

FUNCTIONAL FOUNDATIONS

Introduction to Basketball Training and Conditioning



About This Book

The purpose of this book is to educate entry level coaches, athletes, and parents on the fundamentals and the basics of proper basketball specific training. The information in this manual is based on science and the experience of professional trainers and basketball players. This manual provides simple evaluation techniques, basic strength and conditioning drills, shooting mechanics and the science behind the programming. While we believe it is far superior to have a custom program created for each individual we understand that is not always an option. Educating yourself on the fundamentals benefits the individual athlete and more importantly the team overall.

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Introduction

The Arena is committed to providing the best, most comprehensive and scientifically validated programs in the industry. This manual is an overview of how we apply that philosophy to the speed, power, agility, and conditioning demands of our basketball athletes. The program has been designed mostly around the demands of elite high school players however, it is also intended for and may be used with rights and permissions by trainers, coaches, and athletes of any age or ability level, from youth league to collegiate and professional development. The Arena is unique because its partner, Fit and Functional, runs a school for personal trainers and for strength and conditioning professionals. Syracuse legend and former NBA player, John Wallace, is a co-founder of this program. Wallace was consulted on and contributed to all the information in this manual.

Athletic Development That Takes Your Game to the Next Level

Nearly 30 million Americans play organized, competitive basketball. This popularity, combined with the extremely sports-specific demands of the game, makes the American basketball court one of the most competitive places on earth. Those who have better skills and can apply them with faster movements and higher jumps advance to play better, more selective basketball.

Those who fail to make progress languish or fall behind their peers. The design of our program is to help players make it to their next level through scientific athletic development. If you have the drive and commitment, we will show you how to become a faster, stronger, quicker, more agile, and explosive athlete. We will show you how to maximize your athletic potential.

Do I Train by Myself?

If you are really determined to run your own conditioning program without the aid of a trainer or coach, this manual can serve as an invaluable, extremely sports-specific guide. However, understand that we use it to train both our coaches & our clients. You will get far more out of our manual if you use it in conjunction with professional coaching and training. If you cannot work with one of our specialists locally or in our national network, we suggest seeking a trainer or coach who specializes in training athletes. Ask for credentials such as a degree focused on athletic training, U.S.A. Weightlifting coaching certification, USA Track and Field coaching certification, The National Strength and Conditioning Association's 'CSCS' credential, and Mike Boyle's program. Usually athletic specialists do not cost more than an experienced personal

trainer. In many cases, it is worth looking for someone with specialized knowledge and skills that can safely train in the sport-specific modalities critical to the general basketball-conditioning program laid out in this manual.

General Training Philosophy and How to Use This Manual

Many schools and camps send out detailed, extremely specific workout plans to all of their athletes. We do not do this because no single plan can meet the training needs and real-world realities of a diverse group of individuals. That said, we have a very clear understanding of the relevant research and extensive experience working with players at all levels from youth and high school to elite college and professional players. It is a skill base that informs one basic assumption: most basketball players over-train in ways and in modalities that limit their athletic potential, which predisposes them to injury.

By no means is this manual the end all be all to basketball training. The intention is to educate beginner players, new coaches, and parents on the basic science and fundamentals of basketball. Often, parents and teachers are coaching sports for the younger kids and are not formally educated to do so. This manual gives parents and teachers the safest, simplest, and most effective guidelines to base their practices and training on. Knowledge is power and understanding the game on paper then applying that to hands on playing is far superior to unorganized shooting and training programs.

CHAPTER I

Tests and Assessments

Assessment

How Do I Measure My Level of Conditioning?

Our basketball assessment collects data in four broad categories: physical and athletic history, anthropomorphic measurements, postural analysis (dynamic and static), and six athletic performance tests (Vertical Jump, Max Vert, Standing Long Jump, Pro-Agility, Lane Agility, 10/25-Yard Sprint, 300-Yard Shuttle Run).

We use this battery of tests with the athletes and teams that we train, usually giving the entire battery twice a year, at the start and end of the off-season training cycle (e.g. once in April and once in October).

If You Don't Train with a Coach: It may not be possible for coaches or athletes who are working independently to duplicate all these tests. Nevertheless, we strongly encourage you to look at the score sheets that follow and collect data for the tests that you have the equipment and experience to administer. Remember, if you can't measure it how can you improve it?

At least twice a year, we test the fitness of our basketball athletes in the benchmarks that most specifically correlate to basketball development. Basketball is a sport that demands explosive power and speed. If an athlete wants to play at a higher level they need to have some idea of how fast they have to move and how high they have to jump to compete at that level, and they need a plan for how to get there. This is the point of our assessment battery.

Strength and Conditioning Tests/Assessments

- 300-yard shuttle (set up depends on the access to a field)
- Set cones 25 yards apart. Player must run and touch each cone until they have completed a total of 300 yards or each player may shuttle run 100 yards 3x

3-Minute Step Test

Participant will step onto a foot (12 in) tall step. A metronome with a cadence beat at 96 beats/min should be used. Each click of the metronome represents one step. They continue this for 3 min and then the participant's heart rate is measure after completing the test and the heart rate/ min total will be their score.

Vertical Jump

From a tall standing position, the player will jump up and aim to hit one of the pegs. The player must start from a standing position and is not allowed to have a running or momentum start.

Broad Jump

From a tall standing position, the player will jump forward as far as they can. The distance will be measured from the start line to the player's heel that lands closest to the start line.

5-10-5 Shuttle

Set up cones measured 10 yards apart. The participant will start in the center the two cones equidistant from the ends. The player will run and touch one cone (5yds) then run across the start line to the opposite cone (make sure they touch the cone or line) and then run through the start line.

10-yard dash

This 10-yard dash will be measured with lasers and a sensor pad for the most accurate time. The participant will begin in a sprint position with one hand placed on the sensor pad, which will go off when they take off. While running at full speed the participant must run through the lasers set up 10 yards away without decelerating until they are past the lasers.

High School Male

Test/Domain	Poor	Below Average	Average	Above Average	Elite/DI Basketball*
Body Composition	>27%	22-27%	14-21%	11-13%	< 11%
Movement Screen	<15	15-18	19-21	22-24	>24 (out 27 possible pts)
Vertical Jump	<10"	10-15"	15-21"	22-27"	>27"
Max Vert/Max Touch	n/a				
Standing Long Jump	<60"	60-78"	78-96"	96-120"	>120"
**Pro-Agility	> 5.10 sec	5.10-4.80 sec	4.81-4.50 sec	4.51-4.41 sec	< 4.41 sec
**Lane Agility Drill	Guards >12.0	Guards 12.0-11.1	Guards 11.0- 10.1	Guards 10.0-9.6	Guards <9.7
	Fwrds >12.7	Fwrds 12.6-11.8	Fwrds 11.7-11.1	Fwrds 11.0-10.6	Fwrds <10.5
**25 Yard/ ³ / ₄ Court Sprint	n/a				
300 Yard Shuttle	n/a				
1.5 mile run	> 14:56	14:56-13:53	13:52-12:34	12:34- 10:16	< 10:16

Test/Domain	Poor	Below Average	Average	Above Average	Elite/DI Basketball*
Body Composition	n/a				
Movement Screen					
Vertical Jump	10"	14"	16"	16.9"	18.5"
Max Vert/Max Touch					
Standing Long Jump	<53	53"	57"	61"	65"
**Pro-Agility	5.23	5.1	4.94	4.82	4.65
**Lane Agility Drill	n/a				
**25 Yard/ ³ / ₄ Court Sprint	n/a				
300 Yard Shuttle	n/a				
1.5 mile run	10:10	8:29	7:30	6:48	6:07

High School Female

^{*}N/A: some stats are not available. As we compile more data, we will update these stats. There is not enough research for females and some of the tests are new to the field so data has not be reported. We left these stats in so you can see what we do with the athletes. The 'Elite/D1 Basketball' standard of performance in each test is set to approximate the median values for NCAA Division I players. Few Division I players meet these standards before leaving high school. Nevertheless, we find it is instructive for HS players to understand the average norms of performance for college and pro level as a means of gaining perspective and setting goals. [1] These standards are rooted in both our direct experience and the statistical data compiled and presented in Jay Hoffman's Norms for Fitness, Performance and Health (Champlain, IL: Human Kinetics, 2006), passim.

