PHYSICAL TRAINING MANUAL FOR BASKETBALL REFEREES

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Throughout this publication, all references made to a player, coach, official, etc., in the male gender also apply to the female gender. It must be understood that this is done for practical reasons only.

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This material is created by the FIBA Referee Operations.

If you identify an error or a discrepancy in this material,please notify the FIBA Referee Operations at refereeing@fiba.basketball

Dear Referee,

This Training Manual provides information and instructions in many aspects of the physical training, in order to help the referees to prepare themselves for the physical demands of basketball officiating.

The different sections of the Manual try to cover most of the topics needed for the referees to achieve their maximum performance on the court.

The information is a guideline and may vary depending of your personal situation, facilities and equipment available. In the Training Manual we tried to cover most of the different scenarios you may find and trying to give you solutions for them.

All the training methods and demands in this manual are based on comprehensive studies carried out in FIBA Competitions starting from 2014. For more details, see the "Basketball Referees – Physical demands & profile" document.

Please, do not hesitate to contact us in case you have any questions or comments (referees.fitness@fiba.basketball).

Sincerely yours,

Alejandro Vaquera
Global FIBA Referees Fitness Coordinator

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TERMINOLOGY & SYMBOLS

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

Workout	Training session, a commitment of time which may include any physical training (strength, aerobic and/or weight training).
Intensity	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%).
Training Load	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.
Recovery	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.
Rest	No workout. The rest can be complete (no workout) or can be also an active rest (moderate intensive activity to maintain our physical levels).
Repetitions	The number of times you repeat an exercise
Aerobic & Anaerobic Capacities	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.
Endurance Workouts	Running exercises to increase our aerobic and anaerobic levels. Fitness can be achieved through different exercises such as: running, Fartlek, RSA, etc.* *(* Please check the Workout Examples Section)*
Speed Workouts	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)*
Strength Workout	Exercises that include weight bearing. 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.
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. 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.
HIIT	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

ADV >> External Link

Video material available to download

VID >> External Link

External material available to download

EXT >> External Link

TRAINING USING YOUR HEART RATE

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 – 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 MEDIUM 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

WORKOUT EXERCISES

RUNNING

Easy jogging (around 60% intensity). This is best explained when you can run and talk at the same time. Running is that you achieve a 60-70% 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.

VID >> Running

FARTLEK

A training program that consists of running at 2 different speeds, one slow (60-70% 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

VID >> Fartlek

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.

There is one type of sprint that can make our speed workout even more specific – non-looking sprints.

Non-looking sprints are sprints that simulate a real sprint from a basketball referee when the referee is sprinting but looking to the side (to the court). Sometimes is good to add this type of sprint to simulate what is really happens in a game. Consider sometimes to sprint also with the whistle in your mouth. It may look weird but it is what you do when you are officiating a game.

Speed Sample Workout:	
1) 15´ warm up	6) 3 x 30 m
2) 5´ active stretching	7) 4 x 20 m
3) 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

VID >> Speed

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´ active stretching	7) 5 x 10 m
3) RSA 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

VID >> RSA

SPECIFIC RSA

As we mentioned before, RSA (Repeat Sprint Ability), is the ability of you body to recover after a short burst of speed and the ability to perform subsequent sprints.

In basketball it is difficult to find sprints in just one direction, because most of the time a team is stealing, recovering the possession and the referee has to turn back (power step) and sprint in the other direction. As result of this, we need to train in the most specific way doing RSA at least in 2 directions and maintain recovery incomplete.

Specific RSA training workout	
1) 10´ warm up	6) 5 x 10m x 10m
2) 5´ active stretching	7) 5 x 5m x 5m
3) Specific RSA sets	8) Recovery is incomplete walking to the other end
4) 5 x 20m x 20m	9) 10´ cool down + stretching
5) 5 x 15m x 15m	

VID >> Specific RSA

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: 20-30´´
4) Exercises: Sit ups, Push-ups, Jumping Jacks, Core (side), Half squat, Plank, Knees-chest, Burpees, Lunges, Lower back
5) 5´ cool down + stretching

VID >> Oregon

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) Active stretching
3) Running: 15´
4) 5 x 50m - Full recovery
5) 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 training session.

We can divide the warm up into two parts; General and Specific.

