VOGA & CARE

MANUAL

Co-funded by the
Erasmus+ Programme
of the European Union

Francisco José Borrego Balsalobre

Salvador Angosto

UNIVERSITY OF MURCIA

2023

INDEX

CHAPTER 1. State of the art and systematic review

Introduction

Rowing is a cyclical water sport that involves moving a boat on the water using one or more oars. It is a universal activity practised since the beginning of time wherever there is a suitable water surface. Until the advent of sails and the steam engine, rowing was the most widely used and safest method of transport on water (EcuRed, 2020).

The origin of rowing is very ancient and there are no references to its beginnings. In Ancient Egypt, on the Nile and in Greece, among others, there are known boats that were moved by oars, but there are not many details about them. However, rowing as a sport emerged in Great Britain during the 17th century, as an activity reserved for the high nobility of British society, and subsequently spread to other European countries (Spanish Rowing Federation, 2014).

The first rowing clubs founded outside England emerged during the 19th century, in fact, in countries such as Spain, Portugal and Argentina there are still rowing clubs founded in the 19th century (Aragon Rowing Federation, 2021). The emergence of clubs and associations quickly led to the creation of national federations and, subsequently, of FISA (International Rowing Federation), which was founded in 1892 (Lóriga et al., 2020). En in Spain, the national federation (FER) was founded later, in 1918, at the headquarters of the Barcelona Maritime Club.

Rowing has been on the Olympic programme since its first edition (Athens 1896, although the races had to be cancelled due to bad weather). In its beginnings rowing was a sport exclusively for men, it was not until the Montreal Olympics (1976) that the women's categories made their debut. Men competed in 2000 metres and women competed in 1000 metres (until 1984) (Aragon Rowing Federation, 2021).

Regattas classified as light are for rowers weighing no more than 59 kg and for rowers weighing no more than 72.5 kg. All athletes must be weighed between one and two hours before a race, in case of exceeding this weight, they could not participate in the regatta (Muniesa & Diaz, 2010). Olympic rowing boats are divided into sculls and sculling boats.

The first are those in which each paddler uses two paddles. These oars are about three metres long and weigh a little less than 2 kg each. In terms of modalities, we find the Scull Individual,

which is a boat with a single crew member and two oars. The Double Scull, with two crew and two oars each, and the Double Scull Light, also with two crew and two oars each.

As for the second type mentioned, the point boats are those in which each rower uses a single long oar, measuring between 3.75 m and 3.85 m and weighing 3 kg. There are five modalities of point rowing: cough without coxswain, two with coxswain, four sculls, four without coxswain and eight with coxswain. All of them are contested in the men's and women's categories. (Madrid Rowing Federation, 2020).

The rower stands with his or her back in the direction of travel on a movable seat, which allows the efficient application of the force and movement of the legs. The athlete manages to move the boat by applying the force and momentum of his body on the oar(s), which, when resting on the water, transfer movement to the boat. (Federation Aragonesa from rowing, 2021).

The athlete uses both hands to operate the oar and performs a continuous stroke cycle, which is divided into the "grip", which occurs when the blade enters the water behind the rower; at that instant the knees are bent and close to the chest, the torso is leaning forward and the arms are extended. The "thrust" phase is the propulsive phase, in which the legs push against the footrests, forcing backwards on the movable seat as the blade moves across the surface of the water.

Once the seat reaches its most forward position, the paddler leans back and finishes the stroke with the arms. Then, due to the inertia of the movement, the hands are brought to the chest to finish the stroke. Finally, the "recovery" phase, in which the paddler's hands separate from the body, then the torso returns to the starting position and the knees flex as the athlete slides towards the stern (The Editors of Encyclopaedia, 2019).

Optimal rowing technique involves harmonisation of muscular effort between the legs, back, shoulders and arms, as well as coordinated movement between the rowers and the boat (Liu et al., 2020).

The propulsive force is responsible for the movement of the boat, and is directly dependent on the power generated through the movement of the arms, which pull the oars towards the body. However, this force is directly influenced by the legs, which push to generate reaction force. Therefore, it can be said that rowing speed depends on how much leg pressure force the rower

is able to exert and how this is coordinated with the force generated by the upper body (Liu et al., 2020).

Furthermore, Liu et al. (2020) also state that "joint flexibility is critical, as it allows the muscle groups to function properly throughout the regatta. In addition to coordinating muscle groups, stroke rhythm plays a key role in determining stroke frequency and the number of strokes required during a regatta" (p. 2).

Since the mid-20th century, the sport has evolved from a global recreational practice to an activity that is essential for the recognition of any nation at the international level (Camelo-Suan et al., 2019). The causes of this phenomenon are multifactorial, including the current importance of sporting success in society, the public perception of the value of elite sporting competition and the financial rewards for athletes that this brings (Feeley et al., 2016).

It is therefore becoming increasingly important and necessary to research and identify talent at an early age, as this could be a decisive factor in the preparation and specialisation of athletes in order to achieve high-level results.

Depending on the approach taken, the concept of sporting talent will be defined from two different points of view, the term talent itself, and endowment, which is oriented towards the abilities that the athlete brings with him or her from birth. According to Gagné (2009), "Endowment is the possession and use of outstanding natural abilities" (p. 01).

The second point of view, according to several authors, refers to the skills that athletes have acquired during the training processes (Camelo-Suan et al., 2019). The detection of sporting talent is considered a very complex task, which is the responsibility of physical activity and sport professionals (García-Soler, 2014). Manso (1996) refers to the six categories of talent established by Rice (1970): academic, creative, psychosocial, performing arts, athletic and perceptual-motor talent.

In addition, innate talent and its influence must be taken into account. Innate or natural talent, unlike learned talent, is that which the individual can stop exercising for a long time, and use it again with the same skill as when he or she stopped using it; learned talent, on the other hand, requires continuous work in order not to lose the skill (García-Soler, 2014).

According to Hahn (1988), there are three types of talents: general motor talent, which is the ability of a person to learn a wide range of motor tasks of a certain difficulty, general sport talent, which occurs in a person with great general motor talent and willingness to undertake a training programme, and finally, sport specific talent which refers to performance in a certain sport modality.

For certain authors such as Cazorla (1983) and Salmela (1997), talent detection is an essential factor for sport selection, which allows for the creation of a rational, systematic, phased and planned medium- and long-term talent detection programme that would highlight the material, psychological, sociological and biological requirements of a particular sport for a high level of sport performance.

From the introduction and implementation of these programmes, the most outstanding skills of a sport are selected and then comes the process of selecting and training the athlete, based on the systematisation of training programmes to be able to monitor and thus control the talent identified and turn it into a high performance athlete (García-Soler, 2014).

It should be noted that each sport has specific and different requirements, even within the same sport, depending also on the modality and distance, so different criteria are used to identify promising young athletes.

The review focuses specifically on the sport of rowing. This sport is one of the most complete, due to its high muscular involvement and the aerobic energy demands it requires. It involves approximately 70% of skeletal muscle tissue during a single stroke cycle (Manna, 2018).

Rowing is considered an endurance sport, as there is a close relationship between performance in this sport and the aerobic capacity of the rowers, as the races are performed over a distance of 2000 metres which involves approximately 6 minutes of effort at medium intensity (Cosgrove et al., 1999; Kramer et al., 1994; Yoshiga and Higuchi, 2003). According to Secher (1973) "rowing performance depends on the functional capacity of aerobic and anaerobic energy pathways" (p.195). The amount of energy derived from anaerobic metabolism amounts to 21-30% (Secher, 1993) and 70-86% from aerobic metabolism (Messonnier et al., 1997).

In recent decades, rowing preparation methods have been moving towards more similar models due to the advancement of science and technology. As a result, rowing performance in

international competitions is increasing exponentially. However, there is room for further improvement (Liu et al., 2020). The first step to gain an advantage on the race track could be the selection of rowing athletes at an early age, in order to periodise more specific preparation in the long term.

Many studies report that rowing performance is influenced by, among other factors, biomechanics, rower physiology, the force generated and rower stroke style (Yusof et al., 2020). In addition, stroke distance, stroke rhythm, stroke tempo, stroke power and stroke technique control could be used as crucial criteria to assess a rower's skills (Liu et al., 2020).

Talent selection in rowing is often guided exclusively by physiological and anthropometric variables, as during races, the amount of energy provided by different energy pathways is outstanding (Treff et al., 2021). However, psychological variables are also considered to be important contributors to the development of talent and achievement-motivated performance patterns. Furthermore, it seems that the consideration of these achievement-motivated performance methods in the selection of promising young players is promising for future performance (Schmid et al., 2021).

According to León-Guereño et al. (2018) "Given the importance of body composition in sports performance, it is vital to have references from elite athletes to serve as a guide when monitoring diet and training" (p. 280). All of the aforementioned constructs are decisive in the selection of the group of young people who will form the Spanish team participating in the inclusion programme through the European VOGA&SHARE project.

Research Methodology

Search strategy

This systematic review was conducted following the Prisma in Exercise, Rehabilitation, Sports medicine, and SporTs science (PERSiST) guidelines (Ardern et al., 2022). These guidelines are an adaptation to the context of sports medicine, rehabilitation and sports science of the Prisma 2020 statements proposed by Page et al. (2021).

The protocol for this review has been established in the methodology of this study itself, as, given the characteristics of this non-health systematic review, the PROSPERO platform advised against its registration as it did not meet its criteria for registering systematic review protocols.

Inclusion and exclusion criteria

The review included peer-reviewed empirical articles, and grey literature was not considered. The inclusion criteria for the search articles were:

- Journal articles or academic papers;
- Quantitative, qualitative or theoretical studies;
- Articles addressing some of the areas of interest on rowing;
- Population of coaches or youth athletes;
- Articles in English, Portuguese or Spanish; and
- Articles published from the year 2010 onwards.

The exclusion criteria applied were:

- Reviews, abstracts, Book chapters or books;
- Articles published before 2010;
- Studies not related to rowing or it is focus on health field or injury;
- Duplicate articles.

Search strategy and results

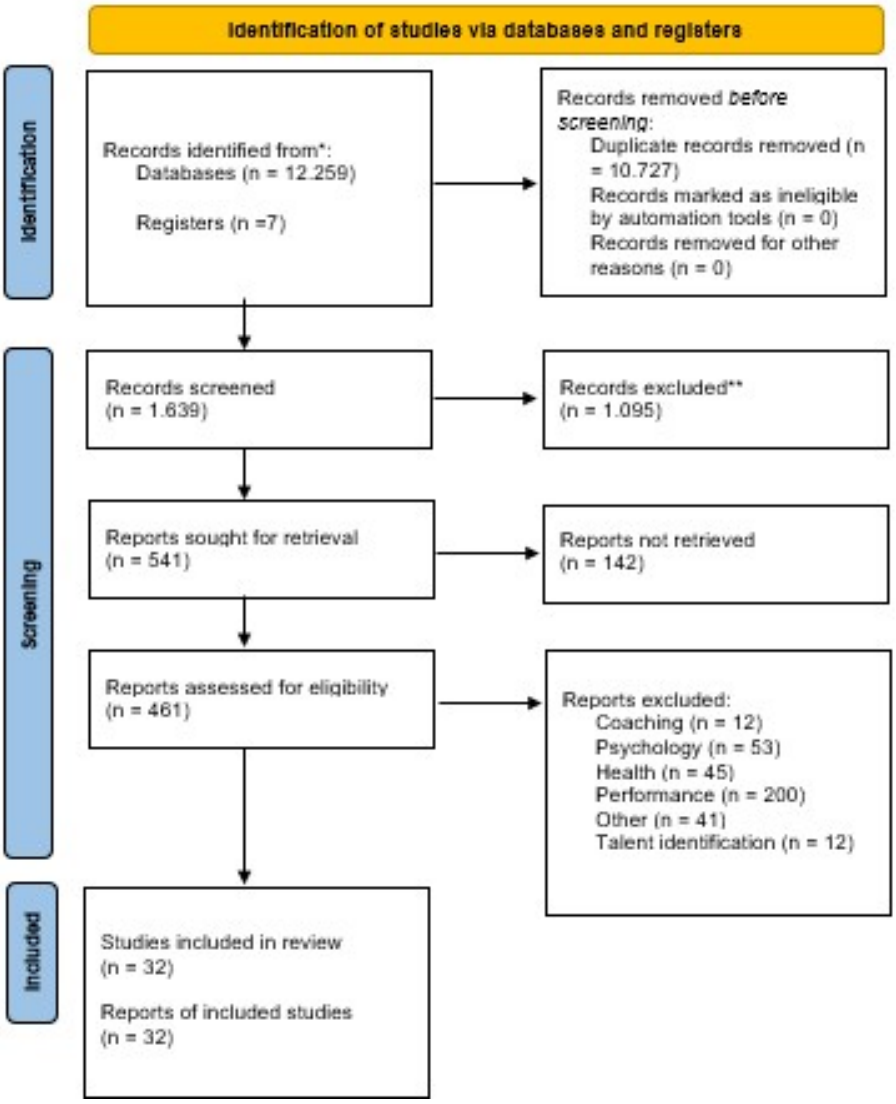
This study is based on a systematic review in six databases: PubMed, Web of Science, Proquest, Scopus, PsycINFO and SPORTDiscus (Figure 1). Three groups of terms were established for the search protocol: i) terms related rowing, ii) subject, and iii) other variables. The search terms used

for the databases used were a combination of those represented in Table 1. The search was conducted between March and May 2021 and updated between January and March 2022.

Table 1. Search category and terms.

Search Category	Search terms
Rowing	*("rowing*" OR "rower*")*
Sample	(Coach* OR trainer OR teach* OR instruct*) (Athlete* OR Young* OR player* OR child*)
Other variables	(psychol* OR "psychological health" OR mental) (performance OR beneficts OR training) (coach* OR "coaching strategies" OR skill*) (education* OR school* OR youth OR mentoring) (support OR inclusion OR integration) (sustianab* OR environment* OR polic*)
Combination	1 and 2 and 3 and 4

Figure 1 shows the flow diagram proposed by Page et al. (2021) following the PRISMA 2020 methodology for the elaboration of the systematic review. In the first review, 110,631 articles were found, of which 108,221 came from the Proquest database, 1,052 from Web of Science, 606 from Sportdiscus, 525 from Scopus, 223 from Psycinfo and 4 from Pubmed. Of the 110,631 references found in the initial search, 15,361 were selected. These were then simplified to 5,293 articles after removal of duplicate papers. Of the 316 articles, a scan of the title, abstracts and full text was carried out and the full text was reviewed against the inclusion and exclusion criteria. Finally, 86 studies were included in the synthesis.



Ilustration 1. Flowchart PRISMA

Data extraction criteria

To extract the data from the selected articles, 12 items were selected:

1. number(nº) of authors,
2. gender and age of the sample,
3. nº of subjects participating in the study,
4. study design and type of analysis (experimental or descriptive),
5. quantitative or qualitative study,
6. variables measured in the study,
7. tests or methodology used,

8. level of the sample (Amateur: sports club, Semi-professional: national and international level in U23 and lower categories, professional: experienced seniors and Olympic Games),
9. conclusion of the study,
10. journal of publication of the study,
11. year of publication of the study,
12. country of the first author and nationality of the sample.

Results

In the selected articles, the 12 items mentioned above in the section "Data extraction criteria" were extracted and analysed and are presented below.

Number of authors and Country of the main author

As for the number of authors, in the selected articles, an average of four authors per article was observed, with a maximum of six authors and a minimum of two authors.

Referring to the country of the lead author, the predominant country is Germany, with three lead authors, followed by Brazil and Spain, with two lead authors, and finally Indonesia, China, France, India and Switzerland, with one lead author each.

Gender, age and nationality of the sample

As for the gender of the sample analysed in the different studies selected, there is a greater tendency to make these assessments in men, with 58.3% of the studies with this characteristic. On the other hand, in 33.3% of the articles, the sample was mixed, and therefore only 8.4% of the publications analysed only women.

As for the gender of the sample analysed in the different studies selected, there is a greater tendency to make these assessments in men, with 58.3% of the studies with this characteristic. On the other hand, in 33.3% of the articles, the sample was mixed, and therefore only 8.4% of the publications analysed only women.

With regard to the nationality of the sample, the predominant native country is Germany, as was the case with the country of the main author. This is followed by Brazil, with two articles analysing subjects from that country, followed by Indonesia, India and Switzerland, with one article

representing that nationality, and finally, there are four articles in which the nationality of the sample is not mentioned, as it is generic.

Number of subjects and sample level

The number of samples analysed in each of the selected studies is very varied, with an average of 360 subjects assessed per study, and 50% of the publications have more than 100 sample subjects.

With regard to the level of the sample, 46.2% of the studies work with professional athletes, this being the predominant level in the selected articles. On the other hand, 38.4% of these articles analyse amateur athletes and only 15.4% analyse semi-professional athletes.

Study design and type of analysis (experimental/descriptive and qualitative/quantitative)

Depending on the type of research carried out, articles have been divided into experimental (if they carry out an intervention on control groups) or descriptive (if they measure, compare and describe) and qualitative or quantitative.

It is in this area that we found the greatest similarity, as in all the articles, the type of research was descriptive, and the variables analysed were quantitative.

Variables to be measured and survey methodology

The following table shows the data extracted concerning the variables measured and their methodology.

The variables analysed are divided into anthropometric, biomechanical, psychological and physiological aspects. After analysing the results, these aspects can be ordered based on the analytical hierarchy process (Nurjaya et al. 2020), i.e. the order of transcendence that these variables have with respect to rowing performance as a basis for the implementation of a talent identification programme in this sport.

Anthropometric aspects

The anthropometric aspects assessed in the selected articles are height, weight, body mass index, skinfolds, bone diameters and perimeters, leg length, humerus arm length, wingspan, trunk flexibility and ectomorphic element.

In terms of methodology, for measurement, the different authors carry out various standardised protocols such as the protocol of the International Society for the Advancement of Kineanthropometry (ISAK) and anthropometric tests.

They perform tests such as the modified Sit-and-Reach test using a flexometer to assess trunk flexibility. They use anthropometric tapes for perimeters, height, wingspan and other related variables. Fat mass is calculated using different equations adapted for athletes, and for muscle mass, the Lee equation. As for the somatotype components, the Carter and Heath equation is applied, and to evaluate the folds, the authors opt for the plicometer.

Psychological aspects

The psychological aspects analysed are achievement-motivated behaviour represented by the variable's proactivity, ambition and commitment, self-confidence and motivation. These variables are measured through quantitative and qualitative tests of athletes and their coaches.

Physiological aspects

The physiological variables analysed in the studies were aerobic and anaerobic power and maximal oxygen consumption, through gas analysis during a rowing-ergometer test, which assesses the aerobic and anaerobic components of the sport.

Biomechanical aspects

Regarding biomechanical aspects, the authors analysed the strength of the lower and upper limbs and muscle power, by means of a maximum effort test of 2000m on an ergometer and with jumping height protocols.

They use medicine ball throwing tests to measure upper limb strength and horizontal jump tests for lower limb explosive strength. While to measure power, they do so through the 2000m maximum effort rowing-ergometer tests.

Table X.Variables and methodology of the selected articles

Study	Information
Basalp et al. (2020)	A simulator was developed to support indoor rowing training. However, the forces were not perceived to be realistic enough for indoor training by experienced rowers. Therefore, we implemented a new model for the paddle-water interaction forces, which incorporates the three-dimensional rotation of the paddle and continuously adjusts the drag/lift coefficients. Ten expert

	rowers were asked to evaluate both models for various aspects of rowing. In addition, the effect of individualisation of model parameters on the perceived realism of the rowing forces was elaborated.
Cerasola et al. (2020)	The objective was to verify the best prediction model of a 2000 m indoor rowing performance. Eight national champions and seven finalists of the Italian Men's Rowing Junior Championships (15-18 years) (age: 15.7 ± 2.0 years; body height 176.0 ± 8.0 cm; body mass 71.2 ± 10.0 kg) volunteered for this study.
Cerasola et al. (2022)	The purpose of this study was to seek a new, simple and rapid method to assess and monitor indoor running performance and to evaluate the relationship between 20 s, 60 s and 2000 m indoor rowing performance of young rowers to assess their anaerobic profile. Over three consecutive days, 17 healthy young male rowers (15.8 ± 2.0 yrs), performed three tests (20 s, 60 s and 2000 m) on a rowing ergometer. Mean power (W20, W60, and W2000) and 2000 m time (t2000) were considered for analysis. In addition, 14 athletes (15-18 years) performed 20 s, 60 s and 2000 m tests and used this as a control group.
Cherouveim et al. (2022)	The aim of this study was to develop accurate, reliable and reproducible equations for the prediction of$\dot{V}O2max$ in high-level male and female adolescent rowers based on anthropometric and performance characteristics, as well as physiological responses during an incremental indoor rowing step test. A total of 215 (N = 215), 119 boys and 96 girls, members of a national rowing federation long-term athlete development (LTAD) programme participated in this study.
Dantas et al. (2018)	The age, weight, height, BMI, upper and lower body explosive strength and bone age of the subjects were evaluated. The latter was estimated using a predictive mathematical model based on anthropometric variables, the explosive strength of the upper limbs was assessed using the medicine ball throwing test and the explosive strength of the lower limbs using the horizontal jump test.
Das et al. (2019)	The purpose of this study was to characterise the kinetics of cardiorespiratory parameters of elite male rowers during the 2000 m rowing time trial. Sixteen

	elite male light weight class (LWC) and 11 open class (OC) male rowers attending the national camp were included in the study. Lung gas exchange and heart rate (HR) during the 2000 m rowing ergometer test were determined by breath-by-breath analysis using a portable metabolic gas analyser and HR monitor. Time to completion, HR, oxygen consumption (V̇O2), minute ventilation (V̇E) and respiratory exchange ratio (RER) were recorded at 500 m, 1000 m, 1500 m and 2000 m intervals.
De Haan & Knoppers (2020)	A qualitative methodological approach was used to understand the coaches' discursive practices. Specifically, a Foucauldian lens was used to explore the discourses on coaching and gender that these coaches relied on to create and legitimise their 'regimes of truth' in their thinking about elite female and male rowers. The sample consisted of 12 rowing coaches who agreed to participate in this study. Nine nationalities and both genders (male = 9; female = 3).
Edmonds et al. (2020)	The purpose of this study was to measure HRV, once a week, over a 15-week training period, from pre-season to competition phase, to provide information on physiological responses to long-term training in young high-performance rowers. In addition, we sought to examine the relationship between cardiac autonomic function and rowing performance (2000 m ergometer time trial). Participants in the study were 180 female university rowers.
Egan-Shuttler (2020)	The purpose of this study was to evaluate the practicality of HRV in documenting training responses during a training or overload period in young female rowers. Time-domain (N-N interval, SDNN; root mean square root of successive differences, RMSSD) and non-linear (SD1) indices of HRV were recorded during initial training, daily during the 6-day training camp and 1 week after the camp in 5 athletes from an elite high school rowing team. Training duration and rate of perceived exertion were recorded to document training load.
Galsworthy et al. (2022)	The Talisker Whisky Atlantic Challenge provides a framework with safety protocols to create safer environments for athletes attempting transatlantic crossings. Race logs, which record communication between paddlers and safety teams, were anonymised and examined to create cumulative totals of medical issues requiring assistance and a timeline of the incident.

Gavala-González et al. (2020)	The aim of this study is to assess the possible existence and its degree through a Bayesian analysis of the Ringelmann effect (or social loafing) in a sample of novice university rowers. The analysis will include some other variables such as gender, academic performance and the type of sport previously played (individual or team). The sample consisted of 131 young adults (47 females and 84 males), all university students and dual-career athletes, with an average age of 22.36 years (SD = 2.01).
Gorman et al. (2021)	The aims of this study were to assess the effects of RS of a rowing task on the ability of trained rowers to comply with concurrent biomechanical biofeedback, and to transfer changes in technique to higher intensity conditions. It is hypothesised that rowing at different RS would promote different kinematic changes in the stroke, and that modifications would be better preserved during competitive intensity transfer tests if performed at higher RS. Thirty participants were recruited (mean ± standard deviation [SD]; age, 22 ± 3 years; height, 171.2 ± 5.2 cm; mass, 69.1 ± 6.7 kg; male, n= 8, female,n= 22). Inclusion criteria were that participants were injury-free, had at least one year of ergometer rowing experience and were training and competing in rowing at the time of the study.
Jones et al. (2020)	The aim of this study was to investigate the influence of MBSR on psychological well-being, sleep, athletic coping skills, and rowing performance in collegiate rowers in a controlled experimental design. Members of an NCAA Division I women's rowing team completed an 8-week MBSR course along with their regular athletic training programme (intervention group) or the athletic training programme alone (control group).
Larochelambert et al. (2020)	It classifies rowers as "tall and slim", "tall and stout", "small and slim" and "small and stout", "small and slim" and "small and stout". Anthropometric tests and checks were carried out for the different distances. Time and speed were collected every 50 m for all boats in each competition where speed and time data were collected for 50 m using a GPS tracker.

León et al. (2018)	The aim of this study was to examine the relationship between coaches' leadership in fixed-bench rowing and athlete satisfaction, with the addition of rower participation as a covariate. The participants were four teams with a total of 66 elite rowers (age: 28.0 ± 5.5 years) and their four coaches (age: 36.1 ± 1.1 years). To assess the leadership exercised by the coaches and its relationship with athlete satisfaction, the Spanish adaptation of the Leadership Scale for Sports (LSS) and the Spanish translation of the Athletic Satisfaction Questionnaire (ASQ) were used.
León-Guereño (2018)	Height, wingspan, body mass, 8 skinfolds, 2 bone diameters and 6 perimeters were assessed skinfolds, 2 bone diameters and 6 perimeters. The International Society for the Advancement of Kineanthropometry (ISAK) protocol was used for measurement. Fat mass was calculated using different equations for athletes and muscle mass using the Lee equation. For the somatotype components, the Carter and Heath equation was applied.
Liu et al. (2020)	Five main criteria and twenty sub-criteria are analysed as evaluation indicators. Evaluation indicators and a questionnaire established through the analysis of relevant literature on rowing and athlete selection. Subsequently, the modified Delphi method is applied to achieve an expert consensus on the selection criteria to be evaluated.
Maciejewski et al. (2019)	The study analyses three different approaches to assessing SJ performance (vertical jump height, jump index and maximum power produced by the lower limbs) and whether they correlate significantly with rowing performance in adolescent rowers at the national level. Furthermore, it aims to predict whether such relationships are influenced by BM.
Manna & Adhikari (2018)	Measures height, stature, ectomorphic element, BMI, weight, humerus arm length and trunk flexibility. All anthropometric measurements were measured with the aid of an anthropometric tape measure. The diameter of the humerus and femur was measured with a sliding caliper with Vernier scale. Skinfold measurements were also taken from five sites with a manual skinfold caliper.

	Hip and back flexion and hamstring extension were assessed by a modified Sit-and-Reach test using a flexometer.
McDonald & Burke (2019)	The study is focused on understanding the autonomous practices of athletes in a Japanese university rowing club. Specifically, the extent to which the relative absence of the coach contributes to athlete autonomy.
Nowak et al. (2022)	The aim of this study was to assess the intensity of health behaviours among wheelchair basketball, wheelchair rugby and para-rowing athletes. It was hypothesised that the intensity of health behaviours of these athletes differs depending on the sports played. All subjects played Paralympic sports: wheelchair basketball, wheelchair rugby and para rowing.
Nurjaya et al. (2020)	Height, length, leg muscle strength and power, self-confidence and motivation, aerobic and anaerobic power, and recovery and driving were assessed. leg strength and power, self-confidence and motivation, aerobic and anaerobic power, and recovery and drive were assessed. MMR was used to create a device that identifies the talents of rowing athletes, developed a talent identification software designed by AHP and Fuzzy Logic analysis based simulation approach, and tested the device using an experimental approach.
Penichet-Tomás & Pueo (2017	The anthropometric measurements of the rowers were evaluated and lower limb strength was measured with the jumping height protocol using a jumping mat. lower limb strength was measured with the jumping height protocol using a jumping mat, and a 2000 m maximal effort test was performed on a Concept II rowing ergometer, in order to relate the rowers' performance to their physical characteristics.
Pérez-Castilla et al. (2022)	This study aimed to compare the maximum mechanical variables derived from the load-velocity (L-V) ratio and 2000m rowing ergometer performance among rowers of different age categories, and to identify the L-V ratio variables most closely related to 2000m rowing ergometer performance. Nineteen competitive rowers (15 men and four women) aged between 15 and

	25 years were assessed during the Chilean national 2000 m rowing ergometer competition.
Schmid et al. (2021)	The achievement-motivated behaviour represented by the variables proactivity, ambition and commitment was assessed by testing coaches and rowing rowers by the variables proactivity, ambition and commitment through coach tests and rower ergometer tests, and to examine the results, they used the person-oriented cluster linkage method after the removal of a residual (LICUR) to identify the relationships between achievement-motivated behaviour and ergometer results at t1 and success at t2.
Silva et al. (2017)	Anthropometric variables, body composition, maximum oxygen consumption and strength. For this purpose, maximal oxygen consumption, strength, 500 m and dual-energy X-ray absorptiometry tests were applied. Multiple linear regression was performed in SPSS 16 for the four different regression models.
Silva et al. (2021)	The objective was to develop a mathematical model capable of predicting 2000m performance for young rowers from a 100m maximal effort test. The study hypothesised that 2000 m rowing performance could be predicted with the mathematical model using parameters easily collected by coaches and reproducible in their daily environment.
Socorro & Hourruitinier (2020)	It is aimed at characterising the development of male rowing in the school category in the city of Cienfuegos in the period from 2008 to 2013, carrying out a logical analysis of the results obtained in this sport in the different national competitions in the School and Youth categories.
Winkert et al. (2017)	Measures height and BMI following a standard procedure and compares the groups through ANOVA test with Post- Hoc test.
Winkert et al. (2018a)	Measures height and BMI following a standard procedure and compares the groups through ANOVA test with Post- Hoc test.
Winkert et al. (2018b)	It measures standing height, body mass, BMI and the effects of anthropometry on career anthropometry on occupational attainment, which were analysed with a proportional odds model. Interquartile ranges of the OG group were used to define normative data ranges, in addition to unpaired t-tests and inferences to compare subjects.