CHAPTER II Strength & Conditioning And Program Design

Basic Program Design

In order to design a successful fitness program, it is essential to establish and understand the primary purposes of that program. Phases, or cycles, should be built into each program in order to obtain consistent challenge and overload for the participant. Each cycle should include certain parameters with realistic goals and progressions for the particular phase. Each phase should be a progression of the last including:

- changing tempos
- rep ranges
- rest periods
- volume
- flexibility and mobility training
- joint health

Generally, a phase should last anywhere between two and six weeks depending on exercise frequency, client progression, and goals. First and foremost, a thorough evaluation must be conducted to identify faulty movement patterns and postural distortions. The findings of your evaluation will ultimately guide you in the program design and customize it for your client. Any deficiencies noted during your evaluation will require attention in order to correct and build a strong fitness foundation for the participant. You need to ensure the client engages in proper warm-up activities according to the movements (both aberrant and normal) acknowledged in their initial evaluation. Dynamic warm-ups and postural control exercises are a great way to get started. Effective program design is truly a fluid process, and it is important to keep in mind that program design should be based on initial as well as ongoing evaluation findings.

A well-designed fitness program will not only address goals but function as well. The client may have specific objectives in mind, but the body needs to have a functional baseline in order to achieve such goals. For example, the participant may have an ambition of hypertrophy in the Pectoralis major muscles. However, if their pectoral muscles exhibit restricted flexibility and can eventually create a cascade of dysfunction for the entire shoulder girdle. It would not make sense to pursue the client's desire at this point in time. If the participant is insistent upon doing an exercise you feel is detrimental to their overall health and achievement of their goals, it is your job to educate them and provide them with a comprehensive explanation as to why certain exercises and movements may not be prudent. Demonstrate their weaknesses to them and describe their effects on daily activities. You must target weak muscles and address any flexibility issues right from the start. Introduce shoulder stability and back strengthening exercises in the situation just discussed. If you approach program design with function in mind, you will be providing the client with sound principles upon which they can build. Progression is paramount; it is always better to be cautious and easy than too difficult. The outcomes of each session will dictate short-term as well as long-term progression. While function should be the cornerstone of program design, how does this translate into keeping your client interested? The average person with some postural issues or muscle weakness will not want to perform rehabilitative exercises for an hour. Generally, if the participant doesn't break a sweat or become winded, they don't feel like they did anything. You need to keep them motivated by giving them safe and easy exercises they can master quickly. If someone has a lot of issues, you can have them perform a circuit of two rehab exercises and one weight-lifting exercise, even if it's not "functional". The majority of your workout should be functional, but tossing in some safe, old-school basics can spice things up a bit and keep your client interested. Remember: client satisfaction and progression in form and function are the hallmarks of effective program design.

Basic Guidelines

Heavy weight training and/or explosive movements should be avoided with beginners. With beginning athletes, performing more sets of lower reps is better because it increases motor skill development while encouraging less fatigue. Teaching form is of utmost importance no matter how experienced your client, because you can actually create faulty motor patterns if the form is not disciplined. In addition, it is important to provide a thorough explanation of how and where cardio training fits into a resistance-training program.

Minimize the amount of exercises to be performed in each session. You are teaching proper mechanics, and repetition and practice is paramount -- if you do one to two sets of 15 different exercises, they will never master the form of any of them. There are no fixed guidelines on how many exercises you should include, because it will be established on the individual's performance on that particular day. However, a good baseline is as follows: include full body movements as they progress from floor exercises and focus on mastering body weight before adding resistance. Once a person has demonstrated that they are ready to do more difficult exercises, start to incorporate multi-tasking exercises. Don't do the same program for more than 4-6 weeks. You need to vary repetition ranges as well as the amount of sets, tempos and rest periods. Include super sets and tri-sets. While diversity is important, don't change the workout every time. Basic structure and consistency is necessary and it will be impossible to track progressions if you do something off the top of your head every time you see them. The majority of the workouts should be uniform so that progress can be measured, and variety can be added so that the client is consistently challenged.

We wish to emphasize that the guidelines suggested here are simple in theory and presented as a starting point basis. This is not an all-inclusive approach to program design; in fact, our intent is to offer the fitness professional a foundation upon which to build. We offer more comprehensive, in-depth program design courses and provide suggestion reading/educational materials on our website.

Athlete Program Design Guidelines

When designing a conditioning program for athletes, it is important to take into consideration the time of year it is for the athlete. Periods to take into account include off-season, pre-season, inseason, and post-season, with cycles or phases incorporated within each period. Workouts must accommodate the primary sport(s) in order to avoid over-training. Program design for athletes is similar to that for other individuals in that initial and on-going evaluations will determine the structure of the workouts and adjustments must be made accordingly.

Despite such similarities, all sports have different demands and training programs must take into account the dominant energy system utilized. Cardio work should be done in intervals related to the sports demands and rest periods. Sport-specific drills should be a big part of the program and be based on athletic movements during game play. Below is a sample program for athletes who are new to weight training:

Off-season

Rep ranges: 6-10

Tempos: 4/0/1 and 3/0/x

Rest periods: 60-120 sec

How many days in the weight room per week? 4-5

Phase 1: Concentrate on gross movements and form with slower tempo.

Duration: 3-4 weeks

Phase 2: Gross movements at an explosive tempo – the focus is on power and explosion.

Exercises should increase in difficulty as time progresses.

Duration: Until pre-season

Pre-season

How many days in the weight room per week? 3-4

Phase 1: Focus on power and building endurance strength. Variety can be implemented with incorporation of bi-sets.

Duration: 3-4 weeks

Pre-season

Phase 2: Perfecting and getting ready to play. Drills will increase in intensity; heavy lifting will still be involved, but changes will be incorporated. Higher reps will be used with the power exercises, e.g., one gross exercise performed slightly heavy for 6 repetitions, followed by a 15-repetition of easier exercise.

Duration: 2 weeks

Rep ranges: 8-10

Tempos: 3/0/1

Rest periods: 60-90 sec

How many days in the weight room per week? 3

In-season

Rep ranges: 6-8

Tempos: 3/0/x or 3/0/1

Rest periods: 10-45 sec

How many days in the weight room per week? 3 or whatever the athlete can best recover.

Phase 1: Adjusting to playing and training together. Continue explosive lifts but decrease frequency and avoid high-risk exercises. Shorten workouts slightly and avoid a lot of aerobic activity.

Duration: 4-6 weeks

Phase 2: Continue explosive lifts but further decrease frequency. Incorporate more flexibility and recovery exercises.

Duration: Until post season.

Phase 3: Usually occurs around crunch time or making it to postseason play. As a general rule, it is prudent to keep the workouts to a moderate intensity and eliminate explosive weight training. Focus more on drills and explosive on-court movements.

