

The background of the cover is a photograph of a surfer riding a wave. The surfer is shirtless and wearing patterned shorts, crouching on a surfboard. The wave is white and foamy, and the sky is a clear, bright blue. The overall image is slightly faded to allow the text to stand out.

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PERFORMANCE

Sustainability and sports science: A new way for a better future

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Dear Editor:

This title demonstrates the commitment of this journal to unite two fields of knowledge that are closely linked. On the one hand, **caring for the environment** and on the other **physical exercise**.

For three decades, international authors have begun to reveal the possibility of expressing the importance of practicing sports in the territories where they are carried out. Likewise, it has already been shown in different publications that sport shares a large part of its values with **Sustainable Development**, which contribute to improving human development (improving public health), social development (promoting stability, tolerance, integration, promotes gender equality and social cohesion), economic development (stimulates investment and employment), and finally political-institutional development (promotes peace and respect for democratic rules).

In the same way, sport as a community can play a very important role in the dissemination and awareness of the values of Sustainable Development which, ultimately, implies not conditioning the freedom of action of future generations, avoiding environmental degradation and social imbalances.

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Special attention will be paid in our journal to:

- Saving and efficient use of water.
- Minimize the use of energy, promotion of renewable energy.
- Reduction of waste, support for recycling and reuse.
- Minimize the effects on Biodiversity. Restore affected areas.
- Preservation of archaeological, historical and cultural heritage
- Fight against violence in sports events.
- Promote the inclusion and cohesion of all social sectors.

For this reason, in our publications they will promote important aspects to ensure that the sports context can carry out:

- -Institutional integration of the principles of Sustainable Development.
- -Implementation of environmental integrity and social cohesion criteria.
- -Participation, promotion and dissemination processes of Sustainable Development.
- -Collaboration with other agents related to the care of the environment.

In a very ecological and sustainable sense, *Sustainability and Sport Science Journal*, will collect this relevant core of sustainable development, having the obligation to dedicate a large part of its publications to making the planet more sustainable and humane.

The best works will be selected in the publication to pay tribute to mother nature and physical activity.

Keywords: Sustainable development, Health, Physical activity, Sports science, Environment, Technology, Innovation, Sport management.

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Strategic management tools for sports management in a public administration body: A case study

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ABSTRACT

Physical activity and sport are basic requirements for a healthy population and public administrations should provide the necessary services for the wellbeing of their citizens. However, there are few clear directives around the priorities and objectives of administrations in terms of sports provision. The present study uses the case study method to show how strategic management tools are decisive when drawing up the strategic sports management policies of a town hall.

Keywords: Strategic management, Sports management, Public administrations, Case study.

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INTRODUCTION

In today's world nobody doubts the importance of sport and physical activity for health, leisure and as an economic stimulus linked to society's concern for sustainability and the work-wellbeing balance.

The Spanish Constitution and regional/local legislation require administrative bodies to promote health/physical education and sport and town halls are required to provide sport and leisure facilities. Town halls must also take responsibility for the promotion, planning and management of sports to encourage participation, integration and social cohesion. The work of specialists in sport is key to the future success of the management of sports installations and equipment (Jamieson, 1987). Despite all this, many town halls enthusiastically promote sport but with very unclear objectives and scarcely visible results (Noël Racine et al, 2020).

Strategic management is aimed at allowing decision makers to know their strategic position and to define and achieve their objectives. Although strategic management techniques are usually employed in the business world, they can be used by all types of public and private organisations to work towards their objectives.

The aim of this study is to use different strategic management techniques to analyse the case of the sports department of a Spanish town hall (El Campello) and thus orientate other sport providers in the determination of their strategies¹. We will follow the strategic tool protocol proposed by Guerras Martín and Navas López (2015), which means that after a brief introduction of the town in question we will analyse the vision, mission and values of the town hall. We will perform an external analysis through PESTEL and Porter's five forces. An internal analysis will be made through DAFO and CANVAS, which will lead to the drawing up of strategic lines. Finally, we will present the main conclusions of the study.

Contextualization

The town of El Campello (situated in the South-East of Spain in the Valencian Community) has a population of 28,930 (INE, 2020) and a coastline of 23 km. It is a coastal town with an excellent Mediterranean climate, ideal for all sorts of nautical and outdoor sports.

The current Municipal Sports Program in El Campello is run by a private company that provides programs for both children and adults. There are about 560 users of the children's program and 680 users of the adult's program. There are also 11 private sports clubs on the Municipal Registry of Associations which complement the provisions of the Municipal Sports Program. The sports clubs have around 1,240 participants.

The activities of the municipal sports program are aimed at children and adults. The most popular children's activities are: football, badminton, tennis, yoga, parasports, pre-sport, psychomotor education, etc. and for adults toning, pilates, fit dance, tennis, oriental dancing, yoga, etc. They also organise special sports events such as get fit at Christmas, carnival fancy dress race, Easter and Christmas workshops, El Campello Fitness, Aquathlon and other swimming events, etc. There is also a school league for the local schools.

¹The present paper is based on the first author's final work for her Master, she is a technician in the sports department of the town hall under study.

Vision, Mission and Values

The vision, mission, and values of an entity help define what it aims to be and what its future vocation is. Its vision determines how it wants to be in the future in that it allows us to identify the differences between what it is now and what it wants to become (Hamel and Prahalad, 2005). The mission is the *raison d'être* of an organisation, its identity and the knowledge of where it is and what it represents. It answers the following question: What is the essence of our business and what do we want it to be? (Hax and Majluf, 1994). Values reflect the principles, beliefs, rules and commitments that guide the actions of an entity to fulfil its vision and mission. The underlying idea is that some objectives cannot be reached at any cost, but that certain ethical principles have to be considered that define how the entity acts and influence the socially responsible behaviour of an organisation and its members (Hendry and Hope, 1994).

The vision of El Campello is to become a point of reference in physical activity by offering sport activities, promoting sport events that will attract tourists and providing its citizens with a range of sports facilities. The final aim is to convert El Campello into a healthy town. Its mission is to guarantee all its citizens access to physical activity through a quality service that satisfies their needs and employs qualified, committed staff and is continually innovated and improved, leading to universal sports participation. The values behind the provision of sports activities in the town are: a) Meeting the needs of the citizens (providing appropriate services). b) Active listening (communication with citizens). c) Teamwork and transversality. d) Innovation and continual improvements. e) Sustainability. f) Quality of service. g) Respect, equal treatment and solidarity.

EXTERNAL ANALYSIS

An external analysis, by which we mean an analysis of all the factors surrounding an organisation, is important to better understand its possible actions as well as its threats and opportunities. Within this environment we can distinguish between the generic environment, made up of factors that affect all the organisations in a certain socioeconomic system, and the specific or competitive environment, which refers to factors that affect the organization through being in a specific industrial sector. To analyse the generic environment we use the PESTEL analysis, whereas for the competitive environment analysis we use Porter's five forces model.

PESTEL Analysis

This analysis identifies the general environment factors that affect organisations, PESTEL stands for Political, Economic, Sociocultural, Technological, Ecological and Legal (Ho, 2014). Applying this analysis to the sports service of El Campello gives us the following situation:

From the POLITICAL point of view, the national and international situation is at a critical moment due to Covid-19. At the municipal level, political change could affect strategic planning as objectives and economic investments may change.

Looking from the ECONOMIC point of view, El Campello has an unemployment rate of 10%, which is low compared to the national average (Generalitat Valenciana, 2021). The service sector accounts for 75% of the economic activity of the town, with another 11% in construction. Only a third of the working population work in the town, which means that it can be considered a dormitory town. There are good transport links with the provincial capital through tram, bus, motorway and roads. It is a tourist town with 8,500 beds distributed among hotels (500), camping sites (1200) and tourist apartments (6700) and the hostelry sector

is also important. El Campello has a marina and a fishing port. It also has an industrial estate with complementary industries.

SOCIOCULTURAL. 17% of El Campello's residents are foreign, of which 71% are European. 20.5% of its inhabitants are over 65 years of age, which makes it quite an old population (Diputación de Alicante, 2019). There are around 100 associations of various types: educational, civic, for European residents, religious, and environmental, but the most numerous are those with a cultural character such as music, dance, local festivals and sports associations.

TECHNOLOGICAL. Currently, and especially as a result of COVID-19, there is a great dependence on technology, as working from home has become part of the fight against the pandemic. Whether the epidemiological situation improves or worsens, technology is a key factor in the fabric of global production and is an essential part of the way in which companies and individuals communicate (He, Zhang and Li, 2021).

ECOLOGICAL. The fields of economy, industry and even cities are becoming more and more convinced of the need to respect, protect and look after the environment, with sustainability and recycling being basic values (Cui, 2018). El Campello has fortunate climatic conditions and kilometres of beach, which permit outdoor sport all year. Outdoor activities lead to awareness of concepts such as sustainability and recycling (McCullough, Orr and Kellison, 2020).

LEGAL. The legal department of the town hall is in charge of processing the paperwork of court cases, but each department is involved in the legal issues relative to its area. In the case of sports, all legal aspects are dealt with by the person in charge of sport management and other issues, which makes it difficult to perform optimum management. As with other aspects of public management there is an excess of bureaucratic paperwork in the legal area, with rigid and tedious laws. Additionally there are also the current constant rule changes due to COVID-19, which lead to legal insecurity.

Porter's five forces model

This model is used to analyse the specific environment, which comes from being in a certain economic sector or industry, in this case sport. For Porter (2008) the competitors of a company are not only companies in the same sector that offer the same type of products or services, but also new potential competitors that offer substitute products and suppliers and customers as they can influence conditions such as prices or quality and, therefore, long term profitability.

RIVALRY AMONG COMPETITORS. Among the competitors of the El Campello sports service are neighbouring municipalities that also offer sports services, and private companies. In the first case, although they are close and there are good communications with other towns the services offered are similar, which dissuades users from travelling. Moreover, the beach offers great possibilities for sports activities that cannot be practiced in inland towns. The private sector has higher prices but with good facilities.

NEW COMPETITOR THREAT. Chief in this regard are online sports activities as a source of threat (Glang et al, 2010). Online sport may be preferred for time management reasons (avoiding travelling time) and for tendency reasons: new applications substituting in-person classes, such as Zwift, which allows triathletes to train at home.

SUBSTITUTE PRODUCTS THREAT. There are various substitute products. Firstly, people organising their own outdoor activities, which has been increased by the social distancing requirements imposed during the pandemic. Secondly, there are leisure activities linked to festivals, which involve bad habits such as drinking alcohol, or videogames. Finally, cultural, musical, artistic and other similar activities are another source of substitute products.

NEGOTIATING POWER OF CUSTOMERS AND SUPPLIERS. In our case, customers do not have great negotiating power as they are numerous but not associated, so that as individuals they cannot have much influence over the town hall's sports provision. The suppliers do not have great power over a public administration such as the sports department of a town hall either, they want to work with the department. They need to be serious when it comes to contracts and budgets to retain some negotiating power.

INTERNAL ANALYSIS

After the external analysis we will now make a strategic internal analysis using DAFO and CANVAS analyses.

DAFO Analysis

This analysis (Dees and Hall, 2012) bridges the gap between an external and an internal analysis of an organisation, as it identifies Opportunities and Threats from the environment as well as the Strengths and Weaknesses of the organisation (SWOT, Strengths, Weaknesses, Opportunities and Threats). This technique helps companies identify the actions necessary to take advantage of the opportunities detected and eliminate or be prepared for threats, making good use of strengths and minimising weaknesses.