Zotova et al. (2019)	The purpose is to study the opinions of rowing coaches and representatives of the Rowing Federation on the reasons for the decline in performance of rowers of the Russian Federation, to identify the physical training practice of academic rowers in different periods of the macrocycle. A questionnaire survey was conducted. The questionnaire survey involved 42 rowing coaches aged 28-73 years, whose average teaching experience was 22.5 years.

Main results and conclusions of the articles This table shows the results and conclusions of the articles analysed.

Table X. Results and conclusions of selected articles.

Study	Description
Basalp et al. (2020)	Based on expert feedback, we concluded that the new model represented resistive forces realistically and ensured a smooth transition of forces within a rowing cycle. Furthermore, we found that the individualisation of the parameters significantly improved the perceived realism of the simulator. Equipped with a configurable rowing model, the new simulator provides a realistic indoor training platform for rowers.
Cerasola et al. (2020)	Absolute W60 and VO2max were 476.1 ± 91.0 W and 4669.0842.0 ml-min', respectively. It correlated negatively with all variables examined and showed the highest significant W60 relationship with absolute Wee (r = -0.943). In contrast, no significant relationship emerged for normalised VO2max and athlete age. The prediction models for indoor 2000 m rowing performance showed the highest R2 value (0.94) and variance (92%), and the lowest SEE (6.4) for the equation combining all variables studied.
Cerasola et al. (2022)	Mean power decreased with increasing test duration (W20= 525.1 ± 113.7 W; W60= 476.1 ± 91.0 W; W2000=312.9 ± 56.0 W) and negative correlations emerged between t2000(418.5 ± 23.1 s) and W20 (r= -0.952, p< 0.0001) and W60 (r= -0.930, p< 0.0001). These findings indicate that W20and W60are significant predictors of 2000 m rowing ergometer performance.

	Furthermore, normalised W20and W60can be used to evaluate athletes and as a reference for planning anaerobic training sessions on a rowing ergometer.
Cherouveim et al. (2022)	The main finding of this study was that male and female adolescent rower V̇O2max.could be predicted by the linear combination of lean body mass and distance covered during the last 4-minute stage of the incremental step rowing test, with significant accuracy.
Dantas et al. (2018)	Boys with late maturation stage obtained a lower performance in both tests compared to the normal stage; as well as girls in normal stages presented lower performance in relation to their early partners. Significant positive coefficient relationships were found between bone age and upper and lower extremity explosive strength performance for both sexes.
Das et al. (2019)	There was no significant difference ($p>0.05$) in HR kinetics during the 2000 m rowing between the groups. However, HR divided over the entire course was on the higher side in OC than in LWC. Relative V̇O2 at 1000m ($p<0.01$), 1500m ($p<0.05$) and 2000m ($p<0.01$) was significantly lower in OC rowers compared to LWC. However, V̇E was significantly higher for the OC group at 1500m ($p<0.05$) and 2000m ($p<0.01$), while RER was only significantly higher at 2000m ($p<0.05$). The %change in absolute and relative V̇O2, V̇E and RER at each 500m interval showed no significant difference between groups. OC rowers had taken significantly less time ($p<0.05$) to complete the first 500 m, 500 m to 1000 m and the last 500 m distance than LWC rowers.
De Haan & Knoppers (2020)	The coaches who participated in this study drew on various discourses to describe the differences they perceived between their male and female athletes. Female behaviour was positioned as "other", deviant and disruptive. Most of the male coaches in their discourse claimed that female athletes are constructed as athletes who ask a lot of questions, have problems, are not necessarily focused on results and do not have their whole identity linked to sport.

Edmonds et al. (2020)	The results of this study reveal a downward trend in HRV estimates of cardiac parasympathetic activity throughout the season, but not HR, followed by an increase during the last 3 weeks of training as competition approached. Unlike previous studies, the current study did not report a clear relationship between cardiac autonomic activity indices and training load or rowing performance within this female youth population.
Egan-Shuttler (2020)	Using progressive statistics, cardiac vagal activity (RMSSD and SD1) most likely decreased during each day of boot camp compared to baseline training, although it returned to baseline within one week of boot camp. Interestingly, SDNN was reduced throughout boot camp and remained reduced until one week after boot camp (78% likely; effect size = -0.32). These insights add value to the use of HRV in youth sport and provide coaches with an easy and cost-effective means of monitoring physiological response to training.
Galsworthy et al. (2022)	Conditions requiring the involvement of a race doctor represent the most serious cases with the potential to deteriorate. Management of dermatological and musculoskeletal problems is vital throughout the race, while prophylaxis and motion sickness education are essential in the early stages of the race. Infections are a concern, and pressure ulcers on the buttocks are a potential route for secondary infections. More research is required before evidence-based guidelines for the management of health problems in ocean rowers can be introduced.
Gavala-González et al. (2020)	The correlations between meters covered and watts input (power) are very high and significant, around 9, but the correlation between the number of strokes in the two conditions (although also significant 0.000), is much lower, not reaching the value of 0.7.
Gorman et al. (2021)	Biomechanical biofeedback on joint sequencing is a useful training aid for expert rowers, whereby some rowers successfully adapted joint movement sequencing patterns during the rowing stroke. Biofeedback compliance was RS-dependent, supporting the specificity hypothesis, such that more similar

	conditions during the biofeedback task to maximal rowing of proficiency intensity resulted in better performance and retention.
Jones et al. (2020)	In contrast to the control group, the intervention group showed improvements in psychological well-being, subjective and objective sleep quality, athletic coping skills and rowing performance as measured by a 6,000 m ergometer test. Improvements in athletic coping skills, psychological well-being and subjective sleep quality correlated with increases in mindfulness in the intervention group. These results suggest that mindfulness training may benefit non-precise aspects of athletic performance.
Larochelambert et al. (2020)	The analysis of each 50 m showed that among the four morphological categories, TR male athletes were significantly faster than their ST counterparts morphological categories the TR male athletes were significantly faster than their ST counterparts between the 800 and 2000 m of the race by 1.76% of the average speed. Anthropometric factors impact pace between rowing categories. Combining anthropometrics and race pace is not only useful for understanding which factors work where, but also for improving training and performance.
León et al. (2018)	The data obtained confirm the hypothesis of congruence raised in the Multidimensional Model of Leadership (MML) and given the differences in leadership found, there is a need for future interventions to improve coaches in this sport speciality.
León-Guereño (2018)	Wingspan appears to be of great importance for traditional elite rowers; while average height may not be as important to performance as wingspan. traditional elite rowers; while average height may not be as important to performance as wingspan. Meanwhile, reducing body fat percentage is likely to be beneficial in achieving elite rowing status.

Liu et al. (2020)	The results showed that when selecting rowers, the body factor criterion has the highest priority, followed by the IoT measurement factor, the professional factor, the reaction factor and the psychological factor. body factor has the highest priority, followed by the IoT measurement factor, the professional factor, the reaction factor and the psychological factor. Furthermore, it reveals that important sub-criteria affecting athlete selection are body composition, muscle composition and competition scores. In conclusion, the main consideration for the selection of rowing athletes is the physical attributes of the rowers. Having the advantage of an appropriate body type can make future training more effective.
Maciejewski et al. (2019)	The main results confirm our hypotheses because HSJYoSJ, and PSJ are significantly correlated with P1500, with a higher correlation coefficient for PSJ, and that these correlations are strongly influenced by BM. More specifically, the allometric scale showed that BM highly explains the performance of SJ and rowing, and explains at least 96% of their relationships.
McDonald & Burke (2019)	It has been found that Japanese university students in the rowing club who stop training under the coach's supervision quickly lose their training habit.
Nowak et al. (2022)	The study confirmed the authors' hypothesis that the intensity of respondents' health behaviours differed depending on their sport discipline. Better overall HBI scores were achieved by rugby players and wheelchair basketball players compared to para-rowers. Basketball players achieved better results in positive mental attitude (PMA) and preventive behaviours (PB) compared to rugby players and para-rowers and by rugby players compared to para-rowers. Para-rowers scored the lowest in each HBI category.
Nurjaya et al. (2020)	After applying the tests and analysing the sub-criteria, it is concluded that, according to the study, muscular power (biomechanics), recovery and impulse (technique) are concluded that, according to the study, muscle power (biomechanics), recovery and momentum (technique) are considered to be the most important criteria for determining performance.

Penichet-Tomás y Pueo (2017)	The performance and efficiency in the rowing ergometer test were strongly correlated with the anthropometric characteristics of height, weight, body muscle and free body fat. This study concludes that the current results provide an argument for coaches and rowers to increase strength training and use anthropometric characteristics to predict success in potential rowers.
Pérez-Castilla et al. (2022)	The load-velocity relationship variables are sensitive enough to differentiate between rowers of different age categories (U16vs.O16) and are significantly associated with 2000m rowing ergometer performance (total time). This novel test methodology may provide professionals and coaches with a simpler and more accurate alternative to comprehensively assess a rower's maximal neuromuscular profiles.
Schmid et al. (2021)	Although the highly motivated rowers were not the fastest on the ergometer at t1, they were more likely to be in the highest. Although the highly motivated rowers were not the fastest on the ergometer at t1, they were more likely to be at the highest performance level at t2 compared to the other groups (OR = 3.5, $p < .05$). In contrast, all unambitious and unmotivated rowers were either competing at national level or had dropped out. In conclusion, certain patterns of achievement-motivated behaviour and current performance are associated with future success (30 months later). The consideration of achievement-motivated behaviour in the selection of rowers seems promising in this context.
Silva et al. (2017)	The anthropometry-power, VO2 peak, strength and power models were reliable predictors for 500 m rowing power presented reliable predictions for 500 m rowing performance, as well as the combination of all variables. Having made these analyses, the need for these models can be assured with the aim of complementing the identification, selection of talents and, above all, improvement in performance.

Silva et al. (2021)	The 100 m performance (seconds) was significantly correlated with the 2000 m performance (minutes). The linear regression model shows that 100 m performance was also efficient in predicting 2000 m performance. We highlight that for the linear regression no significant heteroscedasticity or significant multicollinearity was detected.
Socorro & Hourruitinier (2020)	The research showed that the town of Cienfuegos has had valuable national and international results in the last 10 to 12 years where there has been a renaissance in rowing due to the results. This sport is an example to be followed by all athletes to raise the values of dedication, responsibility and sacrifice for the significant achievements at national level in recent years.
Socorro & Hourruitinier (2020)	The research showed that the town of Cienfuegos has had valuable national and international results in the last 10 to 12 years where there has been a renaissance in rowing due to the results. This sport is an example to be followed by all athletes to raise the values of dedication, responsibility and sacrifice for the significant achievements at national level in recent years.
Winkert et al. (2017)	Small significant effects were found in SH and BM between progression levels. Rowers competing no higher than U19 were smaller and showed less BM compared to higher progression levels. This effect increased by 0.45% for SH and 1.01% for BM. The results suggest that greater height and BMI are associated with greater long-term performance, although these variables should not be exclusive for talent identification criteria.

	Female rowers who tend to have a more athletic body type (lower BMI, taller BM) achieved a higher level of career progression and are likely to do so with a better BMI, taller BMs) achieved a higher level of career progression.
Winkert et al. (2018a)	The paddlers' arm span was found to be significantly greater than that of the kayakers. was found to be significantly greater than that of kayakers, the ectomorphic element and forearm length of paddlers were significantly higher than those of kayakers, the trunk flexibility of paddlers was found to be significantly greater than that of kayakers. The findings of the current study may be useful in talent identification and re-induction during the planning of training programmes.
Winkert et al. (2018b)	Anthropometric factors have a direct influence on the rhythm between the categories of rowers. This can help both in recruiting rowers for specific boats and in adapting race strategy.
Zotova et al. (2019)	According to the questionnaire survey of rowing coaches and managers of different levels, the reasons for the decrease in performance of academic rowers were revealed; the experience of organising the physical training of academic rowers in different periods of the macrocycle was studied.

Discussion

This literature review seeks to compare the conclusions that have been obtained in different scientific journal articles on variables or criteria that can predict with greater certainty the performance of young rowers.

All the articles analysed have the same point in common, and that is the importance they give to performance, due to the transcendence of high-level sport today, so they share the need to analyse the variables that can affect the achievement of better results, and to classify them in order of importance, in order to be able to create protocols for identifying rowing talent at an early age, as this can provide the advantage needed to achieve them.

In the various studies, the same four aspects are discussed or mentioned: anthropometric, biomechanical, psychological and physiological. Anthropometric variables are the most mentioned, taking part in 83% of the studies, followed by psychological variables, considered in 25%, and biomechanical and physiological variables, analysed in 16.6% of the articles.

The aim of these studies was to determine which variables were most suitable for predicting optimal performance in rowers and by analysing their conclusions we can distinguish four fronts among the authors.

Regarding anthropometric variables, the literature presents strong relationships between some anthropometric measures and rowing performance (Penichet-Tomás and Pueo, 2017), and they also directly influence race pace (Winkert et al. 2018b).

Forjasz, J. (2011) reports in his study that elite athletes who are rated as more successful have higher values for the anthropometric variables analysed than those who perform less well, with the exception of the percentage of fat-free mass, which is lower, so he assumes that these anthropometric characteristics directly affect performance. Winkert et al. (2018a) also argue that successful rowers tend to have a more athletic morphotype, i.e. lower body mass index and greater height. León-Guereño (2018), for his part, refers that reducing body fat percentage can be beneficial for achieving elite rowing status, however, he attaches particular importance for performance to wingspan, even above average height.

Furthermore, Larochelambert et al. (2020), Liu et al. (2020), Winkert et al. (2018a), Winkert et al. (2018b), Penichet-Tomás and Pueo (2017) and Winkert et al. (2017) agree that, within the anthropometric aspects, the most important variables for the prediction of future talent are height, BMI and weight. On the other hand, Manna and Adhikari (2018) and León-Guereño (2018) add wingspan and trunk flexibility as essential variables for predicting performance.

While these variables have proven to be of great relevance for talent identification, they should not be exclusive to the criteria of selection programmes, (Winkert et al. 2017), as Penichet-Tomás and Pueo, (2017) argue, because although the anthropometric characteristics of height, weight, body muscle and free body fat correlate with positive performance, the results have not been strong enough to use them as the only predictors of success, so other variables must be taken into account.

On the other hand, there are authors who suggest that aspects such as motivation and ambition are the most important psychological variables for talent detection in addition to behavioural patterns incentivised by the athlete's current achievement and performance, which are associated with future success (Schmid et al., 2021). Winkert et al. (2017) agrees with this and argues for the importance of these psychological aspects to be taken into account in the selection of rowers. Some studies analyse the different variables of success and focus on performance De Haan & Knoppers (2020) state that female athletes do not link their identity to the sport and tend not to be so focused on the result or performance. Other work shows that athletes from a Japanese rowing club who stop training under the supervision of the coach quickly lose their training habit (McDonald & Burke 2019).

Regarding physiological aspects, Tamoghni-Manna (2018) argues that the anaerobic and aerobic capacity of an athlete are the most important variables for success in rowing competitions, since the 2000m distance has specific energy requirements during the six minutes that the race lasts, due to the fact that a constant medium intensity effort is made (Cosgrove et al. 1999; Kramer et al. 1994; Yoshiga and Higuchi 2003) which develops certain physiological adaptations that are evaluated in the athlete, and with which success could be predicted.

In terms of tests that are able to predict performance Silva et al. (2021) state that 100m 'al out' tests can be strong predictors of 2000m ergometer performance.

For Dantas et al. (2018) and Silva et al. (2017) the most important aspects are the explosive strength of the upper and lower limbs and VO2, and Penichet-Tomás and Pueo (2017) defend the need to increase strength training in rowers in training programmes.

Meanwhile, Nurjaya et al (2020) refers that biomechanical variables such as muscle power and strength are the most relevant criteria for predicting performance, as significant relationships can be observed between bone age and upper and lower extremity explosive strength performance in young athletes, which may hint at future potential, (Dantas et al., 2018). In addition, Silva et al. (2017) also analyse strength-power models and suggest that these variables could fairly reliably predict performance.

Conclusions

As conclusions, we can state that there is a clear inclination to take into account anthropometric variables (height, weight, BMI, wingspan and trunk flexibility) over others in the development of

programmes for the identification and selection of young rowers. These have been most often cited by the authors as the best predictors of success, as there are indications that having an appropriate body type may be a performance advantage over other athletes.

However, the physiological variables, which define the physical capacity of the rower, are fundamental for current and future performance, as well as the psychological aspects of the athlete and the biomechanics of the movement. In terms of the ability to infer power from an ergometer, it has been concluded that the more power the greater the distance covered and that the greater the distance of the test, the lower the inferred measured power.

Some of the conclusions drawn from psychological studies are that female athletes are not focused on results and that they do not have a total commitment to the sport. Similarly, some studies point out that rowers who stop training under the supervision of their coach gradually lose the habit of training.

If we take into account performance aspects, it can be stated that the 20 and 60 seconds ''all out'' tests on an ergometer are significant indicators of performance for a 2000 metres test. Other aspects to be highlighted are the use of mindfulness methods to improve the overall performance of the athlete. In a similar direction, using fair regression, it can be confirmed that a 100m all out test is a predictor of performance in a 2000m ergometer test.

Therefore, we can conclude that, due to the fact that sport is multifactorial, a talent identification and selection programme based on only one of the four types of analysable variables (anthropomorphic, psychological, biomechanical and physiological) would not be appropriate or valid in its entirety, but should include all of them, as they act synergistically in performance.

References

Basalp, E., Bachmann, P., Gerig, N., Rauter, G., & Wolf, P. (2020). Configurable 3D rowing model renders realistic forces on a simulator for indoor training. Applied Sciences, 10(3), 734.

Camelo-Suan, R. A; Parra-Cardona, S. A; Caicedo-Sánchez, L.N; Rincón-Marroquín, H; Ibáñez-Castro, Á.L. (2019). *Orientaciones teóricas para la detección, selección y formación de talentos deportivos.* Universidad de Cundinamarca.

Cazorla, G. (1983). De l'evaluation des nageurs de haut niveau a la detection de jeunes talents. En Travaux et Researchs. *INSEPS,* 185-208.

Cerasola, D., Bellafiore, M., Cataldo, A., Zangla, D., Bianco, A., Proia, Traina, M., Palma, A., & Capranica, L. (2020). Predicting the 2000-m Rowing Ergometer Performance from Anthropometric, Maximal Oxygen Uptake and 60-s Mean Power Variables in National Level Young Rowers. Journal of Human Kinetics, 75(1), 77-83.

Cerasola, D., Zangla, D., Grima, J. N., Bellafiore, M., Cataldo, A., Traina, M., ... & Bianco, A. (2022). Can the 20 and 60 s All-Out Test Predict the 2000 m Indoor Rowing Performance in Athletes? Frontiers in Physiology, 776.

Cherouveim, E. D., Methenitis, S. K., Simeonidis, T., Georginis, P., Tsekouras, Y. E., Biskitzi, C., ... & Koulouvaris, P. (2022). Validity and Reliability of New Equations for the Prediction of Maximal Oxygen Uptake in Male and Female Elite Adolescent Rowers. Journal of Human Kinetics, 83(1), 77-86.

Cosgrove, M.J; Wilson, J; Watt, D; Grant, SF. (1999). The relationship between selected physiological variables of rowers and rowing performance as determined by a 2,000 m ergometer test. *J Sports Sci ,17,* 845–852.

Dantas, M.P; Silva, L; Gantois, P; Silva, L; Dantas, R.N. y Cabral, B.T. (2018). Relationship between maturation and explosive strength in young rowers. *Motricidade, 14,* 112-120.

de Haan, D., & Knoppers, A. (2020). Gendered discourses in coaching high-performance sport. International Review for the Sociology of Sport, 55(6), 631-646.

Edmonds, R., Egan-Shuttler, J., & Ives, S. J. (2020). Heart Rate Variability Responses to a Training Cycle in Female Youth Rowers. International Journal of Environmental Research and Public Health, 17(22), 8391.

Egan-Shuttler, J. D., Edmonds, R., & Ives, S. J. (2020). The efficacy of heart rate variability in tracking travel and training stress in youth female rowers: A preliminary study. The Journal of Strength & Conditioning Research, 34(11), 3293-3300.

Remo (Deporte). *(2020). En Ecured.* https://www.ecured.cu/Remo_(deporte).

Federación Española de remo. (2014). *Historia del Remo.* http://federemo.org/category/remo/historia/.

Federación Aragonesa de remo. (2021). *Historia del Remo.* http://farremo.es/index.php/historia-del-remo.

Federación Madrileña de remo. (2020). *Remo Olímpico.* http://www.remomadrid.org/remo-olimpico/.

Feeley, B., Agel, J., y LaPrade, R. (2016). When is it too early for single sport specialization?*The American journal of sports medicine, 44(1)*, 234-241. Doi: 10.1177/ 0363546515576899

Forjasz, J. (2011). Anthropometric Typology of Male and Female Rowers Using K-Means Clustering. *Journal of human kinetics. 28*. 155-64. Doi: 10.2478/v10078-011-0032-y.

Gagné, F. (2009). Construyendo talentos a partir de la dotación: Breve revisión del MDDT 2.0. *MD. Desarrollo y educación del talento en la adolescencia*, 64-78.

Galsworthy, W. J., Carr, J. A., & Hearn, R. (2022). Common health issues and advised treatments reported in an ultraendurance ocean rowing race. BMJ open sport & exercise medicine, 8(1), e001120.

Gavala-González, J., Martins, B., Ponseti, F. J., & Garcia-Mas, A. (2020). Studying well and performing well: A Bayesian analysis on team and individual rowing performance in dual career athletes. Frontiers in Psychology, 11, 583409.

Gorman, A. J., Willmott, A. P., & Mullineaux, D. R. (2021). The effects of concurrent biomechanical biofeedback on rowing performance at different stroke rates. Journal of Sports Sciences, 39(23), 2716-2726.

Hahn, E. (1988). Entrenamiento con niños. *Martínez Roca.* ISBN: 84-270-12047

Jones, B. J., Kaur, S., Miller, M., & Spencer, R. M. (2020). Mindfulness-based stress reduction benefits psychological well-being, sleep quality, and athletic performance in female collegiate rowers. Frontiers in psychology, 11, 572980.

Kaloupsis, S; Bogdanis, G; Dimakopoulou, E. Y Maridaki, M. (2008). Anthropometric characteristics and somatotype of young Greek rowers. *Biology of Sport, 25.*

Larochelambert, Q; Del Vecchio, S; Leroy, A; Duncombe, S; Toussaint, J.F. y Sedeaud, A. (2020). Body and Boat: Significance of Morphology on Elite Rowing Performance. *Frontiers in Sports and Active Living. 2.* Doi: 10.3389/fspor.2020.597676.

Leon Guereno, P., Gonzalez Rodriguez, O., Aguayo Benito, Y., & Arruza Gabilondo, J. A. (2018). The relationship between coaches' leadership type in fixed seat rowing, the number of

regattas rowed and athletes' satisfaction. SPORTIS-SCIENTIFIC TECHNICAL JOURNAL OF SCHOOL SPORT PHYSICAL EDUCATION AND PSYCHOMOTRICITY, 4(3), 462-479.

León-Guereño, P; Urdampilleta-Otegui, A; Zourdos, M. y Mielgo-Ayuso, J. (2018). Anthropometric profile, body composition and somatotype in elite traditional rowers: A cross-sectional study. *Revista Espanola de Nutricion Humana y Dietetica, 22,* 279-286. Doi: 10.14306/renhyd.22.4.605.

Liu, J-W; Chen, S-H; Huang, Y. y Wang, C-T. (2020). An Intelligent Identification Model for the Selection of Elite Rowers by Incorporating Internet-of-Things Technology. *IEEE Access,* 1-1. Doi: 10.1109/ACCESS.2020.2973418.

Lóriga-Socorro, J.J. y Hourruitinier-Font, O.L. (2020). The male rowing in the school games from 2008 to 2013. *Historic sport contribution of Cienfuegos. Conrado, 16(73),*171-181.

Maciejewski, H., Rahmani, A., Chorin, F., Lardy, J., Samozino, P., & Ratel, S. (2019). Methodological considerations on the relationship between the 1,500-M rowing ergometer performance and vertical jump in national-level adolescent rowers. The Journal of Strength & Conditioning Research, 33(11), 3000-3007.

Manna, T. y Adhikari, S. (2018). A comparative study of anthropometric and physical profiles of male junior rowers, kayakers and canoers. *Medicina Sportiva: Journal of Romanian Sports Medicine Society, 14(2),* 3028-3036.

Manso, J. M., Caballero, J. A. y Navarro, M. (1996). Bases teóricas del entrenamiento deportivo:principios y aplicaciones. *Gymnos.*

McDonald, B., & Burke, M. (2019). Coaching pedagogy and athlete autonomy with Japanese university rowers. Sport in Society, 22(8), 1433-1448.

Messonnier, L; Freund, H; Bourdin, M; Belli, A. y Lacour, J.R. (1997). Lactate exchange and removal abilities in rowing performance. *Med Sci Sports Exercise, 29,* 396–401.

Moher, D; Liberati, A; Tetzlaff, J., & Altman DG. (2009). PRISMA Group, Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med, 21*, 6(7):e1000097. Doi: 10.1371/journal.pmed.1000097.

Muniesa, C. & Díaz, G. (2010). Características generales del remo. Deporte cíclico del programa olímpico. *Kronos, 9(18),* 95–102. http://hdl.handle.net/11268/894

Nowak, M. A., Kolbowicz, M., Kuska, M., Sygit, K., Sygit, M., Nowak, L. y Kotarska, K. (2022). La intensidad de los comportamientos de salud de las personas que practican baloncesto en silla de ruedas, rugby en silla de ruedas y pararremo. Revista Internacional de Investigación Ambiental y Salud Pública,19(13), 7879.

Nurjaya, D; Abdullah, A; Ma'mun, A. & Rusdiana, A. (2020). ROWING TALENT IDENTIFICATION BASED ON MAIN AND WEIGHTED CRITERIA FROM THE ANALYTIC HIERARCHY PROCESS (AHP). *Journal of Engineering Science andTechnology,15,* 3723-3740.

Penichet-Tomás, A. & Pueo, B. (2017). Performance conditional factors in rowing (Factores condicionales de rendimiento en remo). *Retos*. 238-240. Doi: 10.47197/ retos.v0i32.56067.

Pérez-Castilla, A., Quidel-Catrilelbún, M. E. L., Rodríguez-Pérez, M. A., & García-Ramos, A. (2022). Association of the load-velocity relationship variables with 2000-m rowing ergometer performance. European Journal of Sport Science, 1-10.

Pérez-Leguizamón, A. (2006). Remo. *Revista Digital*. http://www.efdeportes.com/Salmela, J.H. (1997). Detection des talents. *EPS, 267*, 27-30.

García-Soler, S. (2014). Detección de talentos deportivos. *EFDeportes, Revista Digital.* https://www.efdeportes.com/efd189/deteccion-de-talentos-deportivos.htm

Schmid, M. J., Conzelmann, A. y Zuber, C. (2021). Patterns of achievement-motivated behavior and performance as predictors for future success in rowing: A person-orientedstudy. *International Journal of Sports Science & Coaching, 16(1)*, 101–109. https:// doi.org/10.1177/1747954120953658.

Secher, N. (1973). Development of results in international rowing championships. *Med Sci Sports, 5,* 1893–1971.

Secher, N.H. (1993). Physiological and biomechanical aspects of rowing. Implications for training. *Sports Med, 15,* 24–42.

Silva, F; Brito, J; Reis, V. (2017). PREDIÇÃO DO DESEMPENHO A PARTIR DAS CARACTERÍSTICAS ANTROPOMÉTRICAS, FISIOLÓGICAS E DE FORÇA NO

REMO. *Revista Brasileira de Medicina do Esporte, 23,* 446-449. Doi: 10.1590/1517-869220172306165108.

Silva, L. F. D., de Almeida-Neto, P. F., de Matos, D. G., Riechman, S. E., de Queiros, V., de Jesus, J. B., ... & Cabral, B. G. D. A. T. (2021). Performance Prediction Equation for 2000 m Youth Indoor Rowing Using a 100 m Maximal Test. Biology,10(11), 1082.

The Editors of Encyclopaedia. (2019). Rowing. *Encyclopedia Britannica.* https:// www.britannica.com/topic/rowing-boat-propulsion-and-sport.

Treff, G; Winkert, K; Steinacker, J.M. (Junio 2021). Olympic rowing – maximum capacity over2000 meters. *Dtsch Z Sportmed, 72, 203-211*. Doi:10.5960/dzsm.2021.485.

Winkert, K; Treff, G; Lormes, W; Machus, K; Steinacker, J. (2018). 23 Year Analysis Of Anthropometric Profiles And Long-Term Career Progression Of German Junior Female Rowers. *Medicine & Science in Sports & Exercise, 50, 47.* Doi: 10.1249/01.mss.0000535569.96361.61.

Winkert, K; Steinacker, J; Machus, K; Dreyhaupt, J. y Treff, Gunnar. (2018). Anthropometricprofiles are associated with long-term career attainment in elite junior rowers: A retrospective analysis covering 23 years. *European Journal of Sport Science, 19,* 1-9. Doi: 10.1080/17461391.2018.1497089

Winkert, K; Treff, G; Lormes, W; Machus, K. y Steinacker, J. (2017). Analysis Of ropometric Profiles And Long-term Career Progression In 24 Years Of German Junior Rowing: *Medicine & Science in Sports & Exercise, 49, 619.* Doi: 10.1249/01. mss.0000518626.00470.8c.

Yusof, A.A; Harun, M.N, Nasruddin, F.A. y Syahrom A. (2020) Rowing Biomechanics, Physiology and Hydrodynamic: A Systematic Review. *Int J Sports Med*. doi: 10.1055/ a-1231-5268.