General warm up, the purpose is to active your body and prepare you physically and mentally for the training session. General exercises will take place. Intensity is medium. Active stretching will take place during this part.

Specific warm up, the purpose is to fully prepare your body for a training session. Intensity should be increased and specific exercises should be done; e.g. power step + sprint, changes of direction, etc.

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 training session and reduce injury. Ice can be used as a recovery strategy right after you finish your training session. Foam roller or static stretching are recommended a couple of hours after an intense workout.

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. push-ups, chin-ups and sit-ups)
Elastic bands
Weight Training
Suspension Training

Strength sessions can be prior to the running sessions or isolated any other day. We don´t recommend to perform the strength session after the running session due to fatigue side effects unless it is the only way to do it.

Strength training can be done in a fitness center, home, weight room, … or even in a hotel room maximising the time when you are travelling.



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.

This is an example of circuit to work different muscle groups with your own body weight. As always, it is important to adjust to your individuality. There are multiple options of circuits, using different exercises, all of them with your own body weight.

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 is one of the best ways 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 sessions weight training programme that will help you develop and maintain your strength. If the suggested exercise equipment is not available use an alternative exercise or machine but focusing 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 DB

VID >> Chest DB


Quadriceps

VID >> Quadriceps


Chest

VID >> Chest


Shoulders

VID >> Shoulders


Squat

VID >> Squat


Chest bar

VID >> Chest Bar


Shoulder DB

VID >> Shoulder DB


Triceps

VID >> Triceps

Day 2
(Weight Training Example)


Back

VID >> Back 1


Hamstring

VID >> Hamstring


Back KB

VID >> Back KB


Core

VID >> Core


Gluteus

VID >> Gluteus


Back - Lat Pulldown

VID >> Back LP


Lower Back

VID >> Lower Back


Biceps

VID >> Biceps

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:

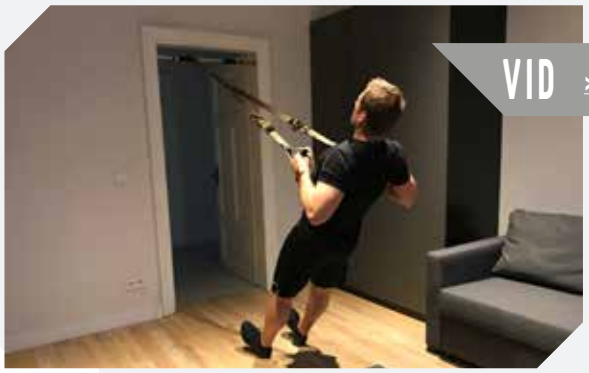
Suspension Training Example:
3 x 10 reps with 1´ rest between exercises, except core that is 3 x 30´´ (Every exercise is composed of 2 photos (initial position and final position) and 1 video)

Chest 3 x 10 repts

Quadriceps 3 x 10 repts

Chest 3 x 10 repts

Hamstrings 3 x 10 repts



Back 3 x 10 repts

Quadriceps + Calf extensions 3 x 10 repts

VID >> Back

Back 3 x 30 repts

VID >> Core

Core 3 x 10 sec

VID >> Shoulder

Shoulder 3 x 10 repts

VID >> Push Ups

Push Ups 3 x 10 repts

VID >> Biceps

Biceps 3 x 10 repts

VID >> Triceps

Triceps 3 x 10 repts

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 VO2 max (the maximum amount of oxygen your body can use during intense exercise); increasing your endurance and your VO2 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 session		
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 performed using your own body weight or even using some other equipment such us; dumbbells, kettle bells, ...

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	  VID >> Jumping Jacks
Abdominal Rower	  VID >> Abs Rower
Side shift	   VID >> Side shift
Burpee	   VID >> Burpee

Plank		
Lunges	 	VID >> Lunges
Push ups		
Squat and calf	  	VID >> Squat & Calf
Side plank	 	
Side squat	 	VID >> 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:

Foam Roller 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"

VID >> Calf

VID >> Hamstring

Harmstring 2 x 15"

VID >> Lower Back

Lower back 2 x 15"

IT band 2 x 15"

VID >> IT Band

VID >> Quadriceps

Quadriceps 2 x 15"

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; Active and Static.

Active 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.
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.

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

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.

