



To all those with a passion for Ultimate Frisbee in the world

Ultimate Frisbee

Training Methodology

By

Cristiam Paul Tejada Otero

Degree in Physical Education, Master in Motricity and Human Development (University of Antioquia, Colombia – South America). Ultimate Frisbee coach at the National University of Colombia. Email: cristejada2002@yahoo.es



Note

This work was first published as a free digital book in 2009, in Spanish, titled [*Ultimate Frisbee: metodología del entrenamiento*](#). It was written by the author while still studying for his degree in physical education, and was the first book written in Spanish about this sport.

Text translation into English was done by the same author with the help, in the first chapter, of Maria Uribe Wolf of the School of Languages at the University of Antioquia. Little changed, the translation is faithful to the original book and was made due to the request for English speakers interested in the sport.

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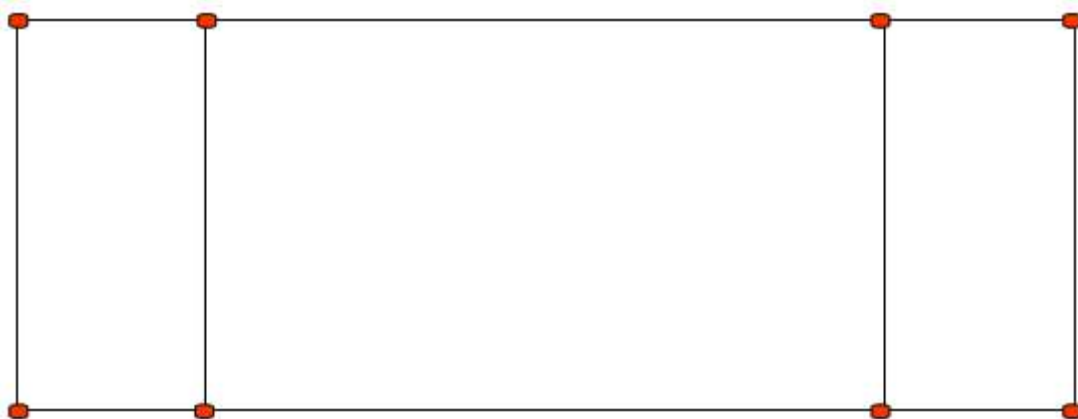
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Escuelas populares del deporte – Ultimate (INDER Medellín)
Kie
Revolutions
Suricatas
Universidad Nacional -Medellín
Yamie Kie
Wiccass

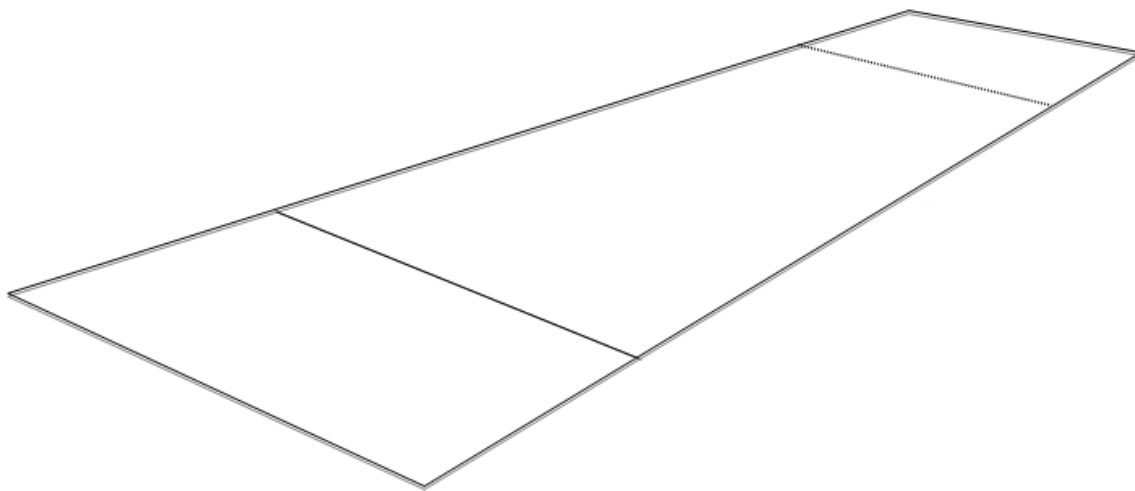
Graphic illustration of the game

Symbol	Meaning of the symbol
	Limit of the movement
	The frisbee
	Cone
----->	Throw or pass
	Feinting run, zigzags, fakes
	Offensive player
	Defensive player
	Sprinting player
→	Direction of the run
↑	Direction of the offense

Sketch of the field



Perspective sketch of the field



Content

Foreword.....	13
Presentation.....	16
Introduction: frisbee and ultimate frisbee.....	17
1. Generalities of ultimate frisbee	18
1.1. Comparison with other sports (soccer and basketball)	18
1.2. Spirit of the Game	19
1.3. Items to assess the spirit of the game	21
2. Technical principles.....	22
2.1 Individual technique.....	23
2.1.1 Basic moves.....	23
Stopped position	23
Pivoting.....	23
Shifting	26
Jumping	27
2.1.2. Throws.....	28
Forehand throws.....	29
Backhand throws.....	29
Hammer throws	29
2.2. Collective technique.....	31
2.2.1. Passing.....	32
2.2.2. Catching.....	34
2.2.3. One-on-one	36
Passing (thrower, catcher)	36

Defense (thrower and still defense).....	37
Profile	38
Catching feints.....	39
2.2.4. Collective defense	40
Cup defense.....	41
Zone defense.....	42
Defensive positioning on the field depending on offensive players.....	42
2.2.5. Collective offense	46
Stack formation	46
L Formation	47
Rhombus formation	47
3. Fundamentals of the tactics.....	48
3.1. Individual tactics.....	49
3.2. Collective tactics.....	50
3.3. Tactical training	51
3.4. Description of the proposed training of motor behavior (Costoya, 2002).	52
3.5. Instance of motor behavior associated (CMA) and specific motor behaviors (CME) applied to ultimate frisbee.....	53
4. Principles of sports training.....	54
4.1. Physiological basis of training	55
4.2. Biological principles of training	61
4.3. Pedagogical principles of training	64
4.4. Warm-up exercises.....	64
4.5. Endurance training	65
4.5.1. Methods for development of endurance.....	66
4.5.2. Exercises	67
4.5.3. Games.....	70
4.6. Power training.....	72

4.6.1. Methods for power development.....	73
4.6.2. Training to improve power in the ultimate frisbee.....	75
4.7. Coordination training and motor learning.....	82
4.7.1. Determinants of coordination and motor learning.....	82
4.7.2. Feedback y feedforward.....	83
4.7.3. Exercises.....	84
4.8. Defense training.....	88
4.8.1. Technical principles for the defense.....	88
4.8.2. Types of defense.....	90
4.8.3. The transition.....	91
4.8.4. Exercises.....	92
4.8.5. Games to improve the defense.....	93
4.9. Training offense.....	94
4.9.1. The technique foundations.....	95
4.9.2. Types of attack.....	99
4.9.3. Exercises.....	101
4.9.4. Games.....	105
4.10. Means for regeneration.....	108
5. High level in ultimate frisbee.....	108
6. Assessment: Testing in ultimate frisbee.....	110
6.1. Testing throwing and catching techniques.....	110
6.2. Agility test, jump test, agility run test, and lateral change of direction test.....	111
6.3. Endurance Test (Leger test).....	113
6.4. Recovery test (heart rate).....	114
6.5. Test of muscle power (Skip for high).....	115
6.6. Biotype of Ultimate Frisbee players.....	116
References.....	118

Tables

Table 1. Comparative aspects between Ultimate Frisbee and other team sports	19
Table 2 Motor behavior associated (CMA) and specific motor behaviors (CME) in ultimate frisbee.....	53
Table 3. Roles in the game and tasks or objectives in ultimate frisbee players	54
Table 4. Percentage of muscle fibers in sports	57
Table 5. Energy systems	58
Table 6. Estimated kilocalories per minute in football and basketball	58
Table 7. Indicators of intensity of the load	59
Table 8. Principles of offense and defense	108
Table 9. Hexagonal test results for ages 16 to 19 years.....	112
Table 10. The table presents a scale to assess the time in seconds suitable for ages 16 and 19 ...	113
Table 11. Percentile scale to classify the test results "change of direction" in time in seconds	113
Table 12. Indirect valorization of maximal oxygen consumption	114
Table 13. Vertical jump height (Abalakov) for men and women of Colombia.....	115
Table 14. Valuation at speed test run at 30 meter dash in seconds from stopped position.....	115
Table 15. Somatotype of elite athletes	116

Figures

Figure 1. Pivoting foot: Backhand and forehand throws	25
Figure 2. Vertical jump	28
Figure 3. Horizontal jump.....	28
Figure 4. Forehand throw techniques	29
Figure 5. Backhand throw techniques.....	29
Figure 6. Hammer throw techniques	30
Figure 7. Offensive player against defensive player	33
Figure 8. Offensive players (black and yellow) in the game.....	33
Figure 9. Types of two-handed catches	35
Figure 10. Types of one-handed catches	35
Figure 11. One-on-one Throwing and catching.....	36
Figure 12. One-on-one Throwing and Catching	36
Figure 13. Ways to defend	38
Figure 14. Defensive profile for backhand and forehand throws	38
Figure 15. Profile and general defense	39
Figure 16. Types of runs to feint	40
Figure 17. Cup defense.....	41
Figure 18. Cup defense along the left side-line.....	41
Figure 19. 3-2-2 Zone defense formation	42
Figure 20. The position of the defense on the field depending on the offensive player.....	43
Figure 21. The position of the defense for the horizontal stack	44
Figure 22. The diagonal positioning of the defense on the field	45
Figure 23. The collective stack offense (vertical)	46

Figure 24. Collective L offense	47
Figure 25. Collective offense Rhombus formation.....	47
Figure 26. Mental map for the playing field in ultimate frisbee	51
Figure 27. The law of overload.....	56
Figure 28. Representation of functional reserve and adaptation to training or adaptation to the load.....	56
Figure 29. Load effect on sports training	57
Figure 30. Borg Scale (modified)	60
Figure 31. Overloading in training.....	62
Figure 32. Ultimate frisbee actions more frequently	66

Foreword

In the past six years, working as a librarian, I was able to see a very positive approach to the world of physical education and sports, which are fields I'm not very interested in, to say the least. The issue was that the references I always associated with sports were almost always performance, competition, unreasonable behavior, violence and discrimination.

Since I did not inherit a love for sports either, P. E. was always a torture for me. Although I never failed the subject, I barely got by and had to take make-ups more than once. One of my high-school teachers, who believed the words Being, Existence and Universe meant *football* (U.S. soccer), could not believe I wasn't at least able to juggle the ball with my feet during my make-up exam. Shaking his head at the motor freak that he was seeing, he gave me the lowest passing grade possible. Up to then, in his football-obsessed brain or his football-centered life, he had never imagined a person with no football skills.

Playing with a Frisbee was one of the few sports activities I enjoyed, but I never had anyone to play with because it was not a sport. It was the 70s, and I knew that in the United States, there was an acrobatic activity with Frisbees performed by dogs. It was not until 2000 when I found out about Ultimate Frisbee from a student at Universidad de Antioquia. He made very good comments; especially, because he told me that it was played by men and women; it had no referees, and playing it seemed more like a party than a conventional sports match. With these characteristics, Ultimate Frisbee has managed to position itself in our setting, broken patterns and made followers of many reluctant traditional sportspeople.

A few years later, still with that hideous notion of P.E. and sports, by mere chance, I came to work in a library specialized in the field. From the beginning, I came across something that surprised me — P. E. professors and students frequently visited the library. Some of them borrowed books, or spent hours deeply immersed in their reading taking notes. Often they asked for more books, and this, led you to believe that the information published on a given subject was poor, superficial, and sometimes, wrong. Contrary to what I expected, I discovered a great passion for knowledge, and an outstanding talent in these people. However, there weren't many publications of the papers that both professors and students wrote in their everyday academic life. It was this concern that brought *VIREF Biblioteca Virtual de Educación Física* to life.

As a librarian, I had to know my users better, and I had an inevitable bond of friendship with them. Besides, I had a purpose of promoting knowledge with this academic community. Likewise, as a psychologist, I tend to ask questions. This is how I found out about Cristiam's interest in Ultimate Frisbee. Cristiam is the author of this book, and a frequent visitor to the library. He mentioned his interest one day in 2006 while we were speaking. At that moment, he was only in fourth semester of his P.E. major.

Since we didn't have enough information on the subject, and at that time just a few students played Ultimate Frisbee in their classes —not taking into account the fact that we had published

only one report on this sport— I committed myself to searching information on the subject, and I also advised Cristiam to write a handbook.

So, in a few days I had in my hands the first version of the handbook, which I returned after checking with the following comment: 'Get a camera and take the pictures, or draw illustrations yourself because we're not going to publish it with any Internet pictures. It is very well made. The hardest part was writing it. Are you going to ruin the easiest part? No way! Find someone to help you'.

Although he could have given up, he carried on—he drew most of the images, designed others on a computer and asked a friend who had a camera to help him take the pictures. They went to a training session at Universidad de Antioquia and the players let them take photos. In early 2007, we published the handbook under VIREF with the title *Ultimate Frisbee. A Handbook*, which soon became the most googled document on the subject, and has remained at the top of the list since then.

To assess this book on Ultimate more objectively, we must consider that Cristiam is still an undergraduate student, now in the senior year of his major, and he must be responsible for his academic work. Since he began his major, he has had to work to support himself, and in the last two years he has done so as an Ultimate Frisbee instructor. He has not received any economic support to write his book about this sport. Besides the handbook, he has published three other papers on the subject: A biomechanical analysis of the hammer throw, an article on the spirit of the game, and a research report on the power used in jumps.

We must mention that his professors and class-mates at Instituto de Educación Física at Universidad de Antioquia, his colleagues at INDER, at the sports club and undoubtedly, his students collaborated during his academic project on Ultimate. This is why every time I present the VIREF experience, or I address professors and students about the importance of publishing, I specially mention Cristiam's case. For me, he is an example that deserves distinction in the fields of sports education and training.

About the book, it's enough to say that one day when Cristiam visited the library well into 2008, I said 'Well, what else are we going to publish?', and he answered 'I think I should write a book.' Well, I just waited for him, and today, I have the great privilege to present Ultimate Frisbee Training Methodology to the Physical Education and Sports Community, and the community of Ultimate Frisbee players and fans.

What are some of the book's contributions?

Except for the books by Parinella-Zaslow and Baccarini-Booth, which Cristiam wisely studied, and the handbook that we published in 2007, we have no references of other texts that focus on the informed practice of this sport. In general, we found Frisbee exercises, games and instructive programs. Similarly, we found historical reviews and brief descriptions of the sport.

This book motivates, informs and instructs. Cristiam presents the contents guiding beginners, experts, players and trainers. His clear description of technical gestures and exercises shows his interest in conveying knowledge effectively in order to improve performance, even when it simply comes down to a recreational sports practice.

The strict reference of all the authors Cristiam studied is a token of his commitment to copyright, although references make a text very tiresome, they should be included in every academic paper.

When it comes to training, since there is not much on Ultimate Frisbee, Cristiam's interest is focused on applying and adapting know-how based on sports that most resemble Ultimate. However, this book is, mainly, an invitation to the informed practice of sports, and to research as a vital attitude beyond the academic environment.

Since we will publish this edition in a readily accessible digital format, it will be very useful to anyone in the world (at least, Spanish speakers) interested in learning more about Ultimate Frisbee.

The author's decision to link himself to the world through free circulation and access to knowledge is another important contribution, and an example that deserves to be imitated in the world. After discussing the subject, we concluded that this kind of publication is best for everybody, and that authors must always try to control their copyrights.

Luis Fernando Acevedo Ruiz
VIREF Educación Física Virtual

Presentation

Ultimate Frisbee. Training Methodology is an educational text. It gives readers basic concepts required to train techniques, tactics and physical abilities test (PAT). This book is the result of a P.E. student's experience as a player and instructor for some years.

The beginning compares Ultimate Frisbee and other team sports showing some general aspects. This is followed by a reflection about the importance of self-refereeing, which makes a difference in the set of values summarized as The Spirit of the Game. The technical description includes some concepts based on other authors' contributions, as well as a general description of tactics. In addition, we suggest some exercises and games.

The book also promotes the principles of training and assessment to improve knowledge about sportspeople and sports. These guidelines guarantee improvement of each item that makes up performance, making it more successful. We go from beginning stages to advanced levels.

We hope that this book will motivate the world's Ultimate Frisbee community and teach the importance of informed practice based on research and well-founded conceptual developments.

The author

Introduction: frisbee and ultimate frisbee

For some decades, it has been somewhat common to see a weird plastic flying object that stirs up a feeling of uncertainty and curiosity in people. Their human instinct of verification makes them take the object in their hands and analyze its texture. Then, they make it fly, and hopefully, it will soar and stay up for a few seconds. This is how illusion becomes movement and, undoubtedly, it soars through the air while the thrower stares, as if he had steered the object through the wavy sheets of Lord Wind. Then, illusion becomes joy, and the thrower thinks 'I will try again.'

The relation between survival skills and playing is as old as our species. For human beings, every tool has been a toy since the beginning of times. As a general rule, the most basic and meaningful knowledge required to live has been learned through games because they are pleasurable methods of training. The universal and ancient custom of making objects fly may have an instrumental sense (developing the accuracy and strength to hit a target), an esthetical sense (the beauty of the flight), or a recreational sense (the pleasure of the action itself). Many other objects existed before Frisbees, and probably, children around the world—all of them potential scientists— were already throwing all sorts of things, including plates if they were within reach.

The Frisbee was invented at the beginning of the twentieth century in Bridgeport, Connecticut, where a family named Frisbie had opened a pastry. Some of their customers—Yale University students— made a habit of throwing the metal plates after eating the cakes while yelling Frisbie, obviously, warning others.

When William Frederick Morrison, an enthusiastic plate thrower back then, came back to the United States after being in World War II, and took up his hobby again. After several tests, he built the first plastic model, which was marketed as Pluto Platter, but later took back its original name. However, because of a mistake made by Rich Knerr, one of the first marketers, it ended up as Frisbee and kept that name (Bernal, p.11-12).

In 1967, high school students in Maplewood, New Jersey created a sport that was played with a Frisbee. One of the students called it Ultimate to mean it was an / the (max) the ultimate sports experience, and it has spread throughout the world since then.

Over the years, the Frisbee—that object that comes in fun colors— has become a synonym of leisure. It has become such a popular way of spending time with friends, family or pets that, today everyone knows what it is and/or how to throw it.

Well, the purpose of this book is to show a point of view related to Ultimate Frisbee, and to help spread and boost this sport. In addition, we intend to contribute knowledge based on sports training theories and on P.E.

To accomplish this, we define the guidelines that must be taken into account to teach this sport, and this will serve as a practical manual for professional Ultimate players.

In the first pages of this book, we classify and define the different actions that make up the game to help guide the coaching process. Then, we outline general training, and finally, we mention some tests that may be used to assess performance in sports.

1. Generalities of ultimate frisbee

First, playing Ultimate Frisbee requires technical mastery of throws, and of backhand and forehand catches, too. They are essential to interact during the game, no matter how simple it is. Now, if your aim is higher performance, it is essential to improve both aerobic and anaerobic endurance, running speed, long-throwing accuracy and jumping power. This is done at an individual level. However, in Ultimate Frisbee, there are no individual plays. As a consequence, individual work must transcend into team work, team motivation, application of joint strategies, and tactical improvement as a team.

Ultimate Frisbee players must be prepared to run at a changing pace, constantly change direction, jump, throw the Frisbee from different distances and go for the possession of the disc. This is why players need training which allows them to repeat these actions many times in a game. In addition, players need short active pauses, and they must play against opponent pressure.

In this sense, Ultimate Frisbee training methodology is not uniform. It must start with individual development of conditional abilities and technical skills so that players perform as expert handlers, cutters or goal-scorers. The morpho-physiological traits of sportspeople, such as somatotype, age and gender, must also be considered. Tactical performance in a game of cooperation and opposition must be improved and it is the main way to improve players' performance as a team.

1.1. Comparison with other sports (soccer and basketball)

Like most popular sports in the world, Ultimate Frisbee also has an international federation. In football, it is the International Federation of Association Football [FIFA]. In basketball, it is the International Basketball Federation [FIBA]; and in Ultimate Frisbee, it is the World Flying Disc Federation [WFDF]. Ultimate also aims to become one of the most popular sports in the world today.

	FOOTBALL	BASKETBALL	ULTIMATE FRISBEE
Number of players	11 against 11	5 against 5	7 against 7
Object used to play	A ball	A ball	A Frisbee
Categories of competition	Men and women	Men and women	Men, women or mixed
Rules	Obeyed with the referee's help	Obeyed with the referee's help	Self-refereed based on The spirit of the game
Name of a score or point	Goal	Basket	Goal

Setting for the game	Grass rectangular space with a goal on each horizontal end	Cement or wooden rectangular space with a hoop on each horizontal end	Rectangular space with a specific area outlined on each horizontal end
Playing Time	Two 45-minute halves with a 15-minute break	Four 12-minute quarters with 5-minute breaks in between	You are free to play either for one hour and a half, or to a maximum of 17 goals, with a break in between when one of the teams scores nine goals
Most common injuries	Injuries because of contact with opponents, bruises, strains, and ligament sprains or sprains in general	Injuries because of contact with opponents, strains and ligament sprains	Scratches, scrapes, sprains, muscle strains and ligament sprains
Number of player substitutions during the match	Three during the two halves	As many as the coach wants when the ball is dead	You can make any necessary substitutions after each goal
World powers	Brazil, Argentina and France	USA, Russia and the former Yugoslavia	Canada, USA and Finland

Table 1. Comparative aspects between Ultimate Frisbee and other team sports

1.2. Spirit of the Game

There is a commitment that determines the conduct, expressions and behavior of the players during the game. That commitment is called the spirit of the game. This is the main quality that has transcended the founders, and today it is called 'the philosophy of Ultimate Frisbee'. This principle stands as the great difference between this and other team sports. It is based on spreading a good-sport spirit and fair play.

Parinella & Zaslow (2004) show this commitment is synonymous with fair play. Fair play calls on all the players to submit to game rules without the help of referees. This aspect has become a special characteristic that allowed Ultimate Frisbee players to build a community that spends the better part of its leisure time promoting and playing this sport.

The spirit of the game is the commitment not to hurt opponents. Besides, it relies on talk as the main mediator in cases of fouls or penalties. These virtues are developed through the players' commitment to take on the role of referees and perform the referee's collective duty, namely, applying the rules in the case of other sports. Based on this, the teams are responsible for calling fouls when required. So the person who committed the foul must submit to the procedure stated in the rules. Moreover, when there are doubts concerning penalties, players talk to reach an agreement that allows them to continue game normally.

Decisions made resorting to the spirit of the game are based on solidarity, promoting collective considerations rather than personal. However, in this case, collectivity involves both the person penalized and the person penalizing. So, in a situation that involves either a fault or a breach of the rules, the opposing team's player makes a loud call using the rule that best summarizes the action. This person can use words like *foul*, *travel*, *count*, etc. Then the player or players who broke the rule must honestly accept or reject their opponent's call.

These self-regulating methods aim to show each player's fair play throughout the game. That way, the winning team can win honestly. This is how the players enjoy their leisure time, and how they promote objectivity. That is, after, they assume a sincere sympathetic communication intended for the natural development of the game. The strange thing is that the pleasure of playing this sport during leisure time is what leads players to make quick decisions, and what makes players display sincerity, tolerance, respect and solidarity. However, actions that take place during the game can be misunderstood. For instance, in the case of a stumble, a light touch, a hand-to-hand dispute, a clash, and so on, players must analyze the situation with their team-mates before giving an immediate aggressive answer. Therefore, players must control their own behavior.

When an infraction/ foul is admitted, the situation is quickly resolved as mentioned above, and the penalized player accepts the rules. However, when the infraction is not accepted, the players involved, first, start a discussion and recall the actions or gestures of the play. This allows them to use arguments from the rules, and start a collective communication with the other players to reach an agreement. This is how they solve the situation objectively. This part of the game allows players to judge the truth based on their fellow players' comments, and therefore, judge who is right.

There are plays when arguments are such that it is impossible to reach a decision in favor of or against somebody. Then, players must come to an equal agreement for that given play. One possibility is to repeat the play, or turn it back and hand the Frisbee to the player who was in possession of the disc before the doubtful play. This situation makes the 14 players go back to the place where the foul was called. Namely, the play is restarted without any advantages of space or time. Thus, it is up to the players to go back to the exact place where they were. This procedure is also known as taking back the play.

All of these qualities promote objectivity on the field because players rely on sincere communication and solidarity. These help the recreational development of the game and promote its continuous progress so there are no needless interruptions that may affect the intense dynamics (running and jumping faster than the opponent) that make this sport different from the rest.

Even though it is up to every player in Ultimate Frisbee to know and accept the rules ethically, there are inconsistencies like in every competitive sport. Some people take advantage of the rules, and call fouls or penalties to gain some advantage that are evidenced in the score. These people are easy to identify because of the way they behave in the game showing how they are. When they self-referee, the other players analyze how right the foul is and show an unconscious fault-finding attitude. Therefore, if this becomes frequent, fellow players point it out as a negative trait that ends up labeling that particular player as a liar, and consequently, with a poor spirit of the

game. So, over time, practice and experience teach that it is true fair play. As Parinella and Zaslow (2004) say 'Play fair, play hard and there is no room for cheaters.'

This is how the spirit of the game is detached from the desire to win or from competitive stress. However, the spirit of the game allows competitiveness, tough plays, and the application of decisive strategies, power and fierceness. In spite of that, there must always be responsibility and respect when touching another player.

Cuenca (1998) suggests that current leisure trends should empower human development. In this sense, Ultimate Frisbee may have that virtue, since playing the game is an active, reflexive and intelligent learning process of ethics and values. Individuals advance at their own pace and the process is most effective when it works in real practical situations such as the game. So the spirit of the game must be understood as a teaching process based on experience. It integrates individuals and promotes human development through the game.

However, this kind of human development is not achieved progressively. It is grasped better through the dynamics of taking on new structures renewed after each game. It is not imposed; it is understood through progress, and it is always related to going back, to constant self-assessment. As Roldán (1997) says 'balancing dichotomies as: Body – soul, word – silence, love – hate, and joy – disappointment.'

This sport revolves around an objective system (in a group) of judgment, fair play or spirit of the game, which does not influence the final score of the matches. Consequently, we say that it is possible to compete without a referee, and play rough without hurting another player. Therefore, the spirit of the game is the code of behavior in Ultimate Frisbee, or the defining element that shapes this sport's internal logic. It sets up the requirements to play and rule the game. The purpose is for the winning team to have merits and deserve goals. This is seen in the team's technique and tactics, or in its determination to win fairly and peacefully.

1.3. Items to assess the spirit of the game

The following are aspects we suggest to assess the spirit of the game

- The spirit of the game in my opponents
- They show that they know the game and the rules.
- They avoid risking an opponent's health in dangerous plays such as jumping for the disc.
- They avoid shifts that could make defensive players clash.
- They relate their knowledge of the game to personal ethics and values.
- They use correct approaches to understand fouls.
- They use adequate resources to understand fouls, correct language (no swear words), and correct signs for the sport.
- They show an unbiased and respectful attitude towards team-mates and opponents, and they are always open to discussion.
- They promote research, new ideas and plays.
- They set up clear processes to assess the spirit of the game objectively.
- They train and do their job on the team.
- Their lifestyle and spirit of the game are similar.

My spirit of the game

- I use proper gestures to start and end a match.
- I avoid touching opponents.
- I avoid risking an opponent's health in dangerous plays such as jumps.
- I avoid shifts that make defensive players crash into each other.
- I am open to resolving foul calls.
- I use correct language and vocabulary (no swear words) during the game.
- I go back to the exact position on the field where the foul was called.
- I prefer clearness to uncertainty.
- I pay attention and protect my opponent's health.
- I point out my opponent's good performance during the game.
- I let my teammate play for me.
- I promote the spirit of the game among my teammates.

2. Technical principles

Manno (1991) defines technique as the process or group of processes learned through exercise and consolidated through repetition. Thus, an action can be performed as thriftilly and rationally as possible to get the greatest efficiency from a movement or group of movements.

In individual sports, technique requires the greatest ability, accuracy, strength, coordination, and so on. All of these are related to sportspeople's learning speed and biotype. These traits enable sportspeople to make a difference and become the best of the best.

In sports that involve cooperation and opposition, like Ultimate Frisbee, these movements enable players to perform according to the context of the game. These movements are classified into actions so that they can be broken down to make teaching and learning easier. However, using these factors does not ensure good performance (winning). Other things are required to get results — i.e., performance, which involves team work.

In Ultimate Frisbee, backhand, forehand and hammer throws, one-handed or two-handed catches, shifts on the run changing direction, and jumps aiming at the Frisbee show techniques. Namely, there are techniques for throwing forehand, catching a hammer throw, pivoting, jumping, throwing 50 m (55 yd) backhand passes, shifting while defending, and so on. Anyway, techniques are subject to actions in a game. This is why the techniques of these actions must be sub-classified so players may learn every 'way' and 'style', so when they are needed in the game, players can perform better. Therefore, technique depends on the player's position (along the line, in mid-field, in a corner), a defensive player, wind speed, context (rain, surface of the field), a catcher's abilities, etc.

In the following section, we classify some Ultimate Frisbee techniques so they can be learned and taught. Our classification is based on Del Río's classification for basketball (1994).

2.1 Individual technique

It is a group of moves that a player makes to play a role efficiently and accurately. Moves such as Jumping, throwing and catching will be required at some point of the game.

2.1.1 Basic moves

Stopped position

It is a neutral biped position that enables a player to be biomechanically fit to react to any offensive or defensive move. This stance is semi-flexed legs, elbow extension and hand extension depending on the distance from the Frisbee. Thus, players aim at width so that hand position and finger extension may block the path of the disc when playing on defense. When playing on offense, a neutral position is marked by an analytical attitude of the context in order to figure out a plan to 'move downfield', or keep possession of the Frisbee.

This position always depends on the position of the Frisbee. That is to say, it is modified either to shift or to maneuver the Frisbee (pivoting). This is why it will only be described to get players used to it so they may react effectively to situations during the game.



The stance may change depending on whether the team is playing offense or defense. For instance: While defending, there is emphasis on the extension of the player's arms and fingers.

Pivoting

Pivoting is a motor activity that enables a player to move with the Frisbee. Pivoting means placing a foot on the ground and moving the other to make feints or fakes easier. The foot that moves can only turn around a single axis on the ground. Pivoting is an individual offensive action in which offense and defense go for the Frisbee.



The correct use of pivoting enables players to combine forehand and backhand throws.

A pivot foot changes depending on the thrower's profile: If right-handed, the pivot foot will be the left one, and vice versa. This foot also provides stability when throwing.



Backhand Pivoting



Forehand Pivoting

Pivoting can be combined with tilts, as well as front and rear turns to perform feints or fakes to 'fool' the defense.



Learning to pivot:

Stage I

Exercises without a Frisbee

Place your left foot on the ground (if you are a right-handed thrower).

Take a step with your right foot.

Take a long step and bend your knee to make either a backhand or forehand throw (see Table 2).

Stage II

Exercises with a Frisbee

Throw after taking a step.

Pivot and throw forehand.

Pivot and throw backhand.

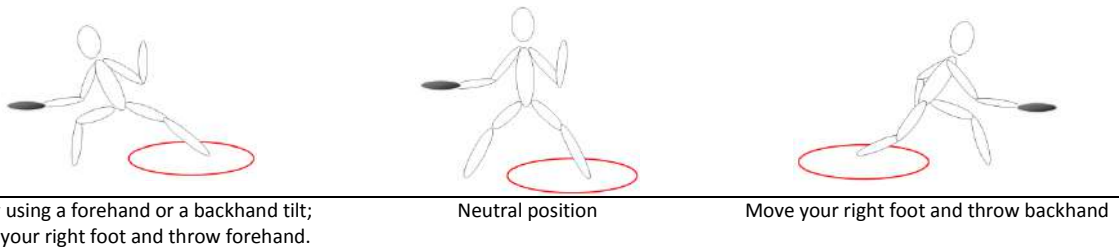


Figure 1. Pivoting foot: Backhand and forehand throws

Stage III

Exercises with a defensive player

Pass pretending there is a defensive player.

Throw a forehand or backhand pass with a passive defensive player (one who does not move arms to intercept).

Pass after feinting either backhand or forehand.

Pass with an active defensive player (one who tries to intercept).



Passing with defense

Shifting

According to Del Río (1994), shifting is generally defined as moving your body from one place to another during a game. Shifts change continuously; in other words, they do not follow a cyclic pattern. Walking and running are among the most common shifts. Some of their characteristics include changing speed and direction (left, right, forward, back, diagonals, turns, jumps, etc.). Therefore, players may be subject to fatigue or exhaustion.

In Ultimate Frisbee, shifts depend on the possession of the disc. They may be analyzed as follows:

When in possession of the Frisbee:

The only possibility is to shift from one side to the other by moving only one foot. That is, always leaving a pivoting foot. Besides, physical contact of offensive or defensive players is forbidden. Pivoting is useful for throws tilting and feinting to fool a defensive player.

