Specific Speed in Basketball

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Strength and Conditioning Coach

2020

Specific Speed in Basketball
Characteristics - I

- Team and Contact Sport
- Anaerobic and Aerobic Bioenergetic System
- Intermittent Actions
- Accelerations, Decelerations, COD, and Jumps
- Medium-to-High Intensity Actions
- Motor Actions With Ball and Without Ball
- Playing Positions with Different Functions

Specific Speed in Basketball
Characteristics - II

PHYSICAL CONDITIONING OF THE PLAYERS:

- **Run faster** than your opponents;
- Acquire sufficient **strength and balance** to withstand physical contact;
- **Jump higher and faster** than the others;
- Support the demands required in physiological matches with **low fatigue**

(Schelling & Torres-Ronda, 2013)

Specific Speed in Basketball
Player Characteristics

- High
- Strong
- Jump Higher

***

Fast and Speedy in Court

***

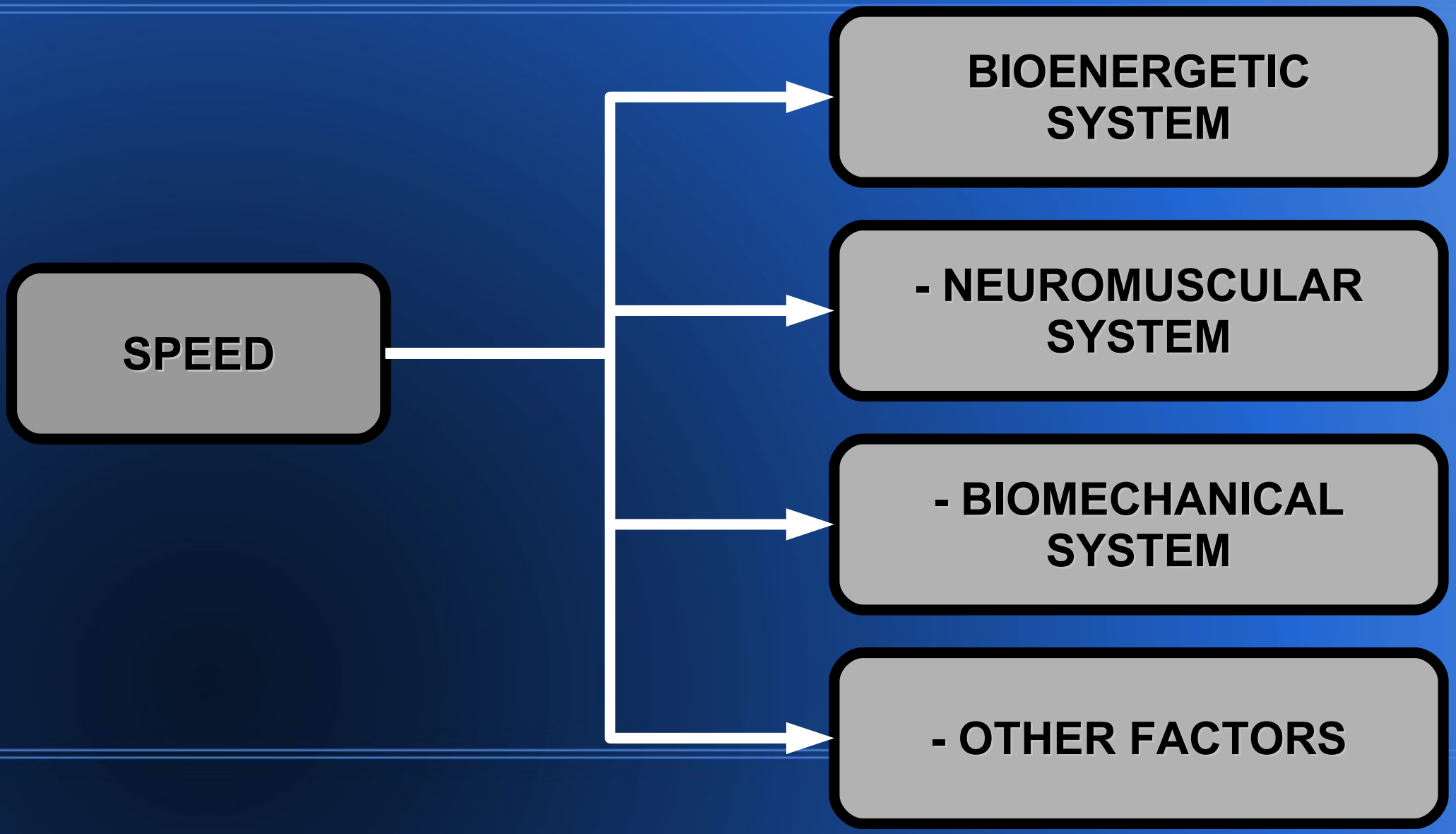
Specific Speed in Basketball
Speed – I

DEFINITION OF SPEED:

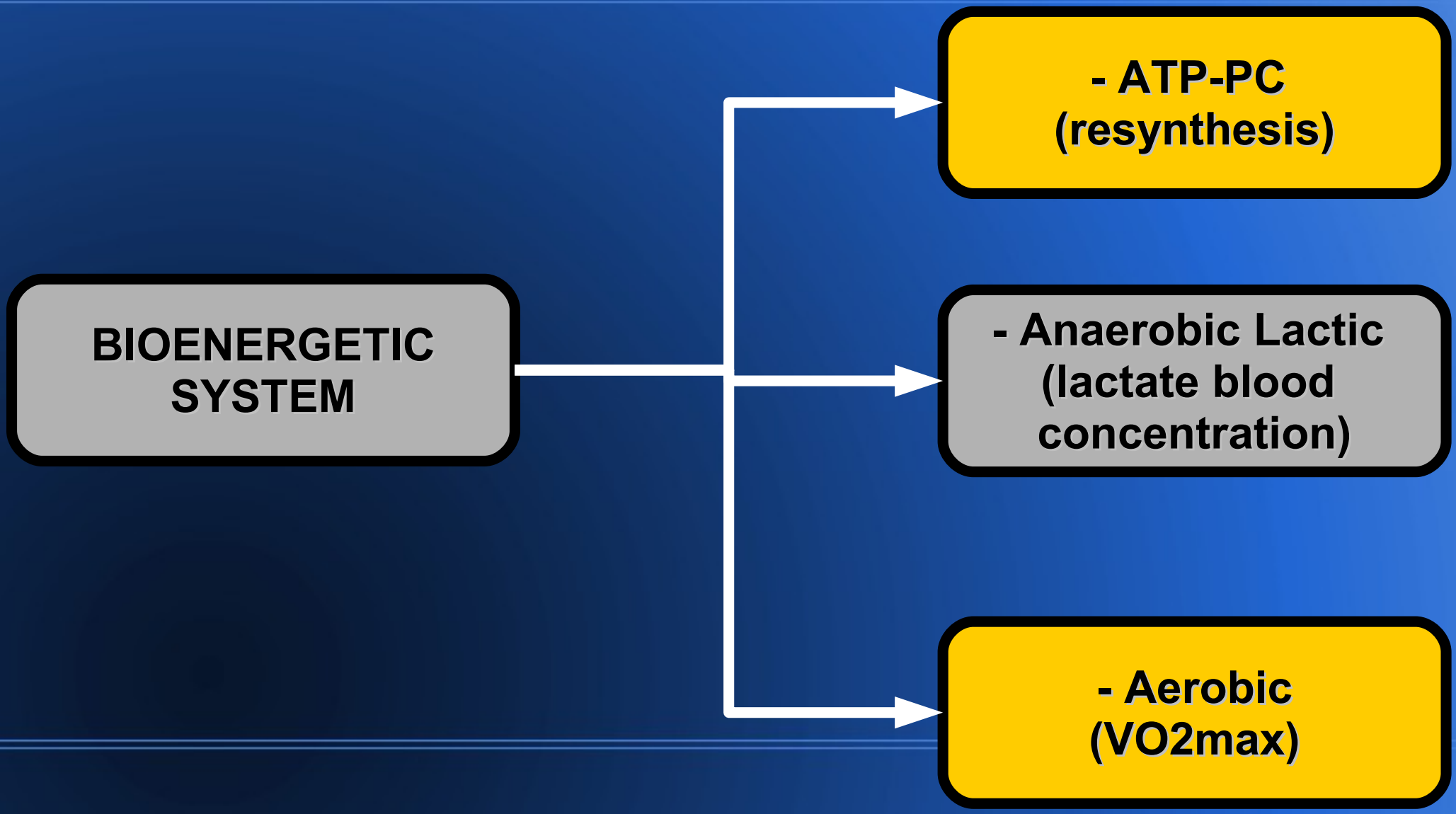
- **Speed** is defined as the ability to perform motor actions and\or tasks with certain quickly.

(Dintiman et al, 1999 ; Platonov, 2008 ; Bompa & Haff, 2012 ; Hoffman & Graham, 2015)

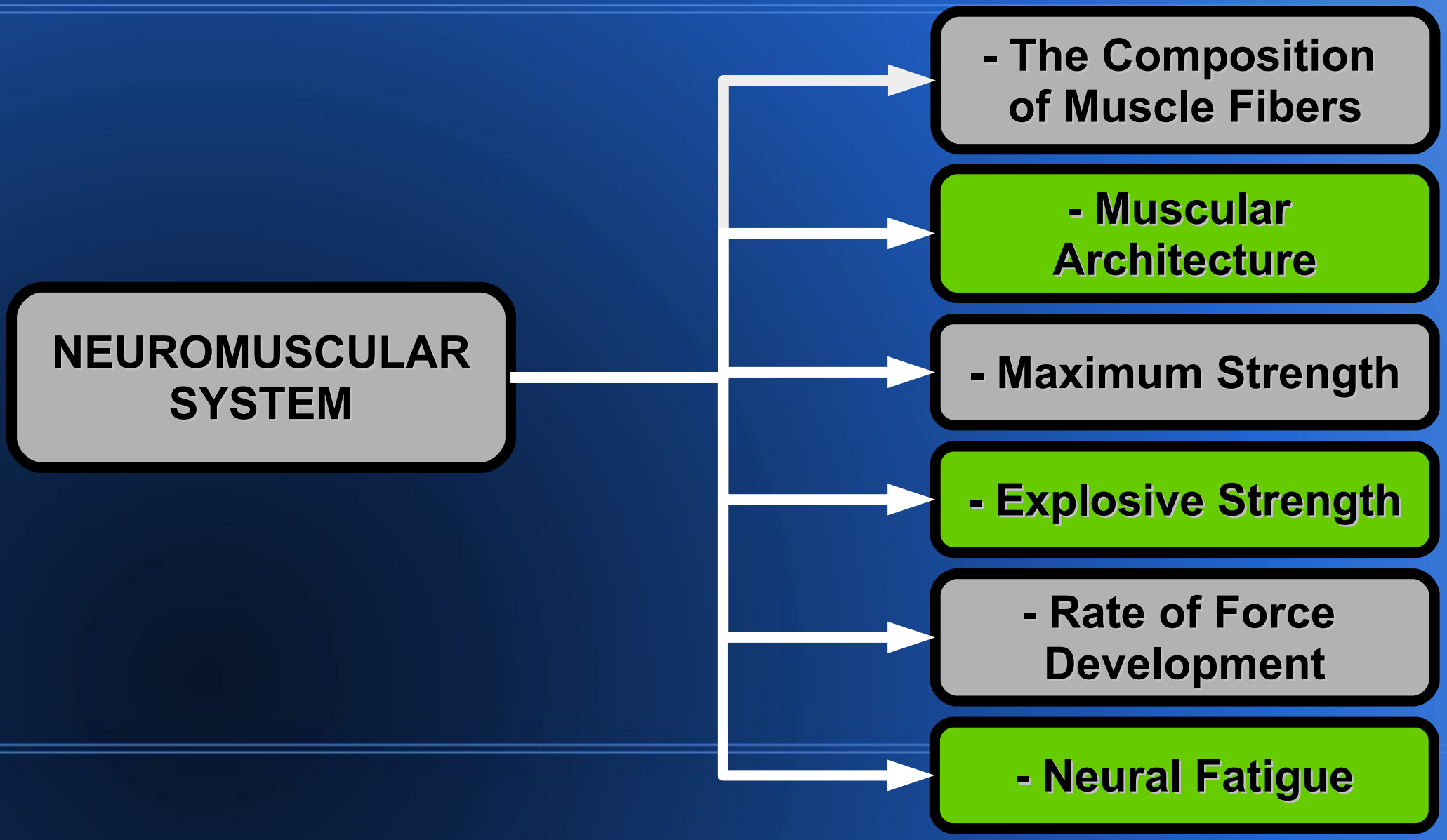
Specific Speed in Basketball
Speed – II



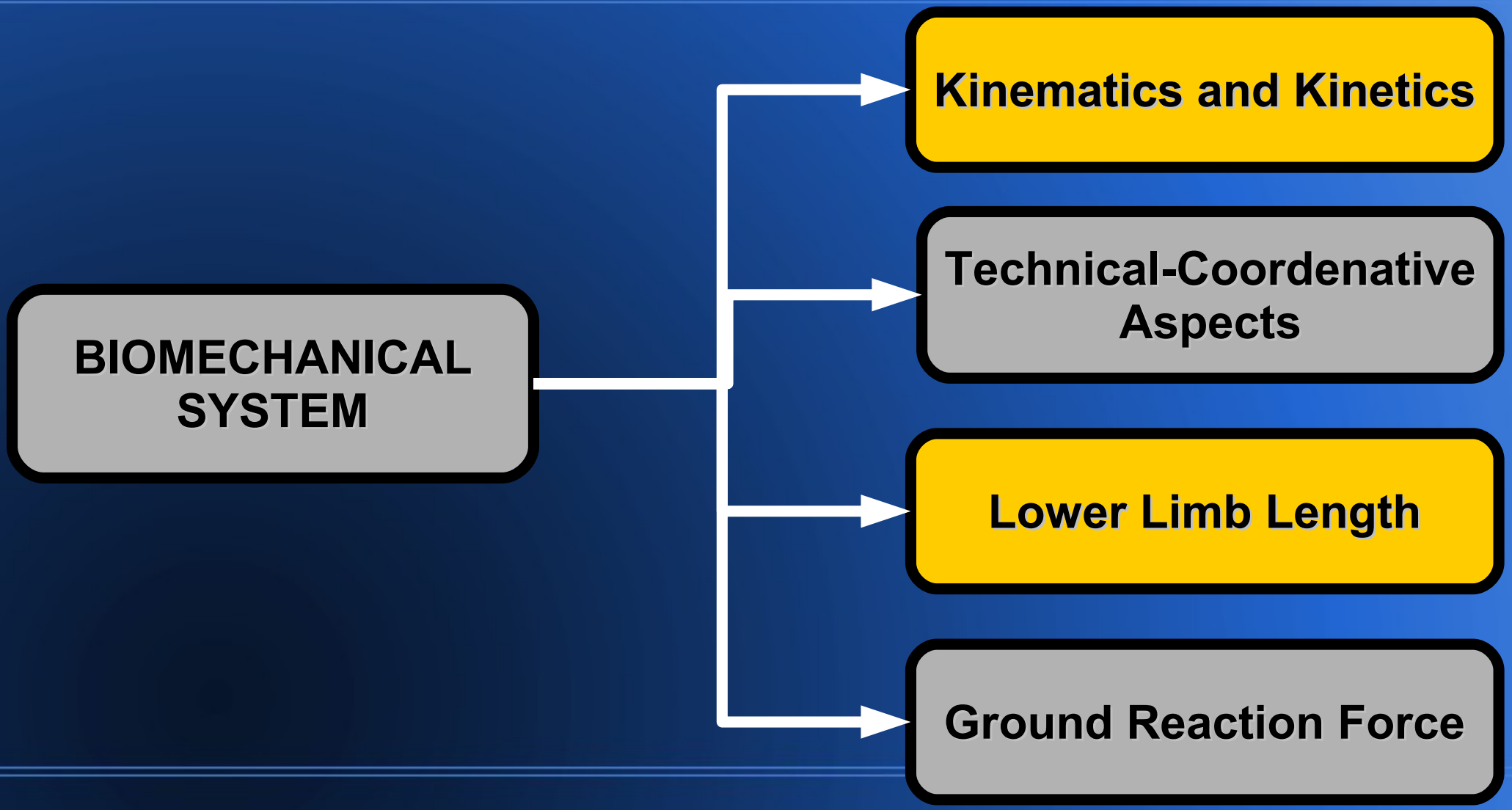
Specific Speed in Basketball
Speed – III