Increase time passively stretching the athlete.

Duration: until end of regular season

Post-season

Rep ranges: 12-20

Tempos: 5/0/1

Rest periods: 30-120 sec depending on weaknesses

How many days in the gym per week? 3-4

Phase 1: Higher reps and low weights for recover, do not overdo it keep intensity around 65%. Do mostly stretching, dynamic on court movements and tons of foam rolling. The athlete is playing their hardest at this point the goal is recovery and remaining pain free.

Duration: until the end of the season. After their final match, give the athlete a week or two to recover. Don't do any weights just stretches and really basic simple movements.

Dynamic Warm-Up:

- •Forward Jog and Backwards Jog 2x10 yards
- •Forward Jog and Snap Skip Back 2x10 yards
- •Forward Jog and Reach Run Back 2x10 yards
- •Heel to Butt 1x10 yards
- •Angled Lunge 1x10 yards
- •A-Skip 3x2
- •Leg Cradle 1x10 yards
- •Lateral Gallop 1x10 yards
- •Carioca 1x10 yards
- •Groin Skip 3x2
- •Sumo Squat 5x
- •Forearm to instep 3x2
- Linear Bound
- •Straight Leg March or Toy Soldier 1x10 yards
- •Inverted Toe Touch 3x2
- •Linear and Lateral Wall Swings 4x10
- •Mini Hurdle Series (lateral)
- •Stick and Hold the Landing 2x5
- •Double Tap 2x5
- \bullet Bound 2x5

Single Leg Series (Lateral)

•Stick and hold Landing Single Leg (shift weight into heel upon landing to activate glutes. Hold landing for a second) - 2x8

Wedge Step (Ladder)

- •Athlete stays low in athletic position (squat or defense position)
- •Athlete moves forward laterally with each leg crossing over the other into each rung of the ladder

•Weight should be on the leg closest to the ladder, so the opposite leg can cross over into thigh block back into the ladder

Lateral Wall Drill

- •Arm extended on the wall
- •Shoulders retracted, core tight
- •Glute squeezed on inside leg
- •Outside Leg comes up to thigh block and drives back down to the ground
- •Leg does not cross mind line of the body (use belly button as reference
- •Single (one ground contact)
- •Double (two ground contacts)
- •Triple (three ground contacts, landing on the opposite leg)

Lateral Acceleration with Resistance

- •Athlete mimics the wall drill moving laterally
- •Coach applies resistance as athlete propels forward with as many ground contacts as possible
- •Face both directions

Linear Acceleration

Dynamic Warm Up:

- •Forward Jog and Backwards Jog 2x10 yards
- •Forward Jog and Snap Skip Back 2x10 yards
- •Forward Jog and Reach Run Back 2x10 yards
- •Heel to Butt 1x10 yards
- •Angled Lunge 1x10 yards
- •A-Skip 3x2
- •Leg Cradle 1x10 yards
- •Lateral Gallop 1x10 yards
- •Carioca 1x10 yards
- •Groin Skip 3x2
- •Sumo Squat 5x

- •Forearm to instep 3x2
- •Linear Bound
- •Straight Leg March or Toy Soldier 1x10 yards
- •Inverted toe touch 3x2
- •Linear and Lateral Wall Swing 4x10

Mini Hurdle Series

- •Stick and Hold the Landing 2x5
- •Double Tap- 2x5 (ground contacts before jumping into next hurdle)
- \bullet Bound 2x5

Single Leg Series

•Stick and hold Landing Single Leg (shift weight into heel upon landing to activate glutes. Hold landing for a second) - 2x8

Wall Drills (Linear)

- •Single (45-degree angle on the wall. Athletes heels should be slightly off of the wall, glutes squeezed for hip extension and shoulders in retraction, single leg comes up to thigh block)
- •Double (both feet come up to thigh block as quickly as possible)
- •Triple (Begin on one side, make three ground contacts as quickly possible and end on the opposite leg)

Linear Acceleration with Resistance

- •Belt goes around athletes' waist
- •Have athlete mimic Linear wall drill
- •Coach will apply tension to the belt as the athlete drives forward

^{*}For the purpose of this manual any type of plyometric movements should be limited to 25 ground contacts per workout session, no more than twice per week. Athletes should seek a professional before advancing past this recommendation.

CHAPTER III

Preparation and Periodization

Basketball Specific Periodization: Basketball Players Need to Play and Practice All Year Long. The Intensity of that Practice Must Be *Calibrated to the Individual* and Allow for *Periods When Speed and Power Are the Primary Focus*.

If you are constantly competing, when are you *preparing* to compete? Some players think that simply running the court and jumping under the boards during games will maximize their speed and jumping ability. It will not. To be as blunt as possible: Players who reduce the volume and intensity of off-season basketball to recover and train specifically for speed, strength, and better movement will run, jump, and play better than players who simply play all the time. That's why colleges and professional franchises all hire people like us to train their basketball players. The effect may seem small over the course of one given year, but over the course of four, five, even ten years the discrepancy between those who simply play and those who train and play in a planned, or periodized way, is incalculable. Maybe you are one of those very rare individuals that are blessed with such natural physical abilities that you can make it to your goal—Varsity, D2, D1, pro?— without specialized conditioning but why play those odds when you can maximize your potential, and maybe even exceed your goals through modern, periodized training.

General High School Basketball Schedule/Program

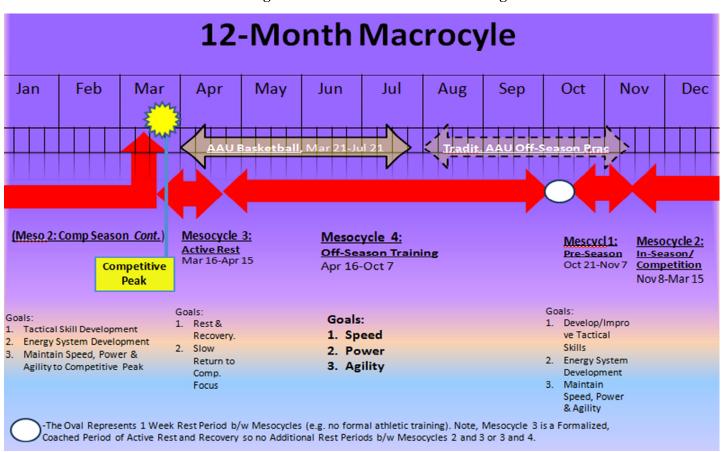


Figure 1. Sample Periodization or Yearly Plan for a High School Athlete

Figure 1 is a graphic representation of how such a prioritized program might work for a high school aged player. However, this is only an example of one possible training plan. Remember that every player is different. Be cautious of online programs that guarantee results. The volume and intensity that is best for one athlete is probably too much or too little for his or her teammate. Nor can you simply build one 'perfect program' and stick with it. Training needs to change and evolve with the athlete. Therefore, your training plan needs to be specific to your needs, your level of commitment, and it will have to be continually revised and modified. If you fail to plan, you are planning to fail. If you want to be your best as a player, you need to have a yearly plan, one that outlines what you are trying to achieve and where your training emphasis will be in every month of the year. If you are one of our clients, we will help you do that. If you are working with another coach or by yourself make the best plan you can and be especially sensitive to modifications you need to make along the way.

Sprint and Agility Training

Loren Seagrave, the father of modern speed coaching, has taught us "speed is a skill that can be taught." To be sure, there are individuals who possess greater or lesser neuromuscular potential for speed and power (proportions of fast twitch muscle fibers, neuromuscular plasticity, etc.). And there are those who naturally, through luck or some combination of motor learning adaptability, 'pick-up' better, more efficient motor programs in childhood (e.g. the child who just 'looks like a sprinter' because without formal training they bring their knee to thigh-block, keep their foot dorsi-flexed etc.).

