

An intervention program on Portuguese Paracanoe athletes: a multidisciplinary approach

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Objective

This project aims to develop an multidisciplinary intervention program that allows the preparation of the Paracanoe Portuguese National Team for the Paralympic Games qualification trails.





A specific training program is a complex process that incorporates several aspects, variables and key training principles, and its effectiveness depends on the knowledge from different areas.

Paracanoe National Team

Paracanoe: the other side





We started to work with the best Portuguese Paracanoe athlete *

- **Male**
- **Age 37**
- **Competing since 2011**

*KL2 class- athletes with partial trunk and leg function, able to sit upright in the Kayak but might need a special backrest, limited leg movement during paddling.



The intervention program was based:

Biomechanical aspects,

Sport training methodology,

Psychological intervention,

Physiological evaluation.



The biomechanical intervention enforces the canoeing techniques as well as kayak tuning and balance, in order to optimize the athlete-kayak dyad.



The sport training methodology intervention was developed through a cooperative work between the coach and experts in this specific area.

A training program was proposed to improve the athlete performance considering an initial evaluation.



A psychological intervention was conducted by a sports psychologist also in a cooperative and systematic relationship with the coach and the athlete.



The **physiological evaluation** focuses on the athletic capacities and body composition assessments

- athletic aerobic and anaerobic capacity;
- muscle strength and power;
- muscle morphology;
- body composition.



Initial Evaluation



Initial evaluation procedures

- Vídeo record of the canoeing techniques ; front, back and side plans
- Dynamic analysis of kayak tuning and balance;
- Video record of time trial (200m);
- Cinematic analysis





Initial evaluation procedures (1)

Video recording of the canoeing techniques ;
front, back and side plans.





Initial evaluation procedures (2)

Dynamic analysis of kayak tuning and balance;





Initial evaluation procedures (3)

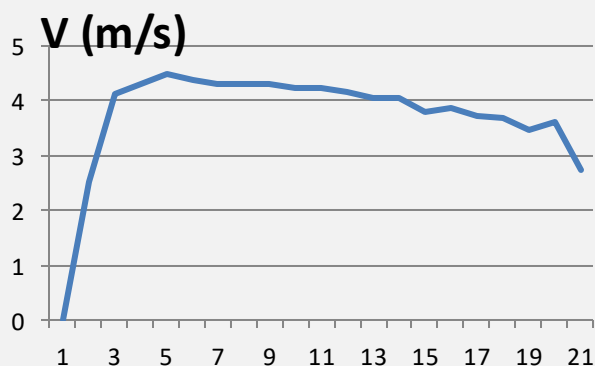
Video recording of time trials (200m)





Initial evaluation procedures (4)

Cinematic analysis



x(M)	10	20	30	40	50	60	70
t	4,08	6,60	9,00	11,32	13,68	16,00	18,44
v(m/s)	2,45	3,97	4,17	4,31	4,24	4,31	4,10
a (m/s)	0,60	0,60	0,08	0,06	-0,03	0,03	-0,09
dt	4,08	2,52	2,4	2,32	2,36	2,32	2,44



Initial Evaluation Results

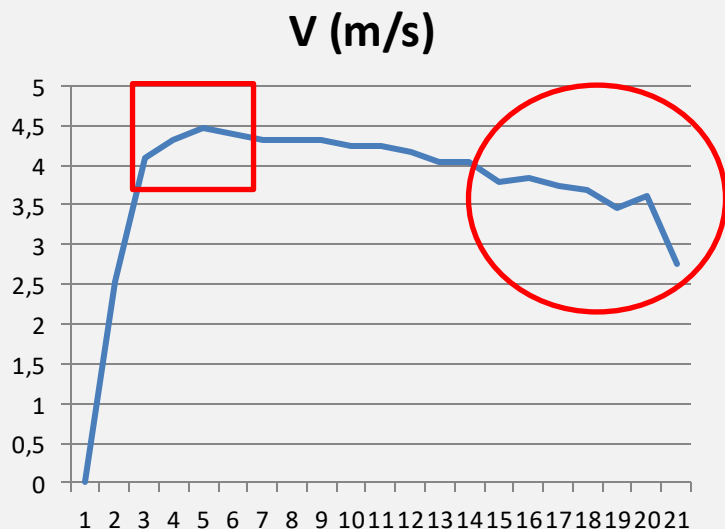
Biomechanical problems detected

- Boat weight and balance
- Rudder trimming
- Seat fixation and athlete accommodation



