

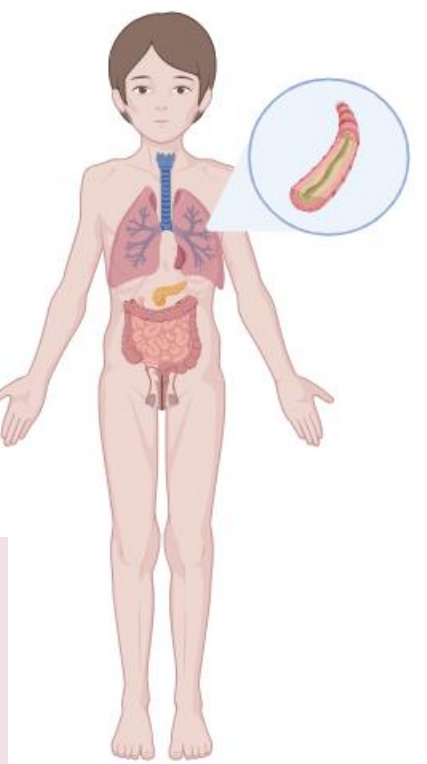
PROPOSITION OF OPTIMIZATION OF THE PROTOCOL TO MEASURE THE MAXIMUM STRENGTH OF THE LOWER LIMB WITH THE TAKEI DYNAMOMETER IN CHILDREN WITH PATHOLOGY.

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BACKGROUND / OBJECTIVE

- **Muscle health** is a critical issue in patients with pulmonary disease.
- It is **recommended** that **lower limb strength be assessed** as part of routine medical consultations.
- **Gold-standard protocols** are **expensive, heavy, voluminous** and **complicated**.
- **Takei-5002 dynamometer** is **portable** and **inexpensive**.
 - **Traditional measurement** protocols involve **biomechanically complex** and **difficult movements** for most people [1], and the need for some knowledge of strength-training. This can lead to **incorrect measurements** and **risk of injury**.



The **objective** of this study was to propose an adaptation of traditional protocols by adding a climbing harness to the Takei-5002 dynamometer to optimize the measurement of maximal lower extremity muscle strength using a biomechanically simple movement.

METHODS

Observational Study consisting of Spanish children and adolescents between 6 and 18 years of age with cystic fibrosis.

Maximal force (kg) assessments were performed on the Takei 5002 analogue dynamometer with two protocols.

Materials



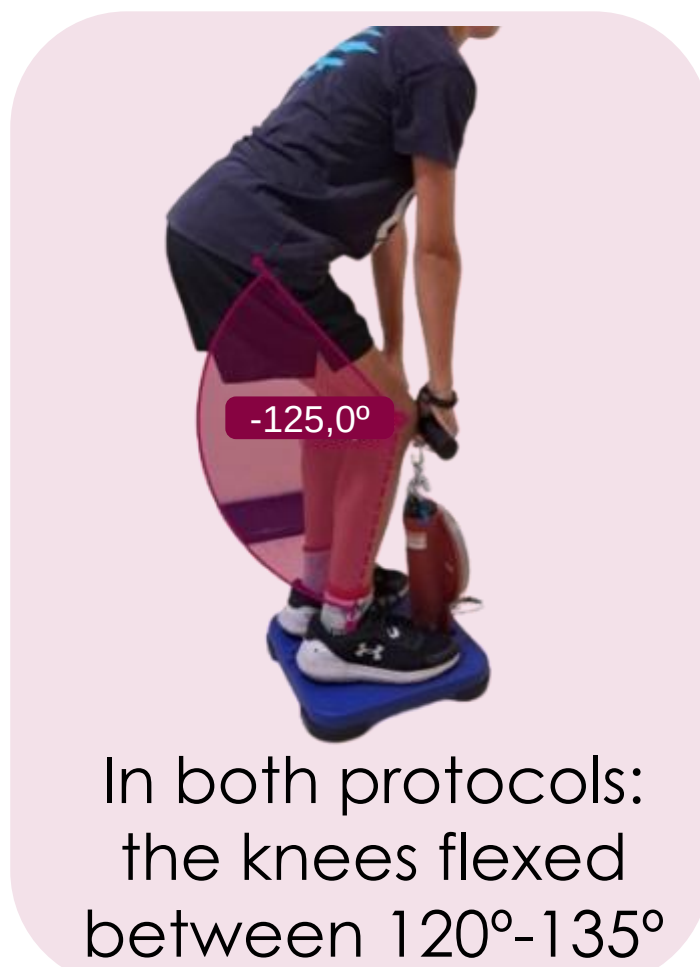
Dynamometer

- Takei 5002® Back Muscle Analogue Dynamometer, UK.
- Measures from >20 kg to 340 kg.



Harness

- Mammut Ophir Fast-Adjust®.



