Original article

# Anthropometric differences and maximal aerobic power among men and women in racing-boat rowing


**Beñat Larrinaga[1], Xabier Río[1], Aitor Coca[2], Manuel Rodriguez-Alonso[3], Ane Arbillaga-Etxarri[4]**

*[1]Universidad de Deusto. Facultad Educación y Deporte. Bilbao. Bizkaia. [2]Universidad Euneiz. Facultad de Ciencias de la Salud. Vitoria-Gasteiz. Álava. [3]NutriMaxPer. Trasona. Asturias. [4]Deusto Physical TherapIker. Departamento de Fisioterapia. Facultad de Ciencias de la Salud. Universidad de Deusto. Donostia-San Sebastián. Gipuzkoa.*



**doi:** 10.18176/archmeddeporte.00145

**Received:** 09/06/2022
**Accepted:** 28/04/2023



**Summary**

Anthropometric, mechanical and performance differences have been observed in rowing between rowers from the same club competing in different categories. Maximal aerobic power has been defined as one of the best predictors of rowing performance. The aim was to observe differences between male and female rowers in anthropometric, physiological and aerobic power data. Weight (P), height (T), fat percentage (G), sum of seven folds (S7) and absolute and relative watts (W) (W/kg) of 55 subjects were assessed. Of the 55 subjects, 38 were male (26.95 ±7.0 years) and 17 were female (24.82 ±6.8 years). Cohen's d was used to calculate the effect size as standardised mean difference. In the results, sample means were obtained for the variables analysed in the different sexes (F: females and M: males). For F: [P: 77.25 (9.41) - T: 1.80 (0.07) - G: 12.77 (3.04) - S7: 72.23 (28.20) - W: 273.6 (52.88) - W/kg: 3.57 (0.67)] and for M: [P: 61.79 (6.85 - T: 1.67 (0.07) - G: 14.44 (2.47)- S7: 103.83 (28.64) - W: 171.35 (29.19) - W/kg: 2.78 (0.43)]. Finally, the results were as follows: P: 1.77 - T: 1.87 - G: 0.57 - S7: 1.11 - W: 2.17 - W/kg: 1.28. Showing significant differences and a large effect size between both sexes in all the variables analysed, except for the fat percentage variable.



**Key words:**
Water Sports. Rowing. Physiology. Body composition


## Diferencias antropométricas y potencia aeróbica máxima entre hombres y mujeres en el remo de traineras


**Resumen**

En el remo de traineras se han observado diferencias antropométricas, mecánicas y de rendimiento entre remeros de un mismo club que competían en distintas categorías. La potencia aeróbica máxima se ha definido como uno de los mejores predictores del rendimiento en el remo. El objetivo fue observar diferencias entre de remeros y remeras en datos antropométricos, fisiológicos y de potencia aeróbica. Se evaluó el peso (P), la talla (T), el porcentaje graso (G), el sumatorio de siete pliegues (S7) y los vatios (W) absolutos y relativos (W/kg) de 55 sujetos. De los 55 sujetos, 38 fueron hombres (26,95 ±7,0 años) y 17 mujeres (24,82 años ±6,8). Para calcular el tamaño del efecto como diferencia de medias estandarizadas se utilizó la d de Cohen. En los resultados, se obtuvieron medias muestrales en las variables analizadas en los diferentes sexos (M: mujeres y H: hombres). Para H: [P: 77,25 (9,41) – T: 1,80 (0,07) – G: 12,77 (3,04) – S7: 72,23 (28,20) – W: 273,6 (52,88) – W/kg: 3,57 (0,67)] y para M: [P: 61,79 (6,85 - T: 1,67 (0,07) – G: 14,44 (2,47)- S7: 103,83 (28,64) – W: 171,35 (29,19) – W/kg: 2,78 (0,43)]. Finalmente los resultados fueron los siguientes: P: 1,77 – T: 1,87 – G: 0,57 – S7: 1,11 – W: 2,17 – W/kg: 1,28. Mostrando diferencias significativas y un tamaño del efecto grande entre ambos sexos en todas las variables analizadas, exceptuando la variable del porcentaje graso.