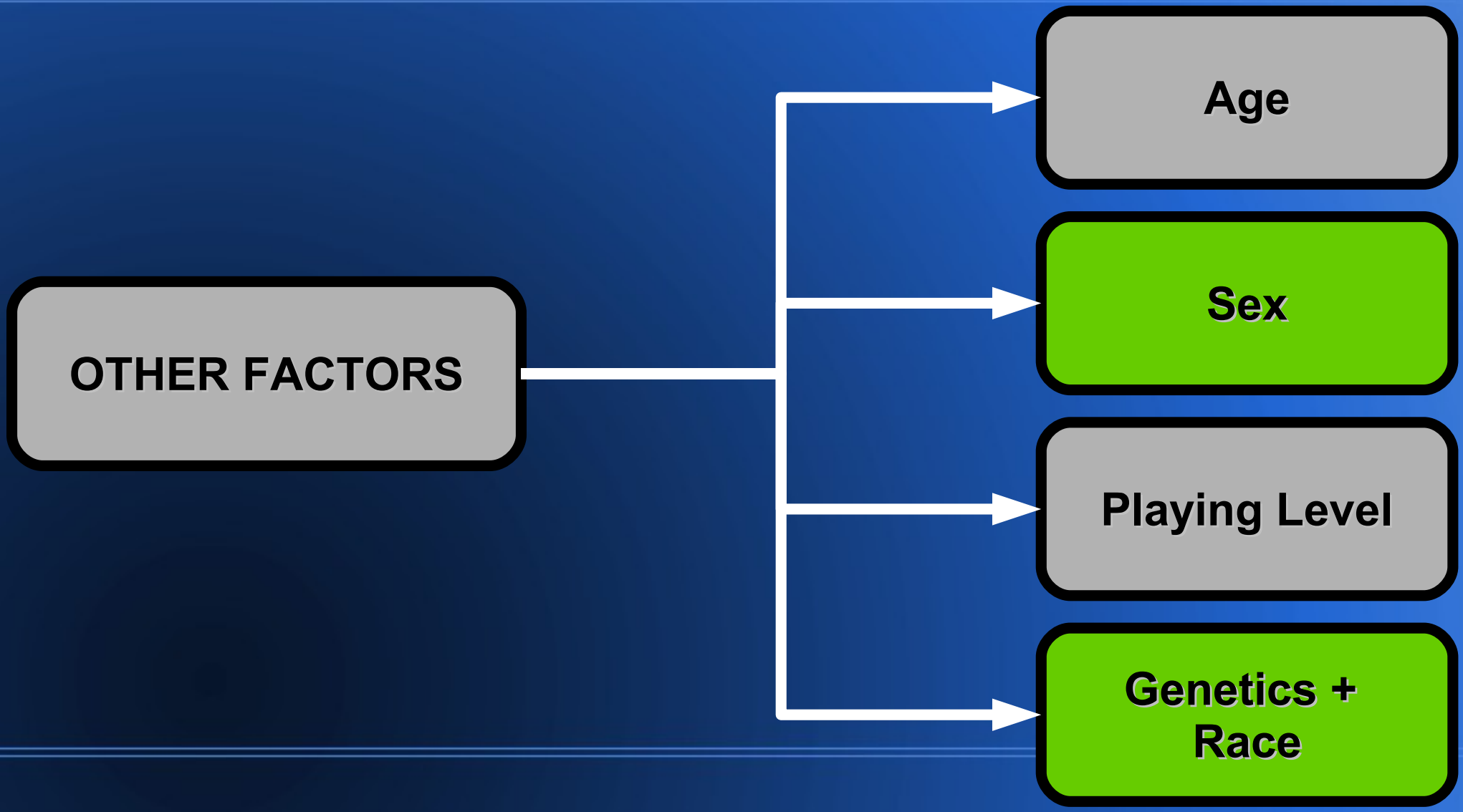
Specific Speed in Basketball
Speed – IV



Specific Speed in Basketball
Speed – V



Specific Speed in Basketball
Speed – VI



Specific Speed in Basketball
Game Speed - I

- Changes to the RULES of the game in 2000:

1)- Reduced attack time

(from 30 seconds to 24 seconds)= ↓

2)- Decreased time to cross the defense court

(from 10 seconds to 8 seconds)= ↓

(Abdelkrim et al, 2007 ; Stojanovic et al, 2017)

Specific Speed in Basketball
Game Speed - II

- Changes to the **RULES** =

The most dynamic and fastest paced game

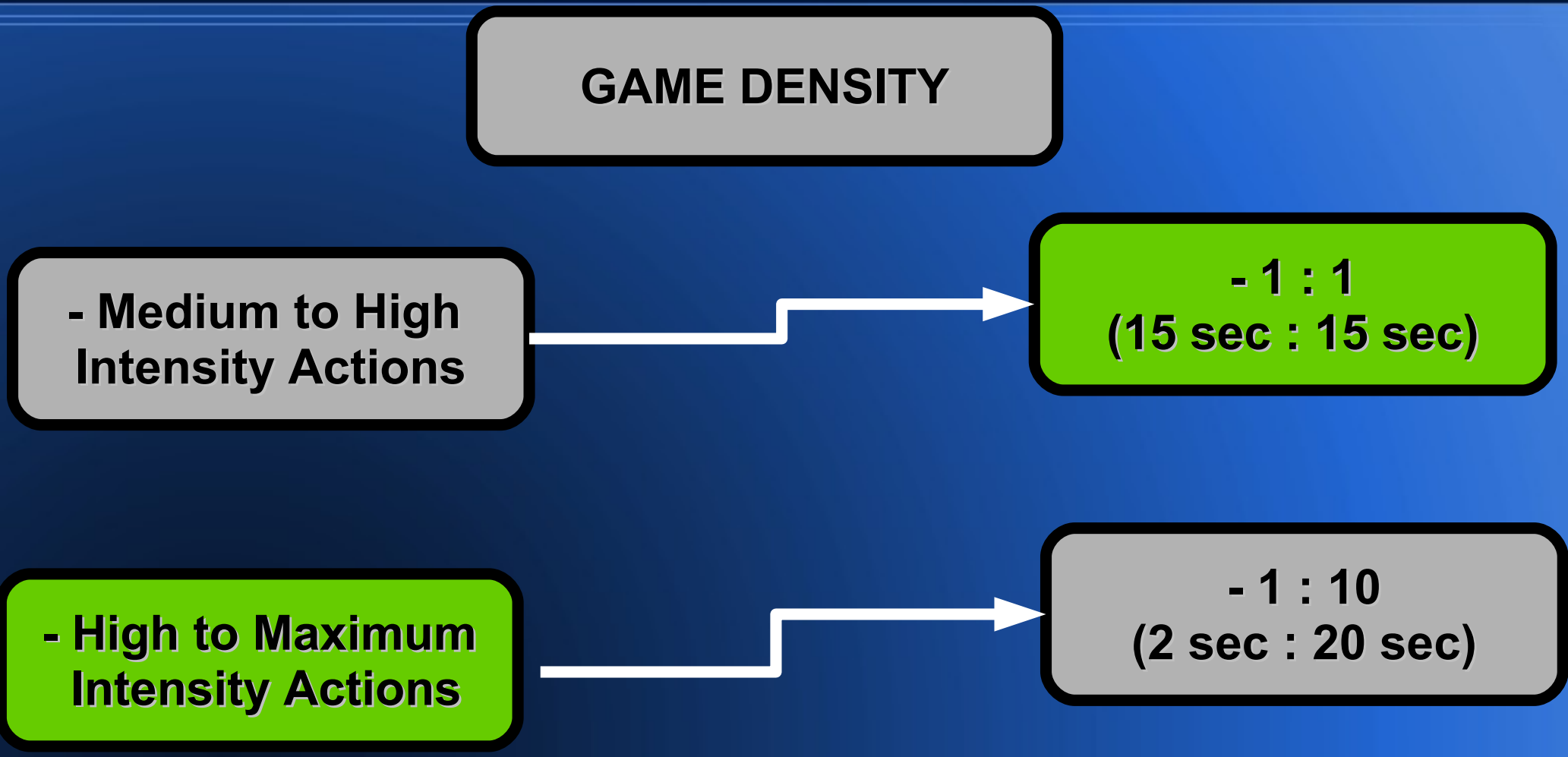
- **Game Speed=** ***"pacing"***
- **Great Alternation of Rhythm**

LOW Intensity

MODERATE Intensity

HIGH intensity

Specific Speed in Basketball
Game Speed - III



(Schelling & Torres-Ronda, 2016)

Specific Speed in Basketball
Game Speed - IV

MOTOR ACTIONS DURING THE GAME:

- **With Ball**

- **Without Ball**

Specific Speed in Basketball
Game Speed - V

NBA GAMES:

- **DEFENSE**
  Average Running Speed → **- 6,2+\- 0,8 km.h-¹**

- **OFFENSE**
  Average Running Speed → **- 7,2+\-0,6 km.h-¹**

FATIGUE: ***"the players covered a less total distance and in a slower speed zone"***

(Tuttle et al, 2020 ; Leite et al, 2013)