RESULTS



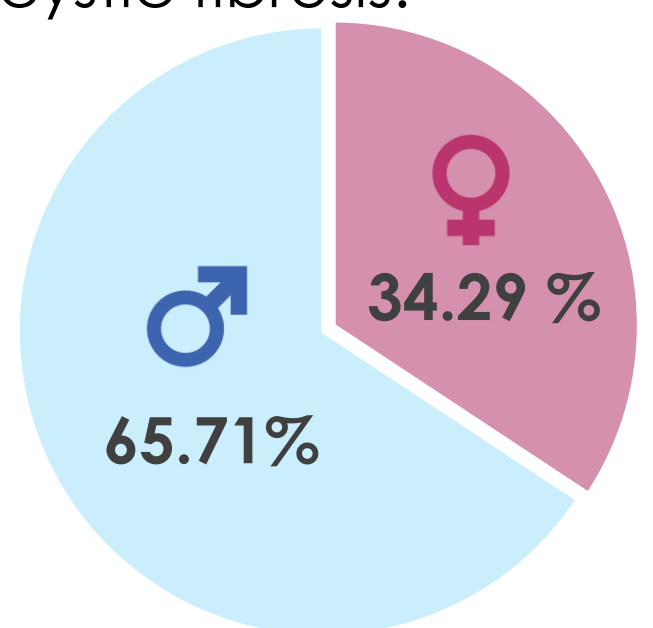
35 children and adolescents with cystic fibrosis.

AGE 12.76 ± 2.59 years

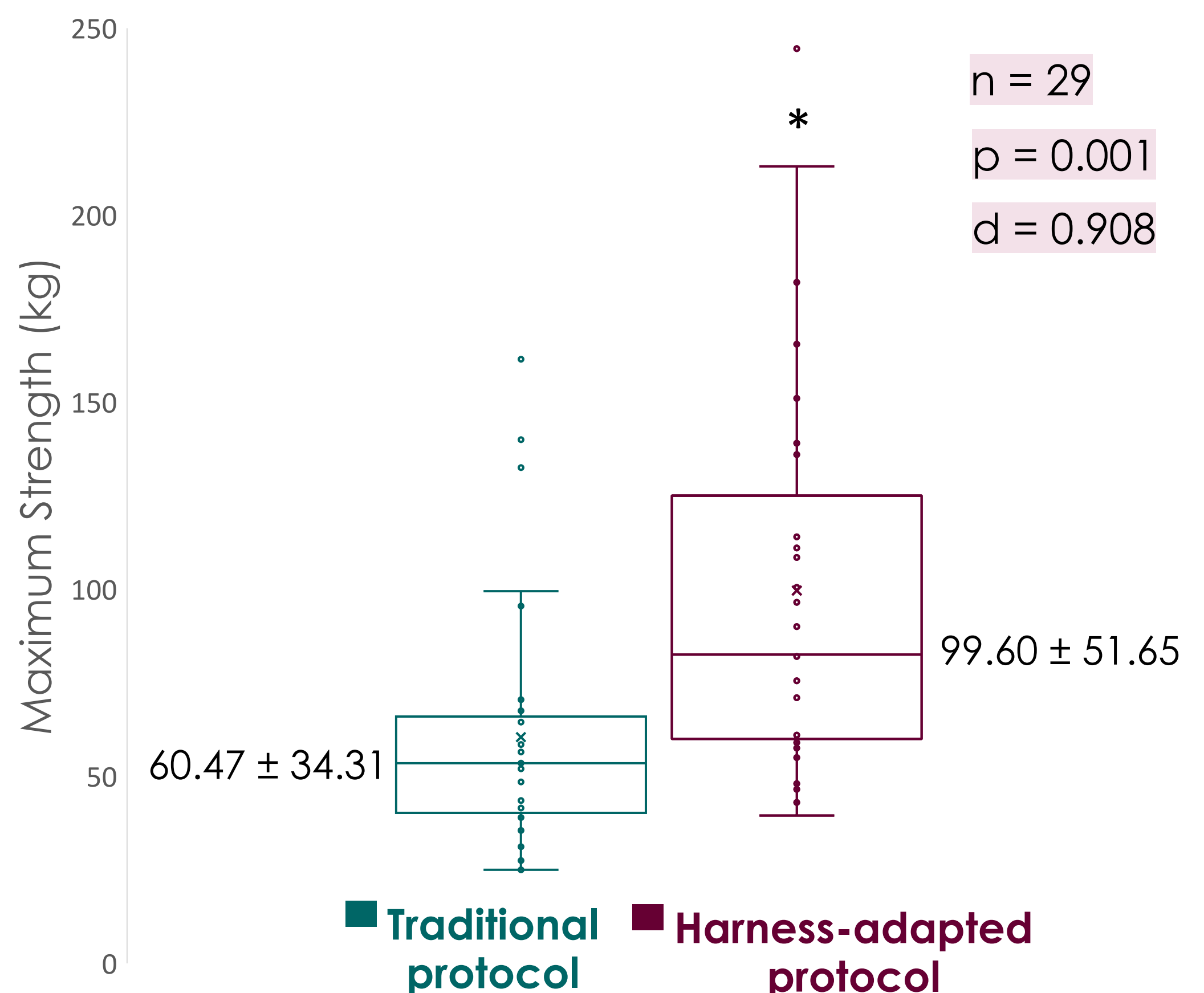
WEIGHT 42.42 ± 11.35 (kg)