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

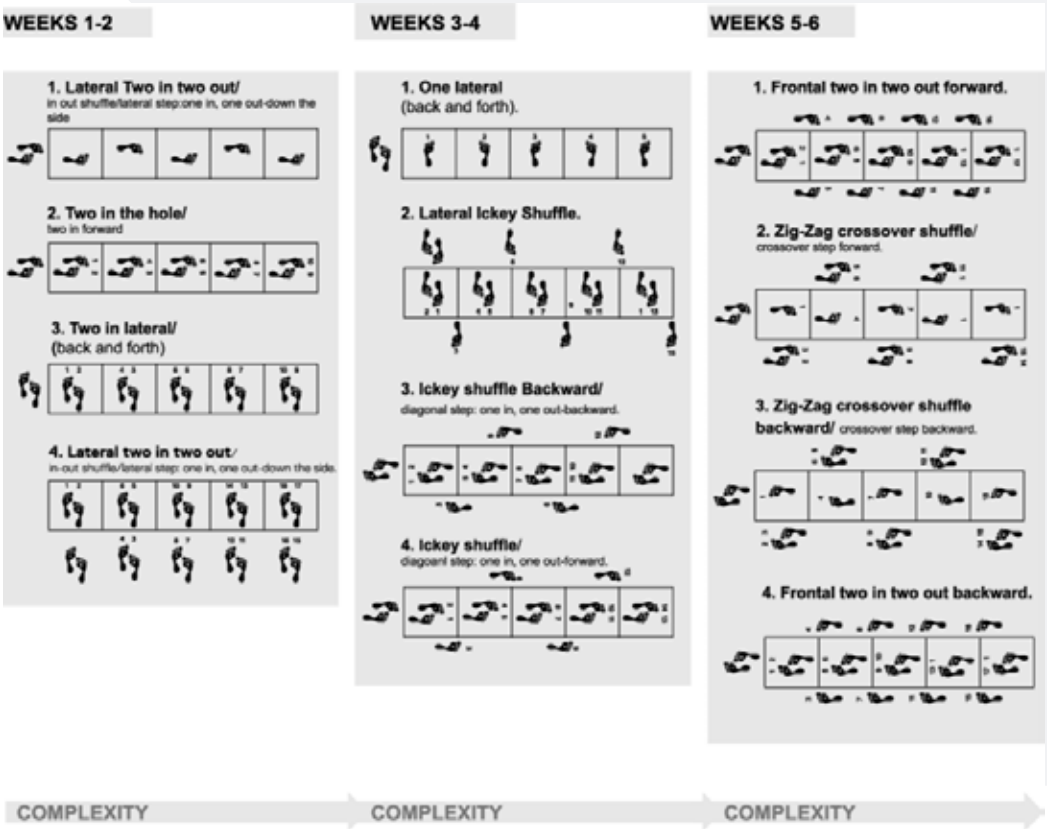
Other Sports: Participating in other sports (tennis, swimming, football etc.) can support a fitness program as well as provide a relaxing alternative to maintaining your physical conditioning. Please be careful with contact sports to avoid any injury.

Agility Training (footwork): Agility is the ability of the body to change direction quickly and accurately without losing speed. For a basketball referee, agility is one of the keys when he/she moves on the court.

One of the ways to work in agility for a basketball referee is through footwork; ladder drills, jump rope,...

Footwork is the way that a basketball referee moves his/her feet on the basketball court. Footwork will help you work on your agility, balance, speed and quickness by training the most useful movement patterns in basketball, including hopping, bouncing and running forward, backwards and sideways. Proper footwork promotes balance, quickness, and readiness to react on the court

Please see below and example, scientifically tested, how in 6 weeks you can improve your agility (footwork) following the progression proposed by Padron-Cabo et al. (2019)



Footwork progression (Padron-Cabo et al., 2019)

TRAINING PERIODS

OFF-SEASON TRAINING

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 TRAINING

Preseason is one of the most important periods of the year, because it will prepare us for the season that usually is a long season. We need to have a good preseason training because it will help us to achieve our maximum performance and also to avoid any type of injury.

In this section we will focus only in training aspects, but don't forget that some others such us recovery, nutrition, hydration, injury prevention,.. are necessary to obtain the desire results.

Usually we are coming from a rest period (off season) that also helped our body to fully heal all minor injuries we had from the previous season. Around 10 rest days are needed once our season is over.