However, the absolute reality is that every athlete—no matter how fast or how slow—has a great ability to improve his or her speed, quickness and agility through coached performance training. To be blunt, if you or your players do not train regularly and seriously to improve the quality of their movement and train for speed and agility, you are falling short of their potential, and they will be slower and less effective on the court than they should be. Of course, this tends to be a very technical aspect of conditioning and we strongly suggest working with one of our coaches or at least another trained specialist in the field whenever you can.

That said, we know that some basketball coaches and individual athletes will be working on their own and we assure you that by using this manual as a starting point, you aim to teach yourself good movement mechanics and train these regularly and rigorously, your investment will be well compensated on the court. Indeed, we wish to emphasize that the most important thing to improving movement speed for basketball is that the 'teachable' skill of speed be taught in ways that carry-over to the court. There are plenty of camps and speed schools that advertise they can 'shave a '4 second off your 40' but what you need is speed when you play. Sure, it's nice to

know that you'll be faster if you get to a combine. However, you are not likely to be invited to the combine if you do not have speed on the court. Instead of learning to be fast at a drill or test, we suggest that you learn to be fast in both the tests and on the court. Research in motor learning and our experience clearly shows that for motor skill learning to be retained and transferred to novel situations with high contextual interference and significant inter-trial variability (e.g. games) there are several factors. The skill must be over-learned (e.g. learned so well that it can be consistently performed in practice with little cognitive effort even after a prolonged break between practice sessions), practiced on a randomized schedule where-in athletes do not know which skill they will be asked to perform next, and practiced in environments that mimic the context of performance. What does this mean for how we conduct speed training?

When we work with a coach or team, we send our performance coach to team practices. The Coach attends as many on court practices as possible. At these sessions, the Coach teaches warm-ups and drills with the basketball coaching staff (so that the coaches learn basic speed teaching principals and so that athletes see that the coaches view speed mechanics as an essential part of their game). These initial drills are normally taught at the beginning of a practice but our coaches always stay for the rest of the practice and encourage the coach to stop at 'teachable moments' for quick reviews and rehearsals of movement mechanics as these apply to the gamelike situations in the practice. So, for example, if we see players pulling with their lead leg (instead of properly pushing with the trail leg) during defensive drills or play we might encourage a coach to stop and remediate the "Squat Push Lateral" for 30-90 seconds before resuming the drill. Alternatively, we might pull aside an athlete that is landing with a pronounced valgus angle and give them 30 seconds of cueing and band work to improve their movement before sending them back into the practice. The same kind of mid-practice remediation can be done once or twice a practice with whatever movement errors are most important to correct that day from failing to hit thigh block on a lay-up to plantar flexed sprinting. Of course, when we work with individual athletes or if you are working on your own it may not be possible to include this type of training directly into your team practices. However, we encourage you to apply the same principals whenever and however you can. Try doing our 'Basketball Specific Dynamic Warm-up' and a few agility drills before practice, do your own agility training on days and mixed in with your on-court skills practice, visualize and even film your practice and basketball play to make sure that you are applying your movement practice, etc. Remember, your goal is to become as fast and powerful a player as possible and that means learning the best, most efficient motor patterns until you can perform and modify them competently and with unconscious mental effort in every game or game like situation!

Mechanical and Physiological Analysis of Basketball

Basketball is a court invasion sport characterized by highly specialized reactive and motor abilities in a context of high-speed multi-directional movement. Players must be able to 'run the court,' execute explosive first moves in all directions, and perform maximal and near maximal jumps in rapid succession. The tempo and timing of the game demand that these skills and abilities be executed with limited recovery, which fundamentally taxes the anaerobic-glycolytic

system. The physicality of the game makes strength and physical size an important asset but unlike football—which is fundamentally an ATP-CP sport that places an absolute premium on the mass of its players. The high glycolytic/anaerobic-endurance demands of the game mean that athletes must carefully balance their body mass against their ability to maintain speed endurance (e.g. an athlete that gets too big will lack speed, agility, quickness and jumping ability later in the game because excess body mass causes undue fatigue).

Of particular importance to the training and development of basketball players is the development of proper sprint, multi-directional sprint and jump mechanics. Common movement patterns errors that need to be corrected include:

- Weak neural drive
- Poor ankle mobility
- Poor knee stability
- Poor hip movement
- Overactive lower back muscles due to hip dysfunction
- Distorted running mechanics
- Overactive trapezius muscles
- Internally rotated shoulders

Many of these issues can be corrected by simple exercises that can be easily integrated into warm-ups. Coaches will usually discard these types of exercises because they think they are not "basketball specific" and a waste of time. This is the very reason athletes become injured and sometimes never reach their full potential. They may not seem basketball specific, but you cannot properly perform basketball movements if you cannot master movement of your own body. If an athlete can eliminate their dysfunction, training can be more intense and technical. Coaches often say they have a hard time getting ki8ds into athletic position. This is an example of why athletes need proper flexibility and efficient movement patterns. In many circumstances, kids are just forced into positions their body cannot naturally achieve. Doing this, forces the body to compensate in other areas and the chain of dysfunction begins. Poor posture can inhibit breathing patterns and diminish stamina.

Coaches and athletes must understand sports are about repetition. Repetition means repetitive stress injuries like stress fractures, plantar fasciitis, tendonitis, etc. The importance of the fundamental exercises cannot be measured. Having a complete understanding of movement is difficult to learn however, with repetition and proper coaching, athletes can learn as they progress at their own pace. Performing corrective exercises regularly enables the athlete to exceed the pre-injury state and greatly reduces the reoccurrence of injury.

Motor programs that are determined partially by genetics and learned motor patterns control both gait and posture. Locomotion can be regarded as a program that uses the combination of both. For athletes, training involves learning certain automatic movements. The practice and repetition of these movements is how an athlete can become efficient.

Gait is defined as the way a person walks. It sounds simple however many factors can affect the way an athlete moves. There are 3 phases of an athlete's gait when running or sprinting: the stance phase, swing phase, and lastly flight phase. Lack of mobility, range of motion, muscle activation, and neural drive are major components to athletic performance. Supervised strength training programs will vastly improve motor coordination and strength. However, it is important to understand that not all athletes accelerate at the same pace in learning and practical applications. Therefore, it is imperative that programs are tailored for a consistent progression and not be overloaded weight or stimulation to an athletes programming. It is more important to focus on the mastery of movement and motor control before overloading weight or volume.

CHAPTER IV Shooting/Dribbling Fundamentals

Athletes and coaches must have at least a basic understanding of the role of every position. A good coach will be able to match each player's skillset to the appropriate position. Here is some general information on each position.

Player Positions

Center. Usually positioned at the basket, this is normally the tallest player. On offense their main jobs are to create lanes for teammates and get into a position to pass and shoot. On defense rebounding, controlling the paint and limiting passing and shooting is crucial for success.

Small Forward. This position requires the player be skilled at drawing fouls, foul shooting, dribbling and an accurate 3-point shot. They must possess speed, inside strength and have the ability to adapt to situations quickly.

Power Forward This position requires the player be powerful and be reliable for scoring close and mid-range from the basket. Players are almost considered a second center but are more versatile.

This position Your next tallest players will most likely be your forwards. While a forward may be called upon to play under the hoop, they may also be required to operate in the wings and corner areas.