Specific Speed in Basketball
The Importance of Game Speed

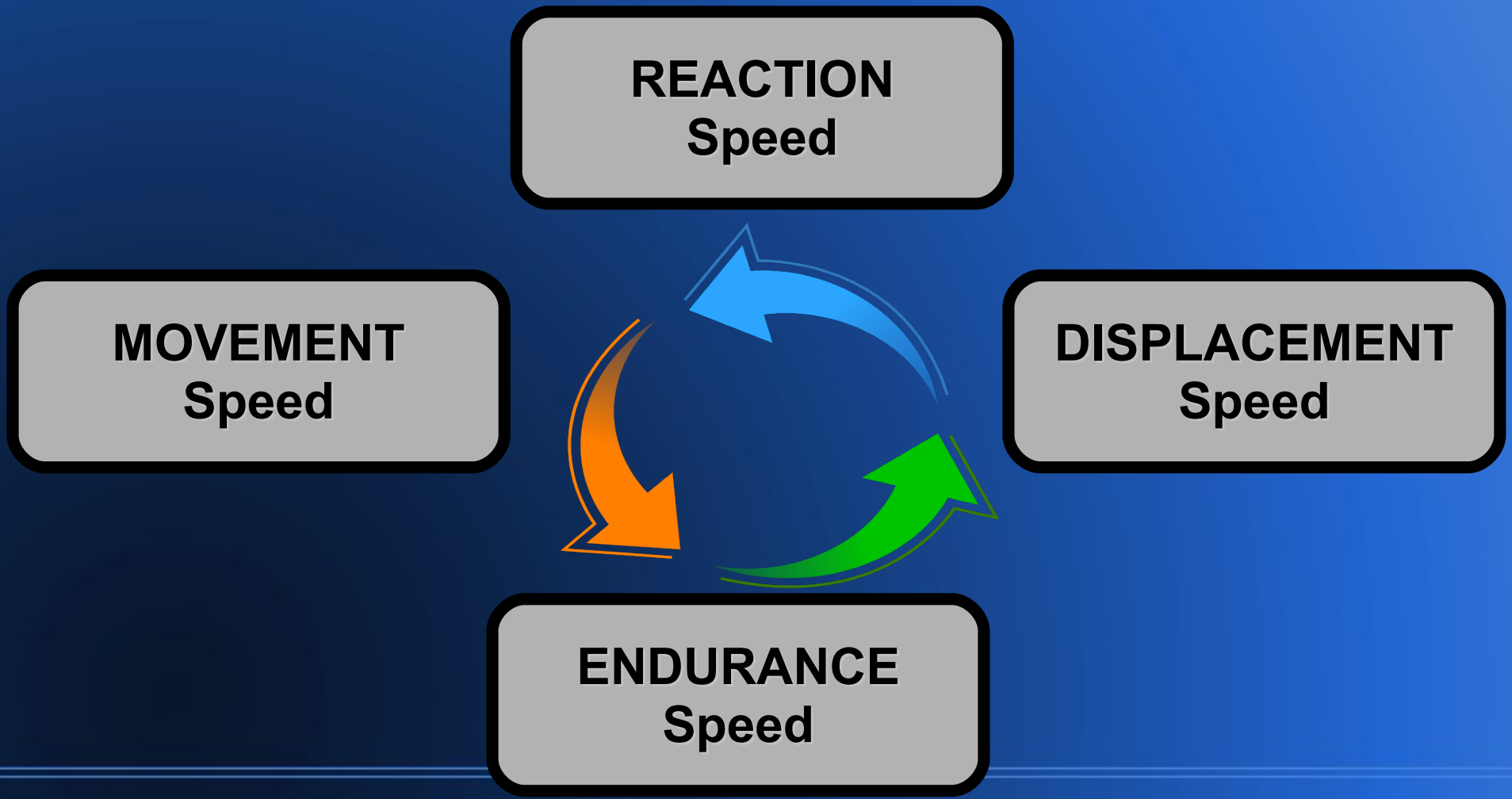
COLLECTIVE ASPECT

- A team that plays at a higher speed than the opposing team

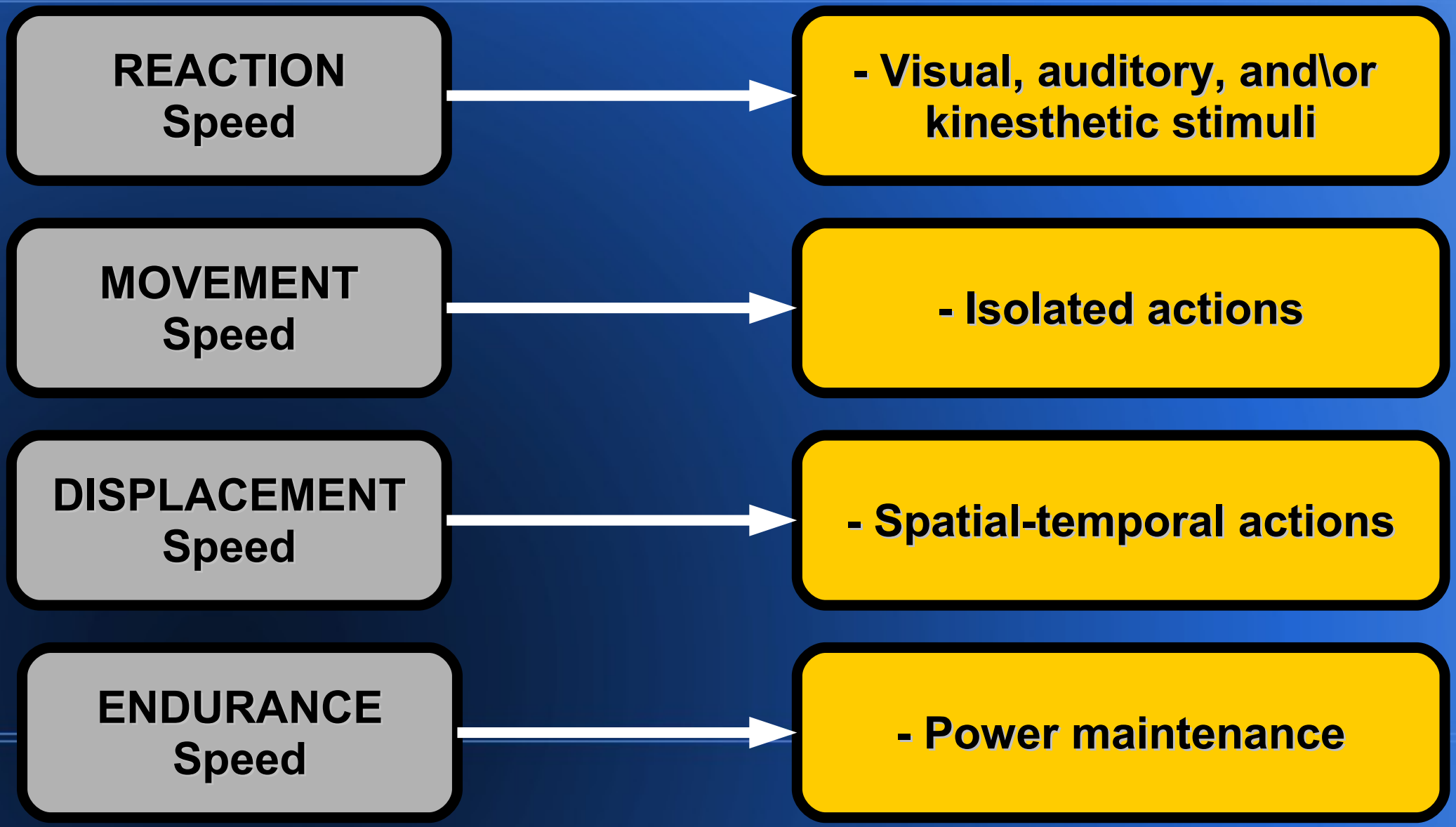
INDIVIDUAL ASPECT

- An athlete who stands out from the others for his speed can contribute significantly to his team

Specific Speed in Basketball
Types of Speed - I



Specific Speed in Basketball
Types of Speed - II



Specific Speed in Basketball
Reaction Speed - I

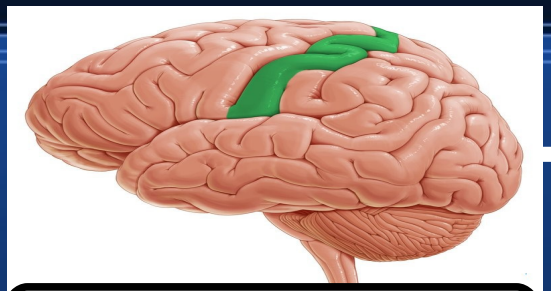
The **reaction speed** is also referred to in the scientific literature as **reaction time.**

SENSORY ORGANS= Stimuli from the external environment

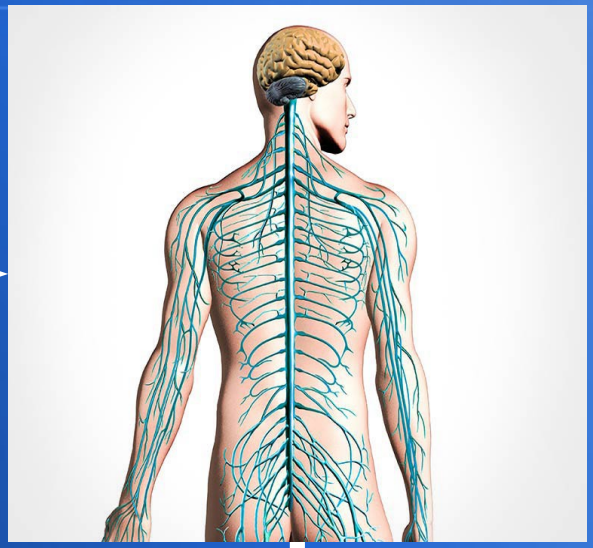
DECISION MAKING in a very **short time**

(Dintman et al,1999 ; Platonov, 2008 ; Magill, 2011)

Specific Speed in Basketball
Reaction Speed - II



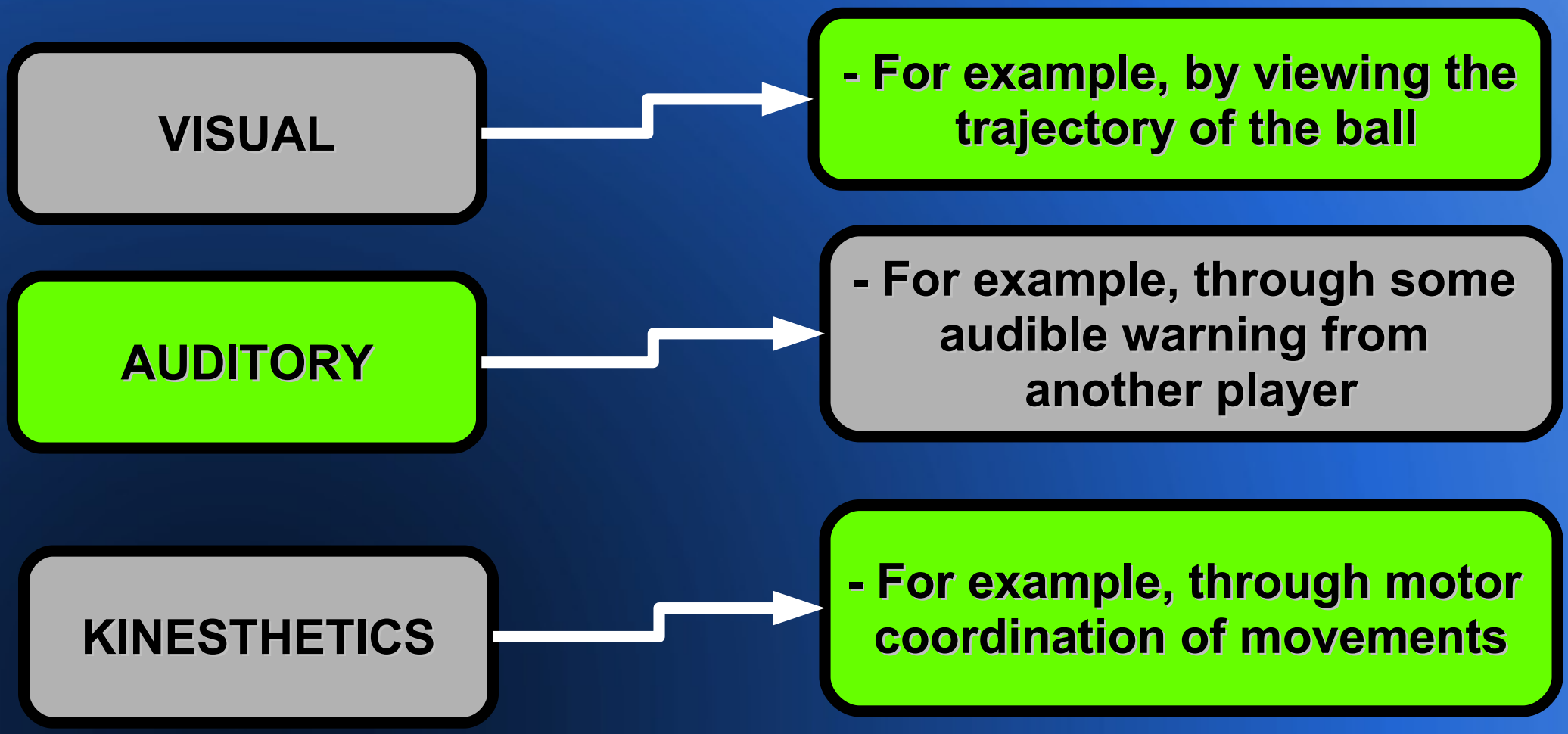
Cortex



BIOPERATIONALITY
(open feedback circuits)

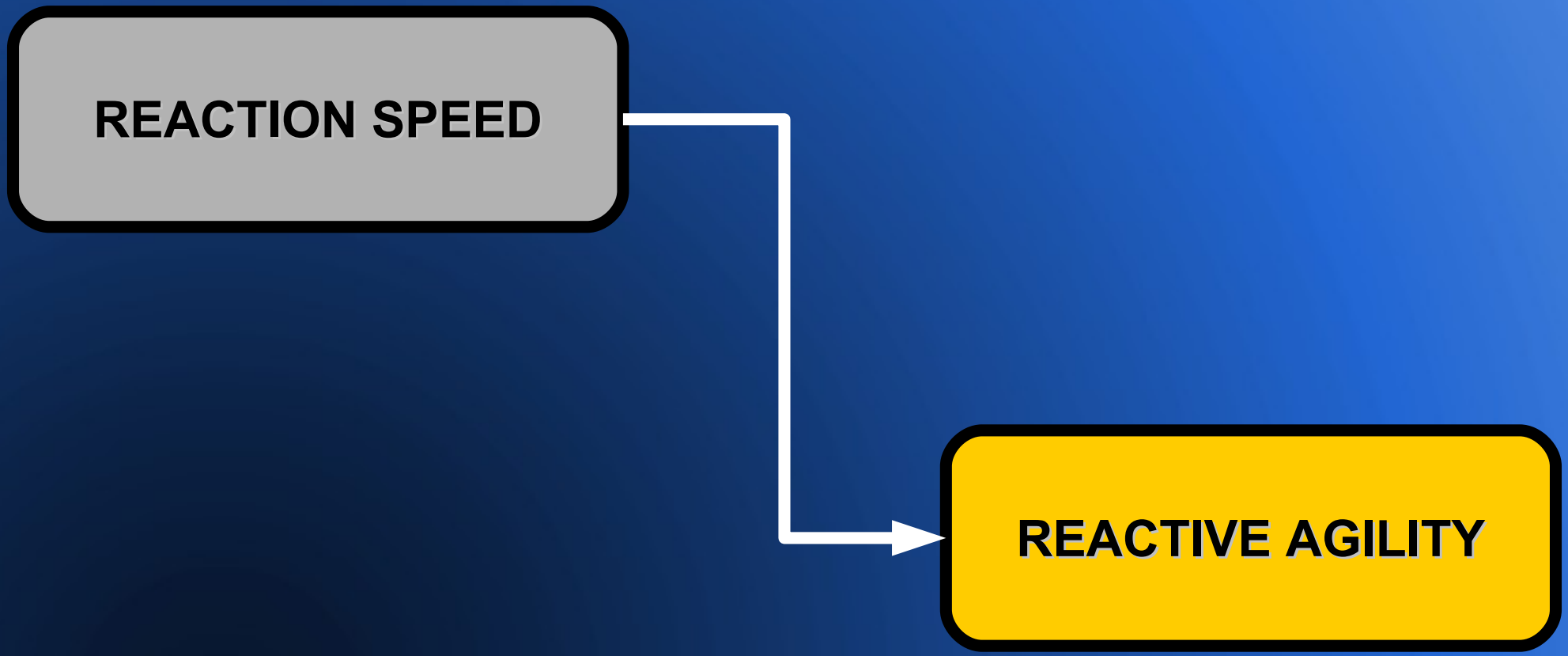
(Adapted from Neto et al, 2010)

