



Journal of Human Sport and Exercise

E-ISSN: 1988-5202

jhse@ua.es

Universidad de Alicante

España

MONTANER SESMERO, ANA M.; MONTANER SESMERO, CARLOS; PÉREZ SORIANO, PEDRO;  
CARRASCO EMBUENA, VICENTE; LLANA BELLOCH, SALVADOR

Application of the discussion groups and initial phases of the qfd methodology to the study of valencian  
ball trinquetes

Journal of Human Sport and Exercise, vol. 6, núm. 4, 2011, pp. 629-638

Universidad de Alicante

Alicante, España

Available in: <http://www.redalyc.org/articulo.oa?id=301023452006>

- How to cite
- Complete issue
- More information about this article
- Journal's homepage in redalyc.org

redalyc.org

Scientific Information System

Network of Scientific Journals from Latin America, the Caribbean, Spain and Portugal

Non-profit academic project, developed under the open access initiative

# Application of the discussion groups and initial phases of the qfd methodology to the study of valencian ball trinquetes

ANA M. MONTANER SESMERO<sup>1</sup>, CARLOS MONTANER SESMERO<sup>1</sup>, PEDRO PÉREZ SORIANO<sup>2</sup>, VICENTE CARRASCO EMBUENA<sup>3</sup>, SALVADOR LLANA BELLOCH<sup>2</sup> 

<sup>1</sup>Physical Education Teacher at Secondary School, Regional Ministry of Education (Valencia), Spain


<sup>2</sup>Department of Physical Education and Sports, University of Valencia, Spain

<sup>3</sup>Department of General and Specific Didactics, Faculty of Education, University of Alicante, Spain

## ABSTRACT

Montaner AM, Montaner C, Pérez-Soriano P, Carrasco-Embuena V, Llana-Belloch S. Application of the discussion groups and initial phases of the qfd methodology to the study of valencian ball trinquetes. *J. Hum. Sport Exerc.* Vol. 6, No. 4, pp. 629-638, 2011. The purpose of this research is to show an opinion study about the specifications that the valencian ball *trinquetes* should have according to the players' opinion. The valencian ball game is a native sport with a great cultural tradition in the Valencian Community and it has been practised in the *trinquetes* since the XIV century. Despite its history, these facilities do not have the normative requirements for suitable sport development. The information provided by the users of the *trinquetes* is the first necessary step to improving the *trinquetes* facilities. Two methodologies based on the User Oriented Designed were applied in this study: discussion groups and initial phases of QFD - Quality Function Deployment. The opinions gathered have demonstrated the necessity for promoting actions to modify reform and modernize these kinds of facilities, in order to improve the practice of valencian ball. **Key words:** OPINION STUDY, FACILITIES, STANDARD RULE.

---

 **Corresponding author.** Universidad de Valencia, Departamento de Educación Física. C/ Gascó Oliag, nº 3. 46010 Valencia. Spain.

E-mail: salvador.llana@uv.es

Submitted for publication September 2011

Accepted for publication December 2011

JOURNAL OF HUMAN SPORT & EXERCISE ISSN 1988-5202

© Faculty of Education. University of Alicante

doi:10.4100/jhse.2011.64.06

## INTRODUCTION

This work is part of the project "Study of the Valencian ball", funded by the Regional Secretary of Sports in Valencia and carried out by the Institute of Biomechanics of Valencia (IBV). The general purpose is to improve the *trinquetes* facilities.

The valencian ball is a traditional and autochthonous sport which has been played at the *trinquetes* since the fourteenth century (Conca et al., 2003; Conca & Perez, 1999). The *trinquete* is an asymmetric installation similar to a fronton, where the two main modalities are played: *Escala i Corda* and *Raspall* (Llopis, 1999; Miller, 1976; Moreno, 1992; Olaso, 1994; Soldado, 1999). The game room consists of four walls, the floor and the *escala* (degrees). The side walls are called *murallas* (walls). The two front walls are known as *rebot*s. There are two types: the *dau rebot*, so named because there is a square of 2 to 3 meters where you have to kick the ball in the serving and the *rest rebot* located on the opposite side (Conca et al., 2003; Conca & Pérez, 1999; Vilalta, 1986) (Figure 1).