In terms of **STRENGTHS**, El Campello town hall has a wide range of activities in its municipal sports program and has a considerable volume of users. The staff in charge of sports management are experienced and motivated, although they are few in number. There can be staff transfers between the departments of the town hall. There are a large number of sports clubs in the town. Finally, outdoor activities and events are organised practically all year round.

With regard to **WEAKNESSES**, there is not enough town hall staff to directly manage sporting activities, there is no municipal staff group. There is organisational and bureaucratic rigidity. There is a lack of technological resources such as online payments and reservations of facilities. The town hall does not seek economic profits, rather it seeks social profit, which could make the services unsustainable. The facilities are obsolete and oversized. There are no good publicity campaigns for the sports service due to a lack of qualified staff. It is especially difficult to interact with young people. The associations are occupied with their own concerns. What is needed is a participatory council to collaborate with the town hall. There is no current well defined strategy and the work is done with no planning, which is the main reason for this study.

There are various **OPPORTUNITIES** in the environment that should be exploited, such as the fact that the citizens are concerned about health and are open to body culture and sport. The town is well connected with the capital and neighbouring towns. It is a seaside town, in which one can combine sports provision with tourism. This opens the possibility of introducing new services that satisfy new needs and give the town a new touristic-sporting image, enhanced by the year-round good weather.

In terms of **THREATS**, the most imminent, but which may disappear in the medium term, is the health crisis caused by COVID 19, which involves economic and social implications, restrictive measures, uncertainty and

rule changes. The increase in outdoor activities could provide competition for the town hall's activities. Finally, there is a lack of coordination between the Ministries of Health, Sport and Education.

CANVAS Analysis

The CANVAS model is used to analyse the business model of an organisation; it is a description of the foundations on which it creates, supplies and captures value through its activities and clients (Osterwalder and Pigneur, 2010). According to the model, there are 9 basic elements that an organisation should consider when deciding how to compete. These basic elements can be represented graphically in a panel, with the right hand side showing how the organisation connects with its market or customers, in other words, what are its *Customer Segmentation*, its *Communication Channels* and its *Customer Relations*. The right hand side shows the internal organisation of its activities in terms of what are its *Key Activities*, its *Key Resources* and its *Key Partners*. The lower part of the panel shows its *Income Sources* and its *Cost Structure*, while the centre of the panel shows its *Value Proposition*, which is the central element and essential to the business model as it differentiates an organisation from its competition by determining that customers prefer an organisation over its competitors (Guerras Martín and Navas López, 2015). Below we apply the CANVAS model to the 9 basic elements of the sports service of El Campello town hall.

Customer segmentation

The customers/users are the key to any business, it should be clear who they are talking to and how. Once the customer segment is identified, its needs can be found and it will be possible to define the product according to the customer/user type and the distribution channel. In our case, the product is aimed at everyone: A) School sports: infants and primary. B) Youth – from high school onward, aged between 12 and 30. A special mention for the new generations: generation Z and the millennials. C) Elderly and vulnerable. D) Elite level sport. E) Sports clubs and associations.

Communication channels with customers

Communication channels are the way in which an organisation communicates with its customer segment. These channels will be different depending on the population profile. The channel that is common to everyone is social media, nowadays used by the majority of the population and an economical, effective and even viral means of communication (Hambrick, 2017). However, in a town, word-of-mouth is a very important channel, as is verbal communication through key agents such as teachers or monitors, in the case of school children and adolescents.

Customer relations

For school children there will be periodic monitoring and valuations of their sports activities because if they are not motivated they can be offered alternatives from a wide range of activities. For young people there should be constant adaptation to their demands, creation of novel, experience generating, activities, active listening and a quick response capacity. For the elderly and vulnerable there should also be periodic monitoring and valuations of their activities. The monitors should be very reachable and the activities very personalised, the users should feel that they are important to the monitor. Any achievements by users should be recognised and there should be group building (cohesion) to help users feel good (sense of belonging). The needs of clubs and elite sportspeople should be met through friendly contact, active listening and by welcoming their participation.

Key resources

The key resources to carry out the sports strategy of the town hall are: The monitors of the sports program, social media and the dynamic web page, the budget and the maintenance team of the sports facilities. We will return to them in the next section.

Key activities

Strategic planning, the object of this study, determines, according to the population segment, which activities are the most suitable for each profile and the rhythm of their implementation, as described in the next section.

Key partners

Key partners are those that create bonds to make joint efforts to obtain better results. They are often alliances with non-competitor firms aimed at reaching a wider market or even with competitor firms that operate in the same market niche with the aim of achieving a mutually beneficial relationship. External collaborators in our case may be a sport doctor, agreements with the University of Alicante or with other towns or countries, the supplier of sports material, the architect that designs suitable sports facilities, etc.

Income sources

The final aim of the town hall is not to make money. The prices decided on by the authorities are social prices that allow access to sport for the whole population. Thus the main aim is to obtain social rather than economic profits. Profitability for the town hall rests on the following points: That the citizens feel satisfied and that their needs are covered, that they attend the activities promoted by the town hall, that the comments on social media are positive and have a lot of “likes”, that the users wear El Campello merchandising such as caps and t-shirts because they feel a sense of identity with their town and are proud to be a part of it.

Costs structure

In general the fixed costs are the monitors' salaries and the maintenance costs of the sports facilities. Variable costs include sports material and equipment.

Value proposition

The value proposition of El Campello's sports service consists in including all segments of the population and in making sport and physical activity accessible for everyone. To this end there will be physical activity programs in primary schools and there will be an attractive sports program with active listening to the needs of the different segments of the population. With regard to youth, we will promote sports activities to improve their academic performance and encourage a healthy lifestyle. For seniors there will be a sports program designed to prevent pathologies and encourage active aging. There will be subsidies and aid for competitive sport and sports clubs to help them maintain their activities.

STRATEGIC LINES

The strategic analysis in the previous sections has led to the establishment of the general strategic lines of the sports department of the town hall in question, they are:

- Foment sport and physical activity for all.
- Construct, renovated and maintain sports facilities.
- Promote sports tourism, communication and sports events.
- Favour sports associations: clubs and elite sport.

Foment sport and physical activity for all

There is strong medical evidence around the poor health effects of a sedentary lifestyle; Spain is one of the most sedentary countries in Europe so it is necessary to establish preventive and therapeutic measures (González-Gross and Meléndez, 2013).

Physical activity and sport are tools for social transformation and improvement so the participation, conscience raising and education of the population is vital. The town hall should focus its attention on providing the resources needed for physical activity and sport so that the citizens can participate properly and responsibly, leading to healthy, long-lasting and autonomous habits.

Physical activity and sport provoke great social and public interest. It is a service that generates various benefits in terms of health, education, and ethical and social aspects that are demonstrated in numerous studies.

The town hall of El Campello will have a physical activity and sport provision that is diverse, quality and adapted to the needs and characteristics of its citizens. These sports activities will go hand-in-hand with respect for the environment and responsible and sustainable use of natural spaces.

Special attention will be given to sport for children as we believe that they should be taught to do sports from an early age so they can enjoy the benefits when they grow up (Chemerilovai et al, 2019). Regular physical activity contributes to wellbeing in different ways; physically, psychologically and socially.

Improved motor skills and conditional capacities; reduced risk factors; control over certain illnesses, both physical (asthma, obesity, heart disease, diabetes,...) and psychological (depression, anxiety, stress,...); acquisition of healthy habits (hygienic, dietary,...); social integration and cohesion (fosters an inclusive model that respects diversity); training in values such as solidarity, tolerance, discipline, self-confidence, personal growth, etc., all of these aspects of physical activity contribute to improving the lives of our citizens. It is important, therefore, that everyone has access to physical activity and especially that children enjoy good experiences related to physical activity and sport, to strengthen their long-term commitment to sport (Telama et al, 2005).

The worldwide situation of aging populations is becoming one of the challenges for governments for future decades (Maffei et al, 2020). The over 65 age group is an important sector in all countries, especially in more developed countries. The population pyramid in Spain is still aging in terms of an increased proportion of over 65s.

According to INE data from January 2018, there are 8,908,151 over 65s, which is 19.1% of the population of Spain (46.722.980). The average age of the population, which is another way to measure this process, is 43.1; in 1970 it was 32.7. According to the INE projection (2018-2068), in 2068 there could be over 14 million over 65s, 29.4% of a population that would have reached 48,531,614 inhabitants (Abellán et al, 2019).

Moderate or intense exercise is not among the frequent habits of the over 65s in Spain (Boente-Antela, Leirós-Rodríguez and García-Soidán, 2020), therefore, the State, the Autonomous Communities and the Town Halls should offer physical exercise programs that attend to the needs, motivations and expectations of this collective. Similarly, physical activity and health professionals should transmit a life philosophy based on regular physical activity and sport.

Physical activity generates an endless amount of health benefits for people of all ages, which is why we should develop strategic plans and actions directed towards full participation in sport and physical activity in general for all ages, creating programs adapted to each segment of the population. This strategic plan is based on 4 objectives and their corresponding outcomes, for reasons of space we will only expand on the objectives:

- a) Introduce a program of after-school activities in the state primary schools for children of 6-11 years old with at least 3 different activities per school year so that they begin to practice sport at an early age (school age).
- b) Develop a program for adolescents and young adults (12-30 years old) with at least 3 activities per year and with at least 60% of the participants coming from the local secondary schools (IES).
- c) Develop a health focussed program for the over 65s with different physical exercises and with the participants being challenged to reach certain goals each quarter (with evaluations). This program will be called "*your health, our challenge*".
- d) Introduce physical activity into the workplace (town hall civil servants) with at least 2 days of activities per year and with at least 40 employees participating on each of these days (healthy habits program).

Construct, repair and maintain sports equipment

Sport is no longer a minority activity, it was previously mainly practised by school age children and competition level adults but is now practiced by all population groups. Alongside the growth in people practicing sport there has been a significant increase in the number and types of activities practiced. New sports or variants of existing ones have emerged and some minority sports have become more popular. Concurrently, certain physical activities have been developed that, although they still are not included among institutionalised and regulated sport, have attracted a considerable number of followers. Accordingly, we can say that sport is a growing phenomenon and, consequently, sport infrastructure planning should be capable of adapting to this characteristic. Public authorities should also be open to new tendencies and respond to the innovative and mobile spirit that is inherent to sport.

A great number of sports have to share facilities with other sports due to space and technical reasons, leading to multi-sport centres. Sports centres should respond to sport demand and supply.

Town halls have skills in sports activities and facilities, therefore public authorities should improve the equipment and services they offer to the public and look for new formulas to encourage and develop sport and guarantee the construction and maintenance of new sports facilities. Alongside the construction of new facilities they should look after their maintenance. The maintenance of a sports facility is designed to ensure optimum conditions for the activities in question. The management plan for maintenance should establish the jobs, monitoring and controls for 2 types of maintenance (preventative and corrective), deciding what should be done by external contractors and what should be done by internal staff.

Town halls should also guarantee the accessibility of their sports facilities (Karusisi et al, 2013). Municipal sports departments should provide access to quality sports provisions without barriers for participants and their companions and/or spectators. They should also maintain their sustainability according to the values of the town hall. The correct maintenance of the existing facilities and their adaptation to the parameters of efficient energy use, accessibility etc., should ensure their quality and durability and these investments should take priority over new installations.