Specific Speed in Basketball
Reaction Speed - III



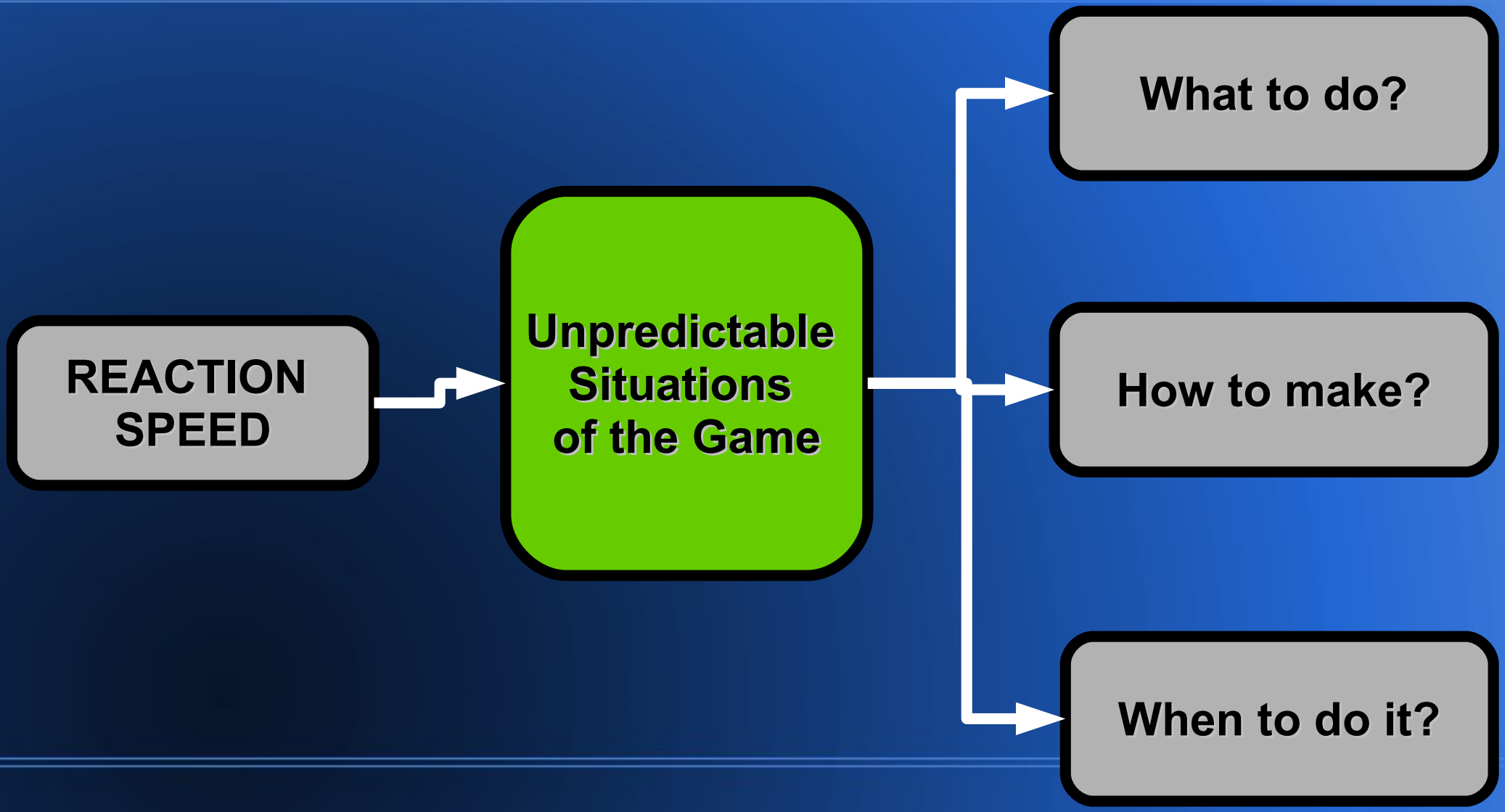
(Adapted from Magill, 2011)

Specific Speed in Basketball
Reaction Speed - IV

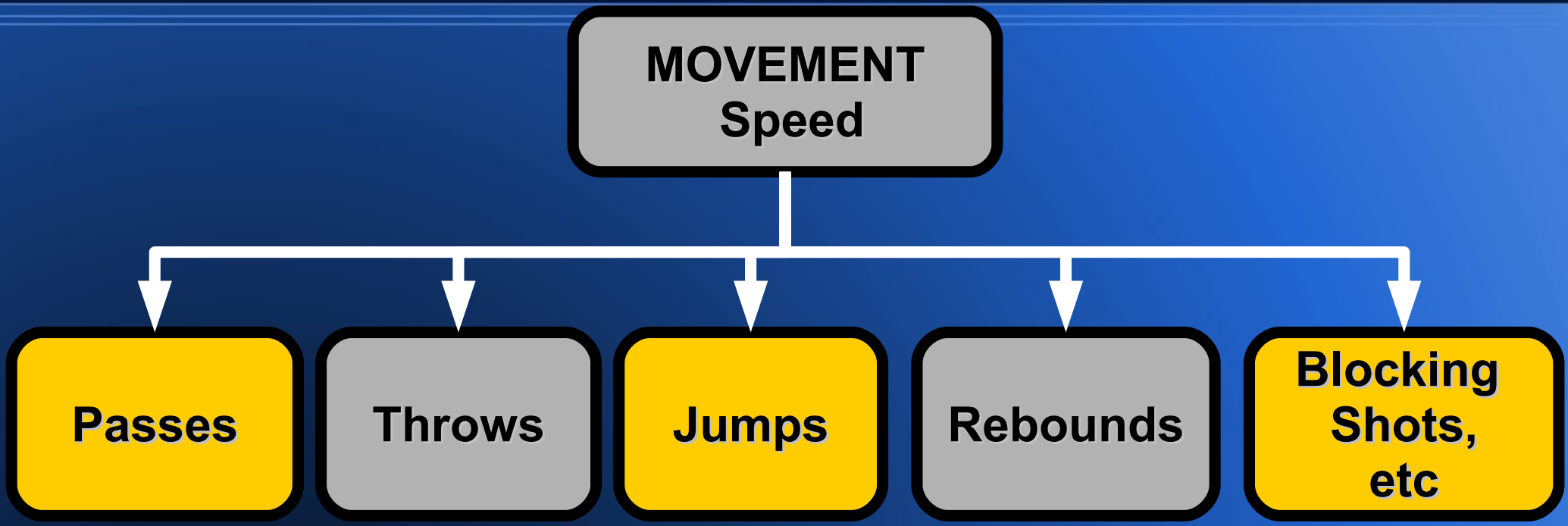


(Bompa & Haff, 2012)

Specific Speed in Basketball
Reaction Speed - V



Specific Speed in Basketball
Movement Speed - I



FREQUENCY OF THE EXECUTION of a certain MOVEMENT PATTERN in a TASK

(Dintman et al, 1999)

Specific Speed in Basketball
Movement Speed - II

+ 1000 different motor actions during a match
(Schelling & Torres-Ronda, 2013)

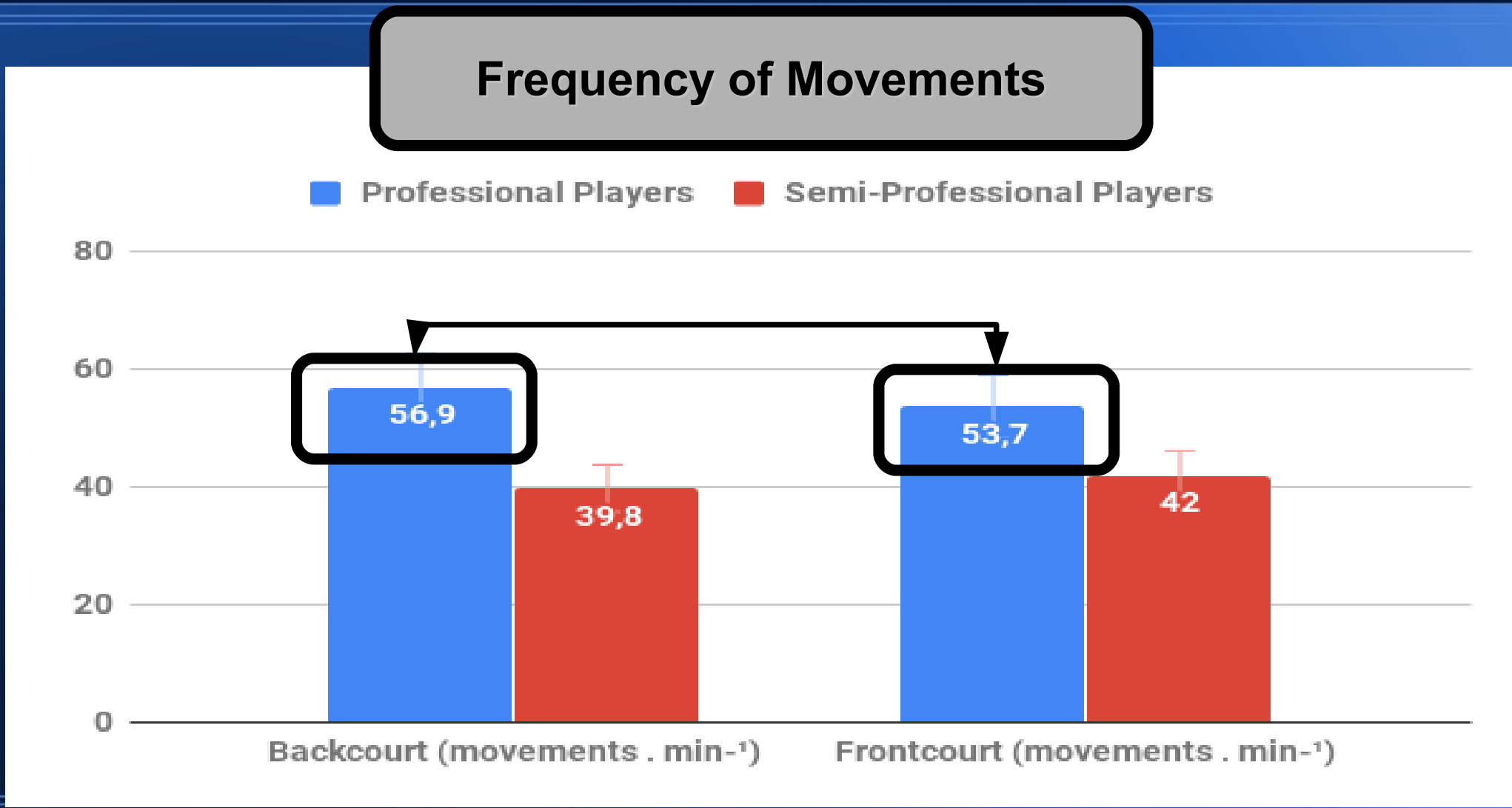
SPATIAL-TIME PERCEPTION

- The ANGULAR SPEED of each JOINT in the body
"ARTICULAR TORQUE"

SLOW
Movement Speed

FAST
Movement Speed

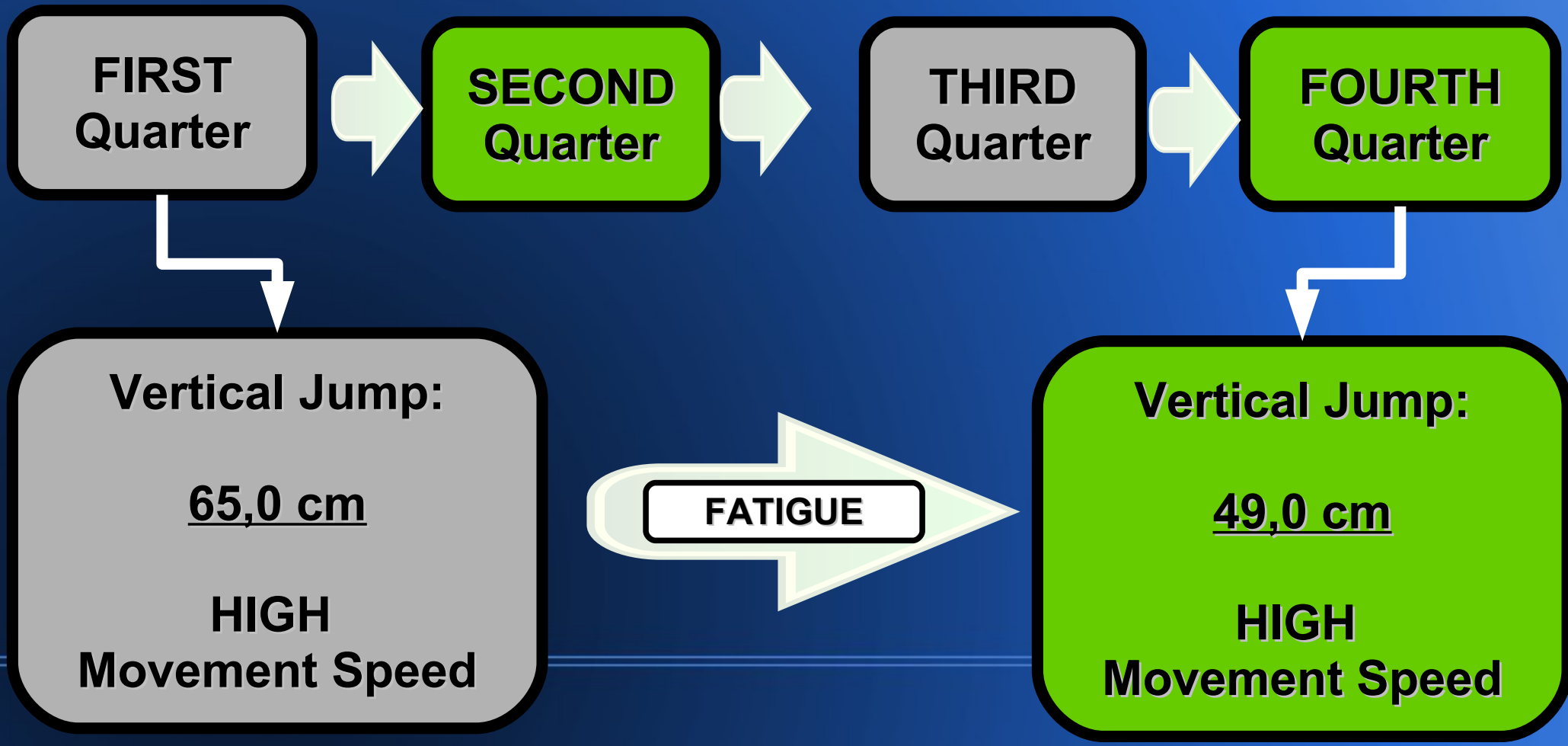
Specific Speed in Basketball
Movement Speed - II



(Adapted from Stojanovic et al, 2017)