We can do some other physical activities during the offseason (swim, tennis,...) to maintain lightly our cardio and strength levels. We always should keep in mind that we need to minimize high intensity and high impact activities during this stage, until we complete a good preseason.

Every referee is different, but we are trying with this section to give some general concepts in order to adapt your own preseason training plan. It is important to remember that **individualization** is a key aspect in sports training.

All the concepts, terms and exercises are in the Training Manual where you can check them.

Our preseason training plan will be composed by **6 weeks** of training. In every week we are planning to have **4 training sessions** (at least 3 are needed).

We recommend to have at least 24h between every training session, but sometimes 48h will be recommended specially after an intense workout/game.

Games are the most specific training session we have, so feel free to use them as the most specific training session. Try to have always a balance between the number of training sessions and games, because with just games we cannot maintain and improve our fitness levels. If we over train ourselves with many games, this can lead to have different injuries.

Flexibility & Stretching

We should have active stretching before any training sessions/game. After the game, but not necessarily right after, we should start our recovery process, using our foam roller or stretching properly and using ice as a recovery tool. We recommend to use foam roller because myofascial massage is one of the best ways recover our muscles. An example of foam roller workout can be found in the Training Manual.

Specific flexibility sessions are required to improve our ROM (range of movement) to maintain/ increase our flexibility. Flexibility doesn't have a direct relationship with performance but it will help during the competition and even more in the recovery process.

Strength

At least 3-4 times per weeks are the minimum number of strength sessions to have benefits in your

body. In the Training Manual you can find different types of strength training. One of the key ideas in strength training for a basketball referee is to have always a progression, preparing your body for higher intensities, and also to have variation in the types of strength training (own body weight, elastic bands, suspension training, weight training). But always adjusting to your individual needs and the type of material you have at your disposal. Strength training is very useful to help in the injury prevention, to increase our performance and to help us with our physical appearance.

Strength sessions can be prior to the running sessions or isolated any other day. We don´t recommend to perform the strength session after the running session due to fatigue side effects unless it is the only way to do it.

Fitness test

Either the Standard Fitness Test or the Elite Yo-Yo Fitness Test are also a good way to train. Standard Fitness Test it is more an aerobic endurance session and Elite Yo-Yo Fitness Test it is more an intervallic endurance session.

We need to see them as a test but also as a good way to work in our endurance (and to prepare the test itself)

General goals during every week

Week 1. Adjusting Microcycle
It is an adjusting week. Coming from an active rest, this week should help us to get back to our basic performance fitness level.
Week 2. Preparatory Microcycle
It is the first real week of training. We focus in our cardio and general strength. It is recommended to perform the Standard Fitness Test or Elite Fitness Test to know what is our level at this stage of the preseason
Week 3. Loading Microcycle
We continue working in our cardio, from the aerobic perspective, and finishing to set up our body with our own body weight exercises. At the end of the week we will introduce some intervallic training sessions as the most specific ones.
Week 4. Loading Microcycle
It is time to mix the aerobic and anaerobic capacities. We will start the week with cardio-orientated exercises and finishing with some others more intense. Now we will start with more intensity in our strength exercises, using weight training, suspension training,... We can work during this week and the next one in our submaximal strength. Time also to start officiating some games as the most specific workout.
Week 5. Loading/Competitive Microcycle
This week is orientated to more anaerobic drills and continuing with more intense strength workouts. Basketball games are needed to continue with our preparation. It is important to maintain the number of training sessions and add the games as extra sessions.
Week 6. Competitive Microcycle
Specific training. Focus should be to get fully ready for the beginning of the competition. No games during the week to get ready for the first weekend of competition. It is recommended to perform either Standard Fitness Test or Elite Fitness Test to see clearly the effects of the preseason. The beginning of the week it is the best moment to do it.

