



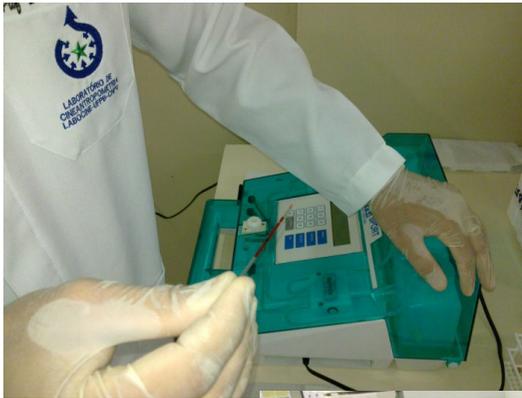
A NEW COMPACT WHEELCHAIR DYNAMOMETER

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*** Presenter**

Universty of Pernambuco

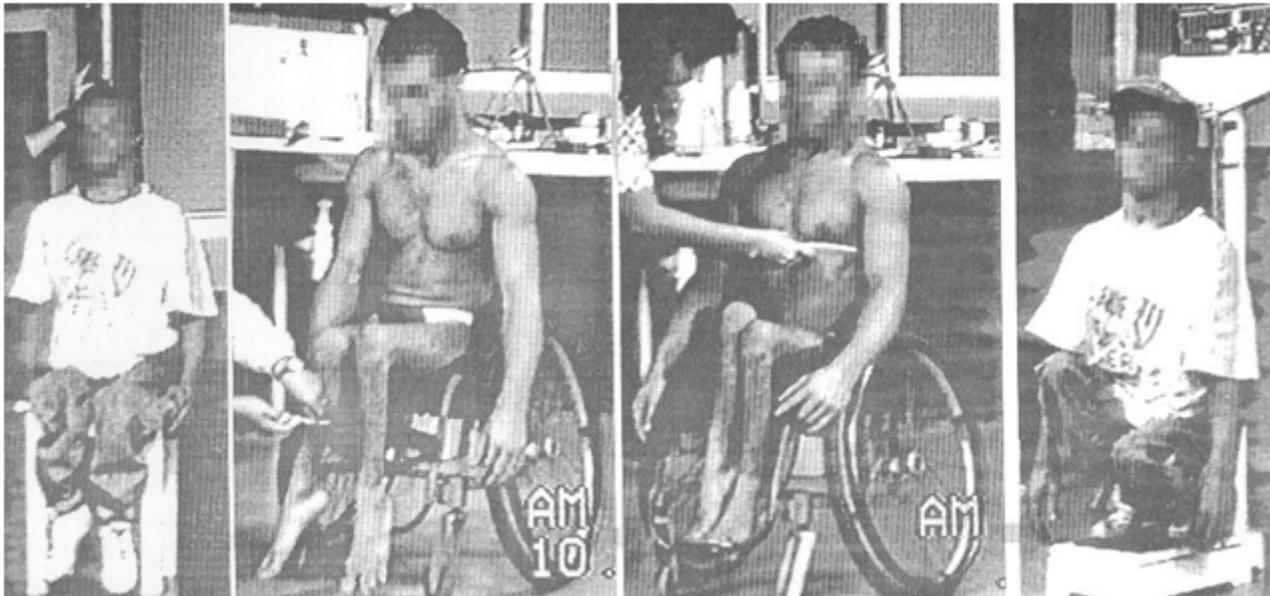
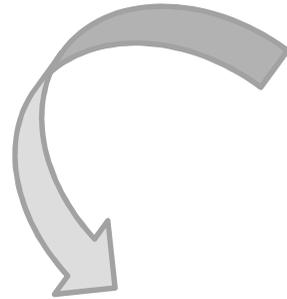
- Human Performance Laboratory



History: 96's e 97's

The initial works

- Costa (1997)



Low Cost Ergometer for Wheelchair Users (Brazilian Patent): 98's

- Validation:



- ✓ Comparison of the MET's in treadmill;
- ✓ Verification of the reproducibility equipment;
- ✓ Correction of the radius and power output.

