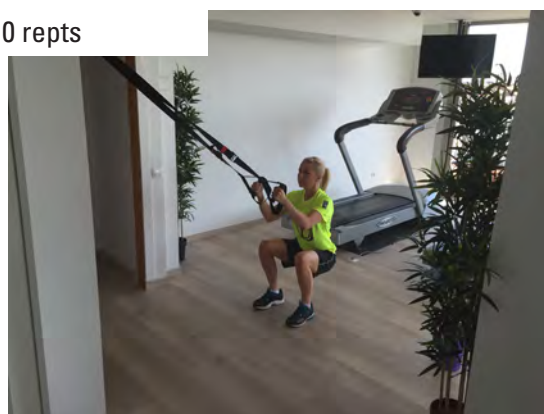
3 x 10 reps with 1' rest between exercises, except core that is 3 x 30''  
(Every exercise is composed of 2 photos (initial position and final position) and 1 video)

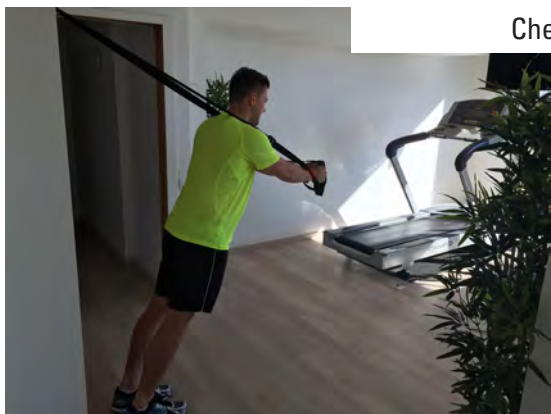


Chest 3 x 10 repts

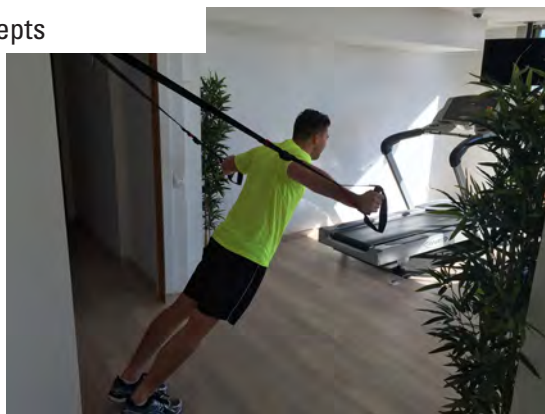


Quadriceps 3 x 10 repts





Chest 3 x 10 repts



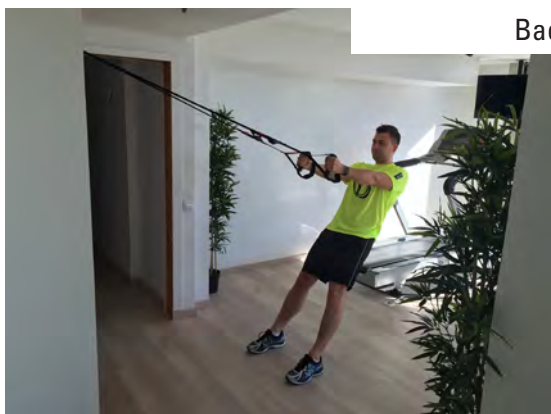
VID  
[» Chest](#)  
(6)



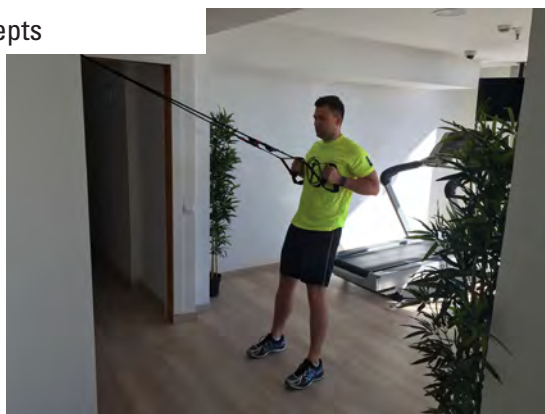
Hamstrings 3 x 10 repts



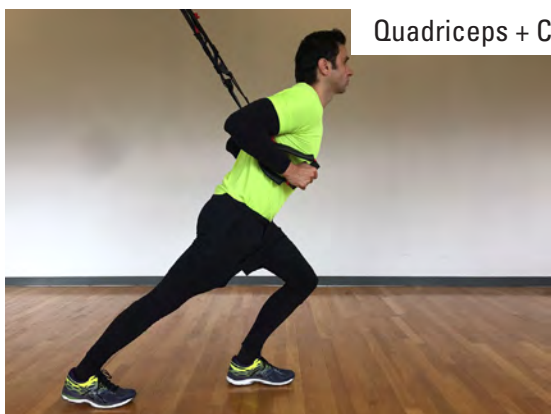
VID  
[» Hamstrings](#)  
(33)