**Palabras clave:**
Deportes acuáticos. Remo. Fisiología. Composición corporal.



**Correspondence:** Beñat Larrinaga García
E-mail: benat.larrinaga@deusto.es

## Introduction

There are various competition modalities within fixed-seat rowing, depending on geographic location. On the one hand, along the coastline of the Bay of Biscay (French Basque Country, Spanish Basque Country, Cantabria, Asturias and Galicia) there are rowboats used for racing called batel, *trainerilla* and *trainera*,[1] while the Mediterranean regions have their own versions such as the *Falucho* in the Valencian Community, the *Llagut* in Catalonia, the *Jábegas* in Andalusia and the *Llaüt* which unifies the competitions in the three Mediterranean modalities[2].

In the Bay of Biscay, men have been competing in *trainera* competitions for many years,[3,4] although women did not take part in official *trainera* regattas until 2008.[5] Female participation in *trainera* regattas grew from that moment on as reflected in the number of female federated rowers, setting up and consolidating sporting structures and the number of boats that compete[6,7].

Physical performance is the most researched aspect of *trainera* rowing. Specifically, the maximal aerobic power (MAP), defined as the work intensity when achieving $VO_{2max}$,[8-10] was determined as one of the best predictors of rowing performance.[11-13] In addition, articles have been published recently which demonstrate performance differences between genders.[14-16] As demonstrated in other sports, this parameter is also useful in rowing due to the simplicity attributed to it when designing, controlling and performing the training[17-19].

Anthropometric and mechanical analysis was also carried out in this sport, as previous studies had determined them both as performance predictors,[13] even pinpointing differences between rowers in the same club who compete in different categories.[4,20] In addition, body mass has been shown to be performance-related.[20,21] Furthermore, regarding *trainera* rowing, physiological and anthropometric differences have been observed between the different categories in the Bay of Biscay *trainera* leagues[18] (Asociación de Clubes del Cantábrico (ACT), Asociación de Remo del Cantábrico (ARC1) and its subsidiary (ARC2).

Regarding female rowers, as far as we know, no study has analysed the physiological or performance aspects among the different categories in the *Liga Euskotren, Asociación de Traineras de Mujeres* (ETE) and *Liga Gallega de Traineras* (LGT) rowing leagues. However, there are studies which determine differences between genders in other rowing disciplines.[15,16] Therefore, it can be asserted that research into female trainera rowing has not accompanied increased participation in this sport[14].

Considering all the above, the aim of this paper was to analyse and compare MAP and anthropometric differences between the different categories and gender of *trainera* rowing.

## Material and method

### Design and participants

In the cross-sectional observational study, 55 subjects were recruited from Level 3 highly trained/national level,[22] 38 men (26.9 ± 7.0 years old) divided into two categories (ARC1 = 18; ARC2 = 21) and 17 women from the ETE category (24.8 ± 6.8 years old). The measurements were taken in the rowing club facilities during the months of the general preparatory phase before the *trainera* season. To be precise, the data was compiled in January, after 11 weeks of general strength training and aerobic work. The participants freely agreed to have measurements taken, as routine tests carried out during season preparation, so the subjects were familiar with the tests they were going to take.

The study was approved by the Ethics Committee of the Ramón Llull University (reference 1920005D) and each participant gave their informed consent in writing before it began.