2000 – 2004

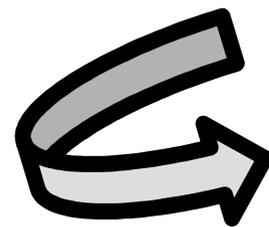


This group provided:

- Evaluations;
- Reports;
- Data collected;
- Physiology;
- Motor performance

A New Equipment for Sports Performance in a ergonomic perspective

- A problem: the power output workout



Power output

A New Equipment for Sports Performance and ergonomic perspective

- The manufactured
 - ✓ Low cost;
 - ✓ Compact;
 - ✓ Reliable;
 - ✓ Validate;
 - ✓ Adaptable to all kinds of the wheelchairs;

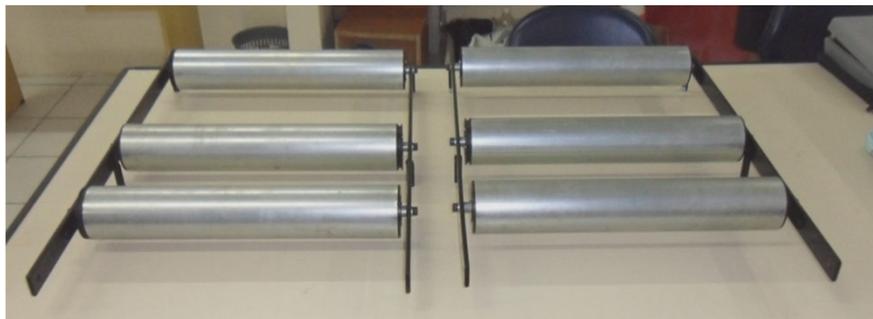


A New Equipment for Sports Performance and ergonomic perspective

- Mechanical Part



Moment of inertia



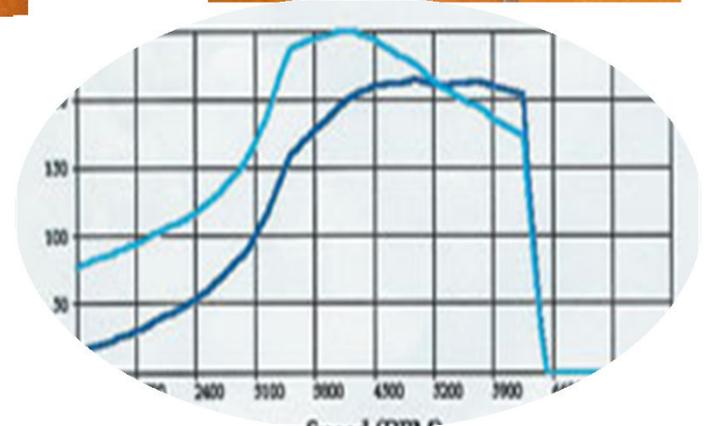
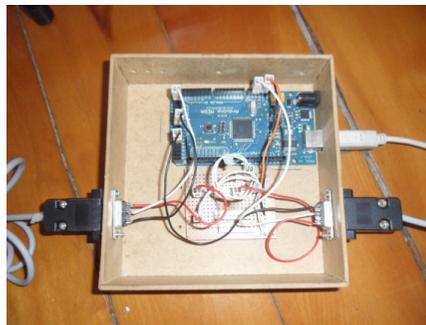
A New Equipment for Sports Performance and ergonomic perspective

- Electronical Part

Arduino Mega
(Arduino, Itália)



Sensores indutivos
(SensorBras, Brasil)



A New Equipment for Sports Performance and ergonomic perspective

- Experimental Procedures



Scientific criteria of authenticity



Concurrent validation through high speed camera (Samsung, WB 2000) with 240 fps

A New Equipment for Sports Performance and ergonomic perspective

- Validation process:

21 subjects non-wheelchair users
(informed consent)

Principle of the maximal systems
stress

Maximal sprint performance in 10
seconds

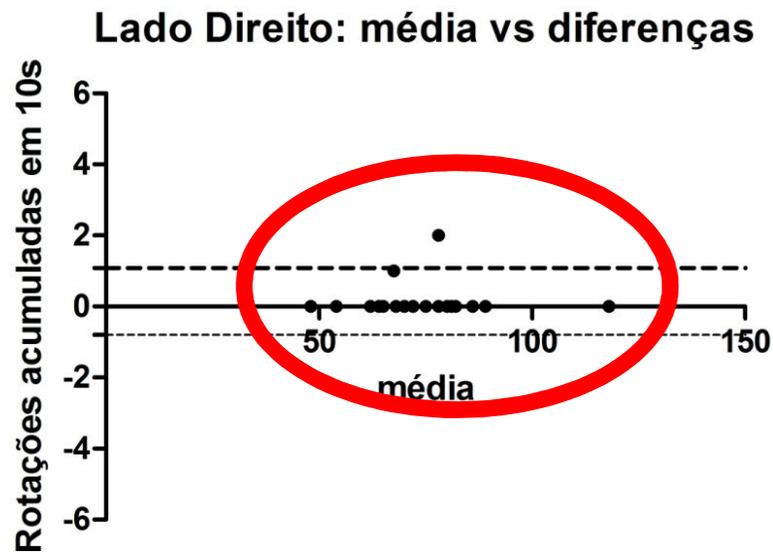
For statistical analysis to compare
Dynamometer with videography:
Bland-Altman plots and ICC