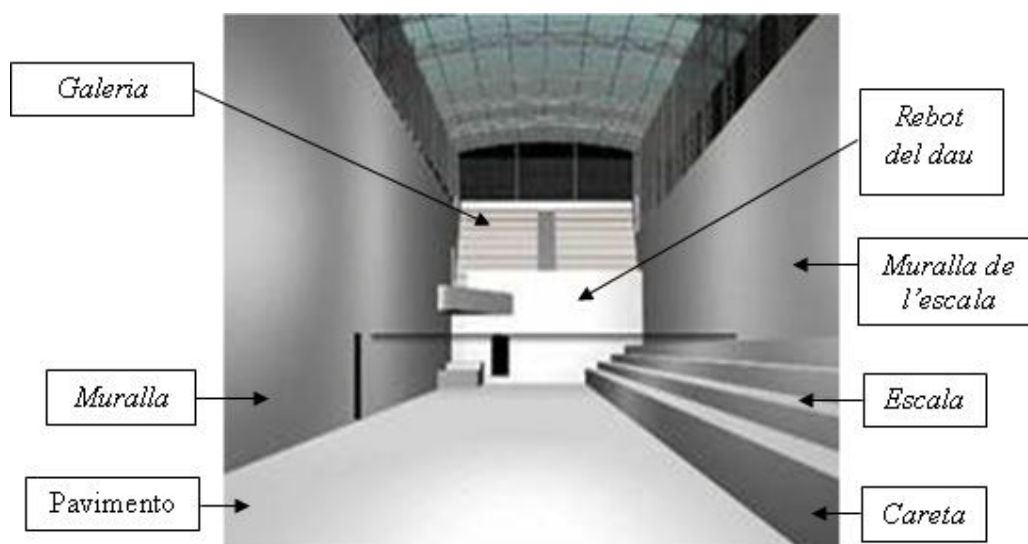
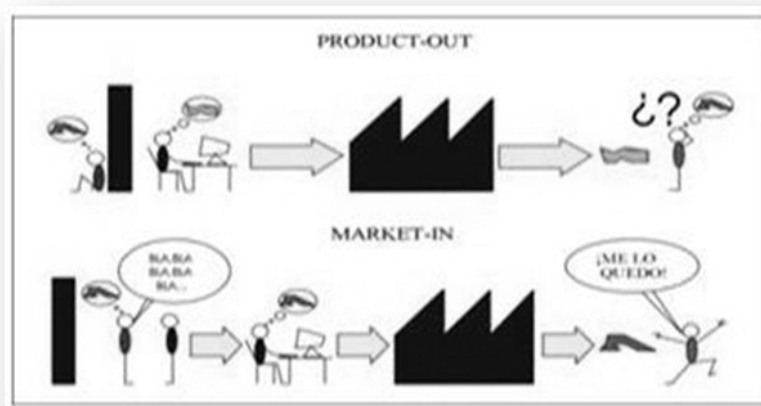


Figure 1. Parts of valencian ball trinquete.

To ensure the safe practice of sports, the facilities must be in good condition. Besides, the facilities need a variety of aspects to be met such as maintenance, comfort, accessibility and performance as they affect the quality of the sport activity. In many sports the quality of the facilities is controlled and improved through regulations. In this sense, the *trinquetes* lack such regulations to standardize these facilities. In addition, it is not clear which aspects should be monitored and assessed. Therefore, it is necessary to conduct an opinion survey. So we can identify the specifications to be met by a *trinquete*, with the aim of characterizing those that are currently active, and this will provide a wealth of information on the potential needs of users (*pelotaris*) as well as gaps and areas for improvement.

The line of research followed in this work is based on a paradigm of product design study called User Oriented Design (UOD) (Page et al., 2001). In this paradigm, the information provided by users about a product is the key to its final development. Thus, the management model is based on ensuring that new products fulfill the needs, expectations and requirements of users from a functional and emotional point of view.

The UOD philosophy follows the maxim that the best-designed products are perfectly adapted to the people who will use them. So, the interaction with users allows to gather perceptions and opinions, facilitating the design process from the earliest stages of product development. Figure 2 is an example of the concept of UOD:



**Figure 2.** Picture exemplifies the UOD philosophy (Page et al., 2001).

The first sequence shows how the product designer and potential user envisage the product differently, so the user ends up with a product that does not meet their expectations. In the second sequence the user takes part in the process, guiding the design, so that the final product has the characteristics expected. This is a simple model in concept but not always taken into account.

