UE361.3A S6-2024

TICE - ANGLAIS

Tutor : Mr. Brioche

THE EFFECTS OF PLYOMETRIC TRAINING UPON CHANGE-OF-DIRECTION PERFORMANCE FOR TENNIS PLAYERS

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1. INTRODUCTION

TEMPORAL CHARACTERISTICS OF A TENNIS MATCH

✦ **TOTAL DURATION**

→ **NO RULES**

- **In 3 sets :** **≈ 1h30**
- **In 5 sets :** **+2h**

1. INTRODUCTION

TEMPORAL CHARACTERISTICS OF A TENNIS MATCH

- TOTAL DURATION
- REST PERIODS

1. INTRODUCTION

TEMPORAL CHARACTERISTICS OF A TENNIS MATCH

REST PERIODS

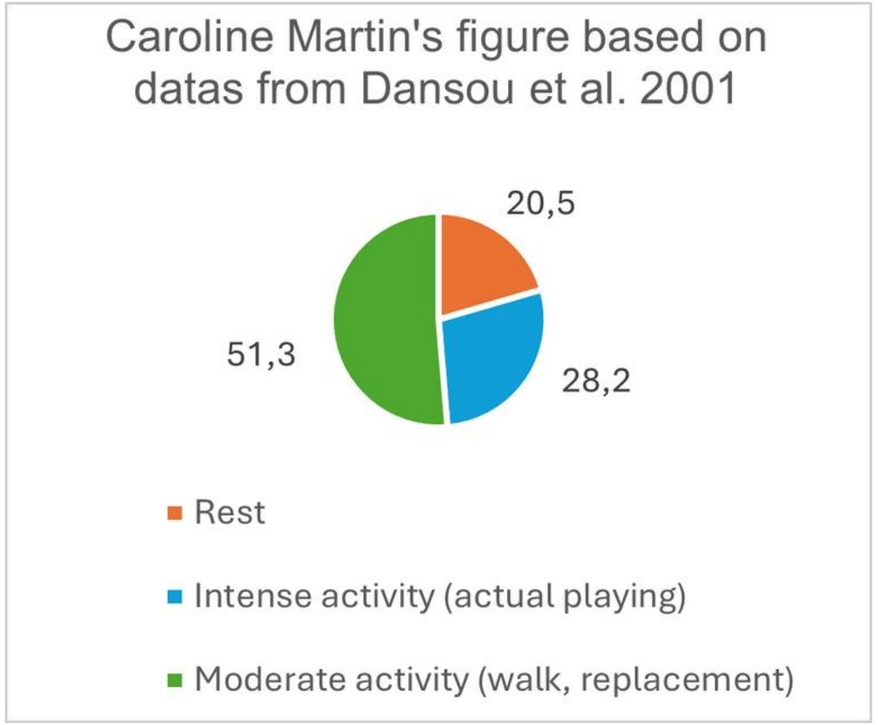
The rules :

Each point : max 25" → **moderate activity**

Every 2 games : 1'30" → **rest**

End of a set : 2' → **rest**

Actual playing time → **less than 30%**



1. INTRODUCTION

TEMPORAL CHARACTERISTICS OF A TENNIS MATCH

- **TOTAL DURATION** ~ 1h30
- **REST PERIODS** ~ 70%
- **INCIDENCE ON PHYSYOLOGICAL ASPECTS**

1. INTRODUCTION

TEMPORAL CHARACTERISTICS OF A TENNIS MATCH

INCIDENCE ON PHYSYOLOGICAL ASPECTS

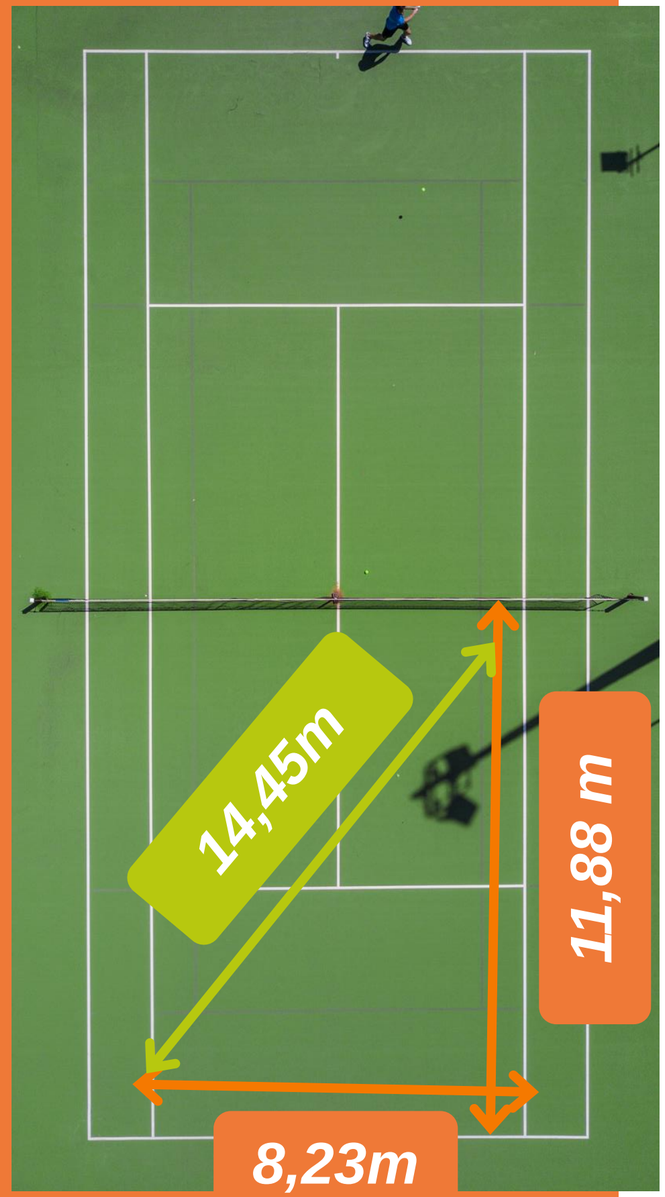
→ **LACTIC ANAEROBIC**

- during the points

→ **AEROBIC**

- during rest time

Excess Post-exercice Oxygen Consumption



1. INTRODUCTION

TYPE OF DEPLACEMENT

- ***DISTANCE TO REACH THE BALL***
  - → ***14,45 m : maximum***
    - ↳ **Explosivity in the first steps**
- ***ANTICIPATION***
  - → ***change of direction ability***
    - ↳ **to react when the opponent hit the ball**