WEEK 1	WEEK 2
Day 1	**Day 1**
Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills
Warm up: 5´ jogging (60% Max HR)	Warm up: 10´ jogging (70% Max HR) Make 3-4 submaximal sprints before the beginning of the Test.
3 x 8´ running medium speed (60-70% Max HR) Recovery between sets: 2x30 core (sit ups)	Standard or Elite Fitness Test. It is not a pass/fail test. It is a training session. Try to achieve the maximum number of laps as possible.
Cool down: 5´ jogging (60% Max HR)	Cool down: 8´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)
Day 2	**Day 2**
Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills
Warm up: 5´ jogging (60% Max HR)	Warm up: 10´ jogging (60% Max HR)
3 x 9´ running medium speed (60-70% Max HR) Recovery between sets: 3x40 core (sit ups)	Oregon Workout: (80-90% Max HR) 1 repetition (30" work) Sit ups, Push-ups, Jumping Jacks, Core (side), Half squat, Plank, Knees-chest, Burpees, Lunges, Lower back.
Cool down: 5´ jogging (60% Max HR)	Cool down: 5´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)
Day 3	**Day 3**
Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills
Warm up: 5´ jogging (60% Max HR)	Warm up: 5´ jogging (60% Max HR)
3 x 10´ running medium speed (60-70% Max HR) Recovery between sets: 4x50 core (sit ups)	3 x 12´ running medium speed (60-70% Max HR) Recovery between sets: 3x60 core (sit ups)
Cool down: 5´ jogging (60% Max HR)	Cool down: 5´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)
Day 4	**Day 4**
Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills
Warm up: 8´ jogging (60% Max HR)	Warm up: 8´ jogging (60% Max HR)
Fartlek 20´ (Slow-Fast): (Slow 60-70% // Fast 80-90% Max HR) 5´+1´+1´+1´+1´+1´+1´+1´+1´+1´+6´	Fartlek 26´ (Slow-Fast): (Slow 60-70% // Fast 80-90% Max HR) 6´+1´+1´+2´+1´+1´+2´+1´+2´+1´+6´
Cool down: 5´ jogging (60% Max HR)	Cool down: 5´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)

WEEK 3	WEEK 4
Day 1 Strength workout Active Stretching Drills Warm up: 5´ jogging (60% Max HR) 4 x 8´ running medium speed (60-70% Max HR) Recovery between sets: 2x50 core (sit ups) Cool down: 5´ jogging (60% Max HR) Stretching drills (Foam roller)	**Day 1** Strength workout Active Stretching Drills Warm up: 5´ jogging (60% Max HR) 5 x 8´ running medium/high speed (70-80% Max HR) Recovery between sets: 2x35 core (sit ups) Cool down: 5´ jogging (60% Max HR) Stretching drills (Foam roller)
Day 2 Strength workout Active Stretching Drills Warm up: 8´ jogging (60% Max HR) Fartlek 28´ (Slow-Fast): (Slow 60-70% // Fast 80-90% Max HR) 6´+1´+1´+2´+1´+1´+1´+1´+2´+1´+2´+1´+6´ Cool down: 5´ jogging (60% Max HR) Stretching drills (Foam roller)	**Day 2** Strength workout Active Stretching Drills Warm up: 8´ jogging (60% Max HR) Fartlek 32´ (Slow-Fast): (Slow 60-70% // Fast 80-90% Max HR) 7´+1´+1´+2´+1´+2´+1´+1´+2´+1´+2´+2´+7´ Cool down: 5´ jogging (60% Max HR) Stretching drills (Foam roller)
Day 3 Strength workout Active Stretching Drills Warm up: 10´ jogging (60% Max HR) Oregon Workout: (80-90% Max HR) 2 repetitions (20" – 20´´ work) Sit ups, Push-ups, Jumping Jacks, Core (side), Half squat, Plank, Knees-chest, Burpees, Lunges, Lower back. Cool down: 5´ jogging (60% Max HR) Stretching drills (Foam roller)	**Day 3** Strength workout Active Stretching Drills Warm up: 10´ jogging (60% Max HR) Oregon Workout: (80-90% Max HR) 2 repetitions (30" – 20´´ work) Sit ups, Push-ups, Jumping Jacks, Core (side), Half squat, Plank, Knees-chest, Burpees, Lunges, Lower back. Cool down: 5´ jogging (60% Max HR) Stretching drills (Foam roller)
Day 4 Strength workout Active Stretching Drills 25´ running (60-70% Max HR) RSA Workout (80% Max HR) (Incomplete recovery. Walk back recovery) 4x30m/5x20m/6x10m/7x5m Cool down: 5´ jogging (60% Max HR) Stretching drills (Foam roller)	**Day 4** Strength workout Active Stretching Drills 28´ running (60-70% Max HR) RSA Workout (80% Max HR) (Incomplete recovery. Walk back recovery) 1x50m/2x40m/3x30m/4x20m/5x10m/6x5m Cool down: 5´ jogging (60% Max HR) Stretching drills (Foam roller)