Some of the tools used to attract the user's opinion are Emotional Engineering: Product Semantics, Kansei Engineering, and User Oriented Design: QFD - Quality Function Deployment, Kano's Model, Value Analysis, Conjoint Analysis and Analysis of Hierarchies of Saaty (Page et al., 2001).

At the Institute of Biomechanics of Valencia, UOD methodology has been used to study the interaction between users (ball players), and the product or environment (the *trinquete*).

Considering everything mentioned, the main objective of this study is to identify the technical specifications "a priori" a *trinquete* must meet, in the opinion of the *pelotaris*. The information provided by users of these facilities constitutes the first step to meeting needs and identifying areas for improvement. These specifications also facilitate the variables to be measured in a *trinquete*.

## MATERIAL AND METHODS

Two methodologies were used to characterize the *trinquetes*: discussion groups and initial phases of the QFD methodology, Quality Function Deployment (Bergquist & Abeysekera, 1996; Page et al., 2001; Perez, 2004; Perez & Alcantara, 2006). These techniques are used in user oriented design (UOD) and are important during the inquiry phase of a new product or redesigning an existing product, as is the case in the valencian ball *trinquetes*.

- **Discussion Groups**

The Discussion Group technique is a method of generating ideas which comes from the field of social intervention, and uses a variation of group dynamics to enhance user participation. The overall objective of this technique is to achieve qualitative information about the perceptions, opinions and attitudes of users / professionals in the valencian ball, promoting all kinds of contributions and views without restriction.

It should be noted that this is a confirmative and not an exploratory technique because the objective is based on an understanding of information, not inference. For this reason, the components of the discussion group should be selected to create a homogeneous group, avoiding excessive randomization or dispersion of parameters, which may produce different opinions or expectations about the product.

It is important and convenient to introduce and define the analyzed aspects used in the discussion group. In this case, these were grouped into the following concepts or families:

- **Functionality:** related to the use of the installation in accordance with the intended purpose, i.e. its operation.
- **Performance:** referring to the suitability of the *trinquete* to the game and improving it.
- **Usability:** ease of use of the *trinquete* by players.
- **Perception:** how the *trinquete* is perceived by the user, their conceptual interpretation which comes from the way the *trinquete* is used and perceived.
- **Quality:** referring to how the user perceives and interprets the adequacy of the installation to the activity, as well as certain features of the facility itself. Also related concepts of durability, resistance, adaptation of materials, etc.
- **Avoiding health problems:** so that nothing alters the user's health.

Regarding data measurement, this analysis model uses audio recordings of the session and records of observation to compare the data with the environment in which they were expressed, roles of participants, etc.

**12 professional players** were involved in these groups as they were familiar with the problems and needs of the sport. The results were converted into technical specifications (using QFD methodology) which allowed recognizing the variables to be measured on a *trinquete*.

The procedure used in the focus groups was as follows:

1. **Performing a search and selection of users**, specifying the required profile, the number of meetings to be held and the issues to be discussed at the sessions.
2. **Writing the script** of the session from different aspects to be analyzed, along with an index of ordered questions that will guide the discussion to the aspects of interest.
3. Development of the **session**: an hour and a half to two hours.
4. **Treatment** and drafting a report with the **results**.

The processing of data consisted of an interpretive analysis of content. This analysis is based on a descriptive model in which the participants' responses are summarized creating brief descriptions and also inferring the meaning of the data.

The following analysis is a systematic and verifiable result, conducted by the session moderator and contrasted by the observer and the expert in the product. The ideas, opinions and feelings have been used as a core part of the analysis. The most frequently recurring data has been identified, showing the range and diversity of experiences.

- **QFD Methodology**

The acronym QFD (Quality Function Deployment), usually translated as Function Deployment Quality refers to a methodology that consists of obtaining the requirements that users want of a product and the translation of these to the technical design (Bergquist et al., 1996; Page et al., 2001; Perez 2004; Perez et al., 2006).

## **RESULTS**

The following views were obtained in focus groups involving players with extensive experience in the field of valencian ball. These players were asked about different aspects of the *trinquetes*, which were grouped into families of needs (Table 1).