Back 3 x 10 repts



VID  
[» Back](#)  
(9)

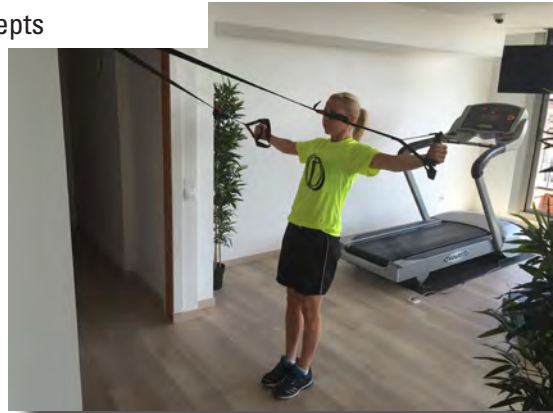
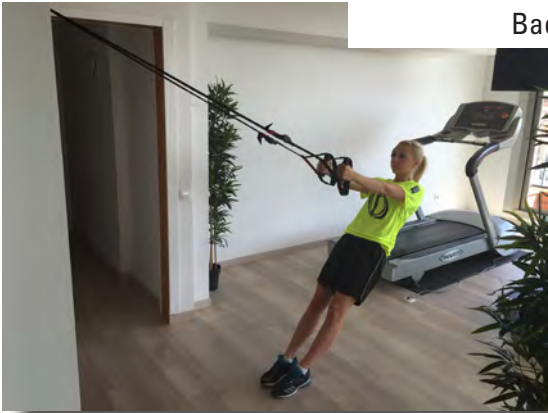


Quadriceps + Calf extensions 3 x 10 repts



VID  
[» Calf](#)  
(36)

Back 3 x 10 repts



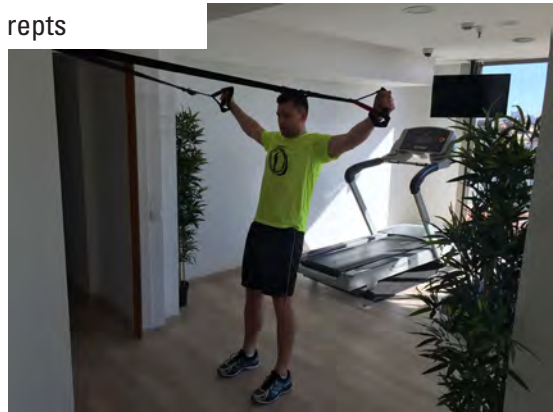
**VID**  
[» Back](#)  
(12)

Core 3 x 30 sec



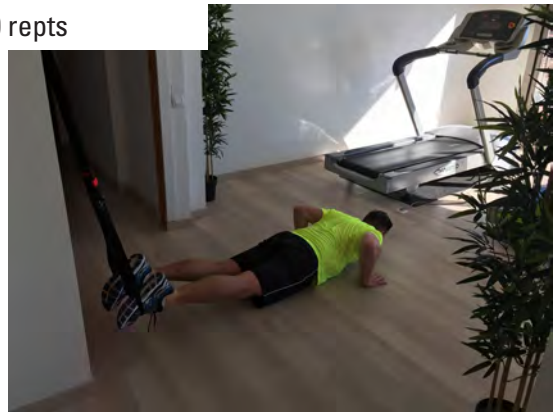
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[» Core](#)  
(24)