WEEK 5	WEEK 6
Day 1	**Day 2**
Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills
Warm up: 5´ jogging (60% Max HR)	Warm up: 10´ jogging (70% Max HR) Make 3-4 submaximal sprints before the beginning of the Test.
4 x 9´ running medium speed (60-70% Max HR) Recovery between sets: 3x40 core (sit ups)	Standard or Elite Fitness Test. It is not a pass/fail test. It is a training session. Try to achieve the maximum number of laps as possible.
Cool down: 5´ jogging (60% Max HR)	Cool down: 8´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)
Day 2	**Day 2**
Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills
Warm up: 8´ jogging (60% Max HR)	Warm up: 8´ jogging (60% Max HR)
Fartlek 30´ (Slow-Fast): (Slow 60-70% // Fast 80-90% Max HR) 6´+1´+1´+2´+1´+1´+1´+3´+2´+1´+2´+1´+6´	Fartlek 23´ (Slow-Fast): (Slow 60-70% // Fast 80-90% Max HR) 7´+30´´+1´+1´+1´+30´´+1´+30´´+1´+1´+1´+30´´+7´
Cool down: 5´ jogging (60% Max HR)	Cool down: 5´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)
Day 3	**Day 3**
Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills
25´ running (60-70% Max HR)	Warm up: 5´ jogging (60% Max HR)
Specific RSA Workout (80% Max HR) (Incomplete recovery. Walk back recovery) 4x30mx30m/5x20mx20m/6x10mx10m/7x5mx5m	3 x 8´ running medium/high speed (70-80% Max HR) Recovery between sets: 3x60 core (sit ups)
Cool down: 5´ jogging (60% Max HR)	Cool down: 5´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)
Day 4	**Day 4**
Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills
22´ running (60-70% Max HR)	20´ running (60-70% Max HR)
Speed (full recovery 1´-2´) (80% Max HR) 2x50m / 3x30m / 4x20m / 5x10m	Speed (full recovery 1´-2´) (80% Max HR) 4x30m / 6x20m / 8x10m / 10x5m
Cool down: 5´ jogging (60% Max HR)	Cool down: 5´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)

SEASON TRAINING

During the competition period, and once our fitness level is appropriate, our focus needs to be in maintaining our fitness level during the season. Training in the right way will help you to be more efficient and obtain better results from your training sessions.

Every referee should have a plan adjust to his/her individuality. Usually a training plan for basketball referees should be renew every month accordingly to the referee competitions and other commitments.

The most common scenario for a referee is his/her week plan. It is basic to have our plan adjusted every week, including training sessions, games and travels.

As in the different parts of the season, training is one part of our performance and should be complement by the others; nutrition, recovery, hydration, etc.. In this section we will talk only about training but the rest of the contents can be checked in the Training Manual.

We will include two different week plan examples depending the number of games from each referee; Game/s only during the weekend, one game during the week and another game/s during the weekend

Game day workout, should be into our routines. It will help us to include one or two more training sessions every week. Explanation and more information about game day workout can be found in the Training Manual.

Please consider that this is a general plan that always should be adapted to every referee.

It is important to adapt this plan to every referee because all of them they have different situations. **individualization** is the key in nowadays training.

Game(s) during the weekend

We plan 3 training sessions plus the game(s), which we cannot forget, it is the most specific training session.

Strength training should be combined with other training sessions (running, stretching,..). At least 3-4 times per weeks are the minimum number of strength sessions to have benefits in your body. Strength sessions can be prior to the running sessions or isolated any other day. We don´t recommend to perform the strength session after the running session due to fatigue side effects unless it is the only way to do it.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
Training session 1		Training session 2		Training session 3	Game	Game

Usually, the load at the beginning of the week should be higher and decreasing as we get closer to the games. Week days in this example training plan are a suggestion, because always you can adjust them, but trying always to maintain 24-48h (when possible) between one training session and the next one. If for example you can practice Tuesday, Thursday and Friday with a game on Saturday, please listen to your body and don't forget that the most important thing is to get fresh and with energy to the game, and obviously not to get injured.

Duration of the session usually is around 35-45 minutes depending of the type of workout and it is something achievable to be included in your daily routines.