**Table 1.** Focus groups results. Players' opinion and requirements grouped into "family" needs.

FAMILY NEEDS	PLAYERS' OPINIONS AND REQUIREMENTS
<b>FUNCIONALITY</b>	Glass walls "spit" the ball too fast. The walls must be uniform and do not wear out the ball. A non squeeze surface. That the surface has a best friction.
<b>PERFORMANCE</b>	The walls must be smooth and "spit" the ball well. The ball should see well in all areas of the <i>trinquete</i> . Both shoes and floor should have good grip. A non dazzling lighting.
<b>AVOIDING HEALTH PROBLEMS ASSOCIATED WITH THE INSTALLATION</b>	It does not worry too much. A protective surface. Non-glare lighting to prevent falls becoming out of step, etc. Poor lighting in most of the <i>trinquetes</i> is a serious problem that is often associated with injuries, especially muscular, because the ball can not be seen, players can be late to hit the ball and so on.
<b>PERCEPTION</b>	A colour of the installation that allow the ball to be easily seen. Ideally, for this to be possible the ball should be white and the <i>trinquete</i> green or blue. This also would be perfect for television. This is something that, despite the traditionalism that has prevailed in the Basque Country, has been carried out in recent years, improving the view of the game and thus the show and the popularity of the ball. The ball impact must emit a good level of sound and it must has a nice sound.
<b>USABILITY</b>	Clean and dust – free floors. Improvement of traffic areas and changing rooms. Lighting: the ball must not be reflected by the light. The light must be located on the side wall (not on <i>scale</i> ) and as high as possible. A homogeneous light throughout the playing area (to avoid injuries). Natural light is ideal. It is best to locate the lighting on the opposite wall to the <i>muralla</i> and to elevate it as much as possible, will not affect the game or cause glare.
<b>QUALITY</b>	The different elements of the <i>trinquete</i> should be homogenized. No cracks or irregularities. The walls and <i>escala</i> should have straight edges, preventing the ball from moving in an unexpected way. When the walls are rough spoil the ball and its behavior changes and makes it more flying (the ball spends more time in the air and moves strangely). The floor is made of stone slab (Monóvar tile). Well cleaned <i>trinquetes</i> and cared for.

In Table 2, we provide the technical specifications along with the opinions of the players on the different elements of the *trinquete*. The table shows the variables to be measured in a *trinquete*.

**Table 2.** Technical specifications obtained in the discussion groups.

TECHNICAL SPECIFICATIONS	VARIABLES	TRINQUETE'S ELEMENTS
Size	Dimensions	<i>Trinquete</i>
Good grip	Longitudinal friction	Surface
	Rotational friction	
Noble boat	Vertical Boat	
	Uniformity of boat	
Smooth floor	Flatness	
"Spitting the ball"	Boat angled on the floor	Walls
	Boat angled to the wall	
Lighting	Lighting in the playing area	<i>Trinquete</i> playgrounds
	Lighting stands	Terraces

## DISCUSSION

The most prominent analysis that comes from the results of the focus groups is the **interest** and willingness shown by the players. All agreed on the need for **development and promotion** within valencian ball, in order for it to be recognized and appreciated as a traditional and original Valencian sport.

The views expressed in the discussion groups about different elements of the installation have highlighted the areas for improvement in the ball *trinquetes*. In this sense and in relation to the **surface** the following specifications have been recognised:

1. The surface offers a **good grip**, i.e. there is optimum friction between it and the players' footwear. These views corroborate several studies that show that incorrect friction levels negatively affect the performance (Cham & Redfern, 2002; Li et al., 2007). However, it must be remembered that high friction rates are related to high rates of injury. (Ekstrand & Nigg, 1989; Frederick & Himmelsbach, 1995; Nigg, 1990; Olsen et al., 2003; Pasanen et al., 2008; Renström, 1995; Stiles & Dixon, 2006). Therefore we have to find a balanced solution that allows a good surface grip without compromising the health of athletes.
2. It must to be **uniform**, as some uneven pavement may increase the risk of injury and / or decrease athletic performance.
3. The ball must **"spit"** well on the pitch. The term "spit" in valencian ball is understood as the behavior of the ball when it bounces off the floor or wall (**angled pot**). Since this feature is of concern to the players it is necessary to establish values of this aspect, to allow proper development of the game.



4. The floor slab should be made of stone (**Monóvar tile**). One reason why it is made of this material may be the tradition and the physical characteristics of the same (high stiffness), which benefits the athletic performance (Nieto et al., 2001).