When not in possession of the Frisbee:

You can walk or run zig-zag, jump, sprint (move as fast as possible), or feint as long as there is no contact (shoves, blows, smacks) to catch the Frisbee and continue the game.

Characteristics of a shift (Del Río, 1994):

Change of pace

It is to change the speed of a shift in any direction: Forward, backward or to the side. This change could be speeding up or slowing down.

Slowing down stage

This movement is marked by slowing down the run. Slowing down is possible, to a great extent, because of the eccentric and isometric force of our legs. In order to slow down, it is necessary to lower our center of mass to be able to run again or jump. This feature may help the following action, which may be turning, running, jumping, etc. In the slowing down stage, there must be a conscious use of both legs to avoid injuries such as spraining ankles or knee ligaments.

Turning stage

This stage is a group of movements that lead to turning around an axis or point to change direction while running. A turn may happen at the beginning, in the middle, or at the end of a run. It is done by leaving one foot on the ground to support our body weight, and then, our torso can turn. Meanwhile, our other foot is free to be placed anywhere to start moving in a different direction.

A turn does not necessarily mean moving forward, backward, etc. However, it may cause knee ligament injuries during a game. For instance: Turning when slowing down or turning on our support foot after a jump.

Race start stage

This stage follows a change of pace, and it is the beginning of a running activity. Therefore, it is somewhat similar to a start in track meets which is great acceleration and coordination of arms to gain speed. A race start is applied to catch a Frisbee, it is popularly known as cutting used to leave the defense behind. Sometimes, offensive shifts are marked by long distances covered by athletes, which sometimes exceed two-thirds of the field (over 65 yd).

Jumping

Jumping is to thrust off the ground, stay in the air for a moment, and fall again. In Ultimate Frisbee, players jump to catch or intercept a Frisbee flying beyond a player's normal reach (abducted arms). It may happen during a run or in neutral position, as well as while two or more players go for the Frisbee. Likewise, players may jump simply to make the Frisbee stay inbounds. These jumps are vertical for the most part. However, they can also be horizontal with extended arms to catch a Frisbee that seems out of a player's reach. This jump is also known as layout.

A horizontal jump is the best sight this sport has to offer. In some elite matches, it is common to see jumps resembling flights to catch the Frisbee. Player's efforts to catch the Frisbee before it touches the ground are outstanding.

We propose the following order to teach and learn:

1. Thrust: It is achieved by speeding up during the run.
2. Slowing down stage: Players bodies must bend enough to allow powerful extension (eccentric muscle mechanisms). Their feet also play an important role when one is in front of the other. If players are right-footed, then their right foot must lead.
3. Power stage: Both legs must generate the most power (concentric apparatus).
4. Flight stage: Whether horizontal or vertical, extending one or both arms may make a difference when intercepting or catching the Frisbee.
5. Falling stage: This stage must allow a player's body to balance itself in order to perform a different action in case it is required.

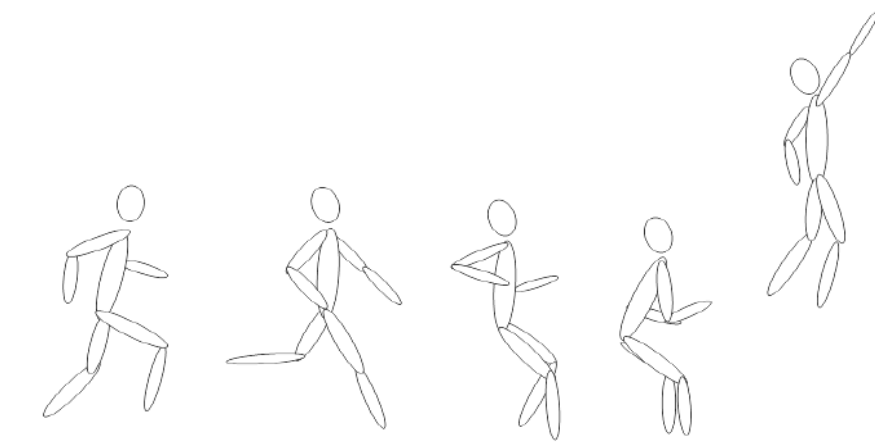


Figure 2. Vertical jump



Figure 3. Horizontal jump

Even though a player may perform well when jumping (over 50 cm – 20'' off the ground), the efficiency of a jump is subject to anticipation, coordination, of lower limb power and the speed of the run before the jump.

2.1.2. Throws

A throw is defined as a group of moves that give both spin and drive to a Frisbee so that it may fly a given length. It takes place when a Frisbee is thrown intentionally, and the wind has a stabilizing effect to make it fly and land somewhere or someone else may catch it. In order to throw, leg stability must be considered. Players' feet must spread apart and their knees must bend so that a stable base is created and their torso can turn easily.

Throwing the Frisbee correctly, accurately, and carefully aimed is an important role for players. If they do not throw accurately, they will not perform well, and it will reflect on the results of a game. The Frisbee must always go from one player to another without falling on the ground. If it lands on the ground or in an opponent's hands, it forces a shift from offense to defense. That is, the offense loses possession of the Frisbee.

At first, repetition is best for players learning to throw. Learning to throw is achieved over months of practice and improving may take even longer. Therefore, it is necessary to be patient, and to use a method that involves practicing throws repeatedly. It could include moving target practice,

games with a Frisbee, and so on. Technical aspects, such as type of throw, distance, speed of throw, etc., must be studied progressively. In addition, while teaching to throw, tactical aspects must also be included. This could be achieved through games for two or more people, so players can have guided varied instruction.

There are many ways to throw a Frisbee. Here we describe the most common ones in Ultimate Frisbee:

Forehand throws

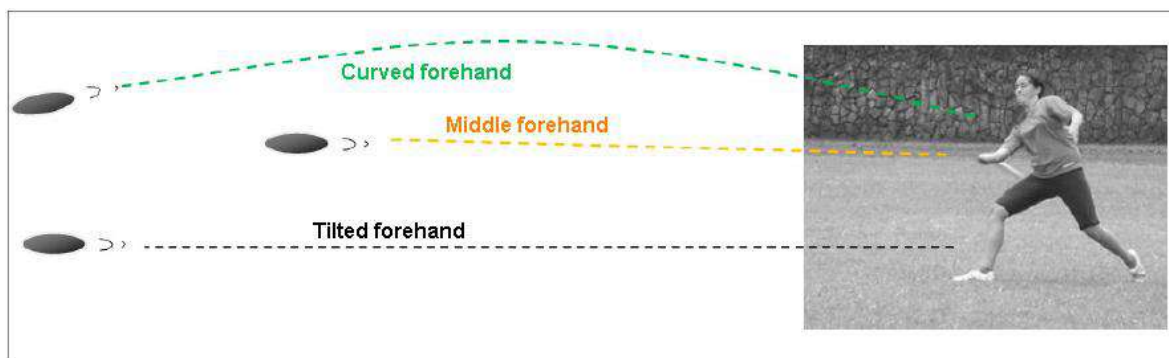


Figure 4. Forehand throw techniques

Backhand throws

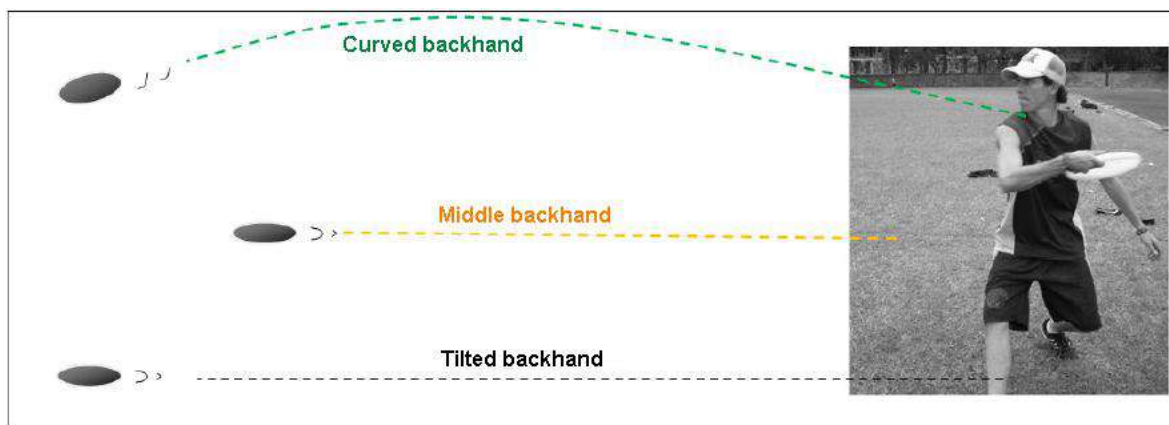


Figure 5. Backhand throw techniques

Hammer throws

This throw has a shorter flight span than the others (backhand and forehand). Therefore, it reaches the receiver more quickly. A curved hammer throw is when the disc flies with the concave side facing up, and a flat throw is a parabolic shape movement and by the perpendicular flight.

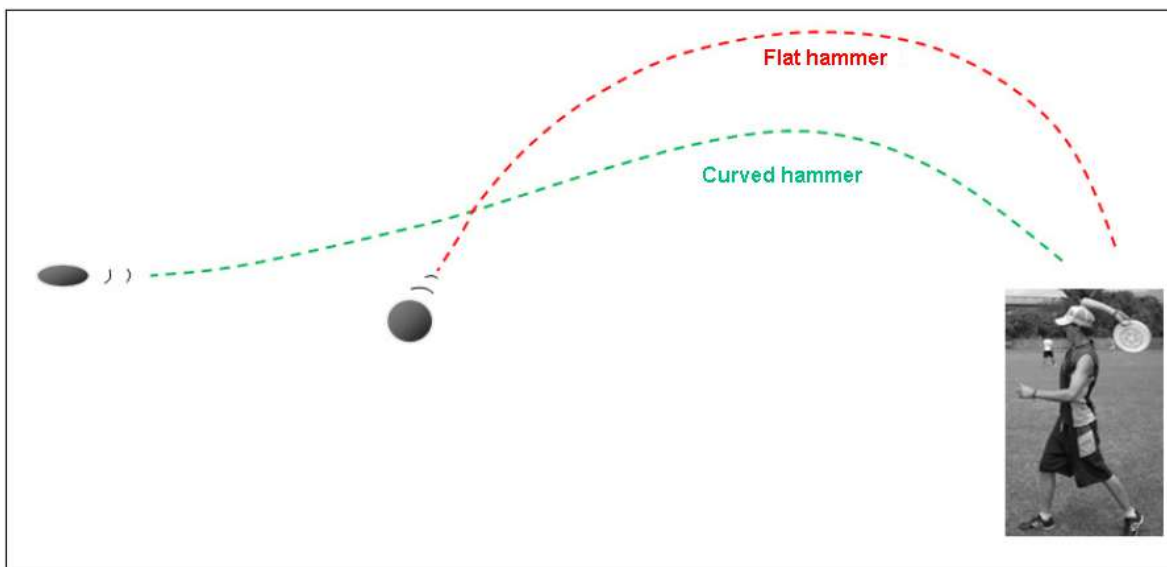


Figure 6. Hammer throw techniques

Sequence of movements and muscles used in throws

Sequence of movements for forehand throws

Drive: external elbow rotation, wrist abduction

Force and spin: internal right elbow rotation and wrist adduction

Deftness or aim: Releasing the Frisbee

Muscles involved in forehand throws

During a throw, it is important for players to contract their torsos because this is the main stabilizer. This provides more or less power depending on the distance that players intend to reach. The torso also provides a turn (torso rotation) that renders force. This action is joined by external elbow rotation, which then gives power to this throw.

External shoulder rotator, teres minor, infraspinatus.

Subscapularis, flexor digitorum (middle and index fingers), pectoralis major (it moves the humerus).

Relaxation of flexor digitorum.

Forehand throws are learned faster than backhand throws according to some instructors in Colombia. Moreover, learning forehand throws first helps to understand pivoting, better. During a game (tactics of the game), when beginners play as throwers, they can understand the use of pivoting better. Pivoting helps players leave the defense behind depending on the 'defensive profile'. That is to say, if the defense covers the right side (forehand), they will shift their moving foot to throw backhand. Thus, developing forehand 'skills' first will provide a better environment for beginners who use feints.

Sequence of movements for backhand throws

Drive: Shoulder and arm flexion, wrist flexion, internal right elbow rotation, left torso turn.

Force: Arm extension, shoulder adduction, torso rotation to the left, wrist abduction.

Deftness or aim: Releasing the Frisbee.

Muscles involved in backhand throws

In backhand throws, isometric contraction is important during a torso turn. Our torso is our main stabilizer because it provides more or less stability depending on the distance that the player wants to reach.

Our torso also turns along with the extension of our arm so that it gives power to the throw.

Pectoralis major, flexor carpi radialis, biceps brachii, internal rotators, latissimus dorsi, obliques.

Medial deltoid, forearm external rotator, latissimus dorsi, obliques, triceps, wrist extensor, finger extensors.

Relaxation of finger extensors.

A pizza throw stems from a backhand throw. A Frisbee is thrown parabolically to take advantage of ascending and descending flights. That is, a Frisbee flies a special course that enables it to stay in the air much longer. This throw is useful for short distance passing over other players.

Sequence of movements for hammer throws

Drive: Shoulder flexion, arm flexion, wrist abduction, torso and head tilt to the left.

Force and spin: Arm extension, shoulder extension, wrist adduction and flexion of index and middle fingers.

Deftness or aim: Releasing the Frisbee.

Muscles involved in hammer throws

Serratus anterior, biceps brachii, extensor carpi radialis longus, obliques, dorsal and sternocleidomastoid.

Triceps, teres major, extensor carpi ulnaris, flexors of middle and index fingers.

Relaxing fingers.

This throw is probably the most difficult to intercept because of its unusual flight path (curved parabolic movement) and the speed it hits the target. Therefore, the only possibility to intercept it is in the area where it is aimed. That is, unlike the forehand or backhand throws, which may be intercepted while they are flying, the hammer throw is marked by a parabola that ascends and descends very fast.

2.2. Collective technique

Riera (1995) defines collective technique as all those actions that two or more sportspeople carry out to achieve a common goal. It leads to the coordinate performance of all the perception and response systems in sportspeople: Moving, shifting, jumping, catching, looking, listening, breathing, etc., in order to create collective abilities.

In Ultimate Frisbee, these combined actions come down to one player throwing the Frisbee to make a pass, and another player catching it. If this process is interrupted (either because of an interception or because the Frisbee touches the ground) the offense is stopped.

Some examples of collective technique:

A player that throws 65-yd passes or longer, and a player who catches the Frisbee.

Three skillful players anticipating get together to build a defense against a single player. Cup defense.

A reasonably tall player who jumps to catch a pass in an area full of defensive players.

A team that stands on the field forming a line (stack), a trident, a diagonal, and so on.

A thrower that makes the Frisbee curve either in or out when making a pass, and a player able to catch it.

2.2.1. Passing

Passing is an action between two players on the same team. One player hands over the control of the Frisbee to another player. Therefore, it involves both a thrower and a catcher. In Ultimate Frisbee, pass is essential because it is the only way to move. It is subject to a conditioning factor which is 10 seconds to pass.

A pass is a throw, and it may be a backhand, forehand or hammer throw depending on the play. We will only deal with actions relative to throwers, and the circumstances that they must consider in order to make a pass just for categorization.

Parinella and Zaslow (2004, p.10) suggest the following good-passing principles:

Identifying a catcher

Making a catchable throw

Putting the Frisbee out of the defense's reach

Avoiding risky throws

Variations of passes are noticeable by seeing how high the Frisbee flies: Low, medium, high (forehand and backhand). These variations can also be classified by how a Frisbee flies — curved flight and straight flight (backhand, forehand and hammer). See Figures 3, 4, and 5.

Feinting (faking)

Silva (2002) defines feinting as an action that leads an opponent to make a mistake. It is a series of connected movements used to fake a play, and deceive an opponent.

Feinting is essential in team sports such as football, basketball, handball, etc., and it is used to make individual plays that unbalance an opponent. During a game, any player, whether offensive or defensive, can feint to force an opponent to make an error.

In basketball and football, there are individual scoring plays. However, in Ultimate Frisbee, there are no individual plays because another player is always necessary to play the game. Therefore, the main feinting is pivoting to tilt, turn, and make all the moves that help a player feint or deceive the defense.

Cases fit for feinting:

1. Offensive player with the Frisbee and facing defenders (obstacle).



Figure 7. Offensive player against defensive player

2. Offensive players shifting to get out in the open and catch a pass.



Figure 8. Offensive players (black and yellow) in the game

Players with the Frisbee must consider:

- a. Dodging the defensive player covering them.
- b. Waiting for teammate to get in and out of a place to catch a pass.
- c. Making a good throw.
- d. Passing in less than 10 seconds.

3. The players with a defensive role can also feint to fool the offense and get possession of the Frisbee.



Cutting

Cutting is when players on the run shift without having the Frisbee. It is used to continue on offense before a defender intercepts the Frisbee. In other cases, this powerful race start is used to make the best of an offensive play that could lead to scoring. Therefore, the goal of this race start is to dodge the defense (one-on-one), and catch the Frisbee.



Rules for cutting

It is understood that passes are always made after both the thrower and the catcher have dodged the defense. Therefore, cuts are almost always made in an open field, while passes are made in the catcher's direction (see figures of technical principles).

In some cases, cutting to catch the Frisbee does not mean getting ahead, but simply continuing the offense (keeping possession of the Frisbee). An open space may be to the right or left, in front, behind, diagonally, etc. Then, cuts may involve covering long distances (40m to 60m – 44 yd to 66 yd), or changing a straight course of the run into a U, an L, a zig-zag, among others (see figures of technical principles).

2.2.2. Catching

This means to catch the Frisbee after a throw. The catcher's job is to make sure that the Frisbee does not hit the ground. A player can receive while the player is still or in motion, running or jumping, with one hand or with both.

Catching the Frisbee is considered the end of a play. It may be a goal, or the fraction of a group of passes that will lead to a goal. Players in possession of the Frisbee must continue playing offense so they can go from catcher to thrower.

When playing offense, shifts such as walking, running or jumping are not allowed. Therefore, if there is a defender blocking the throw or the path of the Frisbee, pivoting is used to feint.

Rules for good catching according to Parinella and Zaslow (2004, p.32):

Taking advantage of chances: Running for the Frisbee.

Safety: catching the safest way possible so that the Frisbee does not hit the ground.

Types of catches

There are two ways to catch a Frisbee: One-handed or two-handed catches. These may be running or jumping catches, and they are classified as follows:

Two-handed		
Grabbing with player's thumbs facing up	Grabbing with player's thumbs facing down	Pancake catch or clap catch
		

Figure 9. Types of two-handed catches

One-handed	
Grabbing with player's thumb facing up	Grabbing with player's thumb facing down
	

Figure 10. Types of one-handed catches

2.2.3. One-on-one

In this part of the collective technique, the mastery of throwing and catching is taken for granted. Therefore, players are given exercises that combine forehand, backhand and hammer throws along with their catches.

Below, we mention the basic actions that an Ultimate Frisbee player must perform:

Passing (thrower, catcher)

Throwing, running, and catching. Zig-zag, X-shaped, and diagonal shifts making forehand, backhand, and hammer throws.

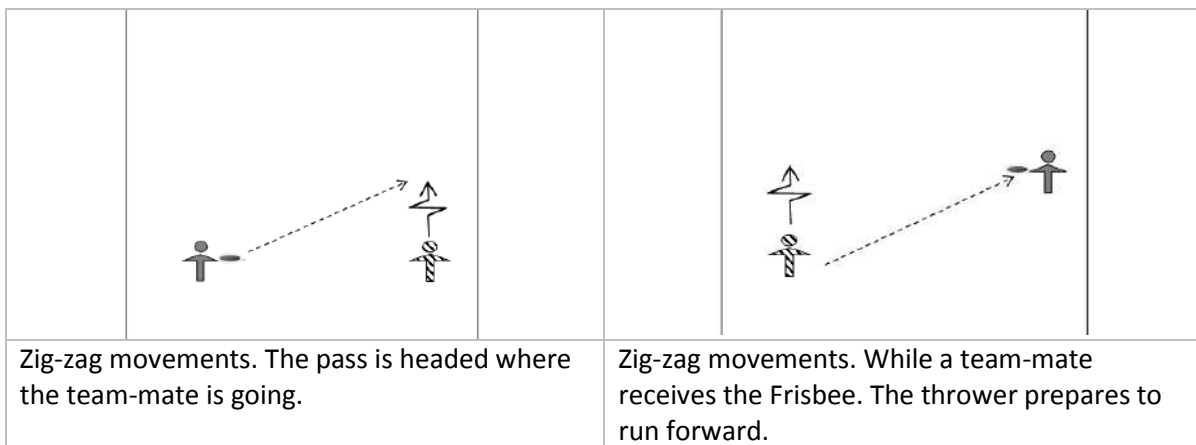


Figure 11. One-on-one Throwing and catching

Front. This move is catching the Frisbee on the run (attacking the Frisbee)

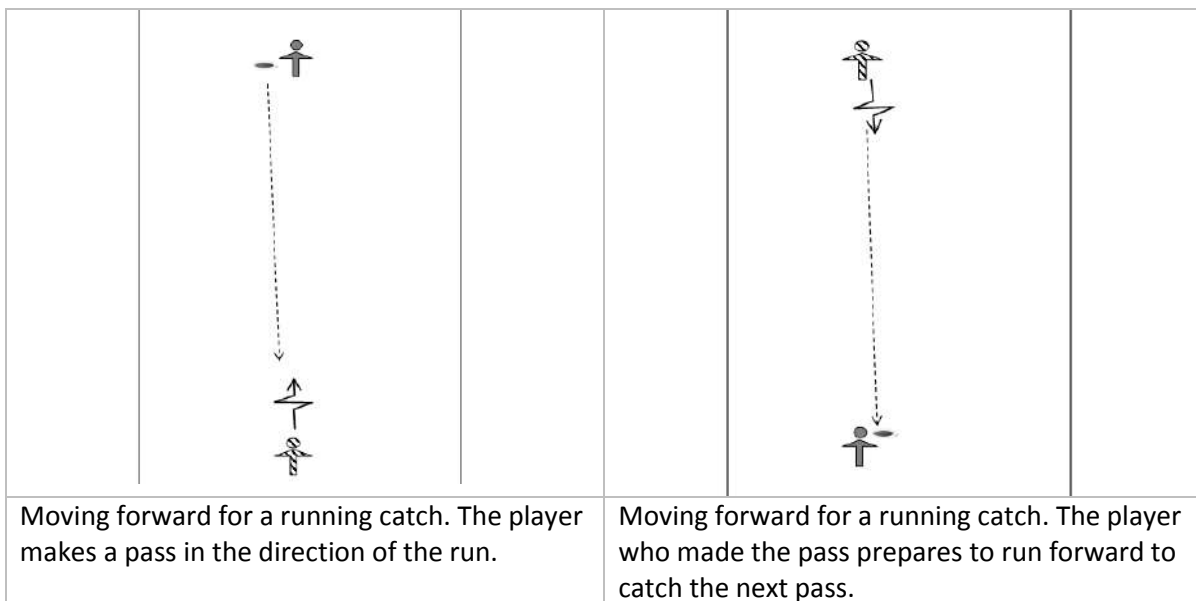


Figure 12. One-on-one Throwing and Catching

Defense (thrower and still defense)

The defense will only have a still position that the thrower must barely dodge. Then, the thrower must:

Know the positions that pivoting could provide (including hoop exercises).

Throw while leaning (use the full extent of the pivoting foot to avoid an interception).

Throw after a backhand or forehand feint, or vice versa.

Throw after turning.

Defense (defense and still thrower)

The thrower will only have a still position that the defender must protect.

Know the profile of the thrower

Face-to-face defense

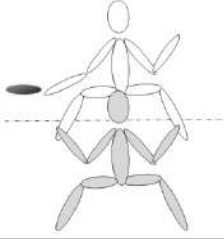
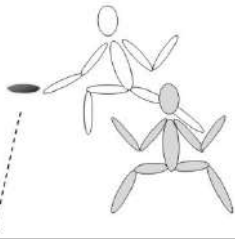
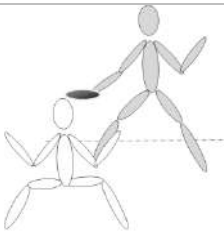
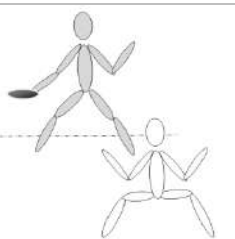
Lateral defense. Touching the potential catcher

Defense (defense and still catcher)

The catcher will only have a still position that the defender must protect.

Face-to-face defense.

Lateral defense. Making visual contact with the thrower

	
<p>Sketch of active thrower and passive defender (still). The gray player defends without moving.</p>	<p>Sketch of active thrower and passive defender. The white player makes a pass after dodging the defender.</p>
	
<p>Sketch of passive thrower (still) against defender blocking the forehand throw.</p>	<p>Sketch of passive thrower (still) against defender blocking the backhand throw.</p>

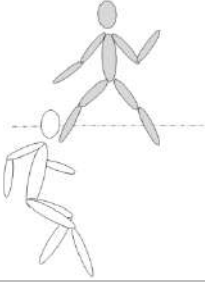
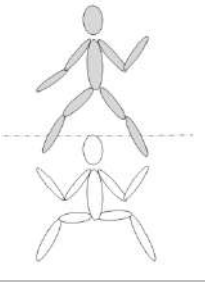
	
<p>Sketch of passive receiver (still) against a defender who makes eye contact both with the thrower and the receiver. The gray player has the role of passive receiver.</p>	<p>Sketch of passive receiver (still) against a defender who makes eye contact only with the receiver. The gray player has role of passive receiver.</p>

Figure 13. Ways to defend

Profile

This term refers to the type of throw (either forehand or backhand) that a player wants to defend against. Blockers stand left or right depending on the throw they want to stop.

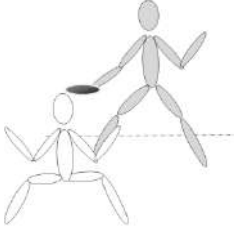
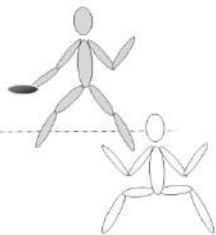
	
<p>The white player defends against the forehand throw.</p>	<p>The white player defends against the backhand throw.</p>

Figure 14. Defensive profile for backhand and forehand throws

When a player defends the profile of a throw (forehand or backhand), the goal is to guarantee that the defended side will be useful for the 'general defense' of the other six players on the field. We show an example below:

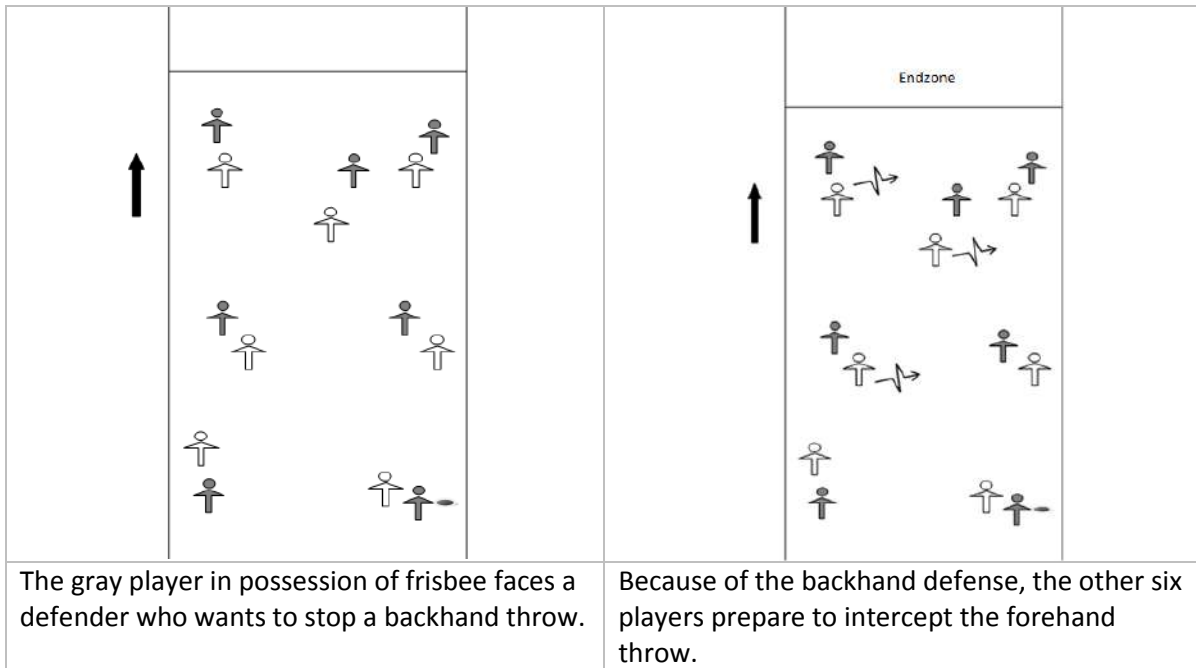
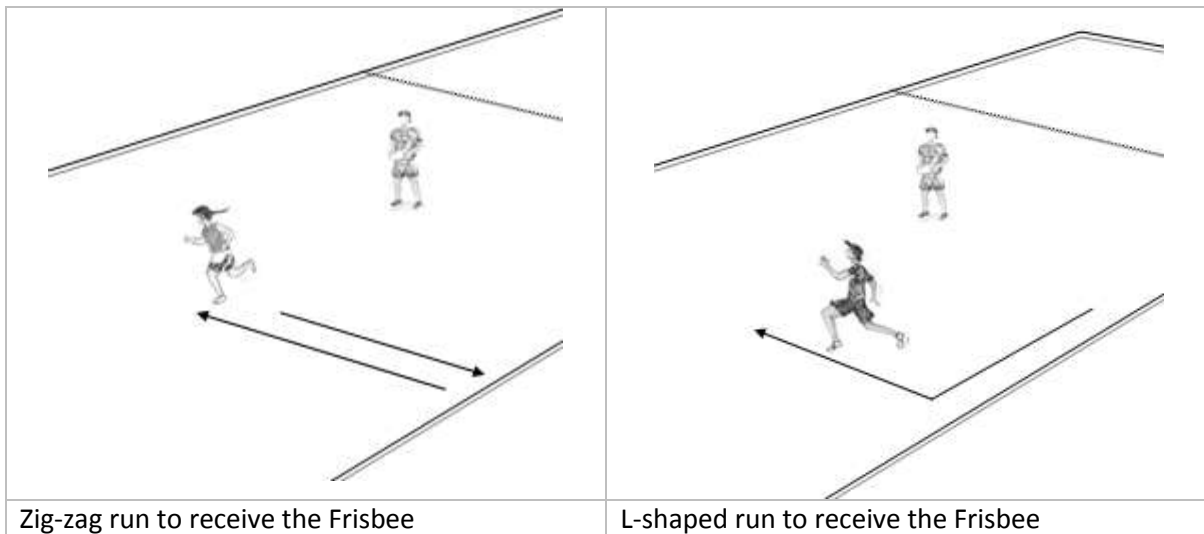


Figure 15. Profile and general defense

The position of the thrower will promote specific positions on the field. For instance:

Catching feints

These are the shifts on the run that players must know to dodge the defender guarding them (one-on-one). They are:



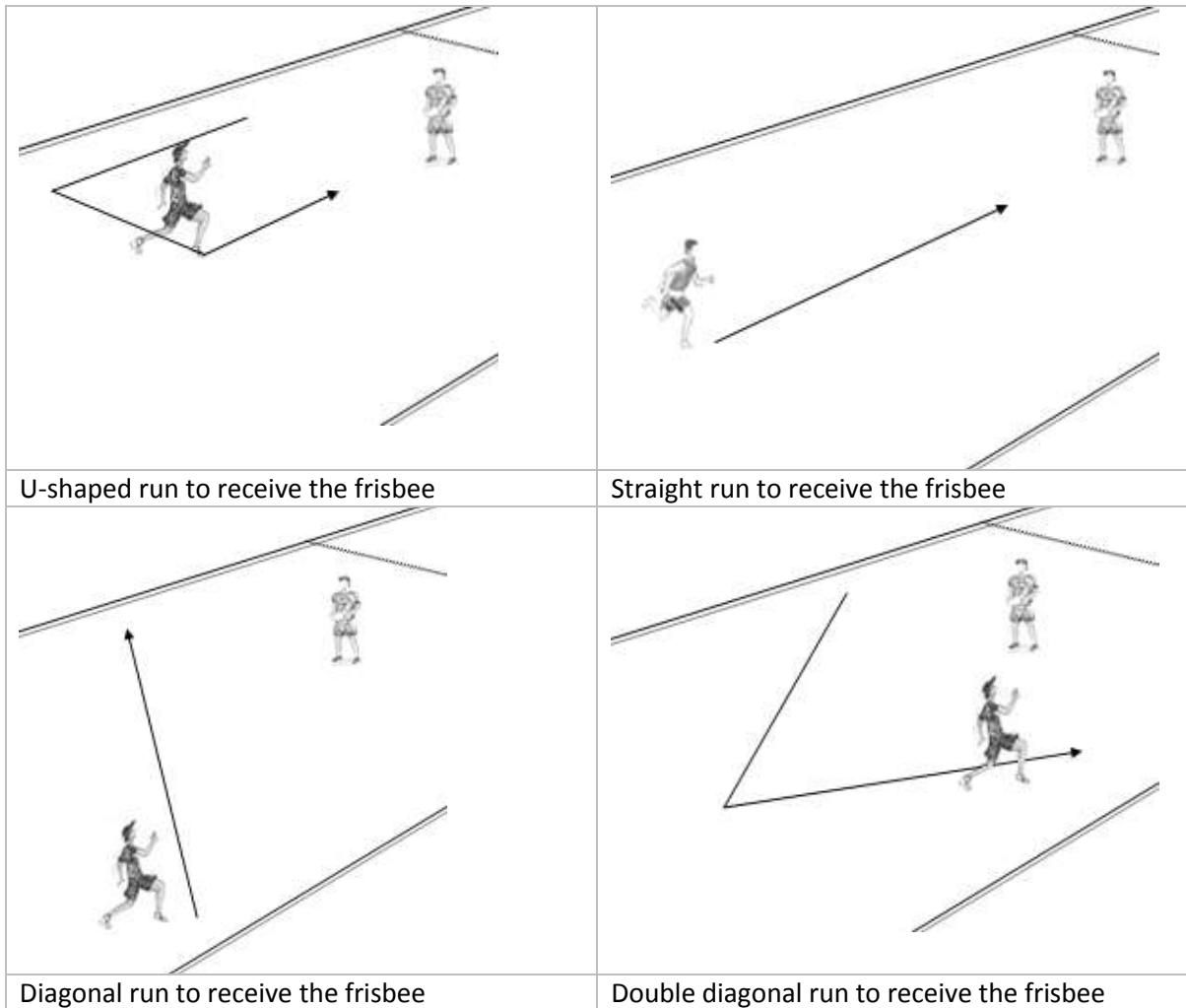


Figure 16. Types of runs to feint

2.2.4. Collective defense

The goal of the collective defense is to pressure the offense into making a mistake. As a consequence, the defense must cooperate make the offense commit an error. For instance: Making the time for the possession of the Frisbee run out (10 seconds), or making an interception of the Frisbee possible. This kind of cooperation entails an agreement among the players, and they know their defensive task (one-on-one) depending on the situation of the game. These situations may be: A player in mid-field, the thrower on the edge of the side-line, the potential catcher moving towards the goal area. So, the defending players (zone defense) can make changes at a distance, and modify all the conditions set up to recover the Frisbee. In conclusion, the defense must restrict all of the offense's potential open spaces until there is no place left to throw and/or catch.