Shoulder 3 x 10 repts

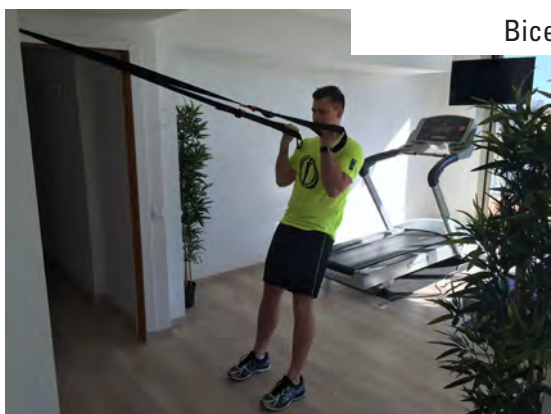


**VID**  
[» Shoulder](#)  
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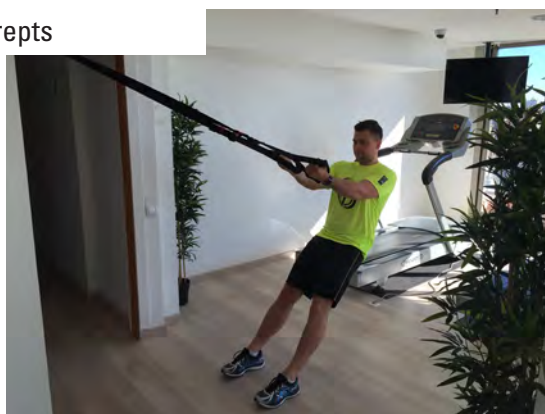
Push ups 3 x 10 repts



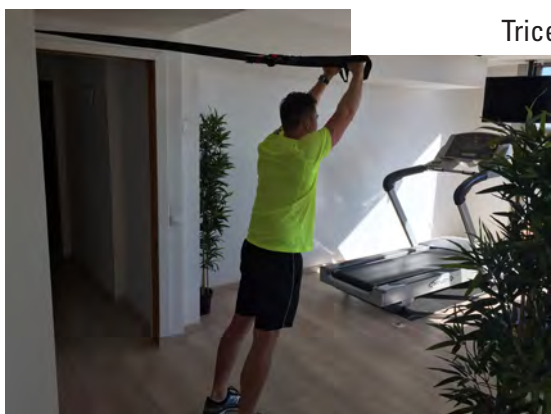
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[» Push up](#)  
(27)



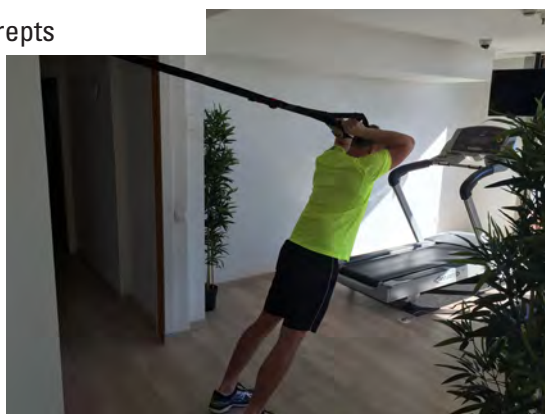
Biceps 3 x 10 repts



VID  
>> [Biceps](#)  
(18)



Triceps 3 x 10 repts



VID  
>> [Triceps](#)  
(21)

### High intensity interval training (HIIT)

High intensity interval training (HIIT), is a form of interval training; characterized by intense and intermittent execution of exercises, alternating passive or active rest periods with low intensity.

HIIT workouts will improve your overall endurance and increase your VO<sub>2</sub> max (the maximum amount of oxygen your body can use during intense exercise); increasing your endurance and your VO<sub>2</sub> max, you will be able to run faster and maintain a higher performance longer in time. We also will introduce circuit training sessions, where we will find all the benefits we mentioned before plus muscular benefits. HIIT workouts also burn a lot of calories in a short amount of time.

We can find in this manual 2 types of sessions; cardio sessions (treadmill, elliptical and stationary bike) and circuit training sessions (using strength exercises). Both types can be realized in a fitness room or even the second one in a hotel room. So, this type of training will match perfectly with the reality of a basketball referee when you have to travel or you don't have plenty of time to workout.

Important information to set up correctly your training session;

HIIT exercise sessions generally consist of a warm up period, then several repetitions of high-intensity exercise separated by active rest exercises with low intensity, and at the end a cool down period. The



high-intensity exercise should be done around at 85-90% of your maximum intensity but always having this intensity under control.

HIIT workouts typically last around 15-20 minutes, with times varying based on a referees' current fitness level. Execution time and the rest time must be changed according to your level of physical preparation. If you feel too tired, dizzy or if you don't feel well, please stop immediately your workout. Use of a clock, timer or an App is recommended to keep accurate times and the number of rounds. Intensity can be controlled using a heart rate monitor.

**Cardio sessions:**

When using your treadmill for HIIT workouts, speed and incline settings can play important roles in designing your workout. Speed has to be adjusted in a safety environment, you have to be able to run at your 85-90% of your maximum speed and at the same time decrease the speed in the treadmill. Be always sure that you can control your running in the maximum speed zones. Appropriate inclination could be 1%.