Sports tourism, communication and events

Sports tourism is a growing segment that has been evolving very positively in recent years. The special climatic conditions in El Campello and the fact that it is a coastal town with a beach facilitate nautical sports and schools which, along with the various outdoor sports events, reinforce the appeal of El Campello as a sports tourism destination (Fernández-Rodríguez, 2020).

Among other aims, the town hall of El Campello aims to support the socio-economic development of the town, as well as to promote it as an all-year-round tourist destination, favouring the rejuvenation of commercial establishments, hotels, restaurants, etc. To this end they promote and incentivise different events of general interest that, due to their reach, generate important synergies for the town. Among the events organised around tourism are sports events which, given the previously mentioned climatic conditions of the town, can be held all year round, allowing the desired move away from seasonal tourism.

Sports events can have positive effects on not only the image of the town but also on the population's desire to participate in sport, meaning that sports events are a key factor in physical activity and sport (Mello et al, 2020). El Campello intends to become a reference point for sports tourism and to benefit from the impact of sports events and sports tourism related actions (Higham, 1999).

To this end there will be a series of actions to strengthen the town's position as a reference point for seasonal training for sportspeople, for example foreign clubs practicing their sport in the town. All of these sports activities and events will be publicised through new technologies and social media to gain impact and visibility (Gregory and Monaco, 2019).

For the execution of this strategic plan the following 4 objectives have to be met:

- a) Collaborations with foreign sports clubs to strengthen the name and image of the town and create possible exchange programs with local clubs.
- b) Elaboration and implementation of a dynamic web page within 2 years, with a sports calendar including the activities and events organised by the town hall. This will be constantly updated and advertised on social media and other channels.
- c) Increase the number of followers on social media.
- d) Encourage sport through promotional campaigns and 2 annual macro-events.

Clubs and elite sport

Sports associations represent the largest associative fabric of our society. This potential should be utilised so that people can actively participate in the management of their sports activities. Town halls should work to establish diversified non-profit sectors that contribute towards channelling and satisfying the heterogeneous and numerous sport demand.

Alongside official competitive clubs other types of associations should be promoted, aimed at training, education and socialising, especially in places people use daily such as schools, community centres and companies that are focussed on community (Doherty, Misener and Cuskelly, 2014).

Attention also has to be given to elite level sport, in situations where a local citizen or club reaches that level. Elite level sport is important as it is an essential factor of sports development due to the stimulus it gives, to the technical and scientific demands of its preparation, and to its national representation in official international competitions. It is also important from the point of view of sports tourism.

Elite level competitive sport not only encourages the development of the different sports disciplines and inspires people to do sports, but it is also a social phenomenon that mobilises millions of people, an element of socialisation, a vehicle for international relations, a phenomenon with models of good behaviour and a way of life for sportspeople. Local administrations should collaborate with national directives and general measures designed to alleviate the inherent deficiencies in elite level sport, rewarding clean sport (Green and Houlihan, 2005).

This strategic line is based on 3 objectives and their corresponding outcomes, for reasons of space we will only expand on the objectives:

- a) Endorse annual agreements or sponsorships of all the local clubs that foment sport and increase the corresponding budget.
- b) Increase the financial sponsorship for local elite level sportspeople and make annual increases.
- c) Organise a “*Sports Gala*” in recognition of local sports club every 2 years.

CONCLUSION

Strategic management tools are useful to understand what are the priorities and objectives of public administrations in terms of physical activity and sport. Some of the key ideas of this work that can be extrapolated to other sports departments of public administrations are: universality of sport, in that it should be for everyone for reasons of health, wellbeing, quality of life and its contribution to good habits; transversality and collaboration, with other town hall departments, with other public bodies, with the health system, with education officials and teachers; accessible sport and physical activity facilities; support for sports associations and elite level sportspeople due to their importance as diffusors of sport participation; promotion of sports events and sport tourism, both of which contribute economically and socially to improving the environment; active listening and new technologies (such as social media) to connect and spread sport supply and demand; sustainability of the facilities and of sport participation.

Among the strategic lines presented here we want to highlight that of converting the town into a reference point of sports tourism and sports events. Collaborating with other town hall departments is key for this aspect but it is worth the effort as it is a sustainable type of tourism with a future, one that stimulates the economy at the same time as encouraging healthy habits and participation in sports.

AUTHOR CONTRIBUTIONS

Mar Soler-Tonda conceptualized the study and obtained the data for it. Reyes González wrote the paper. José Luis Gascó and Juan Llopis analysed and interpreted the data. All authors reviewed and approved the final manuscript.

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Analysis of goal-scoring in an elite European women's football teams

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ABSTRACT

Football is one of the sports with more audience and women's football has undergone a notable evolution at all levels. Scoring goals is the most relevant indicator of success in football. The aims of this study were to analyse, looking for patterns and/or differences in how goals are obtained through European elite women's teams. The goals were analysed through: way of obtaining the goal, type of finishing, type of assistance, time interval in which the goal was scored, assistance zone and finishing zone. A frequency analyses was performed through total number of actions of 174 goals from French and English teams in the respective national championships. The highest percentage of goals was obtained through offensive organization, also giving importance to the number of goals through tactical schemes (set balls). The zone where most goal submissions occur was in the penalty area, and the time interval of the games where the most goals were scored was defined between the 31 and 61 minutes. Differently from men's, elite women's football teams obtain the highest percentage of goals through the offensive organization, with a substantial number of goals also being scored through tactical schemes.

Keywords: Technology, Innovation, Notational analysis, Game analysis, Soccer, Goal analysis, Women's soccer.

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INTRODUCTION

Football is undoubtedly the sport that attracts the most public attention (Pollard & Reep, 1997). It is characterized by a complex system that is in constant change, by which the behaviour and actions of teams must be the subject of several studies seeking to analyse and interpret what occurs during football matches (Clemente et al., 2014). As part of the general evolution of football, women's football has undergone changes and a notable evolution at all levels.

In recent years, there has been a large increase in the amount of scientific research conducted in various areas of football, such as game observation, game analysis, and notational analysis (Garganta, 2001). This is because coaches look for information through this type of analysis, as it can improve the quality of the performance of their teams, either collectively or individually.

Because scoring goals is the most relevant indicator of success in football, it is extremely important to implement training methods and game strategies that increase the percentage of goals scored by a team and to hiring and/or development of players who have a remarkable ability to score goals (Rodenas et al., 2020).

Researchers have tried to establish a relationship between the adopted offensive game methods—such as counterattacks, quick attacks, or positional attacks—and success in scoring goals (Santos et al., 2016). However, it is also necessary to consider the evolution of the effectiveness of shots themselves and the way goals are scored, as well as players' abilities to score goals in different game and training contexts, as these variables are fundamental to a more in-depth study of the tactical components of football (Rodenas et al., 2019).

According to recent literature reviews of football game analyses (Pratas et al., 2018; Sarmiento et al., 2018), few scientific studies have analysed what a goal itself is and how it is obtained. Such an analysis would be valuable, as the number of goals scored throughout a season decreases disproportionately to the number of scoring opportunities and many other variables that occur in greater numbers in a football game (Tenga et al., 2010).

Analysing other offensive variables is useful when assessing the offensive playing style of a team. However, creating more scoring opportunities, having more shots on goal, and entering the opponent's area more often do not guarantee that a team will score more goals. In fact, some studies have observed that the shot/goal ratio is a critical aspect that differentiates successful teams from unsuccessful ones (Castellano et al., 2012; Delgado-Bordonau et al., 2013; Dufour et al., 2017).

Therefore, studying the number of goals scored and understanding how they occur should be prioritized when analysing any football game, as it is the main objective of all teams. Studying this parameter is advised in different contexts and environments, as well as among different teams from different leagues (Santos et al., 2016). The sample of the present study comprises players from European elite women's teams, which are currently evolving rapidly and attracting increasing attention.

Based on the above discussion, this study aims to analyse the goals scored by three European elite women's teams and understand how they are obtained by looking for shared patterns and/or divergences between them.

MATERIAL AND METHODS

In this observational study, the goals scored by three European elite women's teams were observed and analysed according to video analysis using a specific instrument and several predefined variables.

The observational sample consists of 174 goals scored by three elite women's teams from French leagues (Olympique Lyonnais F – 67 goals; Paris Saint Germain F – 60 goals) and an English league (Chelsea Football Club F – 47 goals) during their respective national championships from the 2019/2020 season.

This study analysed different events (including events that culminated in goals) using an observational method with a previously validated instrument (Santos et al., 2016; Sarmiento et al., 2016) and support field scheme (Figures 1) considering several variables.

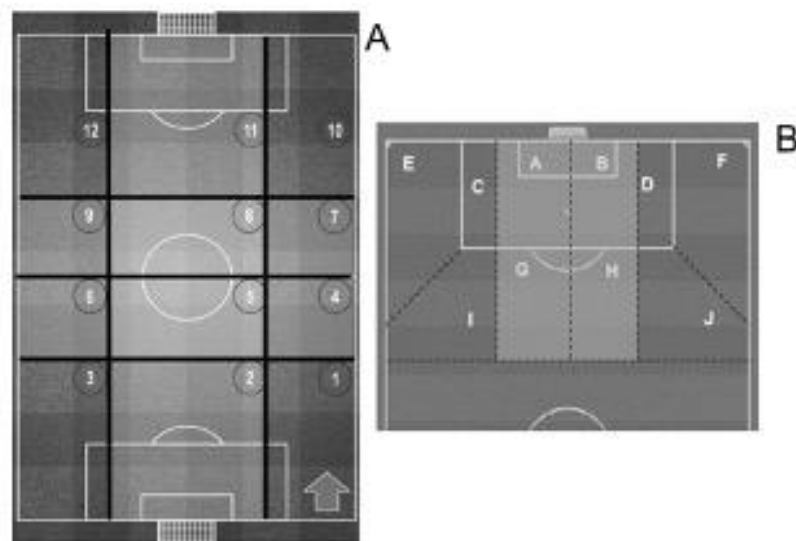


Figure 1. Field scheme (A – submission zone; B – finishing zone).

The following (dependent) variables were used to obtain a complete and detailed analysis of the goals: method of obtaining the goal (offensive organization, which presupposes a positional attack, quick attack, offensive transition, or tactical scheme), type of goal (right foot, left foot, head, and other), type of assistance (individual action, pass, cross, rebound) and submission zone (Figure 1A). The independent variable was the time interval of the game in which the goal was scored in the respective game.

The goals were observed and analysed using the WyScout platform (Chiavari, Italy), which provided access to all the goals that were intended to be analysed (Martín-González et al., 2017).

A Microsoft Excel spreadsheet was created to gather all the variables that were initially defined and analyse all the goals, discriminating throughout the document for further statistical analysis.

The teams' goals were described in each sample point for analysis, as were their positions in the field scheme (which represent the real areas of the field - Figure 1). The events were then analysed concerning how the goal was scored, the area where the shot was taken from (completion zone), the area where assistance was given for the goal, the time interval in which it was scored, and the type of finish.

Frequencies and percentages were calculated for all variables. Microsoft Excel was used to simplify the data analysis.

RESULTS

The most common way to score goals among the analysed female teams was the offensive organization (OO), with about 79 of the 174 analysed goals being scored during this action. In other words, 45.4% of the goals were scored through quick attacks or positional attacks (offensive organization). Also, 97 (55.7%) goals were scored with the right foot ($n = 97$) (Table 1).