There are certain positions on the field based on other team sports that may suit this goal.

Cup defense

This defense has three players covering a player with the Frisbee. It is named cup defense because of the enveloping or surrounding action used against offensive players so they do not have a clear passing option.

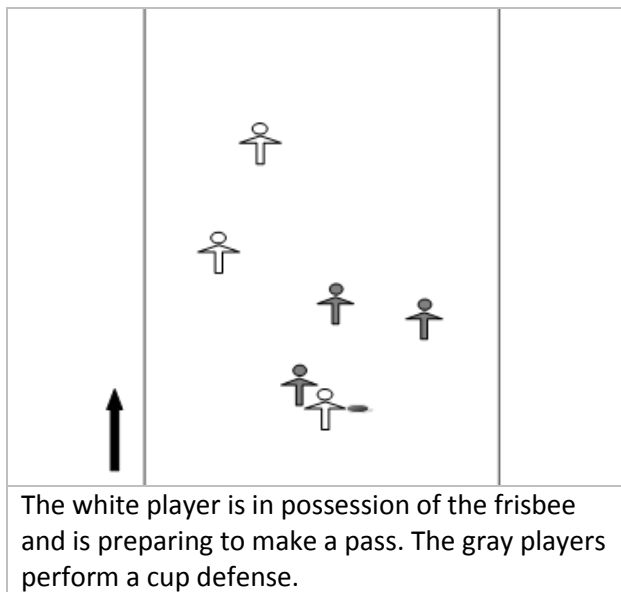


Figure 17. Cup defense

This kind of defense also considers the thrower's position on the field in order to cover open spaces to make the pass.

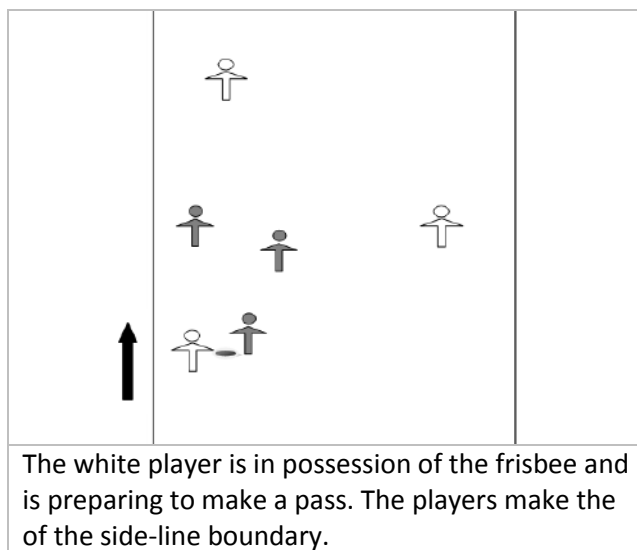


Figure 18. Cup defense along the left side-line

Zone defense

This kind of defense includes all the players on a team because it involves a distribution that allows them to defend all the possible passing paths. That is, players do not defend one-on-one; they spread out on the field in order to defend open spaces.

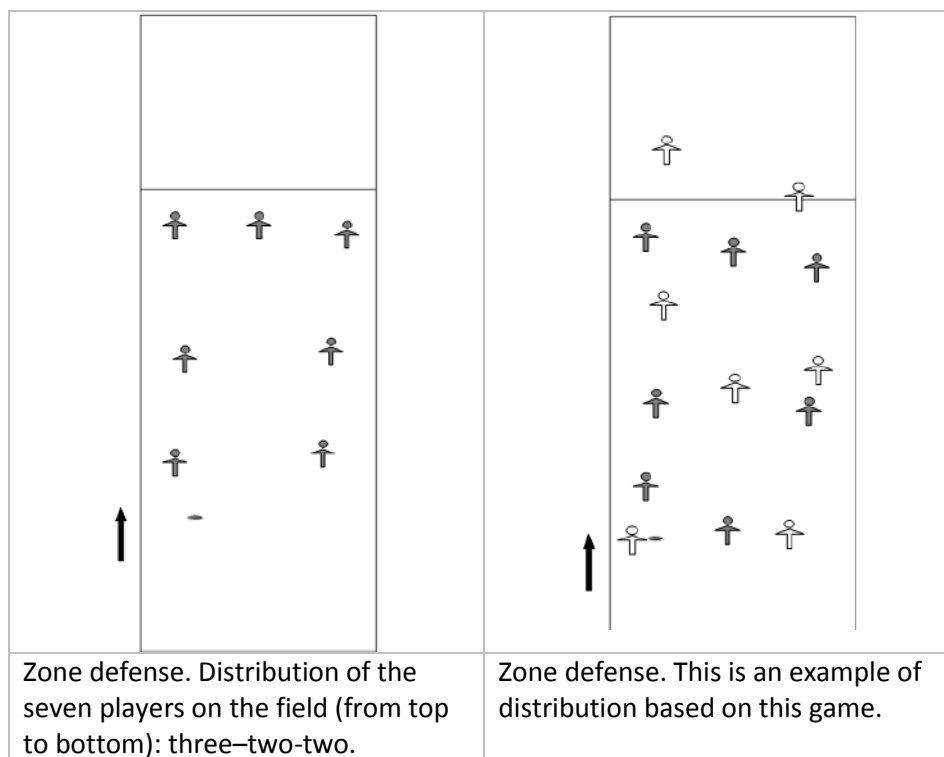


Figure 19. 3-2-2 Zone defense formation

This type of defense is also known as the trident because of its 3-3-1 or 3-2-2 formations.

Defensive positioning on the field depending on offensive players

The still position of the offensive player influences the positioning of the defense. Consequently, the positioning area of the thrower will provide some characteristics for the positioning of the defense. For instance:

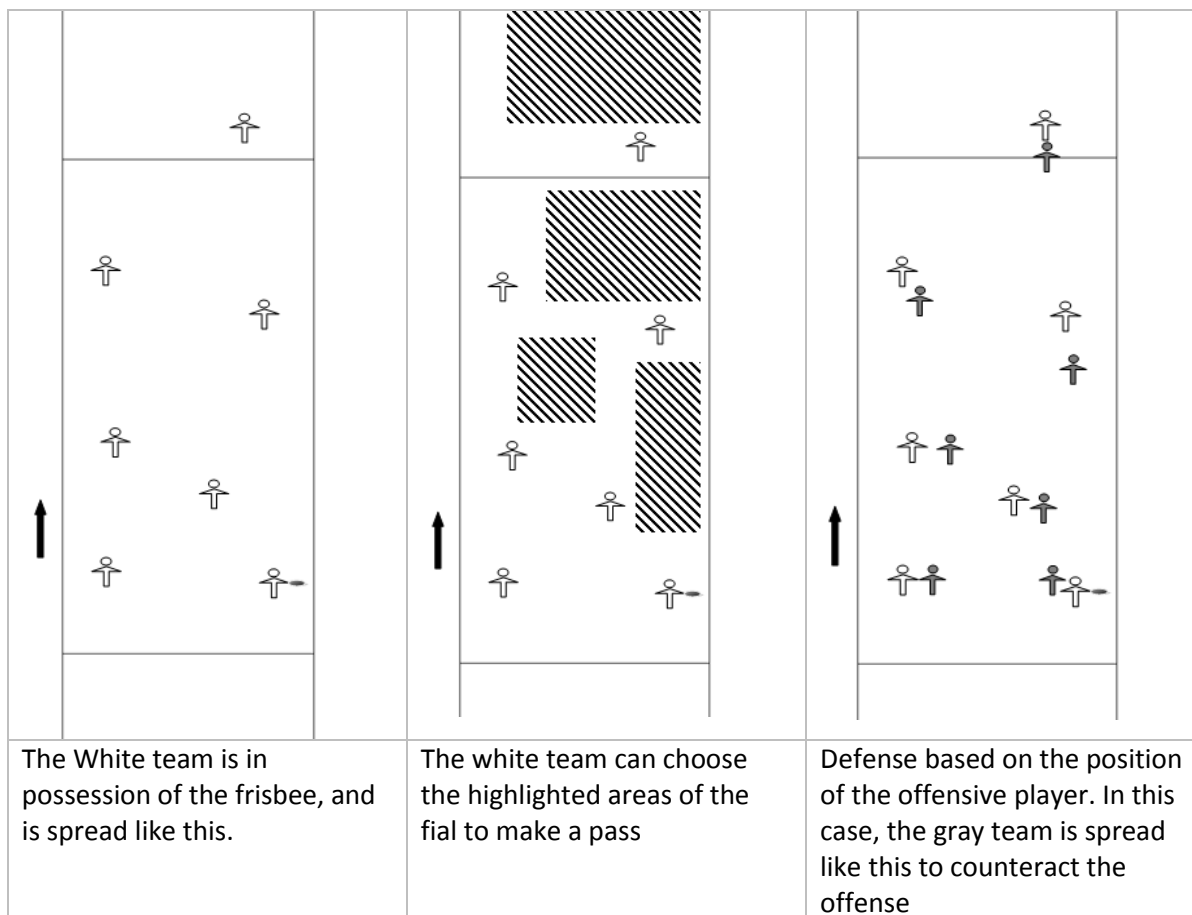


Figure 20. The position of the defense on the field depending on the offensive player

Therefore, the collective goal of the defense will be to counteract the potential threats (catching in the clear space) of this positioning.

If the offensive players spread horizontally, the defense must prevent possible attacks.

Horizontally

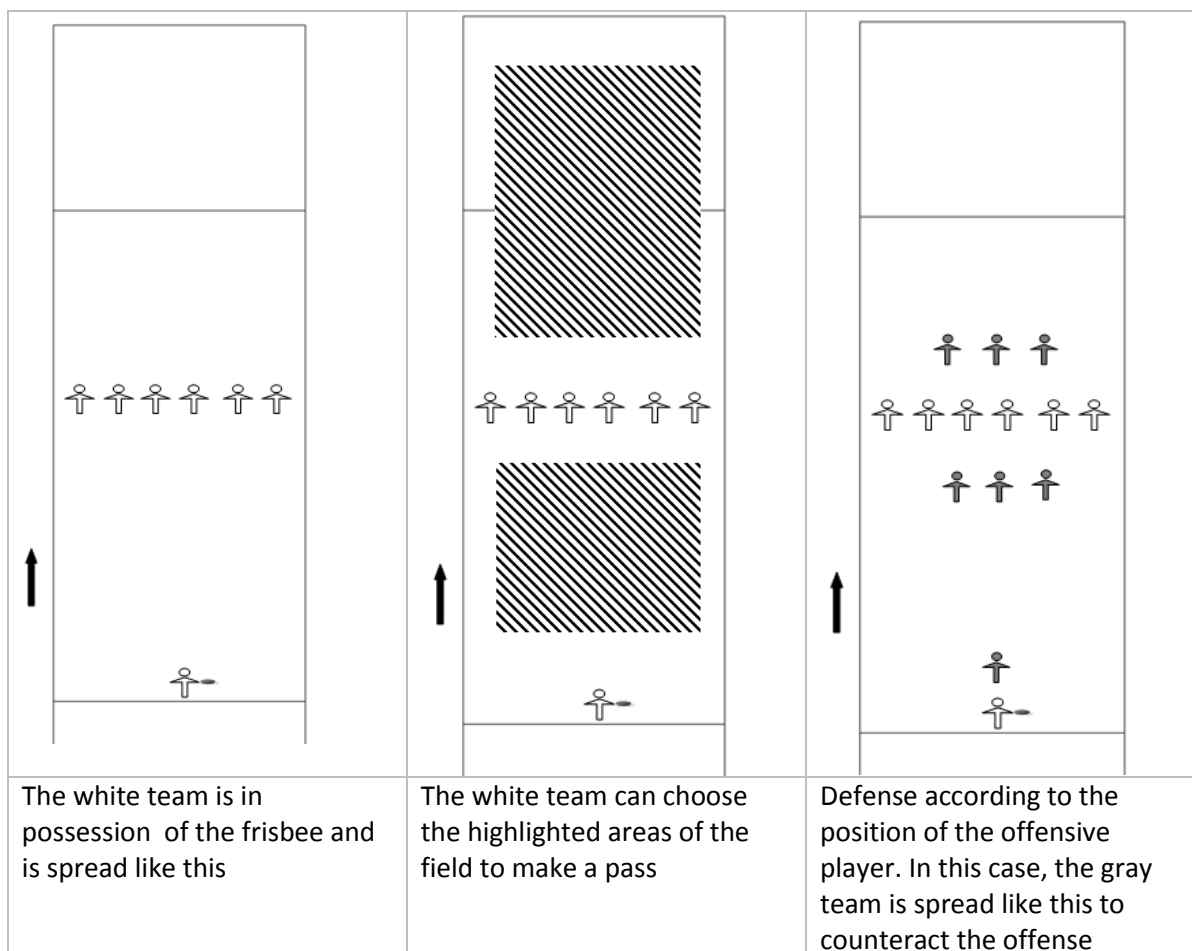


Figure 21. The position of the defense for the horizontal stack

Diagonally

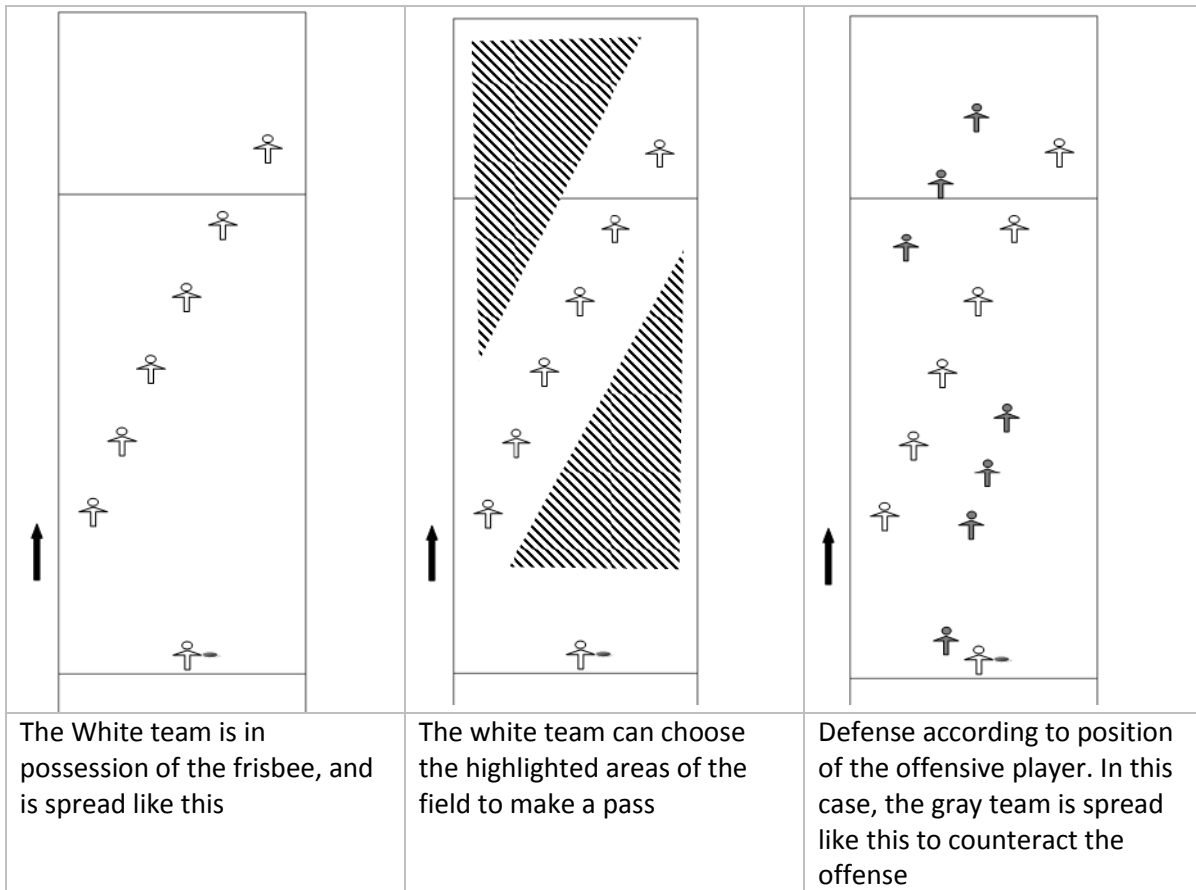


Figure 22. The diagonal positioning of the defense on the field

2.2.5. Collective offense

This kind of offense uses some players to spread strategies (two or more players). The players aim to make surprise attacks on the defense in the open spaces left by this kind of spreading. For instance:

Stack formation

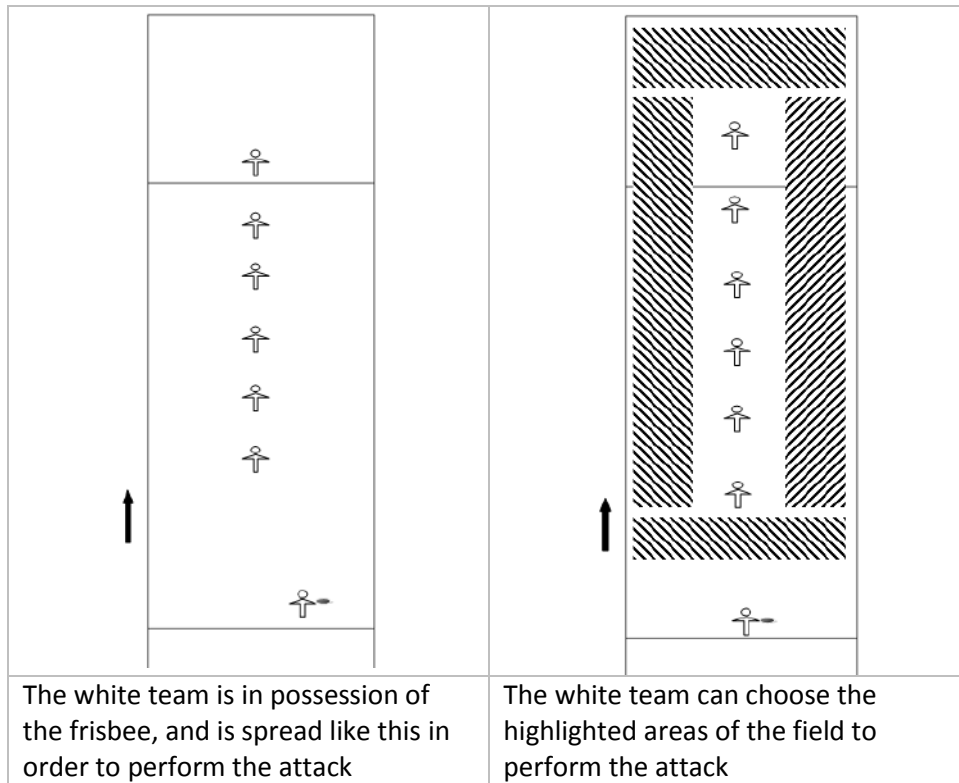


Figure 23. The collective stack offense (vertical)

These structures change (horizontal stack, diagonal line) depending on where the Frisbee is on the field. For instance, if the goal zone is near, it is possible to use the L offense.

L Formation

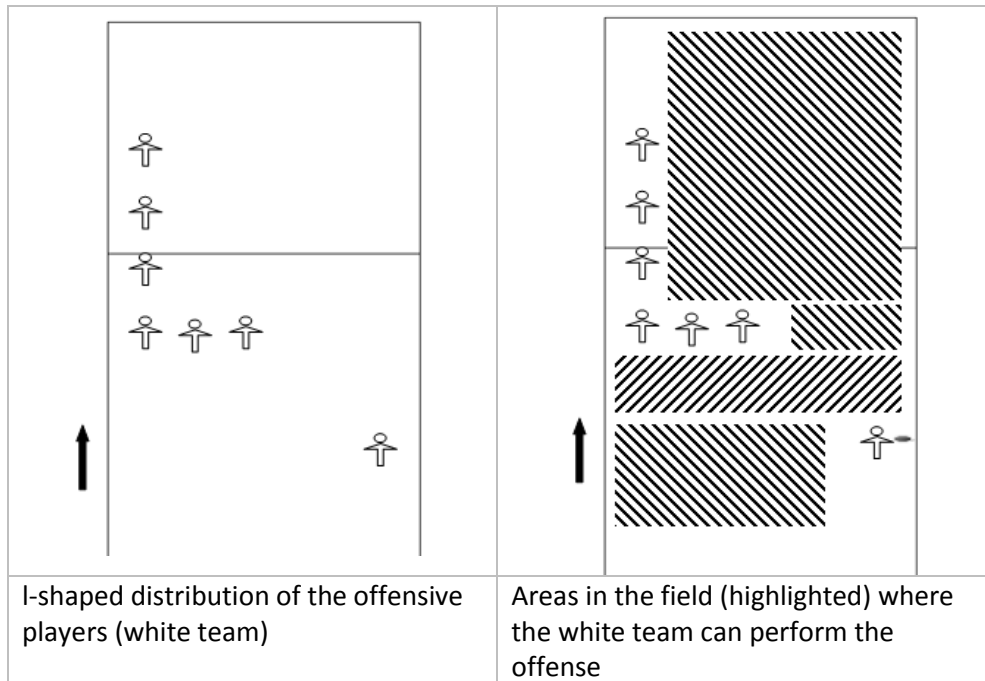


Figure 24. Collective L offense

Rhombus formation

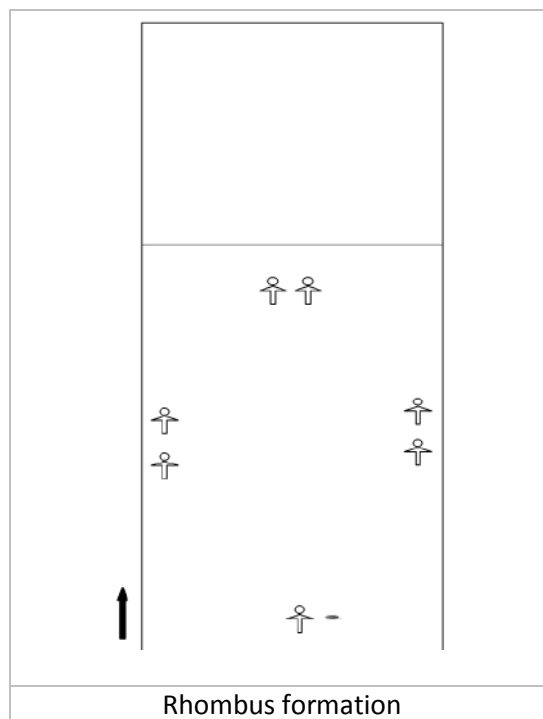


Figure 25. Collective offense Rhombus formation

All the players must know beforehand these offensive positions on the field because they are the main foundation of the collective strategy. Besides, offensive plays have easily identifiable names on the team so that all the players in the game can use them as a code.

Then the planning of the collective offense considers number of players to be used, offensive sprints and/or feints, number of passes, time in the game to carry out the offense, and the position of the Frisbee.

3. Fundamentals of the tactics

The tactics in the game means a system of action plans and alternatives for decision making. This allows you to adjust in a short time a logical sequence of actions according to the target to ensure success (Aquesolo, 1992).

Tactics is the relationship of two or more individuals within the field of play, ranging from individual skills and collective skills. Also, the strategic planning and the collective skills of team members. These actions are shown in real time (live) and takes into account the rational process to play and interact well in sports competition (Costoya, 2002).

Riera (1995) proposed that the objective of the tactic is to overcome the opponent and avoid being overwhelmed by it. Therefore, team members must learn to work with each of his colleagues to compete with the opposing team. At every moment the players should consider the situation of opponents, the ball and players, to decide quickly and run the best collective action to achieve the objective.

At the time to talk about tactics must take into account the stage of the game, players, opponents and the frisbee. These elements are in constant motion and interaction. The teacher or coach is a guide that serves to promote activities that enhance the solution of problems through the creation of a learning environment that involves technical training (pitching, catching, jumping, running) and the development of all Physical abilities.



Learning tactics

In the teaching of tactics should be directed to the player progressively tactical situations through games. These games focus on teaching the basics of the sport (not run with the frisbee, the spirit of the game) and increasing its complexity by simulating game situations that employ two or more players, colleagues and adversaries. In these games is changed from low to high field (yds²). Moreover, increase the difficulty of the game rules in order to improve teaching of a most effective tactic, aimed at competition and sport. The use of games helps the assessment of 'making decisions', individually and collectively, to improve even more.

Similarly, the coach who knows the player and the team can develop an individualized training plan and specific. This training must adapt to the conditions, needs and capabilities of your computer (the principle of individuality). This will enable the highest level of sports performance.

Teach the tactics employed by some methods or strategies. Mahlo (1985) and Blázquez (1995) propose:

- Troubleshooting through the spoken or written.
- Specification of situations using patterns made of slate.
- Specification of models in situations on the ground with moving characters.
- Photographs of game actions.
- Movies (very similar to the practice.)
- Technical and tactical exercises in the field of competition.
- Simplified tactical exercises (games).
- Other sports games with specific objectives.

3.1. Individual tactics

Riera (1995) proposed that the objective of the tactic is to overcome the opponent and avoid being overwhelmed by it. Therefore, individual tactics are seen as all the moves you can do to throw the frisbee or function to intercept the frisbee. That is, movements made by the player on offense or defense. Instance of individual tactical situations:

- Throw or catch the frisbee.
- The fake one by one (offense vs defense)
- The defense one by one (defense vs offense)
- Make a passes and cut
- Creating spaces in the field (offense)
- Lock-free spaces in the field (defense)
- Play with only one 'handler'. Only one player makes passes and receptions with the frisbee
- Play with only one striker

3.2. Collective tactics

According to Riera (1995) team members must learn to work together. Only together they must compete with the opposing team. In every moment, players should consider the situation of the game, opponents, the frisbee and peers. In this way, they must quickly decide and implement the most appropriate collective action to achieve the goal.

Then, in the collective is important tactical fitness, technical skills, expertise in the field of play, quick actions. Likewise, some areas in the game favored in the offense or defense, then everyone should know these areas. Also, the motivation and cooperation is important. In addition, all players must have self-control (inhibitory control) in the collective tactics. Similarly, technical actions that involve physical abilities such as strength, endurance, speed and flexibility.

Instance collective tactical situations in ultimate frisbee:

- The interception of the frisbee. The defense team has this task.
- Creating free spaces in the field to be made passes and receptions. In this way, the team moves into end-zone (offense).
- The players occupy voids in the field for blocks (zone defense, defense cup)
- In a game situation of four people (2 vs. 2), the player with the Frisbee and his partner (offense) versus defenders. A player blocks the player with frisbee, the other player blocks the receptor.
- The superiority of players on defense (many vs. few) offenses looks for ways to keep the frisbee.
- The superiority of players in offense (many vs. few) the defense must prevent the goal.
- During a counter offense. While this happens a transition action or loss of frisbee, there is a change in status of defense to offense or vice versa. The players play quickly so that the defense cannot perform efficiently.

To structure the training, the field can be divided as follows:

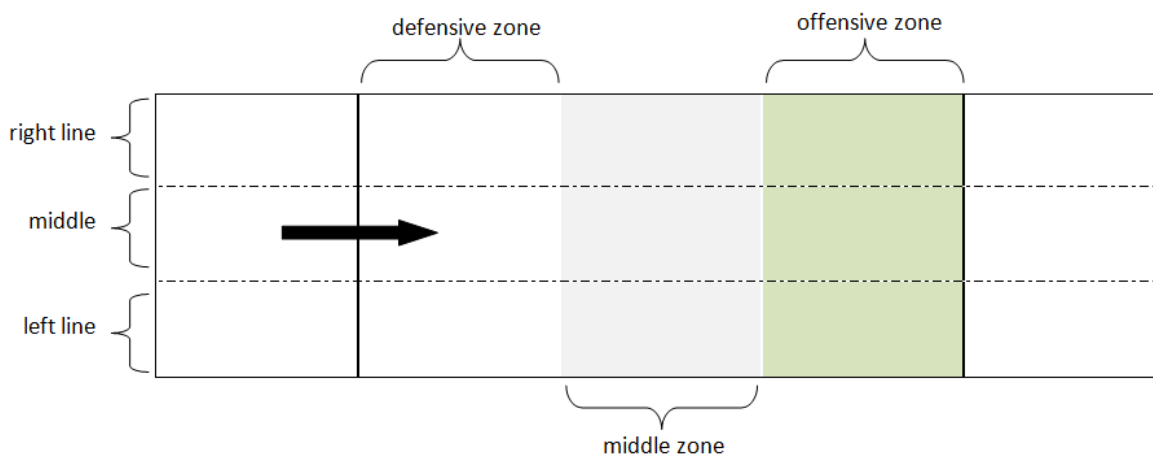


Figure 26. Mental map for the playing field in ultimate frisbee

3.3. Tactical training

According Vrijens (2006) training is a process that allows for gradual adaptation to stress. This definition is based on biological variation of the individual in the musculoskeletal system and cardiovascular system.

The training is to be understood as a concept has been supplemented through the history and development will always be with the help of sports science and biomechanics, biochemistry, neuroscience. Also the training is developed by rational criticism, the exploration of new scientific trends as experimental investigations, which ultimately are based on the basis of trial and error.

Then, the sports training is a commitment involving the graduate physical education, physical trainer and the group of people surrounding the athlete, to employ the assessment and self evaluation. Thus, the procedures shall be modified or be used repeatedly the same job or training plan.

The development of physical abilities and coordinative abilities are important for performance in ultimate frisbee. This development goes hand in hand with motivation (a mechanism for better performance), to nutrition and all the pedagogical principles that recognize the player as rational human. He can also know their strengths and weaknesses so that the streamline. However, the progressive adaptations to stress or fatigue are limited. Not always improve (the adaptation is not infinite), but the characteristics of the training plan provides step by step (time) 'athletic performance' to athletes (up to% 100 of the maximum level) for the competition. Then the 'athletic performance' should decrease step by step, decrease the intensity and volume of training, and then the athlete will be ready for a new beginning or new competition.

The training process is materialized in a directed action. He has a very specific purpose that specifies the objects and methods to be used, therefore, required creating an educational plan. Vrijens (2006) characterized as follows:

- Defining the purpose of training (quantifiable).
- Choice of training content.

- Determination of time for the stages (development, stability and competence, time).
- Choice of objects for training and training methods to be used.
- Monitoring objectives through evidence or test.

On the other hand, when referring to 'objects and methods' takes into account the biological principles and pedagogical principles for this plan of training. All coaches should know the principles for training.