### Variables, measuring instruments and procedures

Body composition was defined by weight (P), height (T), fat percentage (G), body mass index (BMI) and the sum of seven skinfolds (S7). This was done by using a mechanical column scale with a height rod (Año Sayol SL 150 KGS- Medical Weighing Scales) and a Holtain skinfold calliper (HOL-98610ND - precision of 0.2 mm). These tests were carried out on all participants in the same time slot (4:00 to 7:00 pm), using the method from the International Society for the Advancement of Kinanthropometry[23] and always by the same trained, experienced person. To calculate the fat percentage, Faulkner's equation was used, derived from the Yuhasz's equation [% Fat Weight = 0.153*(Triceps fold + Subscapular fold + Suprailiac fold + Abdominal fold) + 5.783].[23] The S7 was obtained using the 7-site skinfold equation, which is determined by adding the following seven skinfolds: biceps, triceps, subscapular, suprailiac, abdominal, quadriceps and calf[24].

The mechanical parameters were defined by the absolute power (W) and power relative to the weight (W/kg). To do this, a test was performed lasting up to 4 minutes on a Concept 2 indoor rower (Model D, Morrisville, VT, USA) modified for fixed seat.[18,25] Before the maximal test, there was a prior warm-up lasting 20 minutes,[26,27] broken down into 4 x 4-minute sessions, increasing the power in each session simulating the total volume of the maximal test, with one minute's rest and total recovery before performing the last stage,[28] so that the system can fully recover before maximal effort. This last maximal 4-minute stage[29-33] determined the MAP, noting the average power. The resistance from the Drag Factor was 140 in men[34] and 120 in women, as women have less body mass, so the drag factor must be adjusted accordingly[35].

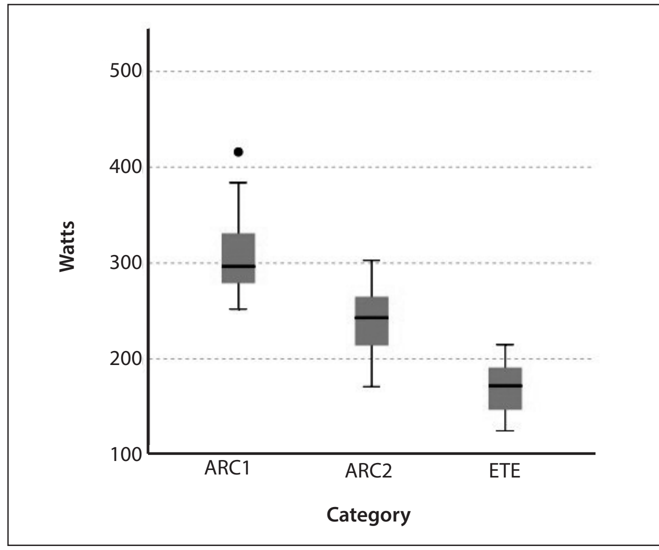
### Statistical analysis

The IBM SPSS Statistics software (version 26) was used to analyse the variables. The quantitative variables are presented as means and standard deviation. Due to the small sample size and the high variance within the group, non-parametric tests were performed to analyse the data. The Mann-Whitney U test for independent samples was performed to analyse gender differences in the P, T, G, S7, W and W/kg variables. The Kruskal-Wallis test was used to analyse differences in the variables between the categories. Furthermore, Spearman correlations were made between the gender, category, P, T, S7, W and W/Kg variables. The size of the effect was calculated using Cohen's d to analyse the standardised mean difference (SMD); an effect size of 0.2-0.49 would be considered small, 0.5-0.79 moderate and 0.8 or above as high[36].

## Results

Table 1 shows the descriptive data for the sample being analysed, with significant differences in the average Watts between categories (Figure 1). Significant differences are also seen between ARC1-ARC2 in absolute power (W) (p <0.00) and relative power (W/Kg) (p <0.00), between ARC1-ETE in absolute power (p 0.00) and relative power (p <0.00) and between ARC2-ETE in absolute power (p <0.00), on the contrary, ARC2-ETE did not show significant differences in relative power (p <0.07). Cohen's d demonstrates high differences between genders in all the variables analysed, excluding the G variable (P = 1.77; T = 1.87; G = -0.57; S7 = -1.11; W = 2.17 and W/Kg = 1.28) (Table 2).