HEIGHT 149.81 ± 11.35 (cm)

BMI z-score -0.05 ± 1.26 (kg · m⁻²)

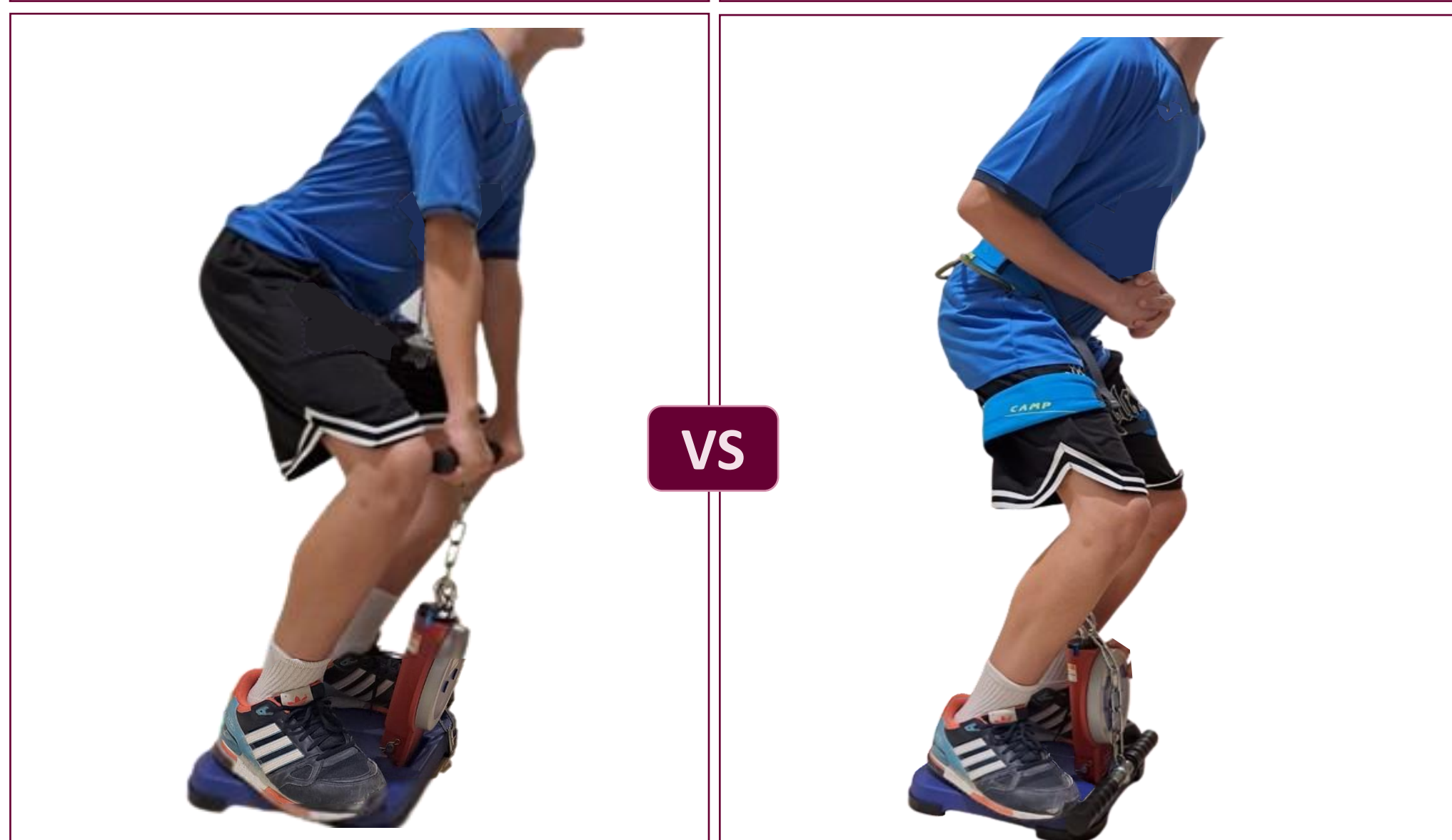


6 participants excluded due to not reaching <20 kg



TRADITIONAL PROTOCOL

HARNESS-ADAPTED PROTOCOLS



STATISTICAL ANALYSIS (SPSS v.29)



Descriptors and T test (p < 0.05)

Cohen's d effect size:

small 0.2-0.3; medium 0.5-0.8;
large ≥ 0.8

CONCLUSION

The proposed adaptation by adding a climbing harness to the Takei-5002 dynamometer allows the participants to obtain significantly higher results of the lower limbs strength. Thus, this adaptation permits more accurate measurement of maximum strength and may facilitates the assessment of lower limb muscles health during routine medical consultation, especially for children with pulmonary disease.

REFERENCES

1. Segovia-Martínez, Elsevier-España, 2007.

ACKNOWLEDGEMENTS

The authors would like to thank all subjects for their participation in the study. This research was funded by INSTITUTO SANITARIO CARLOS III, grant number ISCIII PI 23/00299. No individuals from the funding company have been involved in data collection, data analysis or writing the document. The authors declare no conflicts of interest.