3.4. Description of the proposed training of motor behavior (Costoya, 2002).

According Costoya (2002), analysis of motor behavior in a sport produces a description of the internal logic, and this serves to make a practical intervention or training plan. It argues that '(the methods of analysis)' aims to build knowledge about the internal logic. This knowledge is not intended as a prescription applicable to all sports but is a teaching guide for all coaches.

It is a methodology that could use all the coaches who are looking for maximum performance on their players. This 'proposal' is the result of a research that (Costoya) made in basketball. He aimed to identify the functional structure of the sport. This made it possible to identify 'motor behaviors' of athletes and their relationship with their position in the field. Then, these characteristics are the structure for the game or sport.

Then, as in basketball, ultimate frisbee is presented through the analysis on all the players performed in the field. This includes good and bad actions. In addition, (Costoya) the author speaks of motor behavior and cognitive components of actions performed by players and coaches. These behaviors (motor and cognitive) are used to achieve high performance. In this way, the coach gets the internal logic of the game and the components that have a direct relationship (cause and effect) to achieve good results during competition.

To Costoya (2002) the concept of position in the field or specific job is a definition based on those functions or sets of functions that a player plays during game action. The position player on the field is presented by functions that are usually associated with morphophysiological or anthropometric characteristics. The best player has these qualities.

Then, the categorization is identifying the conduct associated motor (CMA). These are the specific job functions and relationship with the achievement of results in the competition. Categories include technical and tactical aspects of individual player as the occupation of space in the game, temporal perception, the relationship between players.

Moreover, specific motor behaviors (CME) are those specialized functions that are subdivided one (associated with motor behavior) (CMA) and are fundamental requirement for a specific position in the game, for instance, the controller (in ultimate frisbee) central works of the field (associated with motor behavior) (CMA), in addition, the controller must run, make a reception, then he controls the frisbee and make a pass (specific motor behavior) (CME).

3.5. Instance of motor behavior associated (CMA) and specific motor behaviors (CME) applied to ultimate frisbee

Specific position in the field	Motor behavior associated (CMA)	Specific motor behaviors (CME)
Playmaker or handler	Distribute the Frisbee to cutters	Make fake and pivot with the frisbee. Make the best pass of the frisbee from close range.
	Play without Frisbee on offense	Located in areas free of opponents. Perform fakes and cuts from all over the field.
	Make the best throw to catch them. All throws, hammer, backhand and forehand.	Make sure throws in a straight line and curve. The frisbee flies from the inside-out and outside-in (backhand and forehand).
Cutters or poppers	Play without Frisbee on offense. Find a good space in the field.	Located in areas free of opponents. Perform fakes and cuts from all over the field. Run at full speed. Sprinting short and long distance.
	Making the best throw to catch a score.	Make passes with the frisbee from 40 yards or more. Make accurate passes to the end-zone (a score or goal).
Scoring player	Play without Frisbee on offense. Find a good space in the end-zone.	Run away at full speed. Cuts from all over the field. Identify areas free of opponents.
	Catch the frisbee during the run. Make layout or diving.	Catch the frisbee in the running. Catch the frisbee in the jumping. Catching the frisbee in the running and jumping.
Individual coverage for the launch of frisbee. (Defense: One-on-one)	Block a throw without running.	Perform the count of 10 seconds to thrower. Warn the throw of the frisbee (up!). Using the feet as a defense (foot block). Use arms, hands and fingers as a defense. Perform backhand defense or forehand defense. Perform 'cup' defense or zone defense.
Coverage for the reception of frisbee. (Defense: Team defense)	Block a throw in running.	Be between the offense and the frisbee. Dodge players to continue the defense. Block frisbee and not continue flying. Block the frisbee during the run. Make jumps, layout or diving defense.
	Play without Frisbee on defense.	Watch and block one or more players (poaching blocks). Identify the action of switching between other players. Perform the switch.
	Coverage a cutter for wins the position.	Run between the offense and the frisbee. Run away at full speed. Cuts from all over the field. Anticipate: Located in areas free of opponents.

Table 2 Motor behavior associated (CMA) and specific motor behaviors (CME) in ultimate frisbee

This classification has been done for other sports, however, the ultimate frisbee should not be understood as a rigid structure but as a sport that is explained by the actions and categories. This classification allows the planning of goals in training sessions or training program.

Then, the abilities for the ultimate frisbee player must be understood as a comprehensive education that provides aptitudes and attitudes that enable efficiency in any game situation. Thus, the player will have intelligence during the game (driving solution, mental solution), which allows a position of constant learning and pursuit of new knowledge. In this way, we suggest another classification (variant) of 'behaviors' for the ultimate frisbee player:

Roles in the game	Tasks or objectives
Player with the frisbee or thrower	Ensure continuity in the possession of the frisbee over the passes (pass to partner or team friend.)
Player without the frisbee (offense)	Run away at full speed. Cuts from all over the field. Catch the frisbee in the running or jumping or running-jumping.
Player without the frisbee (defense)	Retrieve the frisbee.

Table 3. Roles in the game and tasks or objectives in ultimate frisbee players

4. Principles of sports training

It should stress the importance to the (theory of training) at the level of development achieved in the sport today. Ramos (2001) states that the technologies and methodologies involved in the process of sports training are characterized by a strong foundation in science and experimental research. Thus, there is a scientific community that works with the aim of: athletes faster, stronger and smarter in the game. At all times they work to overcome and set new records. Thus, the methodologies for sports achievements are constantly innovating and in contrast to everything that surrounds the sport. This is the basis for creating all types of devices or accessories such as special shoes, motor learning scenarios, sportswear and shirts that regulate temperature, including the creation of hardware and software that enable precise control of how sports , Up to the challenge of the laws of physics and gravity and sports biomechanics.

Therefore, sports training with the aim of high performance sports is seen as a process that is subject to an interdisciplinary process that requires knowledge of the contents of the sport, planning, teaching methods, evaluations (test); psychological, physiological, biomechanical and nutrition so that articulates the research as the main source of knowledge that allows the optimization of these processes.

4.1. Physiological basis of training

The following describes the physiological basis according Vrijens (2006, 51).

The training process is understood as an adaptation to the effort that occurs in various systems that make up the human body, digestive system, circulatory system, respiratory system, nervous system, which also depends on the abilities of each individual to develop 'functional reserves' in the accumulation and disposal of energy, efficiency and effectiveness of the movement.

Vrijens (2006.52), adaptation classified into two types: immediate adaptation (unstable or poor stability) and the adaptation of long-term (stable).

Immediate adaptation occurs during the training session. This is summarized as follows:

1. Activation of human functional system as the production of hormones, the nervous system, heart rate, oxygen consumption.
2. Momentary balance between demand for energy by the effort (exercise) and the contribution of the body such as oxygen and carbohydrates.
3. The momentary imbalance between the need for effort and contribution of the body. These appear at the same time as the fatigue of the nerve cells that are responsible for all movements and energy input.

On the other hand, the long term adaptation after one or more macrocyclic (months) are summarized as follows:

1. Systematic mobilization of the human functional reserves, thereby, has stimulated in the mechanisms of training adaptation.
2. Over-or super-compensation, allows the morphological and physiological adaptation is evident as muscle hypertrophy, increased ventilatory volume, increased cardiac performance.
3. Consolidation of these adaptations characterized by an increase in the sources and reserves of energy (adenosine triphosphate ATP, phosphocreatine PCr, carbohydrates, lipids).

The exercise and training provided 'adaptation to the load' in the athlete, however, that adaptation is not always progressive increase because it decreases with experience (specificity) of the athlete.

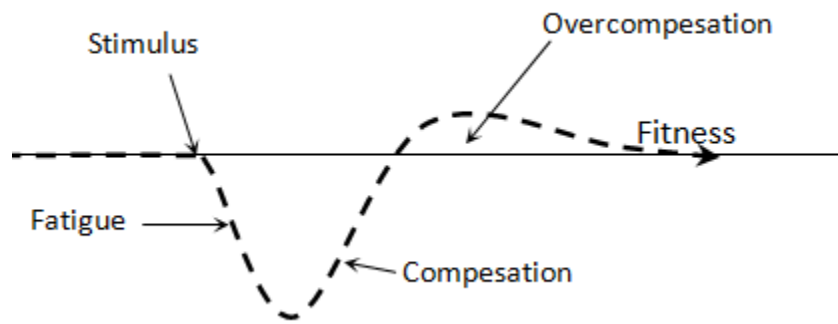


Figure 27. The law of overload

If athletic performance is very high, the margin of Adaptation is lower. Below is a Graphic on the functional reserve and Adaptation to training.

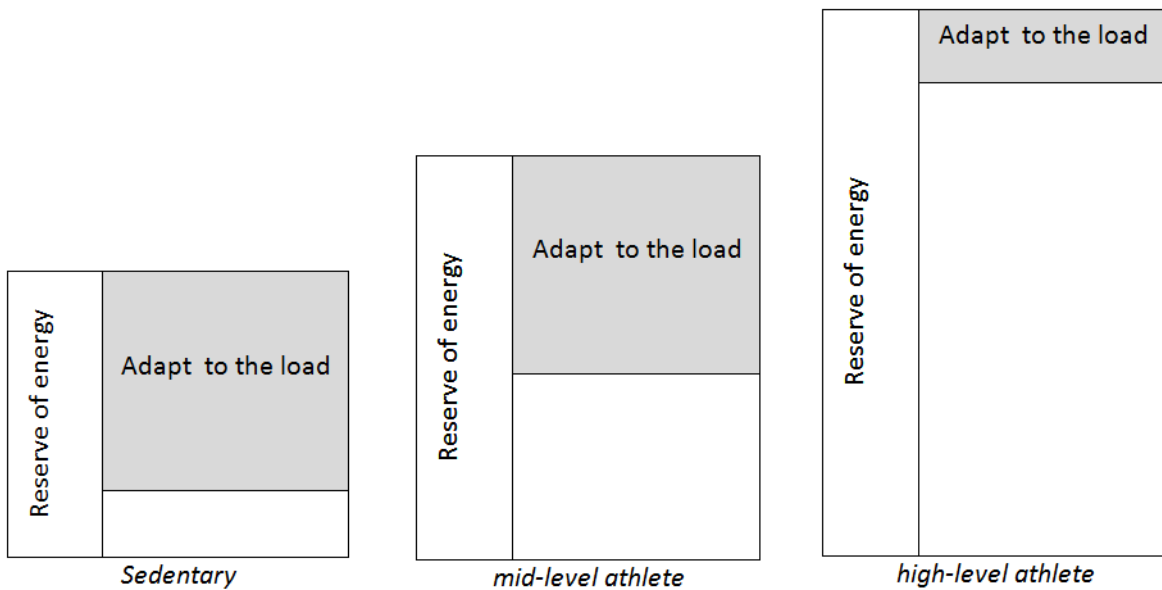


Figure 28. Representation of functional reserve and adaptation to training or adaptation to the load

The effects of systematic training should not be directing the athlete to overtraining. This is an indication that the recovery periods (rest) are not sufficient and therefore affects the health of the athlete.

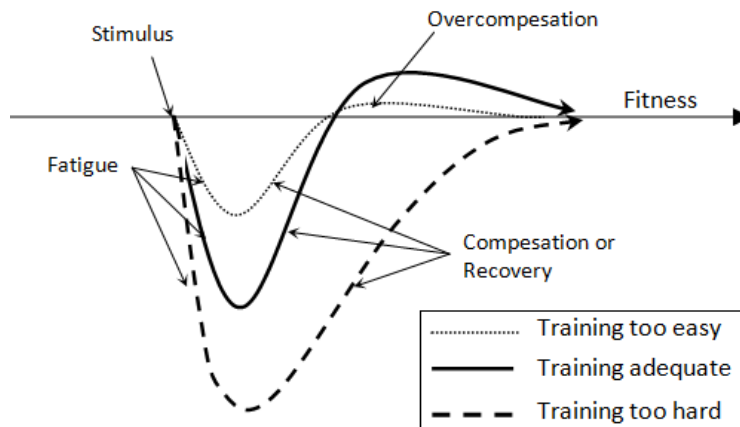


Figure 29. Load effect on sports training

Vrijens (2006, 53) says that the process of long-term adaptation is closely related to gender (male, female) and the ability to adapt to the loads (the principle of individuality). For instance, skeletal muscle consists of numerous fibers; there are two types of muscle fibers. Slow fibers, fast twitch, type I and II respectively. This classification also has a specialty in the effort. Therefore, the slow fibers (slow twitch) are predominant resistance effort, or aerobic energy expenditure. Fast fibers (fast twitch) and maximum stresses acting on short-term; anaerobic energy cost.

Each person has a ratio of fast and slow fibers in muscles. However, a high-level athlete can acquire a suitable proportion of fibers (slow or fast twitch) for their own sport. The development of muscle fibers depends on its ability (phylogenetic) and sports training. Vrijens (2006) and Cappa (2000) claim a proportion of muscle fiber 'type II C' who have no specifications (slow or fast), therefore, these fibers can change their structure through specific training. Then the plan of strength training will target the development of Type II fibers and type II B with the aim of increasing the number of fast fibers.

Below is the percentage of muscle fibers of athletes, according to sports:

Kinds of sport	Percentage of slow twitch (Type I)	Percentage of fast twitch (type II)
Marathoners	82%	18%
Runners middle-distance	70%	30%
Swimmers	65%	35%
Sprinters	40%	60%
Shot-putters	35%	65%

Table 4. Percentage of muscle fibers in sports by Vrijens (2006).

According to the above table, the sports training for ultimate frisbee player should promote the development of fast fibers (type IIB) in the lower extremities (mechanism flexion - extension), which ensures speed during the run or move around the field game.

Although, during the game ultimate frisbee occur stress level and short term. The stimuli are acyclic and competition may take 1 hour and 30 minutes. Then, in the efforts of short duration (less than 8 seconds) the energy input in the athlete is given by the anaerobic pathway involved alactic in phosphocreatine (composite) and ATP (molecule) in the release of energy. Moreover, the sum of all actions during a game of ultimate frisbee, mostly incomplete recovery (active recovery), makes the aerobic pathway is activated. Therefore, the oxygen participates with glycogen and lipids in the release of energy in the athlete. These are important to synthesize and resynthesize ATP.

	ATP system	Lactic system	Aerobic system
Energy source	Anaerobic	Anaerobic	Aerobic
Energy intake	Very fast	fast	Low
Chemical substrates	Phosphocreatine	Carbohydrates	Carbohydrates and lipids
Energy content	Very limited	Limited	Unlimited
Reactions in muscle	Limited reserves	lactic acid production, muscle fatigue	no waste that cause muscle fatigue
Type of effort	Sprints and explosive effort	Maximum effort, duration of 1 to 3 minutes	Long-term effort, up to 4-hours

Table 5. Energy systems by Fox (cited by Vrijens, 2006)

Vrijens (2006, 69) refers to the proportion of aerobic and anaerobic power in basketball and football. These sports have a ratio of 30% (aerobic) and 70% (anaerobic). Ultimate Frisbee is a sport (cooperation-opposition) like football and basketball, too, has a prevalence of anaerobic energy. Therefore, it is an objective in the training program in ultimate frisbee.

Moreover, the estimated energy expenditure (kilocalories per minute) in team sports like soccer and basketball can give you an estimate for proper nutrition, for instance:

Sports	Kilocalories per minute (kcal/min) according to body weight (kg or lb)		
	50 kg or 110,2 lb	70 kg or 154,3 lb	90 kg or 198,4 lb
Football	6.6 kcal/min	9.2 kcal/min	12 kcal/min
Basketball	6.9 kcal/min	9.7 kcal/min	12.4 kcal/min

Table 6. Estimated kilocalories per minute in football and basketball, by Mc.Ardle et al. (Vrijens, 2006, 74)

These values of energy expenditure may resemble the values required for ultimate frisbee, therefore, an athlete with 70kg or 154.3 lb of body weight have a caloric expenditure of 9.2 kcal/min during the game.

The following defines key concepts in athletic training:

Planning

Systemic basis is the implementation, monitoring and evaluation of training of a sports team. It is based on goals (short, medium and long term). The plan identifies the activities to be performed to achieve the objectives. Sessions 4 and 9 days are known as microcycle (or week); a mesocycle (or month) it up several microcycles, in turn, a macrocycle (or years) is formed by several mesociclos (Silva, 2002).

Periodization

It is part of the planning and is defined as a procedure used to distribute time slots, step by step, the plan (macrocycle) according to the seasons (García, 1996). The periodisation is divided into preparatory period (general, special) and competitive period (pre-competitive, competitive, transient). Each period must specify the objectives to be achieved, content, training methods and respective workloads (Silva, 2002).

Load

Is any exercise that acts on the body causing a disturbance of equilibrium (homeostasis), your application must be accompanied by a recovery time. The load, as training size is determined by the length, volume, intensity and density. The load as a measure of effort takes two forms:

- The internal load is the response of the human body as morphological, physiological, psychological, biochemical or cognitive.
- The external load shows the characteristics of exercise in numbers, in space and the degree of difficulty (García, 1996).

Indicators of intensity of the load

External load	Internal load
○ Running speed	○ Heart rate
○ Load lifted	○ Blood pressure
○ Power effort	○ Respiratory rate
○ Density of the effort (load/rest)	○ Blood lactate
○ Exercise duration (time)	○ Maximal oxygen consumption
○ Distance (ft, yd, mi)	○ Perception of effort (Borg table)
○ Repetitions of the exercise in time	

Table 7. Indicators of intensity of the load

Duration

Is represented by the time it takes for the exercise.

Volume

Is the total amount of work done during training sessions in relation to the duration, distance or amount of repetitions. Is quantitative and can be systematized by session, microcycle by mesocycle and macrocycle (García, 1996).

Intensity

It refers to the level of demand loads on different phases of training (external load). This is a qualitative aspect because it refers to the degree of effort the athlete's individual (internal load) (García, 1996).

Therefore, the scale of Borg (1982) is a tool for measuring the intensity of endurance exercise or strength exercise.

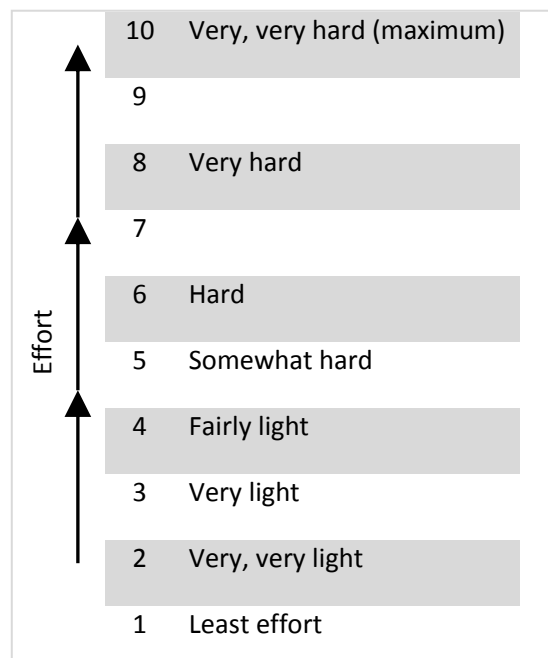


Figure 30. Borg Scale (modified)

Density

The density determines the temporal relationship between exercise duration and recovery time. Is represented as follows:

If exercise lasts 30 seconds and 15 seconds break, then has a density of 2:1.

The density in the interval training is the relationship between effort and recovery. This relationship (work and rest) should look like the real game. Ultimate Frisbee, for instance: an exercise in 3, 4 or 5 seconds of run (sprint, jumps, arm movements) with rest (active) equal to the time period (maybe less). Because this is the way it is presented in the game.

Frequency or maintenance

Frequency is an important element in the magnitude of the load because it refers to the regularity with which repeats a block of exercises or training sessions per week. The frequency of exercise and training session determines the recovery time between sessions. For instance, if three strength training sessions during a microcycle (week 3), then, be taken into account to distribute the workload so that there is recovery and super compensation. You could use a rest day between each session. Furthermore, it should be noted that more than 4 sessions (days) form a training microcycle (week) which includes the volume and load of the exercises (Silva, 2002).

Equipments or elements of training

Are all tools, equipment, settings, methodologies, software, used in a training session. For instance, for a session of resistance training requires a running track, a stopwatch and a whistle, the work plan (session, method), control equipment (heart rate monitor, software). The Equipments used to improve learning in the session (Aquesolo, 1992).

Method

It is a planned procedure that allows content organization to achieve a goal through training. Planning is based on one or more methods. For instance, the comprehensive method (TGFU) for training in offensive tactics or the interval training method for developing anaerobic endurance (Silva, 2002).

The principles of sports training can be classified into biological and pedagogic.

4.2. Biological principles of training

Are the general rules based on sciences that guide the sports training (Silva, 2002). Ultimate frisbee coach must know each of them to develop the exercises.

Overload

It refers to the effective stimulus and effort that causes the desired adaptation. The overhead should not generate excessive exhaustion because it affects the overcompensation (Garcia Manso, 1996).

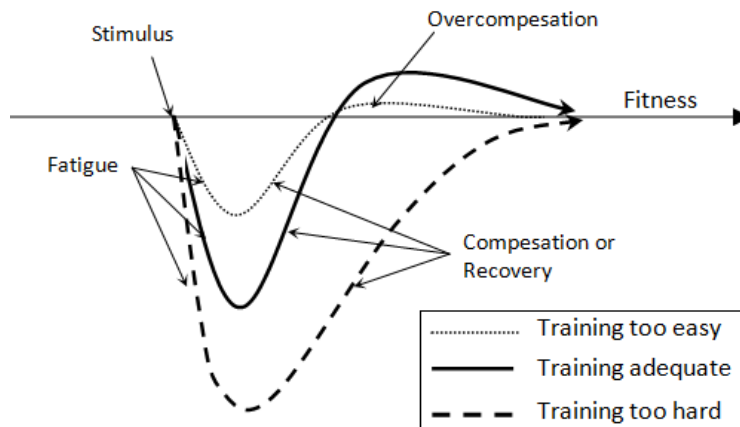


Figure 31. Overloading in training

Load and rest

It refers to the recovery after stimulus or load during the training session. Recovery should also be scheduled during the macrocycle. Therefore, the scheduled rest may vary from one session to another, depending on the type of training. Recovery ensures that the athlete has not overtraining.

Principle of progression of the load and physical abilities

This refers to the programming of increased load. The human body must gradually adapt to the effort. Efforts should be sufficient to gradually develop adaptation. Physical abilities increase as follows: the force is improving week by week, the speed is improving every month, the resistance is improving year by year, the flexibility is recovering day by day.

Specificity

This is to stimulate only the physical abilities required for sports (ultimate frisbee). Applying a proportional level of work and following the appropriate energy pathways (Garcia Manso, 1996). For example, strength training for sport (cooperative competition) focuses on enhancing joint stability and thus preventing injury. In addition, power training is focused to improve the speed of the race by 20 meters.

Variability

It refers to the repertoire of methods, Equipments and exercises that can be used and that promote achievement of training objectives and the achievement of results. The principle of variability is against monotony in sports training. This causes the macrocycle has an amenity, however, maintains the specificity (Garcia Manso, 1996).

Specialization

The specialist controls the stimulus exaggerated of a capacity or ability to not detrimental the performance of other skills that are important, for instance, work too much resistance in the runs to the detriment of speed or sprint. Exaggerated labor flexibility can affect the stability of the joints and is causing injury during the game (Garcia Manso, 1996).

Multilaterality

It is based on learning that the athlete is provided taking into account the maturation of the nervous system. Sports' training in age (8 to 12 years) favors the long-term sports performance (Silva, 2002). In this age can acquire abilities through activities (basic and specific) from other sports like basketball, soccer, volleyball, softball, however, the older multisport strategy use decreases. Do not confuse (high performance) with sports hall training, but this strategy allows to develop several 'motor behaviors', not all.

Reversibility (see Figure 31)

It is based on the athlete's performance decreased as a strategy to achieve a better mark. Therefore, there should always be gradual progress in the administration of the training load, sometimes, the last 5% improvement in athletic performance is hard work (not achieved the goal), therefore, decrease overall training load for some time (up to 2 microcycles) to again increase. In this way the goal will be achieved.

Continuity

It refers to the persistence of training, every day. Also refers to the achievement of a goal and then another goal, therefore, the continuity goes hand in hand with the periodization and intended that the training plan goes from general to specific conditioning (Garcia Manso, 1996). Should be avoided stop the sports training, even if an injury happens, the continuity intended, at least, exercise other muscle groups that are not injured, so, be encouraged to have a minor loss of (sport level). For instance two weeks without strength training can affect the decrease by 15 to 25% of 1 RM (repetition maximum). For every day that you train the technique was lost about 0.1% efficiency.

Periodic regeneration

This principle states that the adjustment should occur first at the functional level and then at the somatic level, for instance, the first objective of training is to improve general endurance and improve muscle strength, in order to increase the number of mitochondria in muscle. So the first thing is to increase muscle mass (hypertrophy). It takes into account the overall adaptation of the body: the regeneration of organs, muscle tissues and systems (nervous, circulatory, respiratory, digestive) to produce the super-compensation.

Individuality

It has all the characteristics (morphological, psychological and functional) for each of the athletes. This is the most important principle because it considers the differences resulting from the comparison between the athletes, too, the evaluation of physical abilities (Garcia Manso, 1996). The athletes can have differences in learning speed of the game, technical skills and tactical performance. Also, in the performance of strength, endurance, speed, and therefore, the (individuality) promotes a change in the planning according to the particular needs of each athlete, the mass training are only used in achieving common objectives.

4.3. Pedagogical principles of training

Consciously

This refers to the knowledge of the training plan (macrocycle) that should have the athlete to have a better athletic performance. The athlete must identify what is being done and you want to achieve with training. Therefore, this principle allows this self-assessment and self-exigency constant on session, microcycle, mesocycle, seasons, macrocycle (Garcia Manso, 1996).

Mental representation

Is to use past learning (motor experiences) to teach a new task or exercise more difficult. In this way, it makes learning easier 'movements or forms of the game' are more advanced. The mental representation is also known as 'transfer' because athletes learn an action that must be applied correctly on the game. The expertise of the athletes in each of the little things will improve big game.

Accessibility

This principle is based on pedagogy of basic steps: The teaching must be of the few at most, from simple to complex, from known to unknown, from general to specific (Garcia Manso, 1996).

Instance: If you plan to teach hammer throw, the learner should at least know how to grip the frisbee, the frisbee spinning so I can fly, the movements performed by the arm and forearm. Therefore, we suggest that you first learn to throw the frisbee as forehand, backhand and then finally hammer.

4.4. Warm-up exercises

Ramos (2001, 137) defines 'warm-up' as a gradual transition that occurs in the body between a relative rest and physical activity more intense. The heating is achieved by exercises that increase

in intensity and complexity in order to achieve greater effectiveness in training and injury prevention.

The use of these exercises is a progressive manner, from lowest to highest degree of difficulty, for instance, starting with joint mobility, then light jogging with other movements to be included in the muscles required to develop the sport, proprioception exercises, followed by jumps with variations that involve racing side, zigzag, jumping to a foot, two feet or combination of movements with arms, then you should use simple games that utilize the basic rules of ultimate frisbee. Finally, this Warm-up will connect with the 'central part' of the session.

The 'Warm-up' should lead to increased heart rate around 120 to 150 beats per minute, the duration between 15 and 20 minutes, with an additional 5 minutes recovery. This effect is evident in the increased metabolism and increased body temperature. Thus, it is intended that the body is available to submit to the high demands of training or competition (Ramos, 2001 and Campo, 2001).

The 'Warm-up' allows:

- Increased responsiveness of the nervous system. That is, a higher conductivity in the nerve pathways, greater speed of contraction of muscles and increased attention.
- Increases body temperature. The heat causes it to accelerate biochemical processes, the viscosity decreases muscle and facilitates the sliding of contractile filaments, also favors the joint components.

In countries such as Cuba training sessions with elite athletes include a 'warm-up' with an average duration of one hour, indicating the importance of its programming. A warm-up meticulously structured program improves the performance of the player during training session and is an issue that should be of interest to the coach.

4.5. Endurance training

Endurance is understood as the physical and mental ability to support a load for a long time. The training of this ability is fundamental to the sport. In the beginning, the endurance is improved through aerobic work which includes cyclic movements such as jogging, swimming, cycling. In this type of training is involved 'continuous method' with a constant load, for instance, running for 40 minutes. On the other hand, the endurance is also improved through acyclic movements are characterized by variations in the intensity in the load, volume, density, although these involve several muscle groups, for instance: Run, stop and change direction several times. Exercise with low weight (30 - 50% of 1 RM) in various muscles. Making bicycling, swimming, jogging without stopping.

To Zintl (1991) endurance is:

Endurance = withstanding tiredness + quick recovery

Zhelyaskov (2001) asserts that sports games have a neuromuscular effort acyclic character, interval-variable, because they have a activities of accelerations in the run, multiple jumps and intense game. This is the case of ultimate frisbee.

Then, the endurance training in ultimate frisbee should provide effective tactical performance during the game. The target for the development of this ability acyclic and (interval-variable) during the training plan is justified to ensure the efficient implementation of the passes, receptions, jumps, offense or defense. Vrijens (2006) states that the development of this ability is the basis of athletic performance in sports.

In ultimate frisbee actions more frequently as jumps, sprint, throws, offense or defense during a game are represented as follows:

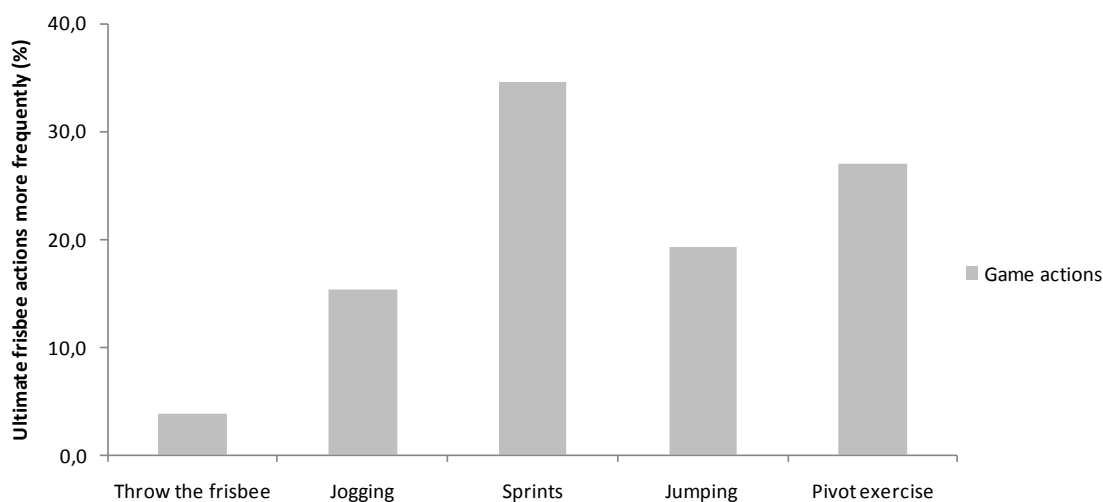


Figure 32. Ultimate frisbee actions more frequently

Then, it must promote a training model to ensure the development of anaerobic endurance from the tactical context. For instance, to plan Training through games (regulated) with frisbee and opponents that involve the basic principles of sport.

4.5.1. Methods for development of endurance

There are several methods for the development of endurance, but what is best for ultimate frisbee? The following are proposed methods 'fractionated' that promote adaptation to a real situation of the sport because it is variable. The basic components are: the number of repetitions, the time duration of load, the intensity and type of rest. The method of intervals (interval training)

is to divide the load in sections. This suggests that each section is run at high speed, with ranges (incomplete recovery). In the (incomplete recovery) low heart rate around 130 p/min. Then, the rest time does not exceed the exercise (time). According to Ramos (2001), this method allows to simulate game situations in sections of competition against time. Then, an example of this method in ultimate frisbee is:

The player must perform the following task: the reception the frisbee, then released to mate backhand, he runs 20 meters diagonally into the goal area and the front desk a pass hammer. 4 repetitions.

For this type of training there are 5 factors that can vary by time intervals:

- The number of sections or routes.
- The distance of each section.
- Time to spend on each section or course.
- The time for rest between exercise.
- The activity to do during the rest period.

Each of these factors is applied according to the real situations of competition.

Moreover, Navarro (1998) made a classification of 'methods of endurance', which describes the interval training (intensive). He suggests duration of loads of 8 to 15 seconds with maximum intensity is almost, but the duration of the effort is short, the work is done from 3 to 8 series and 3 to 4 repetitions. Therefore, increasing the ability 'anaerobic alactic' and improves energy pathway 'aerobic' when the volume is very high. This methodological contribution of resistance training is suitable for the ultimate frisbee as it adapts to the actions that occur during the game.

4.5.2. Exercises

The following exercises are proposed on the method (intensive interval II):

Purpose # 1.