1. INTRODUCTION

CHANGE-OF-DIRECTION ABILITY

- React with explosiveness on the field
- Let more time to do precise gesture
- Increase performance in tennis
- COD → RSI

1. INTRODUCTION

PLYOMETRICS

- **Pliometric training** =  + +
  - Eccentric-concentric muscle contraction
  - **Coupled with exercise**
    - Muscle power
    - Proprioception

OPTIMAL PERFORMANCE

2. INTRODUCTION

PLYOMETRICS

(Michael G. Miller, 2006) and (Hâvard Guldteig Rædergârd, 2020)

- 6 wk
- Plyometric
- Pre-season competition

Individualization

2. PROBLEMATIC

HOW PLYOMETRIC TRAINING CAN IMPROVE CHANGE OF DIRECTION ABILITY FOR TENNIS PLAYERS ?

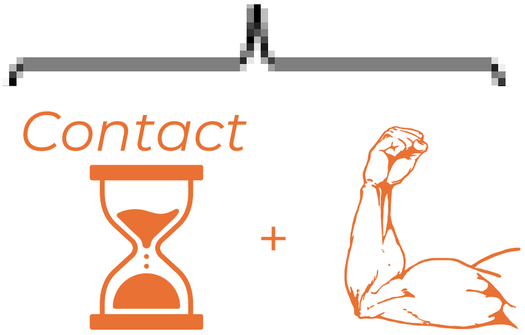
2. PROBLEMATIC

HOW PLYOMETRIC TRAINING CAN IMPROVE CHANGE OF DIRECTION ABILITY FOR TENNIS PLAYERS ?

HYPOTHESIS

- The plyometric training  COD

↳ *Reactive strength index*



3. MATERIALS AND METHODS

PROCEDURES

- 10 SESSIONS
  - → 1 SESSION : PRE-TEST
  - → 8 SESSIONS : TRAINING
  - → 1 SESSION : POST-TEST

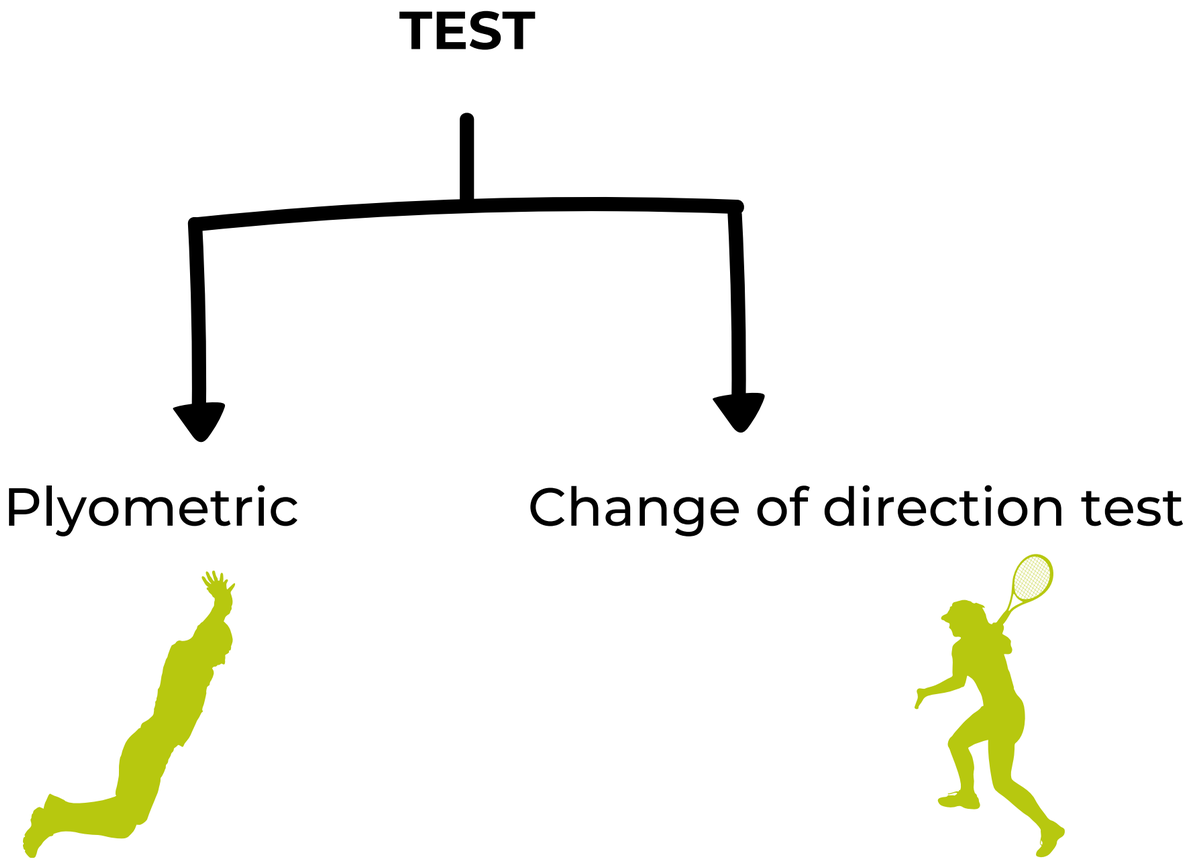
3. MATERIALS AND METHODS

PARTICIPANTS

	Allan	Eva	Rachel	Samuel	Mean	SD
Age (years)	22	21	20	21	21	0,82
Height (cm)	186	171	180	183	180	6,48
Body Mass (kg)	68	74	63	69	68,5	4,51