Point Guard. This position is usually your best passer, ball handler and short-range player. Some responsibilities are defending shots, stealing passes and defending lanes. Players are expected to understand the game and have the ability to recognize plays and manage teammates on the floor.

Shooting Guard This is usually your best mid-range and perimeter shooter. Their ability to move the ball around and communicate with teammates are crucial skills required to create shooting opportunities outside.

*There are hybrid positions that we are not going to include for the sake of simplicity.

There is no one perfect way to shoot a ball because everyone is physically different. Just look at some of the greatest players of all time and you can clearly see differences in shot mechanics. According to John Wallace, Alan Houston is an example of what perfect mechanics would be if they existed. However, there are some basic principles all elite coaches and players use as a baseline. This chapter will educate readers on those basics and the vocabulary necessary to understand the game.

B. E. E. F.

Shooters should learn to develop good habits in order to create a consistent routine to improve their shooting mechanics. One very simple way to begin is with the B.E.E.F method of shooting.

Balance is pivotal when creating solid shooting habits and during practice. Feet are shoulder width apart for good balance. The feet can be in a slightly staggered stance that is consistent and comfortable for each individual shooter. The feet should be pointing in the direction of the basket. Players should try to flex and bend the hips and knees while shooting to simulate a consistent lowered body position to ensure that their balance is maintained. Staying in a lowered ready to shoot position will allow the shooter to get the ball positioned into their "shot pocket"

Eyes should be focused on the basket. Shooters should try to locate the rim as quickly as possible. Narrowing the focus onto a point on the rim will help players zone in on a target. Keeping your target focus is very important!

The **Elbow** is directly under the ball in line with the basket. Keeping the elbow underneath the ball will help you keep the ball straight towards the basket. Avoid letting the shooting arm to kick out laterally away from the body. When the elbow is straight, the ball will sit in the pads of the fingers and be easier to release the ball straight towards the target.

Follow Through has to be consistent and repeatable. The shooting hand should be fully extended in a straight line towards the rim. Allow the ball to roll of the fingertips and snap the wrist so that your fingers are pointed down and straight towards the basket. The guide hand stays to the side and does not interfere or influence the release of the basketball. Hold the follow through position until the ball hits the rim when practicing shooting form.

It is crucial for the athlete to understand where they are on the court and what it is they are doing. Making sure athletes understand basketball vocabulary may seem pointless, but it is extremely important for court awareness. Here are key terms every player should know.

Free Throw Lane is the team's front court where they line up for free throws. A standard free throw lane is rectangular and 19 feet long by 12 feet wide. Free throws are taken from the foul line, 15 feet from the basket. In addition, there are marked spots along the sides of the lane for players to stand. Players may not stand in the lane for more than 3 seconds unless they are actively trying to make a move to the basket or guarding a player. This area is often referred to as the "paint" or the "key."

Three Point Line is the half circle surrounding the basketball hoop. on each team's side of the court. High school and women's college basketball are a bit closer than the NBA, 19 feet 9 inches from the middle of the hoop. In men's college basketball it is just a bit further, 20 feet 9 inches. The NBA the line is 23 feet 9 inches from the arc (center of the hoop) and 22 feet at the sidelines.

Baselines and Sidelines are simply the out of bound lines. The sidelines run down the entire court with the baselines behind each hoop. Professional or college courts are 94 feet long x 50 feet wide and most high school courts are 84 feet long x 50 feet wide.

Center Jump Circle is the area the game begins or starts over time with a jump ball. The radius of the circle is 6 feet. Two players jump and battle for possession. All other players must remain outside the circle until the ball is tipped. There are jump circles located at each free throw line, the NBA uses these areas for held ball calls.

Half Court is the division line that cuts the court into two equal halves, half court. High school and college rules allow 10 seconds to get the ball across the half court line. The NBA only allows 8 seconds.

Basketball hoop has a standard backboard of 72 inches wide and is 4 feet inside the baseline. The hoop, is 10 feet off the floor and has a diameter of 18 inches.

The Elbow is the area on both sides where the free throw line intersects with the line on the side of the key.

The Wing is the area outside the free throw lane. It runs the length of the court from baseline to baseline. The strong side of the wing is where the ball is and the weak side is the opposite side.

The block is the area located along the free throw lane adjacent to the basket. This area is only meant to help players when lining up for a foul shot. However, controlling this area on either side of the ball is advantageous to the team.

The Post The high post is the area along the free throw line and at the elbows of the court. The low post is the area right around the block in the paint on each side of the lane running up near the foul line.

Sample Shooting Workout - 10 wall shots and 50 shots at basket.

1. One-Hand Form Shooting Drill

10 wall shots with good technique

Progress only after making a certain percentage of shots or making 100% of the 10 shots into the basket. It is okay if this takes you some time. The key is sound shooting technique.

2. 10 shots from the free throw

Work on making a certain percentage of free throws. The goals is to make all 10 but take time to master release and technique

3. Catch and Shoot

Have a teammate or coach pass you a ball from any spot and work on timing of catching the pass in the pocket (Hands near hip) and setting up your feet into a comfortable shooting position and release.

Shoot 10 shots from any spot on the court whether mid-range or from the 3-point line. Work on making a certain percentage of shots before proceeding and moving onto the next location.

4. Shot off the dribble

Work on making one move or jab step in either direction. It may also be a crossover move and shoot. Focus on footwork and shooting technique. (Balance/eyes/elbow/follow through) Be patient as this is a more difficult skill to develop. Slow things down and then progress to speeding your movement up.

10 Shots from any spot on the court. Only move onto the next spot after making a certain percentage of shots that you are looking to achieve. Practice will elevate your make percentage. The total number of shots from each location can change as well. Select the number that allows you to work on your game the best.

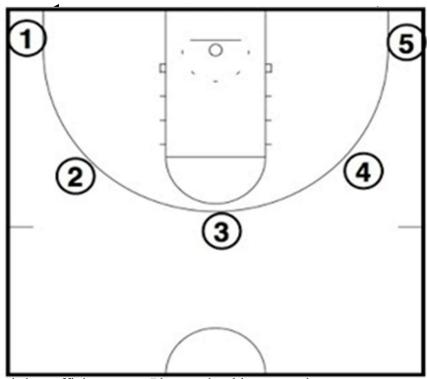
Emphasis Points

- Guide hand near the side of the ball. Do not place guide hand in front or behind basketball.
- Fingers on guide hand pointing upwards.
- Keep guide hand still.

5 – Spot Shooting Drill

In this shooting drill, shooters should get a good feel for the distance and release points. Starting right in front of the basket and progressively moving further and further away from these 5 spots is a simple and very efficient way to cover their range from all over the court.

Working from the low box and transitioning away towards the 3- point line will help shooters gauge their distance from the basket and also give them a feel as to where they feel the most comfortable



around the court and to also work on their less efficient spots. Players should try to make a set number of consecutive baskets at each spot before they move on to the next spot in order to teach discipline and learn how to drill in their mechanics and progress properly. Setting a time limitation and consecutively made shots are variations that shooters can implement to change their routine utilizing the same set up.

CHAPTER V Energy Systems

Manipulating the Energy Systems for Training Goals

The strength and conditioning professional's ultimate goal is to manipulate the systems to create the ultimate performance of the athlete for exercise, sport, or competition. The main factors to manipulate specifically are, intensity, duration, rest, and sport specificity. The systems, with examples of training variables focusing on specific training for the chosen energy system, are as follows:

Phosphagen Energy System

- Sprints, 12 x 20m with recovery of 2 minutes recovery between repetitions.
- Sprints, 5 x 60m with 6 minutes recovery between repetitions.
- 8 x 30m shuttle runs with 2 minutes recovery between repetitions.
- Resistance training of 3 sets of 3 repetitions at 90% 1rm, with 5 minutes rest between sets. This intensity should be performed 2 to 4 times per week for maximal performance of the phosphagen system.