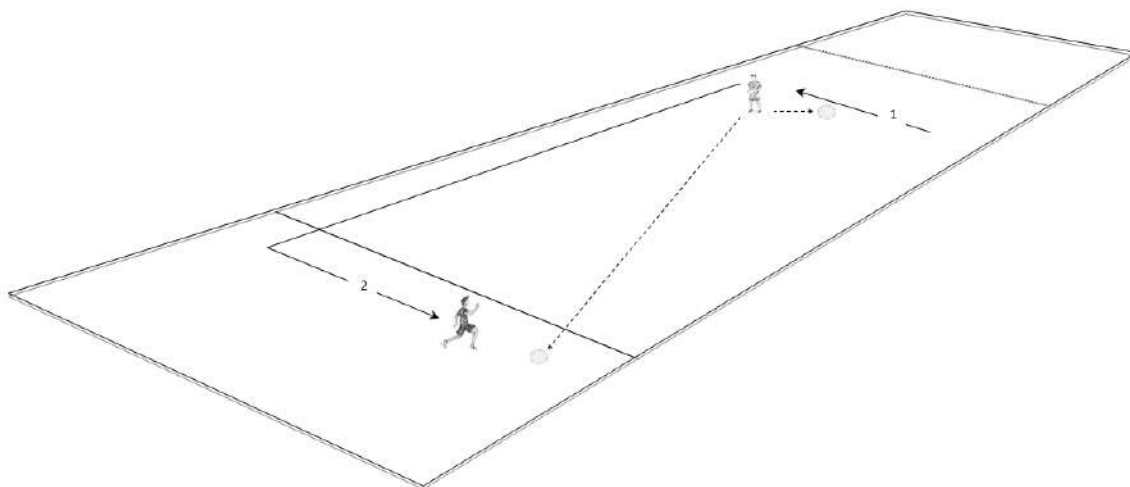
Running, catching, throwing

Make 4 sets of 3 repetitions. Complete the course in the shortest time possible. Resting time (active) between each series will be the time it takes the other player to complete the course.

Materials: 3 cones, 2 frisbees, ultimate frisbee field demarcated.

Exercise Procedure: make two passes one at the defensive end and one to the endzone. The receiver must make a sprint after every pass and secure possession of the frisbee at the reception. The exercise requires that only one shooter and a receiver to ensure compliance with

the method, therefore, immediately arrives at the receiver are changed role (active rest) to continue the exercise.



The player who made the exercise will be located in the sideline of the field and run to the number (1) a reception on the frisbee, then, pass the frisbee back to the thrower and runs again receptions frisbee (2).

Variations:

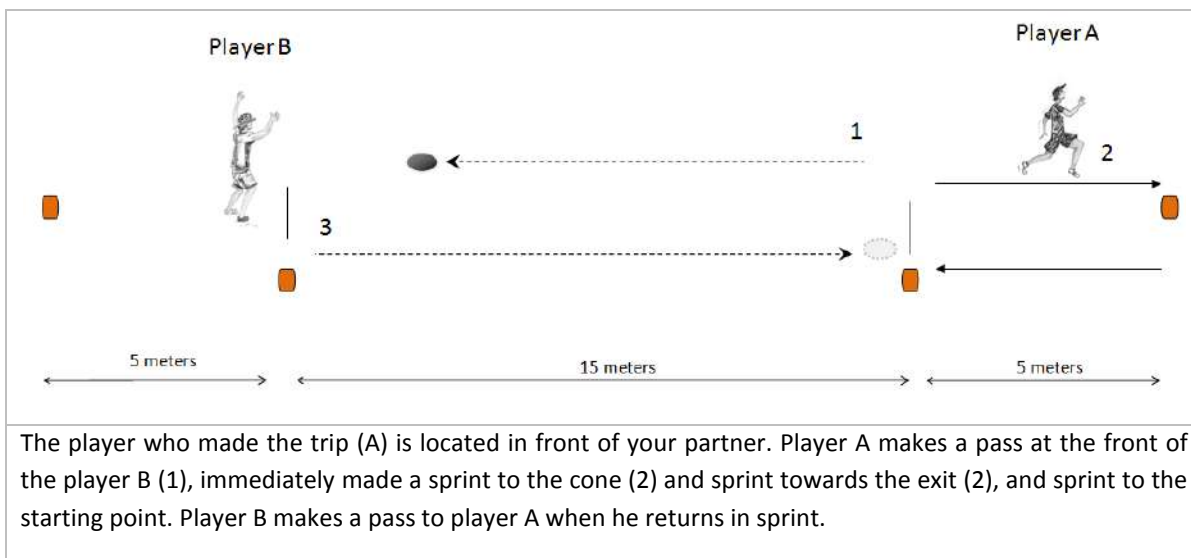
- a. Two pairs, two people running in L, an offense and a defender. The thrower with a static defense.
- b. Perform the exercise without pre-established route. It makes a pass at the defensive zone and then a pass to the endzone.
- c. Alter the direction of U-shaped cutting in the form of bias, including zigzag.

Purpose # 2. In pairs.

Perform 5 sets of 5 repetitions. Resting time (active) between each series will be the time it takes the player (located in front) running and reception 5 times.

Materials: 4 cones, 1 frisbee.

Procedure: Combining displacement front (front and back) with precise passes. This exercise can be done continuously, because the rest is when the other player does the job.



Variations:

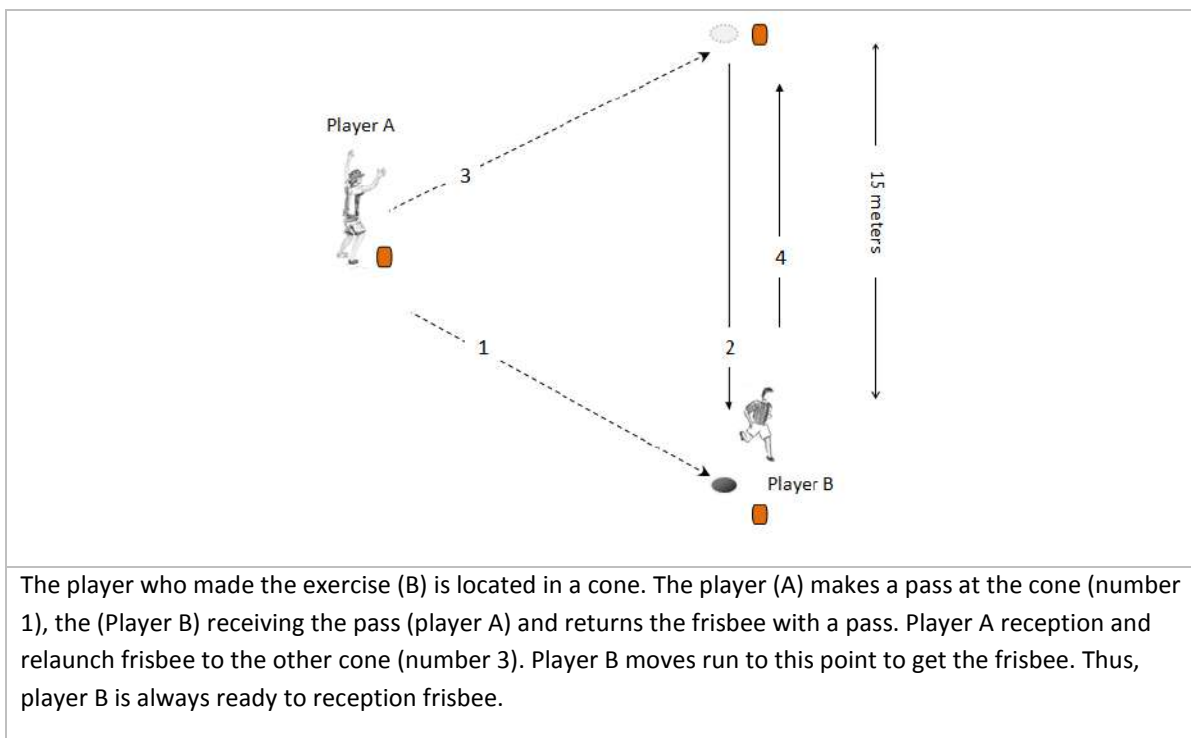
- a. Movements (sprint) only for the player A. Player B makes passes (the height of the frisbee) low, medium or high.
- b. Simultaneously, players A and B move after making the pass.
- c. Make the game (passing and receiving) until the frisbee onto the floor. Challenge for pairs to make the most passes.
- d. Modify the distance between the players.

Purpose # 3. In pairs.

Perform 15 movements (repetitions) at maximum speed. The rest is active, and when Player B completes the 15 repetitions, then player B becomes the thrower for the player A. Perform 4 sets.

Materials: 3 cones, 1 frisbee.

Procedure: Perform passes into the cone, providing the player's speed receiver (the pass arrives the cone at the same time the receiving player.) The receiving player, made the pass and sprint moves to the next point of reception.



Variations:

- a. After the player B make 'n' repetitions then switch roles.
- b. Both players do the exercise together and make the rest (active) with passes static.
- c. Include other reception base.
- d. The coach used this exercise as a test to player B. Evaluate the reception and speed, for instance, how many frisbees get in 20 seconds?

4.5.3. Games

The development of endurance in ultimate frisbee should also guide you through games, because in this way, involving all the variables that influence sports performance. The following games are proposed using the basic principles of ultimate frisbee.

Game 1. Continuous ultimate frisbee

Play for 20 minutes or more

Materials: 1 frisbee, 8 cones, field 30 meters by 40 meters.

Procedure: Play ultimate frisbee with all their rules with changes in space, small field (40 m long x 10m wide). When a team scores a goal, do not zone change, then the team scoring the goal

continues to frisbee to score another goal in another area. Not pull. The object is to score many goals before you intercept the frisbee.



Variations:

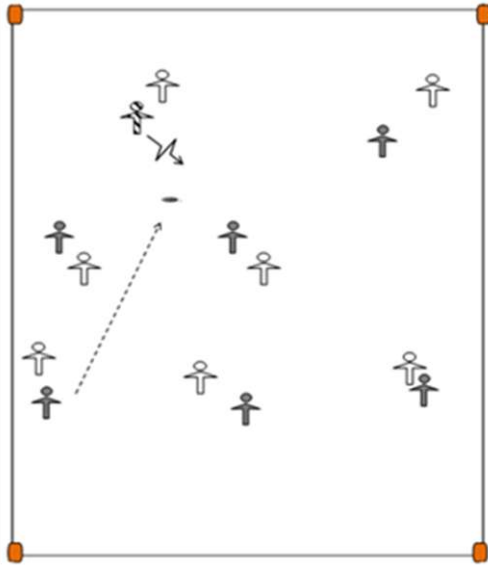
- a. The time of possession of the frisbee, reduced to 5 seconds.
- b. Playing one game a time limit. Win the team scoring the most goals.
- c. Win the team that has possession of the frisbee when time runs out (10 minutes, 15 minutes).
- d. Goal areas (end zone) vary in size: one small and one large.
- e. Reduce the number of players (6 vs. 6 or 5 vs. 5).
- f. Remove lines from the court, leaving only the areas of goal (end zone).

Game 2. Passing game between players (the 21 th).

Play for 20 minutes or more

Materials: 1 frisbee, 4 cones, field 30 meters by 30 meters.

Procedure: Two teams. Each team will pass the frisbee (using the principles of ultimate frisbee: not running with the frisbee, the pivot foot) among his teammates, to complete 10 passes without fall the frisbee. The opposing team will prevent complete those passes, through a defense without body contact. If the offense team loses the frisbee, the defense team will try to make the 10 passes. When you have possession of the frisbee. If a team completes his passes, scores a point and give the frisbee to the other team.



Variations:

- a. Increase the number of passes to complete the point.
- b. Use only forehand, backhand or hammer only.
- c. Delineate the game space.
- d. Include three teams in the game.
- e. Numerical superiority in offense or defense (5 vs. 7 or 4 vs. 6).

Game 3. Capture to mate with the frisbee.

Play for 20 minutes or more

Materials: 1 frisbee, 4 cones.

Procedure: Initially, the participants will choose a player to be pursued by all. This person should run away. The rest of the group will try to capture the player with the frisbee (not throw it), and one out in baseball. Therefore, used quick passes and precise among the pursuers to capture the player. The capturer will be the next player pursued.

Variations:

- a. Two teams: one team persecutor, a team that pursues.
- b. Delineate the game space.
- c. The player who has possession of the frisbee can only use the pivot foot to capture. If not, make a pass to another player.

4.6. Power training

The term power refers to movements at maximum speed and maximum strength. Today in team sports athlete's the power is an important factor. If an athlete is strong (power) guaranteed to be faster in a race of 30 meters, too, can reach levels high in a vertical jump two feet (Kyröläinen et al, 2003). These characteristics have made in sports such as football, strength and speed within the macrocycle are oriented objectives are to improve muscle power of the players (Mendez et al, 2007).

When we speak of power always mention maximum strength. Bosco (2000) states that muscle strength is a muscle contraction to overcome a resistance (strain). Therefore, the maximum strength training and movement speed are the determining factors for the improvement of the power.

The power (Mendez et al, 2007) is the ability to perform work in the shortest time possible. Also known as the 'speed force' and refers to the ability of the neuromuscular system to produce the maximum impulse in a period of time. This definition adds the contribution of Silva (2002), as the ability of humans to transform physical energy into force quickly and it depends on the amount of ATP production per unit of time.

Based on the foregoing, the power training in ultimate frisbee is essential because some game situations that involve saving the Frisbee to fall to the floor. For example, vertical jump to intercept the frisbee, make a throw (pull), make a sprint to catch the frisbee, among others. All these actions become a challenge for high performance players, therefore, should promote training the objective to improve the power of movements involved in the running, the jumping and throwing. For this, you need training with emphasis on the physical abilities of strength and speed, (Silva, 2002).

For strength training is specifically required to develop maximum strength, as the (explosive strength) is used jumps, in the run and throws. Then **maximal strength** is known as the greatest force that could deploy the neuromuscular system in a maximal contraction, excluding the time spent. Maximal strength depends on the nervous recruitment, the percentage of fast fibers and inter-and intramuscular coordination. Moreover, the **explosive strength** is the ability of the neuromuscular system to overcome some resistance to the implementation of very faster contractions, that is, execution of movements in the shortest possible time (speed), (Campo, 2001, 264)

4.6.1. Methods for power development

It then describes a methodology as an experimental research in players who promotes the increase of the maximum strength as a means of increasing the power on the run (Mendez et al., 2007). The muscle groups should be trained for maximum strength are:

1. The knee flexors and extensors.
2. Hip extensors.

3. Ankle extensors.

Then, after identifying the RM (repetition maximum) for each of the athletes, the appropriate technical of each exercise (hip, knee and ankle) and after 3 weeks of adaptation to each year (with moderate loads 60 - 75% RM) will begin with a mesocycle (developer) from 6 to 8 weeks with a load between 75 and 85% RM, with 3 sets per 5 to 8 repetitions (Méndez, 2007). Campo (2001, 264) complements the plan and states to develop **maximal strength** with a load between 80 - 90% of maximal strength, with a number of repetitions, between 4 to 8; by 3 sets.

Explosive strength training

For training (explosive strength) are used percentages between 70 - 85% of maximal strength, with moves at high speed, 5 to 6 repetitions; with rests between sessions of 2 to 4 minutes depending on the volume load. The heavier the load more time to rest or at least loaded shortest time (Campo, 2001, 264)

The speed of the exercise depends on the regulation of muscle energy reserves and rapid turnover of chemical energy. In addition, it requires the ability to have elasticity and muscle relaxation.

Camp (2001, 263) proposes a methodology for the development of speed, there are two types:

- Type 1. These are exercises to improve the speed of reaction. The athlete knows the activation signal (visual, auditory, sensory) and the reaction is automatic movement.
- Type 2. These are exercises that aim to give a quick and appropriate motor response. The athlete makes the 'motor reaction' without an activation signal are previously established.

Speed training, type 1

The duration of such training sessions should not exceed 30 minutes. The recovery between each exercise is 30 seconds to 1 minute. The running time should not exceed 2 to 3 seconds and 100% intensity.

Speed training, type 2

This training uses exercises that depend on a technical learning of gesture (action), performed with a moderate focus on gestural quality. These are longer than the exercise of reaction (type 1), with longer recovery times (between 1 and 3 minutes).

The speed training (Ramos, 2001), emphasizes the following features:

- The athlete must have good technique of the movements.
- The movements are performed at maximum speed.
- Breaks recovery is complete (below 100 beats per minute)
- The excitability of the nervous system must be maintained, then the breaks are active (active rest).
- The method of repetition may be more effective in speed training.

- The analytical method divides the technical gestures in parts; this is an option for exercises that involve the coordination of various movements such as jumps, spins, runs, fakes.

The Power is the ability to perform work in the shortest time possible, this is essential to the achievement of each of the exercises. In the case of weights or dumbbells mobilization will take into account the work divided by time (percentage of RM by repetitions), id est, the volume and intensity. In the case of the running will take into account the distance divided by time.

During power training to keep in mind that 'the acceleration capacity' of an exercise can only develop if the maximum strength is sufficient, therefore, this aspect is the first goal in a training plan, develop maximum strength in each of the athletes (Dinteman et al. by Vrijens, 2006, 246). Because of this, the acceleration serves an important role in the power of movements.

$$\text{POWER} = \frac{\text{work} / \text{time}}{\text{mass} * \text{acceleration} * \text{distance} / \text{time}} = \text{force} * \text{velocity}$$

Because Ultimate Frisbee is a sport acyclic, then the most efficient method for power development is the repetition of specific game situations is likely to happen during the competition, to improve speed aspects as perception, reaction, decision making and implementation of technology. It also includes power training in the gym and exercises technical gestures (with resistance).

4.6.2. Training to improve power in the ultimate frisbee

The power training should ensure that the ultimate player is fastest in the run (sprint), which achieves more height in their jumps and be more effective in catches. Exercises should focus on features, id est, power for the run, power for the jump and include technical and tactical exercises that approaching to real game situations.

Exercises for development of maximum strength

There are two methods to achieve maximum strength, hypertrophied muscle tissue, increasing the intensity of nervous stimulation to have synchronization of all motor units during contraction.

Exercises flexor and extensor mechanism involved in the run or sprint.



Plantarflexion, eccentric phase



Plantarflexion, concentric phase



Hamstrings concentric phase



Hamstrings, eccentric phase



Quadriceps muscles, concentric phase



Quadriceps muscles, eccentric phase



Hip extension with pulley, concentric phase



Hip extension with pulley, eccentric phase



Abdominal muscles, concentric phase;
consciousness to inhale and exhale; avoid
valsalva



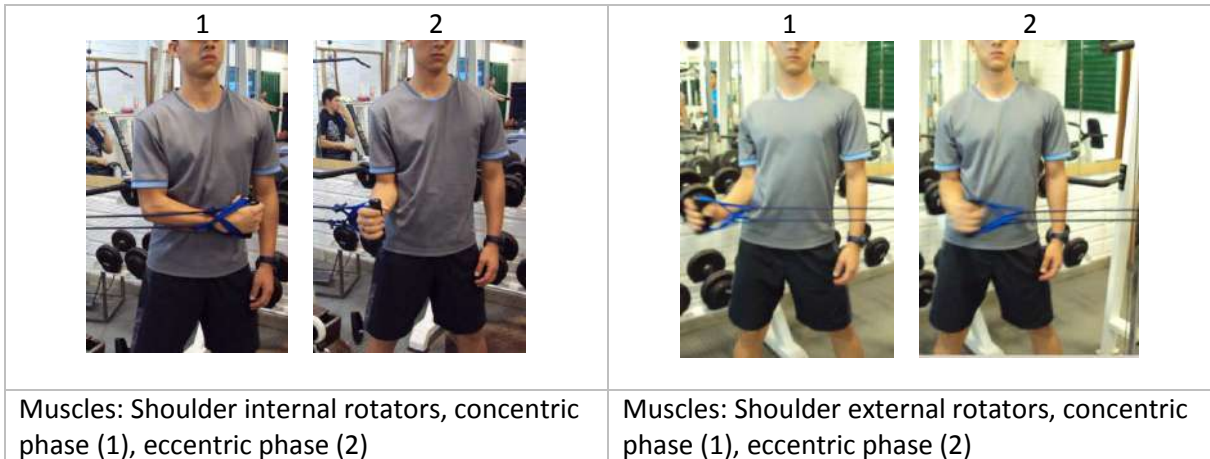
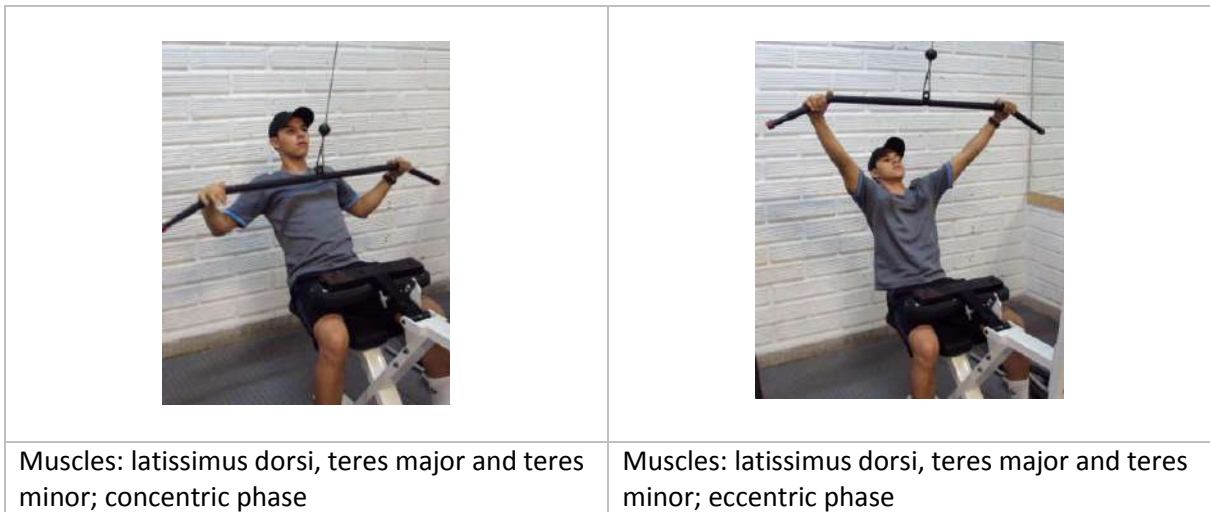
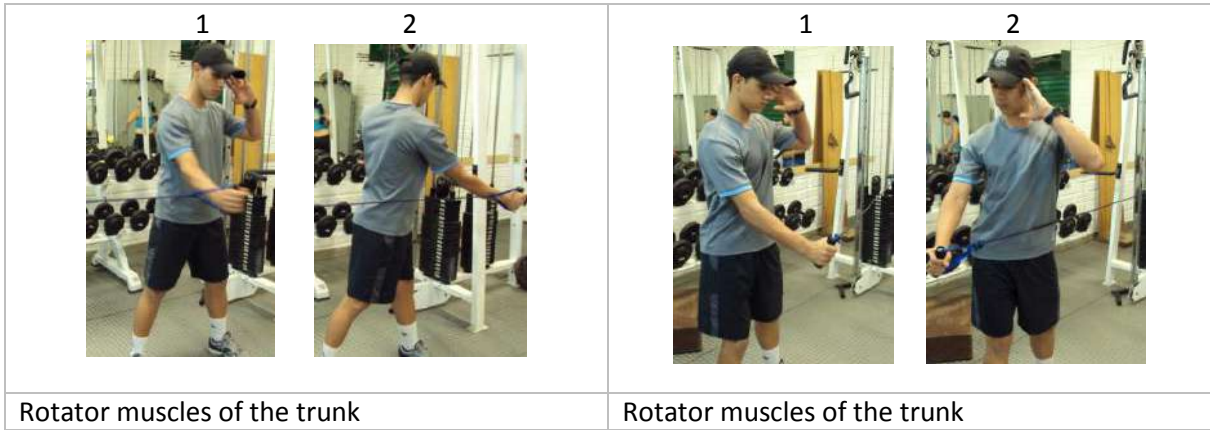
Abdominal muscles, eccentric phase

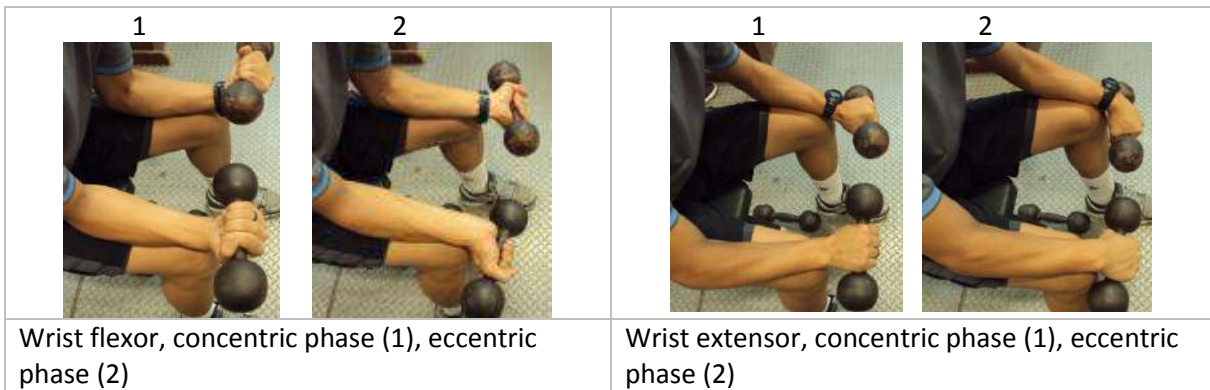
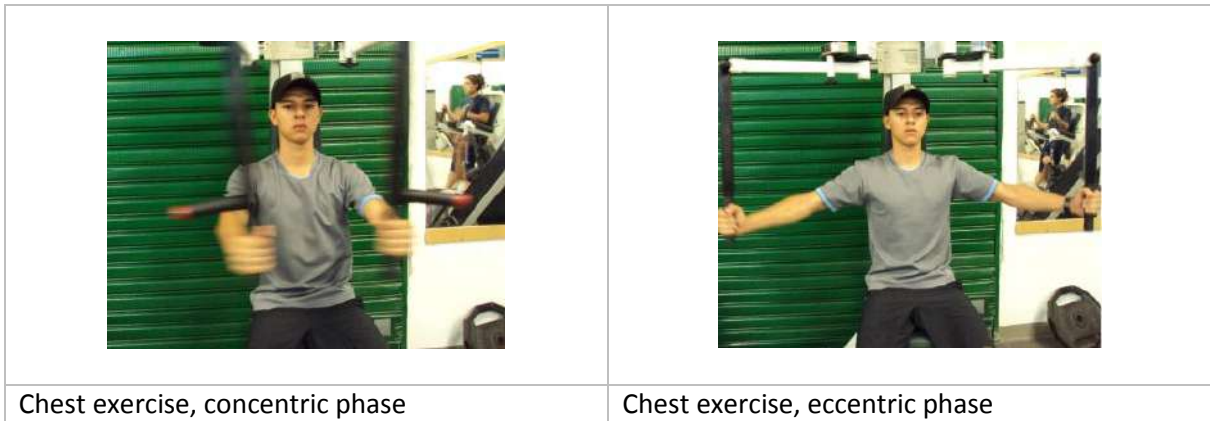
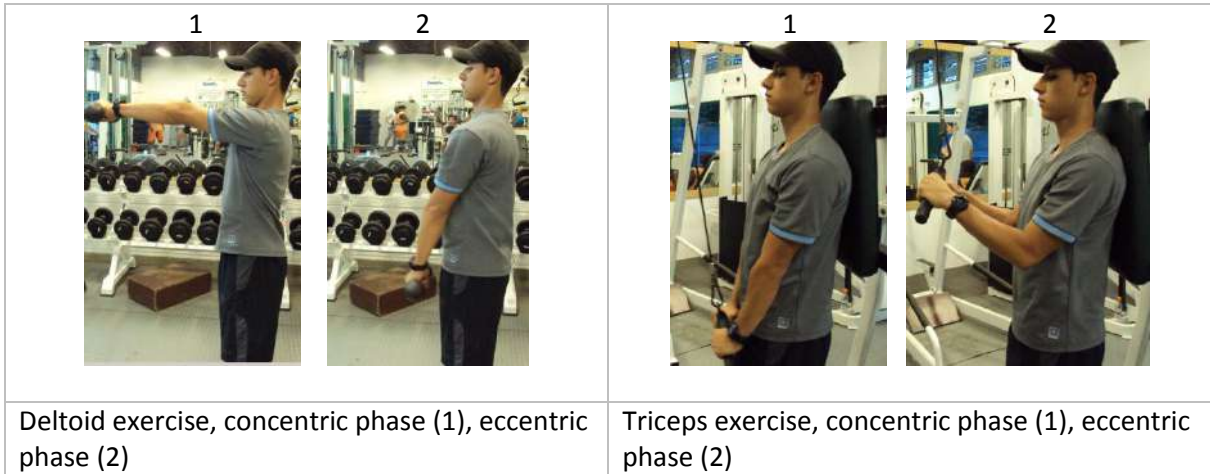


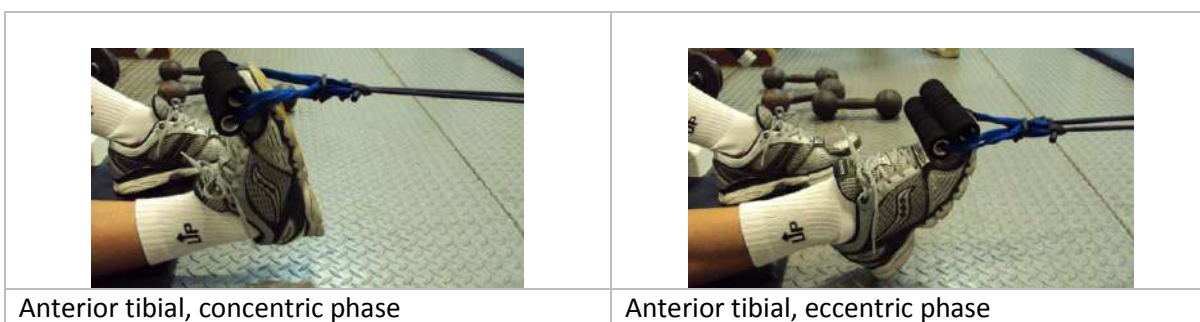
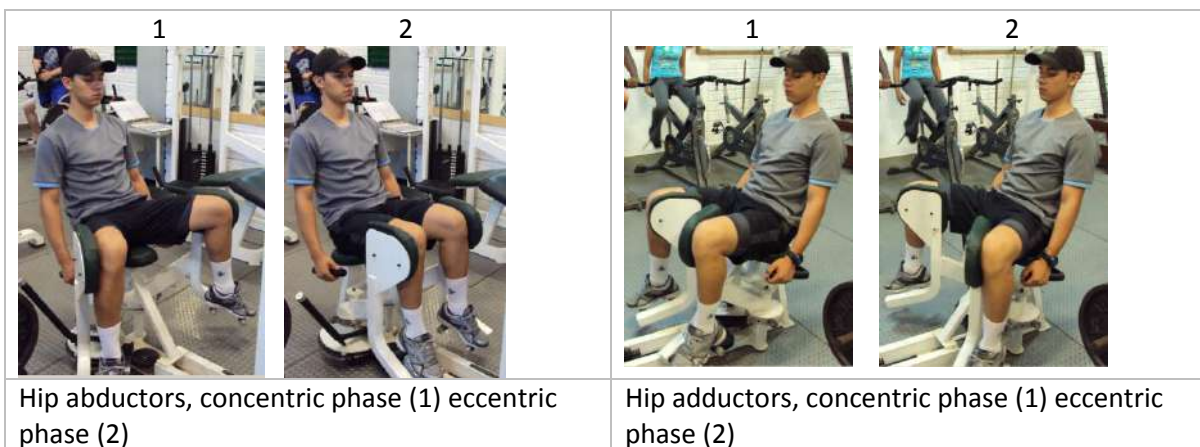
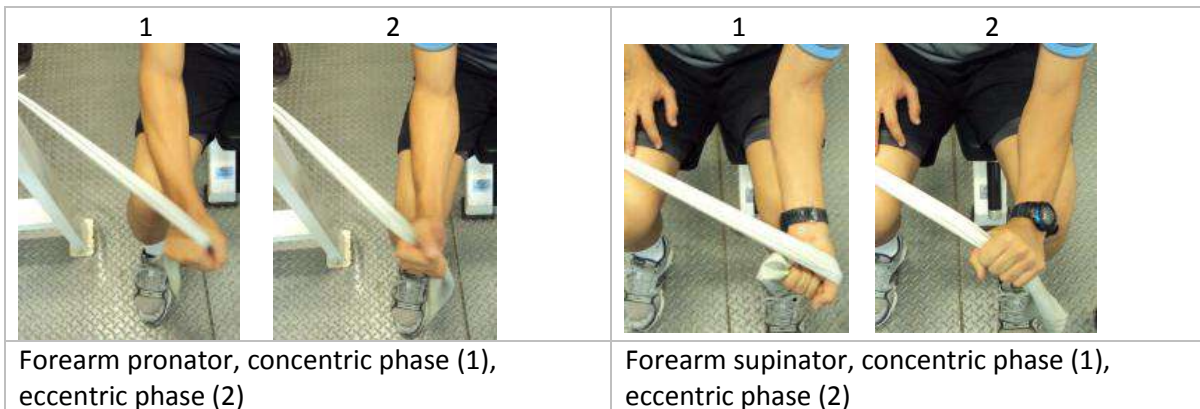
Low Back muscles, concentric phase







Low Back muscles, eccentric phase







			
<p>Internal rotators (foot and hip), concentric phase (1), eccentric phase (2)</p>		<p>External rotators (foot and hip), concentric phase (1), eccentric phase (2)</p>	

The muscular strength training is supplemented with exercises of balance, coordination and proprioception to lower kinetic chain.