Table 1. Goals score distributions according to way, type finishing and type of assistant.

	Frequency (N)	Percentage (%)
Way of obtaining the goal		
Tactical Scheme (set ball)	54	31
Offensive Organization	79	45.4
Offensive Transition	41	23.6
Type of finish		
Right Foot	97	55.7
Left Foot	39	22.4
Head	38	21.8
Type of assist		
Pass	77	44.3
Crossing	55	31.6
Rebound	21	12.1
Individual Action	7	4
Without assistance*	14	8

Note. * Tactical Scheme (set balls): penalty and free kicks.

The remaining goals were distributed evenly between the other two variables ($n = 39$ for the left foot and $n = 38$ for the head). It was found that passing was the most prominent type of assistance. Of the 174 total goals, 77 (44.3%) were obtained after a pass. Crosses were the second most common type of assist ($n = 55$; 31.6%). Only seven goals (4%) were scored using an individual action, such as a series of dribbles after regaining possession of the ball. Goals resulting from shots taken either at the penalty mark or through an offensive freekick were considered unassisted and, thus, were not included in the individual action. Fourteen goals (8%) were obtained in these two ways.

Table 2. Time interval where the goal was scored.

	Frequency (N)	Percentage (%)
[0-15] minutes	28	16.1
[15-30] minutes	14	8.1
[30-45] minutes	34	19.5
[+45] minutes	5	2.9
[45-60] minutes	30	17.2
[60-75] minutes	29	16.7
[75-90] minutes	27	15.5
[+90] minutes	7	4

There was no single time interval in which goals were scored more frequently, as goals were divided quite evenly among the various moments of the game (Table 2).

The most goals ($n = 34$; 19.5%) were scored in the time interval [30-45], near the half time. The start of the second half, (i.e., the [45-60] interval) contained the next-most goals ($n = 30$; 17.2%). The time intervals of [60-75], [0-15], and [75-90] were very similar, with 29, 28, and 27 goals scored, respectively.

Fourteen of the 174 goals (8.1%) were scored in the [15-30] interval. Few goals were scored in the compensation periods (discounts) of the first and second halves here, in the [+45] interval, only five goals (2.9%) were scored; seven goals (4%) occurred in the [+90] interval.

Zone B was the area from which the most goals ($n = 81$; 46.6%) were scored. Another 64 goals (36.8%) were scored from zone A, making it the second-most prevalent goal-scoring area. Therefore, we can verify that the goals were predominantly achieved from the zones within the penalty kick area (Figure 2).

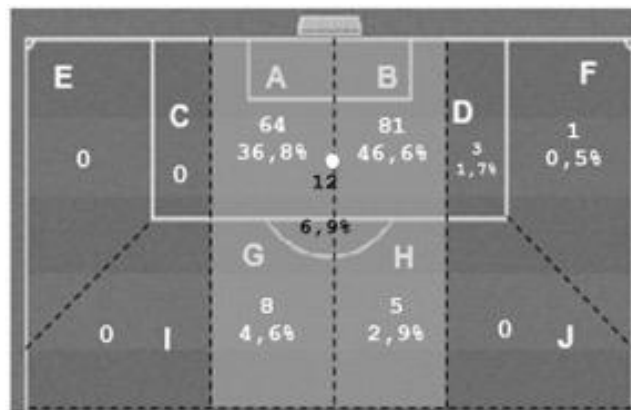


Figure 2. Goals finishing zone frequencies.

Relatively few goals were scored from the penalty mark (12 goals; 6.9%); zone G (8 goals; 4.6%); zone H (5 goals; 2.9%) and zone F (1 goal; 0.5%).

DISCUSSION

In elite women's football, most goals are scored through the offensive organization, which involves positional attacks and quick attacks. Similar findings were obtained in a study that analysed the goals scored by a Sporting CP senior women's team (Santos et al., 2018). It was concluded that goals were obtained most often through quick attacks, while the least goals were scored during offensive transitions (i.e., the transition from defence to attack), as only 23.6% of goals were scored in this way. Meanwhile, 31% of the goals were scored through tactical schemes (set balls), making this the second-most effective method in this study.

These results do not support the vast majority of goal analysis studies (Lago et al., 2012; Liu et al., 2015; Santos et al., 2016; Tenga & Sigmundstad, 2011). Most studies have found that counterattacks (offensive transitions) are the most effective scoring method. This fact demonstrates the difference between men's and women's football in terms of the most effective goal-scoring method. These findings are partially supported by the physiological and anatomical differences between men and women football players (McFadden et al., 2020). For example, male central midfielders covered more total distance during a match than female central

midfielders, male full-backs and wide midfielders covered a greater distance than female players in the same positions at higher speed thresholds (Bradley et al., 2014). Thorough, the distance covered in the higher speed zones across practices and games are superior in men than women, with the differences most pronounced at the highest speed zones with male players accumulated a greater number of sprints during games than female players (McFadden et al., 2020). However, there are no gender differences for technical events between men and women in the number of ball touches, time in possession of the ball or total duels won during both halves and the entire match, but female players lost the ball more often and displayed lower pass completion rates than male players during match periods (Bradley et al., 2014).

The greater number of goals scored from an offensive organization indicates that the opponents are limited to defensive organization because of some debilities in attacking capabilities as reported among so-called inferior men's teams (Bradley et al., 2013).

As expected, most of the scored goals were achieved with the right foot. Similar results were observed in a study that analysed the goals scored by the Club Atlético de Madrid team in the Spanish League during the 2013-2014 season (Santos et al., 2017) and in a study on other elite teams in the 2013-2014 season (Santos et al., 2016b).

The most common type of assist was passing, followed by crossing. These results are expected considering that the greatest number of goals were obtained during offensive organizations as discussed in previous studies (Garratt et al., 2017). Of the 174 goals scored, 21 (12%) resulted from rebounds, which may indicate a lack of pressure from the opponent, as suggested in a study of the 2008 Brazilian Championship (De Andrade et al., 2015). This finding indirectly indicates lower levels of competitiveness and tactical organization.

In the same study, many goals were scored through individual actions, which does not align with our results—we found that only 4% of goals resulted from individual actions. This difference may be because males generally have better-developed technical skills than females. These findings also highlight the differences between male and female football players, considering the acceptability and feasibility of experiencing the same training conditions, which is currently evolving as increasingly talented female athletes are emerging in football on a global stage.

No time interval was associated with a greater number of goals than the others. Goals were not distributed evenly over time in several games. However, there are a pattern during the end of the first half and the beginning of the second half. These results are in line with findings from elite football teams from Italian, English, and Spanish Leagues (Palomino et al., 2000), where the highest frequency of goals was associated with the interval between the 31st and 61st minutes.

Our results demonstrate that the greatest number of goals were scored from the penalty area (mostly zones A and B), which is in line with the findings of several other researchers (Clemente et al., 2014; De Andrade et al., 2015; Palomino et al., 2000; Rodenas et al., 2020; Santos et al., 2016, 2017; Santos et al., 2015; Tenga et al., 2010). However, there is moderate disparity between zones A and B, with more goals being scored from zone B. This makes sense, as more goals are scored with the right foot than the left foot, and zone B is located in the right zone of the penalty area.

This study has some limitations. Most notably, the sample size was limited to three teams and did not include each team's representative from all elite female leagues, thus making it impossible to generalize the findings.

However, this was one of the most relevant women's football teams from the European football league during the 2019/2020 championship. Analysing the goals and the way they were scored—as well as the areas where more goals were scored—are of great importance, as they improve our understanding of the game and why certain events and actions occur, as a database to better understand the game and try to find patterns in women's football. Due to the current lack of information about female football players, further studies on this group of athletes are needed.

CONCLUSION

Differently from men's, elite women's football teams obtain the highest percentage of goals through the offensive organization, with a substantial number of goals also being scored through tactical schemes (set balls). Moreover, similar to elite male players, elite female players score goals most often with the right foot from the penalty area (zones A and B) 31-61 minutes into the game.

AUTHOR CONTRIBUTIONS

Study design, PM, FMC, MC and RL; PM data collection; PM, BS, MR, NM results analysis; PM, BS, MR, NM, FMC, MC and RL statistical analysis; PM, BS, MR, NM, data interpretation; PM, BS and RL literature search; PM, BS manuscript preparation; FMC, MC and RL supervision. All authors read and approved the final version of the manuscript.

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Implication of COVID-19 pandemic and lockdown on sport activities

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ABSTRACT

Background: The world witnessed a sudden outbreak of a new strand of a deadly disease that rapidly spread throughout the globe. The spread of coronavirus (COVID-19) first originated in Wuhan, Hubei province of China in December 2019. This virus strain extended quickly throughout China and became a pandemic in the country. On March 11, 2020, the World Health Organisation (WHO) confirmed the COVID-19 novel coronavirus as a universal pandemic. **Methods:** Appropriate keywords were included in Scopus, PubMed, and Google Scholar to identify the available data. **Result:** Due to the rapid spread and fatality of the COVID-19, the 2020 Olympic Games formally slated for July 24 until August 9, 2020, will commence on July 23 to August 8, 2021. In March 2020, most of the European professional sports leagues, including football, were discontinued for the predictable future. **Conclusion:** Football resumption after the lockdown was challenging because of the inability to affirm the health status of the players when they return to their clubs. Every measure must be clear to reduce the risk of the disease and to clarify the response strategy about self-protection to the public. The sport organizing-bodies control-outlines for sports events should be strategized based on the laydown sports rules and quarantine protocols. National public health organizations and sports associations should work together to protect every level of human health and sport all over the world.

Keywords: COVID-19 novel coronavirus, World Health Organization, WHO, Sports activities, Football, Obesity.

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INTRODUCTION

Since December 2019, SARS COV 2 disease was declared as a pandemic by the World Health Organization (WHO) on March 11, 2020 and has spread quickly around the world (Zuccaro et al., 2021). The spread of coronavirus (COVID-19) first originated in Wuhan, Hubei province of China in December 2019 (Isaifan, 2020). After the virus identification via sequencing, the pathogen for this respiratory-presenting disorder was primarily called 2019 novel coronavirus (2019- nCoV) (Wu et al., 2020). The strand was officially called severe acute respiratory syndrome coronavirus 2 (SARS- CoV-2) by the WHO (Zhou et al., 2020). As the number of confirmed cases was rapidly increasing, the prevention and control of COVID-19 became highly challenging. Acute cardiovascular disease was high with some patients requiring respiratory support (mechanical ventilator), and consequently causing acute respiratory failure crisis and increased risk of death due to COVID-19 (Huang et al., 2020).

Although the disease targeting young people, the elderly were the most affected with acute respiratory conditions (Corsini et al., 2020). On March 11, 2020, the WHO confirmed the COVID-19 novel coronavirus as a universal pandemic (Reade and Singleton, 2020). Nevertheless, no pathology was propagated due to barely accessible autopsy or biopsy (Huang et al., 2020, Chan et al., 2020). As of March 1 2020, health systems in many countries have been overwhelmed by the effect of this outbreak, 79 968 cases of coronavirus have been reported in China and 7169 outside of China, with a death number of 2873 in Chinese patients, and 104 deaths from outside of China (Baud et al., 2020). By March 12, 2020, coronavirus disease has been proven in 125048 people all over the world, carrying a death – rate of nearly 3.7% compared with a mortality of less than 1% from influenza (Mehta et al., 2020).