Glycolysis Energy System

- Distance sprints, 5 to 8 x 300m, with 5 minutes recovery between repetitions.
- 150m intervals at 400m pace with 3 minutes recovery between repetitions, until pace slows significantly.
- Long distance sprints, 6 x 500m with 3 minutes recovery between reps.

Oxidative Energy System

- 4 to 6 sets of 2 to 5-minute runs, with 2 to 5-minute recovery between intervals.
- 10 sets of 400m runs, with 60 to 90 seconds recovery between intervals.
- Long distance 5 to 10 km runs.

Rules for Any Exercise Method

A few simple rules are helpful as you develop your own routine:

- Do not eat two hours before vigorous exercise.
- Drink plenty of fluids before, during, and after a workout.
- Adjust activity according to the weather and reduce it when fatigued or ill.
- When exercising, listen to the body's warning symptoms, and consult a physician if exercise induces chest pain, irregular heartbeat, undue fatigue, nausea, unexpected breathlessness, or light-headedness.

Warm-Up and Cool-Down Period

Warming up and cooling down are important parts of any exercise routine. They aid the body in making the transition from rest to activity and back again, and can help prevent soreness or injury, especially in older people.

Warm-up exercises should take place for at least 8 to 10 minutes at the beginning of an exercise session. Older people need a longer period to warm up their muscles. Low-level aerobic exercise is the best approach, such as dynamic warm-ups, walking briskly, swinging the arms, or jogging in place.

To cool down, one should walk slowly until the heart rate is 10 to 15 beats above resting rate. Stopping too suddenly can sharply reduce blood pressure, is a danger for older people, and may cause muscle cramping.

Static stretching is appropriate for the cooling down period, but not for warming up because it can injure cold muscles. Particular exercises may require stretching specific muscles. For example, a jogger or biker might emphasize stretching the hamstrings, calves, groin, and quadriceps, while swimmers would focus on the groin, shoulders, and back.

CHAPTER VI Warm-Up

Stretching

Stretching is a very important part of a training program but unfortunately, it is often overlooked. Lack of flexibility is at the root of many problems. When a muscle is hypertonic, it is limited in its ability to contract and lengthen properly, causing inefficient movements and joint stress. They are also more likely to contribute to faulty biomechanics. Appropriate stretching and moderate exercise may prevent many musculoskeletal injuries prevalent in today's society. Stretching and strengthening, when implemented appropriately, produce a solid foundation for healthy biomechanics. Without this foundation, biomechanics and movement patterns will become inefficient, leaving one not only performing at a less-than-optimal level, but also with a possible increased risk of injury.

Arbitrarily increasing the joints' range of motion without considering the individual and the tasks they need to perform may be detrimental. Studies have shown a decrease in muscle power output and increased muscle reaction time following a stretch. Stretching certain muscle groups may be contraindicated when strength and/or power are required of them during the activity.

In some instances, a decreased range of motion of the body will enhance performance. An example would be the torso of a sprinter. Energy derived from the ground is transferred to the trunk by the lower extremities. Some of this energy can be lost to excessive lengthening of the trunk musculature. Therefore, in order to develop a training program that will improve upon the desired results, it is important to understand specific motion patterns. Furthermore, there is no evidence that stretching decreases the risk of injury. In fact, work by Dr. Stuart McGill has shown that the low back range of motion of injured workers had little relationship with their return to work. In addition, there has been research found that there is a negative correlation between low back flexibility and back injury. Muscle injury (tears/strain) occurs when tissue is loaded beyond its capacity and capability to absorb and mitigate force. Therefore, a training/stretching program must be tailored specifically for each individual/athlete, and the tasks they need to perform.

Stretching Principles

The Stretch Reflex

The stretch reflex is the neurological process with which the body responds to a sudden change in the length of a muscle. This pathway includes the muscle fibers, receptors, and sensory and motor neurons of the spinal cord.

Stretch receptors (muscle spindles) are located within the sarcomere, or muscle cell, and, when lengthened, send a signal to the spinal cord through sensory neurons. These neurons synapse or transfer the signal to motor neurons that control the muscle being stretched. This causes contraction of the muscle in order to maintain its resting length.

Passive Stretching

A passive stretch is achieved by having an external force, such as a partner's push, wall, floor, machine, and so on, applied in order to attain and hold the end position. Using a well-trained partner can help to achieve greater range of motion (ROM), and to target specific muscle groups.

Active Stretching

Active stretching uses agonist muscle contraction in order to stretch antagonist muscles. This type of stretching uses the principle of reciprocal inhibition.

Dynamic Stretching

Dynamic stretching uses active contraction of the antagonist muscle, creating motion, in order to produce a stretch to the agonist muscle. This type of stretch targets the series elastic component of the muscles. Yamaguchi and Ishi have demonstrated an increase in power during leg extensions following dynamic stretching. This may be due to the rhythmic contraction of antagonist muscles raising the temperature and to post-activation potentiation, which is an improvement in muscular performance following contraction. This study was only conducted on recreationally active men, and not athletes. Therefore, the effect of dynamic stretching on power is not known in competitive athletes.

Ballistic Stretching

Ballistic stretching involves active motion through a joint and creating a bouncing motion at the end range of the stretched tissue. The goal is for the bouncing to cause an increase in motion past its end range on every repetition. This type of stretching may be detrimental to the target or surrounding tissues. It is not suggested to repeatedly force a joint, or a soft tissue through its end range, as this could cause irreversible laxity and instability in the non-contractile tissues of the joint (ligaments, joint capsule).

This could also activate the stretch reflex, which would in turn cause the target muscle to respond by contracting or tightening. This type of stretching is associated with injury and is only recommended under careful guidance of a professional.

Basketball Specific Warm-Up

Whenever we conduct basketball movement training we start with this short (once the athletes know well it can be done in about 7 min) basketball-specific warm-up. It uses a progressive series of thermogenic, activation and dynamic flexibility movements whose primary purpose is to prepare the body for the specific stresses of the session. Its secondary goal is almost as important, as it helps teach, reinforce and ensure the carry-over of all the movement skills we are trying to teach and apply. In order to best achieve those goals, it essential that the warm-up be

'coached' for proper movement mechanics. If the coach doesn't invest time, attention, and effort in it, the athletes will 'go-through the motions' with poor form which 'teaches' or carries over to poor movement in the game. Moreover, it is important to teach these warm-up drills in a context that is as close to basketball as possible so that players begin to transfer these proper movements into their game. Whenever possible, they should be performed on a court. When working with a team, we teach the warm-up to the coaches and ask them to coach their teams through them at each practice (again, about 7 minutes once the athletes have learned the drills well.) Once the drills can be well executed, we ask the athletes to perform most of them while dribbling, etc.

Optional Dribble and Shoot Thermogenic Warm-Up—3-5 min each athlete with a ball; shooting at any basket in the gym, but athletes must get their own rebounds on 1-bounce or less and must dribble at a jogging pace to a new basket after each shot. This, or some variation, of this drill can be used to make productive use of slack time when some athletes are still arriving, being taped, etc.