When using elliptical (cross trainer) or the stationary bike, it is important to set up the resistance. Resistance affects how much force you have to exert on the foot platforms to complete the pedal stroke. For the warm up the resistance should be easier and use a more resistance when starting the workout. In the cool down should be an easier resistance again.

Time of intense exercise can be modified using 30'' to 2' and also recovery times from 30'' to 2'  
 Example for a 30' workout (10 stations of 30'' intense and 30'' recovery):

HIIT: Cardio sessions		
Warm up	14' (Easy speed or resistance)	
Set 1	Intense: 30''	Easy: 30''
Set 2	Intense: 30''	Easy: 30''
Set 3	Intense: 30''	Easy: 30''
Set 4	Intense: 30''	Easy: 30''
Set 5	Intense: 30''	Easy: 30''
Set 6	Intense: 30''	Easy: 30''
Set 7	Intense: 30''	Easy: 30''
Set 8	Intense: 30''	Easy: 30''
Set 9	Intense: 30''	Easy: 30''
Set 10	Intense: 30''	Easy: 30''
Cool down	6' (Easy speed or resistance)	

Using the treadmill, it can be a little more complicated to change from easy to intense (it can go for a little longer than 30''). In longer changes these problems can be minimized.

**Circuit training sessions:**

This type of HIIT uses strength drills combined with a certain time of exercise and certain time of rest. The goal is to work on your cardio at the same time as your strength. All these drills are made in a circuit going from one to another during the rest time. Usually you should alternate upper body with lower body drills or some of them that are a full body drill.

Can be perform using your own body weight or even using some other equipment such us; dumbbells, kettlebells, ...

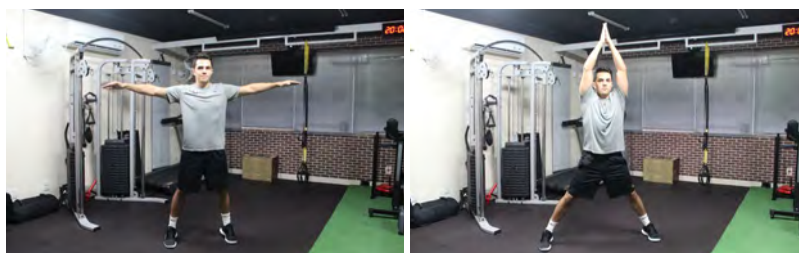
Example for a 30' workout with your own body weight (10 drills of 40'' exercise and 20'' recovery x 2 times)

**HIIT – Circuit Training**

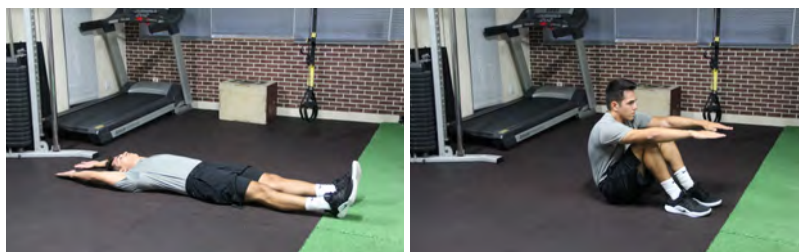
Warm up

5' (Easy intensity)

Jumping Jacks



Abdominal Rower



Side shift



Burpee



Plank



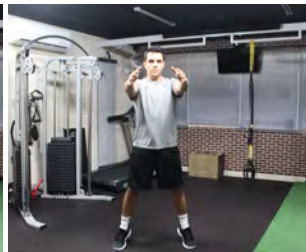
Lunges



Push ups



Squat and calf



Side plank



Side squat



Cool down

5' (Easy intensity)

## Foam Roller

The use of the foam roller is really common in sports. It is one of the most popular forms of self-myofascial release as well as a good way to increase the athlete's range of motion (ROM). This type of myofascial release is performed by the individuals on themselves.

Self-myofascial release may reduce muscular soreness and increase pressure pain threshold as a result of delayed-onset muscle soreness (DOMS) during the 48 hours following damaging exercise.

Foam roller is one of the easiest ways to speed up the recovery process as well as a good way to maintain flexibility.