The spread of coronavirus became extremely serious and has already touched the necessary epidemiological criteria for it to be confirmed a pandemic having infected more than 100 000 people in 100 countries (Remuzzi and Remuzzi, 2020). In the United Kingdom, the government decided that people should work from their homes if it is doable, and those older than 70 years should avoid nonessential societal contact (Hunter, 2020). At this outbreak, the government and health authorities warned people from undue gathering and strictly prohibit free movement. Therefore, the government closed all the schools, universities and stopped all sports event, hoping to reduce the spread of COVID-19 (Hunter, 2020).

EFFECTS OF COVID-19 ON OLYMPIC GAMES 2020

The potential impact of COVID-19 in Japan was hard-felt in the context of the upcoming Tokyo Olympic game in summer 2020. The Olympic and Paralympics game was initially scheduled for July 24 to August 9, 2020, and August 25 to September 6, 2020, respectively in Tokyo (Gallego et al., 2020). Japan is one of the most impacted countries with the outbreak because of the budget on the Olympic Games which is the biggest sports event in the world, involving the participation of 204 countries and 164 at the Paralympic (Ishikawa and Shimogawara, 2019, Gallego et al., 2020, Yanagisawa et al., 2018). During these events, Tokyo expects 11,090 and 4400 participants for the Olympic and the Paralympic respectively and about 20 million visitors under the auspices of 70,000 volunteers for the sports event and 8000 for the city patrol (Nakamura et al., 2018). During the Olympic games, a vast estimated delivery of 14 million food dishes is planned for the players (Nakamura et al., 2018).

Due to the ongoing global outbreak, all sports events were adversely halted or postponed indefinitely, and the 2020 Olympic Games in Japan were not left out. Due to the rapid spread and fatality of the COVID-19, the 2020 Olympic Games formally slated for July 24 until August 9, 2020, will commence from July 23 to

August 8 2021 (CLNET, 2020). As a result of the latter reason, the Paralympic Games were also cancelled and postponed from August 24 until September 5, 2021. Moreover, all countries' sports leagues and competitions dates were also shifted or changed.

The game of football is one of the most popular and most-watched lucrative sports events on earth with the international FIFA world cup competition been the most glamorous (Reade and Singleton, 2020), especially when it involves the participation of the top world footballing countries such as Brazil, France, Belgium, Spain, Germany, Portugal, Italy and England. Following the early outbreak period of COVID-19 in March 2020, most of the European professional sports leagues, including football, were discontinued for the predictable future (Reade and Singleton, 2020). The European football matches in France and Italy stadiums were the foremost affected as the country reported increasing confirmed cases and fatalities. Spectator attendances were negatively affected by the previous day, the first confirmed domestic cases or passing away were announced (Remuzzi and Remuzzi, 2020). Initially, in England and Germany, there was little or no attending response to the initial stages of the domestic outbreaks, however, in Spain, it poses a puzzle; as audiences seem to have increased considerably in response to the first domestic cases to opt from going to watch the matches in fear for the virus transmission. In these countries, there was a negative attendance response to the number of worldwide cases or deaths as the outbreak was advancing (Reade and Singleton, 2020).

From March 8, 2020, the Italian ministry carried out exceptional procedures to decrease the pathogen spread, by implementing movement control order between the individuals. The government and sports authorities decided to limit the sports activities as well as reducing the opportunity for social gatherings. On March 11, the first Italian and Juventus football club player, Daniel Rugani, tested positive for COVID-19, and days later, another five more players (four from Sampdoria FC and one from Fiorentina FC) and a club doctor were confirmed positive for COVID-19 (Corsini et al., 2020). The Italian professional league (Serie A) and some European sports leagues were suspended, and teams were requested to resume their training activities privately to maintain physical fitness (Corsini et al., 2020). The desperate reason for the suspension was due to the vulnerable mode of spread resulting from aero drop or droplet, and since football is a contact sport, it would significantly increase the chances of transmission. Even though the majority of the players playing in the Serie-A league were said to be young (Corsini et al., 2020), and younger age group has a good prognosis. For these former causes, the footballers were not allowed to continue the matches despite there is compliance with the standard protection rules recommended by WHO, hence all countries' leagues were halt (Corsini et al., 2020). Seeing how the scenario played in Italy, the authorities in Spain decided to stop the nation's professional football league (La Liga), the commissioner of the Spain National Basketball Association reiterated the decision to postpone the rest of the National Basketball season. Subsequently, many sports activities around the world were postponed or cancelled, including the 2020 Tokyo Olympics (Gilat and Cole).

The epidemic scenario in the United Kingdom was met with reluctance-to shut down the most lucrative and televised football league in the world. However, the authority was wary of the rapid spread and had to take a stand as many people would be at risk of contracting the virus (Reade and Singleton, 2020). Besides football, many other sporting events were suspended because it usually involves extensive travel of fans across the nation. Over 250,000 people gather at the annual horseracing festival in Cheltenham, England, approximately 10000 Scottish supporters about to travel to Wales using different transportation such as train, car, and bus through England for the Scotland– Wales rugby match, and more than 10000 fans usually travel around the UK to show up for soccer matches in the absenteeism of a government policy (Reade and Singleton, 2020). However, due to the sudden COVID 19 pandemic outbreak, the government and football authorities decided to postpone the rugby and soccer league despite monetary losses and these further led to the cancellation of all other sporting activities in the country and the world until further notice (Corsini et al., 2020).

Although these setbacks are damaging to the game of football, the football world will quickly try as much as possible to resume activities to complete the ongoing season to restructure the next season's league, by that, less damage and financial loss will be minimized, and total recession can be managed in the world of the sports.

RESUMPTION OF SUSPENDED FOOTBALL GAMES

Football resumption after the lockdown was challenging because of the inability to affirm the health status of the players when they return to their clubs (Vessella et al., 2020). Hence, the football medicine community tried to establish a stable and safe condition to continue sports events temporarily. The authority decided that anyone with signs and symptoms should self-isolate him or herself for fourteen days; they must avoid pubs and contact with people before being allowed to resume (Hunter, 2020).

In Europe, the German Bundesliga league was the first league to resumed behind-closed-door on May 16 since it stopped on March 13 2020 (BBCSport, 2020a). The league resumes after a 2-month break due to the coronavirus pandemic but will not be as usual when it resumes. The rest of the league matches will be played in an empty stadium without spectators, interpersonal contact between rivals in the tunnel will not be allowed, as well as FIFA Fair play and welfare support displayed by children walking alongside the players when entering the field will be suspended. Also, there will be no hand-shaking with a fellow player, referee, match officials or any staff. Referees will also be subjected to medical hygiene regulations (BBCSport, 2020a). The matches were to be played without fans and a maximum of 300 staff only in attendance.

There were other rules: players were informed not to spit, have fun in groups or touch hands with each other during goal jublations, not permitted to take pictures before the start, and substituted players will have to sanitize their hands before joining an ongoing game. However, coaches are allowed to remove their masks to guide players. Playing behind closed doors and all these procedures are meant to avoid the spread of coronavirus in the Bundesliga (ALJAZZRA, 2020).

In England, the Professional football league (English Premier League EPL) had been halted since March 13, 2020, due to COVID-19. All clubs discussed to resume training in small groups with an expectation to play again on June 12 (Roaa Dan, 2020) but, it later resumes on June 17, 2020, with the first match between Manchester United and Tottenham Hotspur. In Italy, Serie A professional league was slated to resume on June 18, 2020 (ESPNSport, 2020b). In Spain, La Liga recommenced on June 19, 2020, after suspension since March 12, 2020 (BBCSport, 2020b). In France, the French Ligue1 professional football was suspended in March 2020 (MirrorSport, 2020).

Table 1. Summary of resumption dates for European professional football leagues.

League name	Date stopped	Present decision	Source
Bundesliga	13 March2020	May 16 2020	(BBCSport, 2020a)
Premier League	March 13 2020	June 17 2020	(Williams, 2020)
La Liga	12 March 2020	June 11 2020	(BBCSport, 2020b)
Serie A	March 2020	June 13 2020	(ESPNSport, 2020b)
Ligue 1 & Ligue 2	March 2020	Voted to end their seasons	(MirrorSport, 2020)
Holland Leagues	March 2020	Voted to end their seasons	(MirrorSport, 2020)
Belgium Leagues	March 2020	Voted to end their seasons	(MirrorSport, 2020)

Table 2. European Champions League Matches not played due to COVID-19 (ESPNSport, 2020a).

Teams	Date announced for the match
Manchester City vs Real Madrid	August 7 or 8, 2020
Juventus vs Lyon	August 8, 2020
Barcelona vs Napoli	August 7 or 8, 2020
Bayern Munich vs Chelsea	August 7, 2020

RECOMMENDATIONS FOR SPORTS HEALTH DURING THE COVID-19 PANDEMIC

Governments and organizations have to improve their pandemic response strategy to help players, coaches, referees, and citizens to adhere strictly to the regulations and recommendations issued by the government and national public health agency (Timpka, 2020).

The sport organizing-bodies control-outlines for sports events should be strategized based on the laydown sports rules and quarantine protocols. It is also crucial that frameworks for sports activities must be carried out diligently and carefully in small groups and following all medical protocols (Timpka, 2020). The Norwegian Football Association stated that the rules after COVID-19, contact sport players should not be more than 5-person/ group, the distance has to be around 2m to avoid physical contact among non-participants, and regular washing of the ball to control the spread of the virus. Lastly, it advised that individual sports, virtual competitions can be organized via Internet resources (Timpka, 2020).

Dieticians recommend that people should continually consume hygienic food containing high amounts of fibre, whole grains, unsaturated fats, and antioxidants to boost immune function (Connaughton et al., 2016) and abstain from eating foods high in saturated fats and sugar. Not only should consuming healthy food take the highest priority, but individuals and sports-persons should also be mindful of healthy eating habits to reduce susceptibility to and long-term complications from COVID-19 (Butler and Barrientos, 2020). As reported in a study by Walsh (2018), improving the immune system and maintain a healthy lifestyle requires eating a well-balanced diet and staying well hydrated. Maintaining and sustaining a robust immune system is a plus against the impact of COVID-19. Hence, it is encouraging to consume a considerable amount of vegetables and fruit (7–8 portions per day) because these foods contain polyphenols and flavonoids that maintain the immune system (Somerville et al., 2016). A daily intake of at least five portions of vegetables and fruit, 2 -3 portions of meat or equal (for vegetarians) is highly recommended (Somerville et al., 2016). In addition, pulses and additional appropriate protein-rich food and a significant quantity of starchy carbohydrates, preferably wholegrain should be taken regularly (Jayawardena et al., 2020). Another study on the immune boost by the UK dietician association also recommended that taking multi-vitamin-mineral can be supportive in enhancing people's health, especially during this outbreak period of COVID-19 (COVID, 2020). Vitamins and supplements are essential to enhance the immune system, as vitamin A and D have indicated a positive effect to improve the immunity towards viral infections (Wintergerst et al., 2007, Patel et al., 2019). High dose zinc, selenium supplementations have revealed an immune boost in patients with viral infections, i.e. Torque Teno virus (TTV), and have a positive response after an influenza vaccination challenge (Wu and Zha, 2020). Additionally, several nutraceuticals and probiotics have also revealed a supportive role in improving immunity towards viral infections including oily fish, garlic, cranberry juices and broccoli sprouts are relatively readily available options (Müller et al., 2016, McCarty and DiNicolantonio, 2020). Individuals with chronic comorbid, i.e. Diabetes mellitus need diverse and balanced food to sustain blood glucose and boost the immune functions (Jayawardena et al., 2020), these particular patients should consume food with a low glycaemic index and also reduce intake of food rich in fat or a high level of sugar (Jayawardena et al., 2020).