Exercises run speed (sprint)

Make Sprinting for 20 meters, 30 meters and 40 meters.

Speed exercises for technical gestures

Perform pivoting with fakes to throw forehand or backhand and include the defense during the drill.

Make the highest number of skipping in 5 seconds.

Take tours running with acceleration of the race.

Exercises for the reaction speed

Conduct drills with the visual starting signal, for instance: the check (visual), and auditory stimuli, like a count.

Exercises to jump phases

Perform multi-horizontal jumps, vertical multi-jumps. Jump with one foot. Abalakov Jumps to catch a high pass. Horizontal jumps (layouts).

Plyometrics

Jumps from different heights taking into account that contact with the ground (<0.3 seconds foot contact on the ground). Making moves in eccentric contraction to concentric muscle contraction transforms. The character of muscle contraction must be explosive, reactive, and ballistic.

4.7. Coordination training and motor learning

Motor coordination is the ability to make efficient and precise movement. The coordination is essential to the perfection of technical movement and the duration of learning. It is a basic ability that determines the learning of specific sports movements (Vrijens, 2006, 277).

In many sports define coordination as an indicator of ability to combine movements or the ability to learn a sporting gesture or as the basis for implementing an optimal sports movement. To discuss coordination must first talk of motor learning as a feature that allows the athlete to organize movements, learn a set of actions that solve a problem, for instance, pass the frisbee to a teammate, catching a pass, jump vertically over running (intercept the frisbee). Arboleda (2007, 19) say, learning these movements is critical for athletic performance of the game includes the combination of movements the domain of basic and specific motor skills. Motor learning is also related to motor memory, movements have been learned before, too, cognitive processes such as attention, motivation, feedback and memory. Motor learning also depend on the educator or coach and method of teaching.

Training (motor coordination) used to teach the athlete gestures or move set that increase their performance in the game or the player who knows optimize. He must train and perform specific skills quickly. During training of coordination is important to the principle of individuality, as an indicator that favors the skills to each of the athletes from specific personal performance (Handler, Popper, Deep, Wing), the players jump higher, most fast in the run, smart players.

The goal is to develop in the athlete's ability to anticipate during the development of the game (on offense) or the ability to intercept the frisbee (on defense). The ability to orient in the field, to take advantage of the movement, the jumps and spins. This should develop economic and necessary movements (effectiveness) for many advantages in the game, also the muscle control, so that the athlete is more efficient and is suitable for new requirements for the game.

4.7.1. Determinants of coordination and motor learning

The purpose of technical training is learning the movements, stabilize and refine it until a specific movement. The aim of the exercise with a movement (gesture) or group of movements is to make a permanent improvement that will lead to a better technique and better performance during the game. The coordination is a complex ability that is composed of different factors varies among individuals. Listed below are the components that make the coordination by Harre (Vrijens, 2006).

Reaction time

Is the ability to quickly perform a move after a signal. This signal can be a movement (visual), sound (auditory). The training promotes the reaction speed of motor actions.

Simultaneous execution

It is the ability to perform two or more movements at a time and optimally. These movements are made in order to perform a specific motor action.

Position

Is the ability to select the movement and location of the body in space and time according to a defined action. The position requires the ability to anticipate.

Analysis and imitation of movements

Is the ability to perform partial movements precisely in terms of a general action. It is important for improved step by step the general movement (from micro to macro) and to perform optimally in the competition.

Sense of balance

Is the ability to maintain stability in a small area of support, or distribute the weight on changes in body position during the movements. Cañizares (2000) defines balance as the maintaining (intentionally) a position 'upright' and without any displacement. Static balance and dynamic balance function in the same way, except that there is displacement in the dynamic balance. This may occur for a vertical or horizontal jump. The balance is required to perform actions while in suspension (without momentary contact with the ground) or in flight. For instance, making a catch during a jump, making a throw during a jump.

Ability to quickly and effectively change direction and speed of movement

It is the adaptability of the movement at the time of execution. Is the ability to modify the action or sports movements during perception of a change or unexpected situation in a play. The accurate perception and the choice of how to react (unexpected) determine the value of this ability.

If the athlete has a greater coordination, will be quick assimilation (learning) of new and complex movements (Vrijens, 2006).

The characteristics in 'the coordination' must take into account the motor learning as something that is the result of training and stimulation of specific moves to high performance. During training of coordination should be combined real game situations to get the best tactical performance during the development of competition.

4.7.2. Feedback y feedforward

According Vrijens (2006) the feedback is the second important principle for an effective outcome in the sport learning. It guides you through visual or auditory information which is in contact with a motion previously made, that is, the athlete watches his game or staging. Is a constant self-evaluation on sports performance.

Also, there is intrinsic feedback are all receptors of the human body to capture or record kinesthetic stimuli, sensitive, optical and acoustic. Extrinsic feedback is generated through independent sources the athlete's body, as the coach, teammates, images, videos and photos.

There are four categories (Hopf, 2007) that characterize the management of extrinsic feedback as a fundamental element in motor learning.

1. Feedback extrinsic to the start of training: it is ideal to show movement or gesture that is going to learn.
2. Extrinsic feedback support: serves to improve the technique of movement that makes the athlete. It uses the review of the scene on video by the same athlete.
3. Extrinsic Feedback redundant: it means that there is enough sensory feedback (athlete himself) therefore, the additional extrinsic feedback is repetitive or redundant.
4. Feedback impeding learning: if the feedback is permanent training can cause dependence. Then, the coach should be reduced systematically to obtain better performance.

The feedforward means any information prior to the scene of motor learning. The feedforward comprising instructions, the video model (another player) suggestions of the coach (before training) to improve the technique or to get the sporting objective.

Some recommendations (Cañizares, 2000) for the development of coordination exercises and motor learning are:

4.7.3. Exercises

The first 8 sessions

These sessions are based on general dynamic coordination exercises, id est, the static equilibrium (no displacement) and dynamic balance (oculus segmental). Also, it uses the development of physical abilities. In these sessions do not use the frisbee but included the participation of teammates in exercises in pairs, trios (coordination group).

General characteristics of **the first 8 sessions**:

- Installations and appropriate lighting for the athlete, field, sports center with artificial light, also takes into account the climate.
- The mood of the athletes must be a break prior to training, minimum of 24 hours after the last training session (7 - 8 hours of sleep). Eating foods rich in carbohydrates 2 hours before training.
- The training of coordination is a part of the session and is done during the 'warm-up' specific.
- Include the perception of effort (Table Bohr) as an indicator of exercise intensity in the coordination.
- The intensity of exercise shall be 75% (perception of effort, very hard) and primarily is individualized. The heart rate during exercise is equal to or less than 180 beats per minute.
- It includes exercises and rhythm changes, or changes in the speed of the jumps with one or both feet, running movements in different directions and movements of the kinetic chain upper (head, shoulders, arms, hands).
- Prioritize technical quality, in correcting the style, a balanced position for each exercise.
- During the development of training should be rest breaks (pauses) between exercises, rest breaks mostly 'incomplete'(down the load time).

In the intermediate session

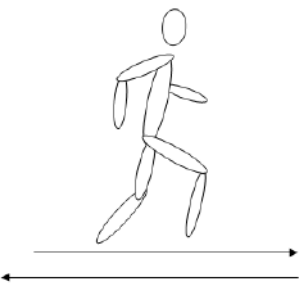
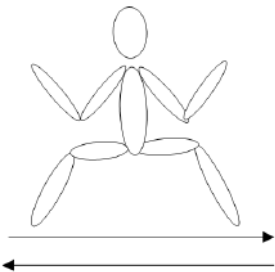
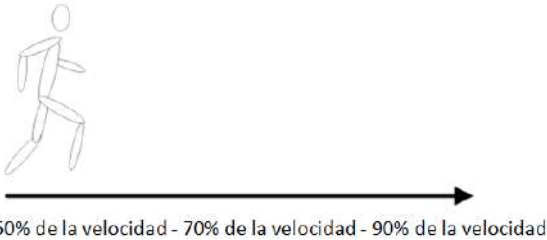
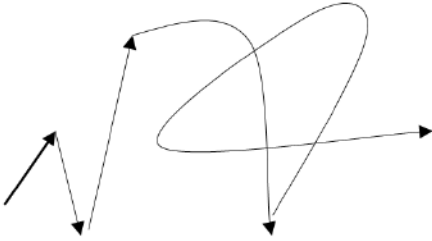

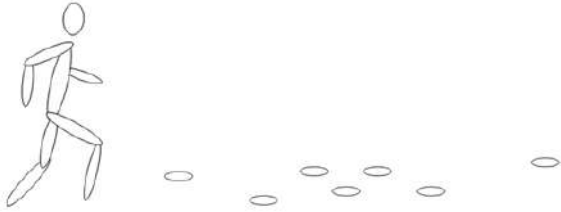
- These sessions are used frisbees, sticks, cones in all sizes, ropes, hoops, fences, gymnastic boxes, mats.

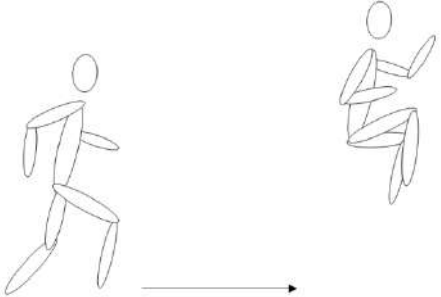
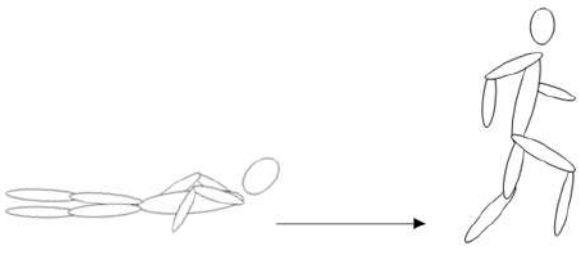


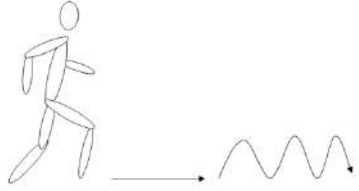

- Training components and their variants include all aspects and coordinative qualities. That is, every situation and variations that occur in the game, the coach will adapt the exercises to the group.
- Includes exercises move around obstacles. To touch some obstacles and some do not.
- Includes route speed (time). Each player will perform the exercises as quickly as possible (without touching the obstacles).

In the last sessions

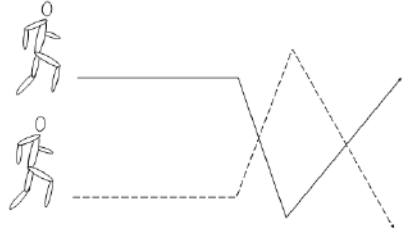
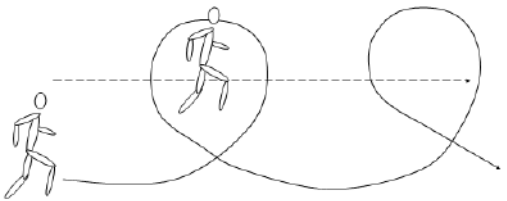


- These sessions are taken up aspects of previous sessions, such as rhythm, movement technique, materials, cooperation between players, the principles of ultimate frisbee game.
- Employing more than 4 sets for each exercise, with a duration between 30' á 45' (seconds) for each repetition of continuous exercise.
- The rest breaks have a duration of 15' á 30' (seconds) to stop the recovery between exercises.
- Between each set (several exercises) there is a recovery of 2 'and 3' minutes.
- During training of coordination were used up to eight different exercises.

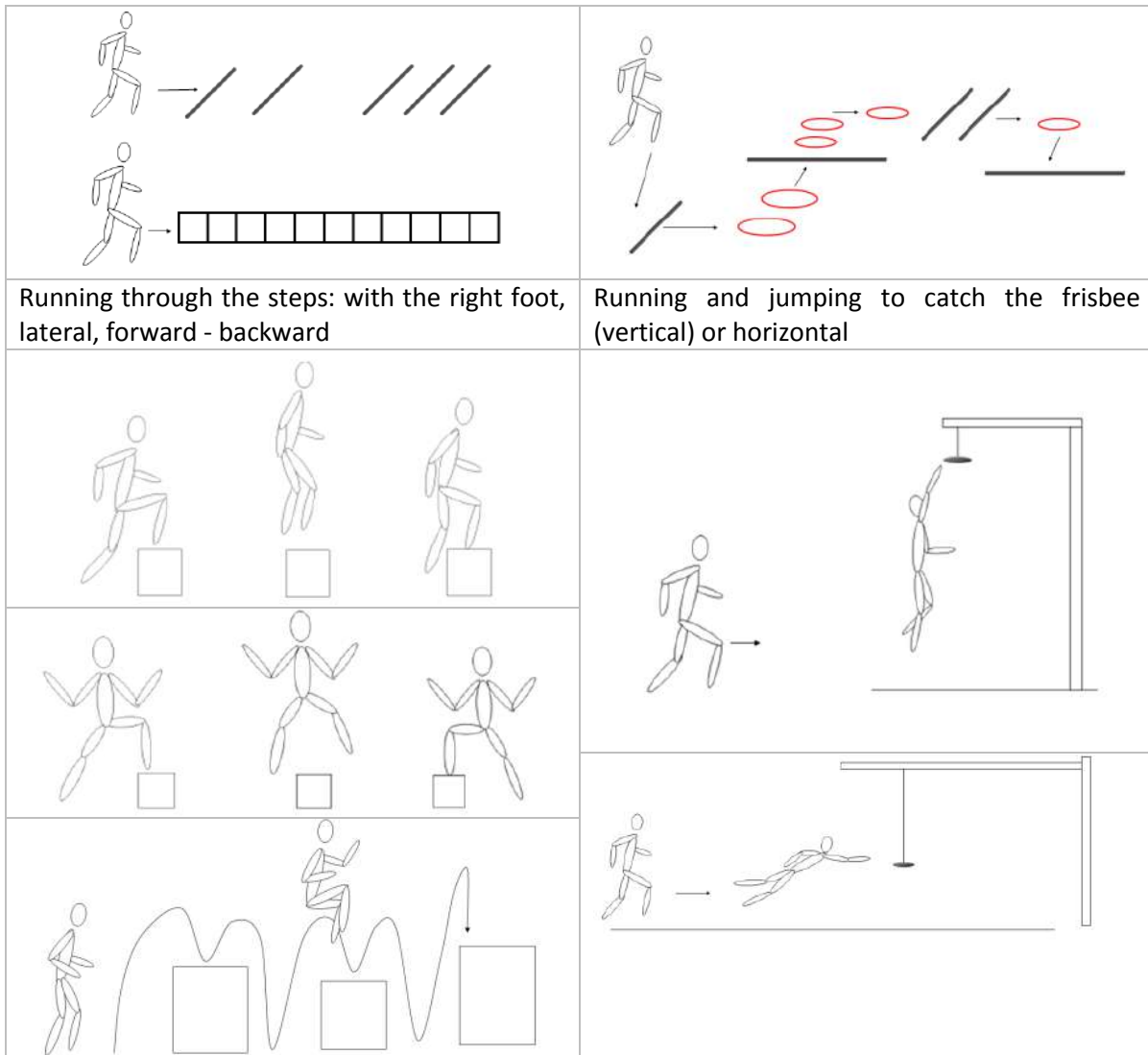
Exercises for the first 8 sessions

Running forward and running backward	Running lateral
	
Run with variations in speed	Run with variations in the direction
 50% de la velocidad - 70% de la velocidad - 90% de la velocidad	
Running and perform spins	Running with variation in stride and frequency
	
Running and jumping	Up and running

	
Running, lying down and run	Jumping on one foot: forward or backward
	
Running and jumping with a foot or two feet	Three small jumps and a big jump
	

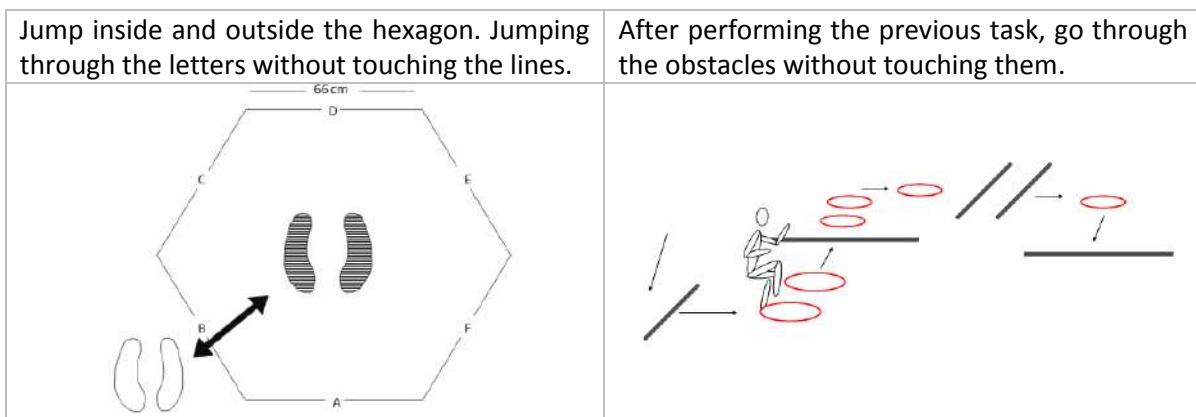
Exercises in sessions intermediate

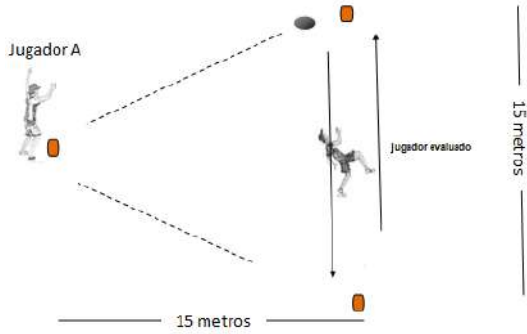
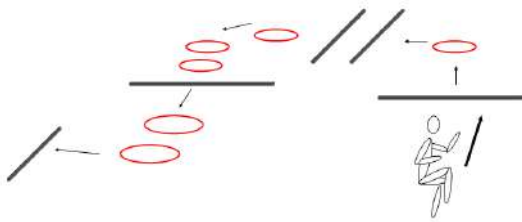
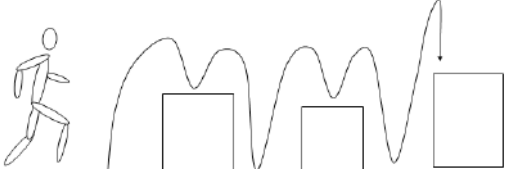
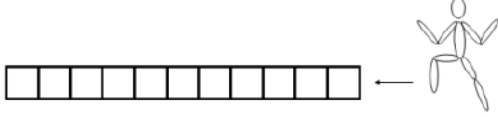
In pairs: running in zig zag	In pairs: running and rotating between the mate
	
In a limited space: running and touching to the partner only with the right hand	In pairs: running with the partner to maintain the distance between them (1 to 2 meters)
	
Running at full speed without touching the obstacles	Running at full speed without touching the obstacles



Exercises in the last sessions

These exercises are oriented in a continuous circuit: The time the route, the memory and the errors is the main evaluation.



<p>The player (A) makes 10 passes to another player (tested). He must catch each pass in the cones.</p>	<p>After performing the previous task, go through the obstacles without touching them (reverse).</p>
	
<p>The player jumps over obstacles.</p>	<p>Running laterally.</p>
	

4.8. Defense training

Ultimate frisbee player must have special knowledge of each of these principles to your training, in the beginning multifunctional, you can achieve the abilities to play well at any time or play any position on the field.

The defense training is organized by location (partially of the frisbee) during the game. It is based on implementing effective mechanisms to recover possession of the frisbee, so as to avoid falling into the 'fakes' and a player to respect the integrity of the other player (avoiding contact). This is the difference with other sports. Defense actions ethical merit used to recover the frisbee, without aggression the other player (spirit of the game).

The aim of training the defense also must tend to maximize energy (ATP, glucose), and manage energy consumption during the game, so that saves energy. Therefore, avoiding unnecessary stress to the maximum energy is used during times of strong attack (offense and defense).

4.8.1. Technical principles for the defense

The defensive position of the player must allow the player to react as quickly to an action to retrieve the frisbee. This position may vary for who possesses the frisbee (player with possession) or to the player who wants to capture. It also allows the use of hands and feet appropriately to stop the trajectory of the frisbee.

Defensive position for the player who has the Frisbee

Distance between the players: who possesses the frisbee and the player who defends him, can vary up to 3 meters (rule applied to make the count of 10 seconds). The position of the player who

holds the defense mechanism characterized by a location in front of the attacker, so that use motion in hands and feet to intercept the throw that makes the player.

Defensive position for players who do not have Frisbee

This position is characterized by constant movement along the offensive player, so that, if you have a throw (frisbee), it can intercept or capture. Also, the player (defense) should avoid contact with the attacker.

Defensive movements

Lateral displacements are used to changes in direction in the run, with changes in running speed or a stopped position (if the situation requires). The aim of these movements is to retrieve the Frisbee. In conclusion, the defense exercised a lot of pressure to the attacking team, to make a mistake during the pass. The following describes the types of movements as the game situation:

Lateral step (defense vs offense)



Chasing the player from the front (looking at offensive player)



From the side, chasing the player (looking at the frisbee and played offense)



Backs to the defense and watching the frisbee: to identify the space where you can throw the frisbee to intercept the pass



Forehand side defense: Includes obstruction hands or feet



Backhand side defense: Includes obstruction hands or feet



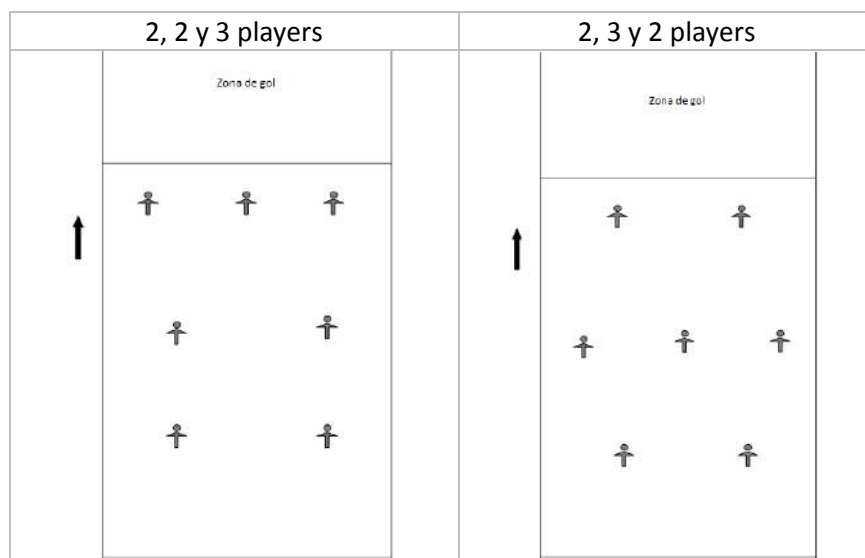
4.8.2. Types of defense

Individual

Is personally, one by one. The fastest player with the fastest, high to high, the slow player with the slowest.

Zone

Is to distribute the players in the space of the field where the pass. Then, the objective will be to close the offense, the space where you can fly the frisbee. For instance:



Combined Defense

It attempts to combine the already mentioned. For instance: the Cup - the Zone, the Cup - personal, the zone - individual.

Defense Alternatives

Are given according to the Zone of possession of the frisbee, according to the height of the attackers (offense), according to athletic performance of the attackers, according to the level of training of another computer (easy, moderate, difficult).

4.8.3. The transition

The transition is defined as the period of passage of a defensive to an offensive position, or vice versa. This concept has an important role in the game. The speed of the actions which involved before and after can contribute (with a goal) to a team that is ready for the counter attack (quick offense). The teams are in constant loss and gain of the object, the ball (Campo, 2001).

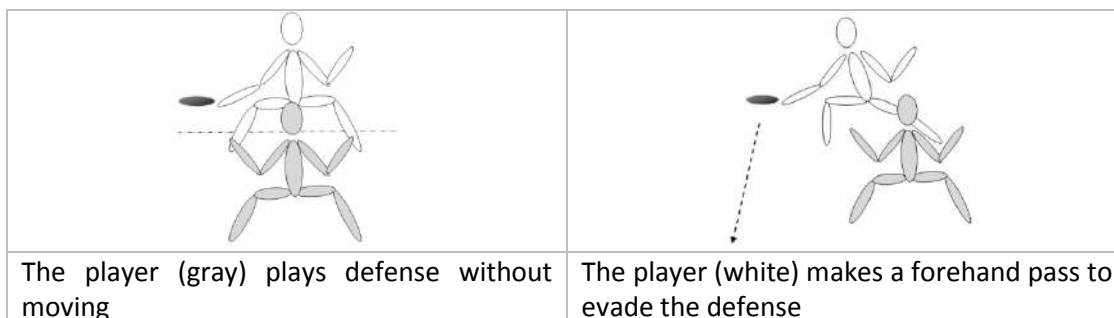
The transition is the best opportunity to make a good defense in a option of goal. The transition can be presented in defense to offense (counter attack). The transition happens when the team that has possession of the frisbee makes a missed throw. The defending team takes possession 'windfall' of frisbee (without dropping to the floor) and make quick actions to goal, taking advantage of the dislocation of the team offense. When this action occurs within the goal area is an own goal (Callahan).

The transition can also occur from offense to defense in this case, the transition indicates quickly rearmament and withdrawal. They go fast action to prevent the entry of goal, like running to endzone, as make the switch or relay, that is, all actions that the players 'defense' may be made to take back control of the game.

4.8.4. Exercises

During training for the fake should be taught to grasp the moment in which the opponent's reaction is delayed or impossible. In this way, it will retrieve the object (the ball). Also, teaches the other party, to capture the moment when the opponent is going to make a fake (Silva, 2002).

Make a fake with a static player

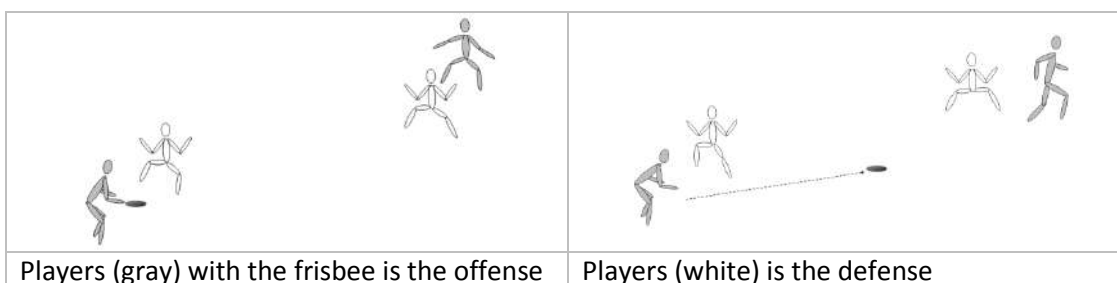


The fake one to one

The offense (has the frisbee) and defense (does the counting). The receiving player is static and is included counts (10 seconds) and the maximum time to possess the frisbee. The player who has the frisbee to pass the frisbee.

The fake two to two

This exercise is guided by a row of players in front of another line of players. The player with possession of the frisbee will have a defense and the first player (receiver) located in the front row will have a defense player. The aim is to avoid the pass reaches the receiver (player) with an interception.



Variations: 1. Include counting. 2. Include a route to the receiver in zigzag. 3. Include only a defense to the receiver (or vice versa).

Defense exercises are also guided as follows:

- From specific positions in the field.
- From specific positions for players.
- Training defense with superior numbers on offense.

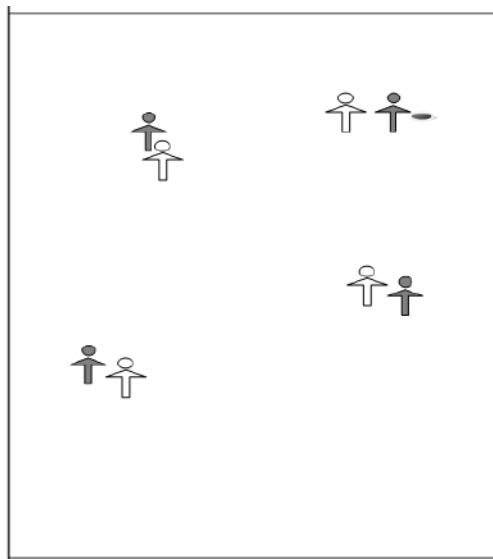
- Defense training with numerical superiority in defending.

4.8.5. Games to improve the defense

In ultimate frisbee is played between two teams and the basic principles of play are frisbee throwing and reception among teammates, without dropping the Frisbee to the ground. When a player has possession of the frisbee cannot be moved except by using the pivot foot. Do not have physical contact during the game between offense and defense. Each player can take possession of the frisbee for 10 seconds counting (loudly) the player's defense. The opposing team can only recover when the frisbee is dropped the team offense, also through the interception of frisbee (by the defense team) during the flight or by the expiration of the time of possession (maximum 10 seconds).

Square space demarcated passes (10 yd by 10 yd, or more)

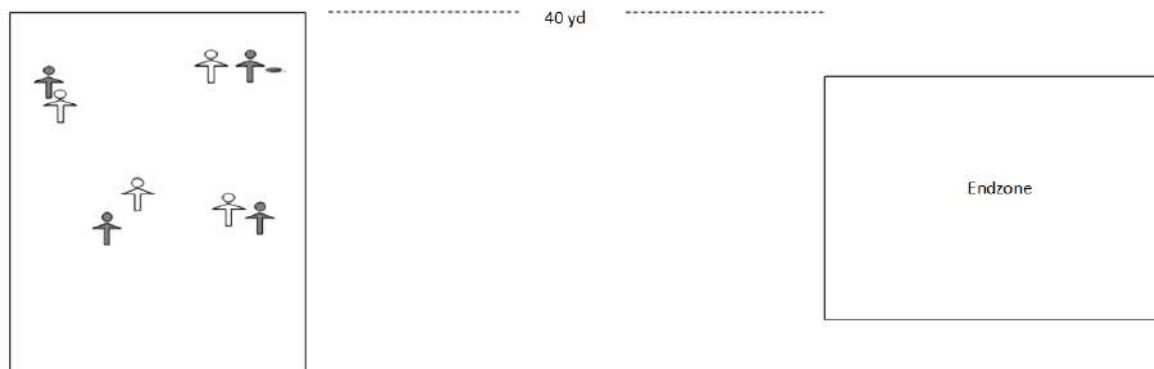
Between two teams: offenses and defenses (4 vs 4). It will play a complete 10 passes using the principles of ultimate frisbee. The defense team will assume this role continued for 10 minutes and only objective is to intercept passes, therefore, cannot make offense until after 10 minutes.



Variations: 1. Increase or decrease the number of passes. 2. Increase or decrease the time and defense role. 3. Include counting. 4. With superior players on offense. 5. Expand is space game (20 by 20 yd; 25 by 25 yd)

Passes and pass goal

Between two teams, offense and defense. It plays to make passes using the principles of ultimate frisbee, in a square space delimited (20 yd by 20 yd) and have another square space (30 d for 15 d) and 45 d demarcated away. The objective is to make 5 consecutive passes in the first square and then make a pass to the square at 40 yards where it is expected that a partner has come running to launch reception (catch) within the demarcated area (30 yd for 15 d). Therefore, the goal for the team defense will prevent the reception of long distance pass (40 yards).



Variations:

1. Increase the separation between the playground and reception area final (endzone).
2. Only one defensive player can run to intercept the frisbee in the endzone.

Play ultimate frisbee modified

Is to play in the regulatory field and ultimate frisbee with the principles regulatory game. The purpose of the game is to take the role of defense during a time of 10 interceptions for changing the role offense, and then the team offense will score the most goals during that time (10 interceptions). The team with possession of the frisbee, start the game from the place of the field where it was the last interception, the team offense will score many goals before the completion of 10 interceptions.

Variations:

1. Increase the number of interceptions.
2. If the interception is made by the defense, without dropping the frisbee (catch), the attacking team loses all remaining opportunities.

4.9. Training offense

In other sports like football and basketball the attack (offense) is to gain space and a player can make individual movements (driving) with the ball to create a scoring option, in this ultimate frisbee game situation is really different, the attack needs at least, two players on the team. A goal can be accomplished only by a launch from anywhere inside the field and a reception in the endzone (except callahan or own goal) and thus, the attack appears to only have the frisbee. However, there are (positions or structures) that can be done in the field, such as strategic locations or pre-planned movements that made the players to score a goal. These structures of 'planned movements' can be learned and memorized through repeated practice of each of the functions of the 7 players, deployment, the location field, the routes, the fakes, the release of spaces, all these mechanisms can be very effective for the goal.

'The three premises for an attack on ultimate frisbee are: to be effective, it is forceful, and unexpected'.