**Figure 1. Difference in Watts between categories**




*p<0,05.

## Discussion

This study analysed and compared the anthropometric profile and the body composition in male and female *trainera* rowers, and the role of these variables in predicting rowing performance. Our results concur with other researchers that variables such as T[24] and G are decisive for the MAP,[15,25] as this is a priority indicator for good results in this discipline.[6-26] On the other hand, like other authors, differences were seen in the MAP in different male categories[18] and between genders[16,37]. The differences in MAP production are similar to results obtained in the study by Penichet-Tomas et al. (2023), where the differences between male and female rowers was 105.5 W compared to 102.3 W, as observed in this study. Furthermore, it is well-known that morphological characteristics are just as decisive in success in this sport.[38,39] Our study seems to confirm this evidence, observing significant correlations for the power generated with the morphological variables analysed (T vs W/Kg = 0.31; T vs W = 0.67; P vs W = 0.60).

It is known that women have a higher fat percentage than men, even at birth.40 The results show a negative correlation between the fat percentage both in the W (r = -0.42) and in the W/Kg (r = -0.51)

**Table 1. Average values per category.**

| Category | N | Weight | Height | Age | BMI | S7 | Fat | W | W/Kg |
|---|---|---|---|---|---|---|---|---|---|
| ARC1 (1) | 18 | 79.13 (9.65) | 1.83 (0.07)[3] | 31.00 (6.49)[2,3] | 23.44 (1.59) | 68.22 (15.68)[3] | 12.53 (1.89)[3] | 309.22 (42.95)[2,3] | 3.93 (0.46)[2,3] |
| ARC2 (2) | 21 | 75.55 (9.08)[3] | 1.78 (0.05)[3] | 23.30 (5.37)[1] | 23.80 (2.58) | 75.85 (36.06)[3] | 12.99 (3.84)[3] | 241.55 (38.87)[1,3] | 3.25 (0.68)[1] |
| ETE (3) | 17 | 61.79 (6.85)[2] | 1.67 (0.07) | 24.82 (6.83) | 22.11 (2.29) | 103.83 (28.64) | 14.44 (2.47) | 171.35 (29.19)[1,2] | 2.78 (0.43)[1] |

Data presented as means and standard deviation. [1-2-3]. Significant differences (p <0.05) between categories.

**Table 2. Differences between genders.**

| | Men | Women | Differences | Cohen's *d* | *p*-value |
|---|---|---|---|---|---|
| Weight | 77.25 (9.41) | 61.79 (6.85) | 15.46 | 1.77 | <.001 |
| Height | 1.80 (0.07) | 1.67 (0.07) | 0.13 | 1.87 | <.001 |
| BMI | 23.63 (2.15) | 22.11 (2.29) | 1.52 | 0.69 | 0.10 |
| Fat percentage | 12.77 (3.04) | 14.44 (2.47) | -1.67 | -0.57 | 0.01 |
| S7 | 72.23 (28.2) | 103.83 (28.4) | -31.60 | -1.11 | <.001 |
| Watts | 273.60 (52.88) | 171.35 (29.19) | 102.25 | 2.17 | <.001 |
| W/kg | 3.57 (0.67) | 2.78 (0.43) | 0.79 | 1.28 | <.001 |

**Table 3. Correlations between variables.**

| Gender | Category | Weight (P) | Height (T) | Folds (S7) | Absolute (W) | Relative (W/Kg) | |
|---|---|---|---|---|---|---|---|
| Gender - | | | | | | | |
| Category | 0.85** | - | | | | | |
| P | -0.64** | -0.61** | - | | | | |
| T | -0.66** | -0.68** | 0.78** | - | | | |
| S7 | 0.46** | 0.44** | -0.00 | 0.40** | - | | |
| W | -0.71** | -0.83** | 0.60** | 0.67** | -0.42** | - | |
| W/Kg | -0.51** | -0.65** | 0.10 | 0.31* | -0.51** | 0.84** | - |