Specific Speed in Basketball
Movement Speed - III

- How many times can the player jump and block at **the same movement speed?**



Specific Speed in Basketball
Movement Speed - IV

CONSTANT
Movement Speed
Throughout the Match

Movement Speed
ENDURANCE ***

Specific Speed in Basketball
Displacement Speed - I

DISPLACEMENT SPEED IN BASKETBALL

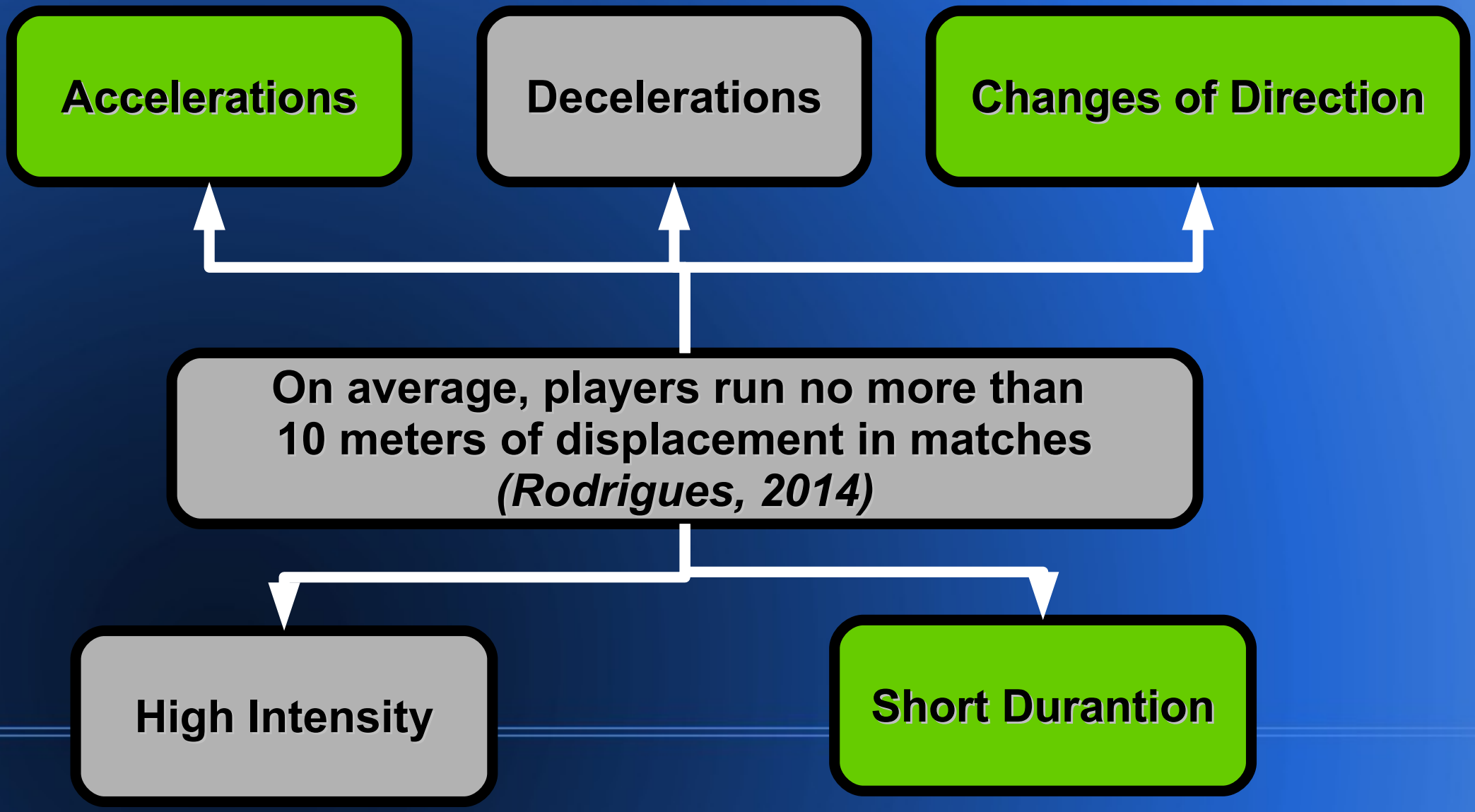
“Moving a player's body weight at high speeds is ensured by the muscle's ability to overcome external resistance.”
(Moreira et al, 2003a)

PLAYERS:

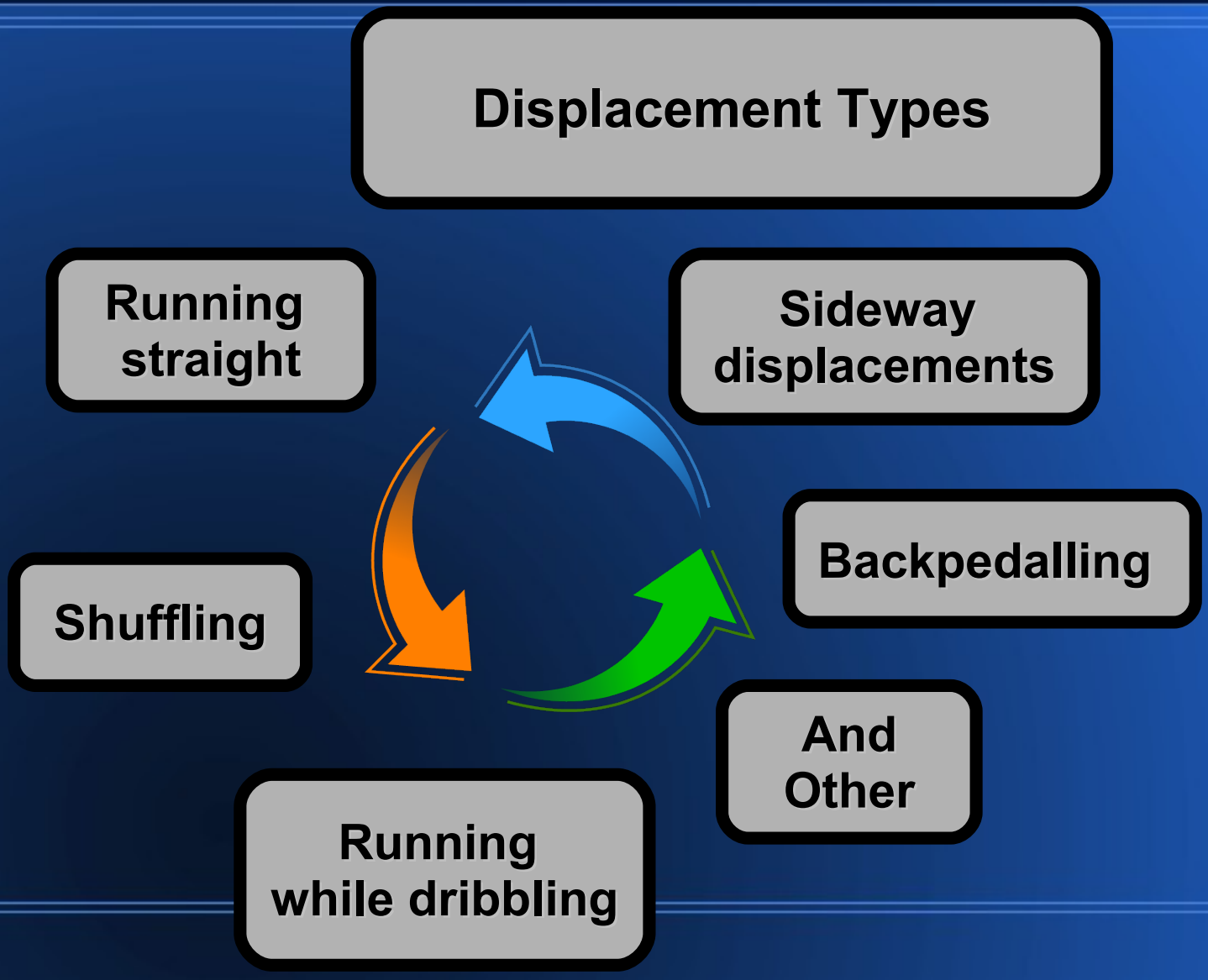
Height: 1,80–2,10m

Weight: 80-120kg

Specific Speed in Basketball
Displacement Speed - II



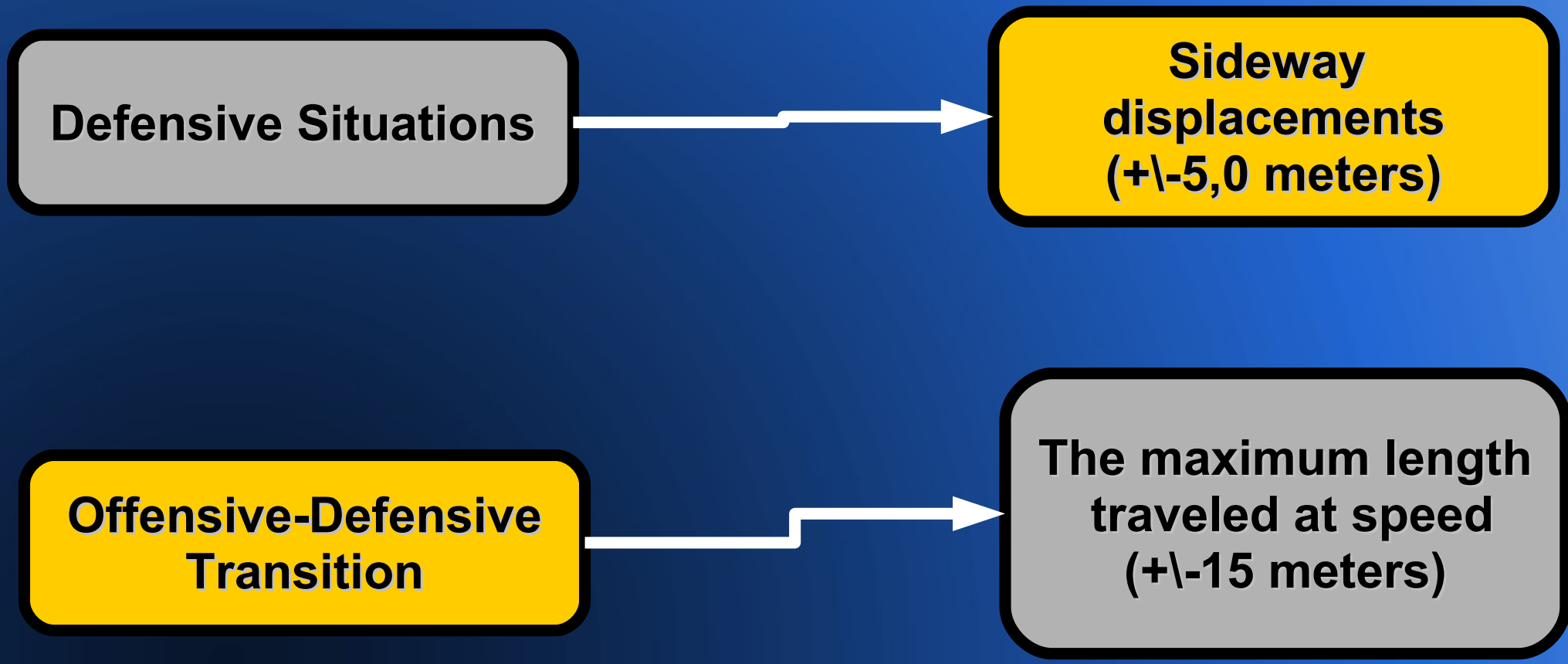
Specific Speed in Basketball
Displacement Speed - III



THESE MOVEMENT PATTERNS:

- Intensity
- Distance
- Frequency
- Duration

Specific Speed in Basketball
Displacement Speed - IV



(Gebrin & Oliveira, 2006)

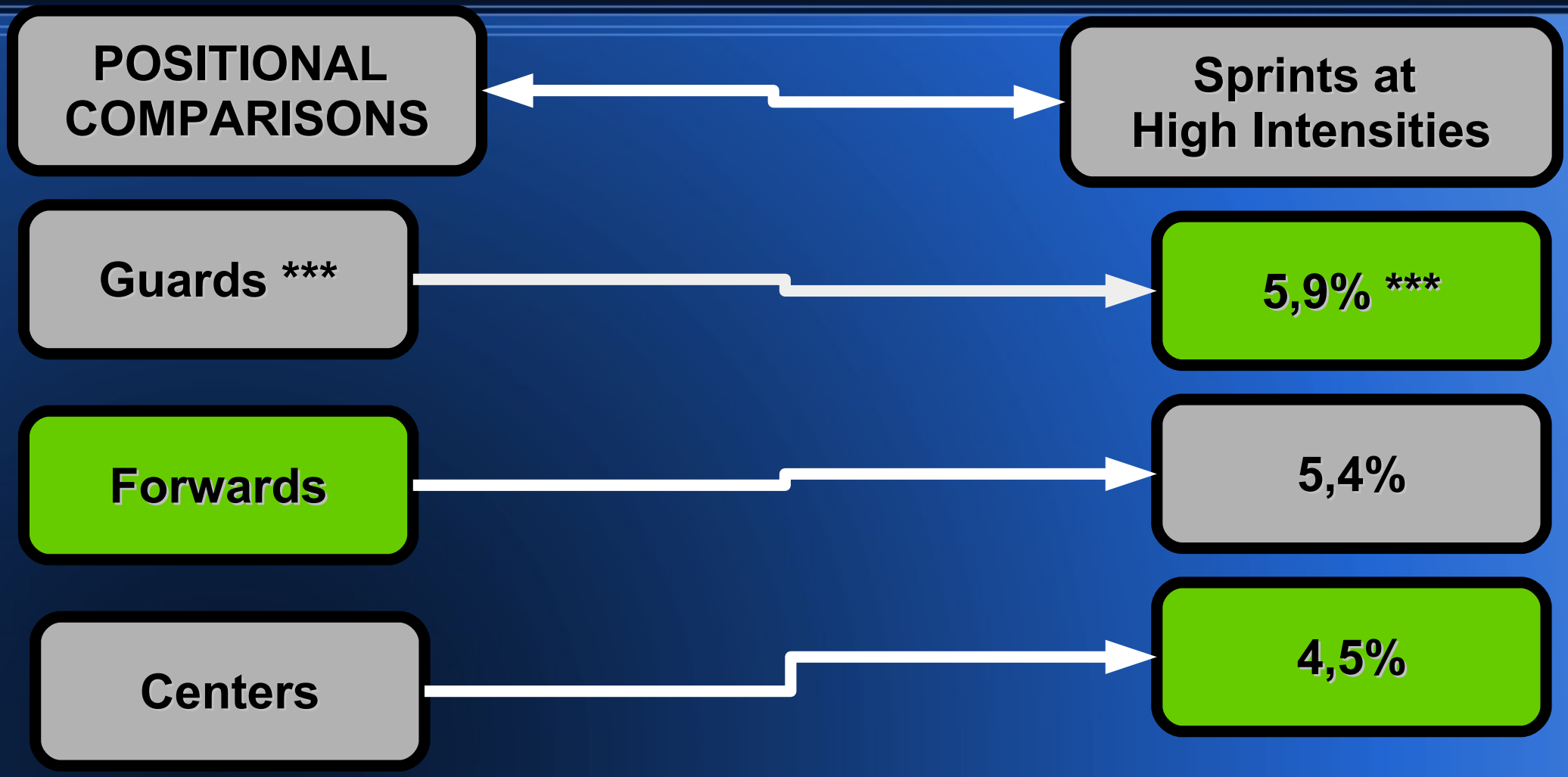
Specific Speed in Basketball
Displacement Speed - V

PEAK VELOCITY

The maximum displacement speed, also known as PEAK VELOCITY, it is difficult to achieve very often a match.