The world and the sport were affected negatively by the sudden outbreak of the COVID-19 pandemic, creating an uncondusive environment because of the high risk of the COVID-19 infection. This outbreak changed the tournament's objective and purpose in the footballing world, and changing the rules led to significant consequences in the timetable of the league, Champions League, Olympic Games and other sports activities, and the global economy at large (Simpson et al., 2020).

CONCLUSION

COVID-19 has affected the whole world with its sudden outbreak and high infection rate. It resulted in the closure of countries' borders: air, land and sea. It resulted in immediate suspension of all sports tournaments including the 2020 Tokyo Olympic and compulsory self-quarantine of players. COVID-19 brought the countries to the world's grave financial deficits, and this negative setback led to millions of job losses all over the world. The sports world faced an unprecedented attack due to the spread of COVID-19. It recorded heavy losses from cancelled or suspended competitions in addition to paying high dues to players. Besides, clubs find themselves denied tickets revenues and proceeds from the television broadcast. This led to the suggestion by club owners to cut the players' salaries to maintain the club debts.

Following the impact of the COVID-19 outbreak sports experts believe that sports events will be affected for an extended period. Therefore, national public health organizations and sports associations should work together to protect every level of human health and sport all over the world.

AUTHOR CONTRIBUTIONS

Conceptualization; S.B.A.-M., W.S.W.G. and M.M.; Data curation, M.G, S.B.A.-M., H.A.A. and B.D.A.; Methodology, K.S., M.G., H.A.A. and B.D.A.; Supervision, W.S.W.G., K.S and M.G; Validation, B.D.A; Visualization.; S.B.A.-M. and H.A.A.; Writing—original draft, S.B.A.-M., H.A.A., M.G., K.S. and B.D.A; Writing—review and editing, W.S.W.G., and M.M. All authors have read and agreed to the published version of the manuscript.

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Relative age effect: A head start for early-born football players

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ABSTRACT

The aim of this study was to examine relative age effect (RAE) on distinctive variables and age groups in recreational football. Participants (N = 79,249) included male (n = 63,540) and female (n = 15,709) players aged 2 to 12 years. Data were gathered through an official database containing all licensed players in Denmark. Birthdate distributions were split by age category, sex, club size, year group size, and birth quarter (Q1 = January to March, Q4 = October to December). RAEs were calculated using chi-square analysis. Significant RAEs existed in all age categories (except females in U6 and below). The effect was most pronounced at the entry level among both males and females. Club size was not associated with RAEs, but were shown in smaller and mid-sized year groups, but were absent in larger year groups. The results of this study show that RAEs are present from early sport participation.

Keywords: Birthdate, Birth effects, Soccer, Early sport participation, Parents.

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INTRODUCTION

The systematic practice of annual age grouping occurs across youth sports and countries. In football (soccer), such processes mean that children are regularly grouped with participants up to 12 months younger or older than themselves. These differences in chronological age among grouped athletes tend to negatively influence relatively younger players' likelihood of reaching both talent and senior elite status (Ryom et al., 2018) and increase the risk of dropout (Delorme et al., 2010). These effects are termed relative age effects (RAEs) and are defined as the overrepresentation of chronologically older participants within one selection category (Cobley et al., 2009). Despite the high number of RAE studies in the last decades, few studies have investigated RAEs in children's early sport participation.

Sport is often advocated as a valuable avenue that can foster beneficial experiences among youth (Fraser-Thomas et al., 2005). In fact, previous research implies that sport participation is associated with positive physiological and psychological outcomes, such as improved fitness and reduced cardiovascular risk in normal-weight and obese children (Andersen et al., 2008; Andersen, et al., 2006), enhanced self-esteem, academic achievement, and the development of leadership skills (Holt & Neely, 2011). Specifically, recreational soccer activities have also been shown to improve the well-being of 10- to 12-year-old male youth football players (Larsen et al., 2021). Such benefits might not be equally attainable for all youth. For instance, based on a PREFIT test, a Spanish study (Cupeiro et al., 2020) investigated the anthropometry and physical fitness among 3,147 children (3 to 5 year olds) and concluded that physical fitness was higher among relatively older youth. Such studies strengthen the case that relative age might also influence children's early sport participation.

Recently, a nationwide analysis among 101,991 Swiss football players (Romann et al., 2020), showed that the RAE only had a small—though consistent—effect on participation at grassroots levels. The analysis also indicated no significant RAEs on waiting lists (players signed up for football clubs) and among teams with no selections; in fact, only teams with selections showed RAE. The authors concluded that coaches' selections seem to be a key factor in perpetuating RAEs. Unfortunately, the analysis did not separate males and females from the early entry at 8 years of age, which prevented analysis of any influence of sex. Similarly, a nationwide study among male French youth football players also showed small and consistent RAEs for recreational football players at almost all levels (Delorme et al., 2010), but did not show any RAEs at the youngest age group, U7. Furthermore, in a systematic review, Smith et al. (2018) found small RAEs in female athletes across all sports, including football. While the results revealed that the magnitude of RAEs were highest in pre-adolescent athletes (U11) and at higher competition levels, it did not determine to what degree the RAE was present in the entry level. Thus, it is still not clear to what degree RAEs are occurring among male and female athletes in general, and among youth football players specifically. Contrary to these studies, Hancock, Ste-Marie, and Young (2013) discovered that only 20.3% of initiation ice hockey players (5-6 years of age) in Ontario were born in the fourth quarter of the year. Investigating RAEs across 10 other age divisions and competitive standards, the representation of athletes born in the fourth quarter was higher than in the initiation division, which highly indicates a rebalancing of RAEs over time. Hancock, Ste-Marie, and Young concluded that previous studies had overstated the importance of coaches' roles as it relates to RAEs and underestimated the influence of parents, as parent enrolment decisions might create an initial enrolment bias favouring relatively older athletes in early sport participation.

Contextual factors related to athletes' place of early development also influence the probability of sport participation, and to some extent, the development of sport expertise in countries such as Denmark (Rossing, 2018) and Sweden (Söderström et al., 2021). Since Musch and Grondin (2001) suggested in their original

review of RAE that broad socio-cultural values of modern youth sport and micro-system structures were all likely contributing to RAE prevalence, a number of studies have also investigated the connection between athletes' place of early development and the RAE. The results of these studies have varied, with some showing birthplace effects, but not RAEs among Canadian ice hockey youth players (Turnnidge et al., 2014) and professional athletes in ice hockey, basketball, baseball, and golf (Côté et al., 2006). In European sport, however, it appears that the magnitude of RAEs is influenced by demographic factors such geographic location (e.g., Portuguese male youth football players; (Almeida & Volossovitch, 2021). Moreover, the results from a recent Swedish study showed that the proportion of youth players in football districts influences whether male and female players, at age 15, continue to play football and whether they play at an elite level as young adults (Söderström et al., 2020).

Although district or community size seem to be related to athlete development and participation, both the development of talent and the differences in place of early development might be related to the structure of sport, which could be termed "*infrastructure*" (Hancock et al., 2021). In a European context, an inevitable structure within sports is the club system and the year group in which most athletes are embedded (Galatti et al., 2016). As competition has been highlighted as an inevitable mechanism for RAEs to exist (Musch & Grondin, 2001), the size of year groups might provide different opportunities for competition to exist. The depth of competition might rise in larger year groups, as coaches might be more willing to select players to specific teams according to the players' current abilities to ensure more equal training groups. Even though we acknowledge that clubs certainly differ within and across countries, researchers suggest that larger clubs influence how they can be more effective in advantages offered to members (Koski, 1995) and decreasing costs to a certain extent (Wicker et al., 2014), though they also experience larger problems regarding the recruitment and retention of volunteers (Wicker & Breuer, 2013). Recently, a Spanish study (Praxedes et al., 2019) revealed how all teams (U8 to U19) in elite clubs ($n = 4$) had significant RAEs, while low level clubs ($n = 4$) only had significant RAE among U14 to U18 teams—again demonstrating that factors other than club size might play a role. Nevertheless, the results of an interview study with Danish coaches and talent managers indicated that participants perceived smaller clubs as being disadvantaged in athlete development, as they often lack resources to facilitate continuous development of athletes (Rossing, 2018). These resources can be tied to both material and financial resources, but also the influence of parents, coaches, and peers, which can be termed "*social structure*" (Hancock et al., 2021).

The social structure surrounding the athletes from grassroots to elite levels includes coaches, parents, and peers. This framework connects to the RAE model proposed by Hancock, Adler, and Côté et al. (2013) that proposes that coaches influence RAEs by adopting higher expectations of relatively older children (i.e., Pygmalion effects). Relatively older athletes then influence RAEs by holding higher self-expectations than their peers (i.e., Galatea effects). Most relevant to the current study, however, is that parents can influence RAEs through Matthew effects (i.e., those with initial advantages continue to be advantaged), by enrolling their relatively older children earlier in life, perhaps because they view their children as advantaged compared to peers or simply put, more mature compared to peers. Clearly, RAEs are intricate and might be influenced by many factors (e.g., sex, club size, and year group size) depending on the country being explored. As such, continued and targeted investigation to better understand these effects is warranted.

In Denmark, youth players can be registered footballers from their birth and start on football-related activities in clubs at 2 years old. Similar to the initiation stage in Canadian hockey (Hancock, Ste-Marie, & Young, 2013), the Danish players cannot play matches arranged by the Danish FA before 5 years old. As Hancock, Adler, and Côté's (2013) model suggests, RAEs are initiated by parents' enrolment decisions at the earliest ages. Given the lack of studies on early entry into sport, this makes Danish youth football an interesting case

to study. Thus, the objectives of this study were to investigate (1) RAEs in a nationwide analysis of male and female football players (2 to 12 years old) who are registered as active players assigned in the database of the Danish Football Association (DBU) and (2) the influence of club size and year group size on RAEs.

METHODS

Participants

Following approval from the local ethical institution and the Danish Football Association, data were extracted in 2020 from an electronic database including 63,540 male (80.18%) and 15,709 female (19.82%) players aged 2 to 12 years old. This included officially registered players across 1,020 (male = 1003, female = 856) football clubs. Age categories ranged from U3 to U12 for both male and female football players (see Table 1).

Table 1. Distribution of participants by sex and year group.