Zotova, F. R., Mingazova, D. V. y Manina, A. Z. (2019). La actitud de los entrenadores hacia la planificación y organización del entrenamiento físico de los remeros-académicos. Medicina Humana, 19(2), 92-100.

CHAPTER 2. Woman and rowing

Menstruction and training

Menstrual cycle

Overview of the menstrual cycle.

The menstrual cycle runs from the first day of bleeding to the first day of the next cycle with the new bleeding. It generally lasts between 24 and 36 days, usually around 28 days. Bleeding lasts between 3 and 8 days, during which time between 5 and 80 mL of blood are usually lost.

The cycle is divided into three main phases: the first is the follicular phase, which includes the menstrual phase (bleeding) and has a variable duration of around 12 to 21 days. The intermediate phase is the ovulation phase, the duration of which is constant between 1 and 3 days. Finally, the luteal phase is the last part of the cycle, lasting a constant 14 to 16 days until the next menstruation, with which the next cycle begins.

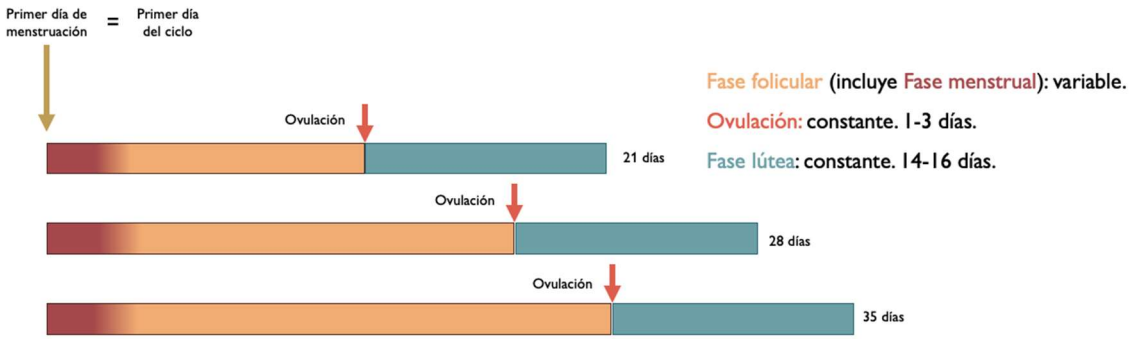


Ilustración 1. Duración de las distintas fases del ciclo menstrual.

During the cycle, a series of changes occur in the ovarian follicle, the uterus and the endometrium, which can be differentiated according to the different phases:

On the one hand, during the ovarian cycle the maturation of the follicles takes place, which begins in the follicular phase. Then, during ovulation, the mature egg is released. Finally, in the luteal phase, the corpus luteum is formed from the released, unfertilised egg.

As for the uterine cycle, during menstruation, the endometrium sheds, which causes the characteristic bleeding. This is followed by a proliferative phase in which the tissue increases in

size in preparation for possible implantation of the fertilised egg. This is followed by a secretory phase, which coincides with the luteal phase, in which there is an increase in glandular activity to secrete the hormones that promote the implantation of the zygote.

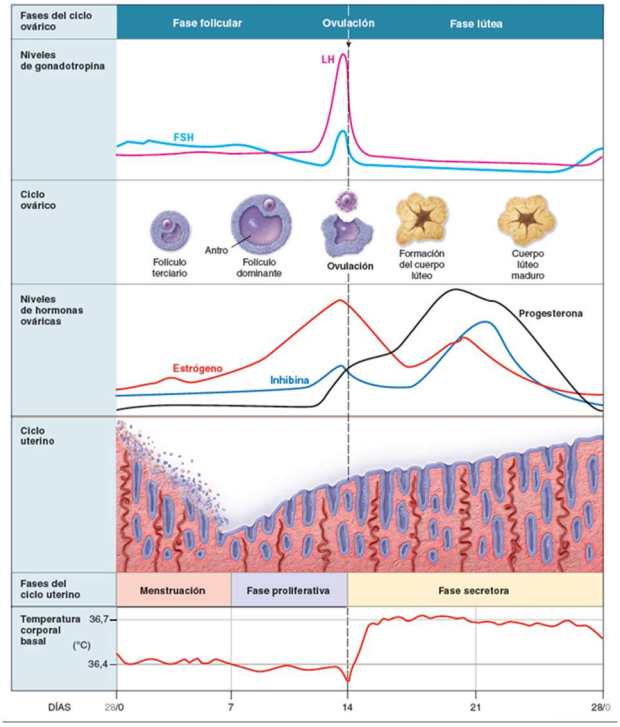


Figure 2. Changes that occur during the cycle.

Oestrogens.

Concentration during the cycle and physiological effects.

The concentration of oestrogenic hormones increases progressively during the follicular phase, at the beginning of the menstrual cycle. In this gradual increase, a peak of maximum concentration is reached just before the release of the mature ovum (about 24 hours before). This increase in oestrogenic hormone concentration coincides with a peak in the concentration of luteinising hormone, one of the main gonadotrophins that stimulates the production of gonadal hormones such as oestrogens.

After ovulation, after about 72 hours, the oestrogen concentration drops to about half of its peak at the beginning of the luteal phase. After that, it rises again slightly, remaining at values lower than those recorded before ovulation, and then falls progressively to its lowest point at the end of the luteal phase. As its concentration is particularly high during the follicular phase, the

physiological effects shown below are especially noticeable in the follicular phase, during the first 12 to 21 days of the cycle:

Somatic effects: redistribution of body fat: lipolysis, pubertal sprouting, increase in bone mass: anabolic effects, closure of bone epiphyses and development of secondary sexual characteristics.

Effects on reproductive organs: increased progesterone receptors, trophic effects on myometrium and vagina, increased uterine blood flow, endometrial proliferation, secretion of filmy mucus and increased vaginal pH.

Vascular and metabolic protective effects: increased endothelial nitric oxide synthesis: vasodilator effect, antioxidant effect, increased HDL/LDL ratio (improved cholesterol profile), increased circulating fibrinogen and complex regulation of the renin-angiotensin-aldosterone system.

Effects on the central nervous system and adenohypophysis: modification of sexual behaviour with increased oestrus ("estrus" = heat), increased neuronal excitability and increased synaptogenesis and neurogenesis; and regulation of other pituitary hormones with increased growth hormone and prolactin.

Other effects: increased hepatic protein synthesis, positive immunomodulatory effects, proliferation of integuments that keep skin smooth and healthy; and stimulation of collagen production (healing).

Performance implications.

The combination of all the physiological effects described above, which occur at different levels, has a series of implications for physical performance, including a favourable anabolic environment due to the anabolic effect of this hormone. In addition, the follicular phase, with a higher oestrogen concentration, is the ideal time to increase carbohydrate intake and replenish muscle glycogen stores. On the other hand, increased neuronal excitability and increased synaptogenesis and neurogenesis promote greater neurological adaptations to training to occur.

This range of performance implications can also be exploited from a training standpoint by following a series of guidelines that allow the athlete to maximise the benefits of increased oestrogen concentration. For example, the follicular phase is an ideal time to programme high-intensity training, maximising energy production by glycolytic means, as this is favoured.

On the other hand, in athletes who aim to achieve an increase in muscle mass, this phase is optimal for programming a higher level of effort in strength training, bringing the series closer to failure than in other phases of training. In cases of concurrent strength and endurance training such as that represented by a rower, the optimisation of glycolytic pathways allows the athlete to improve performance at high cardiorespiratory intensities (R3, R3+ and R4 paces), so it will be the right time to programme a higher volume at these intensities.

In addition, it is interesting to test competition strategies such as simulations and, especially, carbohydrate overloads typical of cyclic sports, thus taking advantage of the fact that glycogen storage is favoured in this phase.

Progesterone.

Concentration during the cycle and physiological effects.

The concentration of progestogens during the phases of the cycle differs from that described for oestrogens. For their part, progestogens maintain a relatively low and constant concentration during the follicular phase, and it is not until 24-48h before ovulation that they begin to increase progressively.

After ovulation, it continues to increase until it reaches its maximum peak towards the middle of the luteal phase, around day 7-8 of the luteal phase, which lasts for a constant 14-16 days. The maximum peak coincides with the formation of the corpus luteum from the mature, unfertilised ovum and, from then on, it falls progressively to its lowest values, coinciding with the beginning of the next cycle.

Since its concentration is particularly high during the luteal phase, the physiological effects cited below are especially noticeable during the last 14-16 days of the cycle:

- Somatic effects: increased body temperature and respiratory rate.

- Effects on reproductive organs: induction of oestrogen conversion (oestradiol to oestrone), induction of the endometrial secretory phase, inhibition of the proliferative effect of oestrogens on the endometrium, inhibition of myometrial activity and decrease in vaginal pH.

- Vascular and metabolic effects: decrease in HDL/LDL ratio (worsening of cholesterol lipid profile) and decrease in insulin sensitivity.

- Effects on the central nervous system and adenohypophysis: sensation of drowsiness and sedation together with decreased neuronal excitability (premenstrual syndrome).

- Regulation of gonadotropin secretion: increased sensitivity to increased partial pressure of carbon dioxide (PCO2).

- Other effects: increased hepatic protein synthesis, negative immunomodulatory effects and fluid retention.

Performance implications.

The sum of all the physiological effects of high progestogen concentration has a number of performance implications which will be particularly noticeable during the luteal phase. On the one hand, the anabolic environment is very unfavourable, unlike during the follicular phase.

The lipolytic pathway is favoured, with a greater use in obtaining energy. In addition, premenstrual syndrome appears, and with the increase in body temperature and lower neuronal excitability, athletes are physiologically predisposed to have a sensation of greater perceived effort in training.

Given these changes and their implications, there are a number of strategies to consider from a training perspective to get the most out of the luteal phase. One of these is to reduce the volume of strength training, due to the lower tolerance and predisposition to adaptations in terms of strength and hypertrophy. In this phase, it will be ideal to programme a lower level of effort and, in addition, to increase resistance work at low intensity (R0 and R1 rhythms) given that the lipolytic pathway is favoured.

Plasma, haemoglobin and haematocrit.

In addition to variations in hormone levels, the menstrual cycle is associated with changes in the amount and content of plasma, haemoglobin and haematocrit, which are due to variations in fluid content and blood loss during the first few days. With menstruation, an average of 43 mL of blood is lost, with 11% of women losing even more than 80 mL. This results in a decrease in haematocrit and total haemoglobin content due to a decrease in red blood cells.

The haematocrit is a measure of blood haemoglobin concentration (g/dL), the result of dividing the total haemoglobin content by the volume of blood plasma. The amount of the latter varies to a greater extent, taking into account changes in fluid volume, which differs in the different phases of the cycle, being higher during the luteal phase in preparation for the losses that occur during

menstruation at the beginning of the next cycle. The total haemoglobin content (g) is less variable and represents the total number of molecules available for oxygen transport.

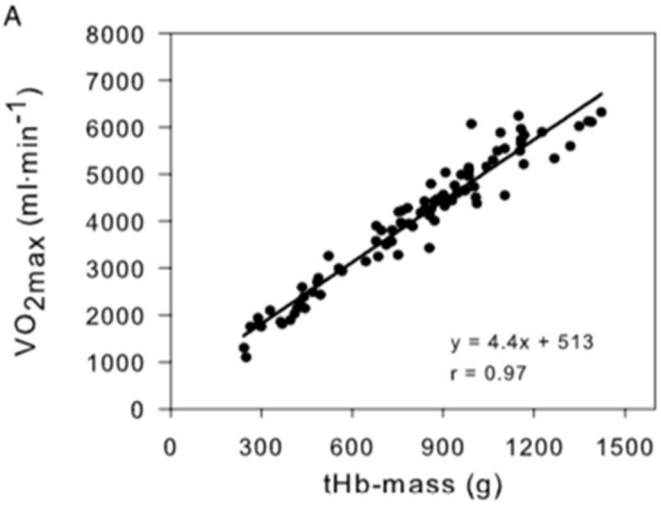


Figure 3. Relationship between haemoglobin content and maximal oxygen consumption.

Source: Schmidt and Prommer (2010).

Since haematocrit varies in response to changes in plasma volume, its relationship to maximal oxygen consumption (VO2max) is not significant. However, as shown in Figure 3, total haemoglobin content does have a directly proportional and significant relationship with VO2max. In other words, the fact that the total haemoglobin content is dissolved in a variable plasma volume (haematocrit) has no effect on VO2max, but losses of total haemoglobin (in g) do have a negative effect on this parameter.

Assuming an average haematocrit value of 14.5 g/dL (i.e. 14.5 grams of haemoglobin per decilitre of plasma) in women, the average loss of 43 mL in each bleed implies a decrease in total haemoglobin content of approximately 14.5 - 0.43 dL = 6.24 grams.

This, applied to the regression equation, implies a decrease in VO2max of 27.5 mL/min, which for a 56kg athlete would represent a loss in VO2max of 0.5 mL/kg/min. In the case of the 11% of women who lose more than 80 mL due to bleeding, this reduction can reach 1 mL/kg/min of their VO2max during the first days of the cycle.

Subsequently, during the follicular phase, total haemoglobin (and thus haematocrit) gradually recovers. At the end of this phase, plasma volume increases in the days leading up to ovulation due to an increase in the concentration of progestogens, which promote fluid retention.

Thereafter, in the luteal phase, the total haemoglobin content remains stable, but the haematocrit decreases because fluids continue to accumulate, especially from the mid-luteal phase towards the end of the cycle.

Heart rate, ventilation and electrolytes

The resting heart rate and resting ventilation are higher during the luteal phase compared to the follicular phase, together with an increase in temperature due to the action of progesterone. This series of changes are what produce a sensation of greater perceived exertion during training, especially in the mid and late luteal phase.

In addition, the concentrations of electrolytes such as sodium and potassium decrease in the luteal phase in relation to their concentrations during the follicular phase, with a negative effect on neuronal excitability. On the other hand, bicarbonate levels are reduced during ovulation and menstruation. Bicarbonate is an electrolyte with a buffering capacity for acid metabolites resulting from training effort, so it loses part of its buffering effect in the aforementioned phases.

Premenstrual syndrome

Premenstrual syndrome is a series of physical and psychological alterations experienced by women during the 7-10 days prior to menstruation with different prevalence among athletes. Some of the physical changes include headache, cramps, breast swelling, bloating, constipation and/or diarrhoea, while psychological changes include low mood and dysphoria, anxiety, emotional lability, irritability, loss of interest and/or lack of concentration. All these disturbances can negatively influence training and performance, directly or indirectly.

Prevalence and experiences of athletes.

On the prevalence and experiences of female athletes with PMS, a study reviewed the changes associated with PMS in a large number of female athletes (Amour et al., 2020), showing that 76% of them did not discuss the menstrual cycle with their coaches and their training was therefore not modified on the basis of the menstrual cycle. Eighty-three per cent of the respondents reported experiencing some of the above-mentioned symptoms during the pre-menstrual period.

More than half (56%) reported negative consequences of PMS on their performance in training and competitions. Almost two thirds (62%) avoided talking about PMS with their coach because of embarrassment or a feeling of lack of understanding. Seventy-one percent of the female athletes indicated that they felt less energy or fatigued earlier in the days before menstruation

and, finally, only 6% of the respondents reported a positive effect on performance due to the changes of the pre-menstrual period, feeling stronger or faster.

Female athlete triad

The female athlete triad is an adverse condition resulting from the sum of three negative health conditions that occur mainly in women and which are highly interrelated, so that the presence of any one of these conditions can cause the appearance of the others. These three conditions are low energy availability, loss of bone mineral density and menstrual disorders (primary and secondary amenorrhoea, etc.). Because of the interrelationship between the three, when optimal energy availability is maintained, the other conditions are usually also in balance, with no decrease in bone density and no amenorrhoea.

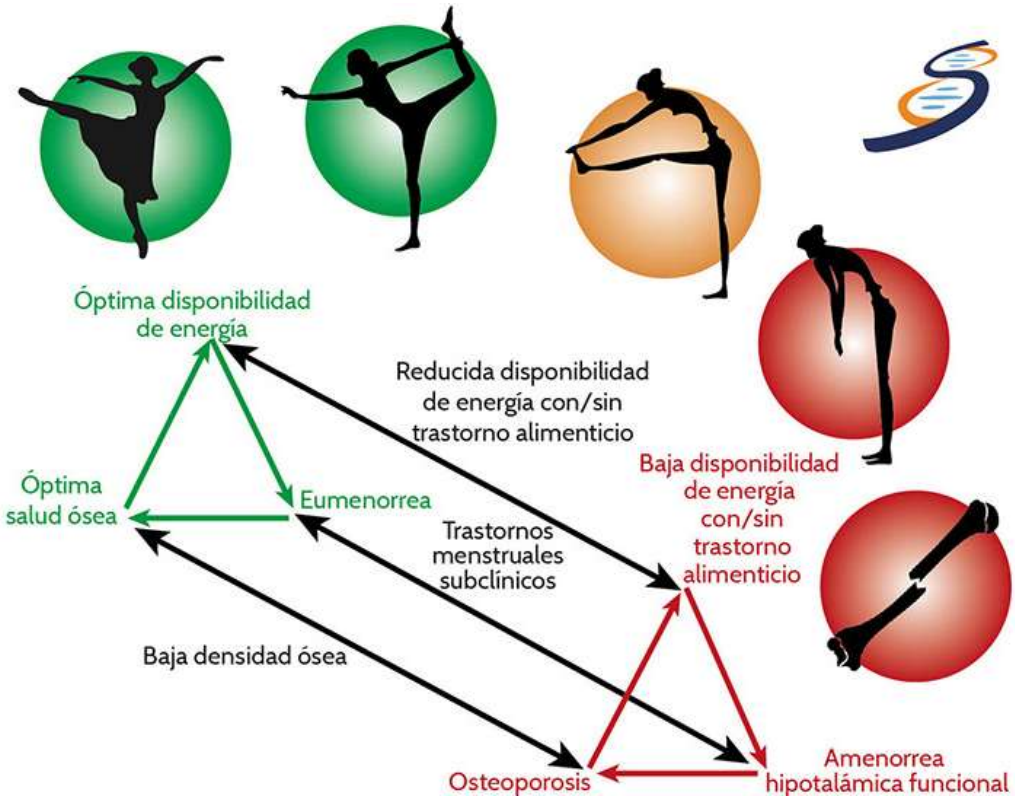


Figure 4. Interrelation between the 3 conditions that make up the triad of the female athlete.

Low energy availability

Energy availability is the balance between the energy consumed by the body and the energy ingested through food. Low energy availability can therefore be caused by drastic decreases in

intake or high increases in activity-related caloric expenditure that are not adequately supported by diet. This low energy availability is associated with hypothalamic dysfunction:

There is a reduction in the ability to secrete gonadotrophins (LH: luteinising hormone and FSH: follicle-stimulating hormone). This increases the incidence of anovulatory cycles, which are those in which bleeding occurs due to the shedding of the endometrium, so that the uterine cycle is maintained, but without the production of mature oocytes, with loss of the ovarian cycle.

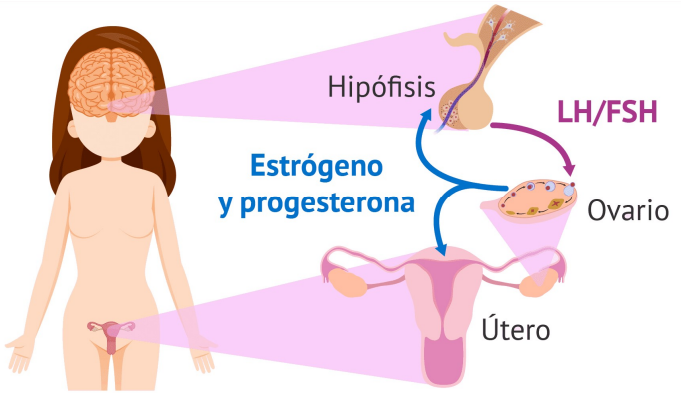


Figure 5. Gonadotropin and gonadal hormone secretion.

As a result, the production of progesterone and oestrogens is limited, leading to amenorrhoea (menstrual disorders) and the loss of the bone protective function of oestrogens. This is the first point of interrelation between low energy availability and the other two conditions that make up the female athlete's triad. But, in addition, a negative energy balance, especially when it is due to a decrease in energy intake, is associated with a decrease in the intake of iron and calcium, among others, which are essential for the maintenance of good health and have a special relationship with the menstrual cycle and bone health, respectively.

The risk of low energy intake is particularly increased in athletes participating in weight-based sports (wrestling, judo, karate, weightlifting, etc.), in sports where physique and aesthetics are of particular importance (dancers, gymnasts, etc.) or in sports where the activity is inherently energy intensive (endurance athletics, cycling, etc.).

Menstrual disorders

Menstrual disorders are understood as alterations in the normal functioning of the menstrual cycle, which can be of various kinds and have many different causes. Among the most frequent alterations are oligomenorrhoea (longer and less frequent cycles), primary amenorrhoea (absence of menstrual cycle at 13-14 years of age) and secondary amenorrhoea (absence of

menstrual cycle for more than 90 days once menarche has already occurred: the first cycle of a woman's life).

These can occur in relation to low energy availability or due to other causes such as sustained high energy expenditure. In either case, they have a negative effect on health and performance. The subsequent hormonal reduction results in decreased vasodilation and perfusion to the muscles, imbalances in oxidative metabolism, worsening of the HDL/LDL ratio and increased bone resorption (uptake of calcium from the bones for circulation in the body).

Loss of bone mineral density

Loss of bone mineral density usually occurs in response to a decrease in bone calcium content, which is the point of interrelationship with the other two conditions of the triad, either through loss of protective oestrogen function as amenorrhoea occurs and oestrogen production decreases, or through reduced oestrogen intake associated with low energy availability. However, it can also occur for other unrelated reasons and appear "genuine" or primary to the other potential triad conditions. In these cases, it can occur due to low calcium intake without energy restriction, concomitant intake of other minerals or calcium chelating elements that hinder its absorption, the presence of pathologies related to the thyroid gland or diabetes.

In all cases, the reduced availability of calcium in the body is compensated by bone resorption which puts calcium from the bones into circulation to be used for other purposes (neuromuscular excitability, renal processes, etc.). This is associated with a loss of bone mineral density, increasing the risk of fractures.

In relation to the other conditions, oestrogens have a protective effect on bone resorption, decreasing the activity of osteoclasts, which are responsible for calcium resorption, and at the same time increasing the activity of osteo-blasts, which carry out the opposite action and promote the fixation of calcium in bone tissue. Therefore, a decrease in their production due to any of the aforementioned causes is related to a loss of mineral density.

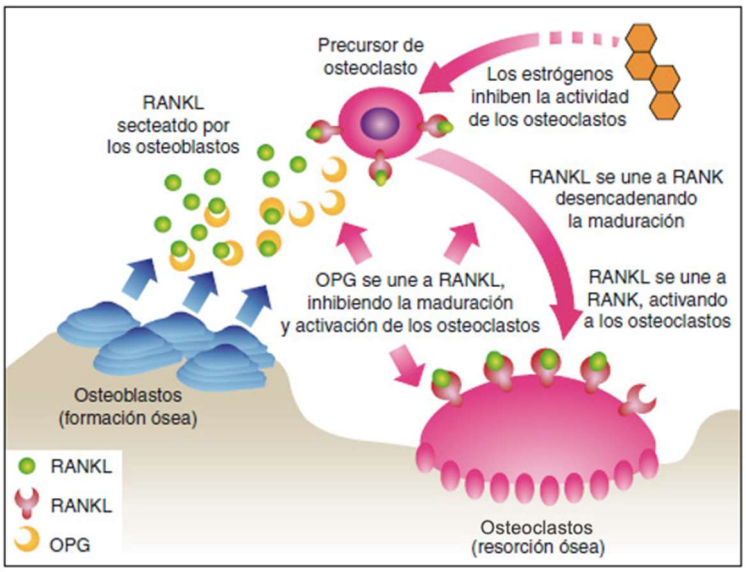


Figure 6. Bone resorption protective activity (oestrogens).

Prevalence of the female athlete triad

Although the prevalence is highly variable between studies, up to 60% of female athletes may suffer from one of the conditions of the triad, the most frequent being menstrual cycle disturbance, either clinically or subclinically. In any case, it should be borne in mind that menstrual disorders are probably the easiest condition to detect and require the least technical means. On the other hand, low energy availability and especially bone mineral density losses are more difficult to detect and require more knowledge and technical means.

The occurrence of all of them, and in particular low energy availability, is closely related to eating disorders: women have a higher risk of suffering from them (10:1 compared to men), their prevalence is higher among sportswomen compared to sedentary women and, moreover, they occur more frequently in young women. All this, added to the sports modalities mentioned above, predisposes to the occurrence of the triad or some of its conditions.

In terms of the prevalence of the triad and each of its formative conditions, the triad is thought to have a prevalence of between 0% and 16% of athletes, with between 3% and 27% suffering from two conditions simultaneously and between 16% and 60% of athletes suffering from one of them, as shown in Figure 7.

Of the three conditions, menstrual disorders may be the most prevalent, with evidence of between 1% and 60% of athletes experiencing them. On the other hand, low energy availability

is present in between 4% and 39% of female athletes, while bone mineral density losses occur in up to 40% of athletes.

However, it should be borne in mind that these proportions could be even higher, given the aforementioned difficulties in detecting some of them, so, in summary, it is clear that the female athlete's triad is a problem with a high incidence among female athletes.

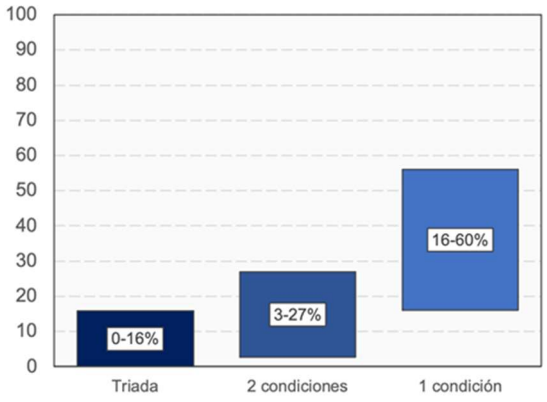


Figure 7. Prevalence (in %) of the triad.

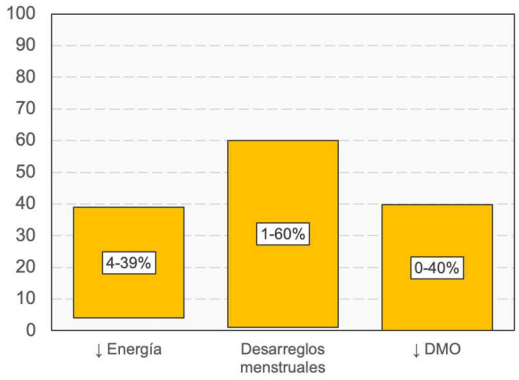


Figure 8. Prevalence (in %) of each condition. Source: Gibbs et al. (2013).

Periodisation of training based on the cycle

The periodisation of training is the planned organisation and distribution of training and its variables (volume, intensity, etc.) in a defined period of time, which can be of variable duration, with an objective and a reason for its choice.

Generalities of periodisation in beginners

In a study by Grgic et al. (2017), they analysed the differences in the adaptations observed at the hypertrophy level in mostly untrained subjects with a training programme equal in volume, but

with different periodisation: linear vs. undulating. In the linear periodisation there is an ascending progression in the relative intensity of the training, using loads that constitute a higher percentage of the maximum repetition (%RM) of each athlete in each training session; while in the undulating periodisation the progression is not linear. However, there are days with higher loads followed by others with lower undulations. In terms of hypertrophy, there were no differences according to the periodisation used.

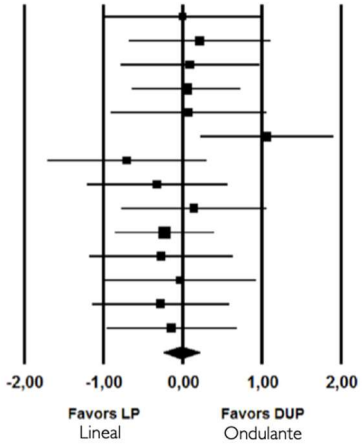


Figure 9. Meta-analysis of the effect of linear vs. undulating periodisation.

This suggests that, in untrained athletes or athletes with a low level of training who are aiming to achieve an increase in muscle mass, there are other variables more important than periodisation to pay attention to. The authors suggest, based on these results, that the choice of periodisation model should be made based on the athlete's preferences.

Regarding strength gains, the study by Harries et al. (2015) analysed the change in 1RM of squat and bench press in untrained subjects with a linear versus an undulating periodisation model. The training volume between groups was the same, and the results showed that there was no difference in either of the two movements analysed in terms of strength gains as a result of training with one or the other periodisation model.

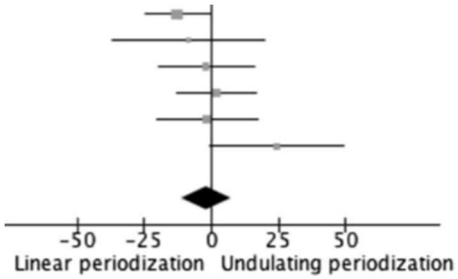


Figure 10. Meta-analysis of the effect of linear vs. undulating periodisation on squat strength gains.

In light of these results, the authors suggest that a variation in stimuli may be more effective than the choice of a particular periodisation model in maximising strength gains in untrained athletes.

Differences between types of periodisation

Block vs. undulating

A study by Bartolomei et al. (2015) studied the differences in the adaptations produced by the same type of training in women with different choice of periodisation model: block vs. undulating. In block periodisation, different predefined training phases are established in which a fixed intensity is used that varies between blocks, while the volume within and between blocks can also vary.