3. MATERIALS AND METHODS

TEST PROGRAM



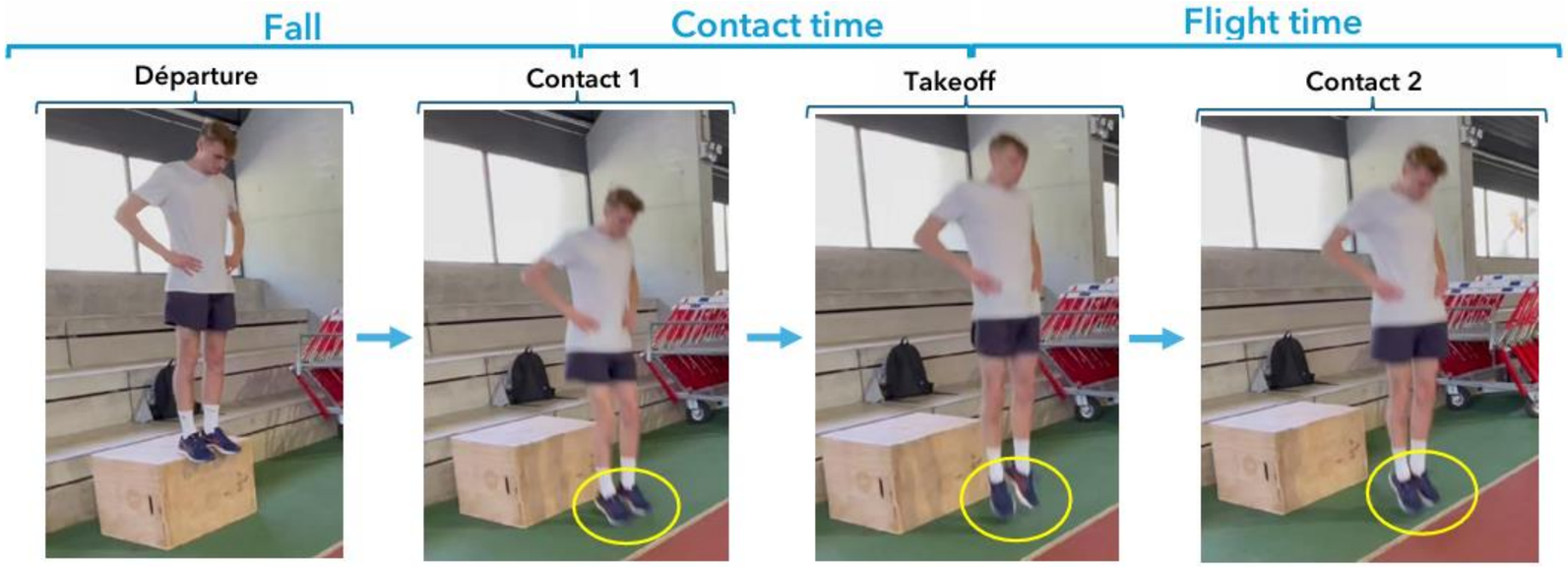
3. MATERIALS AND METHODS

TEST PROGRAM

REACTIVE STRENGTH INDEX TEST

Evaluate plyometric performance

↳ speed of lower body stretch-shortening cycle



My jump lab app → ground contact time
flight time → jump height

»» **RSI**

3 tries

2 conditions

planned

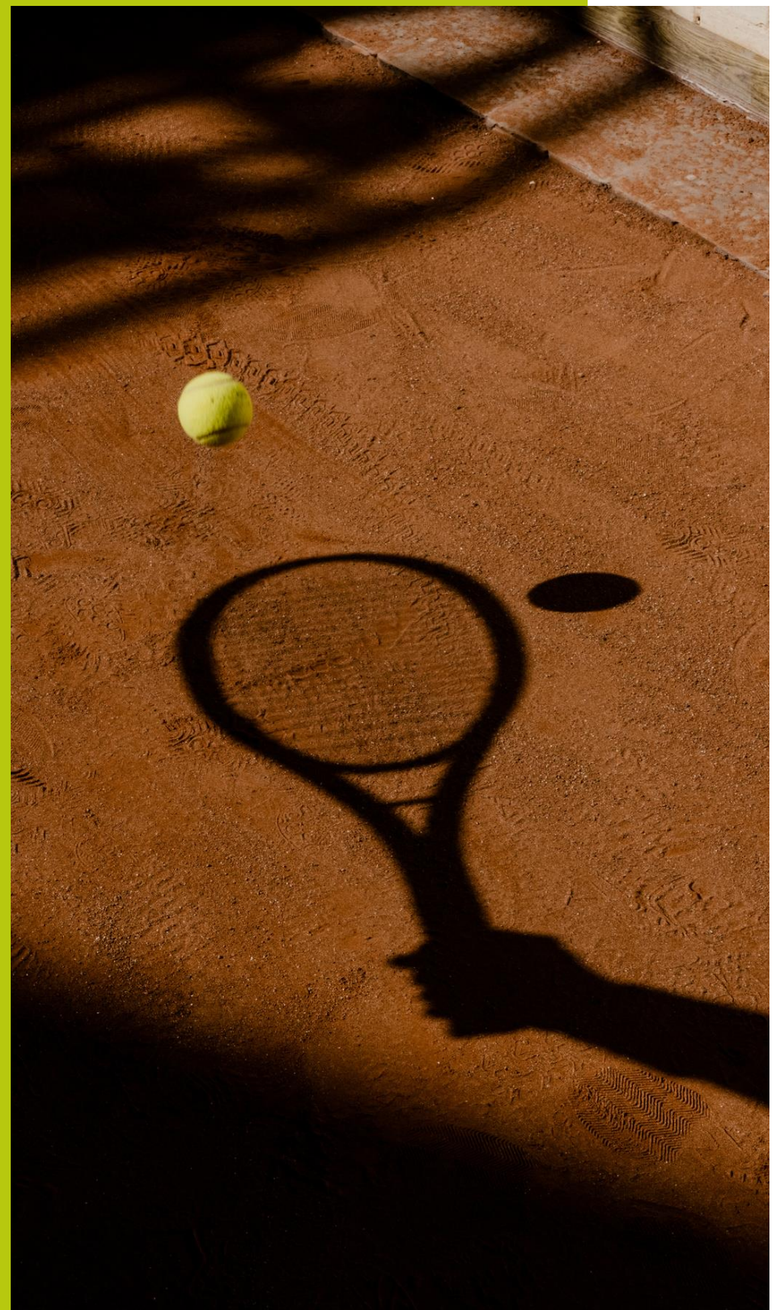
reactive

Visual stimulus

3. MATERIALS AND METHODS