Male			Female		
Year	n	%	Year	n	%
2018	63	0.10%	2018	25	0.16%
2017	297	0.47%	2017	70	0.45%
2016	927	1.46%	2016	200	1.27%
2015	2221	3.50%	2015	395	2.51%
2014	4458	7.02%	2014	657	4.18%
2013	6815	10.73%	2013	938	5.97%
2012	8348	13.14%	2012	1592	10.13%
2011	9179	14.45%	2011	2193	13.96%
2010	10168	16.00%	2010	2863	18.23%
2009	10327	16.25%	2009	3135	19.96%
2008	10737	16.90%	2008	3641	23.18%
Total	63540	100.0%	Total	15709	100.0%

Procedures and data analysis

In Denmark, the cutoff date for all sports is January 1st. Thus, the players were categorized into four quartiles (Q) according to their birth month, independent of their birth year (i.e., Q1 = January to March; Q2 = April to June; Q3 = July to September; and Q4 = October to December). The observed birthdate distributions were calculated for every quartile. The process of comparing observed birthdate distributions to expected equal distribution of births (i.e., 25% for each quartile) has rightly been questioned by Delorme et al. (Delorme et al., 2009; Delorme & Raspaud, 2009). Thus, for our study, the expected birthdate distributions were obtained from the *actual* live birth rates of Danish children (2013-2018), as registered by the Danish Office of Statistics (2020). Observed and expected birthrate distributions were compared using chi-square analysis (e.g., Q1 vs. Q4) with 95% confidence intervals. We also analysed RAEs in relation to football club size, which was defined by the total number of youth players (0-12 years of age) in each club. The club size categories were established by identifying the largest club size (i.e., a 518-member club for male footballers and a 145-member club among female footballers). Based on sheer size, the clubs were distributed into four groups including both male and female players and equal size; a) 131>, b) 131-260, c) 260-389 and d) 389<. As year groups (e.g. children born in 2009) vary in number of players and competition level, players were also categorized according to the size of their year group in each club. As year group size can potentially serve as a proxy for depth of competition, we categorized players from U6 to U12 into smaller (< 20), medium (20

to 40), and larger year groups (> 40). As there were limited female players within each year group, they were excluded from this analysis.

RESULTS

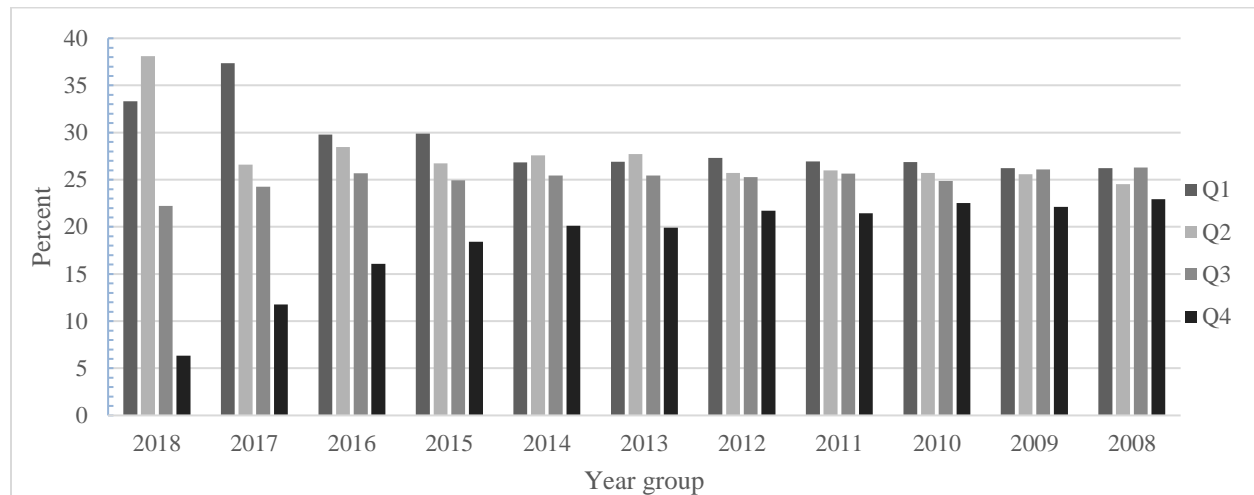


Figure 1. Quartile distributions of male youth players across age categories.

Table 2. Birthdate distribution analysis for male and female youth football players.

Sex	Year	n	χ^2	p	w	Q1 %	Q2 %	Q3 %	Q4 %
Male	2018	63	14.83	.002	0.49	33.33	38.09	22.22	06.34
	2017	297	44.97	.000	0.39	37.37	26.59	24.24	11.78
	2016	927	47.97	.000	0.23	29.77	28.48	25.67	16.07
	2015	2221	93.14	.000	0.20	29.89	26.74	24.94	18.41
	2014	4458	61.89	.000	0.12	26.86	27.59	25.43	20.12
	2013	6815	79.59	.000	0.11	26.91	27.73	25.46	19.89
	2012	8348	62.49	.000	0.09	27.31	25.71	25.27	21.70
	2011	9179	48.75	.000	0.07	26.93	26.01	25.63	21.43
	2010	10168	41.17	.000	0.06	26.87	25.72	24.88	22.52
	2009	10327	33.91	.000	0.12	26.22	25.56	26.09	22.12
	2008	10737	28.33	.000	0.05	26.23	24.51	26.30	22.95
Female	2018	25	3.66	.301	0.38	40.00	20.00	24.00	16.00
	2017	70	25.73	.000	0.61	45.71	30.00	15.71	08.57
	2016	200	2.20	.531	0.10	26.50	26.00	23.50	24.00
	2015	395	11.47	.009	0.17	26.33	27.34	28.35	17.97
	2014	657	4.73	.193	0.08	27.54	25.57	23.74	23.14
	2013	938	16.51	.001	0.13	28.25	27.93	23.77	20.04
	2012	1592	17.77	.000	0.10	28.01	24.81	26.58	20.60
	2011	2193	25.55	.000	0.11	27.45	26.86	26.08	19.61
	2010	2863	35.17	.000	0.11	28.89	24.97	25.39	20.75
	2009	3135	14.49	.002	0.07	26.44	26.22	25.29	22.04
	2008	3641	26.51	.000	0.09	26.37	26.42	26.23	20.98

As illustrated in Figure 1, RAEs were evident across all male age groups. Though the sample sizes are noticeably smaller for U2 to U4 age groups, a significant overrepresentation of relatively older athletes and a significant underrepresentation of relatively younger athletes was clearly evident (see Table 2). In fact, male players born in the fourth quarter of 2018 and 2019 represent only 6% and 11% of the proportion of players in their cohorts, respectively. This confirms that RAEs influence early entry into Danish football before the age at which competitions exist. Furthermore, the results show a rebalancing effect, since the proportion of male Q4-born players increases from ~6% in the U2 age category to ~23% in the U12 category.

Figure 2 illustrates the tendency for relatively older female players to be overrepresented in Danish football. Unlike male players, however, the trend was not significant for all age groups (i.e., U2, U4, and U6), and there was even an instance of Q3 athletes being most overrepresented in one age category (i.e., U5). Though not all results were statistically significant (possibly due to low sample sizes), the data show a clear tendency favouring relatively older female athletes, especially during the entry years into football.

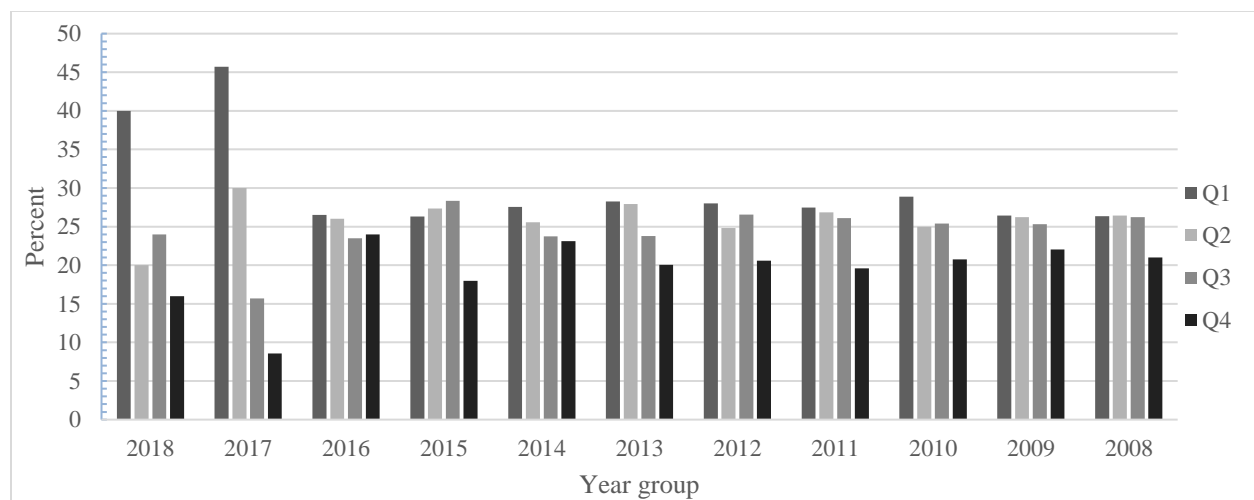


Figure 2. Quartile distributions of female youth players across age categories.

Focusing on club sizes, it was revealed that RAEs did not differ based on the size of one’s football club. In fact, RAEs were present for all club sizes across both sexes (see Figures 3 and 4). Birthdate distributions showed an overrepresentation of players born in the first half of the year, with an underrepresentation of those born in the second half of the year. For most club sizes, Q4 athletes were significantly underrepresented (see Table 3).

Table 3. Birthdate distribution analysis for male and female youth football players.

Sex	Interval	n	χ^2	p	Q1 %	Q2 %	Q3 %	Q4 %
Male	3-131	32810	275.9464	.000	27.36	25.59	25.58	21.44
	131-260	19144	116.2945	.000	26.39	26.30	25.56	21.73
	260-389	8323	62.98729	.000	26.51	26.68	25.32	21.47
	389-518	3171	21.86236	.000	26.58	25.82	26.42	21.16
Female	3-38	7821	87.17662	.000	27,66	25.68	25.99	20.64
	38-73	4545	52.4718	.000	27,04	26.66	26.02	20.26
	73-109	1971	836.9987	.000	25,92	26.94	25.46	21.66
	109-145	1113	14.81364	.002	28,12	25.51	22.64	23.71

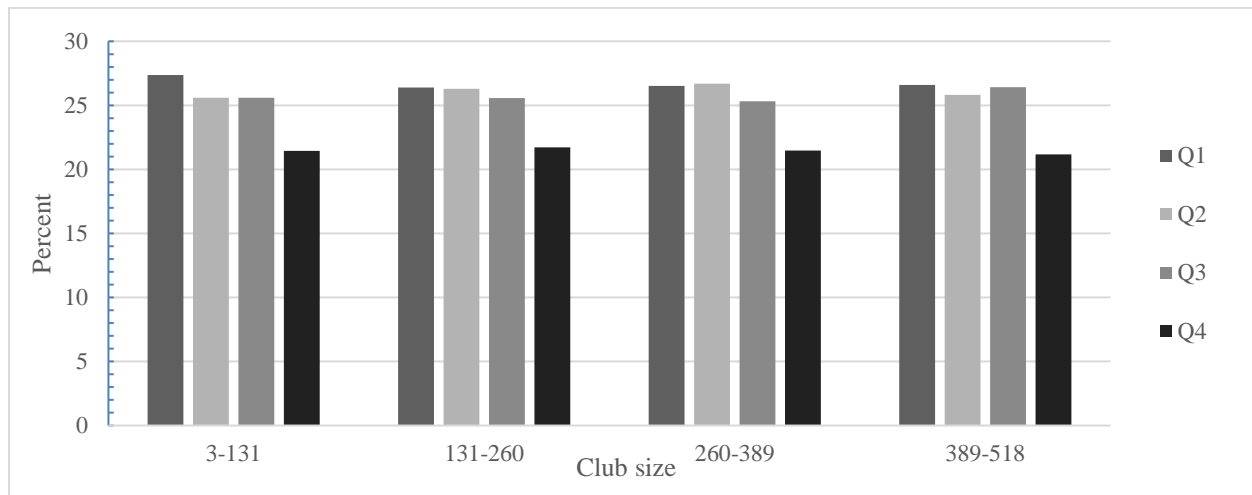


Figure 3. Quartile distributions of male youth players across club size categories.