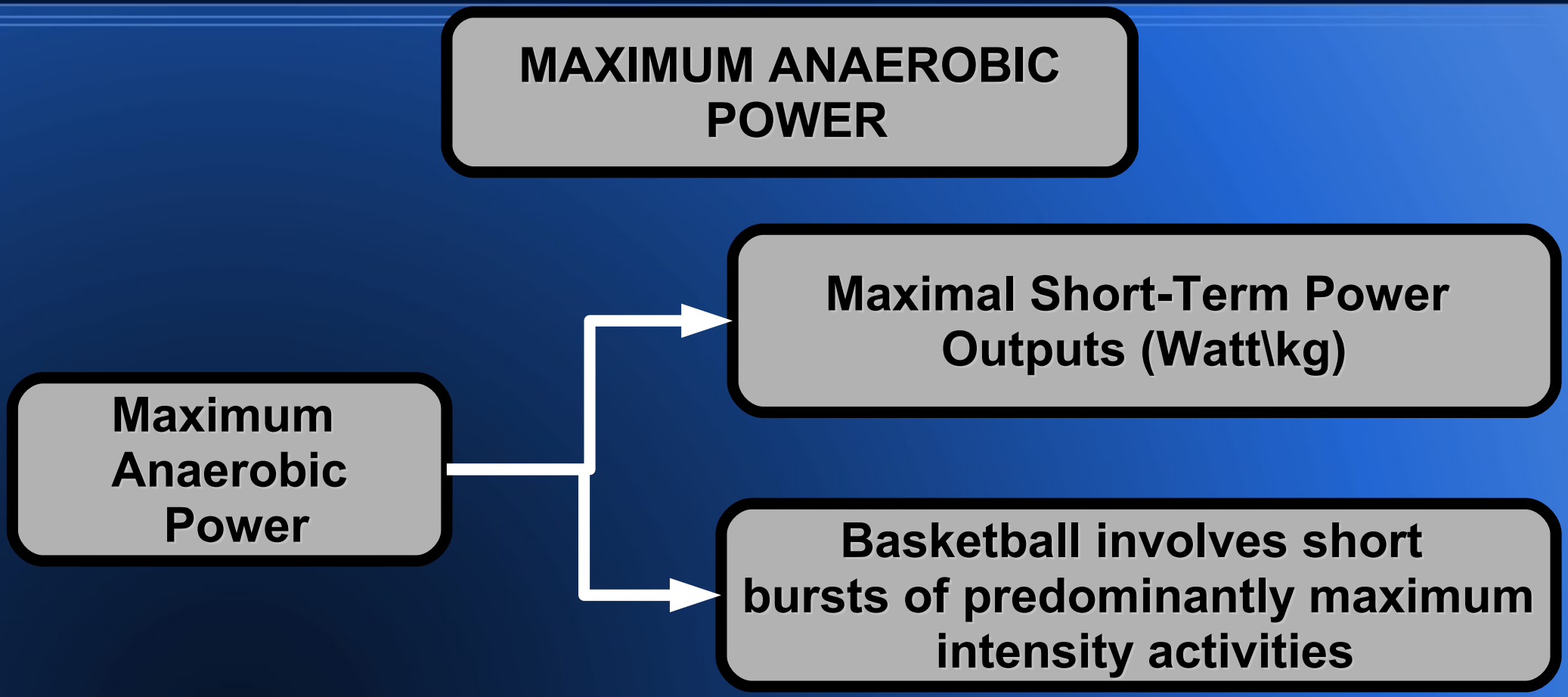
Acceleration	**5,10,15 meters**
Peak Velocity	**>20-30 meters**

Specific Speed in Basketball
Displacement Speed - VI



(Adapted from Stojanovic et al, 2017)

Specific Speed in Basketball
Displacement Speed - VII



(Moreira et al, 2003b ; Asano et al, 2013 ; Carvalho et al, 2011)

Specific Speed in Basketball
Displacement Speed - VIII

Ground Reaction Force

The fastest athletes in the displacement speed were those who knew how to apply greater horizontal propulsive force to the ground.

(Morin et al, 2015)

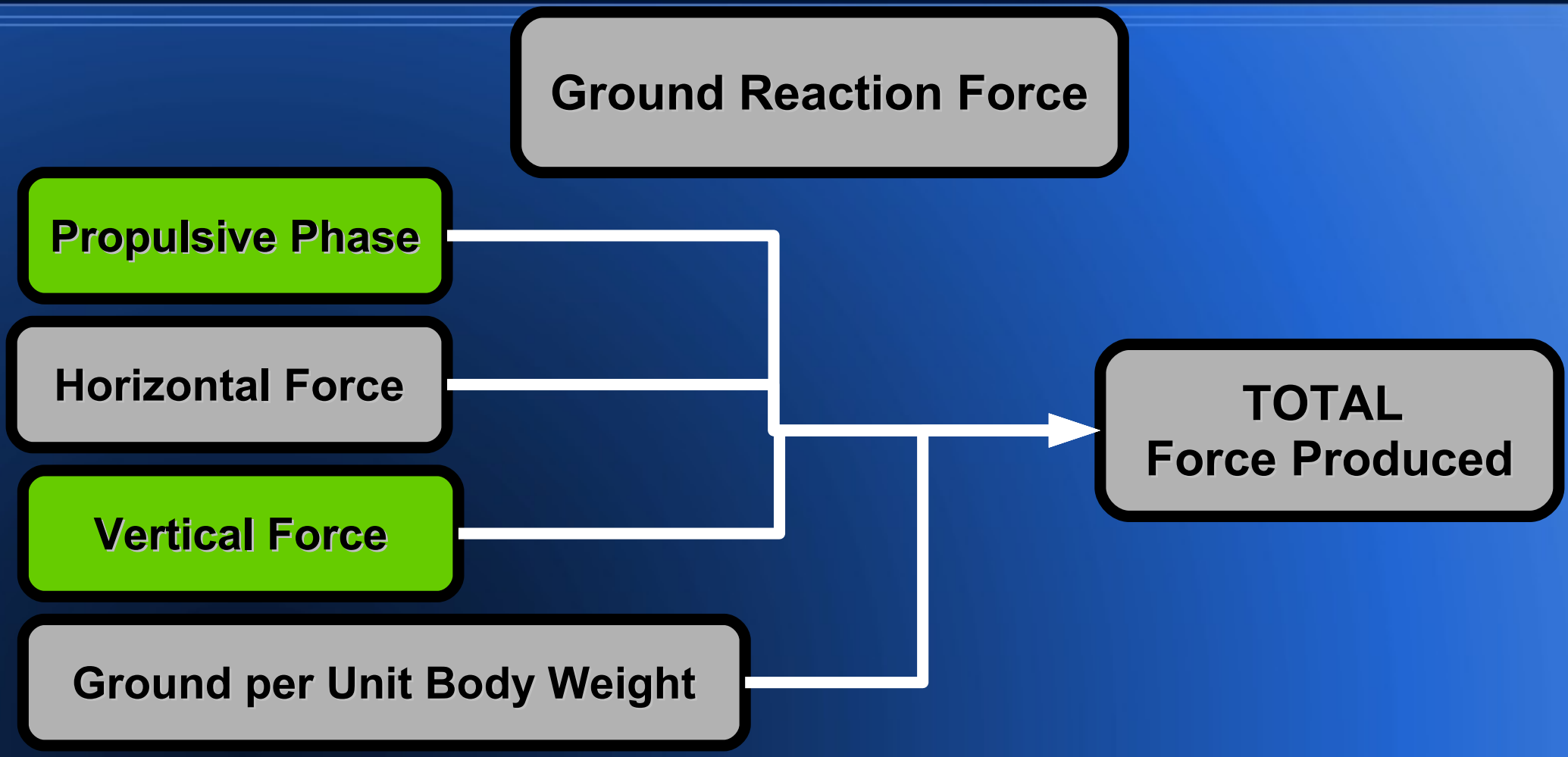
Specific Speed in Basketball
Displacement Speed - IX

Ground Reaction Force

The ground reaction force is the force that the athlete exerts on the sole of the foot when accelerating.
(Hoffman & Graham, 2015)

The ground reaction force is the force that the athlete's foot exerts against the ground.
(Boyle, 2018)

Specific Speed in Basketball
Displacement Speed - X



(Morin et al, 2011 ; Morin et al, 2015)

Specific Speed in Basketball
Displacement Speed - XI

MULTIDIRECTIONAL TASKS

1)- Initial Body Position when Accelerating

2)- Reaction Speed

3)- Reactive Force

4)-Enviromental Situations

5)-Decision-Making

Specific Speed in Basketball
Displacement Speed - XII

Motor Action Speeds

ACTIVITIES	Multidirectional Movement	Defensive Stance
Standing, Walking	0-1,0 m.s^{-1}	<1,67 m.s^{-1}
Jogging or Low-Speed Running	1,1 – 3,0 m.s^{-1}	1,0-3,3 m.s^{-1}
Running or Moderate-Speed Running	3,1 - 7,0 m.s^{-1}	3,0-5,0 m.s^{-1}
Striding or High-Speed Running	~5,1 – 6,6 m.s^{-1}	---
Sprinting or Maximal-Speed Running	>7,0 m.s^{-1}	>6,6 m.s^{-1}
Low-Intensity Shuffling	<1,67 m.s^{-1}	<2,0 m.s^{-1}
Moderate-Intensity Shuffling	~1,68 – 2,5 m.s^{-1}	
High-Intensity Shuffling	>2,5 m.s^{-1}	>2,0 m.s^{-1}
Sideways Running	>3,3 m.s^{-1}	---

(Adapted from Stojanovic et al, 2017)

Specific Speed in Basketball
Displacement Speed - XIII

Relationship Between Running Speed and Vertical Jump in Professional Basketball Players

	Jump Height	Relationship to 10-m sprint	Relationship to 20-m sprint	Relationship to 40-m sprint
CMJ	52,0 cm	0,45* (r^2=20,0%)	0,49* (r^2=24,0%)	0,74* (r^2=54,8%)
CMJ Peak Power	5167,2 W	0,19 (r^2=3,6%)	0,18 (r^2=3,2%)	0,11 (r^2=1,2%)
Squat Jump	43,1 cm	0,53* (r^2=28,1%)	0,57* (r^2=32,5%)	0,74* (r^2=54,8%)
SJ Peak Power	4609,1 W	0,27 (r^2=7,3%)	0,24 (r^2=5,8%)	0,10 (r^2=1,0%)
Reactive Strength	8,9 cm	-0,13 (r^2=1,7%)	-0,11 (r^2=1,2%)	0,07 (r^2=0,5%)
	*p≤0,05	r^2=shared variance		

(Adapted from Shalfawi et al, 2011)

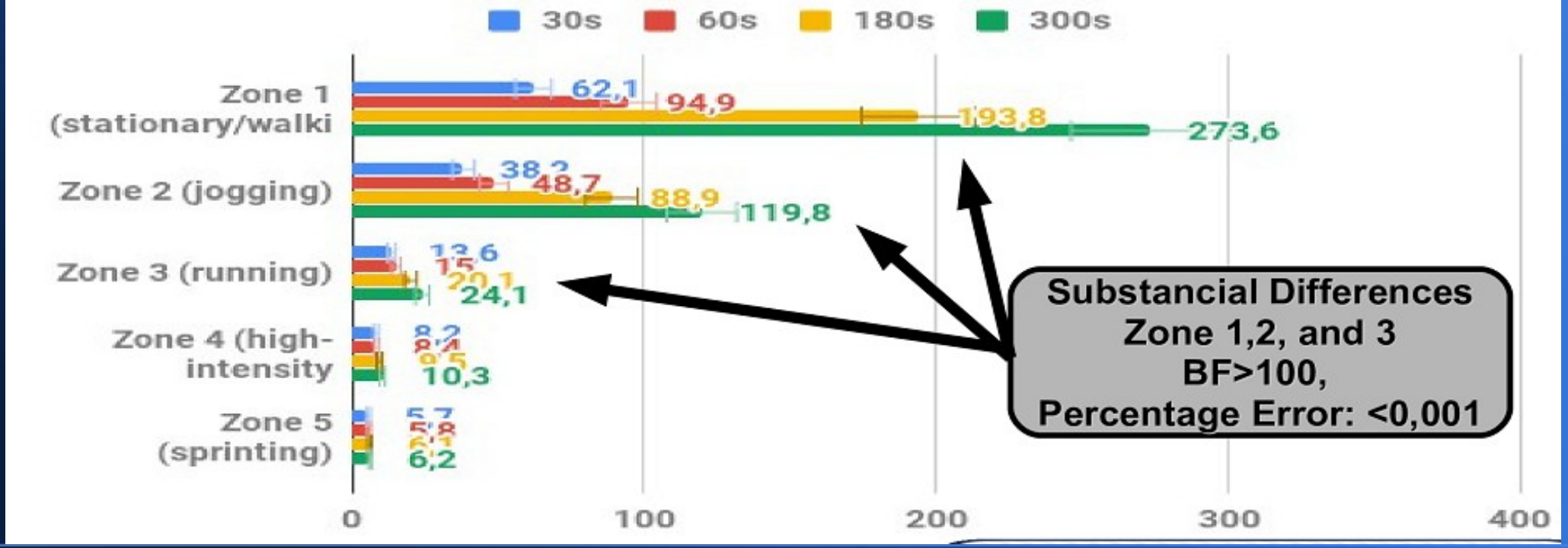
Specific Speed in Basketball
Displacement Speed - XIV

STUDY	GROUP	DISTANCE	Speed (m\s)	Speed (Km\h)
Xie et al, 2020	Male - Varsity	10-m	5,67	20,7
Kose, 2018	Male - Senior	10-m	5,43	19,5
Koklu et al, 2011	Male – Second Div	10-m	5,81	21,0
Dawes et al, 2016	Male – NCAA Div I	20-m	7,14	25,7
Rinaldo et al, 2020	Male - Pre-Adolesc	20-m	6,21	22,3
Drinkwater et al, 2007	Male – National Team	20-m	6,49	23,3
Román et al, 2017	Male - Young	25-m	4,85	17,4
Abdelkrim et al, 2010	Male - Senior	30-m	7,31	26,3

Specific Speed in Basketball
Displacement Speed - XV

n=94 male U-18 basketball players – AGE: 17,4+\-0,7 years-old

PROTOCOLS: A total of 13 games from a tournament were monitored. The athletes were monitored using the portable local positioning system (LPS), where the devices were installed on the upper back of each player. The LPS allowed measuring the speed and mean acceleration and deceleration for intermittent activities during matches. Software was used to calculate the physical demands using four different time epochs (30, 60, 180, and 300s). RESULTS: A total of 29867 observations were measured. Substantial differences were found in each intensity zone, with the exception of zone 4 and zone 5.