Please see below some exercises that you can carry out after your training sessions and games:

### Roller Foam Training Example:

Carry out each exercise 2 times for a duration of 15'' each.  
(Every exercise is composed by 1 photo and 1 video)



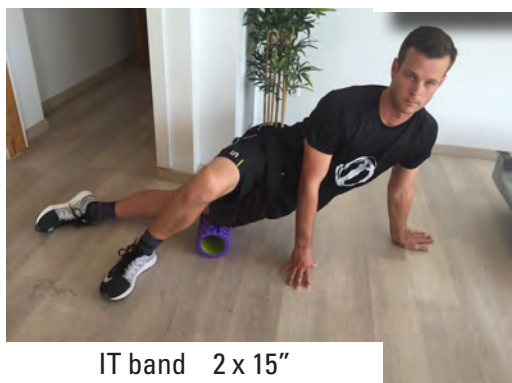
Calf 2 x 15''



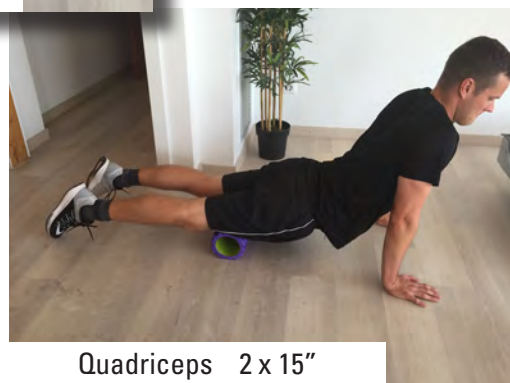
Hamstring 2 x 15''



Lower back 2 x 15''



IT band 2 x 15''



Quadriceps 2 x 15''



>> [Calf](#)  
(2)

>> [Hamstring](#)  
(4)



>> [Lower back](#)  
(6)



>> [IT band](#)  
(8)

>> [Quadriceps](#)  
(10)

**Flexibility:**

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

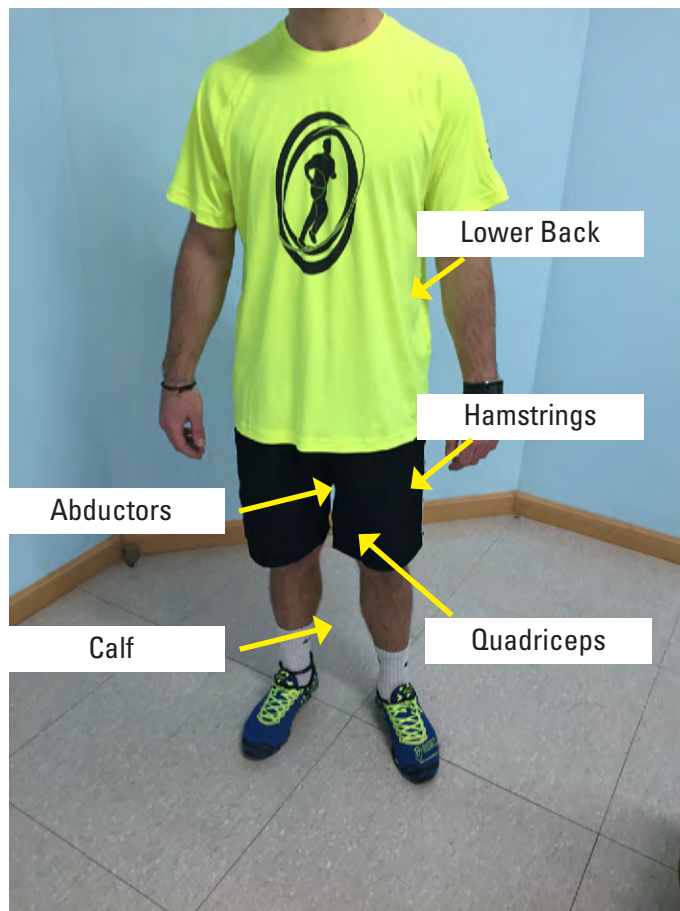
It is important to stretch before and after every workout or game.

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 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.