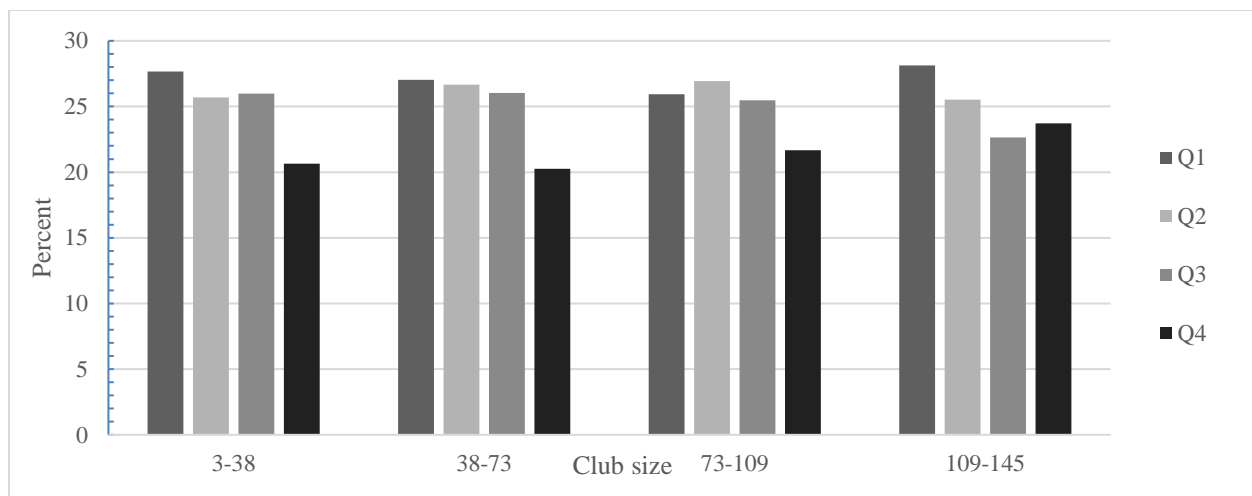


Figure 4. Quartile distributions of female youth players across club size categories.

Recall that we also examined RAEs and year group size. Analysis revealed significant RAEs for small (< 20 registrants in a player’s club at their age category) and medium (20 to 40 registrants) year groups, but no RAE for large (> 40 registrants) year groups. Whereas the small year groups had an overrepresentation of relatively older athletes, medium year groups had the strongest overrepresentation for Q3-born athletes (see Figure 5 and Table 4).

Table 4. Birthdate distribution analysis for male youth player U6-12 across year group sizes.

Interval	n	p	χ^2	Q1 %	Q2 %	Q3 %	Q4 %
1-20	31573	.000	235.162	27.36	25.59	25.58	21.44
21-40	20839	.016	88.743	26.39	26.30	25.56	21.73
>40	8941	.062	48.113	26.51	26.68	25.32	21.47

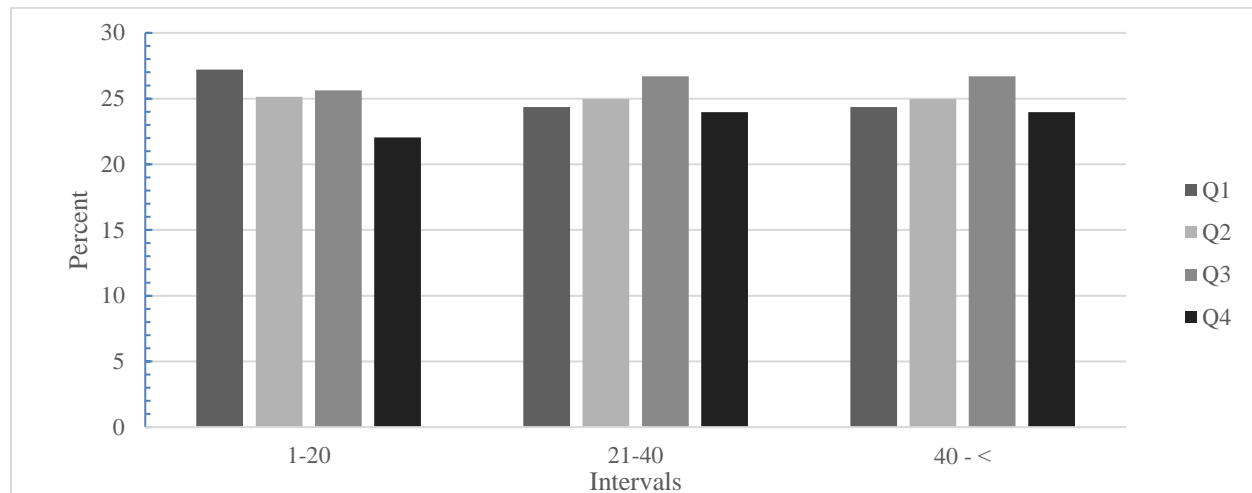


Figure 5. Quartile distributions of male youth players across year group size categories

DISCUSSION

This study aimed to better understand factors that influence RAEs by examining birthdate distributions of Danish youth football players. The first key finding was that the RAE was most pronounced in the early sport participation years (for both males and females), as the proportion of Q1-born male players enrolled in U2 and U3 categories were 33% and 37%, while the proportion of Q1-born female players in same age categories were 40% and 46%. Second, the RAE was significant in most age categories (exceptions being female U2, U4, and U6 players), but RAE clearly dissipated within older age categories. Examples of this rebalancing effect are seen when examining the proportion of Q4 players. Among male players, this proportion increased from ~6% at U2 to ~23% at U12. For female players, the proportion increased from ~16% at U2 to ~21% at U12. The third key finding was that club size does not seem to yield RAE differences, as registration patterns across all club sizes and among both sexes were quite similar (i.e., Q1-born players overrepresented and Q4-born players underrepresented). Lastly, a typical RAE pattern was found within smaller and medium year groups, while larger groups showed non-significant results.

Parents' initial enrolment bias

With such a low proportion of Q4-born players in the earliest years of participation, the results indicate that parents' initial enrolment bias might play a central role in the progression of RAEs in the early stages of participation. It is known that parents play an important role in children acquiring early sport experience, coaching, practice, and motivation (Witte et al., 2015), and that the impact and involvement of parents are larger in the beginning of children's sport careers than in adolescence (Côté, 1999). For instance, a study of parents' experiences over the initial period of a first child's sport involvement (Dorsch et al., 2015) found that the parents were highly guided by their own expectations (e.g., beliefs regarding their children's sport participation, interest, perception of parenting norms, etc...). The study also highlighted how parents compared their children with their teammates and opponents to assess their children's abilities. Such an orientation might also occur prior to choosing children's sport participation, leading some parents to be unwilling to send their children to sports such as football. As youth sport, especially football, has been characterized as a "race to the bottom approach" (Rossing et al., 2020) due to commonly used early selection and specialization procedures, parents of relatively younger children might delay their children's participation on the premise of protecting their well-being.

Though our data cannot not conclusively address why parents might enrol or withhold their children from youth sport, it is clear that this enrolment bias exists in Danish football. This extends the support for Hancock, Adler, and Côté's (2013) model positing that parents initiate RAEs through Matthew effects. Specifically, early entry into sport likely leads to more training, coaching, and competitive opportunities, which further advantages relatively older athletes in years where team selections exist. Meanwhile, relatively younger children miss out on the opportunities, which might disadvantage them later in their athletic careers, specifically when trying out for competitive teams and elite clubs. These findings are novel and more research is needed to understand the Matthew effect on RAEs; however, the results assist in providing a more versatile explanation for RAEs.

Club size and year group

A novelty of this study was its exploration of club and year group size as a potential variable that influences RAEs. However, the results clearly showed that the RAE was consistent across all club and year group categories (except large year groups), which indicate that the size of the club and year group does not increase the existence of RAE. Previous researchers have shown that, in Spain, the type of football club (elite vs. non-elite) might influence RAEs (Pizarro et al., 2019). However, unlike Scandinavian sport traditions, Spanish clubs seem to operate as either elite clubs or mass participation clubs from U8. This likely has considerable consequences on both the recruitment and practices of players between the types of Spanish clubs as they have different aims. In a Danish context, elite clubs are not allowed to formally recruit players, which therefore does not seem to explain the results.

Recently, a number of case studies have investigated how extremely successful year groups have influenced football players' development and participation from their entry to adolescence (Erikstad et al., 2021; Rossing et al., 2020). As most athletes in team sports, at least in Europe, are embedded in year groups during their development as children and youth, this is certainly a vital social structure. Illustrating this point, research on Danish and Norwegian football clubs (Rossing et al., 2020; Erikstad et al., 2020) showed how the coaches ensured that all players were recognized as players in their daily training sessions, but also at competition (e.g., providing them all equal playing time). Interestingly, the two successful case studies in Denmark and Norway exhibited similar year group sizes (33 and 40, respectively), indicating that year group size might be beneficial for a strong development environment. As the studies also clearly indicated that the synergy between coaches, parents, and peers highly influences participation and development opportunities, additional analyses on the size of year groups might be favourable.

The club and year group variables were included in the study as they potentially serve as social structures that could illuminate the depth of competition among youth players. However, the depth of competition might be difficult to extrapolate within a social structure such as size of club and year group, since competition, or what the Danish sociologist Anders Petersen (2016) calls a "*performance oriented society*", might permeate all levels of society and therefore is not shown in our categories of club and year group. Especially in football, children are being recruited into academies as young as six years of age with the ambition that they have better opportunities to reach elite level (Hill & Sotiriadou, 2016; Larkin & Reeves, 2018). Such practices are widespread across elite football clubs and national associations (Höner & Feichtinger, 2016). Even though elite clubs in Denmark are not allowed officially to recruit players under 12 years of age, Petersen (2016) points out that the current society is designed on the basis of logic of performance, in which our own performances determine our success in life. As competition is the primary engine of a "*performance oriented society*" (Petersen, 2016), it can influence the choices made by the parents—if parents expect that their relatively younger children might not be successful when entering sports such as football, they might postpone their initial enrolment into sport.

Limitations

Despite its unique contribution to the field, this study has limitations. First, this study examines RAEs in Danish soccer during the 2019/2020 season, which is not necessarily a reflection of the general situation over a longer period of time. Second, although participants were drawn from the DBU's official database, players might be enrolled in various clubs and teams that can differ in size, training quantity and quality, coaches' competencies, and many other factors that can influence their participation in local volunteering clubs. Nevertheless, this is the first study to include a complete nationwide database of both sexes across all age categories from their earliest entry into sport participation.

CONCLUSION

This study aimed to investigate RAEs in a nationwide analysis among 2-12 year old football players. This study highlights that RAEs exist at the enrolment stage in sport participation among both male and female players and that it slowly decreases across older age groups, although small effects still exists. Future researchers should investigate the influence of parents' initial sport enrolment decisions on RAEs.

AUTHOR CONTRIBUTIONS

Niels Nygaard Rossing conceptualized the study, while Kasper Raaby Pedersen obtained the data for it. Kasper Raaby Pedersen and Niels Nygaard Rossing performed a data analysis while all authors interpreted the data. Niels Nygaard Rossing, Knud Ryom and David J. Hancock wrote, reviewed and approved the final manuscript.

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