4.9.1. The technique foundations

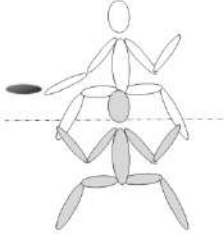
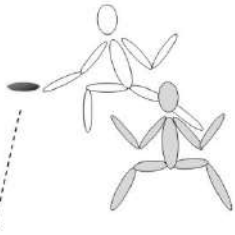
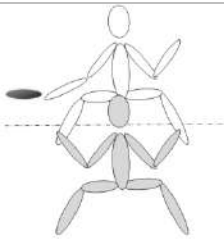
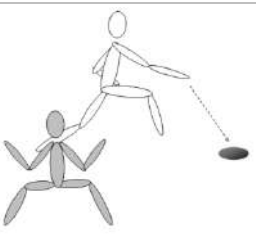
The offensive position player should be allowed to react as quickly to an action, as opposed to a defensive posture, this is a variable position and though not only determined by the specific position, is characterized by changes of direction in the running, passing from a jog to a sprint to catch the frisbee. Therefore, the attack is identified by explosive movements like sprinting (cut), jumping, changing direction or zigzag, as the need of the game. These movements, in turn, must ensure receipt of the pass, breaking the defense and thus realize a goal. Then, the objective of the offense is exceeded defense and passes reception.

The player with possession of the frisbee

During the attack scenario is 1 player in possession of the frisbee and 6 receive function, then, movements that use the player with the Frisbee are limited only to the pivot, that is, to evade the defense uses only turns, inclines and fakes in general, leaving one foot (fixed) pivot foot.

Dominating the pivot foot

This feature is part of the attack and allows us to overcome the defense (one to one) to implement a pass. The player with possession of the frisbee must know pivot foot function to implement launches a 'distance' between the feet wide (bend or lean) and not incur a fault (travel). A right-hander his pivot foot is the left. Therefore, you can change your right foot back and forth according to the Launch you want to use. For instance:

	
<p>The player (gray) plays defense without moving. The player (white) is neutral.</p>	<p>The player (white) is leans and makes a forehand pass to evade the defense.</p>
	
<p>The player (gray) plays defense without moving. The player (white) is neutral.</p>	<p>The player (white) moves the right foot to the left and throws a backhand pass to evade the defense.</p>

Pass: precise and free space

The pass and the reception are defined as the only way of interaction between players to develop the game in ultimate frisbee. However, during the development of this game is not that simple. During a game of ultimate frisbee there are recurring situations. It is a game that is constantly changing displacement by the field, in the jumps and throws, because 14 players interact in a space of 4800 yd².

This situation makes a pass can be presented forward, backward, side, diagonal, straight line, curved, shaped (hammer), with fast speed flight. There is no specific way that condition, but a pass must be done to free space on the playing field, to where the player (receiver) is directed, away from the defense (1 vs 1) and without dropping the frisbee.

Then the player who made the pass must tap the full repertoire of shots that dominate (forehand, backhand, hammer, curves, etc.) and frisbee can reach the reception area of his teammate. An effective launch of the frisbee is that during their flight into contact with the ground or with objects outside the playing field, so the launcher will execute the pass with the certainty that the defense did not intercept and will catch teammate.

The reception of the frisbee to prevent interception

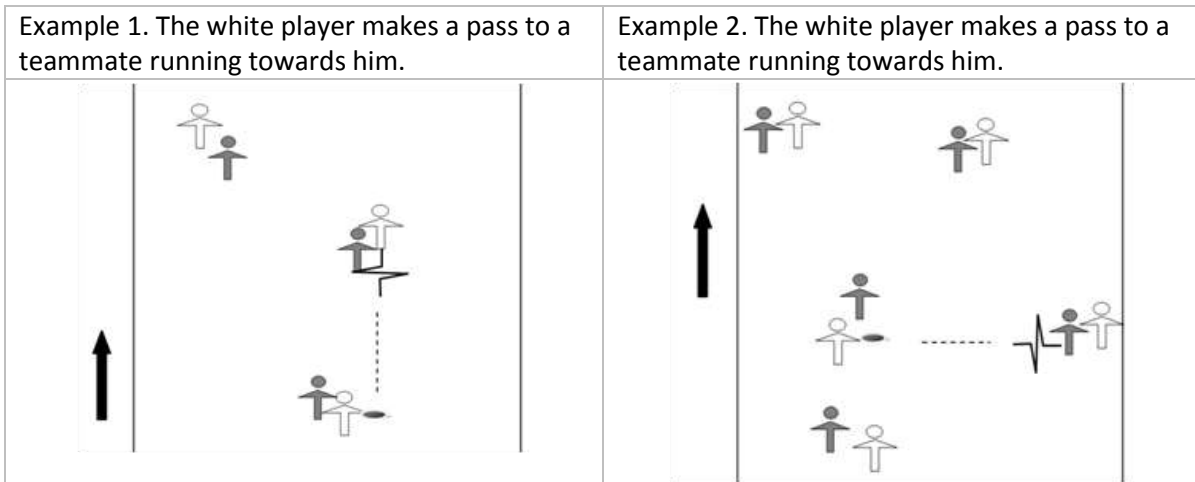
The reception is the culmination of a pass. Indicates that achieved the objective of launching and would continue to attack position. It may also indicate that scored a goal; if reception in the endzone.

The player will pass receptions should foresee the possibility that the defense intercepts it, therefore must move to the frisbee to ensure that reception frisbee. Also, you must rely on feints, jukes, spins, zigzag enabling it to evade the defense (one to one). In addition, the power movements and jumps are decisive for the reception and is won during the dispute with the defense.

Examples of pass and reception:

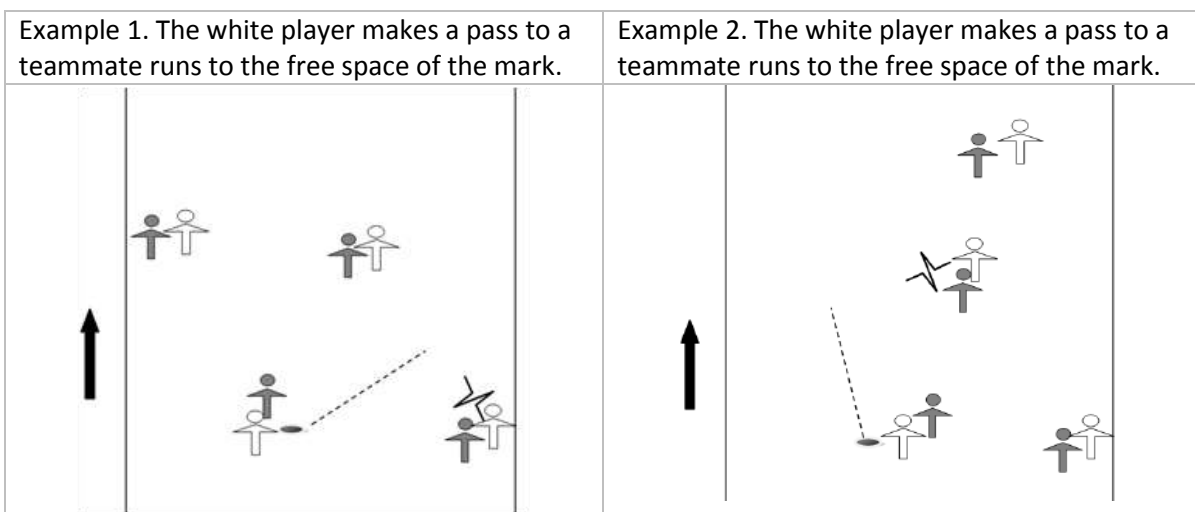
Catches of front

The player who receives runs away from the launch.



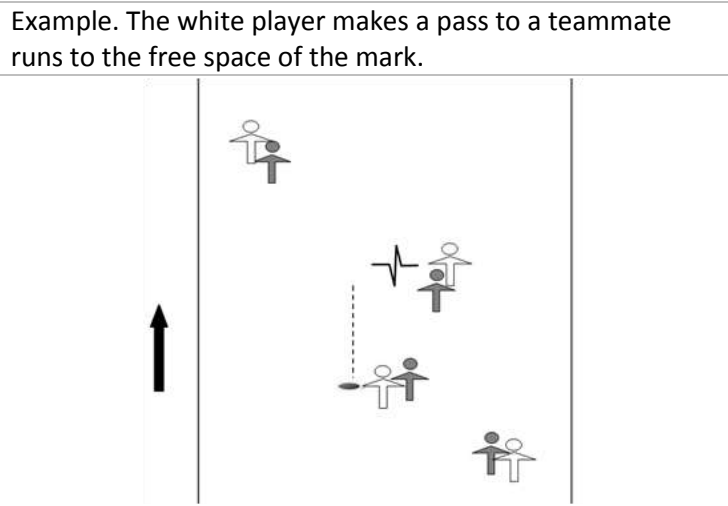
Catch diagonally

The player running towards the path leading to the frisbee. Allowed to win space on the field, although increasing the risk of interception.



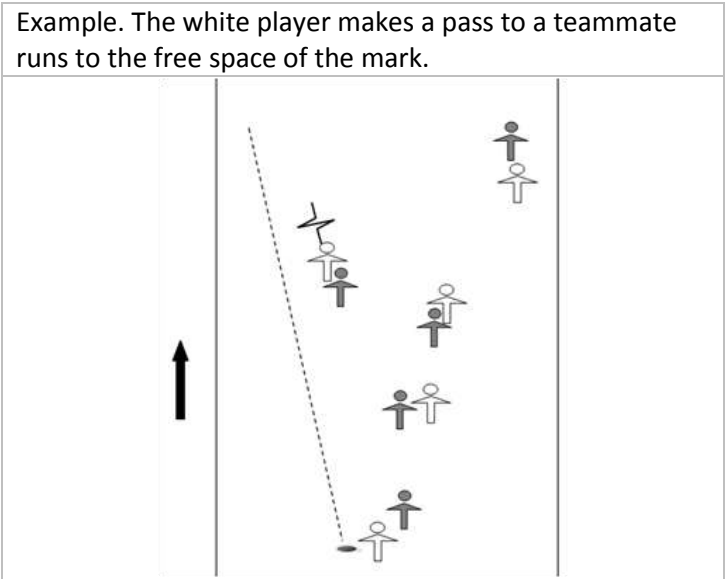
Catch side

The player runs into the path that takes the frisbee and reception.



Receiving risk

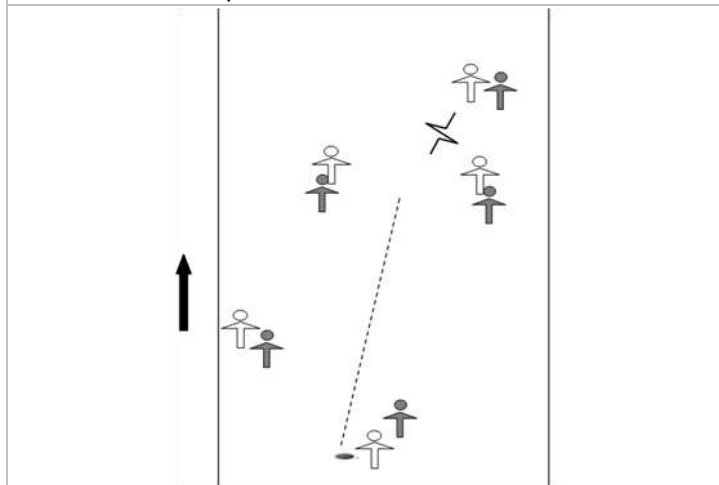
Reception at the direction the frisbee. The player runs in the same direction as frisbee, is sometimes used for long distance pitches to win a large space on the field or to score a goal. They used a long sprint receptions (> 40 d) sometimes fly (layouts).



Receiving risk

Reception among offensive players. The receiving player takes initiative and is expected to save the possession of the frisbee.

Example. The white player makes a pass to a teammate runs to the free space of the mark.



Common mistakes when you have possession of the frisbee (attack position):

- The player with the Frisbee always fakes when reception.
- The receiving player moves through the field with his back to the frisbee.
- Do not attack the frisbee during the pass.
- That time is over possession of the frisbee (10 seconds) to claim that only progress towards the goal area.
- Making a pitch-pass random or more than one player.
- Making pitches in the form of parable. The curve of the parabola leads to increased flight time, therefore, becomes more vulnerable to interception.

4.9.2. Types of attack

Transition and counterattack

This type of attack is characterized takes place when the defense has not had time to organize. As was mentioned, the transition can occur from defense to attack and provides a moment to adjust the situation to make this action (frisbee interception) in a scoring option, hence the importance of the unexpected possession of the frisbee. The transition and the counterattack is when the defense team frisbee reception during the attack on the opposing team, without dropping the Frisbee to the ground. This allows for quick action to not allow time for defensive actions such as retreat, switch (switching between defenses), defense, one by one.

The counterattack prepared

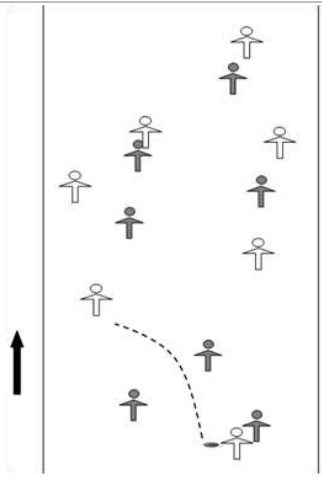
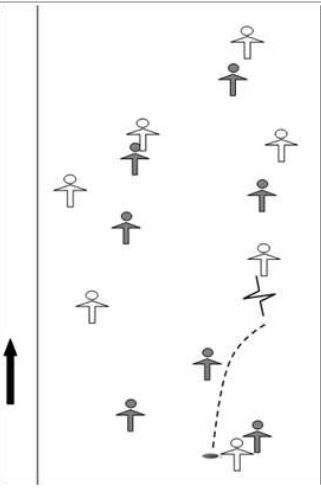
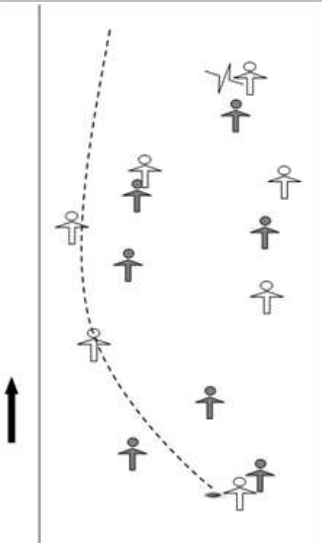
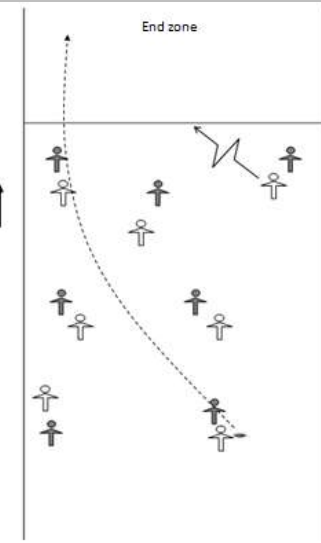
This attack has been previously thought and has practiced many game situations. Therefore, each player must be clear about the actions that make the play. Its aim is to establish numerical superiority and is based on the effectiveness of the passes and agile movements.

The counterattack is divided into three parts:

1. Retrieving the frisbee. This is when you get the frisbee under the guidelines of rules, when leaving the field area, when met within 10 seconds of possession, with the catch.
2. Deployment of players. The 6 players move quickly to a place from which to implement their specific attack.
3. Go with the frisbee. Are the launches that will ensure the goal.

Offensive against the defense of Cup

This attack is based on accuracy launches and launch Hammer is a good choice. They take advantage of the two attacking players who have no defense. In this manner, is played by passing in the form of Hammer (level) above the players engaged in the defense of Cup.

<p>Example 1. The white player takes a shot hammer above the cup defense.</p>	<p>Example 2. The white player takes a shot hammer above the cup defense.</p>
 <p>A diagram of a field with a goal on the left. A white player at the bottom center is shown taking a hammer shot (indicated by a dashed line) towards a cluster of black players in the center. A vertical arrow on the left points upwards.</p>	 <p>A diagram of a field with a goal on the left. A white player at the bottom center is shown taking a hammer shot (indicated by a dashed line) towards a cluster of black players in the center. A vertical arrow on the left points upwards.</p>
<p>Example 1 (option 2). The white player takes a shot (hammer), long distance to the goal area.</p>	<p>The white player takes a shot (hammer) to the partner who runs into the endzone.</p>
 <p>A diagram of a field with a goal on the left. A white player at the bottom center is shown taking a long-distance hammer shot (indicated by a dashed line) towards the goal area. A vertical arrow on the left points upwards.</p>	 <p>A diagram of a field with a goal on the left. A white player at the bottom center is shown taking a hammer shot (indicated by a dashed line) towards a partner who is running into the endzone. A vertical arrow on the left points upwards. The endzone is labeled "End zone".</p>

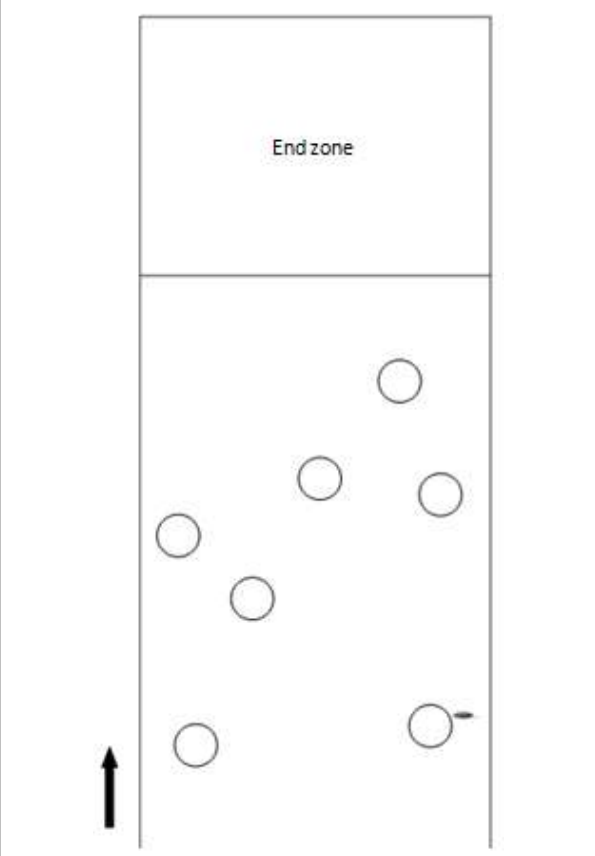
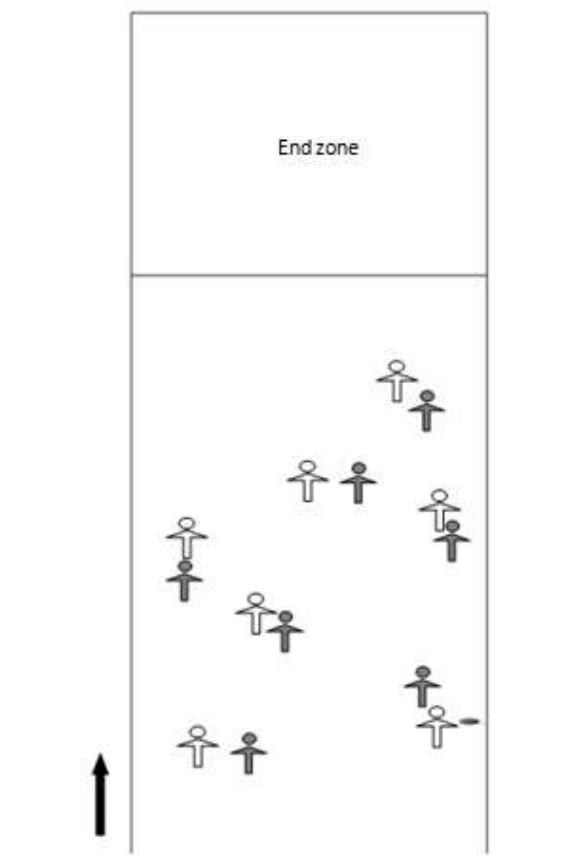
Offensive in zone defense

This attack is based on fast launches (with possession of frisbee of at least two seconds) and short distance. It occurs when two players started the attack. He who has possession of the frisbee throwing to his only mate and immediately made a move (cut diagonally) to pass reception in the small spaces that can be found, so there will be no time for players to defense are located in zone and then penetrates the structure.

4.9.3. Exercises

The exercises must be repeated over and over each of the tasks thus suggests some situations that may occur during the course of a game of ultimate frisbee, so that each of the players to exercise their best effort and can learn from this situation.

For the specific location of each of the offensive players are used hoops.

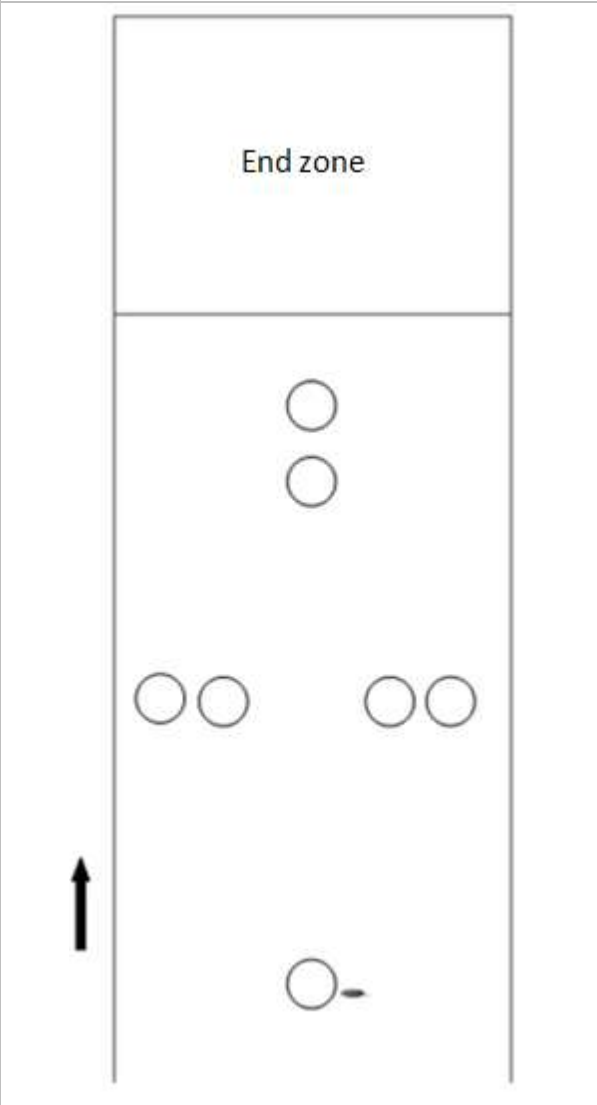
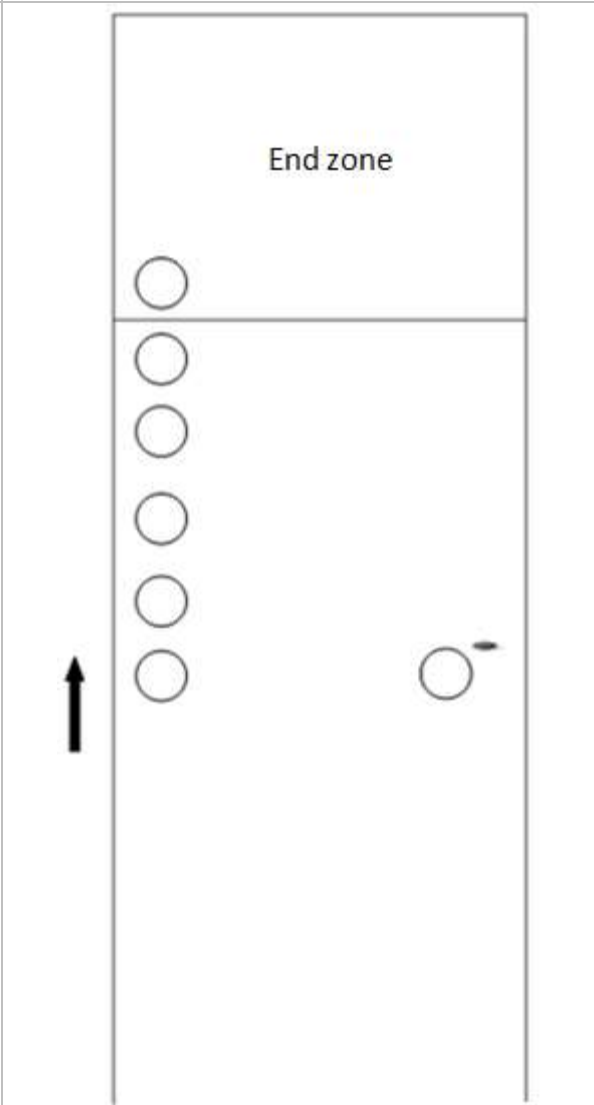
Exercise. The attacking team uses these specific positions by a hoops placed on the field.	Exercise. The attacking team takes the position of each of the hoops and is ready to attack. The attack will always start from this position.
	

Equipment: A field of ultimate frisbee, hoops, 14 players, 1 Frisbee, 1 stopwatch, 1 whistle.

Variations:

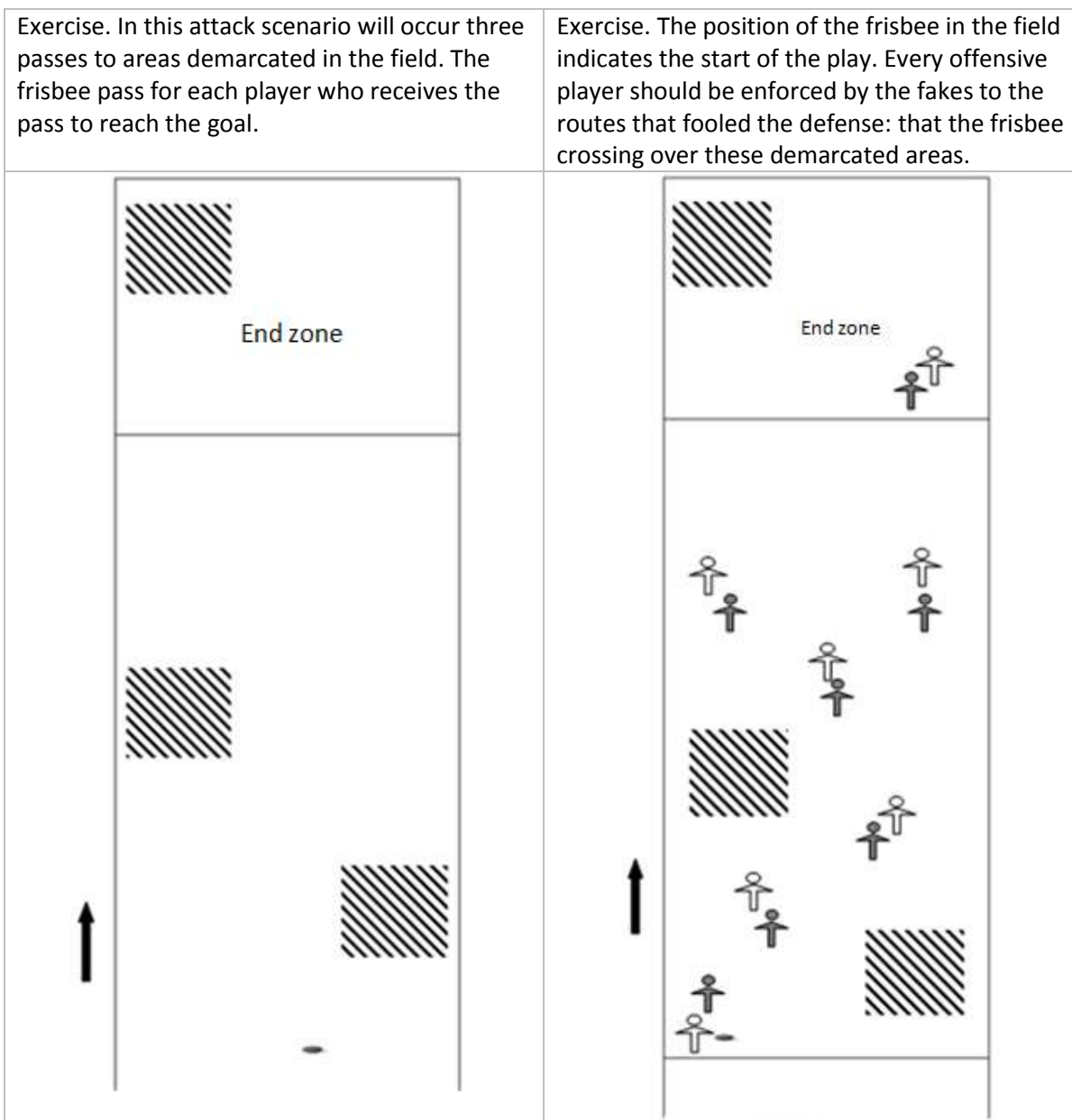
- Assign a number of passes to reach the goal and respect this condition.
- Reduce the number of players on offense or defense.
- Move the start of the play near the endzone or the place where determined by the coach.
- Include a time limit to make the goal.
- Changing the position of the attacking players strategically.
- Assign a specific route, players receptions and who simply will run.

Other examples:

<p>Example. The hoops located in the field represents the position to take the strategic offensive players after a pull or after frisbee fallen.</p>	<p>Example. The position taken by players can vary according to the movements of the attackers.</p>
	

These structures located in the field are used to be implemented passes to specific areas (throwing to Space)), without defense players know about the strategy. Therefore, players start the game with full clarity of each movement and launches to be made.

The exercise allows us to exploit the abilities of some players in the long and precision launching. During exercise training can use a whiteboard or table for mapping miniature motion. For example:

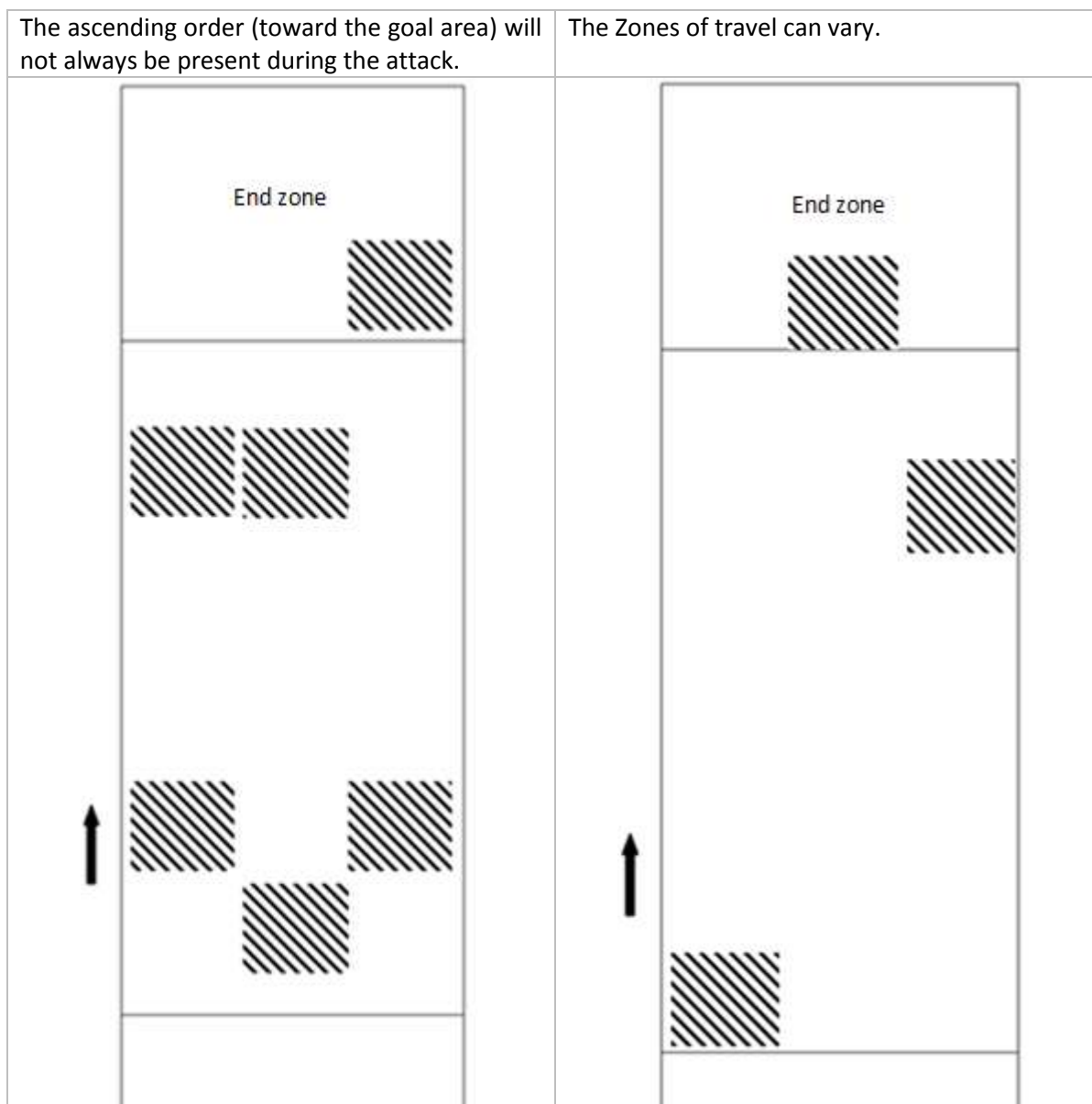


Equipment: An ultimate Frisbee field, 14 players, a field in miniature portable whiteboard, a marker.