TEST PROGRAM

COOKE TEST



Link to the video of of the training program :

3. MATERIALS AND METHODS

TRAINING PROGRAM

- Tuesdey and Friday = 72h of rest

Plyometric exercises

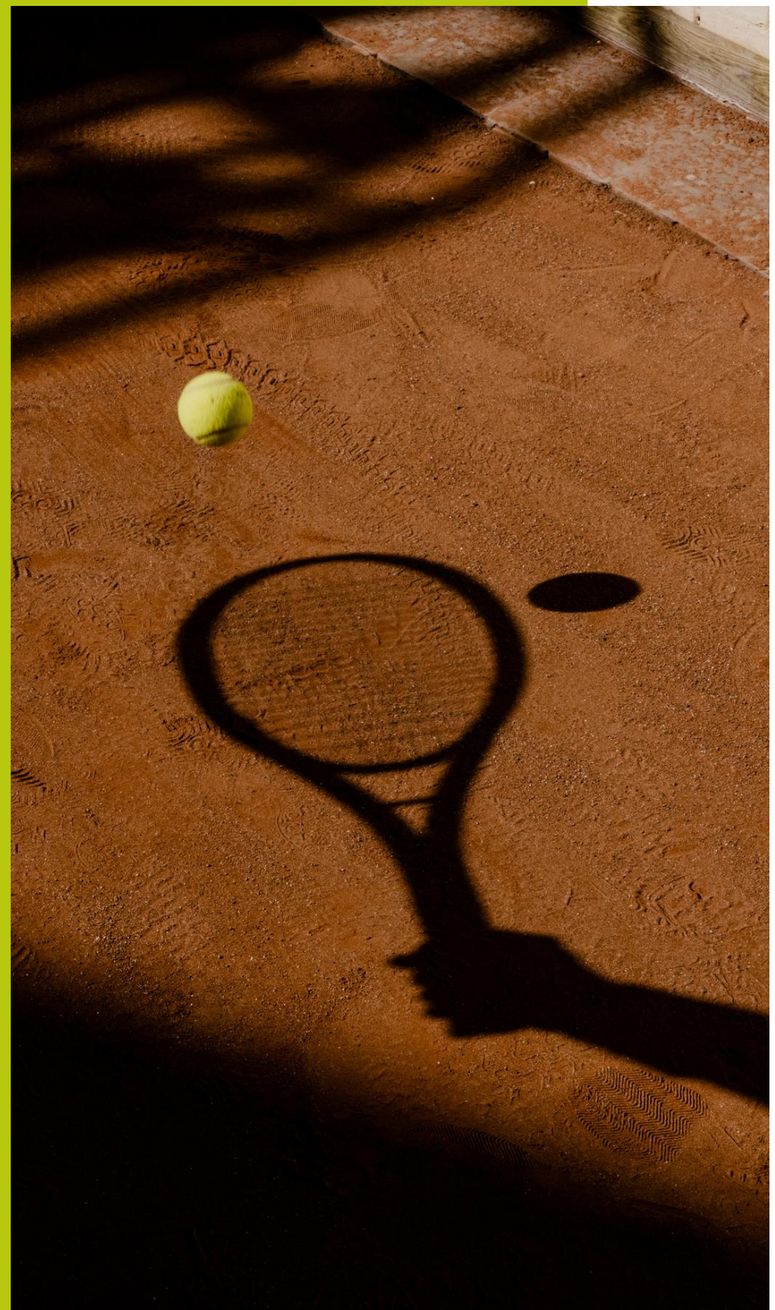
- *Unilateral CMJ*
- *Drop jump*
- *Unilateral*
- *Hurdle jump*
- *Bilateral Hurdle jump*
- *Skate jump*

Plyometric exercises

- *Unilateral CMJ*
- *Drop jump*
- *Unilateral*
- *Hurdle jump*
- *Bilateral Hurdle jump*
- *Skate jump*