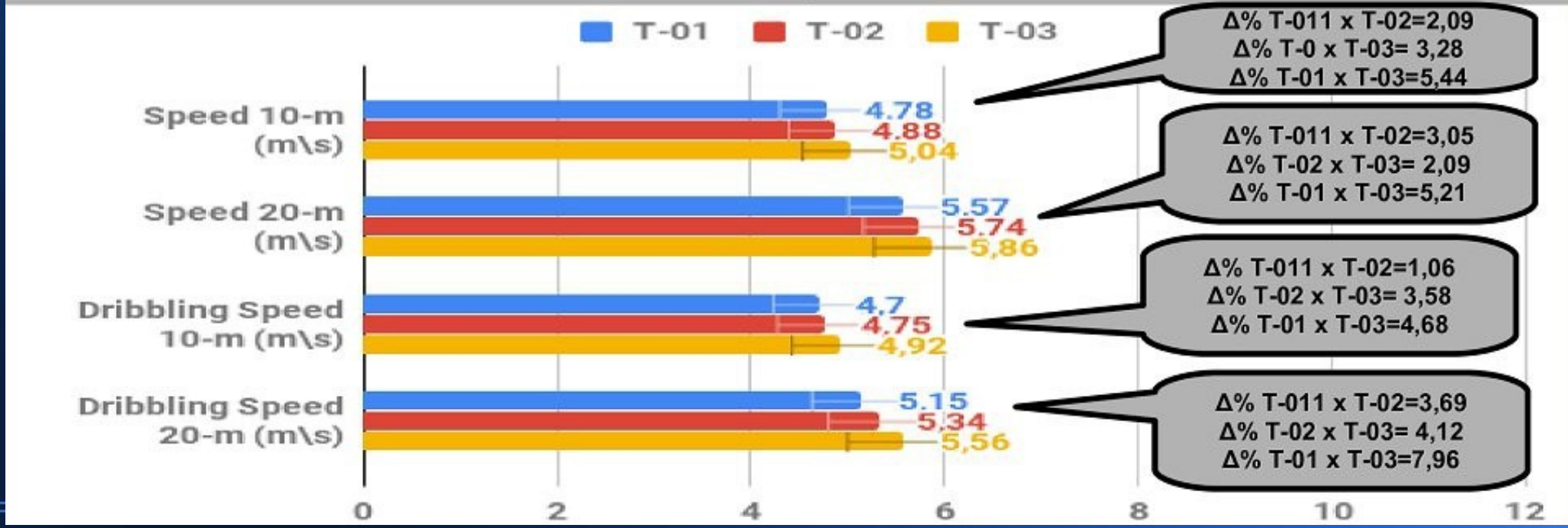


(Adapted from Vázquez-Guerrero et al, 2017)

Specific Speed in Basketball
Displacement Speed - XVI

n=11 youth male basketball players – AGE: 13,3+\-0,6 years-old

PROTOCOLS: During the macrocycle there were 52 training sessions, with a maximum duration of 120 minutes, and the team participated in 6 official matches. This period consisted of six weeks of the preparatory period and fourteen weeks of competitive period. Speed assessments took place in three moments: in the first week of the preparatory period (T-01), at the end of the preparatory period (T-02) and at the end of the competitive period (T-03). RESULTS: The speed changed during the macrocycle. However, these changes were not statistically significant during the different evaluation periods.

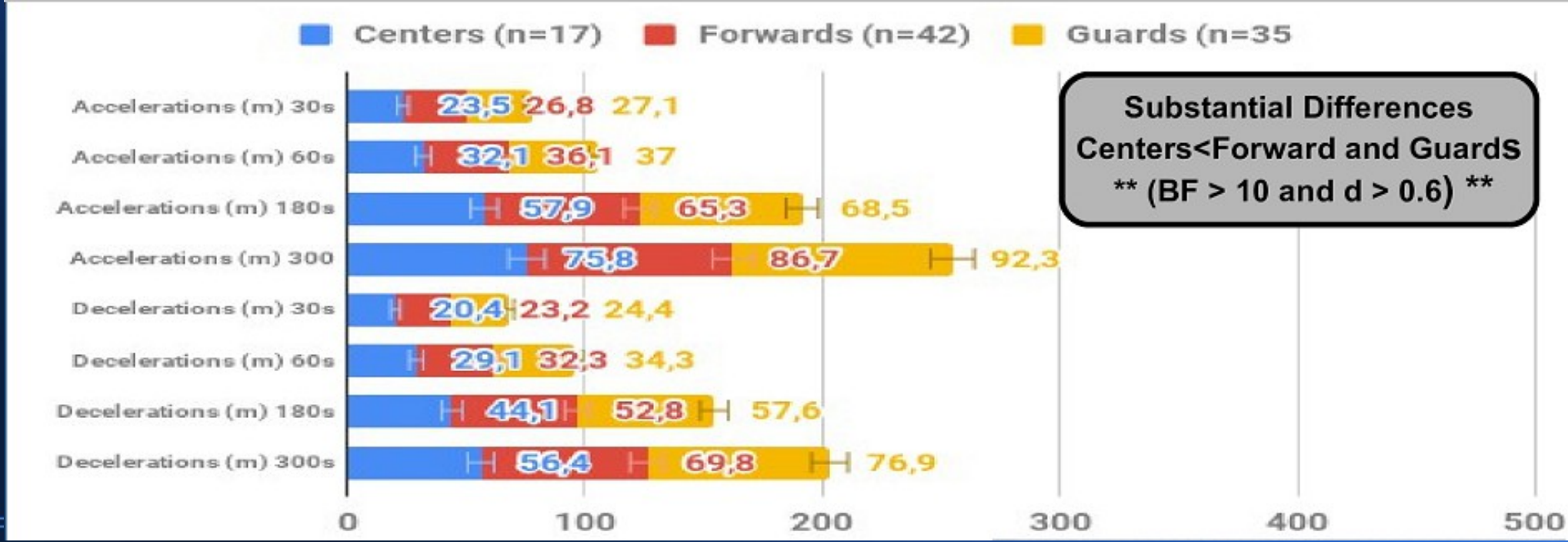


(Adapted from Rodrigues, 2014)

Specific Speed in Basketball
Displacement Speed - XVII

n=94 male U-18 basketball players – AGE: 17,4+\-0,7 years-old

PROTOCOLS: A total of 13 games from a tournament were monitored. The athletes were monitored using the portable local positioning system (LPS), where the devices were installed on the upper back of each player. The LPS allowed measuring the speed and mean acceleration and deceleration for intermittent activities during matches. Software was used to calculate the physical demands using four different time epochs (30, 60, 180, and 300s). RESULTS: A total of 29867 observations were measured. There were substantial differences between playing positions in the variable acceleration and deceleration. Centers have low scores when compared to forward and guards.



(Adapted from Vásquez-Guerrero et al, 2017)

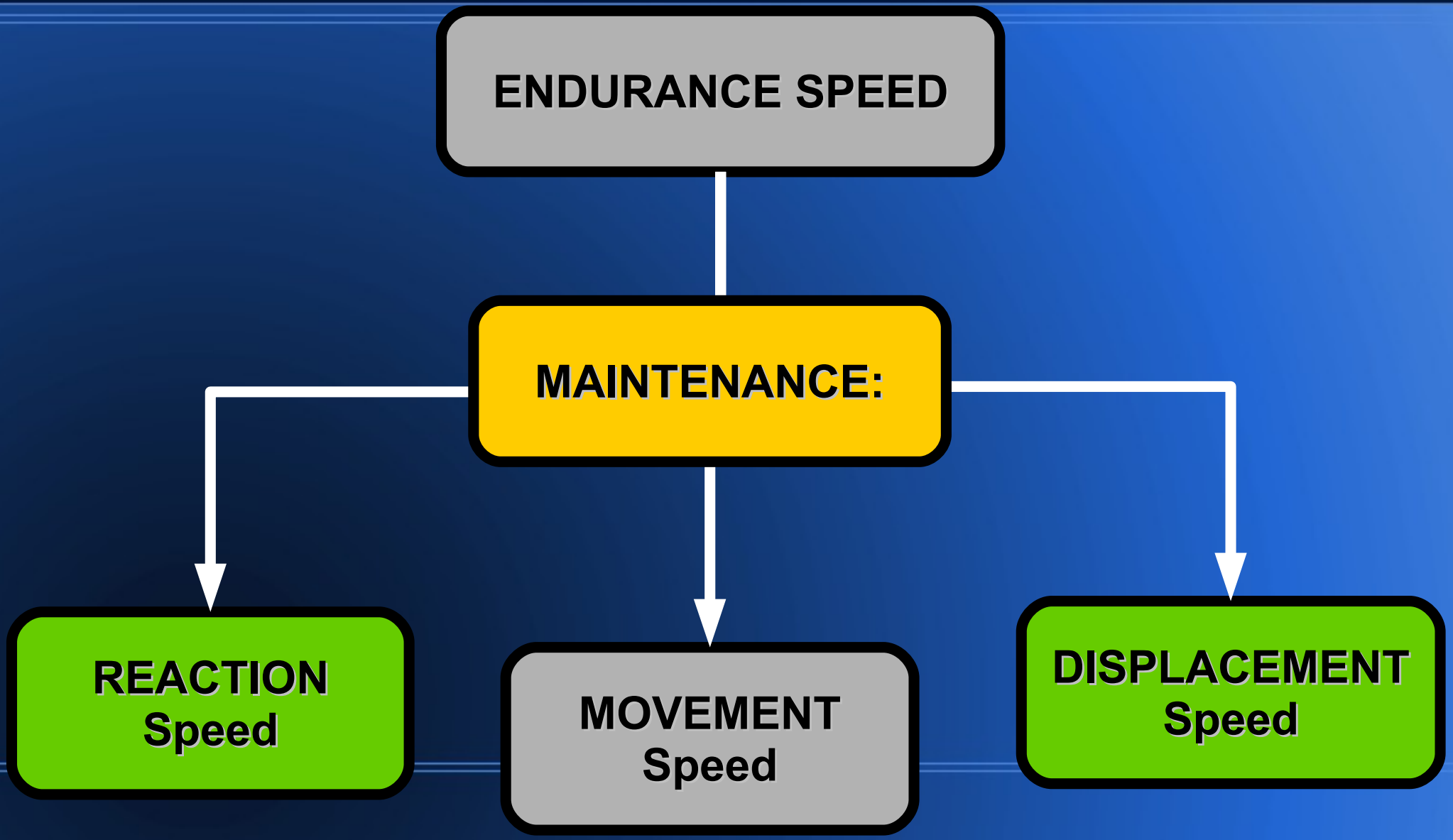
Specific Speed in Basketball
Endurance Speed - I

ENDURANCE SPEED

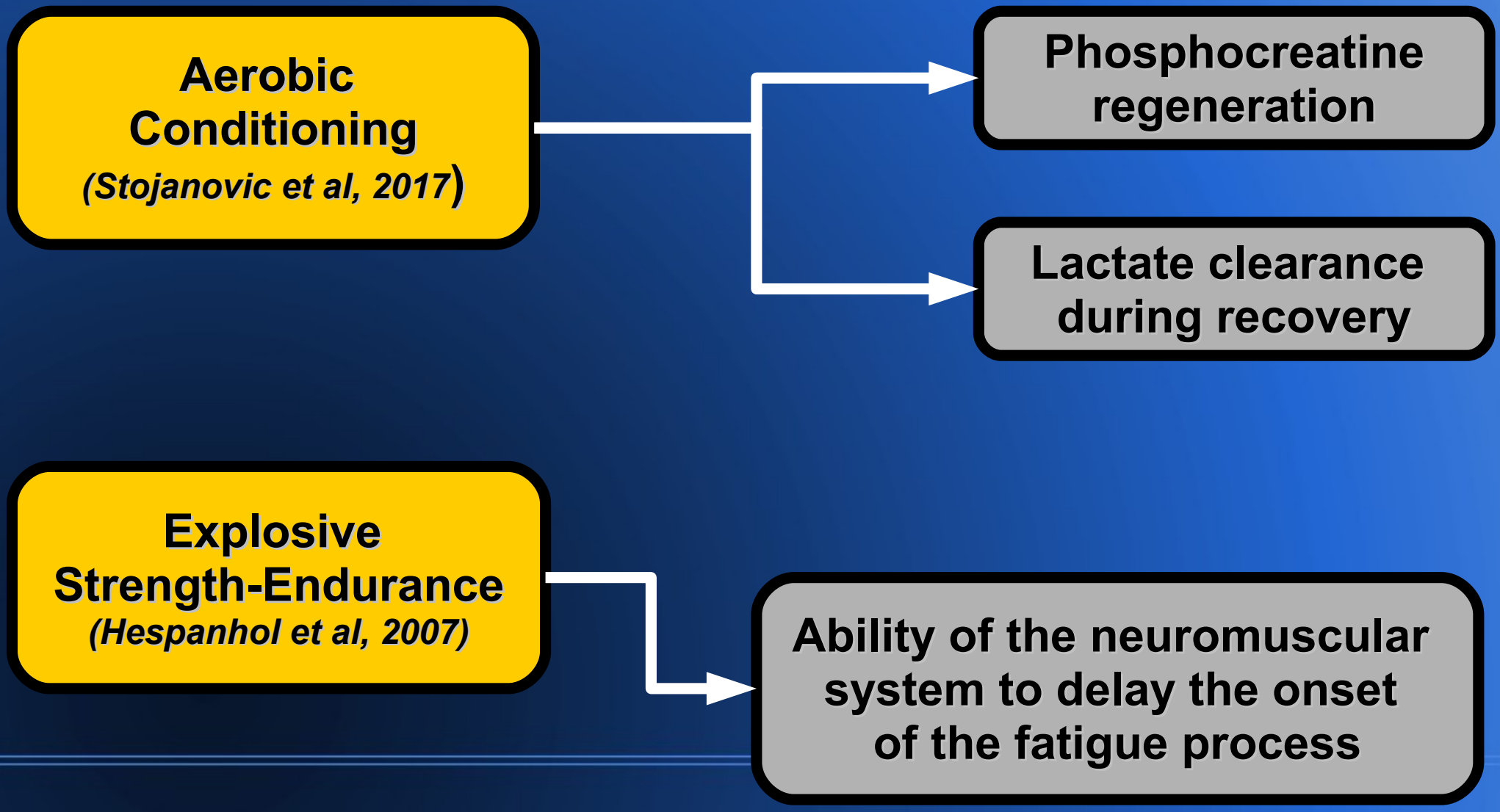
It is the ability of the basketball player to be able to maintain speed levels without substantial losses throughout the game, minimizing the effect of fatigue.