Initial Evaluation Results

Sport training aspects



The following problems could be identified:



maximum speed phase is short



very sharp speed reduction in the final phase



The physiological evaluation

Periodically, we carry out the following tests and protocols:

- 1) Aerobic power and capacity – incremental protocol for VO_2max on the kayak ergometer
- 2) Lactate threshold test – by the lactate curve analysis
- 3) Anaerobic power – Wingate test on arm crank ergometer
- 4) Upper body strength tests – Isometric, isokinetic and power tests
- 5) Body composition – determined by dual-energy x-ray absorptiometry (DXA)
- 6) Muscle morphology – upper body muscle thickness by ultrasonography



A multidisciplinary intervention program



The biomechanical intervention

Enforces the canoeing techniques as well as kayak tuning and balance, in order to optimize the athlete-kayak dyad.

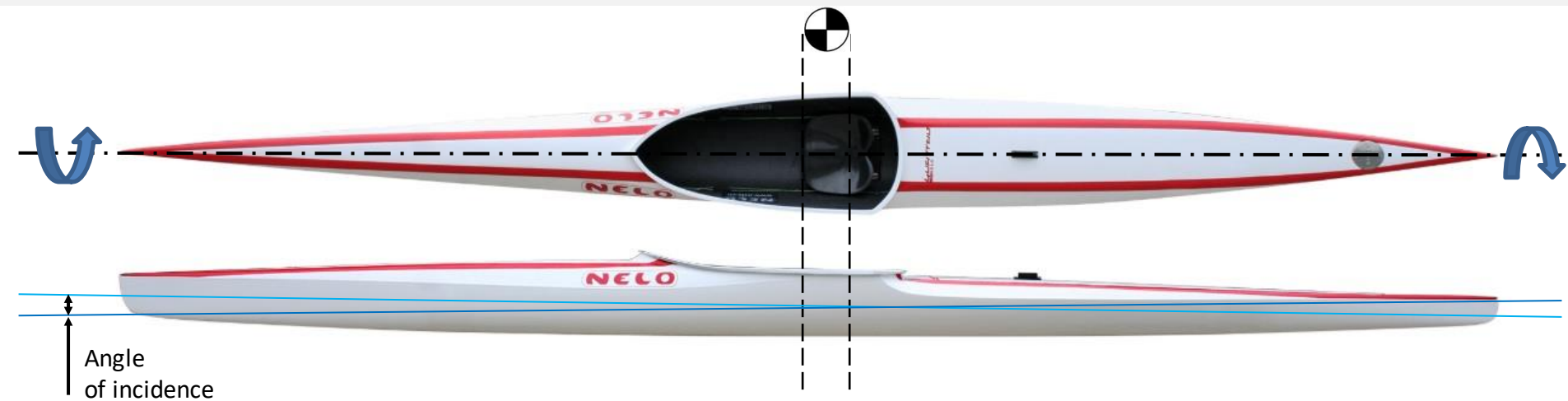
- Seat leveled according to athlete prosthesis characteristics
- Seat longitudinal reposition for better weight and balance
- New type and repositioned seatbelt
- Rudder positioned according to paddling mechanics
- Small adjustments on paddling travel