The training

1 wk	Test
2 wk	Intensity
3 wk	Intensity
4 wk	Intensity
5 wk	Intensity Test



3. MATERIALS AND METHODS

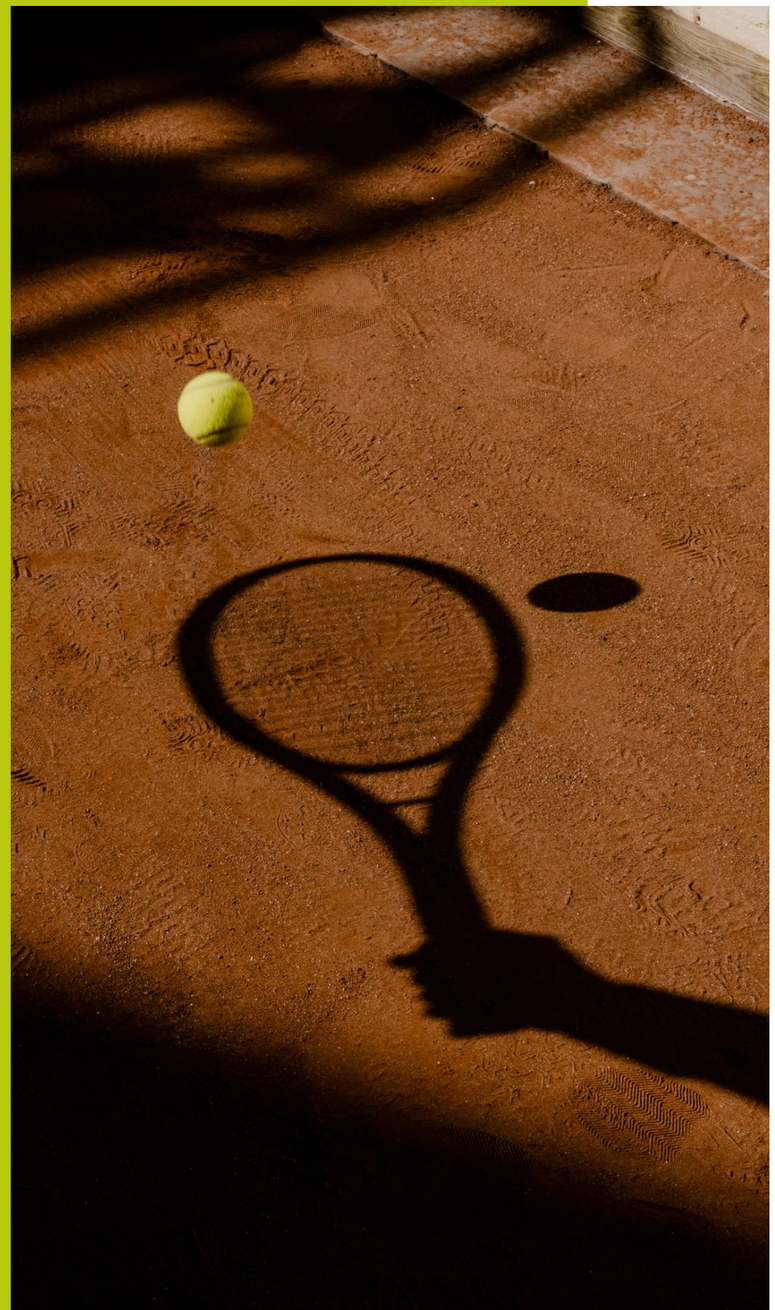
MONITORING TRAINING LOAD

- **RSI Test**
  - Optimal jump height
    - *Standard deviation*

Really good

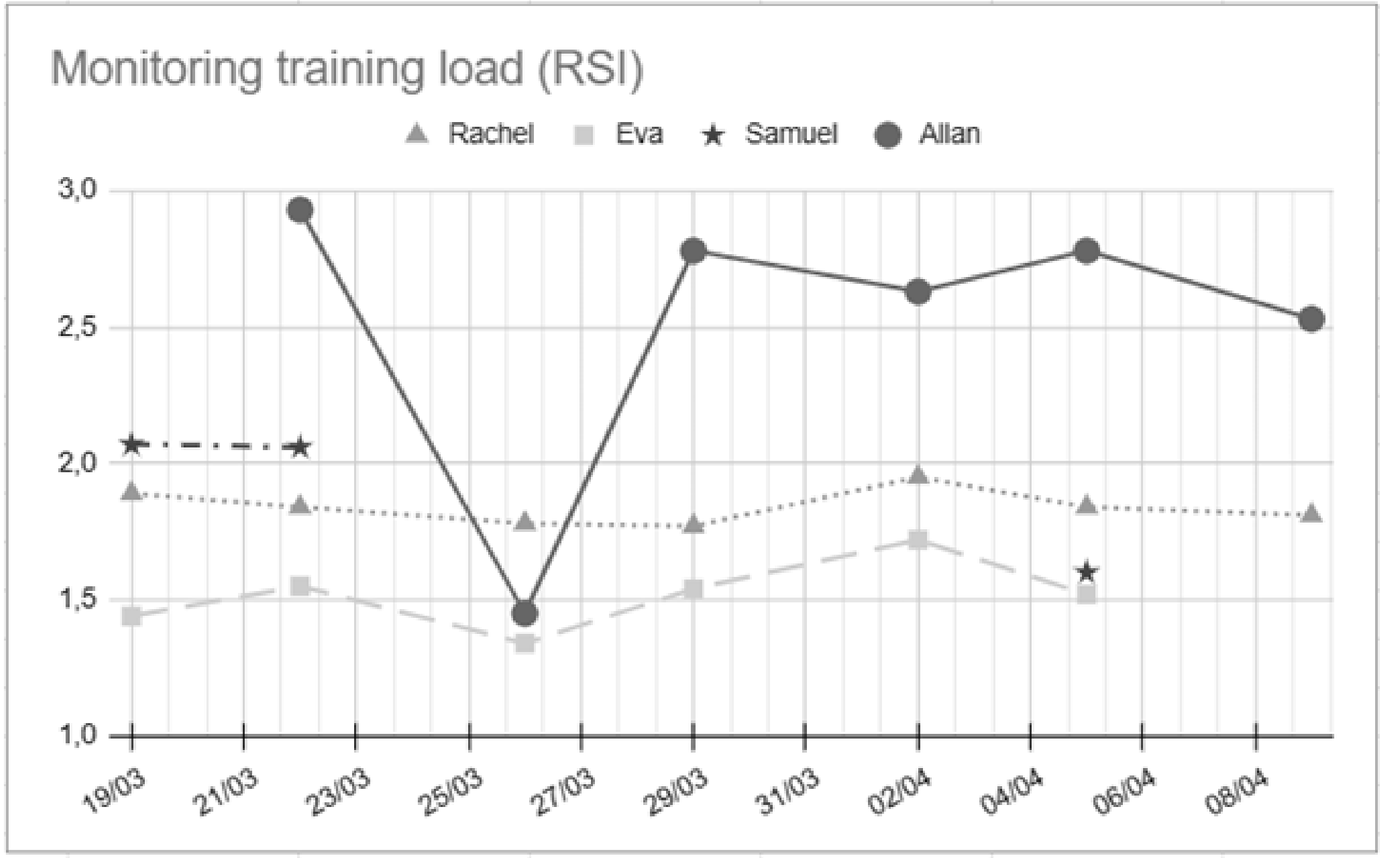
Good

Neuro-muscular fatigue



3. MATERIALS AND METHODS

MONITORING TRAINING LOAD



4. RESULT

STATISTICAL ANALYSIS

RSI AT 30 CM

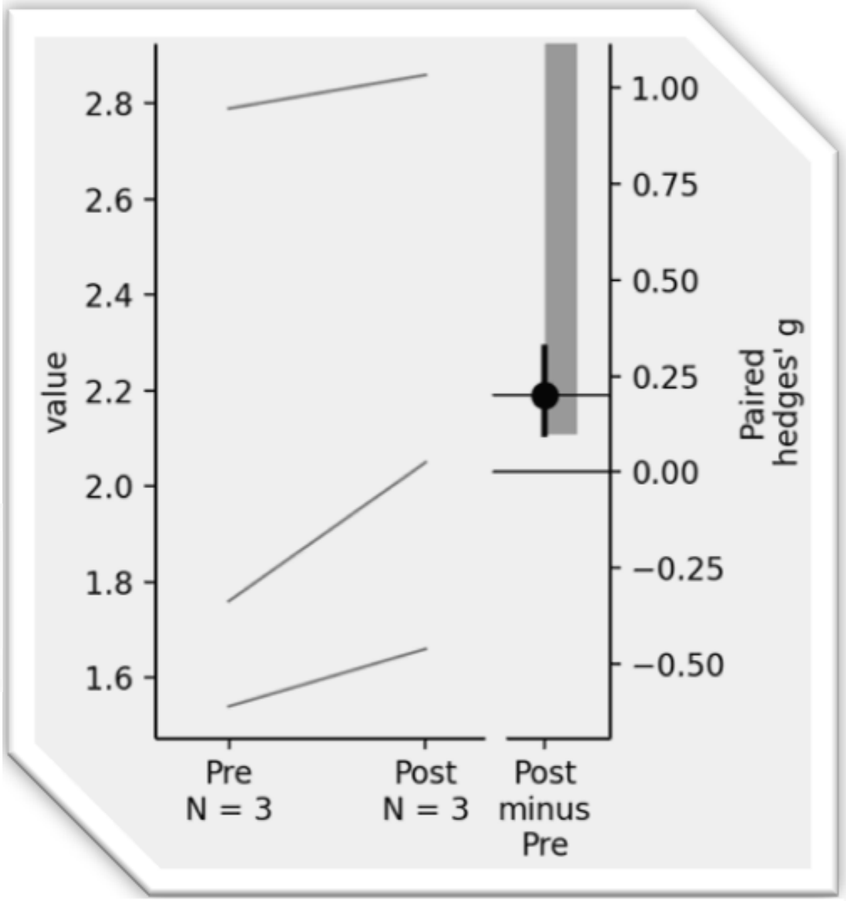
(PRE- AND POST- TEST)

↗ **For all the participants**