*Significance at $p<0.05$ - ** Significance at $p <0.01$

**Table 4. Differences between genders.**

| Results | Men | Women | Differences | Cohen's *d* |
|---|---|---|---|---|
| Weight | 77.25 (9.41) | 61.79 (6.85) | 15.46 | 1.90 |
| Height | 1.80 (0.07) | 1.67 (0.07) | 0.13 | 1.85 |
| Fat percentage | 12.77 (3.04) | 14.44 (2.47) | -1.67 | -0.60 |
| S7 | 72.23 (28.2) | 103.83 (28.4) | -31.60 | -1.11 |
| Watts | 273.6 (52.88) | 171.35 (29.19) | 102.25 | 2.49 |
| W/kg | 3.57 (0.67) | 2.78 (0.43) | 0.79 | 1.43 |

(Table 3), so it seems that a low-fat percentage is beneficial to improve sporting performance.[38] These results in the anthropometric differences concur with other studies,[18] which conclude that controlling body mass in relation to the lean mass and the fat percentage could be decisive to achieve greater success in this sport, where there is inverse association between the evolution of anthropometric and physiological parameters.[15] In concordance with the study by Podstawki *et al*., (2022) significant differences were seen in anthropometric and mechanical characteristics (P, T, G, S7, W, W/kg <0.001).

This suggests new research on comparing different performance-related values and variables between men and women in the *trainera* rowing sport, as some studies have demonstrated differences in the kinematic parameters for the rowing technique.[41,42] Our results indicate a high effect size between men and women in the power and body composition variables (Table 4), so that male rowers seem to produce more power than female rowers in consonance with other studies.[2,42]

On the other hand, as might be expected,[4,18] significant differences can be seen when analysing the composition categories in the performance parameters, giving higher levels in the highest-level category (Table 1).

The gender-related differences observed in the fixed-seat sport[43] suggest the need to run an analysis which might improve the trainera design for women, as the physiological and anthropometric needs of female rowers seem to clearly differ from their male counterparts. If the distances, performance and body composition differ between genders, it is clear that the boat should be reviewed.

## Conclusions

Traditional male rowers were significantly taller and heavier than their female counterparts, with higher values in absolute and relative power. Furthermore, women demonstrated a higher sum of skin folds, and a higher percentage of fat. Consequently, it is recommended to consider the training methodology and adjust boats to the sexual dimorphism noted between male and female rowers.

### Conflicts of interest

The authors declare that there is no conflict of interest.

## Bibliography


1. Urdampilleta A, León-Guereño P. Análisis de las capacidades condicionales y niveles de entrenamiento para el rendimiento en el remo de banco fijo. *Lect. educ. fís. deportes.* 2012;17;1-7.
2. Penichet-Tomás A. Análisis de los factores de rendimiento en remeros de modalidades no olímpicas: Yola y llaüt. Diss. Universitat d'Alacant-Universidad de Alicante. 2016.
3. Zulaika, LM. Unidad didáctica de un deporte tradicional en el área de educación física. Remo en banco fijo. La formación inicial del profesorado de Educación Física ante el reto europeo.
4. Izquierdo-Gabarren M, de Txabarri Expósito RG, de Villarreal ESS, Izquierdo M. Physiological factors to predict on traditional rowing performance. *Eur J Appl Physiol.* 2009;108, 83.
5. Obregón-Sierra Á. Evolución del número de regatas de traineras (1939-2019). Evolution of the number of traineras races (1939-2019). *Materiales para la Historia del Deporte.* 2020;20;84-93.
6. Ayuntamiento de Donostia. Donostia Kultura. 2016.
7. Federación Guipuzkoana de Remo.
8. García Manso JM, Navarro F, Legido JC, Vitoria M. *La resistencia desde la óptica de las ciencias aplicadas al entrenamiento deportivo.* Madrid. Editorial Grada SportBooks; 2006.
9. Daniels J, Scardina N. Interval training and performance. *Sports Med.* 1984;1;327–34.
10. Volkov N, Shirkovets E, Borilkevich V. Assessment of aerobic and anaerobic capacity of athletes in treadmill running tests. *Eur J Appl Physiol Occup Physiol.* 1975;4;121–30.
11. Cosgrove M, Wilson J, Watt D, Grant S. The relationship between selected physiological variables of rowers and rowing performance as determined by a 2000 m ergometer test. *J Sports Sci.* 1999;17;845–52.
12. Riechman S, Zoeller R, Balasekaran G, Goss F, Robertson, R. Prediction of 2000 m indoor rowing performance using a 30 s sprint and maximal oxygen uptake. *J Sports Sci.* 2002;20;681–7.
13. Sebastia-Amat S, Penichet-Tomas A, Jimenez-Olmedo JM, Pueo B. Contributions of Anthropometric and Strength Determinants to Estimate 2000 m Ergometer Performance in Traditional Rowing. *Appl. Sci.* 2020;10;6562.