The authors compared changes in different exercises such as the countermovement jump (CMJ), squat, deadlift, bench press and peak rate of force development (PRFD). In addition, they studied the differences observed in body composition adaptations in terms of lean mass, fat mass, arm circumference and triceps cross-sectional area.

The results obtained in this study in women showed greater adaptations in terms of both strength and body composition in those who followed an undulating periodisation model, with significant differences in favour of the latter in all the variables mentioned except 1RM in dead weight and arm circumference. These differences probably lie in the fact that in the block model, phases with a high intensity or volume of training can be made to coincide with the moments of the menstrual cycle when the athletes are less inclined to perform or feel a greater perception of effort. On the contrary, the undulating model is less affected by these phases, as the undulation in the loads may result in less coincidence of days with high training intensities with the luteal phase, ovulation or bleeding. Therefore, if information on an athlete's menstrual cycle is not available, the undulating model is a better choice than the block model.

Linear vs. linear inverted vs. wavelet

Two other studies conducted by de Lima (2012) and Prestes (2009) compared the adaptations related to strength gains and body composition changes in women who performed the same training, but with three different types of training periodisation: linear, inverted linear and undulating. The inverted linear periodisation is one in which, unlike the ascending linear one, it

starts with higher loads in the first training sessions and progressively decreases in the subsequent ones.

Firstly, in the comparison between linear ascending and inverted, a significantly greater increase in strength was observed in the high pulley pull-up and arm curl exercises with the ascending periodisation model. In addition, this model led to a significantly greater increase in fat-free mass than the inverted linear, so, in summary, it is obtained that in women an ascending linear periodisation seems to be more effective in the adaptations achieved with respect to the inverted linear.

Next, comparing the linear ascending with the undulating, it was observed that the results were very similar, with only two significant differences, one in favour of each type of model. On the other hand, the linear periodisation promoted a greater decrease in body fat percentage, while the undulating one favoured a significantly greater increase in 1RM in bench press. Based on these data, it seems that in women, linear upward and undulating periodisation promote greater adaptations than linear inverted periodisation, with no differences between the first two.

Based on the menstrual cycle

Periodisation based on the menstrual cycle is not a model in itself, but constitutes the modulation of loads and their distribution according to the different phases of the menstrual cycle. Therefore, various models of periodisation can be adapted to achieve periodisation based on the menstrual cycle. For example, the linear ascending periodisation model adapted to the menstrual cycle would start with the lightest loads and lowest effort character in the luteal phase of a menstrual cycle, then increase in a linear fashion to reach the highest intensities during the follicular phase of the next cycle, when performance is enhanced.

On the other hand, the undulating periodisation model is more flexible for adaptation, as there is no fixed progression to follow as there is in the linear ascending model. In this way, strength sessions will be proposed with greater intensity and character of effort during the follicular phase, and these loads and effort can be undulated downwards on days with less predisposition (for example, during bleeding, which occurs during the follicular phase).

In a systematic review on this issue (Thompson et al., 2020), the authors compared different periodisation models with two foci:

1. Non-periodised training vs. periodised training on a cycle basis.

2. Cycle-based periodisation: follicular-based vs. luteal-based.

Regarding the first comparison, they analysed the differences between training every 3 days (regardless of the time of the cycle) and the same type of periodised training based on the cycle: training every two days in the follicular phase and training every week in the luteal phase. The results observed indicated that periodisation based on the cycle produced greater adaptations in terms of strength.

Then, once it became clear that cycle-based periodisation is the most appropriate in women, they went on to compare follicular-based (greater training volume in the follicular phase) and luteal-based (greater volume in the luteal phase). In this case, they observed that accumulating a greater volume of training in the follicular phase allows greater gains in strength and muscle mass compared to accumulation in the luteal phase (with equal volume between models). The differences between the two sub-models lie in the physiological changes mentioned throughout the paper.

However, as we have discussed in this section, the follicular phase includes the days of bleeding, which may alter the performance or training readiness of female athletes. This raises the question of whether the accumulation of training volume in the follicular phase should also be maintained during this menstrual period. To answer this question, McNulty et al. (2020) conducted a meta-analysis comparing performance in the early follicular phase (bleeding) with the rest of the follicular phase.

In their work, they observed a high heterogeneity between the different studies. The overall effect is not significant in favour of the bleeding phase over the rest of the follicular phase, but there are studies (and therefore groups of women) where performance is better during bleeding (green shading), others where there are no differences (yellow shading), groups where there seems to be a trend towards performance improvements when there is no bleeding (pink) and some studies where large differences are observed in favour of performance in the absence of menstruation (red).

Although no clear overall effect is observed, the authors suggest that the area under the performance curve is lower in the early follicular phase compared to the rest of the follicular phase, and that the differences could be due to the interindividual differences in the menstrual period and associated symptomatology in each case. Therefore, a progressive increase in follicular phase volume is proposed, taking into account previous bleeding experience.

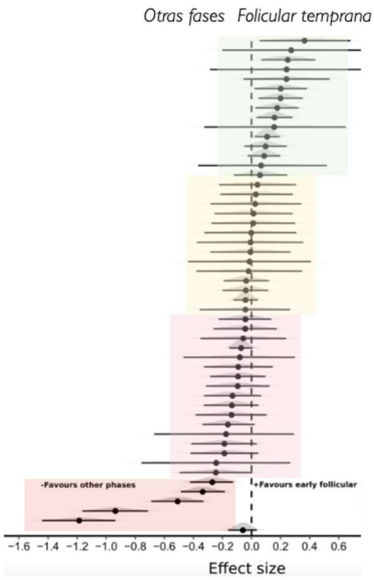


Figure 11. Meta-analysis of performance in the early follicular phase (bleeding) vs. the rest of the follicular phase.

For this, good communication between athlete and coach is key in achieving the best distribution of training. Furthermore, taking into account the differences from one athlete to another is a determining factor in the periodisation of training based on the menstrual cycle.

Summary and practical application

To summarise what was presented in section 3, we state that several different periodisation models have been investigated in women's training:

- By blocks.
- Undulating (daily/weekly).
- Linear (ascending and inverted).
- Based on the menstrual cycle (follicular-based and luteal-based).

Undulating periodisation produces greater effects on performance and body composition variables than block periodisation. Between linear and inverted linear, the former seems to facilitate better adaptations in terms of performance, hypertrophy and fat loss.

When comparing linear and undulating, both produced similar effects on performance and body composition, although linear seems to favour the anthropometric component to a greater extent, while undulating could benefit performance to a greater extent.

Periodisation based on the menstrual cycle appears to be a better option for managing training in women. The benefits observed in undulating periodised training could be due to this fact.

Periodised training by blocks means that periods of high workload can coincide indistinctly with phases of the menstrual cycle in which women benefit to a lesser extent.

Bearing in mind all of the above, the practical application that we can extract is: periodise training in a linear or undulating way, making the weeks with the highest workload in the follicular phase coincide with the weeks of recovery or lower workload in the luteal phase. During the follicular phase, reduce the load during menstruation if there is a drop in performance in previous mesocycles.

References

1. Armour M et al. Australian female athlete perceptions of the challenges associated with training and competing when menstrual symptoms are present. Int J Sports Sci Coa. 2020;15(3):1-8.

2. Bartolomei S et al. Block vs. Weekly Undulating Periodized Resistance Training Programs in Women. J Strength Cond Res. 2015; 29(10):2679-87.

3. de Lima C et al. Linear and daily undulating resistance training periodizations have differential beneficial effects in young sedentary women. Int J Sports Med; 2012; 33(9):723-7.

4. Gibbs JC et al. Prevalence of individual and combined components of the female athlete triad. Med Sci Sports Exerc. 2013;45(5):985-96.

5. Grgic J et al. Effects of linear and daily undulating periodized resistance training programs on measures of muscle hypertrophy: a systematic review and meta-analysis. PeerJ. 2017; 22;5:e3695.

6. Harries HK et al. Systematic review and meta-analysis of linear and undulating periodized resistance training programs on muscular strength. J Strength Cond Res. 2015; 29(4):1113-25.

7. McNulty KL et al. The Effects of Menstrual Cycle Phase on Exercise Performance in Eumenorrheic Women: A Systematic Review and Meta-Analysis. Sports Med. 2020; 50(10):1813-1827.

8. Prestes J. Comparison of linear and reverse linear periodization effects on maximal strength and body composition. 2009; 23(1):266-74.

9. Schmidt W & Prommer N. Impact of alterations in total hemoglobin mass on VO2max. Exerc Sport Sci Rev. 2010;38(2):68-75.

10. Thompson B et al. The Effect of the Menstrual Cycle and Oral Contraceptives on Acute Responses and Chronic Adaptations to Resistance Training: A Systematic Review of the Literature. Sports Med. 2020; 50(1):171-185.

Eating disorders in the female athlete

Introduction

Mental health in sport involves an extensive field of study and analysis that unfortunately has received little interest from sports institutions, the media, and society in general, until the last few years. Some world sports stars have confirmed their suffering from different clinical conditions, such as anxiety disorders and depression, which has led to greater visibility of these relevant problems. Independently of the most popular athletes, various psychological pathologies can have an impact on the health of the practitioner at any level of competition. In addition to those mentioned above, exercise addiction, burnout, overtraining, or substance use and abuse, among others, can have serious consequences for those who suffer from them, not only on their sports performance, but also on their health and general well-being.

Due to its high prevalence and the negative effects it involves, a significant pathology in sport is Feeding and Eating Disorders. The estimated prevalence of eating disorders and disordered eating in athlete's ranges from 0 to 19% in men, and between 6 and 45% in women (Bratland-Sanda & Sundgot-Borgen, 2013), statistics clearly show the magnitude of the problem, especially among female athletes. In addition, it also highlights that its prevalence in athletes is higher compared to non-athlete populations (Joy et al., 2016). It is also considered that eating disorders can affect any athlete, and occur in any sport and at any time, crossing the limits of gender, age, body size, culture, socioeconomic status, performance level and sport performance.

Although, as already mentioned, any athlete may be susceptible to developing one of these disorders, it is true that there are disciplines that, due to their intrinsic characteristics and competition rules, involve a higher risk. Among them, are usually mentioned sports with aesthetic criteria (such as rhythmic and artistic gymnastics, figure skating, dance, bodybuilding or synchronized swimming), gravitational sports, where a heavier body weight can restrict performance because moving the body against gravity is an essential part of the sport (such as long-distance running, cross-country skiing, road or mountain biking, ski jumping, or jumping events in athletics), and sports that compete in weight categories (lightweight rowing, weightlifting, and combat sports such as Olympic wrestling, judo, taekwondo or boxing).

Eating disorders

Eating behavior is the set of actions of the individual in response to biological, psychological and sociocultural circumstances linked to food (Sámano et al., 2012). An imbalance in this behavior can lead to several problems.

Feeding and Eating Disorders are serious psychiatric diseases, characterized by alterations in behavior, attitudes and food intake, usually accompanied by intense preoccupation with weight or body shape, and include problematic eating behaviors, distorted beliefs, preoccupation with food, eating and body image, and result in significant distress and impairment of daily functioning (e.g., in sports, school/work, or social relationships) (American Psychiatric Association, 2013). They constitute difficult-to-treat and health-damaging diseases that predispose individuals to malnutrition or obesity and are associated with poor quality of life, high rates of psychosocial comorbidity and premature mortality.

But in addition, between optimal and appropriate nutrition for the athlete and eating disorders, there are also disordered eating, which are problematic behaviors that do not meet the clinical diagnosis of an eating disorder, but also have adverse consequences for the athlete (Wells et al., 2020). Therefore, we can understand that in this continuum (Figure 1) there are thin lines that separate the correct athlete's nutrition from the disorganized practices that are often usual and assumed as not problematic, and from these to suffer from a clinical disorder with excessively harmful effects.

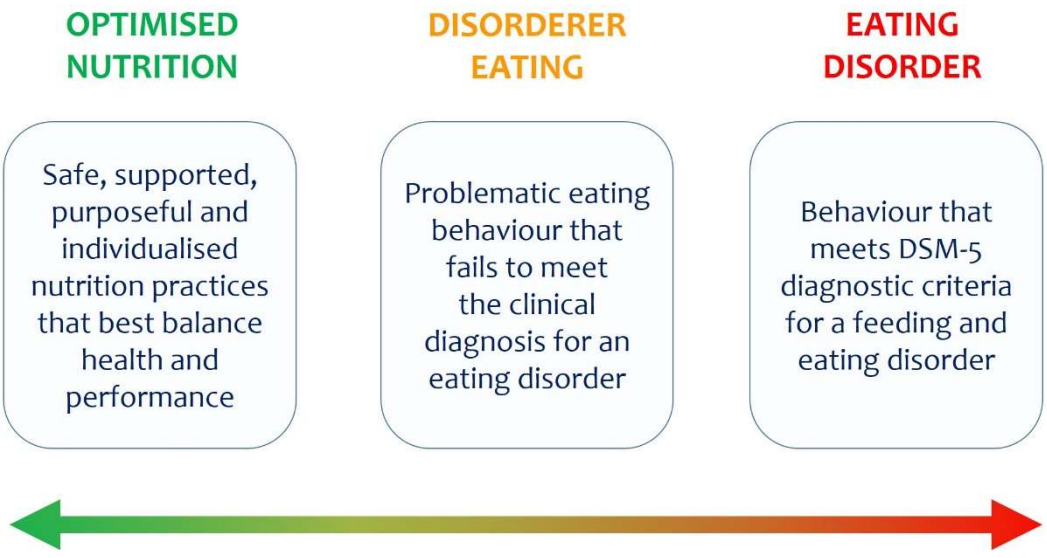


Figure 1. Eating behavior continuum (Wells et al., 2020)

Eating disorder and disordered eating share different common characteristics, but at the same time present particularities that differentiate them, which can be verified in Table 1 (Reardon et al. 2019). The main difference is that, although it can be seen how disorders involve patterns that can lead to harmful consequences, they are not usually as disabling as disorders.

Table 1. Characteristics and differences between ED and DA (In Reardon et al. 2019)

EATING DISORDERS	DISORDERER EATING
Restricting, bingeing or purging often occur multiple times per week	Pathogenic behaviours used to control weight (e.g. occasional restricting, use of diet pills, bingeing, purging or use of saunas or 'sweat runs') may occur but not with regularity
Obsessions with thoughts of food and eating occur much of the time	Thoughts of food and eating do not occupy most of the day
Eating patterns and obsessions preclude normal functioning in life activities	Functioning usually remains intact
Preoccupation with 'healthy eating' leads to significant dietary restriction	There may be preoccupation with 'healthy eating' or significant attention to caloric or nutritional parameters of most foods eaten but intake remains acceptable
Excessive exercise beyond that recommended by coaches may be explicitly used as a frequent means of purging carbs	While exercise may not be regularly used in excessive amount to purge calories, there may be a cognitive focus on burning calories when exercising

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (American Psychiatric Association, 2013), establishes various types of eating disorders. In summary, these disorders and their main characteristics are as follows:

- *Anorexia Nervosa*. Restriction of energy intake in relation to requirements, leading to a significantly low body weight in the context of age, sex, developmental trajectory,

and physical health. Intense fear of gaining weight or of becoming fat. Distorted body image. Persistent failure to recognize the severity of current low body weight.

- *Bulimia nervosa*. Recurrent episodes of binge eating and compensatory behaviors designed to undo or offset the effects of binge eating. Ingestion in a given period of a quantity of food that is clearly in excess of what most people would eat in a similar period under similar circumstances. Feeling of lack of control over what is ingested during the episode. Compensatory behaviors: self-induced vomiting, incorrect use of laxatives, diuretics or other medications, fasting or excessive exercise. Binge eating and inappropriate compensatory behaviors occur, on average, at least once a week for three months.
- *Binge-Eating disorder*. Recurrent episodes of binge eating. Eating much more quickly than usual. Eating until you feel unpleasantly full. Eating large amounts of food when not physically hungry. Eating alone because of embarrassment about the amount eaten. Feeling disgusted with oneself, depressed or very ashamed. Intense discomfort about binge eating. They occur, on average, at least once a week for three months.
- *Other Specified Feeding or Eating Disorder*. Includes atypical anorexia nervosa, bulimia nervosa of low frequency and/or limited duration, binge-eating disorder of low frequency and/or limited duration, purging disorder and night eating syndrome.
- *Avoidant/Restrictive Food Intake Disorder*. Similar to anorexia, as both involve limitations in the amount and/or types of food consumed. Unlike anorexia, it does not involve any distress about body shape or size, or fear of becoming fat.

Eating disorders in sport

Risk factors

Eating disorders are often caused by a number of risk factors to which the athlete may be exposed. General risk factors and sport-specific factors are usually cited (Bar et al., 2016; Bratland-Sanda & Sundgot-Borgen, 2013; Reardon et al. 2019; Wells et al., 2020). Among the general risk factors, there are biological, psychological and sociocultural risks.

Of the biological risk factors, age, time of development or certain genetic factors may be important elements influencing the athlete. Also, body dissatisfaction, low self-esteem or perfectionism are psychological variables that have been shown to have a high effect on the onset

of eating disorders. Family and media influences, the "ideals of beauty and thinness" prevailing in society, and peer pressures are examples of risk factors at the sociocultural level.

Sport-specific risk factors are also important. The aforementioned sports with a higher risk or in which weight is a determining factor, such as aesthetic sports or category sports, or sports regulations that lead certain athletes to conform to specific body prototypes are basic risk factors. In addition, the transitional periods through which the athlete may go through are important, such as early specialization and sport-specific training before the body is fully mature, being out of practice for a while due to injury or illness, or the end of her sporting career.

Table 2. Risk factors to Eating Disorders

GENERAL RISK FACTORS	SPORT-SPECIFIC RISK FACTORS
• *Biological risk factors* - Genetic factors (e.g. eating disorders or addictions in the family) - Age - Stages of growth, development or puberty - Early growth or development - Growth or development significantly different from average • *Psychological risk factors* - Body dissatisfaction - Low self-esteem - Personality traits (e.g. perfectionism, neuroticism) - Impulsivity - Stress reactivity - Anxiety - Depression - Negative affectivity	- Risky or weight-sensitive sports - Pressure and behavior of the coach - Professionalization - Competition category - Performance pressure - Weight and diet pressure - Sports rules and regulations - Gender-specific risk factors - Muscularity demands - Traumatic events, including injuries - Steroid use - Use of nutritional and ergogenic supplements and aids - Transition periods Early initiation of sport-specific training Entering a senior team at an early age Retirement (forced or voluntary) Non-selection or exclusion Injury, illness, surgery, time away from sport and training

- *Socio-cultural risk factors*
  - Family influence, value placed on weight and aesthetics
  - Family eating patterns
  - Peer pressure
  - Media influence
  - Bullying
  - "Thinness ideal", "muscularity ideal" or "fitness ideal"
  - Teasing based on weight or appearance, intimidation
  - Social isolation
  - Experiences of weight stigmatization

Other conditions in sport

In addition to the disorders covered by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013), and that undoubtedly any athlete can suffer from, in this field different researches have analysed other conditions related to eating styles and behaviors and body image that, although they are mostly in relative initial stages of study, their impact and the existing prevalence rates make it necessary to know and research them, as ways for prevention and treatment.

Muscle dysmorphia or bigorexia, in DSM-5 it is conceptualized as a specific type of body dysmorphic disorder, although there is increasing evidence linking it to eating disorders. (Compte & Sepúlveda, 2014). Muscle dysmorphia involves an disturbance of body image, with a pathological preoccupation with muscle composition and muscle development, with underestimation of body size and strength. A basic problem is that it leads to dietary restriction and maladaptive compensatory behaviors develop. In addition, high physical activity leads to impairment in social, occupational or family areas. It has sometimes been mentioned that bigorexia and anorexia are pathologies totally opposed (gaining volume versus being thin), although both share the common refusal to gain fat.

Orthorexia involves a pathological obsession with following proper or healthy eating, and the establishment of an emotionally disturbed relationship with food, leading to a restrictive diet, focused attention on food preparation, and the emergence of ritualized patterns with food (Bratman & Knight, 2000). The person becomes so obsessed with so-called "healthy eating" that it actually harms their own well-being and quality of life, as orthorexia leads to obsessive rituals, both in the preparation of food and in the nutritional analysis of the products, abnormal behavior patterns, and even social isolation, psychological imbalance, and may even experience nutritional deficiencies due to the omission of certain food groups (Ruiz & Quiles, 2021).

Edorexia is a syndrome that causes a disproportionate, dysfunctional or "pathological" appetite, compared to the functional or "healthy" appetite. There is a perception of a constant, uncontrollable, automatic, daily appetite and with the purpose of immediate relief, which causes a continuous habit over time, and not merely episodic, of overeating or the implementation of avoidance strategies to the desire to eat, such as compulsive physical activity and food restriction (López-Morales, 2013).

The *Female Athlete Triad* is a disorder often seen in athletes with high-intensity training, girls and physically active women, and includes three components: 1) low energy availability with or without eating disorders, 2) menstrual dysfunction, and 3) low bone mineral density. Female athletes often present with one or more of the three components of the triad, and early intervention is essential to prevent progression to severe endpoints, including clinical eating disorders, amenorrhea, and osteoporosis (Joy et al., 2014).

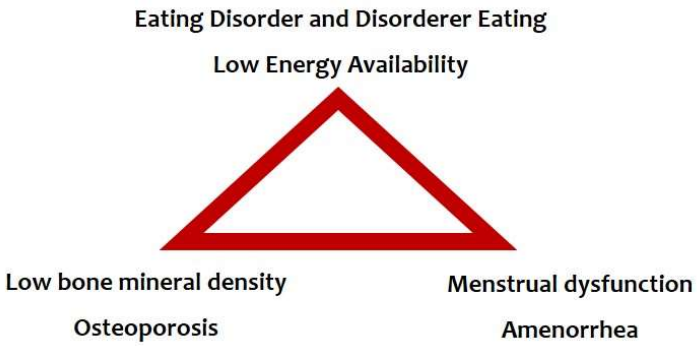


Figure 2. The Female Athlete Triad

Finally, eating disorders are closely related to exercise addiction, which is characterized by excessive and obsessive exercise patterns, an abnormal dependence that manifests itself in physiological and/or psychological symptoms, with the sufferer being unable to control this

behavior and persisting in it despite the negative consequences it entails (Berengüí & Pelegrín, 2018). There are two types, a primary addiction, in which exercise dependence is the main problem, and also a *secondary exercise addiction* in which the main pathology is an eating disorder, using excessive exercise as a way to control weight.

Consequences on performance and health

Eating disorders and disordered eating logically have an impact on the athlete's performance and, more seriously, on her health.

These consequences can be of very different types, physiological (electrolyte imbalances, dehydration, nutritional deficiencies), gastrointestinal problems (dental, gingival, bleeding, ulceration, bloating, constipation), and mental health problems (depression, anxiety, personality disorders, substance abuse, self-injury and suicidal ideation). (Team Physician Consensus Statement, 2018).

But additionally, imbalanced eating disorders and behaviors often lead to Low Energy Availability (LEB), which occurs when there is an imbalance between energy intake and exercise load, leaving insufficient energy to meet the body's other needs, and which can arise from inadequate energy intake, increased expenditure from exercise, or a combination of both, and can occur either deliberately or unintentionally (Mountjoy et al., 2018).

One risk of BDE is the occurrence of Relative Energy Deficiency in Sport (RED-S) syndrome, which results in direct impairment of physiological function due to this energy deficiency. On health it can have gastrointestinal, endocrine, cardiovascular, hematological, and immunological effects, and affect menstrual function, bone health, and growth and development. Furthermore, it is considered that psychological consequences may precede RED-S or be the result of it. As for its potential effects on performance, decreases in endurance, response to training, coordination, concentration, glycogen and muscle strength have been noted, while at the same time, increases in risk of injury, irritability and depression have been reported. (Mountjoy et al., 2014).

Prevention

The entire body of research generated over decades, and the knowledge that has been derived from it, should serve to recognize the symptoms and warning signs that help to detect athletes with disorders or at increased risk of developing them. Therefore, the main objective is prevention.

Clearly, athlete education should be the first and foremost method of prevention. Education should focus on the key problems of a sport and may include elements related to increasing awareness of the problem and its risk factors, improving body image, and increasing nutritional knowledge (Wells et al. 2020). Work should also be done so that the athlete knows how to recognize and interpret her own emotions and thoughts in this context, enhance the feeling of control over their behaviors in terms of food and weight, encourage the development of skills, attitudes and healthy behaviors (Diaz, 2012), and that they become more aware of the importance of proper weight for sports practice.

It also requires the training of coaches, so that they know how to detect the signs and symptoms of disorders, know the healthy habits and ideal dietary guidelines in sport, have adequate communication skills with athletes, use a democratic style of training and grant autonomy to the athlete, and avoid negative comments and give excessive importance to the weight (Díaz, 2012).

Similarly, it is essential to educate parents, so that they can know the signs and symptoms, the importance of a healthy diet in their daughters, and pay attention to the moments of cessation of practice due to illness, injury, etc.

Finally, the involvement and awareness of the sports authorities is necessary, so that they understand the existing problems and make an effort to examine the rules of each sporting discipline and are aware of the need to make the categories and regulations more flexible.

References

American Psychiatric Association (2013). Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). American Psychiatric Pub.

Anderson, C. B., & Bulik, C. M. (2004). Gender differences in compensatory behaviors, weight and shape salience, and drive for thinness. Eating Behaviors, 5(1), 1-11. doi: 10.1016/j.eatbeh.2003.07.001

Bar, R. J., Cassin, S. E., & Dionne, M. M. (2016). Eating disorder prevention initiatives for athletes: a review. European Journal of Sport Science, 16(3):325-335. doi: 10.1080/17461391.2015.1013995

Berengüí, R., Castejón, M. A., & Torregrosa, M. S. (2016). Insatisfacción corporal, conductas de riesgo para trastornos de la conducta alimentaria en universitarios. Revista Mexicana de Trastornos Alimentarios, 7(1), 1-8. doi: 10.1016/j.rmta.2016.02.004.

Berengüí, R., & Pelegrín, A. (2918). Problemas asociados a la práctica deportiva [Problems associated with practising sport]. In R. Berengüí & J. M. López-Walle (Eds.), Introduction to Sports Psychology (pp. 451-488). EOS Editorial.

Bratland-Sanda, S., & Sundgot-Borgen, J. (2013) Eating disorders in athletes: Overview of prevalence, risk factors and recommendations for prevention and treatment. European Journal of Sport Science, 13(5), 499-508. doi: 10.1080/17461391.2012.740504.

Bratman, S., & Knight D. (2000). Health Food Junkies: Orthorexia Nervosa-Overcoming the Obsession With Healthful Eating. Broadway.

Castejón, M. A. (2017). Aspectos psicopatológicos y variables de personalidad como factores de riesgo en los Trastornos de la Conducta Alimentaria. [Doctoral dissertation, Universidad de Murcia]. Digitum. https://digitum.um.es/digitum/handle/10201/55759

Castejón, M. A., & Berengüí, R. (2020). Personality differences and psychological variables related to risk for eating disorders. Anales de Psicología, 36(1), 64-73. doi: 10.6018/analesps.36.1.361951.

Compte, E. J., & Sepúlveda, A. R. (2014). Dismorfia muscular: perspectiva histórica y actualización en su diagnóstico, evaluación y tratamiento. Behavioral Psychology / Psicología Conductual, 22(2), 307-326.

Díaz, I. (2012). Detección y prevención de los trastornos de la conducta alimentaria en el deporte. [Doctoral dissertation, Universidad de Vigo]. Spain

Eichen, D. M., Conner, B. T., Daly, B. P., & Fauber, R. L. (2012). Weight perception, substance use, and disordered eating behaviors: Comparing normal weight and overweight High-School students. Journal of Youth and Adolescence, 41(1), 1-13. doi: 10.1007/s10964-010-9612-8

Joy, E., De Souza, M. J., Nattiv, A., Misra, E. , Williams, N. I., Mallinson, R. J., Gibbs, J. C., Olmsted, M., Goolsby, M., Matheson, G., Barrack, M., Burke, L., Drinkwater, B., Lebrun, C., Loucks, A. B., Mountjoy, M., Nichols, J., & Sundgot-Borgen, J. (2014). 2014 Female Athlete Triad

Coalition Consensus Statement on Treatment and Return to Play of the Female Athlete Triad. Current Sports Medicine Reports, 13(4), 219-232. doi: 10.1249/JSR.0000000000000077

Joy, E., Kussman, A., & Nattiv, A. (2016). 2016 update on eating disorders in athletes: a comprehensive narrative review with a focus on clinical assessment and management. British Journal of Sports Medicine, 50(3), 154-162. doi: 10.1136/bjsports-2015-095735

Mountjoy, M., Sundgot-Borgen, J., Burke, L., Carter, S., Constantini, N., Lebrun, C., Meyer, N., Sherman, R., Steffen, K., Budgett, R., & Ljungqvist, A. (2014). The IOC consensus statement: beyond the Female Athlete Triad—Relative Energy Deficiency in Sport (RED-S). British Journal of Sports Medicine, 48, 491-497. doi: 10.1136/bjsports-2014-093502

Mountjoy, M., Sundgot-Borgen, J. K., Burke, L. M., Ackerman, K. E., Blauwet, C., Constantini, N., Lebrun, C., Lundy, B., Melin, A. K., Meyer, N. L., Sherman, R. T., Tenforde, A. S., Torstveit, M. K., & Budgett, R. (2018). IOC consensus statement on relative energy deficiency in sport (RED-S): 2018 update. British Journal of Sports Medicine, 52(11), 687-697. doi: 10.1136/bjsports-2018-099193

López-Morales, J. L. (2013). Síndrome de Edorexia: Definición y análisis de variables psicosociales asociadas [Doctoral dissertation, Universidad de Murcia]. Digitum. https://digitum.um.es/digitum/handle/10201/36678

Reardon, C. L., Hainline, B., Miller, C., Baron, D., Baum, A. L., Bindra, A., Budgett, R., Campriani, N., Castaldelli-Maia, J. M., Currie, A., Derevensky, J. L., Glick, I. D. Gorczynski, P., Gouttebarge, V., Grandner, M. A., Han, D. H., McDuff, D., Mountjoy, M.,… Engebretsen L. (2019). Mental health in elite athletes: International Olympic Committee consensus statement. British Journal of Sports Medicine, 53(11), 667-699. doi: 10.1136/bjsports-2019-100715

Ruiz, Á., & Quiles, Y. (2021). Prevalencia de la Ortorexia Nerviosa en estudiantes universitarios españoles: relación con la imagen corporal y con los trastornos alimentarios. Anales de Psicología, 37(3), 493-499. doi: 10.6018/analesps.449041

Sámano, R., Zelonka, R., Martínez-Rojano, H., Sánchez-Jiménez, B., Ramírez, C., & Ovando, G. (2012). Asociación del índice de masa corporal y conductas de riesgo en el desarrollo de

trastornos de la conducta alimentaria en adolescentes mexicanos. Archivos Latinoamericanos de Nutrición, 62(2), 145-154.