✦ **Absolute change : 7,88%**

✦ **Hedges' g = 0,249878**

↳ **small effect size**



Hedges' g:
0.249878
"statology.org"

	N	Mean pre (SD)	Median pre	Mean post (SD)	Median post	Absolute Change (%)	Qualitative
RSI (30 cm)	3	2,03 (0,67)	1,76	2,19 (0,61)	2,05	+ 7,88	↗ small

4. RESULT

STATISTICAL ANALYSIS

RSI AT 50 CM

(PRE- AND POST- TEST)

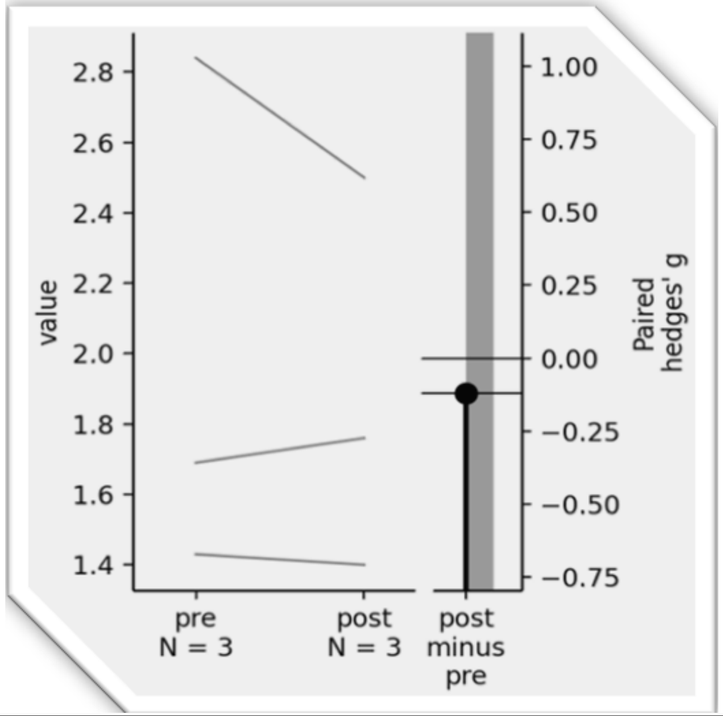
- ↘ **Most of the participants**
- ✦ **Absolute change : 5,13%**
- ✦ **Hedges' g = 0,150965**
  - ↳ **Very small effect size**