WEEK EXAMPLE		
Day 1	**Day 2**	**Day 3**
Strength workout	Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills	Active Stretching Drills
Warm up: 5´ jogging (60% Max HR)	Warm up: 8´ jogging (60% Max HR)	25´ running (60-70% Max HR)
3 x 8´ running medium speed 60-70% Max HR) Recovery between sets: 2x30 core (sit ups)	Fartlek 28´ (Slow-Fast) (Slow 60-70% // Fast 80-90% Max HR) 8´+1´+1´+1´+2´+1´+2´+1´+2´+1+8´	RSA Workout (80% Max HR) (Incomplete recovery. Walk back recovery) 4x30m/5x20m/6x10m/7x5m
Cool down: 5´ jogging (60% Max HR)	Cool down: 5´ jogging (60% Max HR)	Cool down: 5´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)	Stretching drills (Foam roller)

Week game(s) plus Weekend game(s)

We plan 2 training sessions plus the games, which we cannot forget, they are the most specific training session. But there is one think that we should keep in mind; Only officiating games NEVER will get us to be in good shape to officiate in a high level. Training sessions are required to help us to develop the different physical abilities.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
Training session 1		Game		Training session 2		Game

2 training sessions per week are probably enough for a few weeks, but as soon as we have the chance, we need to include at least 3 training sessions per week.

Consider to have the game day workout (when possible), as an extra training session.

It is really important when we have 2 or more games per week, the recovery process. Have enough hours of sleep, use of the foam roller, eat properly,... all of these aspects will help to you to recover faster.

Travelling should be planned in advance to reduce the side effects of travelling in your bodies.

After a few weeks of travelling with many games, please listen to your body.

Visit the physiotherapist every month if you have this type of game load. It is always better to visit the physiotherapist to prevent than when you are injured.

WEEK EXAMPLE	
Day 1	**Day 2**
Strength workout	Strength workout
Active Stretching Drills	Active Stretching Drills
Warm up: 8´ jogging (60% Max HR)	28´ running (60-70% Max HR)
Fartlek 30´ (Slow-Fast): (Slow 60-70% // Fast 80-90% Max HR)	RSA Workout (80% Max HR) Incomplete recovery. Walk back recovery)
8´+1´+1´+1´+1´+1´+2´+1´+2´+1´+2´+1+8´	1x40m/2x30m/3x20m/4x10m/5x5m
Cool down: 5´ jogging (60% Max HR)	Cool down: 5´ jogging (60% Max HR)
Stretching drills (Foam roller)	Stretching drills (Foam roller)

TRAINING PRINCIPLES

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

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.

VID >> Reach & Touch

"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)

VID >> Tilt

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)

VID >> Squat

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

VID >> Lunges

Lunges on the bosu ball (progression: additional load)

VID >> Squats on bosu

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

VID >> Step-Up

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

OTHER TRAINING ASPECTS

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.

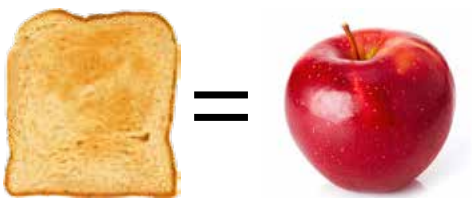
Excessive body weight and fat mass decrease the relative aerobic capacity while increasing physical strain and susceptibility to fatigue. An athletic physique helps to keep up with the play and emphasizes authority on the court. Moreover, it allows to recover well between games.

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 (~1500 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".



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 micronutrients, 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 build-up 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).

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. Travellers 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.

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.

FEMALE FIBA REFEREES TRAINING

The idea of this section is to give some brief ideas about female referees and training. We just want to give a few tips to help female referees in some of the most common topics. Obviously, there are a high inter-individual variability reported in performance and side effects experienced during the menstrual cycle, so basically every female athlete is different. If you are an athlete concerned about your reproductive health or your cycle, make an appointment with your doctor, who will advise you on the steps you can take to address the different issues.

Injury prevention for female referees

Due to anatomical differences, the possibilities to have a non-contact anterior cruciate ligament injury in female is six to eight times higher than in men. The primary reason has been attributed to the wider female pelvis, which creates a larger angle between the femur and tibia; and the estrogen receptors in the anterior cruciate ligament, which can weaken during the menstrual cycle. (Arendt & Dick, 1995).