Team Physician Consensus Statement. (2018). Female athlete issues for the team physician: a consensus Statement-2017 update. Medicine & Science in Sports & Exercise, 50(5), 1113-1122. doi: 10.1249/MSS.0000000000001603

Wells, K. R., Jeacocke, N. A., Appaneal, R., Smith, H. D., Vlahovich, N., Burke, L. M., & Hughes, D. (2020). The Australian Institute of Sport (AIS) and National Eating Disorders Collaboration (NEDC) position statement on disordered eating in high performance sport. British Journal of Sports Medicine, 54(21), 1247-1258. doi:10.1136/bjsports-2019-101813

Woman, rowing and +, RowFit Project

Introduction

Rowing training can be very versatile and, as it is a non-impact sport, it can be included among the Sport for All activities. Described as a sport of power and endurance, rowing is one of the most physiologically and metabolically demanding sports out there. The metabolic demands of rowing can be defined as 70-88% aerobic and 12-30% anaerobic (Ingham, et al., 2002). Rowing racing begins with an anaerobic sprint, then there appears to be a slowdown in energy input through aerobic means, after which effort is maintained at a high percentage of O2 max until the final sprint to the finish line (Pripstein, et al., 1999). This sprint can last up to 4 minutes, depending on the length of the race and the closeness of the competition, at an intensity of 95-99% of maximum aerobic capacity. With this type of intensity, planning training and complementary activities that guarantee the health of the physiological mechanisms involved is crucial for the training and personal satisfaction of rowers.

However, studies on rowers have focused mainly on the development of physical performance and its training patterns in female competitors (Keenan, et al, 2018) or university amateurs (Stoyanova, 2020). In countries with a tradition of outdoor exercise, rowing has been used for its great aesthetic and physical appeal and as a way to keep fit (Toepell, et al., 2004). But the limitations to have safe sheets of water,

The ROWFITTM Program in Switzerland

The ROWFITTM program has been created by Clarence Pérez Díaz. As a top athlete, she learned how to bring out the best in female athletes in team sports and that is exactly what she intends for the rowers involved, analyzing rowing to maximize her performance with an emphasis on health and the mindset to challenge herself. herself to go beyond the comfort zone. Currently, he has focused on protecting the health of rowers through the RowFit TM program. This is an extremely complete and low-impact training that focuses on perfecting the correct technique for each exercise, both in rowing and in complementary exercises with the aim of promoting health and sport through the RowFit training program at the that, since 2018, 26 women have participated (Table 1).

Table 1. Row. Fit TM Program Participants

	Women (n= 26)
Middle Ages	39.61±5, 77

Illustration 1. Outdoor RowFit at the Rowing-club Lausanne facilities.

Goals

The objective of the ROWFITTM program is the creation of an effective training plan aimed at improving the structural and functional parameters of women, reducing their unhealthy habits and providing information on a healthy lifestyle.

Methodology

The oars used have been Concept 2 (PM5, PM4). RowFit TM combines functional training, weights, body weight control, proprioception exercises, plyometrics, core stimulation and stretching through Yoga exercises, combined with a series of rowing intervals. (Table 2). The oar training is planned in strokes/cadences (C), with the indication of rowing together in the same boat (even if each one has their oar).

Table 2. RowFit types.

Year	Population	Intensity	Aim
ROWFIT	All	High average	Cardio, strength and core
ROWFIT MAX	Intermediate	high	Interval Training (HIT)

ROWFIT MOTION	All levels	Half	Breathing, strength and cardio, joint mobility, balance
ROWFIT GOLD	Master (Golden age)	Low/Medium	Strength, balance, coordination

All the activities have been carried out in the facilities of the Rowing-club Lausanne (Illustration 1), outdoors when the weather permits or indoors, with music to attract people who until now had been involved in leisure sports. Music is also part of the training because at certain times, the rhythm of the music can be faster or lower depending on the number of repetitions and sequences that we want to practice. The music is removed at specific times, when we want the rowers to hear the sound of the rowing machines to row simultaneously. The booking system is also used, which is done online (like a flight) and, after registering, the training is carried out as a new experience. Table 2 specifies the types, population to which it is directed.

The RowFit program is focused on improving cardio-respiratory fitness and core-focused strength. It's all about learning the best rowing technique, alternating between rowing intervals and exercises to improve your overall and rowing performance. The practitioners learn to master the technique and are guided to make the most of each exercise. It is suitable for all levels of physical condition. It is done in series of 3 minutes in the cadences of 18 C - 20 C - 22 C for conditioning, while the resistance is done with training in series of 4 minutes each cadence, and finally pyramids are made to improve explosiveness and technique with series of 2 minutes.

RowFit Max is aimed at improving VO2max and maximizing rowing skills. It is based on a high intensity interval training (HIT), combining rowing intervals with specific exercises and techniques with physical exercises to work on the definition of the form, being suitable for intermediate levels of fitness. Example: Explosive strength: 30% - 50% - 2- 3 series, performed in pyramids of 18 C (1m), 20 C (1m), 22 C (1m), 24 C (1min), 26 C (1m), 24 C (1m) and HITT series – 2 x 26 C (1 min) recovery 20 C (2min). With the pyramids the ascent is gradual and with the last series the strength of resistance is worked on at a high cadence. With HIIT the start is strong in rowing and stabilizes at 26 C and then moves on to strength resistance and recovery. When the pulsations have stabilized, the second series begins.

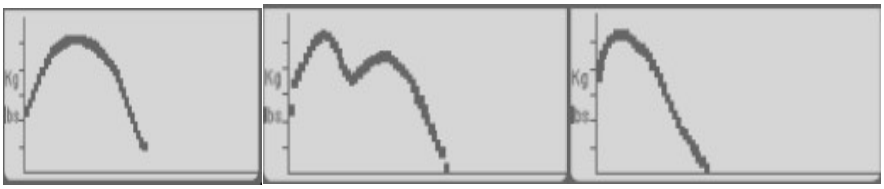
RowFit Motion is geared toward respiratory improvements, strength gains, and cardiovascular enhancement. It's a full-body workout that combines yoga-inspired movements (isometric bodyweights, proprioception, and mobility) to build strength and balance, with rowing intervals to work on the cardiovascular aspects (Figure 2). Workouts always end with full-body stretches to improve flexibility and relax muscles. It is suitable for all levels of physical condition. Example: Strength conditioning (warm up MAX): 50%- 65% - 2- 3 series Resistance: 4'5-5'5. Series of 18 C, 20 C, 22 C - 3' and 3'.

Illustration 2. Yoga practice in the Rowfit Motion program

The RowFit Gold training level is designed for rowers in the golden age, to gain muscle strength, improve their balance and coordination. The training carried out is full body combining functional training and rowing techniques to develop strength, proprioception to improve balance and coordination. In the RowFit Gold we use a heart rate monitor to control the slopes of the heart rate (between 80/90 ppm slope). As a reference we indicate that the person can continue speaking without problem. Example of Strength-Resistance: 50% - 65% - 2-3 series Resistance: 4'5 - 5'5. Series of 18 C (4m), 20 C (2m), and Conditioning: 18 C (3m), 20C (3m). (The training levels are summarized in Figure 3).

Illustration 3. Aerobic training levels (Spanish Heart Foundation, 2021)

In all the programs the feedback system provided by the PM4 and PM5 ergometers is used. These include the power curve feature to help reinforce good rowing technique (Concept 2, 2021) (Figure 4).



A B C

Illustration 4. A Ideal curve, B peak and plateau curve, C "double diamond" curve.

Results

In order to quantify the improvements obtained by the rowers and serve as a stimulus, quarterly tests of 200 and 1000 m are carried out (Table 3).

Table 3. Rowing ergometer test. 200 and 1000m.

Distance (m)	Best time (min: seconds,tenths) (half±SD)	% improvement (half±SD)
200	0:49.72±0:20.05	14±7.33
1000	04:23.1±00:20.24	09±6.25

The improvement percentage is better in the 200 m tests, indicating that the participants better assimilate the training aimed at improving strength vs. endurance, although there are also improvements in the 1000 m test.

Main conclusions

The results of the study show that the total effectiveness of the applied program shows its convenience and adequacy to optimize the physical condition and motor skills of the rowers, especially in higher speed tests, although the age of the participants is almost 40 years.

The RowFit program contributes to developing a normative basis for the control and optimization of physical fitness in order to increase the effectiveness of the process of physical improvement

of the participants. The activities developed, based on the physical exercises in rowing ergometer, have brought significant positive changes in the physical fitness of the athletes as indicated by the improvements in the 200 and 1000 ml tests.

References

Concept2. (2021) Using the Force Curve Concept 2. Available at:https://www.concept2.com/indoorrowers/training/tips-and-general-info/using-the-force-curve. Accessed on December 2, 2021.

Spanish Heart Foundation, (2021). Available in: https://fundaciondelcorazon.com/ejercicio/calculo-y-monitorizacion/3160-zonas-de-intensidad-del-entrenamiento-aerobico.html. Accessed on December 2, 2021.

Ingham, SA, Whyte, GP, Jones, K, and Nevill, AM. (2002). Determinants of 2,000 m rowing ergometer performance in elite rowers. Eur J Appl Physiol 88: 243-246.

Kalache, A., & Keller, I. (1999). The WHO perspective on active aging. Promotion & education, 6(4), 20-23.

Keenan, KG, Senefeld, JW, & Hunter, SK (2018). Girls in the boat: Sex differences in rowing performance and participation. Plos one, 13(1), e0191504.

Pripstein, LP, Rhodes, LP, McKenzie, DC, and Coutts, KD. (1999). Aerobic and anaerobic energy during a 2-km race simulation in female rowers. Eur J Appl Physiol 79: 491-494.

Toepell, AR, Guilmette, AM, & Brooks, S. (2004). Women in Masters rowing: Exploring healthy aging. Available at: https://hdl.handle.net/1807/1058. Accessed on December 6, 2021.

Stoyanova, S. (2020). Evaluation of the Effect of Application of the ROWFIT Program of Students from UNWE. Nauchni trudove, (4), 97-106.

CHAPTER 3. Disabilities and rowing

Adapted rowing

Introduction

Adaptive rowing is the general term used to refer to all forms of rowing for people with disabilities.

Para-rowing is a subgroup of adapted rowing that includes anyone with an impairment recognized by the International Paralympic Committee.

In 2019, a comprehensive study into the current state and future growth of the handheld rowing community demonstrated that while the handheld rowing community is currently a relatively small part of the sport, the potential for growth is significant.

Research by Sport England and the Activity Alliance in 2019/20 showed that 70% of disabled people, who make up one in five of the UK population, would like to be more active and improve their health. We know that rowing is a very flexible sport that can be adapted to a wide range of disabilities, but there are currently barriers to participation. Among them are the lack of promotion/communication and low awareness among the coaching community. Our challenge as a rowing community is to support clubs, coaches and volunteers to develop and increase opportunities for get more people involved in adapted rowing by removing these barriers to participation.

Why consider adaptive rowing?

Although people with disabilities are underrepresented in clubs and in sport in general, the Activity Alliance Disability 2019-20 survey identified that: 4 out of 5 people with disabilities would like to be more active.

This means that there is a pool of potential new partners that may not you have considered as a target group for your club.

Among the benefits of incorporating a rowing program adapted to your club include:

• Benefits for the club: can have many positive effects in all aspects of club life, such as increasing the number of members and volunteers, attract new partners or additional financing, as well as generate an open and inclusive club environment.

• Benefits for the community: expansion of the supply of activities for disabled people, creation of a network of wider support and enhancement of the club's reputation in the

local community.

• Individual benefits: from new friends and skills to improved health, well-being and confidence.

Where to start?

The adaptive rowing programs of many clubs begin with a consultation with one person. For others, they may start with a link to a local disability group. Whatever your approach, it is important to know and understand the number of adapted paddlers that you and your volunteers can safely accommodate.

Starting with one person allows your club to grow organically and increase their knowledge and experience in adaptive rowing over time. this is a good to help build the confidence of their coaches. By contrast, establishing links with larger, more formal disability groups may require more upfront planning and more training, but often provides access to a broader support network and knowledge base to aid implementation.

Whatever your approach, there are a series of questions that will help you provide a great experience for new rowers that will encourage them to join your club. Don't get discouraged if you don't have all the answers from the beginning.

Remember that it is not always necessary to make significant changes to the club to attract new adapted rowers; in fact, many adapted rowers will not need any changes.

to the facilities or accesses. Understanding the needs of adapted paddlers and what is important to them will help manage expectations. Not all clubs can, nor are they expected to, cater for all types of disabilities or impairments.

When you offer adapted rowing, you don't need all your adapted rowers to attend sessions together, although this may be easier if you work with groups or schools. Many adapted rowers need not be restricted to rowing only with other adapted rowers and some may also be able to row other club crews.

You can organize individual sessions for some rowers, bespoke sessions for others or include adapted rowers in non-adapted sessions. The approach should be taken in consultation with coaches, rowers and any carers/parents or support they need. Everyone's safety is the primary consideration.

Whichever approach you take, make sure that adapted rowers have the same opportunities as other members and that they are encouraged to participate fully in the day-to-day activities of the club.

You could also consider:

• Adapted rowing sessions for adults and youth.

• Competitive and recreational groups.

• Flexible session times, such as daytime rowing sessions or sessions to accommodate work shifts.

• "Try it and see" or "Pay as you go" sessions: Many people would rather try a sport a few times than have to pay an annual fee upfront. See Club Management Guide, Section 2, Membership Management.

• Affordable Options and/or Financial Assistance – Does your club offer assistance if someone can't afford to row?

• Mixed Ability Sport Sessions (supported rowing), where your rowers are in boats with their coaches and/or other club members.

• Opportunities in the path of Paralympic Performance.

Mixed rowing is a type of adapted rowing in which a disabled person and a non-disabled person are in the same boat (also known as supported rowing). It can be very rewarding for all involved. This model focuses on more than just rowing, emphasizing:

• Education and training among equals.

• Sustainability.

• Club level environments, fully integrated into all aspects of club life.

• Social interaction and individual impact.

International Mixed Ability Sports has supported a successful mixed ability rowing program in Bradford for the past two years.

Access considerations

The laws on Equality and access to sports facilities force clubs to make "adjustments Reasonable Rates" on your services so that everyone can access them, including people with disabilities. For example, this may require physical changes to club facilities to help people disabled to overcome any physical barrier that prevents access.

There is some degree of flexibility in deciding what constitutes a "reasonable adjustment". It may depend on the services offered by the club, the cost of changes and the number of people affected. For example, the "reasonable accommodation" can be as simple as providing training to the trainers to improve their knowledge (their services) or have a removable ramp to access the clubhouse (facilities). No has to mean installing an elevator or spending large sums on new buildings. Many adapted paddlers will need very few changes, or None, in the club's facilities.

Accessibility means much more than ramps or wide doors: from produce accessible and easy-to-understand information to provide a socially welcoming environment. Also remember that by improving the access to the club, it will improve the environment of the club for many other members of All ages.

Don't let the fear of what you think you will have to do become a barrier to welcome disabled people into your club.

Although not all adapted paddlers will have needs that require a change in operating procedures and facilities of the club, there will be some rowers for whom a change would be beneficial.

Access to the clubhouse

Use the accessibility audit to review the facilities of your club. The minimum change you should make is to ensure that there are toilets and accessible changing rooms. This does not always mean building new facilities. If the current facilities are not adequate, you can consider the possibility of renting them in the short term. If you don't have a accessible shelter, you can reuse existing spaces in your shed.

Also think about access to the gym and rowing machines.

If access to these areas is difficult, why not enter into a usage agreement with a local gym or health club for a win-win workout? If your group grows, you could also consider renting facilities, for example at a local college or institute, that are accessible to all.

Access to water

Access to the water depends on the configuration of the club's sailing areas and this may influence the type and number of adapted paddlers that can be accommodated. For example, deep steps may be unsuitable for wheelchair users or people with limited mobility and may also be unsuitable for a ramp due to the slope. The ideal is to have a flat, gradual slope down to the water, with stable landing pads, but this is not the situation in many clubs. The provision of pontoons and stages are often within the scope of grant funding programs so purchasing them might be an option.

Other access considerations may include:

• Is there a clear path to the water's edge?

• Is the road and access to the water level?

• Do the steps need raised edges?

• Need protection for sharp edges like steps and pontoons?

• Do you need transfer mats, seats or boxes?

It is important to note that often these adaptations can be done quite easily and cheaply and can benefit everyone.

It is also important to remember that although access to the water may be impossible for a small number of people, participation does not always have to focus on paddling on the water. Try to get members involved in all aspects of club life, including access to the indoor gym or ergo facilities, as well as volunteering and social activities.

Safety and well-being

Security issues

There may be additional hazards and risks associated with adaptive rowing. These risks depend on many factors and are often influenced by the specific impairments of each rower. Additional support and supervision, as well as additional equipment, may be needed to keep everyone safe.

Make sure that:

• Club policies, safety plans, and emergency response plans reflect additional steps needed.

• Each rower has an individual safety plan which, with the rower's consent, must be communicated to all security personnel and coaches involved in the session. Some people may not need additional security measures, but it is important to have all relevant information from your rower and their support team/carers/parents; this will allow you to carry out the sessions safely for everyone.

• You know what information you collect and why. Tell your rower why you collect it, how you will use it, and how long you will keep it.

Risk assessment

Appropriate life jackets, flotation devices and safety aids should be available and may be required for some or all sessions, depending on the rower's skill level, experience, confidence and support needs, as well as site conditions. at that moment. All of these aspects must be assessed through a risk assessment.

Ensure that all life jackets and any other equipment are regularly checked, maintained in good repair and worn correctly so that nothing interferes with

its proper functioning. It is important that they do not interfere with the stroke or the oarsman's ability to free himself from the boat if it capsizes.

Involve your Club's Rowing Safety Advisor and all support staff in all safety discussions. These meetings should be a team effort for the benefit and learning of all, but remember to respect the confidentiality of the information.

participants. Information sharing on health issues should be based on a "need to know" basis.

Capture and recovery

A capsize and recovery drill is an essential tool to help you and your rowers prepare for the consequences of a capsize. It will:

• Allow your rower, safety personnel, and coach to evaluate the procedures to follow in the event of a capsize.

• Provide feedback and learning opportunities, in a controlled environment, regarding any difficulties that may arise. Any specific actions necessary to protect the rower should be included in your individual safety plan.

• Assess equipment to manage key issues such as foot entrapment, prosthetic release, and the rower's ability to safely remove body and leg straps underwater.

There are many types of disabilities that you may encounter and how to deal with a rollover situation will vary from person to person. It is important that all persons involved have experience of observing and attending a capsize and recovery drill, including anyone assisting in adaptive rowing sessions.

Security releases

It is good practice to have water safety cover for all adaptive paddling sessions, with properly trained staff.

Appropriate life jackets, flotation devices and buoyancy aids should be carried as spares in your safety boat, along with a suitable knife to cut the straps in case a capsize occurs and the rowers are unable to release the straps.

Not all rescue boats are capable of rescuing all adapted paddlers.

For example, your rescue boat may need to have low freeboards and/or a drop bow, to account for reduced mobility or muscle weakness.

Other considerations

Club Safety Procedures

Ensure that the club's security procedures are followed at all times and pay particular attention to:

• Throwing lines: if they will be useful and if the helpers have experience in their use.

• Different methods of communication, such as radios, walkie-talkies, and headsets from coach to athlete.

• The number and experience of support staff.

• The number of rowers in each session.

Safety on land is covered by your club's safety procedures, plans and rules, but if rowers are using gym equipment or rowing machines with additional accessories, these will also need to be assessed and included as part of their safety plan. individual security.

Pontoons

Using "pontoons" or "floats" for boats used in adaptive rowing is one way to make them more stable. They don't have to be reserved just for individual oars. Using it on two oared boats (2X) and coxed rowing boats (4+/X+) can boost everyone's confidence. However, it is important that they are correctly configured.

Rowers well-being

By having effective safeguarding policies and procedures in place and ensuring that everyone applies them in the course of their duties, you will help everyone enjoy sport in a safe and inclusive environment. Club policies and procedures should be widely publicized and followed by everyone, from committee members to officers.

to coaches and volunteers, as well as to their rowers and their support networks.

If you have junior rowers, you will already have a Child and Youth Protection Policy in place, which will also apply to adaptive rowers under the age of 18.

Everyone should understand the content of this policy and know what to do in the event of a concern, whether it arises in the paddling environment or not.

Your adult adapted rowers can decide for themselves if they identify themselves as Adults At Risk, as it is up to them to make their own decisions, unless it is shown that they are not capable of doing so. This does not alter the responsibilities of the club towards them. Keep in mind that, as with any other group, abuse can happen anywhere and take many forms. There are many categories of abuse that adults at risk can experience and you can find more information about them here.

Your coaches and volunteers have a duty to care for your rowers. Make sure they are aware of the different forms of abuse, the behavioral signs of abuse, and the procedures for reporting any concerns.

Training for all involved in adaptive rowing training is beneficial and your club welfare officer can help you achieve this.

World rowing instructional manual for para rowing physical impairment classification

World rowing

The origin of rowing

The boat was mankind's most significant mode of transport for centuries and the oar is considered to be the most important invention before the wheel. The first representation of a rowing boat was discovered in Finland and dates back to 5 800 BC. The earliest regatta was held on 16 September 1274 in Venice, Italy, where regattas developed as challenges between gondoliers and boatmen in a variety of rowing boats. Rowing has evolved all over the world wherever people and water mix. The origin of the sport of rowing as we know it today comes from England, where the world-renowned Oxford versus Cambridge University Boat Race was first held in 1829 on the River Thames.

The creation of World Rowing

In the second half of the 19th century the number of clubs increased and associations were set up. The popularity of rowing continued to grow, and the need arose for a uniform set of rules. Louis Choisy (SUI), who was to take over the administration of World Rowing (originally created as FISA) for many years, explained how the international federation came about in the following terms:

"Race rules differed from club to club. Different texts were used in Gand, Zurich and Como. The distance varied between 3000 and 4000 m with several turns. We tacked round a buoy, a post or a ball, sometimes round a single turn, sometimes round three laid out in a triangle, some to port, some to starboard. There were no restrictions on the construction and equipping of craft!

You can imagine what it was like when there were three different types of craft competing together! Finally, there was complete liberty on the subject of prizes. Amateurism was practically unknown; bookmakers laid the odds, members of the jury and the oarsmen themselves were the keenest gamblers. The jury reigned supreme and settled any dispute; the arbitration judge did not exist. It became imperative to emerge from this chaos.

Thus the plan to set up a federation, which would unify all those different clubs, was favourably received. To fulfil this need, the bureau of the Belgian Federation of Rowing Clubs decided to bring together delegates from the different rowing nations in a congress.

Before we look at this congress it should be mentioned that this federation had set up a European Championship in 1890. This event only covered one category of boat – the sculling outrigger. It was held on 21st September over a distance of 2840 m in a straight line on the Terneuzen canal at Cluysen-Terdonck. Edouard Lescrauwaet of "Sport Nautique de Bruges" won in 12 minutes and 8 seconds. On 21st July 1891, at Brussels, representatives of associations in five countries (BEL, FRA, HOL, ITA, SUI) met under the chairmanship of Hector Colard, the President of the Belgian Federation. The congress members agreed to define the amateur oarsman and decided to meet again in Turin the following year to draw up an international racing code.

On 13th September 1891, a European Championship was held once again. Five Belgian scullers and one Ch. Hahn from Strasbourg, were entered. Edouard Lescrauwaet of the "Société Royale Nautique" of Antwerp raced home in 11'34".

On 21st July 1891, the Belgian federation proposed the setting up of an international union of rowing clubs.

On 25th June 1892, the following congress members met at Turin (ITA):

Giovanni Giorguli (AUT) for the Trieste Regatta Club, made up of all the Adriatic clubs;

Hector Colard, Aimé Duhot and J. de Dryver (BEL) for the "Fédération Belge de Sociétés d'aviron":

Count R. Biscaretti (Alsace-Lorraine) for the Strasbourg Rowing Club;

P. V. Stock (FRA) for the "Union des sociétés d'aviron", the "Fédération des sociétés nautiques du Nord" and the "Union des sociétés d'aviron du Nord-Est" ;

M. Frilet (FRA) for the "Fédération du Sud-Est";

L. Guittard (FRA) for the "Union nautique du Sud-Est";

Count E. de Villanova and L. Capuccio (ITA) for the Italian Rowing Club;

A. Séguin (SUI) for the "Société nautique de Geneve"

The “Real Club” of Barcelona, although it was not represented, declared in advance its adherence to the decisions of the meeting. As for the Amateur Rowing Association of London, it was unable to send a delegate but did send its best wishes for the success of the congress. The work achieved led to the setting up of the “Fédération Internationale des sociétés d’aviron”, the first of the International Sports Federations.

Rowing at the World Rowing Championships

The first World Rowing Championships was staged in Lucerne, Switzerland in 1962. Initially held every four years, the championships soon became an annual event. It is the biggest annual World Rowing event. The 2019 World Rowing Championships were held in Linz-Ottensheim, Austria with 1 200 athletes from 80 nations competing.

Women’s boat classes were included in the World Championship programme from 1974, with lightweight categories for both men and women featuring annually from 1985. In 2018 the championship programme became gender equal with the same number of boat classes for men and women. Para rowing was integrated into the World Rowing Championships programme in 2002. Originally raced over 1000m, in 2017 the length of racing changed to 2000m.

Rowing at the Olympic & Paralympic rowing regattas

Rowing became an Olympic sport in 1896, at the first Olympic Games of the modern era held in Athens, Greece. Rough seas in the Piraeus harbour, however, forced the event to be cancelled which is why rowing won its first Olympic medals four years later in Paris. Women’s events were added to the Olympic programme in 1976 and lightweight events in 1996. Para rowing first appeared at the Paralympic Games in 2008.

Rowing at the Paralympic Games

The Paralympic Games is held every four years and includes para rowing. Para rowing was introduced into the Paralympic programme in 2005 and at the Beijing 2008 Paralympic Games it was held for the first time. Qualification regattas are held to select the quota of 104 athletes that will compete at the Games. There are five boat classes: PR1 men’s single sculls, PR1 women’s single sculls, PR2 mixed double sculls, PR3 mixed double sculls and PR3 mixed coxed four. Races are held over 2,000 metres for all five events.

World rowing classifiers

The World Rowing Executive Committee of World Rowing shall appoint the Classification Advisory

Panel (CAP), who will work alongside the World Rowing Classification Coordinator. The CAP will appoint the members of any classification panel and a Chief Classifier, as needed. A World Rowing Classifier is an individual who has been approved as such by World Rowing and the CAP after undergoing the required World Rowing classifier training for this purpose. There are 2 types of World Rowing Classifiers:

• World Rowing Medical Classifier: a medical doctor, physiotherapist, or occupational therapist (experience with para rowing is recommended);

• World Rowing Technical Classifier: a person with extensive knowledge of rowing with experience such as a rowing coach, sport scientist, former rower, or similarly qualified person.

All World Rowing Classifiers are required to adhere to the Classifiers' Code of Conduct at all times.

Pre-classification eligibility check

An athlete's Member Federation (MF) shall upload all required relevant medical documentation via the World Rowing Database no later than 45 days prior to the date of classification. The purpose of this documentation is to allow the Chief Classifier or CAP to verify that an athlete's activity limitation(s) are the direct result of an underlying health condition which has resulted in a permanent and verifiable impairment which is eligible for para rowing. Upon receipt of the medical documentation, the Chief Classifier will review and either accept the documentation as uploaded, or may request the MF to provide specific additional information. If the documentation submitted is not sufficient to verify that the athlete has an underlying health condition which has resulted in a permanent and verifiable impairment, a classification appointment will not be scheduled. Documentation to be submitted and reviewed:

• A World Rowing Medical Diagnostics Form signed by a Medical Physician, including the additional required documentation that is related to the permanent impairment which makes the athlete eligible to compete as a Para Rower. This must be in English, or be accompanied by an English translation.

• Athletes with a Visual Impairment (VI) must provide proof of prior International Blind Sport Association (IBSA) classification with a sport class, or have their ophthalmologist complete the VI Medical Diagnostics Form in preparation for classification by an IBSA classification panel in collaboration with World Rowing.

Prerequisites for classification

Athletes who are seeking to be classified as a Para Rower must present to the Classification Panel the following classification paperwork:

• A completed Athlete Evaluation Consent Form.

• An uncompleted World Rowing Para Rowing Classification Form (for athletes with a physical impairment only).

For athletes with a Visual Impairment (VI), the VI Classification Panel will review all paperwork and evaluate athletes using the International Blind Sports Federation (IBSA) Classification regulations and sign the form where appropriate, indicating the correct sport class. Processes encompassed in the classification of athletes with VI are developed and regulated by IBSA.