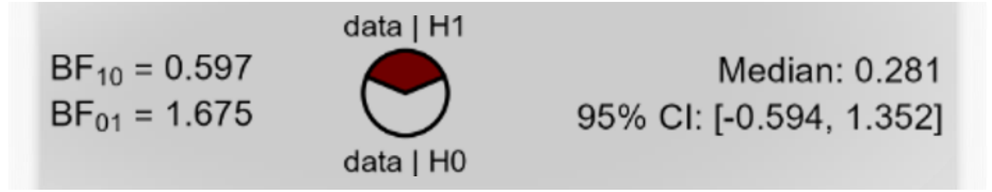
RSI AT 60 CM

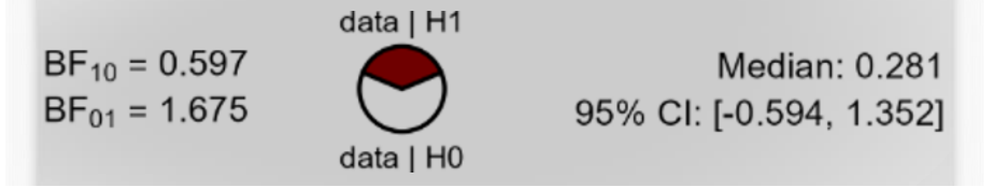
(PRE- AND POST- TEST)

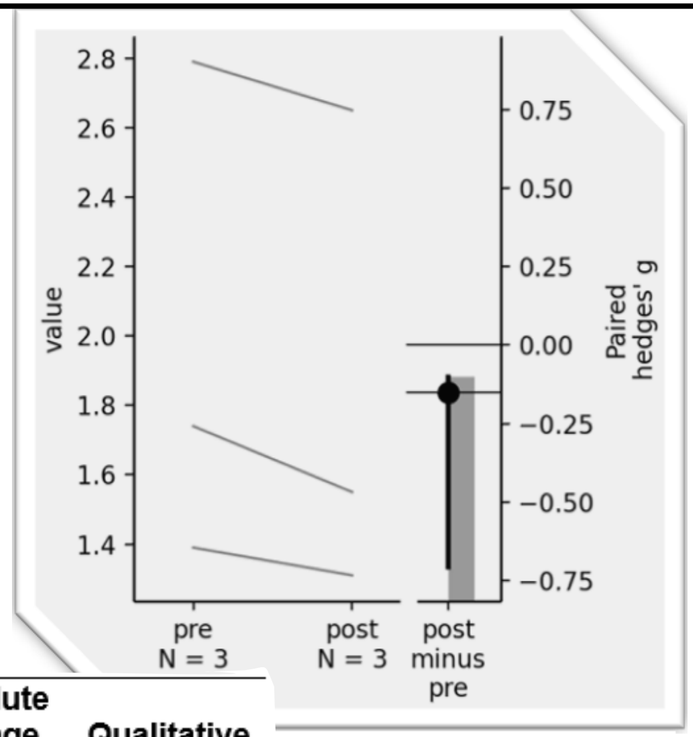
- ↘ **For all the participants**
- ✦ **Absolute change : 6,60%**
- ✦ **Hedges' g = 0,189398**
  - ↳ **Very small effect size**

	N	Mean pre (SD)	Median pre	Mean post (SD)	Median post	Absolute Change (%)	Qualitative
RSI (50 cm)	3	1,99 (0,77)	1,69	1,89 (0,56)	1,76	- 5,13	↘ very small









	N	Mean pre (SD)	Median pre	Mean post (SD)	Median post	Absolute Change (%)	Qualitative
RSI (60 cm)	3	1,97 (0,73)	1,74	1,84 (0,71)	1,55	- 6,60	↘ very small

4. RESULT

STATISTICAL ANALYSIS

COD PLANNED

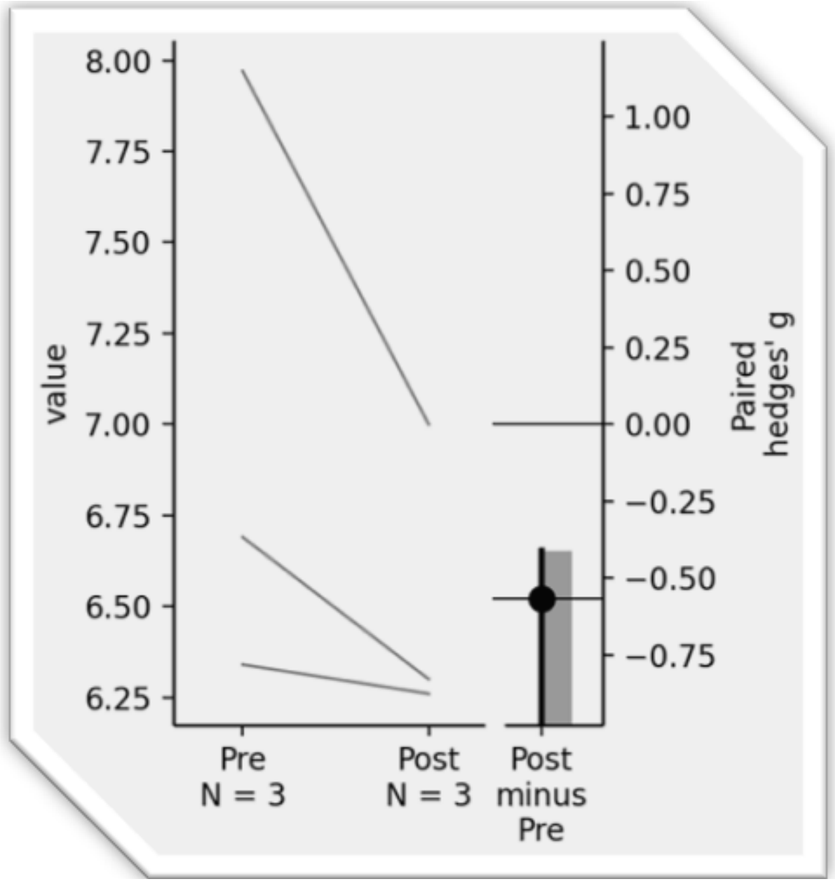
(PRE- AND POST- TEST)