A recent meta-review of studies looked at how hormonal changes may impact tendon laxity and risk of tendon injury. It found that the risk was highest in the days leading up to ovulation, when estrogen is high.

More research is needed, but it's worth doing **longer warm-up exercises** and **not over-stretching** during your fertile window. (Balachandar et al., 2017; Herzberg et al., 2017)

Strength training and Recovery

Several studies have looked at differences in responses to strength training in the follicular phase (the time from your period until ovulation), versus training in the luteal phase (from ovulation until your period).

Some research has found that strength training during the **follicular phase** resulted in **higher increases in muscle strength** compared to training in the luteal phase. If you start paying attention to your cycle phases, you may find your strength training pays off the most in your follicular phase.

Studies by Sung and Han (2014) and Wikström-Frisén, et al., (2017) suggest that strength training during the follicular phase may result in higher increases in muscle strength, compared with other times of the month.

Still, these fluctuations aren't all bad, on the mid-cycle (around ovulation), there are very high estrogen levels, which can promote muscle-building. Also, progesterone can increase flexibility of the muscles, which is a good thing no matter what your workout of choice is, from cardio to strength training and everything in between.

Based on the information above, you might want to schedule your rest days during your luteal phase. That doesn't mean you should entirely skip training in this phase, as you'll still improve from strength training in the luteal phase.

Scientific studies recommend sticking to light workouts if at all possible. It's fine to modify your exercise to light workout or gentle weight lifting. But always keep in mind that we should always listen to our bodies. Regular exercise is beneficial for your body and your mind. There's no scientific reason you should skip out on your workouts during your period. In fact, there's evidence that exercise can be helpful during this time. (Smith et all., 2015)

If you want to take time off from training during the offseason, your luteal phase is a great time to take it in order to reduce impact on your strength goals.

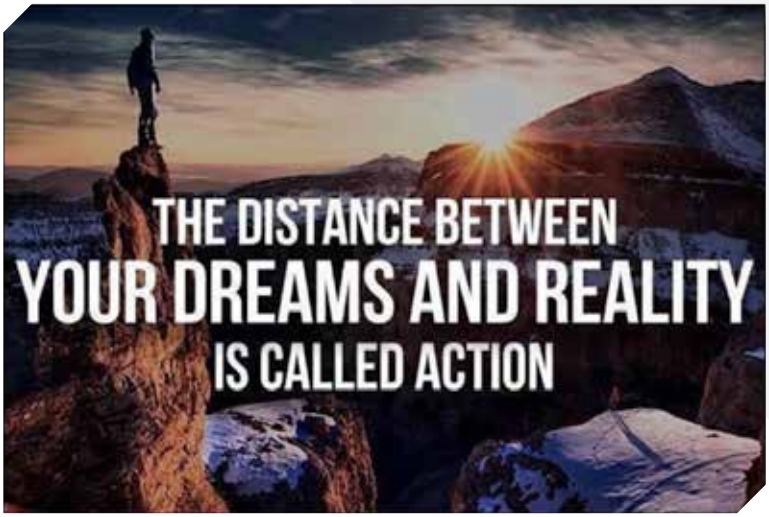
Nutrition and Hydration

During the first days of your cycle, hormone levels drop. A lack of iron can affect our energy levels. This lack of iron can make us feel fatigued and low in energy, so eating **iron rich foods** such as red meat, green veg, lentils and seeds can support iron production. (Oosthuyse & Bosch, 2010)

Also, **vitamin c** could be really good during this time. Vitamin c is an antioxidant that not only helps with immunity, healthy skin, and wound healing, but also helps our bodies to absorb iron even better. Therefore, if you are adding in an iron rich meal during that time of the month, be sure to pair it with a source of vitamin c, such as citrus fruits or veggies like bell peppers, tomatoes, and leafy greens.

Protein catabolism, the breakdown of muscles and other protein stores for cellular processes, has also been shown to beak with progesterone levels in the luteal phase, increasing protein needs during this part of a woman's cycle. Consider upping your **protein intake** during your luteal phase, especially if in a bigger or higher intensity training cycle. (De Jonge, 2003)

Fluid status will change throughout your cycle. During the mid-luteal phase, there is a marked decrease in time to exhaustion, which is believed to be a result of increased body temperature, so pay extra attention to your **water intake** those days. (De Jonge, 2003)



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