Process for classifying athletes with a physical impairment

Standard World Rowing classification process is conducted by a World Rowing Classification Panel comprised of 2 World Rowing Classifiers, 1 of whom must be a World Rowing Medical Classifier and 1 a World Rowing Technical Classifier. The process for classifying athletes is called the Athlete Evaluation. The Athlete Evaluation involves four parts: 1. Athlete Interview 2. Bench Test – performed by a World Rowing Medical Classifier with World Rowing Technical Classifier in attendance 3. Ergometer Test – performed by a World Rowing Technical Classifier with World Rowing Medical Classifier in attendance 4. Observation while Rowing– performed by both a World Rowing Medical Classifier and a World Rowing Technical Classifier. This may be conducted during training and/or in competition.

The athlete must present ready to be classified in training attire and the athlete should bring along:

• all sport equipment including but not limited to seat, cushions, straps, braces and prosthetics.
• a recognised form of photo identification (government issued passport or ID).

Each athlete can have 1 person to accompany them:

• A minor (under 18 on the day of classification) must be accompanied by a member of the relevant MF appointed with responsibility for the athlete.

• The accompanying person may not influence the Athlete Evaluation in any way. The Athlete Evaluation is conducted in English. The respective MF is responsible for arranging for an

interpreter to be present. If an interpreter is present, they can be the second support person in the room with the athlete.

Paris 2024 Paralympic Games Qualification Regulations

ALLOCATION OF QUALIFICATION SLOTS

The qualification slot is allocated to the NPC not to the individual athlete or team.

MAXIMUM QUOTA ALLOCATION PER NPC

An NPC can be allocated no more than one (1) boat per medal event for a maximum allocation of five (5) male and five (5) female qualification slots (excluding coxswains).

ATHLETE ELIGIBILITY

To be eligible for selection by an NPC, athletes must:

• be internationally classified either with a 'Confirmed' sport class status or a 'Review' sport class status with a review date after 31 December 2024.

MAXIMUM ENTRY PER NPC

An NPC can enter a maximum of one (1) boat per medal event and may select a maximum of:

• one (1) male athlete for the Single Sculls PR1M1x medal event;

• one (1) female athlete for the Single Sculls PR1W1x medal event;

• one (1) male and one (1) female athlete for the Double Sculls PR2Mix2x medal event;

• one (1) male and one (1) female athlete for the Double Sculls PR3Mix2x medal event; and

• two (2) male and two (2) female athletes for the Coxed Fours PR3Mix4+ medal event.

QUALIFICATION PRINCIPLES

Only those countries that have not qualified any boats at the 2023 World Rowing Championships shall be eligible to participate in the Continental Qualification Regattas. There will be no restriction on who may participate in the Final Qualification Regatta. This means that those NPCs that have participated in the Continental Qualification Regatta in an event but not qualified may compete again in the same event at the Final Qualification Regatta.

An eligible NPC may only enter one (1) boat per event at the relevant Continental Qualification Regatta and at the Final Qualification Regatta.

An NPC will be allowed to qualify a maximum of one (1) boat through the Continental Qualification Regatta. If an NPC achieves more than one qualifying place at a Continental Qualification Regatta, it is the highest-ranking boat from the NPC that qualifies for the Paralympic Games. If two boats have equal rank in qualifying places, then the NPC must select the boat that will qualify for the Paralympic Games.

In the case where two boats from an NPC achieve a qualifying place at the Continental Qualification Regatta, the qualification place of the boat that is not selected by the NPC to qualify for the Paralympic Games passes to the next highest ranked boat in that event.

There shall be no restriction on the number of boats which an NPC may qualify at the 2023 World Rowing Championships and the Final Qualification Regatta up to the entry limit of one boat per NPC per medal event at the Paralympic Games.

TIMELINE

3-10 September 2023 2023 World Rowing Championships, Belgrade, Serbia

22 September 2023 World Rowing confirms in writing to the NPCs the number of allocated qualification slots from World Rowing Championships

6 October 2023 NPCs confirm in writing to World Rowing the use of allocated qualification slots from World Rowing Championships

TBC Africa Continental Qualification Regatta, TBC

TBC Americas Continental Qualification Regatta, TBC

TBC Europe Continental Qualification Regatta, TBC

TBC Asia & Oceania Continental Qualification Regatta, TBC

TBC Deadline for Paris 2024 Organising Committee to receive accreditation application forms submitted by NPCs (“Accreditation Long List”)

TBC World Rowing confirms in writing to the NPCs the number of allocated qualification slots from all Continental Qualification Regattas

TBC NPCs confirm in writing to World Rowing the use of allocated qualification slots from all Continental Qualification Regattas

TBC Start of Bipartite application process

TBC 2024 Final Paralympic Qualification Regatta, TBC

TBC World Rowing confirms in writing to the NPCs the number of allocated qualification slots from the Final Qualification Regatta

TBC Deadline for NPCs to submit Bipartite applications to World Rowing

TBC NPCs confirm in writing to World Rowing the use of allocated qualification slots from the Final Qualification Regatta

TBC World Rowing confirms in writing to the NPCs the reallocation of unused qualification slots

TBC World Rowing confirms in writing to the NPCs the awarding of Bipartite invitations

5 August 2024 Deadline for Paris 2024 Organising Committee to receive sport entry forms submitted by NPCs

CHAPTER 4. Voga&Share Project

The 'Voga&Share' project

Protocol number 622268-EPP-1-2020-1-IT-SPO-SCP, co-funded by the European Commission's Erasmus+ programme for sport, is led by the Centro Universitario Sportivo di Palermo and the partners are the University of Murcia (Spain), Asd Margherita Sport e Vita Basket (Italy), Rijeka Sports Association for Persons with disabilities (Croatia), Institul National de Cercetare pentru Sport (Romania) and Ligue D'Aviron de Pays de la Loire (France).

Voga & Share focuses on the practice of rowing, and although this sport is considered to be among the most complete in that it mobilizes the whole body and promotes concentration aimed at achieving a goal, its dissemination, particularly among young people, does not get the echo it deserves. In many EU countries, rowing is often reserved for adults and does not involve the younger generation as it should. We have a cultural and educational gap to fill.

Rowing is one of the oldest traditional European sports, and already in the fifth book of the Aeneid, Virgil writes about a rowing competition organized by the Trojan prince Aeneas to honor the death of his father Anchises: we are talking about a work written between 29 and 19 B.C., so we can say that this sport has such ancient origins. Although rowing has deep roots in history, unfortunately among the new generations, and especially in school education, the practice of this sport is very rare. Although it is an activity accessible to all ages, as it is a gradual and progressive discipline, rowing is especially recommended for young people: the movements are shock-free, thus reducing the risk of injury. Learning is progressive and adapted to each person's abilities and characteristics. It is a fact that sports education in schools is often limited to the most popular sports (football, basketball, volleyball…) leaving many areas of interest for many students unexplored.

Based on the analysis carried out and the experience of the partners of the various sports clubs, we have noticed that these groups bring their expertise into the school system sporadically and intermittently; the promotion and utilization of sports club expertise occurs only in a few EU countries and in a non-systematic way.

A great resource of skills and knowledge is therefore wasted, while the experience and preparation of clubs, perfected by years of presence in different territories, could be better

exploited, creating stable collaborations and educational and didactic synergies between schools and clubs.

In fact, rowing is still not included in school physical education, even in areas where the presence of bodies of water (sea, lakes, rivers, streams) should encourage the spread of this practice.

One example above all: a city like Venice, built on and around water with an ancient rowing tradition, does not fully exploit this great sporting and cultural heritage, and synergies between clubs and schools are still rare, sporadic, or occasional.

In line with the objectives of the Erasmus plus programme, which aims to "achieve a positive and sustainable impact on education, training, youth and sports policies and practices", the project focuses on creating a positive link between different areas of education and sports, providing young people with a tool for confrontation and growth with great impact, improving the skills of sports clubs for the benefit of schools, with a focus on environmental protection, supporting rowing as an alternative to motorized boating, which has a strong negative impact on water quality. The project also aims to "encourage integration, social inclusion and equal opportunities in and through sport", to involve young people at risk of dropping out of school or social exclusion, with the aim of strengthening their commitment to sporting activity, which might otherwise be a barrier to possible radicalization or dangerous isolation.

The project also offers young people the opportunity to improve their health by practicing sport with other students from different countries, speaking a non-native language, being a team player and strengthening their sense of belonging to the Union through the creation of 'European' teams. Thus, each partner selects and trains a group of 20 young people between the ages of 12 and 18 (50:50 gender balance) in rowing, with a view to participation in the Venetian Vogalonga on 28 May 2023. From this sample, each of the partners, according to criteria jointly established by the partnership, will select 10 young people (50:50 gender balance) to be physically brought to the event.

In the days leading up to the event, the teams from the various organizations taking part in the project will get to know each other, team up and practice rowing together, and then participate in the sporting event with mixed crews. In the spirit of social inclusion, the Croatian partner will carry out the same activity with young people with intellectual-relational disabilities. The partnership will participate in the event with different types of rowing boats, depending on the

predisposition of the pupils, the preferences of the coaches, and the availability of the boats themselves.

During the course of the project, the partnership experts are working on the production of various texts useful to schools and clubs for the dissemination and improvement of the discipline's methodologies, which can be downloaded free of charge from the documents section of this website. More specifically, the following are being produced: VOGA & TRAIN, THE TRAINERS MANUAL; VOGA& CARE MANUAL; VOGA&SAVE THE PLANET EDUCATIONAL GUIDELINES; VOGA&FUN SURVEY RESULTS: How can we promote sport among youngsters? and VOGA&SHARE VADEMECUM.

Seminars and conferences will give the appropriate echo to important intellectual outputs like VOGA&TRAIN THE TRAINERS manual, VOGA&CARE MANUAL and VOGA&SAVE the Planet educational guidelines. These tools will be disseminated to schools, sport clubs, Federations, local, regional, national authorities and will be freely available on project web site.

In addition, for each of the two European Sport Weeks, occurring during the project duration, each of the partners will organize local sport multiplier events aimed at reaching out to stakeholders in the various local communities, which will be useful both during the course of the project and for possible continuation of the project beyond the duration of the co-funding.

Vogalonga

The Vogalonga is a non-competitive celebration for all rowers. This peaceful protest against wave damage caused by motor boats, and lagoon degeneration, brings together Venetians and enthusiasts from around the world. The Vogalonga is a non-competitive event and as such it does not have performance rankings at the finishing line. Each rower who crosses the finishing line will be issued a participation certificate and a medal to commemorate the event. The organisers agree to put in a raffle any boats or other prizes offered by public bodies or private institutions; these prizes, offered only to participants who complete the course, will be obtained by means of a prize draw to be held by the end of October. In order to claim a prize, participants must show the numbered slip which is attached to a duplicate copy of the registration form. Crews should not encroach on the proper course of other crafts, 'interfere' with other crews' oars or commit any act to the detriment of other participants. It is also strictly forbidden for crafts to leave the waters

of the fixed course conspicuously marked by signs set out by the Organising Committee. Checks will be carried out along the course in Burano and Rio di Cannereggio.

The race starts in Bacino S.Marco. Once the boats have wound round the island of S.Elena, they will paddle around the islands of Vignole, S. Erasmo and San Francesco del Deserto. Halfway through the course the rowers will reach Burano, and after flanking the islands of Mazzorbo, Madonna del Monte and San Giacomo in Paludo, the procession will head into Murano via its Gran Canal. Once participants get to Venice, they will proceed along the canale di Cannereggio to get to the Gran Canal and from there they will reach their destination at Punta della Dogana opposite San Marco.

Preparatory phase and training workpage for Vogalonga

During the preparatory phase schools organize meetings including project participants for educational sessions on various disciplines defined as cultural Venice workshops: history, art, culture, environment and health in rowing. In addition to these workshops, every club will organize rowing training sessions.

An Interim Meeting is planned at the end of this phase, including the MSE VOGA&CARE CONFERENCE.

Tourism

Venice, the city of canals and gondolas, is one of the most popular tourist destinations in the world. Known for its romantic atmosphere, stunning architecture, and rich history, Venice attracts millions of visitors each year.

The city is built on a group of small islands in the Venetian Lagoon, and is connected by a network of canals and bridges. The main mode of transportation in Venice is by boat, with the famous gondolas being a popular choice for visitors looking to experience a traditional Venetian ride.

One of the most famous landmarks in Venice is the Piazza San Marco, also known as St. Mark's Square. The square is home to several iconic buildings, including the Basilica di San Marco, the Palazzo Ducale, and the Campanile di San Marco. Visitors can also enjoy a cup of coffee or a gelato at one of the many cafes that line the square.

Another popular attraction in Venice is the Rialto Bridge, which spans the Grand Canal. The bridge offers beautiful views of the canal and the surrounding buildings, and is a popular spot for tourists

to take photos. The bridge is also home to several shops and markets, where visitors can purchase souvenirs and local products.

Venice is also known for its art and culture. The city is home to several museums, including the Gallerie dell'Accademia and the Peggy Guggenheim Collection. Visitors can also explore the many churches and palaces that dot the city, including the Chiesa di Santa Maria della Salute and the Palazzo Contarini del Bovolo.

For those looking to experience the local culture, a visit to a traditional Venetian glassblowing factory is a must. The island of Murano, located a short boat ride from Venice, is home to several glassblowing factories where visitors can watch artisans create beautiful glass objects.

Despite its popularity, Venice can be a challenging city to navigate, especially during peak tourist season. Visitors are encouraged to plan ahead and avoid the busiest times of the year to make the most of their trip.

However, in recent years, Venice has also been facing a number of issues related to tourism. The high number of visitors has put a strain on the city's infrastructure and resources, leading to overcrowding and pollution. In addition, many locals have been priced out of the housing market as property prices have risen due to the demand for tourism accommodations.

To address these issues, the city and local government have implemented a number of measures. For example, they have introduced a tourist tax and restricted the number of visitors to certain areas during peak season. They also encourage sustainable tourism practices, such as using public transportation and supporting local businesses.

Despite these challenges, Venice continues to be a popular destination for travelers. And with the right planning and an understanding of the city's issues, visitors can still have an enjoyable and memorable experience.

For those looking for a unique experience, a visit to the Venetian islands of Burano, Murano and Torcello is a must. These islands are known for their colorful houses, traditional lace-making and glass-blowing factories, respectively. Burano is also a popular spot for photography and its colorful houses have become an iconic symbol of Venice.

Venice is also a food lover's paradise, with a diverse range of traditional Venetian dishes and seafood that you can enjoy in the many restaurants and trattorias. Some of the most popular

dishes include cicchetti (Venetian tapas), fegato alla veneziana (Venetian-style liver) and risi e bisi (a risotto-like dish made with rice and peas).

In conclusion, Venice is a city that offers a wealth of experiences for visitors. From its famous canals, beautiful architecture, and rich culture to its delicious food, the city has something to offer everyone. However, it is important to keep in mind the challenges that the city is facing and to be mindful of sustainable tourism practices during your visit.

VENICE

- In the Middle Ages, Venice became a hub of trade between Orient and Occident because of its strategic location and the vast maritime knowledge that its inhabitants gained almost as a necessity.
- In the distant lands of Orient, they imported spices and silk, which they then resold to their European neighbours at a very high profit.

VENICE

- "Queen of the Adriatic" and "City of Canals".
- One of the most touristic and artistic cities in Europe.
- Gondolas and vaporettos.
- Numerous floods (Aqcua alta).

Historic Buildings in Venice

- The Doge's Palace.
- St. Mark's Basilica.
- Scuola Grande di San Rocco.
- The Campanile.
- Santa Maria della Salute.

The Doge's Palace.

- LOCATED AT ONE END OF ST. MARK'S SQUARE AND BUILT IN THE 9TH CENTURY, IT IS ONE OF THE MOST IMPRESSIVE PALACES IN EUROPE AND ONE OF THE MOST BEAUTIFUL PLACES TO VISIT IN VENICE.

St. Mark's Basilica.

- THE BASILICA OF SAINT MARK'S IS THE MAIN CATHOLIC CHURCH IN THE CITY OF VENICE AND A MASTERPIECE OF BYZANTINE ARCHITECTURE. IT HAS THE STATUS OF A CATHEDRAL.

Scuola Grande di San Rocco.

It was a confraternity formed by Venetian citizens in 1478 that became particularly prosperous in the early 16th century. It was created to assist citizens in times of plague.

The Campanile

St. Mark's campanile is the bell tower of St. Mark's Basilica. It is one of the symbols of the city.

Santa María della Salute.

Santa Maria della Salute is a basilica in Venice, which stands near the Punta della Dogana. It was built, ex voto of the Venetian inhabitants because of the plague that decimated the population in 1630.

ILLUSTRIOUS IN VENICE

- **Marco Polo**
  - He was a wealthy Venetian merchant and traveller.
  - He became a member of the Grand Council of the Republic of Venice.
  - He wrote a chronicle of his travels in China, calling it "The Book of the Wonders of the World".

ILLUSTRIOUS IN VENICE

- PAOLO VERONESE
  - Famous Renaissance painter, whose work in Venice was outstanding.
  - Representative of the Venetian school, who painted elaborate narrative cycles in a dramatic Mannerist style
  - His masterpiece, the Wedding at Cana.

VENETIAN FOOD

- Traditional and simple food with local products.
- The menu is dominated by fish and seafood.
- Wide variety of typical dishes.

BACCALÁ MANTECATO

- Dish made with cooked cod (creamy) and served with bread.
- It is usually eaten as a starter or tapa.

FEGATO ALLA VENEZIANA

- Veal liver cooked with onions and butter.
- Very popular and difficult to imitate.

RISI E BISI

- Simple dish made with rice and peas.
- Historical recipe, eaten on the feast of San Marcos.

BIGOLI IN SALSA

- Thicker spaghetti, served with tomato, onion and anchovies.

SWEET MOMENTS!

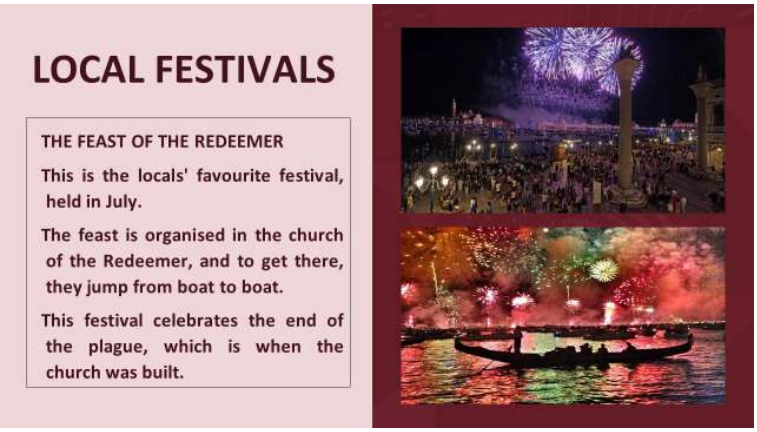
- FRITOLE: declared "official sweets", they are a kind of doughnut.

LOCAL FESTIVALS

CARNIVAL

Venice's most typical festival, held at the beginning of February.

This carnival is unique in the world, people dress up in 17th century costumes and add masks of all kinds to hide their identity.



History

Venice is a city located in Northern Italy, known for its unique architecture and its location on a group of islands connected by canals and bridges. The history of Venice is long and rich, filled with political, economic, and cultural events that have shaped the city into what it is today.

The city of Venice was founded in the year 421 AD by refugees fleeing barbarian invasions on the mainland. The first inhabitants of Venice settled on the islands of the Po River delta, where they built their homes on wooden and reed structures. Over time, these structures became stone and masonry buildings, and the canals became the main means of transportation.

In the 9th century, Venice became an independent republic and began to develop its own economy based on trade and navigation. The city became an important commercial center between the East and the West, and its maritime fleet became one of the most powerful in Europe. During this time, many of the buildings and monuments that are now iconic symbols of the city were also constructed, such as the Basilica of San Marco and the Doge's Palace.

In the 12th century, Venice began to expand its territory on the Italian peninsula and in the Adriatic, becoming a naval and commercial power. During the 13th century, the city became an important center of art and culture, and many famous artists and writers, such as Dante Alighieri, visited Venice.

In the 15th century, Venice experienced a period of great economic and cultural splendor, known as the Venetian Renaissance. During this time, some of the most impressive buildings in the city were constructed, such as the Palazzo della Dogana and the Palazzo dei Doges. A school of

painting and art also developed, which became famous throughout Europe, and many famous artists, such as Tintoretto and Veronese, worked in Venice.

In the 16th century, Venice's economy began to decline due to competition in trade with other European ports and wars with the Ottoman Empire. Despite this, the city continued to be an important cultural and artistic capital, and many visitors from all over Europe continued to travel to Venice to admire its architectural and artistic wonders. However, the economic decline of the city also had an impact on its political power, and in the 18th century Venice was conquered by Napoleon Bonaparte and became part of the French Empire.

After the fall of Napoleon, Venice became part of the Republic of Venice again, but over time it became part of the Kingdom of Italy. Despite this, the city continued to be an important tourist and cultural center, and many visitors continued to visit Venice to admire its monuments and historical buildings.

In the 20th century, Venice experienced an increase in tourism and construction, and some of the city's historical buildings suffered damage due to increased traffic and infrastructure construction. However, in the 1980s, efforts were made to protect and restore some of the city's historical buildings and monuments, and Venice became a UNESCO World Heritage Site in 1987.

Today, Venice continues to be one of the most visited cities in the world, known for its unique architecture and rich history. The city has been the setting of several films, books, and works of art, and remains a popular destination for travelers looking to admire its beauty and explore its rich history. Despite the challenges it faces, such as increased mass tourism and climate change, Venice remains one of the most impressive and fascinating cities in the world.

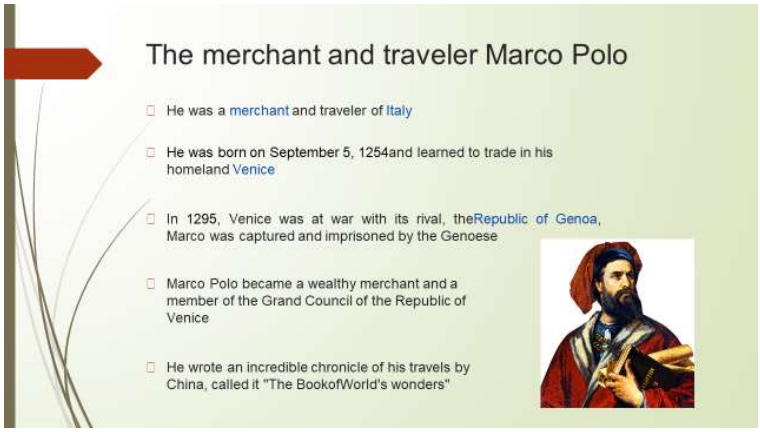
In the 19th century, with the unification of Italy, the city of Venice lost its political and economic status, but it continued to be an important tourist center. Many travelers and artists visited the city, inspired by its beauty and rich artistic and cultural history. In the early 20th century, Venice experienced an increase in construction, and some of the city's historical buildings suffered damage due to increased traffic and infrastructure construction. However, from the 1960s, efforts were made to protect and restore some of the city's historical buildings and monuments, and Venice became a UNESCO World Heritage Site in 1987.

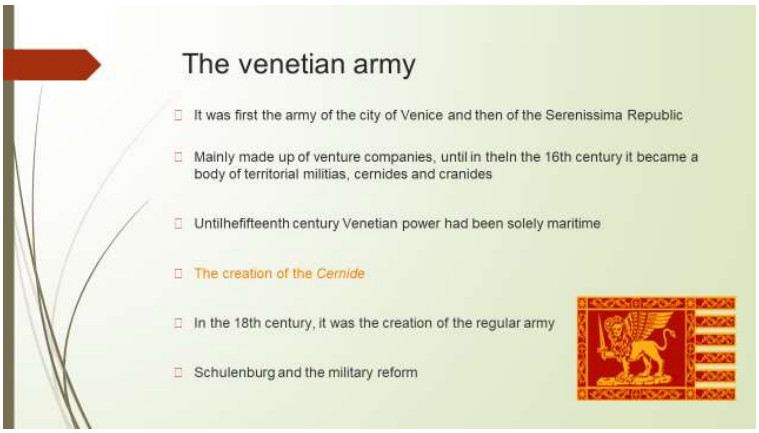
In addition, in recent years, Venice has faced a major problem with the increase of mass tourism, causing a great impact on the city, both economically and environmentally. To mitigate this,

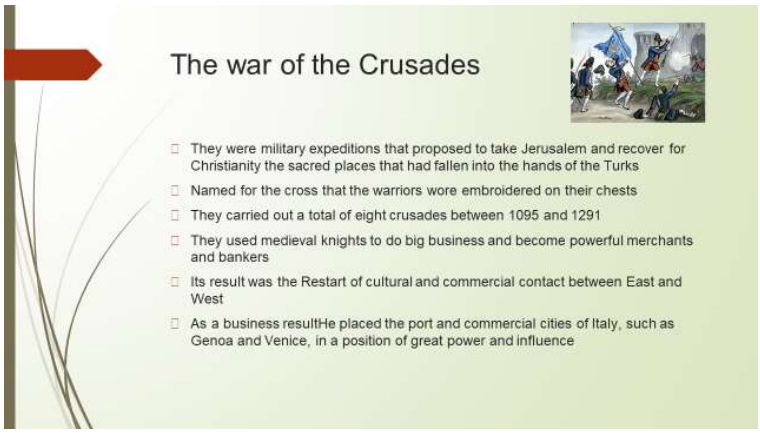
measures have been implemented such as the introduction of entrance fees to the city and the limitation of cruises visiting the city.

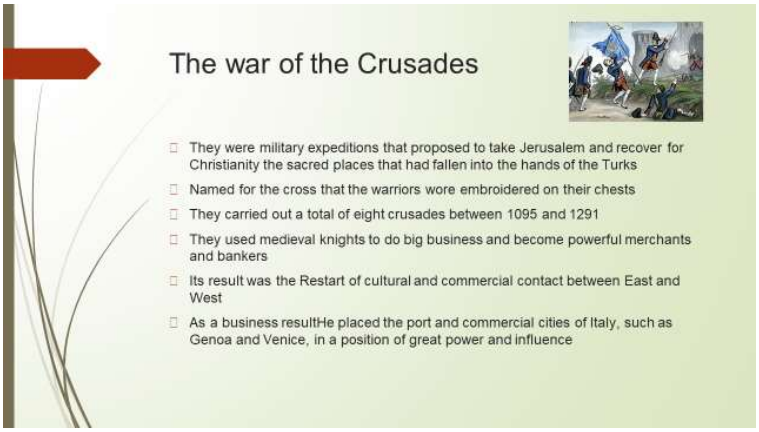
The city has also faced problems due to climate change, including the rising sea level and recurrent flooding. These problems have led to the creation of projects to protect the city, such as the construction of a barrier system to prevent flooding.

Despite these challenges, Venice remains one of the most impressive and fascinating cities in the world. With its unique architecture and rich history, the city continues to attract millions of visitors every year. It is important to continue working to protect and preserve the city for future generations.









Art

Venetian painting from the 16th to 18th century is known for its luminosity and vibrant colors, as well as its depictions of daily life and urban landscapes of the city of Venice. Famous artists of this school include Tintoretto, Veronese, and Canaletto. The oil painting technique, newly introduced in Venice in the 16th century, was widely used to create vivid and detailed representations of the city and its inhabitants. These works often featured the use of strong contrasts of light and shadow, as well as a characteristic emphasis on the play of light on water. Venetian painting also made significant contributions to the development of the genre of landscape painting.

Additionally, many Venetian painters of this period were heavily influenced by the rich cultural and artistic traditions of the city, incorporating elements of Venetian culture, architecture, and costumes into their works. The use of color was also a defining feature of Venetian painting, with artists experimenting with a wide range of hues and shades to create a sense of depth and realism.

One of the most notable and influential figures of Venetian painting was Jacopo Tintoretto, known for his dynamic compositions and dramatic use of light and shadow. Veronese, another prominent artist of the era, was known for his grandiose and opulent depictions of religious and mythological scenes. Canaletto, on the other hand, specialized in detailed and accurate depictions of the architecture and landscapes of Venice.

During the 17th century, Venetian painting continued to be important through the works of Tiepolo, Canaletto or Francesco Guardi . The invasion of the Serenissima by Napoleon in 1797 caused the loss of the city's independence and it came to be dominated by the Austrian Empire, leading to its loss of artistic prominence that was played by other regions of Italy such as Tuscany and Lombardy. However, throughout the 19th and 20th centuries, Venice continued to be an

aesthetic benchmark because its art reflected its richness of colour, sensuality and a taste for fantasy. The "myth of Venice" was configuredas the center of learning for many artists and a destination for travelers. Avant-garde artists use Venice and its art as experimentation and create topics such as Venice and light.

At the end of the 18th century, Venetian painting was not very well regarded in countries like France and Great Britain because it was considered the example of a decadent world typical of the Old Regime that they were trying to replace. Despite all this, we find artists like Joshua Reynolds who focus on Venetian painting, especially the nude model created by Titian.

In Spain the Venetian influence is prominent due to the works from the royal collections and the work of artists such as Tiepolo and his son Doménico who were working in the country. It is clear, for example, how Goya takes the Venetian nude as a model to make his Majas out of it.

In France, during Neoclassicism, special importance was attached to drawing, but this does not mean that different artists such as Jacques Louis David, Ingres or Francesco Haye z incorporated Venetian elements. Thus we can see the richness of colors in David's works or the influence of the Venetian nude model on Ingres.

During French Romanticism several artists are influenced by Venetian painting, highlighting Gericault and Delacroix. These authors took painters such as Titian, Tintoretto and Veronese as models and adapted the sensuality, drama and exoticism of these painters to their works.

The Venetian influence during British Romanticism is evident. The best proof is Turner's. The Venetian influence can be seen in his frayed and dissolved painting, his experimentation with landscape, and his atmospheric tones. Turner was responsible for one of the most Neo-Venetian paintings of his time, Venus and Adonis of 1803. Turner visited Venice and studied the painting of Titian, Tintoretto, Bellini, and Canaletto. Especially important is his reinterpretation of the works of Canaletto, albeit with a more modern brushstroke. Other romantic authors in whom we can see Venetian traces are John Constable, Richard Parkes Bonington, David Wilkie or William Ety.