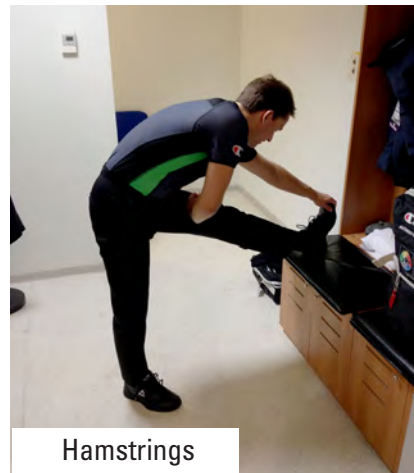


### Stretching Drills Sample Workout

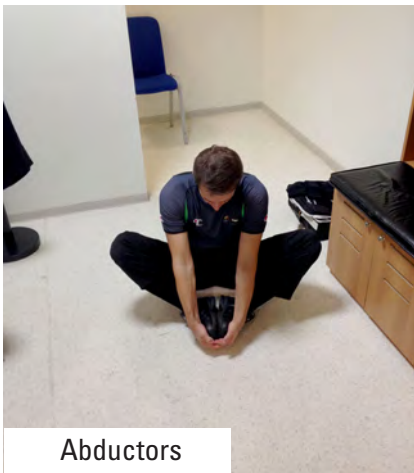
These stretching drills can be done after every workout but especially after every game. Takes less than 2 minutes, 10-12 seconds each.



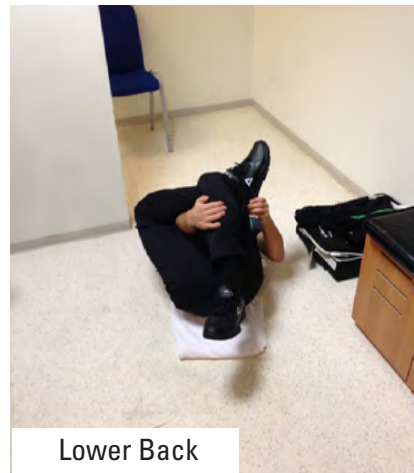
Calf



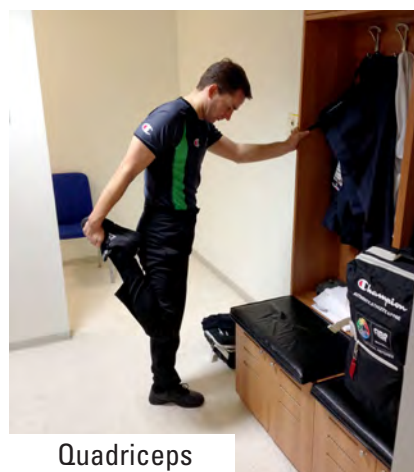
Hamstrings



Abductors



Lower Back



Quadriceps

## ALTERNATIVE TRAINING METHODS

**Treadmill:** When outside 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 workout.



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 workout and the cardio benefits are similar to running exercises. The elliptical is a less stressful alternative for referees 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.



# 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 workout program when the season begins. 10 days of passive rest (full rest) are recommended after every season.

**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 also called competitive period. The importance of a good physical training program will help the referees to maintain their performance level for the whole season. During the season it is important to focus also on the quality of the workouts and not just on the quantity.



# TRAINING PRINCIPLES



# TRAINING PRINCIPLES

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Some of the training principles are more important than others 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 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 directly 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 at risk 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 and knee problem. These 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.

Balance and proprioception exercises:

Very well-developed balance ability is not only essential for effective movement performance such as running, jumping, stopping, cutting etc., but it has been shown to reduce lower extremity injuries. Balance and proprioception training are common parts of integrated injury prevention programs (e.g., ankle sprains, knee ACL injury) that include strength, power and mobility training too.

Balance training improves neuromuscular efficiency and optimizes movement quality by strengthening and



stabilizing muscles and connective tissue (e.g., tendons) around joints (e.g., knee, ankle) and by increasing kinesthetics awareness and overall body stability. On the following pages you will find different balance and stabilization exercises that are designed to improve your ankle and knee joint stability by teaching your lower extremities' muscles to efficiently contract and react in case of a sudden and unexpected lower body perturbations.

General training recommendation is:

- 2 times per week,
- 10-15' per training session,
- 6-8 exercises,
- 2-3 sets,
- 8-10 repetitions,
- 1'– 2' recovery between the sets,
- 2'-3' recovery between exercises.

It can be performed at the beginning of the session as a warm-up / activation protocol, but also in combination with other exercises during the training session.

There are several ways to make progression in the training:

Eyes open → eyes closed

Double leg → single leg

Stable surface (the floor) → unstable surface (e.g., balance board, bosu ball, foam cushion...)