"Sustained Power"
(Dintman et al, 1999)

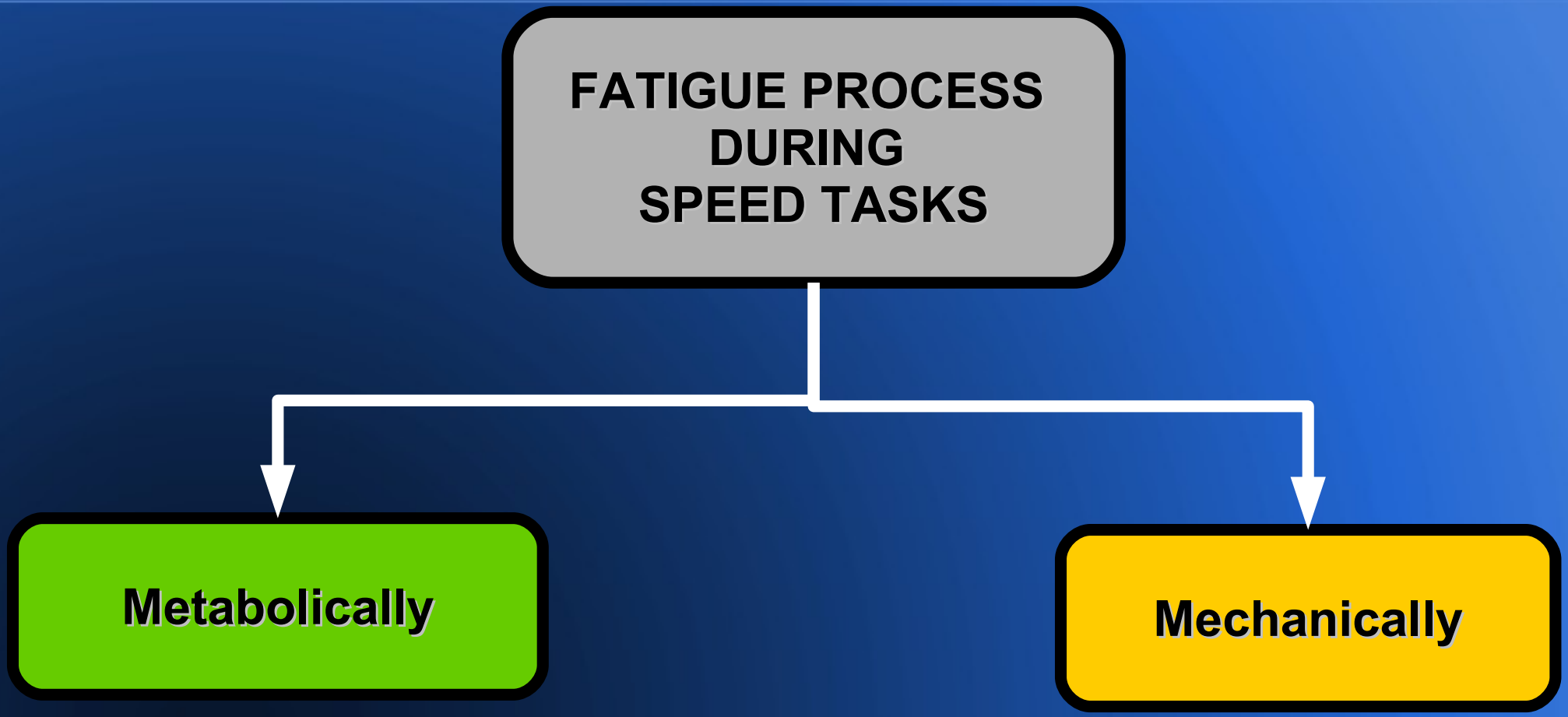
Specific Speed in Basketball
Endurance Speed - II



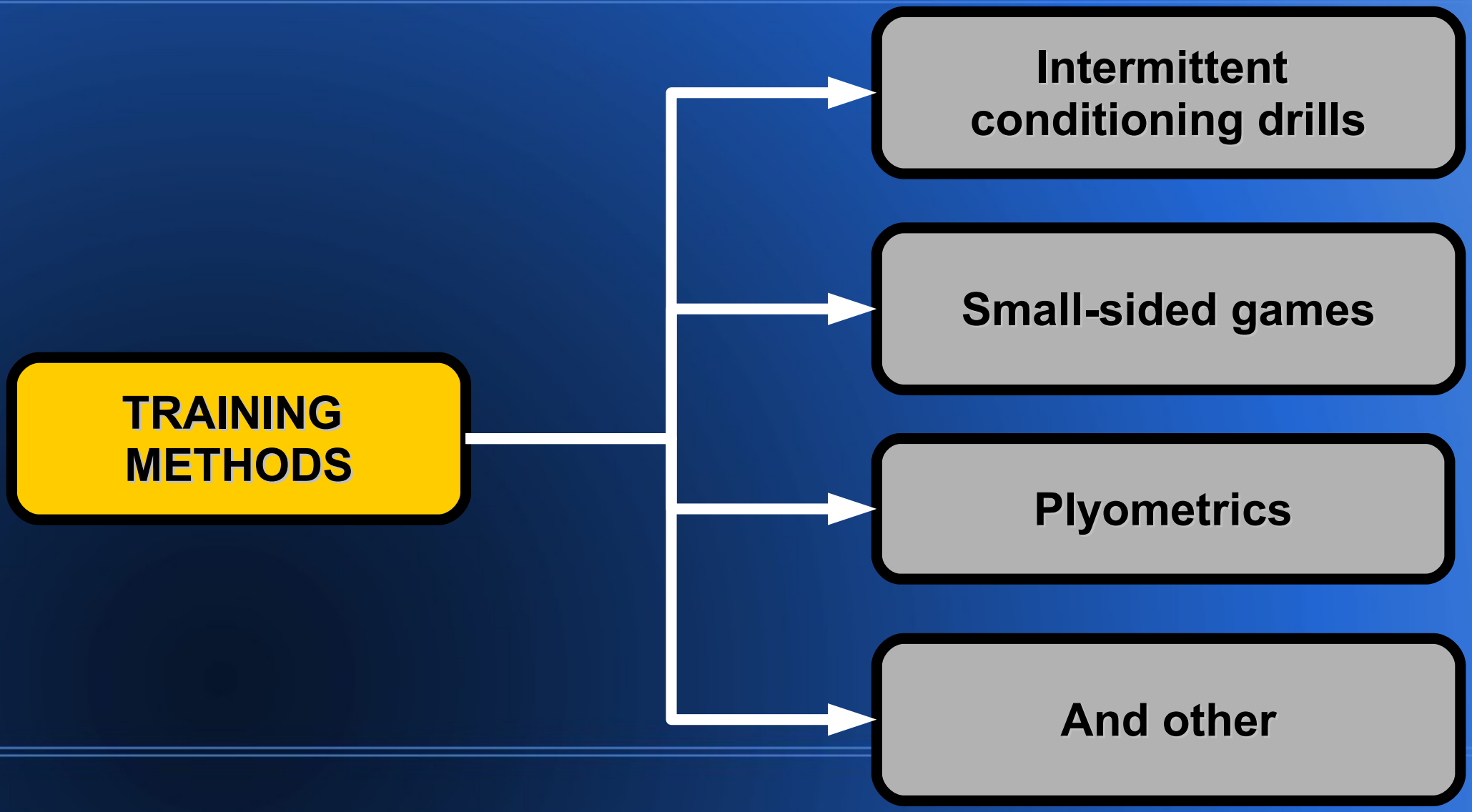
Specific Speed in Basketball
Endurance Speed - III



Specific Speed in Basketball
Endurance Speed - IV

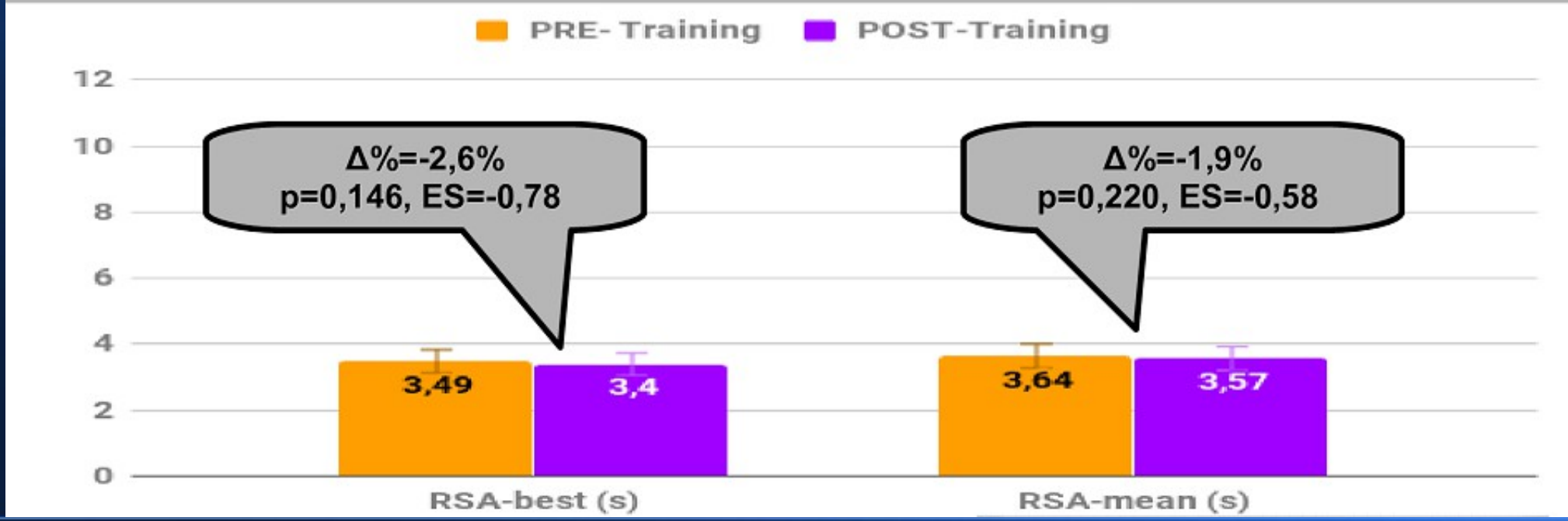


Specific Speed in Basketball
Endurance Speed - V



Specific Speed in Basketball
Endurance Speed - VI

n=08 professional female baskestball players – AGE: 21,5+\-2,0 yeras-old
PROTOCOLS: Observational longitudinal study. The study was conducted during the four weeks of pre-season (evaluated at the beginning and end). In the pre-season the athletes performed 28 training sessions (3 strength training sessions per week and 4 technical-tactic sessions per week). The repeated sprint ability (RSA Test) protocol consisted of 6 sprints of 35 meters with 10 seconds of recovery.
RESULTS: The team's average did not show statistically significant differences in the RSA-mean and RSA-best values in the pre and post training period. However, in the individual analysis of the data, 75% of the players were responsive to the training.



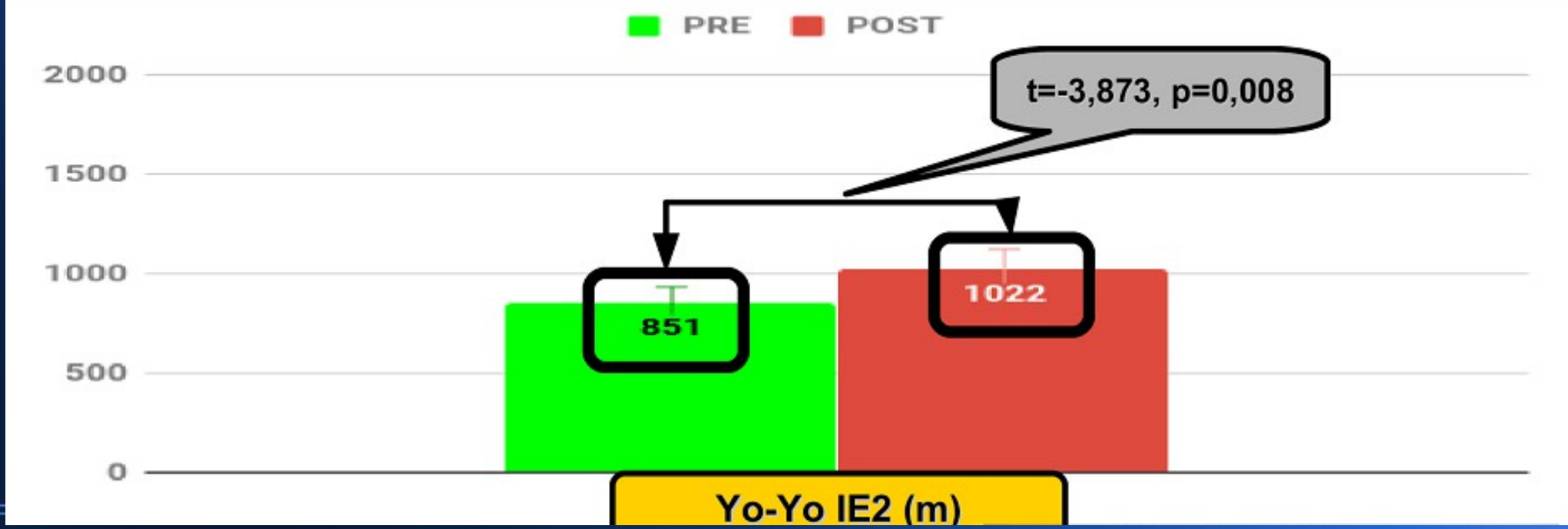
(Adapted from Braz et al, 2018)

Specific Speed in Basketball
Endurance Speed - VII

n=12 male basketball players – AGE: 18,6+\-0,5 years-old

PROTOCOLS: The players underwent a 4-week training program, with a weekly average of 10 sessions, lasting between 60 and 120 minutes. Physical conditioning sessions were held in the morning and technical-tactical training in the afternoon. The first two weeks corresponded to the end of the preparatory period and the last two weeks to the beginning of the competitive period. The Yo-Yo Intermittent Recovery Test Level 2 was used to assess the ability to perform in high intensity efforts.

RESULTS: Significant improvements were found in the PRE and POST values of distance covered in the Yo-Yo IR2.



(Adapted from Marcelino et al, 2013)

Specific Speed in Basketball
Endurance Speed - VIII

Small-Sided Games
(Schelling & Torres-Ronda, 2013)

Court Size	Full or Half
Number of Players	2x2, 2xV, 3x3, 3xV, etc
Duration Time	Effort-Pause Ratio + Density
Rules	Types of Adaptations
Tactical System	Game Models

Specific Speed in Basketball
Final Considerations - I

- **Understand** how each manifestation of speed works
- **Train each type of speed** separately and together
- Create **an organization and rational structure** of training
- **Training quality,** not quantity
- **Youth Players:** multifaceted approach
- **Senior players:** the specificity of the tactical position
- Respect the **athlete's biological individuality** and the **specificity** of the sport

Specific Speed in Basketball
Final Considerations - II

- **THANKS!!!** 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