The Venetian influence is also evident in the landscape painting of realistic painting and academic painting. For landscape artists such as Camille Corot or Narciso Díaz de la Peña, Venetian painting is important due to the recreation of the ambient atmosphere and the importance of the landscape. In the academic painting carried out by Couture or Hans Makart we can see the taste for large compositions and the treatment of color typical of Venetian painting.

Of all the realist painters, Gustave Coubert must be highlighted due to the chromaticism of his works and the influence of Titian's painting. In Great Britain, Dante Gabriel Rosetti must be singled

out among many. In Italy, the Italian Manchistas such as Ciardi stand out. In Spain, Mariano Fortuny stands out, taking the works of Tiepolo and his taste for opulence and sensuality. We must also mention Martín Rico and his treatment of landscapes and light.

We can see the Venetian influence on Manet in works like Olympia or Breakfast on the Grass and how he pays attention to the Venetian nude. The painting of "colored spots", characteristic of Venetian painting, will cause impressionist authors such as Monet, Renoir or Berthe Morisot to take this painting as a model. We must also cite artists like Degas or Cézanne within the sphere of Venetian influence.

Among the American painters we must mention John Singer Sargent and James McNeill Wistler. The Venetian influence on Whistler is evident and can be seen in his Canaletto -influenced “color spots” painting.

In the 20th century we can see how Venetian painting continues to influence artists. We can see how the Venetian female nude influences painters like Picasso or Henri Matisse. If we observe the poses of the Young Ladies of Avignon we can see how they are based on works such as Diana and Actaeon by Titian and Diana and Callisto by Rubens. The presence of the drapery is another element that is taken from Venetian painting.

The taste for painting "color spots" and ideas such as improvisation or the concept of the "unfinished" influence movements such as Pollock's Action painting or Rothko's Color field painting within Abstract Expressionism.

We must also mention those movements that during the 20th century opposed Venetian painting, such as Futurism. Futurist artists in their manifestos pointed out that Venice was one of the festering sores of Italy. In 1910 they made a manifesto against Venice of the past and the Discourse against the Venetians.

In the 20th century Venice continues to be one of the great artistic goals as can be seen in the creation of the Venice Biennale since 1895. We must also mention the patronage that Peggy Guggenheim has been doing in Venice since 1946 in her Venieri palace. Authors such as Filippo de Pisis, Giussepe Santomaso, William Cogdom or Lucio Fontana take the city of Venice as a reference for their works.

Architecture of Venecia

Venice amazes at every turn of the gondola. Its thousand-year architectural history bears several high tide marks: pointed Venetian Gothic arches rounded in the Renaissance; the rigorous classicism revived by palladianamid the baroque flourishes; and sober modernism relaxing around thedecadent.

VENICE ARCHITECTURE

contemporary venice

Despite the limitations of history, Venice has hosted a surprising number of projects that have turned it into a showcase of contemporary architecture.

The italian architect Chinese zucchi, trained at MIT, launched a creative revamp of Giudeccain 1995 with the conversion of warehouses of the s. XIX in spacesartistic.David's London studio chipper field architects breathed new life into Cemetery Island, SanMichelle. Meanwhile, the foundation Giorgiocini converted the old shipyards of the arsenalin the art galleries of the Biennale.

contemporary venice

DIVINE ARCHITECTURE

St Mark's Basilica: domes Byzantine paintings with brilliant golden mosaics.

Basilicasay SantaMaria dellahello: Wonderful of bulbous domes of longhenna, which is believed to have mystical healing powers.

Basilicasay San Giorgiomaggiore: wide basilica of palladian with inspiring cloisters.

YoFrari :Churchbrick Gothic with a filleted roof and a campanile of the s. XIV.

Santa's ChurchMaria dei miracoli: Hesmall Renaissance miracle of the Lombardo in polychrome marble.

School Spagnola: Thetheatrical and elliptical gallery of women attributed to longhenna.

DIVINE ARCHITECTURE

RECREATIONAL PALACES

- **Biennale Pavilions**Contemporary architecture sometimes more striking than the works presented.
- **Tipdella dogana** Old customs warehouses converted by tadaol walk in galleries for avant-garde installations.
- **Business olivetti** the advanced carloScarpatrans formed a dusty souvenir shop into a high-tech showcase in 1958.
- **Foundation Giorgiocini** Former naval academy converted into an avant-garde art gallery.

RECREATIONAL PALACES


ART IN VENICE

The water may be the first thing that draws your attention to Venice when you arrive, but as you get closer, you discover a city saturated with art. The canals are only brief interruptions between the works of art in this UNESCO World Heritage site, with more art treasures than any other city.

ART IN VENICE


VENICE MUSEUMS

Yeahpeek inside the Grand Canal palaces donated to Venice, and you'll see that they're packed right down to the trendy Prada rafters, samurai armor, and the occasional dinosaur. Although he tried for 11 years, Napoleon could not steal all the treasures that the Venetians accumulated over the centuries. Generous benefactors have restored Venice's valuable museums and enriched them.

MUSEUMS OF VENICE


Culture

Venice is a city known for its rich history and culture, and its cuisine is no exception. The city's location on the coast of the Adriatic Sea means that seafood is a staple in Venetian cooking. Popular dishes include seafood risotto, grilled fish, and pasta with seafood sauce.

One of the most famous Venetian seafood dishes is sarde in saor, which is made with marinated sardines and onions. Another traditional dish is bigoli, a type of thick spaghetti that is typically

served with a sauce made from anchovies and onions.

In addition to seafood, Venetian cuisine also features a variety of meats, such as rabbit and duck. One of the most popular dishes is fegato alla veneziana, which is thinly sliced liver sautéed with onions.

Venice is also known for its delicious desserts, such as tiramisu and the famous Venetian pastry, zaletti, which is made with corn flour, butter and sugar.

Eating in Venice is not just about the food but also the experience and the atmosphere. The city is famous for its "bacari", small wine bars where locals gather to enjoy traditional dishes and wines. Visitors can also find traditional trattorias and restaurants that offer a taste of authentic Venetian cuisine.

Overall, Venice's cuisine is a mix of seafood and traditional dishes that reflect the city's rich history and cultural heritage. To truly experience Venice, it is essential to try the local food and wine.

Another important aspect of Venetian cuisine is the use of fresh, seasonal ingredients. The city's many markets, such as the Rialto Market, offer a wide variety of fruits and vegetables that are used in many traditional dishes. The city's fertile hinterland also offers a rich variety of herbs and spices, such as garlic, rosemary, and sage, which are used to add flavor to many dishes.

Another interesting aspect of Venetian cuisine is the influence of other cultures. Throughout history, Venice was a major trading hub, and as a result, the city's cuisine has been influenced by the flavors and ingredients of the Mediterranean, the Middle East, and Asia. For example, dishes like Risi e Bisi (rice and peas) and Risotto al Nero di Seppia (squid ink risotto) are examples of how the city's cuisine has been influenced by the Mediterranean region.

Additionally, Venetian cuisine is also known for its use of traditional methods of preservation such as salting, smoking and drying. This allows for the fish and meat to be enjoyed all year round.

One of the best ways to experience Venetian cuisine is to attend a traditional cicchetti crawl, where locals and visitors alike can sample small plates of traditional Venetian foods and wines at various bacari. This is a great way to experience the local culture and try a variety of dishes.

In summary, Venetian cuisine is a reflection of the city's rich history, cultural heritage, and its location on the coast of the Adriatic Sea. With an emphasis on seafood and seasonal ingredients, along with the influence of other cultures, it offers a diverse and delicious culinary experience that is not to be missed.

Another important aspect of Venetian cuisine is the emphasis on simplicity. Many traditional dishes are made with a small number of ingredients, allowing the flavors of each ingredient to shine through. This simplicity is also reflected in the cooking methods, with many dishes being

either grilled, sautéed, or boiled.

The Venetians also have a strong tradition of using local ingredients. They have a wide variety of fish, shellfish and crustaceans, as well as different types of rice and grains, to prepare their dishes. They also use a wide variety of herbs, fruits and vegetables from the surrounding region to add flavor and freshness to their dishes.

In addition to traditional Venetian cuisine, the city is also home to a diverse range of restaurants that offer a variety of international cuisines. From classic Italian fare to modern fusion cuisine, there's something for every taste and budget.

One of the most important events in Venetian cuisine is the annual "Sagra del Pesce" (Fish Festival) which takes place in the city. During this event, local restaurants and cicchetti bars prepare and serve a wide variety of fish and seafood dishes, as well as traditional wines and liqueurs. This event is a great opportunity to taste the best of Venetian cuisine.

Another important aspect of Venetian cuisine is the use of fresh herbs and spices. Herbs such as basil, oregano and thyme are used to add flavor to dishes, while spices like black pepper, cinnamon and nutmeg are also used to add depth and complexity. The use of herbs and spices is not only for taste but also for their medicinal properties. For example, rosemary is known for its anti-inflammatory properties and is often used to flavor meat dishes.

One of the most popular ways to experience Venetian cuisine is through a traditional gondola ride. Many gondoliers offer a "gondola traghetto" service, which is a traditional Venetian gondola ride with a difference. Instead of the usual sightseeing tour, visitors can enjoy a traghetto meal, where they can sample traditional Venetian dishes and wines while enjoying the beautiful views of the city from the water.

Venetian cuisine is also known for its use of regional wines. The Veneto region is home to many famous wines such as the Prosecco, Soave, and Amarone. These wines are often paired with traditional dishes to enhance the flavors and create a perfect culinary experience.

Finally, it's worth noting that Venetian cuisine is not just limited to seafood and traditional dishes. The city is also home to a wide range of vegetarian and vegan options, with many restaurants offering plant-based alternatives to traditional meat-based dishes.

In conclusion, Venetian cuisine is a delicious and diverse culinary experience that is steeped in history and tradition. The use of fresh seafood, seasonal ingredients, herbs and spices, regional wines and traditional cooking methods, along with the influence of other cultures and the availability of vegetarian options, make it a unique and must-try culinary experience for any visitor to Venice.

- Venice was founded from the 5th century AD, when the populations of the interior of Italy wanted to seek refuge from the barbarian invasions. The Venetians moved towards the lagoon, which was made up of 120 small islands, which are connected by the numerous bridges through which we can transit.
- In order for the city not to flood, it became necessary to build a whole network of canals to channel the water from the lagoon. The canals of Venice, which cover a total of 42 kilometers, were built in several stages, starting with the construction of cofferdams.

- Venetian Gothic is the local variant ofArchitectonic styleof theitalian gothicbuilt in Venice, in which the requirements for building in such a special environment converge with influences from thebyzantine architectureand of theislamic architecture, which reflects the wide commercial network of therepublic of veniceat that moment.
- The best known examples are the Ducal PalaceHi CA'gold
- The beginning of the style probably dates back no further than the 18th century.XIII, though the dates of early Gothic palaces, and especially features such as the windows in them, are largely uncertain.

ARCHITECTURE

DUCAL PALACE

The Doge's Palace Venice, it is a historical buildingItalianlocated at the eastern end of the plazaSaintMark, in these stiere of San Marco. It is one of the symbols of the power of Venice and the main work of the Venetian Gothic. Its two most visible façades face the Venetian lagoon and Saint Mark's square. The palace was the residence of the Doges, supreme magistrates and top leaders of the Republic of Venice, seat of government and of the court of justice and prison of the Venetian Republic.

THECA'DÓRO

The Ca'goldis a notable palace in Venice, (Veneto, Italy), located in these stiere of Cannaregio, next to the Grand Canal. It currently houses the art museum "GiorgioFranchetti".

The palace was built around 1442 by Giovanni, Bartholomewgood and Matteo raverti commissioned by the attorney of San Marcos Marinocontarini. It represents a good example of the change that marks the passage from the Gothic to the Renaissance style in Venice. The marble tracery on the first and second floors and the parapets of the windows and balconies show shapes that clearly indicate the late gothic; while the colonnade facing the canal and the small square windows in the right wing already announce Renaissance forms.

- The style of the successive painters of Venice maintained some common characteristics (warm and rich colors) that radiated their influence through the media. The so-called "Venetian School" influenced teachers as diverse as rubens and Velazquez, and was decisive in the genesis of thebaroque paintingin itXVII century. Venice enjoys a legendary fame for its extensive artistic heritage and long history as a reference for European painting.

PINTURE

PAUL VERONESE

Paul Caliari (or Cagliari) took the surname Veronese from his hometown, Verona. He was a famous Renaissance painter, whose work in Venice was masterful. Along with other Venetian artists such as Titian (1485-1576), and Tintoretto (1518-1594), Veronese. He was one of the most important artists in the city. Representative of the Venetian school, Veronese was a great colourist, who painted elaborate narrative cycles in a dramatic mannerist style. the artist isbest known for his monumental banquet scenes, such as his masterpiece, the*wedding at Cana*, the *Dinner at Simon's house*, and the*Dinner at Levi's house*.His works are full of figures and elaborate decorations, rich in color and skilful architectural representations.

Sculpture

Venice has a rich history of sculpture, dating back to the Middle Ages. One of the most famous sculptors from Venice is Tullio Lombardo, who created the tomb of Doge Andrea Vendramin in the Church of San Giovanni e Paolo. The tomb is considered one of the most important examples of Renaissance sculpture in Venice.

Another important sculptor from Venice is Sansovino, who created several sculptures for the Basilica di San Marco, including the famous statue of St. Mark. The statue was created in the 16th century and is considered one of the most important examples of Renaissance sculpture in Venice.

In the 18th century, Venice saw a resurgence of sculpture with the works of Canova. Canova was a major figure in the Neoclassical movement and created several important sculptures for Venice, including the tomb of Pope Clement XIII in the Basilica di San Giovanni e Paolo and the statue of Mars and Venus in the Gallerie dell'Accademia.

The 19th century saw the arrival of the Futurist movement in Venice, led by the sculptor Umberto Boccioni. Boccioni's sculpture, "Unique Forms of Continuity in Space," is considered one of the most important works of Futurist sculpture and can be found in the Gallerie dell'Accademia.

In the 20th century, Venice saw the arrival of the modernist movement in sculpture with the works of artists like Marino Marini. Marini's "Angel of the City" is a famous example of his work and can be found in the Piazza San Marco.

Today, Venice continues to be a major center for sculpture with many contemporary sculptors working in the city. Some notable contemporary Venetian sculptors include Lorenzo Quinn, who is known for his large-scale public sculptures, and Mauro Staccioli, who creates sculptures that explore the relationship between art and architecture.

The sculptures in Venice are not limited to the museums and churches, but also can be found in the squares and streets of the city. Many of these sculptures are in the form of statues, fountains, and monuments, which serve as a reminder of the city's rich history and cultural heritage.

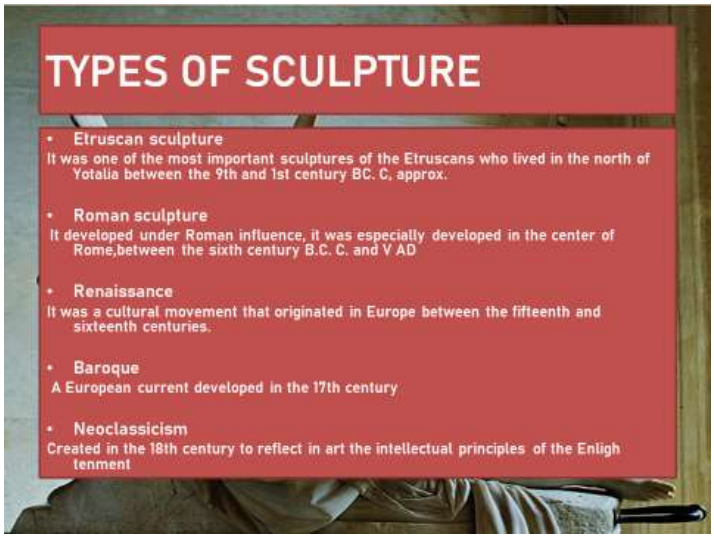
One of the most famous sculptures in Venice is the "Winged Lion of Venice" which is the symbol of the city. The sculpture can be found in various locations throughout the city, including the Piazza San Marco. The lion is a symbol of power, strength and courage, which are all values that the Venetians hold dear.

Another famous sculpture in Venice is the "Pegasus" which is located in the Piazza San Marco. The Pegasus is a symbol of freedom and inspiration, and is a reminder of the city's connection to the ancient world.

The "Moses" by Tullio Lombardo is a famous sculpture that can be found in the Church of San Giovanni e Paolo. The sculpture depicts the prophet Moses holding the tablets of the Ten Commandments, and is considered one of the most important examples of Renaissance sculpture in Venice.

The "David" by Sansovino is another famous sculpture that can be found in the Basilica di San Marco. The sculpture depicts the Biblical hero David, and is considered one of the most important examples of Renaissance sculpture in Venice.

The "Apollo and Daphne" by Canova is a famous sculpture that can be found in the Gallerie dell'Accademia. The sculpture depicts the Greek myth of Apollo and Daphne, and is considered one of the most important examples of Neoclassical sculpture in Venice.



EXAMPLES OF TYPE OF SCULPTURE

Baroque

EXAMPLE OF TYPES OF SCULPTURE

neoclassicism

SCULPTORS

- Antony canova: He was an Italian painter and sculptor of Neoclassicism, born on November 1, 1757. His style was largely inspired by ancient Greek art, his work was compared to the best of antiquity by his contemporaries, and he is considered the greatest European sculptor from Bernini. he was sensitive to the influence of romanticism.

SCULPTORS

- TitianAspetti: He was an Italian sculptor of the Renaissance. He was born in Padua, where he mainly carried out his activities, and in Venice. He made large and small sculptures in bronze. Among his great works, the bronze statues on the façade of the Church of San Francisco de lacame and Saint Anthony

Statue of Bartholomew Colleoni

- The equestrian statue of Bartholomew Colleoniis a Renaissance sculpture located in Venice (Veneto, Italy), the work of Andrea del Verrocchio created between 1480 and 1488. He was a former Captain General of the Republic of Venice, died and by his will left a substantial part of his patrimony to the Republic on the condition that a statue of himself be built in Piazza San Marco.

THE GOBBO DI RIALTO

- Il gobbodi Rialto is a marble statue of a hunchback that stands in front of the Church of San Giacomo di Rialto at the end of the Rialto in Venice. Sculpted by Pietro daSalo in the 16th century, the statue takes the form of a crouching, naked hunchback supporting a small flight of steps.

Statue ofDanielle Manin

- The statue of Danielle Manin stands in the center of the square that bears his name. Maninhe is considered a revolutionary hero of Venice due to his incessant struggle for the unification of Italy. It was sculpted by Luigi Borro in 1875.

Health

Rowing is a great way to improve your overall health and fitness. Not only does it provide a full-body workout, but it also helps to build endurance and improve cardiovascular health. Additionally, rowing is a low-impact exercise, which makes it a great option for people of all ages and fitness levels.

When rowing, you use a variety of muscle groups, including your legs, back, and arms. This can help to increase muscle strength and tone, which can lead to improved posture and balance. Additionally, the repetitive motion of rowing can help to improve joint mobility and flexibility.

Rowing is also a great cardiovascular workout. The motion of rowing requires a lot of energy, which can help to increase your heart rate and improve cardiovascular fitness. Additionally, rowing is an aerobic exercise, which means it can help to improve your lung function and increase your stamina.

Another benefit of rowing is that it can be done indoors or outdoors, making it a versatile exercise option. Whether you prefer to row on a machine at the gym or on a lake, you can easily fit rowing into your workout routine.

Overall, rowing is a great way to improve your overall health and fitness. It provides a full-body workout, helps to build endurance and improve cardiovascular health, and is a low-impact exercise that can be done indoors or outdoors.

Additionally, rowing is an excellent exercise for burning calories and losing weight. Depending on the intensity level, you can burn up to 600 calories per hour while rowing. This makes it a great option for those looking to lose weight or maintain a healthy weight.

Furthermore, rowing is a great stress reliever. The repetitive motion and focus required during rowing can help to clear your mind and reduce stress levels. Additionally, being out on the water or in nature while rowing can also provide a sense of calm and tranquility.

Rowing is also a great way to improve mental focus and concentration. The coordination and precision required to row effectively can help to improve your focus and concentration. This can be beneficial for both your personal and professional life.

Overall, rowing is a great way to improve your overall health and fitness. It provides a full-body workout, helps to build endurance and improve cardiovascular health, it's a low-impact exercise that can be done indoors or outdoors, it's an effective way to burn calories and lose weight, it's a great stress reliever and it can help to improve your mental focus and concentration.

Additionally, rowing is a great way to improve your overall sense of well-being. The physical and mental benefits of rowing can help to boost your mood and energy levels. Regular rowing can also help to improve your sleep quality and reduce feelings of anxiety and depression.

Rowing is also a great way to socialize and connect with others. Many people enjoy rowing in groups or teams, which can help to build camaraderie and support. Joining a rowing club or team can also provide a sense of community and belonging.

Finally, rowing is a great way to explore the great outdoors and appreciate nature. Whether you're rowing on a lake, river, or ocean, you'll be surrounded by beautiful natural scenery. This can help to increase feelings of happiness and gratitude.

Overall, rowing is not only a great way to improve your physical health, but also your mental and emotional well-being. It can help to boost your mood and energy levels, reduce feelings of anxiety and depression, improve sleep quality, and provide a sense of community and belonging. Additionally, it gives you the opportunity to explore and appreciate nature.

In addition, rowing is a great way to challenge yourself and set goals. As you become more proficient at rowing, you can set new goals for yourself such as rowing longer distances or at faster speeds. This can help to increase your motivation and satisfaction with your progress.

Also, rowing is a great way to cross-train for other sports. The full-body workout and cardiovascular benefits of rowing can help to improve performance in other sports such as cycling, running and swimming.

Finally, rowing is a great way to maintain a healthy lifestyle. Regular rowing can help to improve your overall health and fitness, which can lead to a longer, healthier life. It can also be a great way to prevent chronic diseases such as obesity, diabetes, and heart disease.

In conclusion, rowing is a great way to improve your overall health and fitness. It provides a full-

body workout, helps to build endurance, improve cardiovascular health, it's a low-impact exercise that can be done indoors or outdoors, it's an effective way to burn calories and lose weight, it's a great stress reliever, it can help to improve your mental focus and concentration, your sense of well-being, your social connections and your appreciation of nature. Additionally, it's a way to challenge yourself and set goals, cross-train for other sports and maintain a healthy lifestyle.

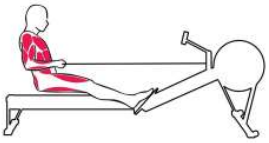
BENEFITS OF ROWING FOR THE CARE OF THE BODY AND MIND

The benefits of rowing are innumerable in the physical and psychological dimensions of a person. In the aspect of integral health, the improvement of cardiovascular capacity is reason enough to start in the sports discipline ofrowing.

HeRowing is an Olympic water sport, which consists of moving a boat on the surface of the water, through coordinated physical movements using oars, which act as the levers that provide the advance.

The reason why rowing has become one of the most popular sports practices is that it is one of the most complete exercises in which the fastest results are achieved. Also, when practiced as a team, the psychological benefits are positive. Increases the resistance and strength of the body, because the muscles are workedmain.

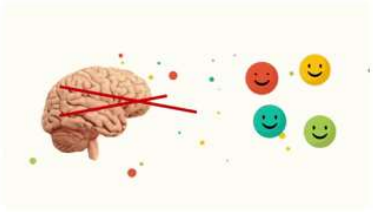
Below is a list of the multiplebenefitsof the rowing for the human body:



Strengthening ofmusculature

The muscles of the lower and upper body are seeninvolvedin rowing practice. In the muscles of the back (latis, rhomboids and trapezius), in the arms (deltoids, triceps and biceps), in the legs (buttocks, quadriceps and hamstrings) and in all the abdominal muscles, provides strength, eliminates excess fat and defines the lines of the body, in littletime.

HeRowing is a complete exercise that helps achieve results much faster than the time it takes to see the same results in the gym.



freeendorphins

The benefits of rowing are similar to the benefits obtained from aerobic exercise, but with a greater impact because the demand is greater than that of the rest of theaerobics.

Whenendorphins are released automatically, improves mood and quality of sleep, in addition, it generates enough sensations of pleasure to reduce stress levels. People who suffer from insomnia can experience a decrease in this condition in a short time, especially when rowing is done constantly.

Eliminates stiffnessjoints

Among the consequences of not staying active and not exercising, is joint stiffness. This condition causes the body to age faster than normal, causing pain and decreased elasticity in muscle tissue, therefore the body's natural mobility is seen.diminished.

TheRowing practice helps keep the body young, eliminates stiffness and strengthens the body in an integral way.

Helps eliminate fatbodily

Many people undergo complex diets to eliminate excess body fat and thereby look and feel healthier. However, constant rowing helps reduce body fat naturally, while conditioning the body's metabolism to absorb nutrients from food and burn unhealthy fat naturally effective.

ThisIt is one of the most remarkable benefits of rowing because the weight loss that is achieved as a result of the practice of this sport goes hand in hand with the definition of a healthy musculature.

Improvementof thecoordination

With the rowing exercise we will strengthen all the main joints of the body. Rowers must follow a specific pattern to generate maximum force with each stroke and minimize the risk ofinjuries.

Withrowing develops coordination, in other words, the ability to control the extremities of the body at the same time and precisely.

Elderlymobilityjoint

Another of the benefits of the rowing machine that we will name is that it helps to mitigate the stiffness of the joints caused by inactivity and a sedentary lifestyle. Moving the joints through a wide range of motion stimulates fluid productionsynovial.

The synovial fluid lubricates the joints so they will function properly. With the rowing we will achieve less wear on the joints and will help improve their health.

improves staminacardiovascular

Strengthening the cardiovascular system is of the utmost importance for all human beings. One of the benefits of rowing has to do with improving cardiovascular capacity.

TheRowing practice helps directly with strengthening the health of the heart and lungs, in addition, the benefits extend to the effective prevention of arterial hypertension and glycemia control.

It is important to note that rowing must be accompanied by a healthy diet, in which essential nutrients cannot be missing for after training.

Theconstant intake of water, to keep the skin and body organs at the required levels of hydration, and the necessary sun protection so that UV rays do not affect the skin during training.

Voga&Care Conference

It is the conference among researchers and trainers about sport benefits – especially of rowing discipline – on psychophysical health, specifically on youngsters, with a special focus on those 12-18 years old.

A team of sport researchers are invited to discuss on rowing benefits on psychophysical health. A psychotherapist also highlights psychological benefits of sport activities and their impact on school results. After the conference partners' coaches share impressions and suggestions which are then detailed with the acts in the final manual

Conference schedule

Wednesday, 14.12.2022

Partners Arrivals

Thursday, 15.12.2022

09.00 – 09:30 Arrival of participants (coffee)

09.30 – 09:45 Welcome speeches

09:45-11:00 Going through all Project activities, Work packages and IO

11:00 – 11:45 Coffee break – Displacement Sport Club

11:45 – 13:45 Sea rowing and Program of modernization of recruitment of talents in rowing for young people in the Region of Murcia

Practical session of sea rowing and dragon boat (Laura Salmerón)

(Bring waterproof clothing for those who want to participate)

15:30 – 16:45 Discussion about project activities

Activities evaluation Vogalonga

16:45 – 17:00 Open discussion, conclusions

17:05 Meeting closure

Friday, 16.12.2022

09:00 – 09:30 Arrival of participants (coffee)

09:30 – 09:45 Open session conference - José María López, Arturo Díaz, Rosario Genchi

10:15 – 10:45 1th Speech: Beach Sprint Rowing – the future is now! - Fabio Patrignani (MSV)

10:45-11:15 Presentation Voga&Share Project & Voga&Care Manual - Francisco Borrego, Salvador Angosto, Guillermo López (UMU)

11:45-12:15 2nd speech: A test for young rowers. The strange case of 20 seconds - Daniele Zangla (CUS Palermo)

12:15 – 12:35 Coffee break

12:35 – 13:05 3rd Speech: The importance of modern technology in rowing training and Monitoring - Andrei Dragomir

13:05 – 13:35 4th Speech: Rowing for Education - Antoine Mevel (FFAVIRON)

13:35 – 14:05 5th Speech Nutritional strategies for young rowers - Adrián Bayonas (UMU)

14:05 – 14:15 Conference Close

Conferences

Beach Sprint Rowing – the future is now! - Fabio Patrignani (MSV)

Vogalonga2023

Point of view/ Fabio Patrignani

Vogalonga

Vogalonga is not a race. It's a rowing tour in Venice laguna of 33 km (+/-).

We have to row 5 km to go to star line and 5 km to go to parking and put the boat in the trailers. (more or less)

In totally we must row 40 km.

Logistic problem

We will arrive with trailers in Tronchetto Parking.

There are 2 parking:

- small with a pontoon and crane,
- big without service.

It's important to arrive to the trailers at the parking in the end of morning or early afternoon.

Proposal 1

we can put the boat in the water in the afternoon and row from Tronchetto to Canottieri Giudecca and stop boats there. We are very close to start line (1 km).

We cross Giudecca Channel (big waves for Dragon Boat).

We can rent is space to stop the boats.

Sunday Morning we can take a ferry boat from Tronchetto Parking to Canottieri Giudecca (very very very early). We put the boats in the water at 7/7:30 maximum.

Proposal 2

we can put the boat in the water early morning on sunday. Very very very early.

And we row 5 km to the start line.

Tour

The complete tour is 33 km.

We can "cut" tour when we will arrive in Sant'Erasmo channel.

We can row to Murano anche then to Canareggio and Canal Grande.

When we finish tour we come back to Tronchetto parking and put the boats in the trailers.