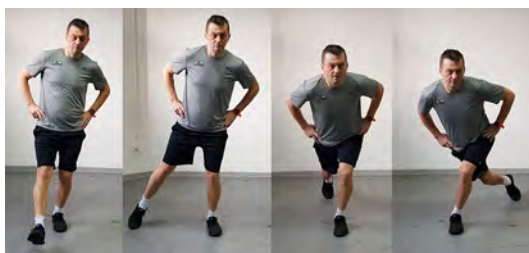
No load → additional load (e.g., bar, medicine ball, dumbbells)

### Balance – Exercises on a stable surface



Mini squat (try to do a single-leg mini squat by touching the floor with the opposite leg's heel. Do it slowly to avoid any side-to-side knee movement!

“Flamingo” Stand on one foot (balls) and close your eyes! Keep this position 20-25 seconds and then switch the legs.



“Reach and touch” Try to make four single-leg touches in different directions reaching the longest possible distance.

Balance – Exercises on an unstable surface  
(balance board and bosu ball)



Tilt the balance board

Using only your ankles, try to slowly tilt the balance board until the edge touches the floor: forward, backward, left and right. 2 x [6-8 x (4 touches)]. Progression: a single leg stance



“Reach and touch” Standing on the balance board, try to make four “soft” single-leg touches in different directions reaching the longest possible distance. Keep the balance board as stable / horizontal as possible!



Squat  
(parallel stance)



Squat  
(diagonal stance)  
Keep the balance board  
as stable / horizontal as  
possible!



Lunges on the bosu ball  
(progression: additional  
load)



Squats on the bosu ball  
(progression: additional  
load, a single-leg mini  
squat)



Step-up on bosu ball, Keep the up position 3-4 seconds. Stabilize your body!  
Progression: use dumbbells or medicine ball to lift it up





# 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.

## **Nutrition and hydration guidelines:**

Specific adaptation of nutritional habits and hydration strategies help to maintain the physical and cognitive performance during game progression, thus avoiding neuromuscular fatigue and injury susceptibility. As a consequence of the increased physical demand and the professional assistance in teaching and training of referees, a more athletic body composition is needed by referees..

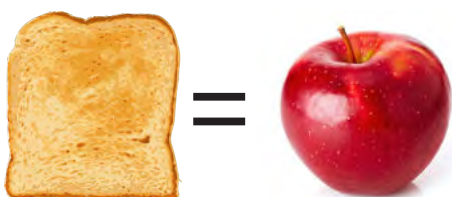
Excessive body weight and fat mass decrease the relative aerobic capacity while increasing physical strain and susceptibility to fatigue. An athletic physique helps to keep up with the play and emphasizes authority on the court. Moreover, it allows to recover well between games.

**Healthy eating plate:** A general recommendation in everyday life is to eat and drink

- ½ of your plate: good quantity of vegetables and variety. Potatoes and French fries don't count. Choose plenty of fruits (lots of color).
- ¼ of your plate: variety of whole grains (e.g., whole-wheat bread, whole-grain pasta, quinoa, oats and brown rice). Limit refined grains (e.g., white rice and white bread).
- ¼ of your plate: protein power. Aim for fish, poultry, chicken, beans, and nuts; limit red meat; avoid bacon, sausage, cold cuts, and other processed meats.
- in moderation: vegetable oils like olive, canola, soy, corn, sunflower, peanut, and others for cooking, on salad and at the table. Avoid trans fats. Low-fat does not mean "healthy."
- Water, tea or coffee: Skip sugary drinks, limit milk/dairy products to 1-2 servings/day, and limit juice to 1 small glass/day.

**Energy demands as a referee:** The dietary habits must suit your quotidian physical activities. Indeed, referees should develop a diet that relatively restores the referee's energy expenditure during training and/or official game (~500 kcal/game). Think that a medium-sized apple or banana represent ~85-105 calories. You normally store enough glycogen (a form of energy storage) to last for 60-90 minutes with intermittent moderate-intensity (a game).

**Carbohydrates ("carbs"):** one of the main types of nutrients, they are a key source of energy (e.g., included in whole grains, fruit, or vegetables). They help to prevent fatigue and support recovery from exercise. To maintain an adequate supply with regular exercise, ingest a range of 100-150 grams of carbohydrates daily. A food that contains 15 grams of carbohydrate is called "one carb serving" (e.g., a small apple, slice of bread). 2/3 cup of spaghetti has 30 grams of carbs and is "two carb servings".