Variations:

- a. Assign a specific player who receives in each area.
- b. Increase the number of reception areas.
- c. Move the start of the play near the endzone or place of determined by the coach.
- d. Include a time limit to make the goal.
- e. Assign a specific route, players receptions and who simply will run.

Other examples:

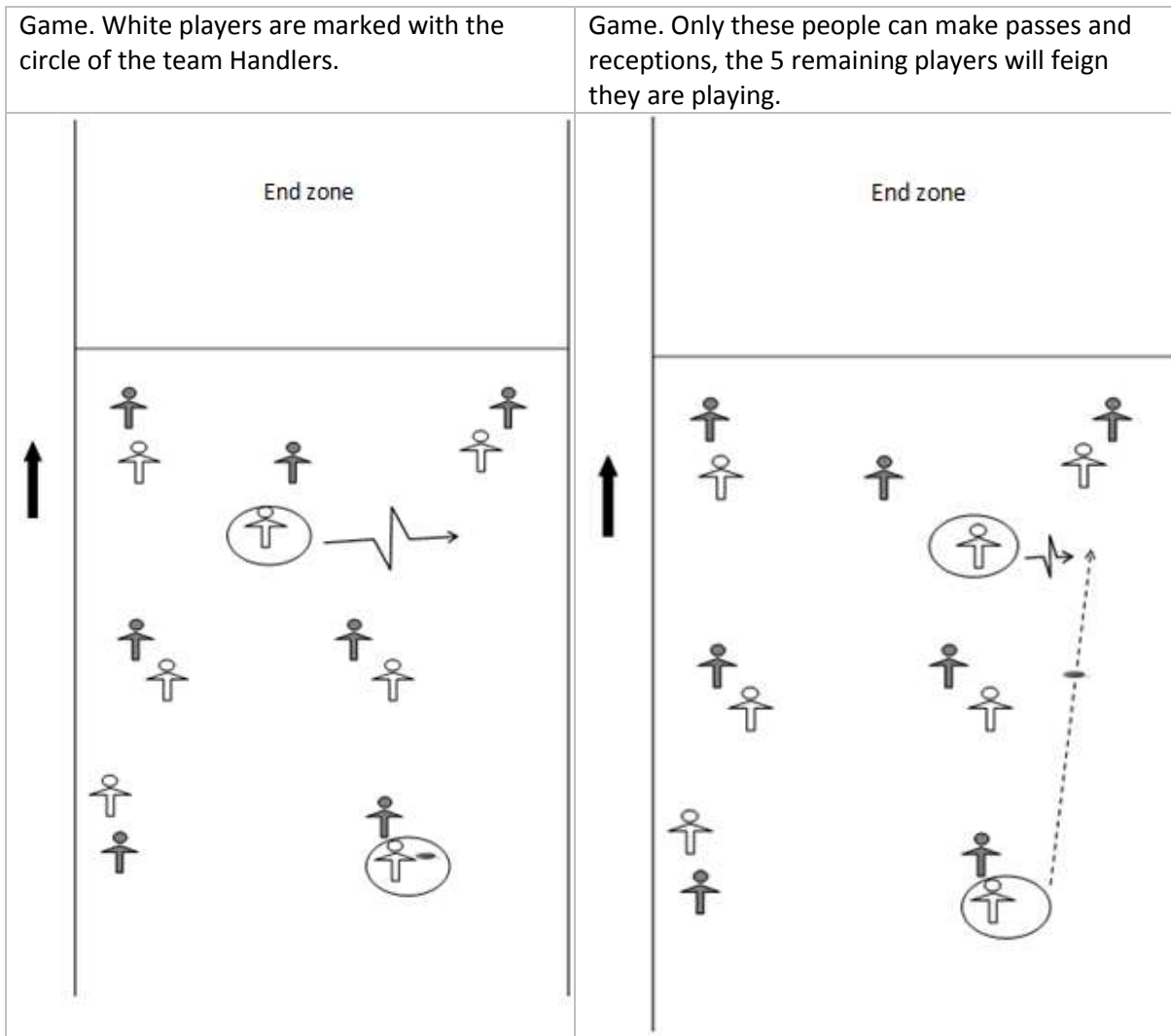


4.9.4. Games

Must provide the 'motor solution' and 'mental solution' to solve the game situations.

Game with permanent Handlers (point guards)

Between two teams, attackers and defenders, each team chooses a partner of players who will be responsible for the passes and receptions. The attacking team will be responsible for ensuring that only eligible players (partner) receiving and passing the frisbee between his companions (the other five). The plan is to score goal with 'permanent Handlers'.



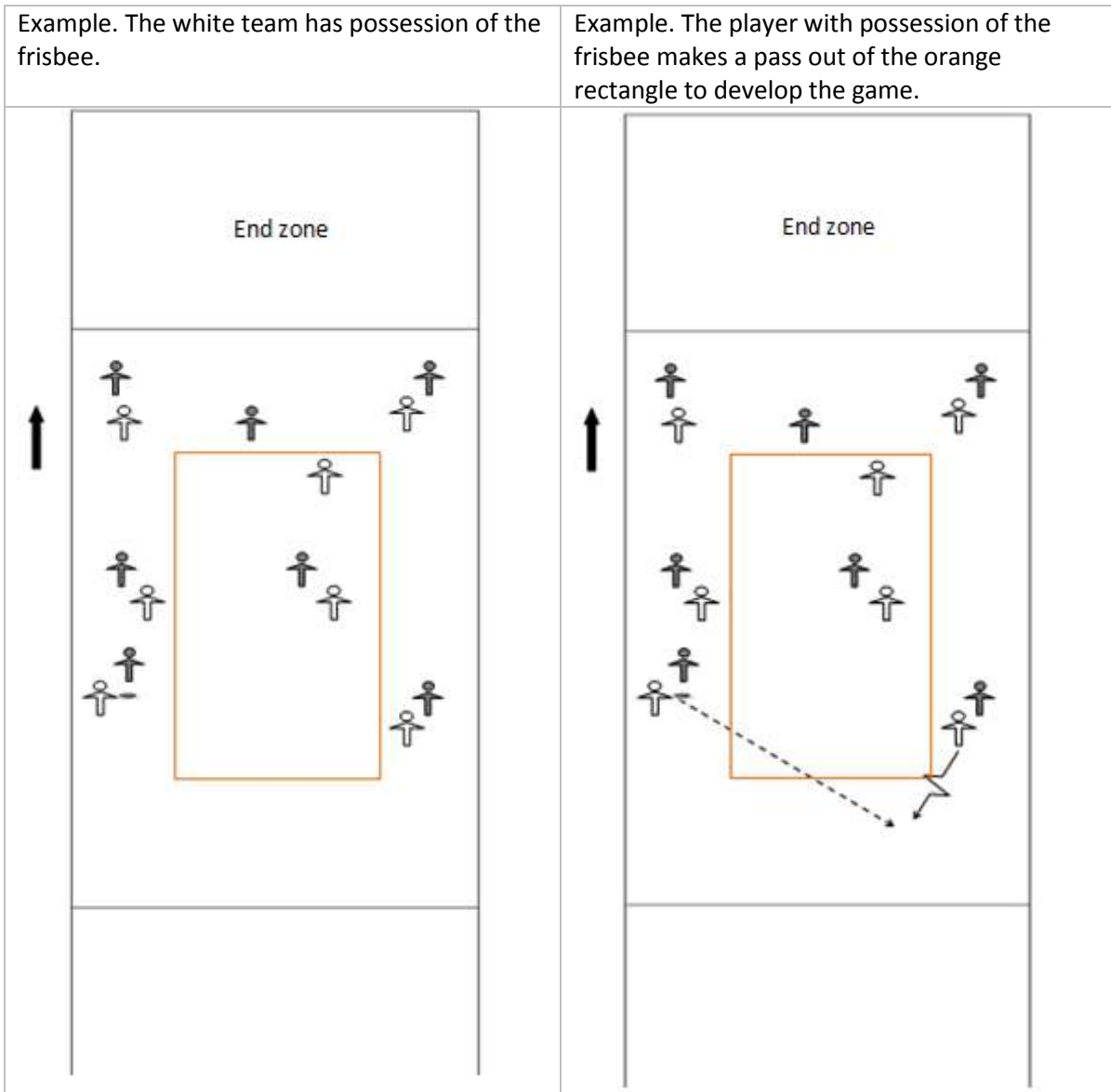
Variations:

- There is only one Handler.
- Passes are made only to advance the field.
- That reduces the time the possession of the frisbee to less than 10 seconds.

d. Allow possession of the frisbee until you make the annotation of the goal. It does not take into account the frisbees intercepted.

Game with limited space in the field

Between attackers and defenders both teams play ultimate frisbee is normal, except that the play space areas will be banned to receive passes.

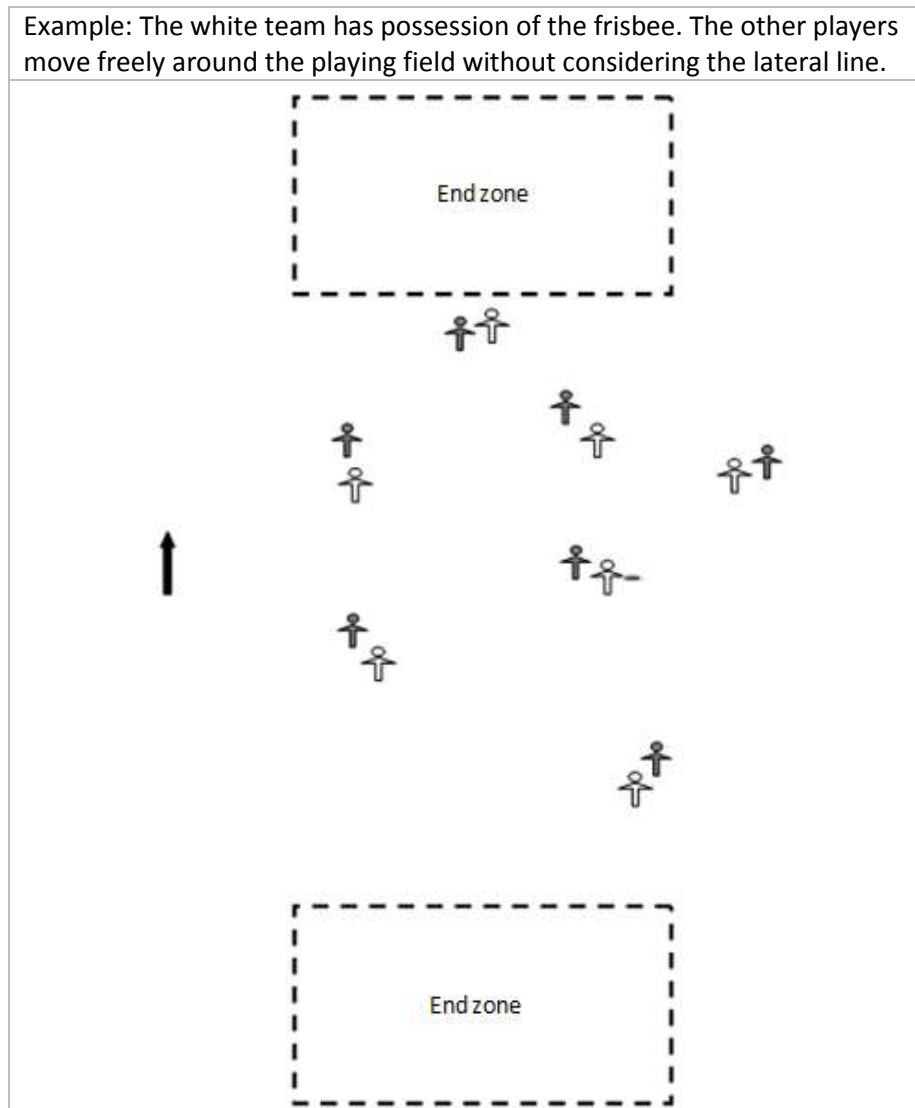


Variations

- a. Passes are made only to advance the field.
- b. That reduce the time the possession of the frisbee to less than 10 seconds.
- c. To allow the possession of the frisbee until you make the annotation of the goal.

Ultimate frisbee game without designated area of play

Only demarcate the endzone's.



Modifications

- The goal will be considered only if all players had contact with the frisbee.
- The reception of the passes take an order, ie, 1 passes to player (b), 2 passes to player (c), 3^o pass player (d), if you damage this order the attacking team loses the frisbee.
- The player to drop the frisbee out of the game.

Ultimate frisbee player must meet each of the tactical principles of play as penetration, mobility, transition, breakdown tactic, containment, relay or switch (see table 8) for the training in the beginning is "multipurpose" allowed to acquire skills to perform well at any time or play any position on the court. The following explains each:

Tactical principles	
In offense can to give:	In defense can to give:
<ul style="list-style-type: none"> ○ Transition: when the defensive team recovers the frisbee through the intercepted. ○ Penetration: when the player who receives the Frisbee made a pass and immediately run to return to receive the frisbee, that is, space is advanced into the endzone. ○ Mobility: the ability to make passes between the attacking players to maintain possession of the frisbee. Unlike penetration, mobility does not indicate progress towards the goal area but passes (lateral or backward) as a retreat to reconsider the attack. 	<ul style="list-style-type: none"> ○ Containment: limit the attack to causes the defense. Individual resources or collectives that are used to prevent the progress of frisbee. For example, in a zone defense, defense in the form of Cup. ○ Retraction: the displacement of one or more players to prevent penetration in the attack. ○ Relay or switch: sharing between players that can occur in a defense situation. It is used to prevent a player who exceeds the defense can get the frisbee. A player leaves the defense to go to another player in order to neutralize the attack.

Table 8. Principles of offense and defense

4.10. Means for regeneration

This aspect may be as important as warming and refers to return to the calm when you end a training session or game. This process serves to accelerate replacement of the human body's physiological systems or homeostasis.

Ramos (2001) proposes the following means:

- Jogging (1.5 to 2.0 yards per second): conducive to the rapid removal of lactate, the stabilization of homeostasis in relaxation and distension of the musculature general.
- The stretching and relaxation movements, emphasizing the muscles that were key for the development of the session.
- Regenerative Massage, favors the elimination of metabolites and decreased tone muscle.
- Food: carbohydrate, water and electrolytes to promote rapid replacement energy.
- The hot bath 36 to 38 ° C, 10 to 15 minutes duration improves circulation blood producing a calming effect.

5. High level in ultimate frisbee

The development of a higher level is a biological process at adaptation to work, which takes into account the athlete's physiological systems. To reach the highest level, must prioritize the systematic management principles for planning and periodization of training and individual adaptation mechanisms such as load, rest, overcompensation and adaptation. The high level is evaluated with detailed tracking and monitoring individual athlete.

The highest level is the main objective to achieve in training. It is based on the structuring and planning. Therefore, the methodology is important in interaction sessions with the athletes they

will achieve better results in the competitions. This is a process that begins on a date, achieved its objectives and then, the high level controllably decreases.

The training methods the high level structured in three phases:

1. Athlete formation: This reinforces the physical abilities necessary for the sport. It is based on the stimulation and development of skills in the sport. In planning and periodization of training occurs during "the mesocycle developer" that can take between 7 and 9 weeks (Betancur, 1999). In ultimate frisbee this first stage of a sport involves the development of running speed at distances of 20, 30 or 40 meters, to improve the cardiac index of recovery (heart rate), to improve the accuracy of the hammer throws, backhand, forehand, at n distance; also improve the generation and occupation of space on the field (tactical).
2. Stabilization: This ensures an optimal preparation of the athlete and also based on the maintenance of sporting level (high level) the player has achieved, and the stabilization takes between 9 and 15 days. It should be noted that previously there is a specific preparation of athletes, and can last from 2 to 5 months (preparatory period), this depends on the particular training, hence the importance of periodization to identify the physiological qualities in athletes and thus can calculate the percentage of improvement during training (perception of effort). The stabilization phase includes the competition, id est, the main tournament for which he trained, here is expected to achieve the objectives of the training plan (macrocycle). It demonstrates the real level of athlete.
3. Detraining periodical: here the athlete experiences an organized reduction of the loads and controlled rest to allow recovery of competitive stress. At this stage you cannot lose all the specific skills and physical abilities gained, you can lose 8 to 12 percent of the way sports, in this way, ensure better performance next season.

Being at a high level does not mean to win competitions.

Indicators of high level sports

The signals presented by the athlete when in his best time are (Lainer cited in Garcia, 1996):

- The athlete is able to achieve its best result in the test.
- The athlete works with a high muscle performance.
- Their motor skills are a level above the level required by the competition.
- Resolved quickly tactical situations in the game.
- The athlete gets a good result or effectiveness of their technical and tactical executions.
- The athlete trains extensively with great economy in their physiological functions.
- The symptoms of fatigue are delayed.
- Athletes recover quickly; potential energy consumed in the effort.
- He has a great motor coordination in their actions.
- Focuses attention on the task, becoming capable of self-assessment.
- He can overcome the unexpected obstacles that occur in the competition.
- He is able to control their emotional states.

6. Assessment: Testing in ultimate frisbee

Blázquez (2003) presents a complete analysis of the test. The test is an assessment of the educational process (sports) or the season. Evaluated variables such as the methodology, the space, the equipments, the communication, the Pedagogy and the individual differences in athletes. Evaluate the product, id est., the results of the training, knowledge acquired, discipline in the sessions, and all qualitative and quantitative aspects. This section emphasizes the evaluation as a way to assess the training process, the teaching-learning process that leads to people, to question the process and to optimize learning. The evaluation is a continuous process and must be viewed from session to session, microcycle to microcycle. This resource promotes the readjustment, reconstruction of the session through the analysis of all these variables, so that the teacher (coach) to develop self-critical thinking and can know whether the action has been effective.

Evaluate can also be understood as a way to comment on action, therefore, provides data and information that will help to judge precise criteria, based on improving the process. Consequently, the need to carefully select the assessment and measurement instruments specify can provide an adequate basis for a good evaluation.

Measure is the action or set of actions oriented at obtaining and recording of quantitative information. Consequently, a quantitative measurement technique is considered objective in itself, unless the evaluator does not commit an error or no influence on the assessment made. The quantitative technique is based on a scale of physical measurement to quantify, in absolute terms, a particular feature of the athlete, for measurement scales, time distance, weight, number of repetitions.

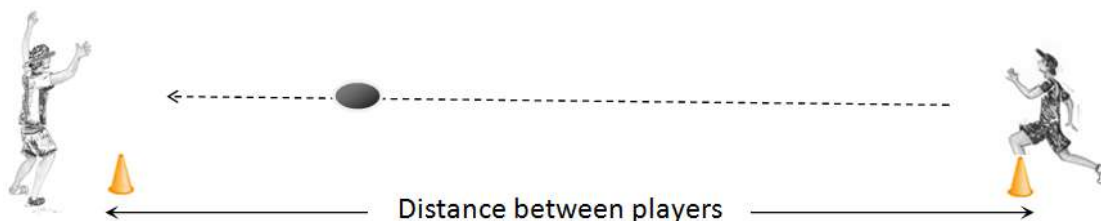
In ultimate frisbee training monitoring and evaluation can be done by all the above. Here, we propose a test used to assess some physical abilities. For the development of these assessments should take into account the athlete's clothing, for instance, use of cleats and clothing appropriate for the test, also has had adequate rest (7 hours of sleep the night before) and nutrition high carbohydrate (2 hours before).

6.1. Testing throwing and catching techniques

Evaluate the technique of throws and receptions of two players simultaneously. Also ranked the players in beginner, intermediate or advanced. It consists of making 20 passes with a partner. Only are counted the throwing that is received without the frisbee fall to the floor.

The evaluator should consider the experience level of players for the performance of a player does not influence the result. The test applies to throws of backhand, forehand and hammer, men and women.

Equipment: 1 Frisbee, 2 cones, metric tape.



Classification	Reception	Beginner	Average level	Advanced level
Poor	< 7			
Good	8 - 15	Between 10 meters	Between 30 meters	Between 40 meters
Excellent	> 16			

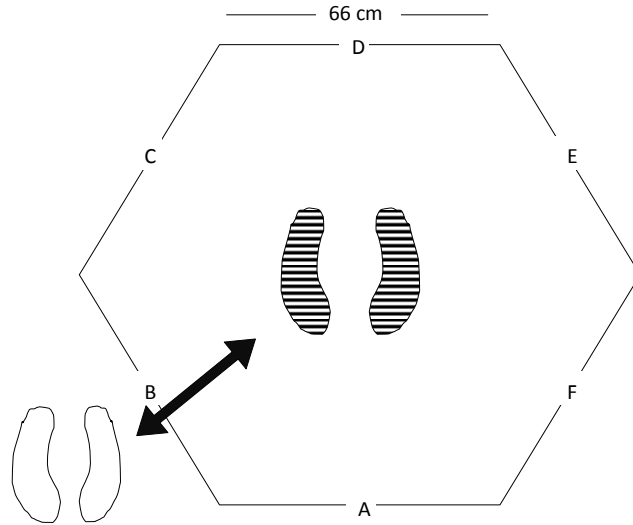
For instance, if a couple of players scored 15 good throws and receptions, from a distance of 30 meters, are located such as players with "good practice" on average level.

6.2. Agility test, jump test, agility run test, and lateral change of direction test

Hexagonal test

Evaluates the speed of changes in direction of movements. Required to be marked on the floor a hexagon with 66 cm (26 inches) per side.

1. The athlete stands in the middle of the hexagon facing side A.
2. It should jump with both legs above the line drawn to the side B, then back to center with another jump, then jump over the side line to C and returns to the medium in the same way, then jump over the line next to D and returns to the middle and so on.
3. When the athlete to jump over the line A, and back to the center, has completed a circuit. The test continues until complete 3 circuits.
4. It gives the athlete a break of 5 minutes or more to allow full recovery and repeat the test again.
5. Finally with the time of the two attempts is calculated an average time.
6. If the athlete jumps to a line that does not apply in the order, or fall on the lines, he has to restart the test.



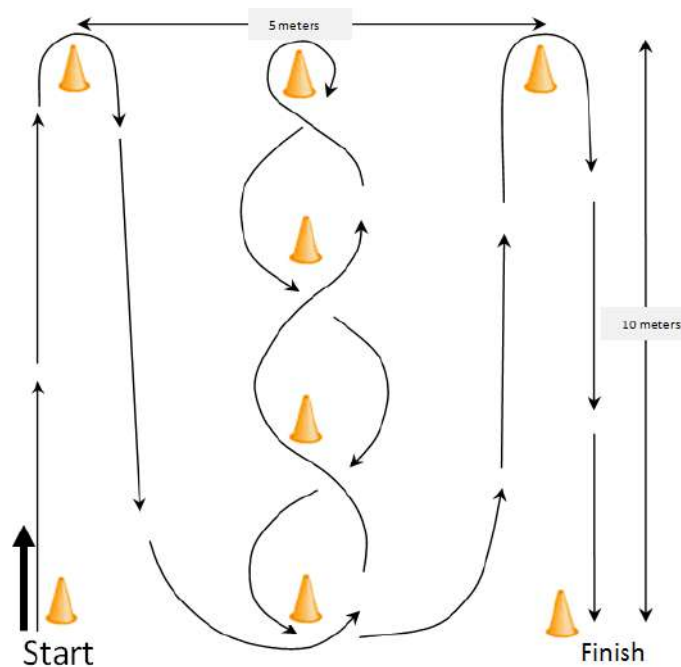
Gender	Excellent	Above average	Average	Low average	Poor
Male	< 11,2	11,2 - 13,3	13,4 - 15,5	15,6 - 17,8	>17,8
Female	<12,2	12,2 - 15,3	15,4 - 18,5	18,6 - 21,8	>21,8

Table 9. Hexagonal test results (C. Gaines, cited by Alba, 2005) for ages 16 to 19 years.

Illinois Agility Test

Evaluates the athlete's running agility. It requires flat surface, 8 cones and a stopwatch.

The athlete is lying face down on the start line. On the command starting, jump and run as shown in the figure above, around the cones to the finish line. It registers the time.



Gender	Excellent	Above average	Average	Low average	Poor
Male	< 15,2	15, 2 – 16,1	16,2 – 18,1	18,2 – 18,3	> 18,3
Female	< 17,0	17,0 – 17,9	18,0 – 21,7	21,8 – 23,0	> 23,0

Table 10. The table presents a scale to assess the time in seconds suitable for ages 16 and 19, according to Davis et al. (Alba, 2005)

Lateral direction change test

Evaluates the speed to change direction. Also known such as round-trip test of 20 meters. It is suitable for all sports with multidirectional run. It takes 3 cones and a flat, a field of grass or sand. The cones are placed in a straight line, separated by 5 meters.



The athlete stands at the cone located in the middle. The evaluator gave the order to start activating the timer, and indicating the cone to go (left or right). The athlete runs to the cone and touches it, back at full speed toward the cone of the medium continues to the opposite cone touching it and back to the middle cone, touching the latter. It registers the time.

After 3 minutes, repeat the test going to the opposite side and choose the attempt where the time was better.

Percentile	Female	Male
91 – 100	between 3,22 - 3,37	between 2,90 - 3,05
81 – 90	between 3,38 - 3,53	between 3,06 - 3,21
71 – 80	between 3,54 - 3,69	between 3,22 - 3,37
61 – 70	between 3,70 - 3,85	between 3,38 - 3,53
51 – 60	between 3,86 - 4,01	between 3,54 - 3,69
41 – 50	between 4,02 - 4,17	between 3,70 - 3,85
31 – 40	between 4,18 - 4,33	between 3,86 - 4,01
21 – 30	between 4,34 - 4,49	between 4,02 - 4,17
11 – 20	between 4,50 - 4,65	between 4,18 - 4,33
1 – 10	between 4,66 - 4,81	between 4,34 - 4,49

Table 11. Percentile scale to classify the test results "change of direction" in time in seconds, according to D. Chu (Alba, 2005)

6.3. Endurance Test (Leger test)

It consists of running back and forth on a track 20 meters long with increasing speed. It uses an audio track (CD or mp3) that will indicate the signal that initiates the trip. The test is stopped when

the athlete is not able to keep the rhythm indicated by the audio track. Take the times resisted the rhythm of the test and calculate the "VO2 max" according to the following table.

Test duration in minutes	Velocity (km/h)	Maximal Oxygen Consumption (ml-1/Kg-1/min-1) according to age		
		14 years	16 years	18 years or more
1	8,5	31,4	27,3	23,6
2	9	34,1	30,3	26,6
3	9,5	36,7	33,2	29,6
4	10	39,4	36	32,6
5	10,5	42,1	38,9	35,6
6	11	44,8	41,7	38,6
7	11,5	47,5	44,6	41,6
8	12	50,2	47,4	44,6
9	12,5	52,9	50,3	47,6
10	13	55,6	53,1	50,6
11	13,5	58,3	56	53,6
12	14	61	58,8	56,6
13	14,5	63,7	61,6	59,6
14	15	66,4	64,5	62,6
15	15,5	69,1	67,3	65,6
16	16	71,8	70,2	68,6
17	16,5	74,5	73	71,6
18	17	77,2	75,9	74,6
19	17,5	79,9	78,7	77,6
20	18	82,5	81,6	80,6

Table 12. Indirect valorization of maximal oxygen consumption, according Course Navette (Ramos, 2001).

The ultimate frisbee players (men) are between 53.5 and 65.6; according to laboratory assessments of physical education at the University of Antioquia (2008).

6.4. Recovery test (heart rate)

This indicator uses the recovery through the maximum heart rate after exercise. For instance, instantly the athlete completes the Leger test records the numbers of beats per minute with a heart rate monitor.

Then, after a minute of rest, recorded with a stopwatch, there is again the number of beats per minute. If the value corresponds to a decrease of 50% or more of the heart rate in the Leger test is considered an **excellent recovery**. If the value ranges between 49 and 30% is considered **good recovery**. For instance:

An athlete at the start of the test resting heart rate was 54 beats per minute, and scored 208 beats per minute at the complete the test. As he passed one minute recorded 140, then the recovery rate = (maximum heart rate - resting heart rate) / (maximum heart rate - heart rate at minute one).

Percent Recovery = $(208 - 54) / (208 - 140) = 0.42$. This indicates that only 42% recovered, therefore, recovery is **good**.

6.5. Test of muscle power (Skip for high)

The power is evaluated through tests that measure the speed of movement and weight that moves. Proposed test easy to use:

These perform a vertical jump from both legs. It makes a leg semi-flexed, followed by the extension. During this action are used to achieve more height arms with flexion - extension (Acevedo et al., 2008)

Percentile	Female (cm)	Male (cm)
91 – 100	38 - 55	55 – 70
81 – 90	34 - 38	51 – 55
71 – 80	32 - 34	49 – 51
61 – 70	30 - 32	47 – 49
51 – 60	28 - 30	45 – 47
41 – 50	27 - 28	43 – 45
31 – 40	25 - 27	41 – 43
21 – 30	23 - 25	38 – 41
11 – 20	21 - 23	34 – 38
1 – 10	13 - 21	16 – 34

Table 13. Vertical jump height (Abalakov) for men and women of Colombia (Jáuregui, 1993)

Speed test run

The tests that measure the speed common feature of short-term environment because the maximum speed can be maintained only for a short space. Some of the most popular test to assess the speed have been the distance run fast on 20, 30, 50 and 60 meters at launched (the register in seconds). To apply these tests are made three runs of 30 meters at full speed with full recovery between repeats (Alba, 2005).

Gender	Excellent	Above average	Average	Low average	Poor
Male	< 4.0	4.2 – 4.0	4.4 – 4.3	4.6 – 4.5	> 4.6
Female	< 4.5	4.6 – 4.5	4.8 – 4.7	5.0 – 4.9	> 5.0

Table 14. Valuation at speed test run at 30 meter dash in seconds from stopped position

Maximum strength Test

To establish the repetition maximum (RM) for the orientation training for power (force x speed) we propose the following test of strength. The athlete is ready to lift a moderate weight, with which it is able to perform at least twelve repetitions, without damage the exercise technique. The weight that was used is multiplied by the number of repetitions you done, then multiply by 0.03 and adds the weight lifted. The result of this operation is equivalent to 100%, approximately.

For example, an athlete was able to perform only 12 repetitions of 100 kg in the leg flexors, then $100 * 12 = 1200 * 0.03 = 36 + 100 = 136$. Therefore, the maximum weight that can be mobilized at least once again (100%) is 136 Kg flexors of leg muscles.

Therefore, during strength training the movements (flexion, extension, abduction, adduction, etc.) should be made at full speed. In the case of exercises with maximum loads will be taken into account the duration of exercise (to complete the bend, to complete the extension) in order to reduce the time during the motion.

6.6. Biotype of Ultimate Frisbee players

When speaking of biotype in athletes must be referred to the Kineanthropometry as the science that studies the meaning of the size, shape, proportionality, composition, biological maturation, with the aim of finding a relationship with athletic performance. It also takes into account the nutrition and growth process.

One of the methods used to determine the biotype is anthropometry, which uses specific instruments to measure muscular perimeters, skinfolds, bone diameters, height, length, weight, among others, to interpret the morphology of the athlete (Silva, 2002).

These measurements help determine a biotypology (classification) of the contexture of the human body through a model developed by Heath-Carter, known as somatotype (Carter et al, 1990). Therefore, the somatotype of an athlete can be endomorph (tendency to obesity), mesomorph (tendency to muscle development - skeletal) and ectomorph (linear trend).

In descriptive studies have been classified the sports according to somatotype. For instance, a study (Argentine athlete) with elite athletes from 2000 to 2002, (Lentini et al, 2004) found that differences exist between athletes and sports. The study presents a table of all sports, however, only discussed basketball, handball and soccer.

	FEMALE			MALE		
	Endo	Meso	Ecto	Endo	Meso	Ecto
Basketball	3,8	3,3	2,5	2,4	3,7	3,6
Soccer	3,0	3,8	1,0	2,3	4,8	2,2
Handball	3,8	4,0	2,0	2,6	5,0	2,3

Table 15. Somatotype of elite athletes

In the table we can see that there is a prevalence of a mesomorphic somatotype in men and women. Perhaps these values are approach to those observed in ultimate frisbee players, because these sports share some similarities.

Moreover, the anthropometric somatotype is an indicator that can classify a player in order to assign specific functions in the development of the game. Thus, in sports like basketball and football have been established anthropometric characteristics for positions in the field. According to a study in basketball, it was found that there are differences in anthropometric variables, body composition and somatotype, to the competitive level of the players (Salgado et al, 2009). In another study (García, 2007) was used anthropometry and somatotype for talent identification in handball, which suggests the importance of a homogeneous somatotype showing what slender

and athletic, but the study concluded that there are other important factors that also contribute to the talent of the players as individual psychology and tactics.

In ultimate frisbee studies should also be made for players to set the anthropometric characteristics of the players to make analysis of these variables and thus could create a reference of somatotype to an ultimate frisbee player.

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