1. Quadriceps and Hip Flexors—Team	Athlete(s) Start at Baseline
Activation	
-Forward jog	
-Backward	
-Forward jog	
-Backward snapskip	
-Forward jog	
-Backward reach run	
Dynamic stretch	
Heel-to-butt raise	5x each leg
Angled lunge-twist-reach	5x each leg
5	
2. Abductors	
Activation	
A-skip (in-place) *	5x each leg
Carioca quick-step*	2x Baseline to FLE and Back
Dynamic stretch	
Leg cradle	5x each leg
3. Adductors	
Activation	
Groin Skip*	5x each leg
Lateral Gallop	1x 20 yards each direction
Dynamic Stretch	
Sumo Squat*	5x
Forearm to instep	5x each leg
Iron cross	5x each leg
Prone scorpions	5x each leg
4. Hamstrings	
Activation	
Butt kickers to Run-Out*	2x Butt Kickers
Linear strait leg bound (mini-bounds)	2x 20 yards
Dynamic Stretch	
Strait leg march	2 x 5 each leg
Inverted toe touch*	2 x 5 each leg
Build-Up Runs (85-95%)	2x to Opposite
Baseline	

CHAPTER VII Stretching and Recovery

Basic Recovery, Flexibility and Fundamental Exercises

It is vital that athletes understand they can only train as hard as they can recover. Athletes play multiple sports, which causes time constraints that usually result in over training and no time for recovery. Athletes must understand the importance of proper nutrition, doing flexibility training and recovery work on their own. We included general static stretches, foam roller work and exercise suggestions based on the most common weaknesses. The stretches and recovery can be done daily and the exercises can be used as warm ups or done as a routine every other day.

We believe one-on-one custom programs are best because no two people are the same but a good group program has benefits as well. We designed this program as a starting point in an effort to help the general population and new coaches educate themselves and train smarter. Know your athletes limits and track progress to avoid over working them.

General Static Stretching

Included are some basic static stretches that will benefit every athlete. There are many other ways to stretch and its best to get an evaluation to see exactly what is needed. Static stretching needs to be done after activity; it is not a warm-up. There are many controversial beliefs on static stretching however, static stretching should primarily be done after working out. The intensity of the stretch should be monitored and if the stretch ever feels like a sharp pain or a burning sensation, the intensity should be dialed back.

- Hold each stretch for roughly 2 min
- May perform more than once per day if desired so long as it is not right before activity.

Precautions

Always consult a health care professional before initiating a stretch program. Stretching can be dangerous in the presence of musculoskeletal injury or disease. It is also important to warm up muscles before stretching them. Stretching a cold muscle can result in injury.

Problems with static stretching prior to exercise:

- Scientific evidence demonstrates that static stretching of muscle decreases isometric and dynamic muscle strengths at different velocities.
- Isometric strength is important for stability during complex movements.
- Dynamic strength has obvious importance when it comes to actual movement.

In plain English, this means you will be slower and weaker on tasks that are fundamental to high-level performance.

Static Stretching Acutely Impairs:

• Slow-speed, high force movements (Power lifting)

• High-speed, lower force movements (jumping & sprinting)

Research also demonstrates that balance, reaction time and overall movement time are negatively affected. Endurance athletes will be interested to know that static stretching also reduces muscular endurance. Static stretching some muscles before activity may be required if they are so tight they impede movement. Usually the psoas and the scalenes fall into this category. There are always exceptions to the rule so be aware of client needs.

Static Stretching has its benefits post-workout:

- Relaxation
- Increase or maintain a particular range of motion
- After weight training
- After walking/running
- After aerobic activity

Foam Rolling

Due to rigorous sports schedules and regular workouts, our bodies may develop structural imbalances, excessive scar tissue, trauma from injury, and painful points along a muscle or in the fascia. These 'trigger points' can cause a restriction in blood flow to the muscle, shortening of the muscle, and possibly inflammation and pain. Any one of these problems can inhibit proper posture, impede athletic performance, effective exercise form, proper joint alignment and poor neuromuscular transmission, potentially setting the stage for a more serious injury. Trigger points also put a strain on surrounding muscle and tissue that must compensate for the weakened area.

Foam rollers are an excellent method to help break down the scar tissue that has formed, thereby returning the blood flow and nervous system transmission to/from the area. Removing the 'knots' will also allow for exercises to be effective in returning the structural balance and joint stability to the area and removing the stress on the muscles that have been compensating for the weak area. Greater flexibility will also be achieved.

With all the sports and activities kids are involved with, we see a growing injury problem. It is more important to prevent injury than anything else is because an injured player cannot play.

- Roll on target area for 12-20 repetitions
- Repeat 2-3 times or as needed

Foam rolling is generally for recovery, improving flexibility, and preventing injury. In some cases, a tight area may be rolled before and even during activity to loosen it up.

CHAPTER VIII NUTRITION

Sports Nutrition

General Pre-Workout Snack Guidelines to Follow:

Food preferences for pre-workout snacks can vary depending on the individual, type of exercise and level of intensity. For example, endurance athletes can often eat more during a long slow cycle when their heart rate is lower, than while running or training at a higher heart rate. Experiment with the following guidelines to help determine an appropriate snack for you.

Choose a snack that:

- Contains a sufficient amount of fluid to maintain hydration.
- Is low in fat and fiber to facilitate gastric emptying and minimize GI distress.
- Is high in complex <u>carbohydrates</u> such as fruits, vegetables, whole-grain bread, rice, pasta, and cereals to maintain blood glucose levels, and maximize carbohydrate stores.
- Contains some **protein** for staying power throughout your workout.
- Is low in simple sugars such as candy. They can send your blood sugar level shooting down, leading to a severe drop in energy.

The more time you allow between eating and exercise, the larger the quantity of food you will be able to eat. Allow more digestion time before intense exercise than before low-level activity. Your muscles require more blood during intense exercise, and therefore less blood will be available to your stomach to help with digestion. If you have a finicky stomach, try a liquid snack prior to your workout. Liquid snacks such as smoothies or sports drinks tend to leave the stomach faster than solid foods do and will be easier to digest. Each person is different so play around with the listed choices to see what works best for you and your workouts.

Pre-workout Snack Ideas:

- Apple with almond or peanut butter (all natural)
- Protein bar some brands: Larabar, Clif Mojo, or PowerBar Harvest
- A whole wheat English muffin with cottage cheese
- Small bowl of whole-grain, low sugar cereal
- Orgain protein shake

General Post-Workout Snack Guidelines to Follow:

In order to see improvements in your fitness level and help your body recover from an intense exercise session or competition, it is extremely important to eat after a workout.

Two things are happening when you work out: You are creating microscopic tears in your muscle tissue (during resistance exercise) and you are depleting your body's glycogen stores (glycogen is stored glucose in muscle tissue which is burned for energy during any workout).

Experts believe that it is best to eat within 30-45 minutes of completing your workout. According to Martica Heaner at MSN Health and Fitness, this "metabolic window" is the time when "enzymes that replenish muscle carbs are at their highest levels," and "insulin, which rebuilds protein stores, is at peak levels." Even if you will be having dinner within the next couple of

hours, it's best to keep a snack on hand for immediate consumption to maximize the benefits, the most important being rebuilding and not storing as fat.

Some key nutrients to include in your post-workout snack should be a mix of carbohydrates (simple and complex) and protein, carbohydrates to restore glycogen to muscle and protein to provide the necessary amino acids to rebuild muscle tissue. Ideally you should look for easily digestible forms of these nutrients---your body can break down and use the whey protein in a shake, for instance, more readily than it can the protein in a steak.