Regarding the *trinquete* **walls**, which greatly influence the game as part of the playing field and the ball can bounce on them, the following have been identified:

1. The walls must be smooth and "**spit**" the ball well (**boat angled wall**). In this sense the walls should have no irregularities, chipping or deformation, and be as smooth as possible. Considering and improving this aspect is crucial since it directly influences the game.

In relation to **lighting**, one must take into account the following specifications:

1. **Focus** on the *trinquetes*, so that discomfort is not caused to the ball player in the game, nor the spectator following the game.
2. **Homogeneity of light** should be present in the court and in the stands. The provision of artificial lighting is a prime need, therefore, that the installation provides light is a decisive factor for the development and diffusion of valencian ball, increasing the hours of practice, and the number of practitioners. Also, the lighting should be adapted to EN 12193:1999 according to lighting in sports facilities.
3. Finally, note that the players prefer **natural lighting**. This aspect is greatly influenced by the orientation of the *trinquete* and the windows through which light enters. Thus, the most appropriate guidance is one in which the longitudinal axis of the *trinquete* is north-south, thus maximizing the amount of light and preventing glare largely due to the rising and setting sun. It is also important that the roof and windows allow the entry of *trinquete* sunlight.

Another specification provided by the players is the **size** of the facility, in order to **standardize** the measurements of the *trinquetes*. This should measure the **dimensions** of different parts of the *trinquete*.

In addition, through discussion groups it was found that **the evolution of the trinquete** has been minimal in recent decades. In fact, these facilities have experienced virtually no changes over the years and what is worse, there is a rather run down group of *trinquete* courts. Many have fallen into disuse and others do not have the necessary characteristics to carry out the development of the game. In addition, the maintenance and repair cost is high and, in most cases, the owners can not afford it, or do not dare to do so by the lack of criteria to develop properly and guarantee to maintain and even improve demand for dynamic and active facilities.

Finally, it was observed that a large part of the current *trinquetes*, are not in good condition for the proper development of sport; costumes in disrepair, lack of minimum conditions of hygiene, facilities (surface and play area) inappropriate for the athlete, and so on. It is clear that for a healthy sport, the *trinquete* must possess **ancillary spaces, changing rooms and bathrooms** in good condition, being necessary to reform and conditioning in those facilities where they are deficient. Also, proper **maintenance and cleaning** of the floor are required, highlighting the need to minimize the risk of injury and the safe practice of sports. The poor state of repair and maintenance of the surface can reduce delivery and performance of athletes, as well as showmanship and quality of play.

## CONCLUSIONS

The opinion-identification study of specifications ball players, has contributed to the views of this group regarding the characteristics to be met by *trinquetes*. The views expressed have highlighted the need to promote actions to reshape, reform and upgrade these facilities in order to improve the practice of the valencian ball. Besides, variables have been determined to be measured in a *trinquete*, in order to enforce standards in the future.

## ACKNOWLEDGEMENTS

*This study was made possible through the support of the Secretariat of Sports in Valencia Autonomous Community and the collaboration of the Institute of Biomechanics of Valencia (IBV) and players of valencian ball.*