14. Lawton TW, Cronin JB, McGuigan MR. Strength, Power, and Muscular Endurance Exercise and Elite Rowing Ergometer Performance. *J. Strength Cond. Res*. 2013;27;1928–35.

15. Podstawski R, Borysławski K, Katona ZB, Alföldi Z, Boraczyński M, Jaszczur-Nowicki J, *et al.* Sex Differences in Anthropometric and Physiological Profiles of Hungarian Rowers of Different Ages. *Int. J. Environ. Res. Public Health.* 2022;19;8115.

16. Penichet-Tomas A, Jimenez-Olmedo JM, Pueo B, Olaya-Cuartero J. Physiological and Mechanical Responses to a Graded Exercise Test in Traditional Rowing. *Int. J. Environ. Res. Public Health.* 2023;20;3664.

17. García Manso JM, Navarro F, Legido JC, Vitoria M. *La resistencia desde la óptica de las ciencias aplicadas al entrenamiento deportivo*. Madrid. Editorial Grada SportBooks; 2006.

18. Elorza IG. *Análisis y comparación de remeros de distinta categoría y el entrenamiento en el remo de traineras*. Doctoral dissertation, Universidad del País Vasco-Euskal Herriko Unibertsitatea. 2017.

19. Joyner MJ. Physiological limits to endurance exercise performance: influence of sex. *J. Physiol*. 2017;595;2949-54.

20. Bourgois J, Claessens AL, Vrijens J, Philippaerts R, Van Renterghem B, Thomis M, *et al.* Anthropometric characteristics of elite male junior rowers. *Br. J. Sports Med*. 2000;34, 213–6.

21. Aramendi JM. Remo olímpico y remo tradicional: aspectos biomecánicos, fisiológicos y nutricionales. *Arch. Med. Deporte*. 2014;159;51-9.

22. McKay AKA, Stellingwerff T, Smith ES, Martin DT, Mujika I, Goosey-Tolfrey VL, *et al.* Defining training and performance caliber: a participant classification framework. *Int. J. Sports Physiol. Perform*. 2022;17;317–31

23. Marfell-Jones M, Olds T, Stewart A, Carter L. *International standards for anthropometric assessment.* ISAK. Holbrooks: National library of Australia. 2001.

24. Ramón J, Cruz A, Dolores M, Porta J. *Protocolo de valoración de la composición corporal para el reconocimiento médico-deportivo*. Documento de Consenso del Grupo Español de Cineantropometría de la Federación Española de Medicina del Deporte. 2009.

25. Arrizabalaga R, Aramendi JF, Samaniego JC, Gallego E, Emparanza JI. ¿Cuál es el "Drag Factor" del Concept 2 que mejor simula el remo en trainera? *Arch. Med. Deporte.* 2007;24;245–52.