Recommended post-workout snacks vary based on your weight and goals. If you expect to have a meal within the next couple of hours, still eat something right away. Keep your post-workout snack below 200 calories or 300 if you are a bodybuilder. If the end of your workout coincides with a mealtime, you can eat a meal instead of a snack to replenish.

Post-Workout Snack Ideas:

- Homemade trail mix with raw nuts, raisins, freeze dried fruit and seeds
- Plain yogurt with fruit and low-fat granola
- Banana and peanut or almond butter on brown whole wheat bread or brown rice cake
- Hard-boiled eggs with whole-grain bread
- Smoothie with whey or egg white protein powder, frozen berries, almond milk or organic skim milk, ground flaxseed
- Turkey wrapped in avocado with apple slices
- Orgain shake

Electrolytes Defined:

Electrolytes are a group of minerals – sodium, potassium and chloride that are extremely important to maintaining the proper fluid balance and hydration.

Some good sources of electrolytes are:

- Coconut water and juice instead of Gatorade because it is pure sugar
- Banana
- Potatoes
- Prunes
- Raisins

Sample Sports Nutrition Food Plan, Day 1

B: smoothie with egg white OR whey protein powder; frozen berries (no added sugar); skim, rice OR almond milk, 1 or 2 spoons plain low-fat yogurt

S: 15 raw walnuts

L: turkey chili (no cheese)

S: apple; ½ serving cottage cheese sprinkled with cinnamon and ground flaxseed

D: turkey OR lean sirloin burgers; whole wheat bun; romaine lettuce leaves; tomato; baked sweet potato; salad; sautéed broccoli with garlic and olive oil

Sample Sports Nutrition Food Plan, Day 2

B: oatmeal; cinnamon; wheat germ OR ground flaxseed; sliced raw almonds

S: squeeze juice of a lime over broiled mango

L: grilled chicken on whole wheat bread; 1 slice low-fat Swiss, lettuce, tomato, sprouts, balsamic vinegar OR mustard

S: homemade trail mix (handful raw almonds, raw sunflower seeds and raisins)

D: grilled salmon; Asian vegetables (broccoli, bean sprouts, peppers, snow peas); brown rice

CHAPTER IX Fouls and Violations

We feel it is important to include at least general information on violations. This manual is not meant to have details on all the rules and regulations. This chapter is simply to educate readers on the basics.

Personal fouls: These types of fouls include pushing, hitting, holding, smacking and illegal screens. Players fouled while shooting the ball receive two free throws if the shot misses, only one if the shot goes in. If it is a 3-point shot, then players get three free throws only if the shot misses. When a player is fouled that is not shooting the team that is fouled gets to inbound the ball. In the event a team has seven or more fouls a player will receive one foul shot and a second if the first one goes in. After 10 fouls the player receives two free throws.

Charging. This is an offensive foul called when a defender has an established position and is shoved or run over. The team called for the offense loses possession.

Blocking. This is a defensive foul called when a defender does not establish position in time to defend an opponent's drive to the basket.

Flagrant foul. This type of foul is any type of aggressive contact that may cause harm to the player. It may be intentional, but not always is.

Intentional foul. When a player purposely fouls another player with no evidence of making a play on the ball.

Technical foul. This type of foul is called for bad language, a variety of unpleasant gestures and arguing with officials. In addition, filling in the scorebook improperly or not abiding by warm up protocol.

Violations

Traveling. This is also called walking. This occurs when a player takes more than a step and a half without dribbling the ball. Once you stop dribbling you may not move your pivot foot.

Carrying This is also called palming. This happens when a player dribbles the ball with their hand either too far to the side or even under the ball, so it looks like a scooping motion.

Double Dribble. This occurs when a player stops dribbling and then starts again or dribbling with both hands on the ball at the same time.

Held ball. This happens when two opposing team members gain a firm grip on the ball. The officials usually do not let a tug of war happen for long, they always stop it if it becomes aggressive. Depending on the level the ball may be returned to the team that last had possession or be a jump ball.

Goaltending. This happens if a defender blocks a shot while it is descending towards the basket, interferes with the ball after it touches the backboard and is going in the basket or while it's

moving around the rim as it goes in. If called the shot counts. In the event the offense is guilty they lose possession.

Backcourt violation. One a player on offense brings the ball past mid court they cannot go back during that possession. If called the team loses possession.

Time restrictions. There is a five second time limit when inbounding the ball, 3 second violation and shot-clock restrictions depending on level of play.

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Owner of THE ARENA and founder of Fit and Functional

Charles DeFrancesco is the owner and founder of the education company, Fit and Functional. He is also a consulting partner for THE ARENA and Fit 4 Fun. He provides all the in-house education to the ARENA staff. Charles was co-founder of Greenwich Sports Medicine, where he was in charge of all personal training and therapy operations for over five years. Currently Charles is a consultant for Westchester Sports and Wellness and Phoenix Fitness.

Charles graduated from Purdue University, summa cum laude with a BS in Health and Wellness. He is certified by the National Academy of Sports Medicine National Academy of Sports Medicine (NASM) and by the National Federation of Professional Trainers National Federation of Professional Trainers (NFPT). He is also USAW Olympic lifting certified and Equinox Fitness Group Prenatal certified. Charles has completed the Functional Exercise Specialist course, Cardiac Conditions course (AFPA), attended EFTI, and has over 7 years of clinical experience. Charles was a guest speaker at the 2009 IHRSA conference in San Diego. He also holds year-round seminars and educational courses in the tri-state area. Charles is one of the authors of the accredited NFPT standard CPT study manuals. He created NFPT's advanced trainer workshop and writes continuing education courses for ACE, NASM, NSCA and NFPT. He is the NFPT continuing education coordinator, member of the NFPT Board of Education and is the North East director of workshops. Charles is the main author of the Principles of Functional Exercise manual, The Truth Behind the Fitness Fads and A Squash Players Handbook https://thearenafitness.com/ In addition, Charles has written numerous articles and has given presentations on various topics, including: basic movement screenings, essentials of core training, flexibility and strength & conditioning. Many websites and magazines publish Charles's articles, including www.ptonthenet.com Charles works with a variety of doctors and has consulted with them on developing programs and training staff for their rehabilitation facilities. In addition, he consults with commercial gyms, corporate parks, and fitness studios. Charles has extensive experience and a proven track record which allows him to testify as an expert witness on a variety of topics. Charles is a licensed agent in NY for Health, Life and Accident Insurance. The license allows Charles to offer full service corporate wellness programs.

Kevin Chen, BS, NFPT CPT

Kevin is a Certified Personal Trainer through NFPT. He attended the University of Hartford and has a Bachelor of Science degree in Health Science. He is currently working with NFPT as a Subject Matter Expert, writing and itemizing questions for the NFPT Certified Personal Trainer Exam. He has worked with clients of all ages and fitness levels. His main focus is to help others increase their neuromuscular function through methods including rehabilitative exercises to correct physical dysfunction, functional movement training in programs to increase mobility, flexibility, athletic performance and daily function. He specializes in Olympic lifting, functional movement, athletic performance and injury prevention. He is very invested in Olympic lifting and is very passionate about the sport. He is always training to improve his Olympic lifts as well as researching different techniques used by different Olympic coaches and athletes. Moving

forward, he is looking to continue his education by pursuing a Doctorate of Physical Therapy degree.

John Wallace

John graduated from Syracuse University. He is a former professional basketball player and current broadcaster on MSG Networks. He is also an executive board member of the Heavenly Productions Foundation, a 501c-3 charity based in Armonk, New York whose mission is to help children in need and in distress.