30 grams of carb  
2/3 cup

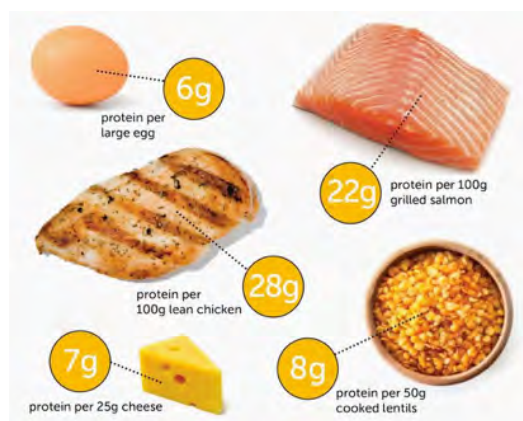
### Meals timing before games

12:00 – 14:00	Breakfast before 08:00 / Brunch around 11:00
15:00 – 16:00	Breakfast 09:00 / Lunch around 12:00 or some fruit
17:00 – 19:00	Lunch around 14:00 / Grab some fruit, cereal bars, ... In case you may need it
20:00 – 21:00	Lunch around 15:00 / Grab some fruit, cereal bars, ... In case you may need it

### Hydration timing before and during games

3-4 h before	Drink plenty of water
1 h before	~330 ml water/sodium
During	Fluid intake needs to be a trade-off between how much fluid can be managed and tolerated and the potential benefit to performance

**Protein:** generally, a regular diet is enough to cover the daily needs 1.2-1.7 g/kg body mass (when you are both officiating and exercising on a daily basis). So, if you weigh 80 kg x 1.2= 96 g of protein. In this case, if you eat three times daily and never snack, you'll need about 32 g of protein per meal.



**Fat:** generally, fat intake is recommended to range from 20 to 30 % of total energy intake. Regarding micro-nutrients, vitamins and minerals supplements are not required if diet includes a range of foods and provides enough energy. For instance, eating salmon, fatty fish, egg yolks and fortified products (milk, cereal and orange juice) will provide proper vitamin D levels, necessary for muscle function.

### The importance of recovery:

After games/training sessions, your recovery hydration regimens should include sodium, carbohydrates and protein. In this regard, full-fat and skimmed milk are better than only water (milk contains things other than water, such as fat, carbs and protein). Fluid deficits as little as 2% body mass may impair your performance. The general idea is that for every 1 kg of body weight you lose throughout a game, you should consume 1 L of fluid. You can do this drinking at least 250 mL fluid per hour for the first four hours. Also, supplementation shakes support muscle buildup and recovery. The preferable option is ~20 g of animal protein (whey) mixed with milk/water.

### Supplements and ergogenic aids

Caffeine doses of 200 mg (single-caffeine pills serving) prevent physical and cognitive fatigue and may help in special conditions, such as jet lag and strenuous game-play (e.g. overtime).

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**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 sleep longer than this time our body may get too loose and may be counter-productive to our 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 compression socks 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 hrs. and thus catch up.

Sleeping pills have been used by some traveling athletes to induce sleep while on board a 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.

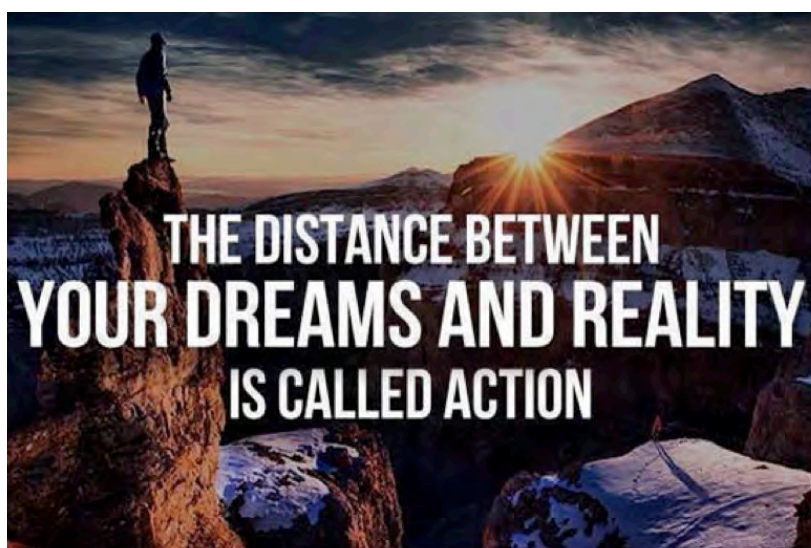
Exercise can hasten the adaptation to a new time zone, and a light training session after a flight has proved beneficial. Naps should be avoided for the first few days because a long nap at the time the individual feels drowsy (presumably at the time he/she would have been asleep in the time zone just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

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**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, however have deteriorated from the inside (because of the use).

**Physiotherapist:** 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.



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