26. Stromme SB, Ingjer F, Meen HD. Assessment of maximal aerobic power in specifically trained athletes. *J. Appl. Physiol.*1997;42;833-7.

27. Barranco-Gil D, Alejo LB, Valenzuela PL, Gil-Cabrera J, Montalvo-Pérez A, Talavera E, *et al.* Warming Up Before a 20-Minute Endurance Effort: Is It Really Worth It? *Int J Sports Physiol Perform*. 2020;17;1-7.

28. Jambassi FJC, Gurjão ALD, Prado AKG, Gallo Luiza H, Gobbi S. Acute Effects of Different Rest Intervals Between Sets of Resistance Exercise on Neuromuscular Fatigue in Trained Older Women. *J Strength Cond.* 2020;34;2235-40.

29. Lacour JR, Padilla-Magunacelaya S, Barthélémy JC, Dormois D. The energetics of middle-distance running. *Europ. J. Appl. Physiol*.1990;60;38–43.

30. Cunningham LN. Relationship of running economy, ventilatory threshold, and maximal oxygen consumption to running performance in high school females. *Res. Q. Exerc. Sport.* 1990;61;369-74.

31. Berthoin S, Gerbeaux M, Turpin E, Guerrin F, Lensel-Corbeil G, Vandendorpe F. Comparison of two field tests to estimate maximum aerobic speed. *J Sports Sci*.1994;12;355-62.

32. Berthon P, Fellmann N. General review of maximal aerobic velocity measurement at laboratory: Proposition of a new simplified protocol for maximal aerobic velocity assessment. *J Sports Med Phys Fitness.* 2002;42;257.

33. Davis JA. Anaerobic threshold: review of the concept and directions for future research. *Med Sci Sports Exerc.* 1985;7;6-21.

34. Ingham SA, Whyte GP, Jones K, Nevill AM. Determinants of 2,000 m rowing ergometer performance in elite rowers. *Eur J Appl Physiol*. 2002;88;243.

35. Nevill AM, Beech C, Holder RL, Wyon M. Scaling concept II rowing ergometer performance for differences in body mass to better reflect rowing in water. *Scand J Med Sci Sports.* 2010;20;122-7.

36. Cohen J. *Statistical power analysis for the behavioral sciences* (2a ed.). Erlbaum, Hillsdale; 1998.

37. Seiler KS, Spirduso WW, Martín, JC. Gender differences in rowing performance and power with aging. *Med Sci Sports Exerc.* 1998;30;121-7.

38. León-Guereño P, Otegui AU, Zourdos MC, Ayuso JM. Anthropometric profile, body composition and somatotype in elite traditional rowers: A cross-sectional study. Re. *Espanola de Nutr Hum y Diet*. 2018;22;279-86.

39. Sablic T, Versic S, Uljevic O. association of motor abilities and morphological characteristics with results on a rowing ergometer. *Sport Mont.* 2021;19;3-6.

40. Lutz TL, Burton AE, Hyett JA, McGeechan K, Gordon A. A hospital-based cohort study of gender and gestational age-specific body fat percentage at birth. *Pediatr. Res.* 2021;89;231-7.

41. Ng L, Campbell A, Burnett A, O'Sullivan P. Gender differences in trunk and pelvic kinematics during prolonged ergometer rowing in adolescents. *J. Appl. Biomech.* 2013;29;180-7.

42. McGregor AH, Patankar ZS, Bull AMJ. Do men and women row differently? A spinal kinematic and force perspective. *Proc Inst Mech Eng P J Sport Eng Technol.* 2008;222;77-83.

43. Penichet-Tomas A, Pueo B, Selles-Perez S, Jimenez-Olmedo JM. Analysis of anthropometric and body composition profile in male and female traditional rowers. *Int J Environ Res Public Health.* 2021;18:7826.