A New Equipment for Sports

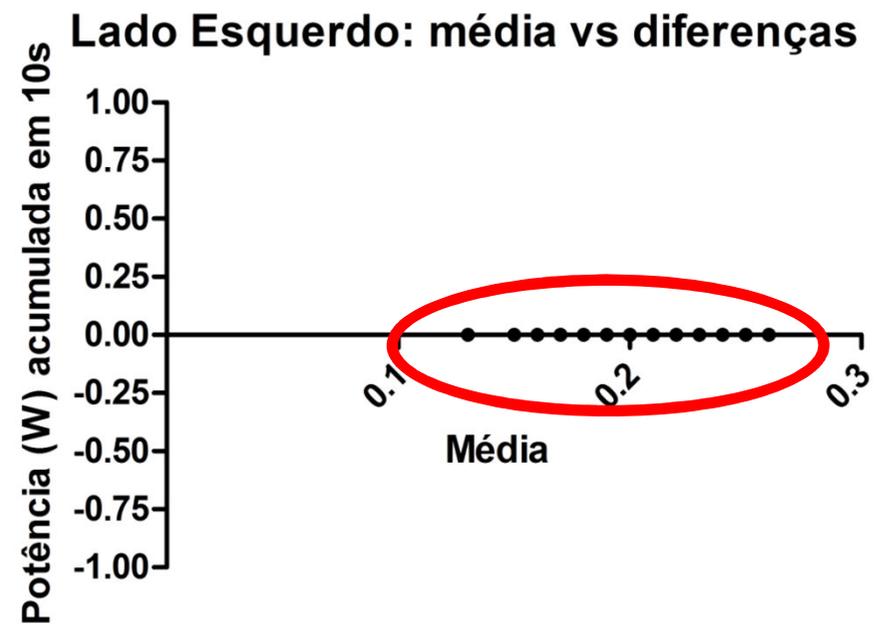
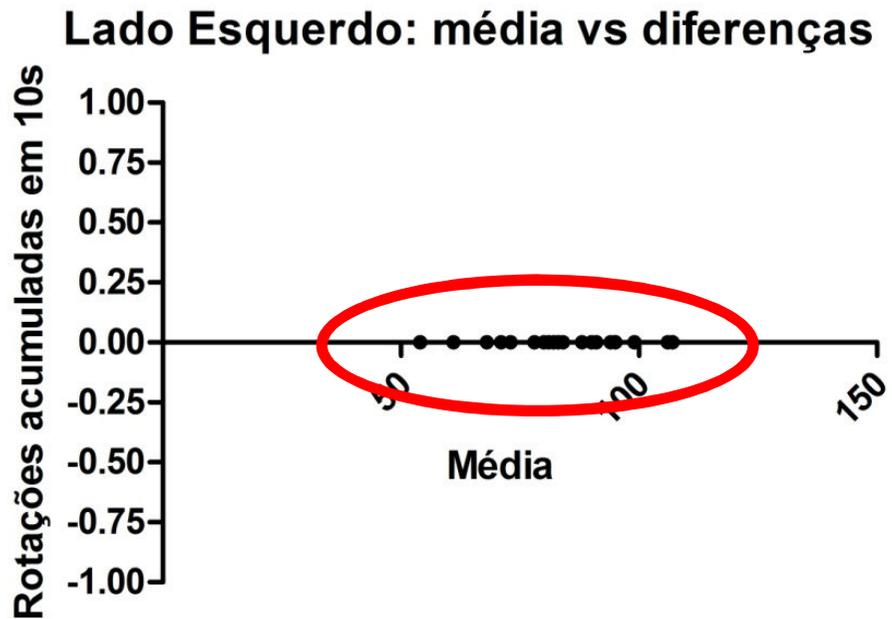
Performance and ergonomic perspective

- Results: right side



A New Equipment for Sports Performance and ergonomic perspective

- Results: left side



A New Equipment for Sports Performance and ergonomic perspective

- Future Perspectives:
- Children in sports;
- Electronics wheelchairs;
- Propulsion patterns in sports;
- News wheelchairs performance.



- **Acknowledgments:**
- **IPC;**
- **Athletes;**
- **UPE;**
- **EAD.**