The biomechanical intervention

Weight & Balance

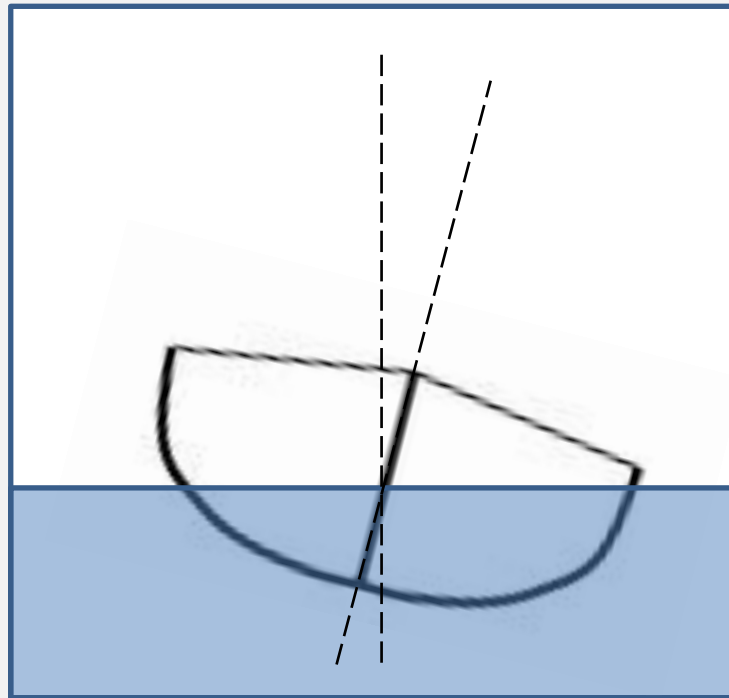




The biomechanical intervention

Weight & Balance

- Assymetrical segment mass
- Seat ergonomic adjust





The sport training methodology intervention

The training program was changed according to the results of the initial evaluation.

Changes were proposed in the training process in order to:

- 1) Stabilize the maximum speed phase
- 2) Reduce the effect of fatigue in the final phase
- 3) Minimize speed decrease



A psychological intervention was conducted by a sports psychologist also in a cooperative and systematic relationship with the coach and the athlete.



Mental coaching

- Boost believes and attitudes to perform
- Proactivity
- Overcome doubts
- Pre competition routines
- Get in the zone



Mental coaching

- Manage distractions
- Self confidence
- Focus
- Pre competitive stress



Mental coaching

- Live and family coaching
- Coach the coach
- Life balance
- Sport career counseling
- Mental health



Practice

- Initial assessement
- Mental training plan
- Intervention sessions - Monthly
- Unlimited email correspondance and phone contact
- Conferencing technology
- Workbooks
- Final assessement



Evaluation of the intervention program



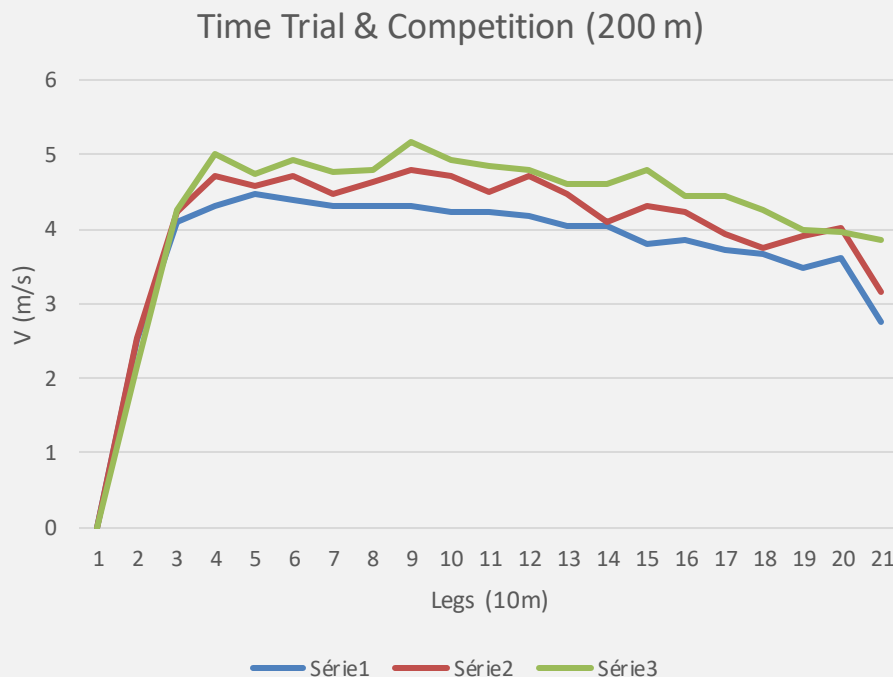
Evaluation of the intervention program

The intervention was evaluated considering:

- The results perceived by the athlete and the coach;
- The final marks in the time trials during practice;
- Results in competitions.



Last Evaluation Results



- The total time of trial changed from 53.32 to 48.36s
- Peak velocity changed from 4.31 to 4.72m/s on practice
- On official competition final time was 46.42s



Last Evaluation Conclusions

The results show an improvement in the final times and peak speed achieved.

The multidisciplinary intervention program had a positive effect.

Facing the results, we decided to extend the application of the program to the other members of the national team.



Thank you !



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