A test for young rowers. The strange case of 20 seconds - Daniele Zangla (CUS Palermo)

UNIVERSIDAD DE MURCIA

Co-funded by the Erasmus+ Programme of the European Union

A test for young rowers. The strange case of the 20 seconds

Meeting Murcia
16 december 2022

Daniele Zangla
Technical Rowing Director of CUS Palermo

- Many studies have shown how some parameters such as body mass and VO_2max influence performance and how they are correlated with performance, becoming good predictors for high-level rowers.
- For some years now some studies have begun to highlight how muscle power and strength can also be predictors in Elite and Amateur rowers with many years of experience (Izquierdo-Gabarren M., Eur J Appl Physiol, 2010)

- Up to now the evaluation of the anaerobic component with the rowing machine is not a common use, at least in the societies, for the evaluation of the profile of the young athletes.
- Several authors (Mikulic 2009, Petrykowki 2006) have applied tests of the modified Wingate or 15" max on the rowing machine for school selection.

- The common idea supported by the scientific papers is that the aerobic component affects performance by 65-75% and the anaerobic component by 25-35%.
- Evidence supported by the correlation between VO2max and 2000mt does not explain the difference in performance in elite athletes who have similar VO2max values

A test for young rowers.
The strange case of the 20 seconds

- My university colleagues and me wondered the question of what was the correlation between the anaerobic component (strength) and the 2000m performance.
- The study began about 10 years ago with analyzes on young rowers and the correlations between rowing exercises on 2000mt, 20", 60", 6000m and 60'.

A test for young rowers.
The strange case of the 20 seconds

> J Sports Med Phys Fitness. 2015 Sep;55(9):872-7. Epub 2014 Jun 12.

Mean power during 20 sec all-out test to predict 2000 m rowing ergometer performance in national level young rowers

A Cataldo [1], D Cerasola, G Russo, D Zangla, M Traina

A test for young rowers.
The strange case of the 20 seconds

- This first approach was not fully satisfactory, even if it showed a trend of greater correlation between 20" vs 60".
- Between 15" and 20", the latter proved to be a test with a high interclass correlation coefficient (ICCs=0.99) and a low coefficient of variation (CVs=2.5%).

A test for young rowers.
The strange case of the 20 seconds

- Several authors (Gastin 2001, Smith 1991) have demonstrated the glycolytic peak of power at 20"
- So we considered the 20" as a test for evaluating anaerobic power closely related to ATP-PC resources and muscle glycolytic energy.

A test for young rowers.
The strange case of the 20 seconds

Table I. Characteristics and rowing ergometer performance of the participants (mean ± s; *n* = 20).

	Mean ± s
Age (years)	15.2 ± 1.3
Height (cm)	175.6 ± 7.7
Body mass (Kg)	70.7 ± 10.0
Fat mass (%)	11.7 ± 5.4
Fat free mass (Kg)	62.4 ± 9.6
W_{20} (W)	501.7 ± 113.0
W_{20} ($W \cdot Kg^{-1}$)	7.20 ± 0.8
VO_2max ($ml \cdot min^{-1}$)	4622.0 ± 660.7
VO_2max ($ml \cdot Kg \cdot min^{-1}$)	64.9 ± 7.2
t_{2000} (s)	425.0 ± 25.8

W_{20} = mean power during 20-s all-out test.
VO_2max = maximal oxygen uptake during incremental test.
t_{2000} = 2000-m rowing ergometer performance time.

Mean power during 20 s all-out test was 501.7±113.0 W and VO_2max during incremental test was 4622.0±660.7 mL min^{-1} (respectively 7.2±0.8 W Kg^{-1} and 64.9±7.2 ml Kg^{-1} min^{-1} when normalized by body mass) (Table I).

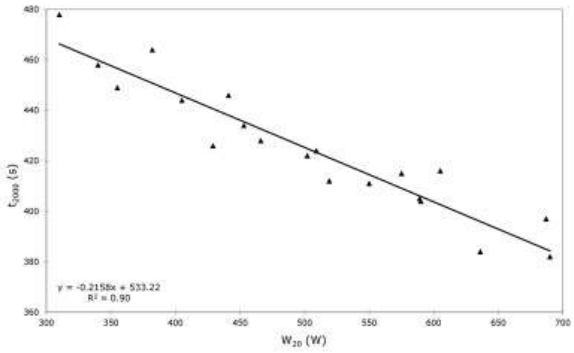
A test for young rowers.
The strange case of the 20 seconds

Table II. Correlations between 2000-m rowing ergometer performance time (t_{2000}) and characteristics of participants.

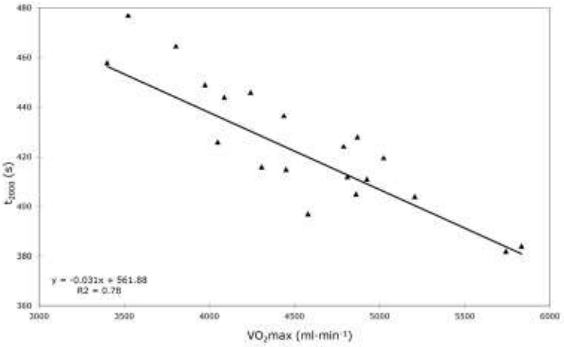
	Age	Height	Body mass	Fat mass	Fat free mass	W_{20} (W)	W_{20} ($W \cdot Kg^{-1}$)	VO_2max ($ml \cdot min^{-1}$)	VO_2max ($ml \cdot Kg^{-1} \cdot min^{-1}$)
r	-0.511	-0.870	-0.787	0.312	-0.853	-0.947	-0.792	-0.884	0.007
R^2	0.261	0.758	0.620	0.097	0.727	0.897	0.627	0.781	0.001
P	0.03	< 0.0001	0.0001	0.2	< 0.0001	< 0.0001	0.0001	< 0.0001	0.9

W_{20} and VO_2max in absolute values were all significantly inversely related to t_{2000} (r=-0.947; P<0.0001 and r=-0.884; P<0.0001, respectively) (Table II, Figures 1, 2).

A test for young rowers. The strange case of the 20 seconds



A test for young rowers. The strange case of the 20 seconds



A test for young rowers. The strange case of the 20 seconds

Table III. Stepwise multiple regression model of 2000-m rowing ergometer performance time (t_{2000}).

Step	Variable	R^2	SE	*P*-value
1	W_{20} (W)	0.897	8.48	< 0.0001
2	W_{20} (W)	0.949	5.67	<0.0001
	VO_2max (ml·min^{-1})			0.003
3	W_{20} (W)	0.951	5.78	0.003
	VO_2max (ml·min^{-1})			0.003
	Fat free mass (Kg)			0.5

T 2000 = 544,040 + 0,335 (FFM) – 0,159 (W20) – 0,014 (VO2 max)

A test for young rowers. The strange case of the 20 seconds

- We need to have a correct relationship between 20" and VO2max
- We can improve VO2max with a specific run and boat
- The 20", anaerobic component (strength) can be improved in the youth phase also on the boat but later with weights
- ATP-PC reserves increase with workouts to exhaustion

Un test di 20" per dimostrare l'importanza della forza nella prestazione gara 2000 mt

Conferenza Tecnica Nazionale

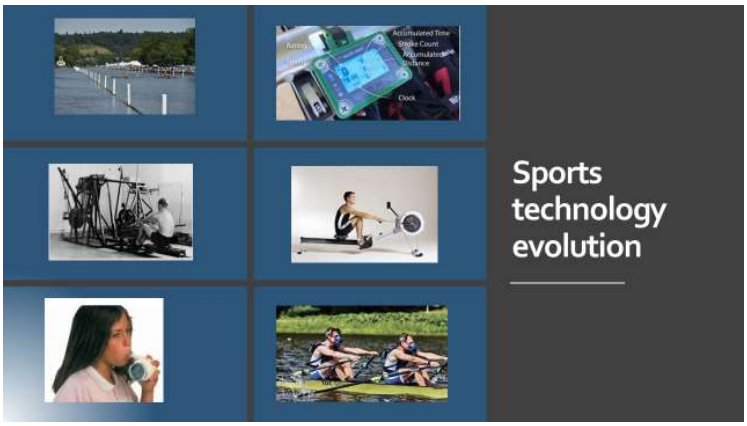
Formia 12-13 dicembre 2015

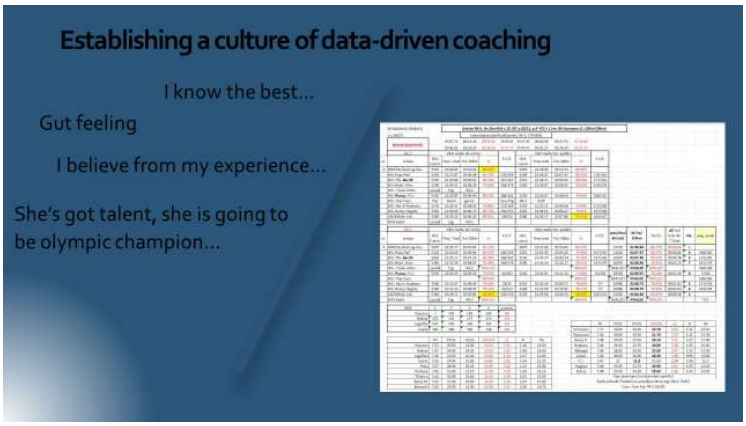
Settore Formazione FIC - Daniele Zangla

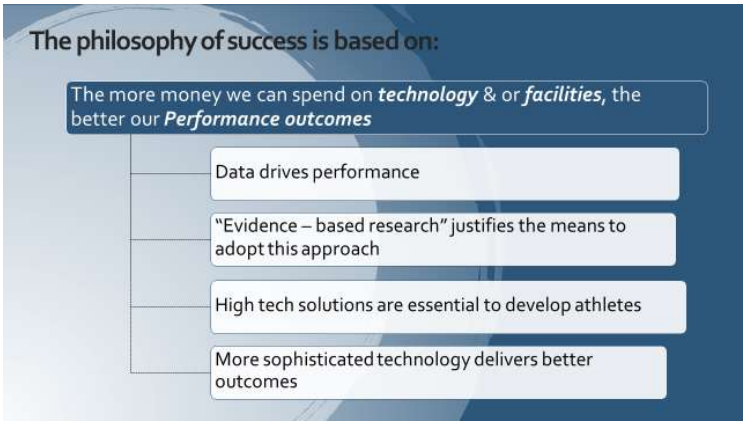
Finally I would like to thank my sports and academic team:

FP MD Marcello Traina - UNIPA
PhD Angelo Cataldo - UNIPA
PhD Dario Cerasola UNIPA - FIC
Head Rowing Coach Cus Palermo Andrea De Simone - FIC

The importance of modern technology in rowing training and Monitoring - Andrei Dragomir





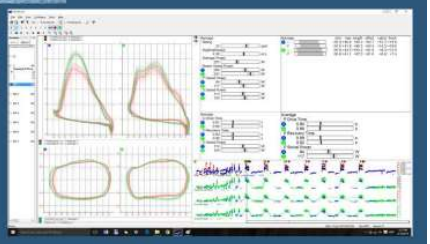


A data driven workflow: Understanding the process

- Define the problem — Performance issue – define it
- The filter — What do we already know? — What do we ready need to know?
- The outlook — What's the bigger picture/ broader issues?
- The context — Generic performance issue? — Specific to a situation?
- Problem solving — Do we need technology? — Existing solutions — Available expertise
  - Scientist/support team — Data specialist — software
- Implementation — Targeted and focused on the performance issue
- Impact — Utilization — Measure performance outcomes
  - Quality of information — Accuracy/ precision of measurement — The technology
  - Speed of analysis & availability for instant use — The platform/ interface
  - Quality of presentation — Visually appealing & easy to understand

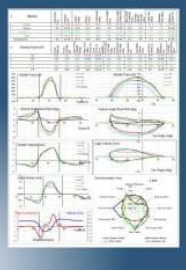
Case 1

Rowing technique issue

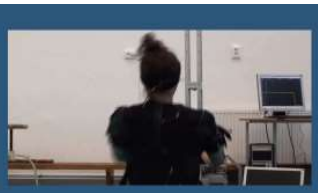


Case 2

cheating training

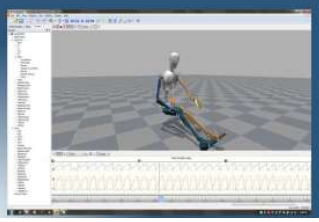


Case 3

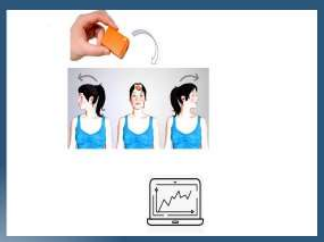


Rehabilitation

Focal dystonia is a neurological disorder



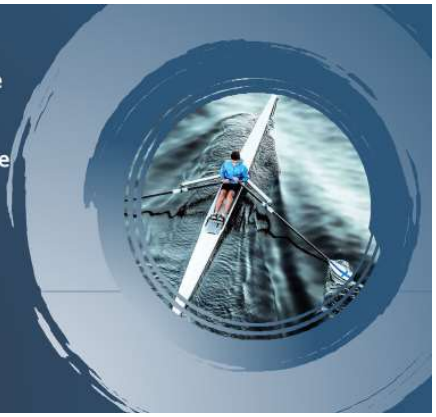
Case 3



Define the right performance question(s)

Find the most appropriate solution

To make the right decision & intervention…at the right time



Rowing for Education - Antoine Mevel (FFAVIRON)

ROWING FOR EDUCATION

TPM2 Voga&Care Conference
16/12/2022

Co-funded by the Erasmus+ Programme of the European Union

A STARTING POINT

Rowing is not ideal for education

- It's not very fun
- There are technical constraints
- It is not an easily accessible sport

BUT :

- With the development of new activities (Indoor, Coastal, Health, Para, ...)
- With the development of adapted programs for schools

⇒ Rowing becomes a platform for learning about health, environment, inclusion, ...

⇒ The coach becomes a teacher and not just a coach for the competition

Co-funded by the Erasmus+ Programme of the European Union

AVI'SANTE A L'ECOLE

For primary school

- From 10 to 11 years old
- With the teacher who is not a sports specialist
- Support are river / coastal / indoor
- 6 or 8 sessions
- It's about Environment, Health, Well-Being

Educational documents :

- Website : link
- Document for the teacher : link
- The rower's booklet : link

Co-funded by the Erasmus+ Programme of the European Union

RAME EN 5e !

For middle school

- For the 13 years old
- 1 session in the middle school
- With the teachers (biology and sports)
- Support are indoor rowing
- It's about Health and Nutrition

Challenge & Knowledge

- Individual race and relay race
- Quiz on how the human body works
- Workshop about calories

Go further

- Video for teacher and video to present the activity to the students

Co-funded by the Erasmus+ Programme of the European Union

RAME EN 5e se jette à l'eau !

For middle school

- For the 13 years old
- 1 session / in the club
- With the teachers (biology and sports)
- Support are rowing
- It's about Environnement

How can the student become a rower ?

- Classroom are in the club !
- 3 Workshop :
- Water cycle quiz
- Discover rowing and environment on the water
- Collective game to finish

Go further

- Resource link / Video

Co-funded by the Erasmus+ Programme of the European Union

AVIRON

ERASMUS+ R.O.S.E.

Rowing an Outdoor Sport for Education

- From 11 to 15 years old
- With the teacher / in partnership with school
- Support are river / coastal / indoor
- 9 sessions in the club
- This is the sequel to the Avi' Santé

Cofinancé par le programme Erasmus+ de l'Union européenne

R.O.S.E.

Rowing an Outdoor Sport for Education

Involve the coaches :

- 9 sessions created by the coaches of the ROSE program
- 3 themes : Environment, Health, Inclusion
- 3 supports : River, Coastal, Indoor

⇒ 9 propositions for 9 sessions

⇒ Students learn by rowing

⇒ Resource : Educational document / Video / (Start session)

ROWING FOR EDUCATION

Vega&Care Conference – 16/12/2022

Co-funded by the Erasmus+ Programme of the European Union

AVIRON

NEXT STEP ? VOGA PROJECT !

How to built :

- With the student
- And for the students

R.O.S.E.

Rowing an Outdoor Sport for Education

PROGRAM R.O.S.E

Cofinancé par le programme Erasmus+ de l'Union européenne

Presentation

The practice of rowing has, in particular, a certain pedagogical interest for the learning of autonomy, safety and constitutes a privileged means of contact with the natural environment. If you allow children to live "exceptional adventures", advancing in age, it offers the prospect of a smoother physical practice, centered on the development of personal well-being. Whatever the approach, through emotions, sports performance, collective experiences, the practice of rowing involves the individual in a process of transformation.

In 2021, at the initiative of CROS of the Pays de La Loire, in collaboration with the Regional Rowing League, and in partnership with the Intermunicipal Community of Alto Minho (Portugal), Clare Sports Partnership (Ireland) and We Atlantic (France), the European Commission, under the Erasmus + Sport 2020 program, validated the Outdoor Sport Rowing for Education (R.O.S.E.) project. This project aims to promote education within and through the practice of rowing through the development of the competencies of sports educators in 3 areas (Health/Inclusion/Environment) in order to strengthen the links between the school environment and the sports movement.

R.O.S.E.

Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Environment 1

Follow the cap

Learning – Environment

To teach students about the tides - why it happens and how it affects their rowing. To teach students about the gravitational pull of the moon and that there are 2 tides every day.

Row Task

Ask a crew row to a set point and then sit in boat with the oars off the water. Observe the drift of boat over a period of 1 minute . After 1 minute the crew marks the second point. Then they can measure the distance and the direction of the drift.

If you have the distance and direction for 1 minute calculate how far you drift in 1 hour.

Top Tips

- Be aware of environment / surroundings
- Carry out in known waterways
- Ensure a safety boat is present
- Keep all oars off waters
- Remove tiller/rudder to make the drift accurate

Equipment

- Boat (1x, 2x, 2-, 4x or 8x)
- Measuring Device (laser/tape) Safety Boat
- Compass to determine direction of drift
- Buoys to mark distances
- Stopwatch

Safety

- SafetyBoat
- LifeJackets
- Compass
- Weather forecast
- Time of the tide
- Radio
- Map with depths of water at high / low tide. (Marine map.)

R.O.S.E.

Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Environment 2

Follow the cap

Discussion

- Discuss with the kids the consequences of not having the safety equipment
- Discuss the distance they travelled/drifted and the effect on their boat.

More

- Tide charts. Website for weather
- Get kids to figure out the tidal times . If at 12 pm the tide is in, tomorrow at 4pm where will the tide be?

Go further

- How to row correctly in relation to wind + tides : At the start you need alignment buoys
- The rower keeps their head aligned straight with these buoys. while rowing to finish line. The boat may turn/drift, but the rower must maintain their head on straight line. Time it start to finish
- Repeat distance and do not use alignment buoys rower will drift out of line because of the tide and wind. Time it and compare it to test A.

Rowing Story

Two girls Galway Ireland went out with stand up paddleboards and they drifted 6km from where they started. They had no safety communication device. I t took the coastguard 14 hours to find them.

They were found clinging to a lobster pot. It is a good example of how quickly the current can pull you.

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Environment 1 Food chain

Learning – Environment

Learn about different types of fish to understand the how the food chain is organized and the importance of biodiversity

Row Task

Rowing treasure hunt 500m (orienteering).
Before the task, they get a page with the food chain and different types of fish with the answers already on it. You can also go to the aquarium before the task.
For example, divide 12 students into 3 teams. (3 boats e.g. 1x)
Place a person at each station, have 4 / 5 questions on waterproof signs.
Hand out one clue at a time, they can move to the next one when they solve it.
Each clue leads to a number: they must get the numbers in the right order to reorganise the correct food chain

Top Tips

- Give them hints.
- Read answer sheet carefully
- Make sure they go in different directions
- Check the tide, flow and weather forecast

Equipment

- Marker buoys
- 3/4 rowing boats,
- 2 - 3 safety boats
- Laminated signs with questions
- Answer sheets

Safety

- Safety boat
- Lifejackets for coxes (x24)
- Protective shoes

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Environment 2 Food chain

Discussion

- What have you learned?
- Discussion about fishing
- Importance of each fish at each stage of food chain
- How do humans influence the food chain?

More

- Links with the science Curriculum

Go further

- Visit to the aquarium
- Fish market
- Fishing harbor
- Fish conservation
- Fishing boats

Rowing Story

Documentary about whale fishing.
An average whale can hold her breath for 60 minutes.

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Environment 1 Water cycle

Learning – Environment

The water cycle how each stage happens and the impact of water on landscape - erosion.
Interaction of humans with water - pollution.

Row Task

1.On the land teach children the water cycle, before they go in boats.
2.Use a rowing boat with four participants and coach 3.
A- Condensation – very slow rowing – Rate 16
B- Precipitation – Rain – Row fast – Rate 30
C- Collection – Steady rowing – long and strong Rate 24
D- Evaporation – Tall – legs rowing – legs only
4. Run through this drill – twice

Top Tips

- Listening for the coaches' instructions
- Focus on technique and posture
- Be aware of weather conditions and demonstrate water cycle with a poster

Equipment

- Rowing boats and row equipment
- Buoys
- Cards about water cycle
- Poster about water cycle

Safety

- Coaching launch
- Life jackets
- First aid kit
- Radio or phone
- Contact numbers for emergency services
- Correct boat handling instructions
- Megaphone for clear and correct communication between coach and athletes

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Environment 2 Water cycle

Discussion

- Before
  - Explain the origin of water on our site (river, sea or ocean)
  - Explain the water cycle (4 parts: condensation, precipitation, collection, evaporation)
- After
  - Pollution – how it happens and how it affects humans
  - Erosion – impact on landscape

More

- National Geographic Society – The water cycle (website)
- World Rowing – Pollution and Health recommendations
- Agence de l'eau Loire-Bretagne
- The water cycle on Youtube.

Go further

- Do the task as a relay put more boats on the water and they must keep a strict timing between water cycles
- Send more boats to further disrupt the water cycles
  To keep the same route but remove the bouys
- Collect rubbish from the river / sea / over banks

Rowing Story

Pollution affected the Rodrigo de Freitas lagoon for the 2016 Rio Olympics for 1,400 athletes rowing. Rowers had to avoid being splashed. They had to bleach the oar handles, they had to use anti-bacterid monthwash and kept their water bottles in plastic bags.

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Health 1 Biomechanics

Learning – Health

Compares arms only rowing versus legs only rowing to understand
how the body and muscles create more power.
More muscles = more efficiency = more power.

Row Task

Indoor Rowing machine
- All body rowing drill
- Legs only drill
- Arms only drill
- Row with one leg only and then swap to the other leg
- Row with each arm individually.
- Trunk only rowing
  - Compare the distance and watts for each drill. Record it on paper

Top Tips

- Try repeat with stroke rates
- Focus on using trunk muscles
- Use watts and distance

Equipment

- Indoor rowing machine
- Paper + Pen
- Mirrors (to see your position)

Safety

- Participant should do a warm-up Check if there are any injuries
- Do a cool down and stretch after
- Drink water

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Health 2 Biomechanics

Discussion

- Which muscles groups are strongest
- What is the easiest drill to do?
- Have a discussion about angles and positions for example foot position on rowing machine
- What happens if it is changed?
- What have you discovered about the core/trunk muscles ?

More

- Technology: Use online video app/software to watch core and technique
  Rower Up application for phone
- Online video illustrating muscles being video for stroke throw highlighting the individual muscles

Go further

For progression : 2x on the water – calm conditions on the water, each participant rows with a oar in double scull, Try to stay in time with each other. Row in straight line with good technique. Start slowly. Discover rowing in a circle. Let the participants find the solution.

Rowing Story

In a tight race in coastal rowing when boats collide an oar could break. The person with one oar keeps rowing efficiently to try keeping the boat straight to finish. All the crew reacts to find the solution, they row harder on one side to compensate

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Health Nutrition 1

Learning – Health

Food is your bodies fuel. Pay attention to nutrition labels. Proteins, carbohydrates and fats are macronutrients. The importance of hydration and water. The importance of nutrition for recovery.

Row Task

- Row two minutes on the calorie setting on the rowing machine then use the table to see what the calories burned apparently equals in food.
- Group students by team. They have to put the number of
- calorie in rowing machine.
- The team have to burn the calories of that by using 1 rowing machine in a relay.

Top Tips

- Bring a water bottle to every training
- If it's a long session bring food for after training
- Use bottle that have indicators on the side as targets
- Teach students to cook/prepare snacks themselves

Equipment

- Water bottle with indications on side
- Watch with reminders to drink water
- Handouts with nutrition information for rowing
- Indoor rowing, ergometers

Safety

- Warm up all students
  Parents have responsibility to ensure kids have eaten
- Kids must refuel after training
- Drink water cool down + stretch

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Health Nutrition 2

Discussion

Ask the children to discuss

- How much water to drink
- If you feel more energy with or without food
- How many calories, you burn vs what you eat

More

- Jeremy Azou wrote a book on how controling nutrition throughout his high level lightweight carreer was almost more challenging than the rowing itself.
- The book is called « une médaille à la faim »

Go further

- Nutrition workshop
- Cooking Workshop with practical approach
- Week-end training camp with food supplied to team food requirements
- Learn about food labels

Rowing Story

- High Performance lightweight rowing can cause a big mental strain constantly trying to maintain weight and manage nutrition and fuel.
  Spanish lightweight 2x pulled out of the Olympics lightweight race due to the mental stress of nutrition and weight.

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Health Well-Being 1

Learning – Health

Learn to be self-aware. Learn how to measure your heartrate. Learn how to control your pacing. Learn to listen to your body.

Row Task

- Bring the group out in boats. Do a warm-up.
- Row 1 minute at rate 32 firm then 1 minute at 28 rate
- Then 1 minute at 24 rate then rate 20, then rate 16.
- Turn off boat engine, close eyes listen to the boat run at low rate, feel your heartrate.
- Start to feel completely relaxed, row at rate 16with eyes closed.

Top Tips

- Quiet surrounding
- Explain the purpose of exercise
- Switch off the engine

Equipment

- Rowing boats
- Safety Boat

Safety

- Safety boat
- Safety equipment

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Health Well-being 2

Discussion

- Ask the students about what they discovered.
- Discuss well-being and ask did they manage to lower their heartrate

Rowing Story

- How do the athletes feel
- This rowing story can be their own story

Go further

- Eyes open, follow strokes movement, stoke moves when they think the boat is going to stop
- Closed eyes – strike position when you think boat is going to stop then open your eyes.

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Inclusion How to understand each other 1

Learning – Inclusion

How to understand each other without a common language or talking even if one or two people in the boat have a disability.

Row Task

- Determine route or course (picture/map)
- Choose signs (body language)
- Demonstrate signs
- Navigate the route

Top Tips

Students
Keep looking at the instructor to see the signs
Focus on the movement
Coach
Use pedagogical resource to create signs or codes
Be visible to the crew at all times and be aware of sun or fog

Equipment

- Colored Buoys to set out route
- Ear Plugs to show athletes without hearing disability what it is like for hearing impaired
- athletes Video, camera (etc..)to create instruction for new athletes
- Coaches boat to accompany students boats safety equipment

Safety

- Safety Boat
- Use a small area for the course first
- Life jackets, first aid kit
- Have a phone (with light) / radio on the boat so that you can call for help

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Inclusion How to understand each other 2

Discussion

Before

- Explain what is going to happen to happen in the session
- Check that everyone understands the signs or codes

After

- One to one discussion so you can facilitate communication
- Feedback scale – visual

More

- Descriptive video of the signs or codes.
- Intro to sign language course
- Rowing simulator
- Link with other inclusion educational file or workshop

Go further

- Make the navigation course bigger
- Have a race with two or more boats
- Club exchange with other impaired athletes

Rowing Story

- Mo O'Brien became the first deaf person to row 3, 000 miles across the Atlantic Ocean for her 60th birthday. It took 49 days. She rowed two hours than had two hours off to sleep, eat and wash

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Inclusion Let's Listen 1

Learning – Inclusion

Gender diversity (Inclusion) "Let's listen to girls"

Row Task

- Rowing Challenge: Go as far as possible with 10 strokes.
- Assign responsibility to a student to guide the work
  Inter-class competition: mixed teams prepare coach or guide each other
- How many words can you manage to coach the exercise?
- This exercise can be done on ergometer or on water.

Top Tips

- Make two teams in of similar ability to compare efficiency

Equipment

- Indoor rowing machines

Safety

- Be careful of your posture and manage the risk of falling from the seat

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Inclusion Let's Listen 2

Discussion

- What is the most important?
- Rowing is a complex sport; it requires the ability to understand and be understood.

Rowing Story

„ Get students to highlight a woman (local) and an inspiring situation or story.

Go further

- Transfer this drill to the water
- Row 3 strokes and let slide we see how far the boat moves etc.

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Inclusion Rowing with a disability 1

Learning – Inclusion

- Get an able-bodied person to row in a boat with legs strapped in.
- Learn what it is like to row with a disability. This can be done in a 1x, or 2x with a disabled person or 2 able-bodied people.

Row Task

- Do 1 minute on rowing machine with hands only
- Do 1 minute on rowing machine with hands and body
- Do 1 minute on rowing machine with legs, hands and body
  Compare the results with top para-athletes

Top Tips

- Warm up.
- Learn how to unstrap quickly
- Try keep same rate for each task

Equipment

1. Indoors :
   - Ergometers
   - Adaptive seats
   - Adaptive shoes
2. For 2nd session water :
   - Boats / Launch
   - Adaptive Seats / Straps

Safety

- Safety Boat
- Training for coaches.
- Safety equipment in launch

R.O.S.E.
Rowing an Outdoor Sport for Education

Cofinancé par le programme Erasmus+ de l'Union européenne

Inclusion Rowing with a disability 2

Discussion

- Before
- Explain to the rowers what we are doing and why we are doing it.
- Ask them what they think of para-rowing before the exercise and then afterwards.
- Ask how did it feel, being strapped in, did their opinions on para-rowing changed?

Rowing Story

- A para-athlete arrived to row in a Portugese club, he enjoyed it so much he invited his para-friend to join. Now they both row with the club at a very high level.

Go further

- Try do the same session on the water