*This survey comply the law of LOPD (1999).*

## REFERENCES

1. BERGQUIST K, ABEYSEKERA J. Quality Function Deployment (QFD). A means for developing usable products. *Int J Ind Ergonom.* 1996; 18(4):269-275. doi:[10.1016/0169-8141\(95\)00051-8](https://doi.org/10.1016/0169-8141(95)00051-8) [[Back to text](#)]
2. CHAM R, REFERN MS. Changes in gait when anticipating slippery floors. *Gait Posture.* 2002; 15(2):159-71. doi:[10.1016/S0966-6362\(01\)00150-3](https://doi.org/10.1016/S0966-6362(01)00150-3) [[Back to text](#)]
3. CONCA M, GARCÍA G, GIMENO T, LLOPIS F, NAYA J, PÉREZ V. *La Pilota Valenciana, Unitat didáctica*. Valencia: Generalitat Valenciana; 2003. [[Full Text](#)] [[Back to text](#)]
4. CONCA M, PEREZ V. Joc popular i tradicional valencià: la Pilota Valenciana. En: M Villamón (Ed.). *Formación de los maestros especialistas en E. Física*. Valencia: Generalitat Valenciana; 1999. [[Back to text](#)]
5. EKSTRAND J, NIGG BM. Surface-related injuries in soccer. *Sports Med.* 1989; 8(1):56-62. doi:[10.2165/00007256-198908010-00006](https://doi.org/10.2165/00007256-198908010-00006) [[Back to text](#)]
6. EN 12193:1999. Iluminación. Iluminación de instalaciones deportivas. [[Back to text](#)]
7. FREDERICK EC, HIMMESLBACH JA. Biomechanics of courts sports. En: C Hogfors (Ed.). *Proceedings of the Ninth Biomechanics Seminar*. Göteborg; 1995. [[Back to text](#)]
8. LI KW, YU RF, HAN XL. Physiological and psychophysical responses in handling maximum acceptable weights under different footwear-floor friction conditions. *Appl Ergon.* 2007; 38(3):259-65. doi:[10.1016/j.apergo.2006.06.006](https://doi.org/10.1016/j.apergo.2006.06.006) [[Back to text](#)]
9. LLOPIS F. *El joc de Pilota Valenciana*. Valencia: Carena; 1999. [[Abstract](#)] [[Back to text](#)]
10. LOPD. Ley Orgánica 15/1999, de 13 de diciembre, de Protección de Datos de Carácter Personal; 1999. [[Back to text](#)]
11. MILLO LL. *El trinquet*. Valencia: Prometeo; 1976. [[Back to text](#)]
12. MORENO C. *Juegos y deportes tradicionales en España*. Madrid: Alianza y CSD; 1992. [[Back to text](#)]
13. NIETO M, DURÁ J, GARCÍA A, MARTÍNEZ A. Prevención de lesiones en atletismo en base al estudio de la relación entre la opinión de los atletas y los ensayos de la normativa IAAF. *Selección.* 2001; 9(1):13-22. [[Back to text](#)]
14. NIGG BM. The validity and relevance of tests used for the assessment of sports surfaces. *Med Sci Sports Exerc.* 1990; 22(1):131-9. [[Abstract](#)] [[Back to text](#)]
15. OLASO S. *El joc de la pilota en la Comunitat Valenciana* [tesis doctoral]. Barcelona: Universitat de Barcelona; 1994. [[Abstract](#)] [[Back to text](#)]

16. OLSEN OE, MYKLEBUST G, ENGBRETSSEN L, HOLME I, BAHR R. Relationship between floor type and risk of ACL injury in team handball. *Scand J Med Sci Sports*. 2003; 13(5):299-304. doi:[10.1034/j.1600-0838.2003.00329.x](https://doi.org/10.1034/j.1600-0838.2003.00329.x) [[Back to text](#)]
17. PAGE A, PORCAR R, SUCH MJ, SOLAZ J, BLASCO V. *Nuevas técnicas para el desarrollo de productos innovadores orientados al usuario*. Valencia: Martín Impresores; 2001. [[Abstract](#)] [[Back to text](#)]
18. PASANEN K, PARKKARI J, ROSSI L, KANNUS P. Artificial playing surface increases the injury risk in pivoting indoor sports: a prospective one-season follow-up study in Finnish female floorball. *Br J Sports Med*. 2008; 42(3):194-7. doi:[10.1136/bjsm.2007.038596](https://doi.org/10.1136/bjsm.2007.038596) [[Back to text](#)]
19. PÉREZ P, LLANA S, ALCÁNTARA E. Aplicación parcial de la metodología QFD en el diseño de colchonetas para la gimnasia. *Selección*. 2006; 15(1):3-10. [[Abstract](#)] [[Back to text](#)]
20. PÉREZ P. *Análisis de los parámetros biomecánicos durante la recepción en colchonetas y su influencia en los mecanismos de lesión en gimnasia deportiva* [tesis doctoral]. Valencia: Universitat de València; 2004. [[Full Text](#)] [[Back to text](#)]
21. RENSTRÖM AF. Knee pain in tennis players. *Clin Sports Med*. 1995; 14(1):163-75. [[Abstract](#)] [[Back to text](#)]
22. SOLDADO A. *Joc de pelota. Historia de un deporte valenciano*. Valencia: Diputació de València; 1999. [[Back to text](#)]
23. STILES VH, DIXON SJ. The influence of different playing surfaces on the biomechanics of a tennis running forehand foot plant. *J Appl Biomech*. 2006; 22(1):14-24. [[Abstract](#)] [[Back to text](#)]
24. VILLALTA S. *Estudi tipològic i catàleg dels trinquets*. Valencia: Conselleria de Cultura, Educació i Ciència; 1986. [[Back to text](#)]