↗ **For all the participants**

✦ **Absolute change : -6,96 %**

✦ **Hedges' g = 0,711795**

↳ **Medium effect size**



Hedges' g: **0.711795**
"statology.org"

	N	Mean pre (SD)	Median pre	Mean post (SD)	Median post	Absolute Change (%)	Qualitative
COD p	3	7,00 (0,86)	6,69	6,52 (0,42)	6,3	- 6,96	↗ medium

4. RESULT

STATISTICAL ANALYSIS

COD REACTIVE

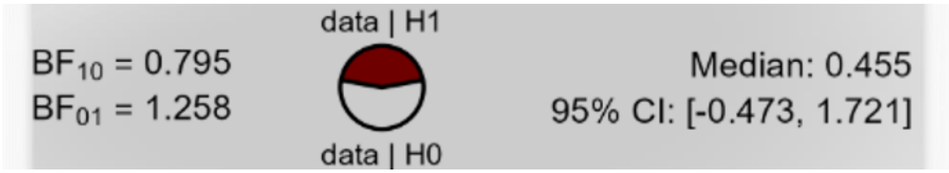
(PRE- AND POST- TEST)

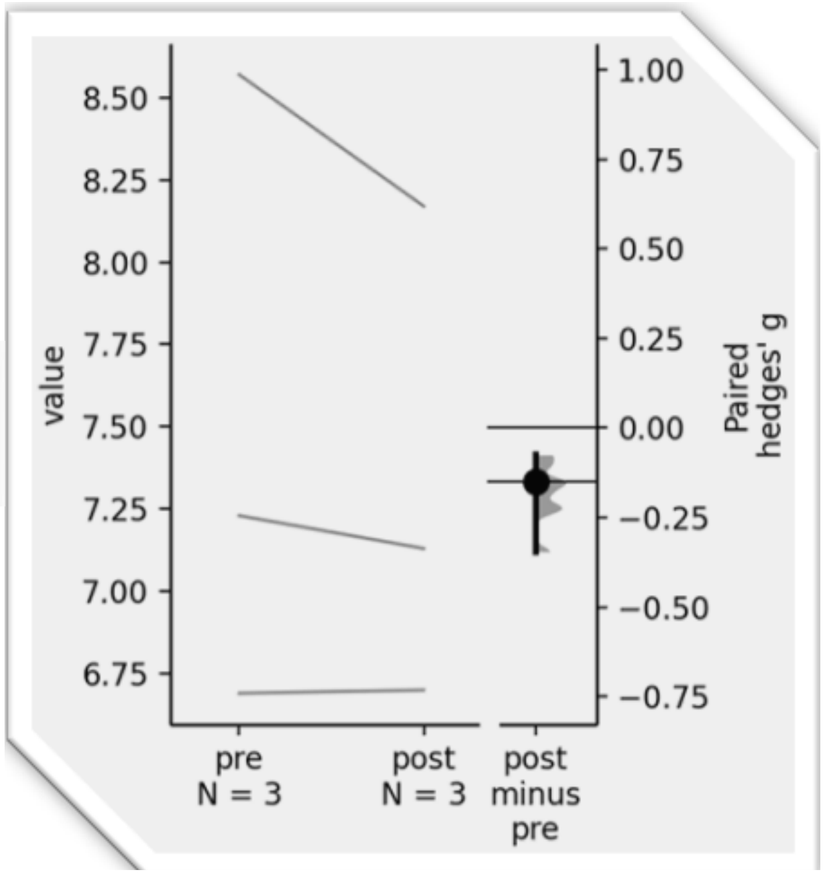
↗ **Most of the participants**

✦ **Absolute change : -2,37 %**

✦ **Hedges' g = 0,188090**

↳ **Very small effect size**





Hedges' g:
0.188090
"statology.org"

	N	Mean pre (SD)	Median pre	Mean post (SD)	Median post	Absolute Change (%)	Qualitative
COD r	3	7,50 (0,97)	7,23	7,33 (0,76)	7,13	- 2.37	↗very small

4. RESULT

SUMMARY TABLE OF THE RESULTS

	N	Mean pre (SD)	Mean post (SD)	Absolute Change (%)	Qualitative
RSI (30 cm)	3	2,03 (0,67)	2,19 (0,61)	+ 7,88	↗ small
RSI (50 cm)	3	1,99 (0,75)	1,89 (0,56)	- 5,13	↘ very small
RSI (60 cm)	3	1,97 (0,73)	1,84 (0,71)	- 6,60	↘ very small
COD p	3	7,00 (0,86)	6,52 (0,42)	- 6,96	↗ medium
COD r	3	7,50 (0,97)	7,33 (0,76)	- 2,37	↗ very small

(RSI = Reactive Strength Index; COD p = change of direction planned; COD r = change of direction reactive; SD = standard deviation; ↗ or ↘ = performance's augmentation or diminution*)*

5. DISCUSSION

- ***Initial hypothesis ?***
  - ***COD performance ↗ >>> Pylometric program***
- ***RSI results***
  - ***30 cm ↗ 7.88%***
  - ***50 / 60 cm ↘ >>> Neuromuscular fatigue***
- ***COD results***
  - ***planned ↗ > reactive ↗ >>> other factors involved***
- ***Improvement ?***
  - ***Sophisticated equipment ↗***
  - ***Different recovery time >>> Better adaptation and gains***

6. CONCLUSION

- *Plyometric training is usefull for improving change of direction performance*
- *The cognitive abilities are important too in tennis performance*
- *A protocol without a lot of equipement can be effective*