The Influence of the Design and Manufacture of Sports Equipment on Sports

Zhenyu Qiu*
School of Tianjin University Renai College, Tianjin, China

*527093568@qq.com

Abstract. Sports equipment is the general term of all kinds of equipment, apparatus and supplies used by people to participate in sports. It is an important carrier for people to participate in sports. Nowadays, the influence of sports is gradually expanding day by day. With the progress of science and technology, the important role of sports equipment has been highlighted in sports. The producers of sports equipment carry out innovation and creation, according to each link of sports, which not only promotes the development of sports, but also provides convenience for all levels of sports crowd. The design and manufacture of sports equipment is closely related to the function of sports events, and also closely related to the use of sports participants. From the user's point of view, this paper discusses the classification, design and improvement of sports equipment, and also discusses the application of sports equipment in sports competitions to avoid the occurrence of unfair factors, so as to maintain the fairness of sports competitions.

1. Introduction
With the development of society and the improvement of economic and cultural level, people pay more and more attention to sports. There are all kinds of sports, different sports programs use different sports equipment and apparatus. People must use sports equipment when they participate in sports, so sports equipment has become an important part of sports.

2. Classification of sports equipment
Sports equipment is the general name of all kinds of equipment and supplies that people participate in sports. Generally, sports equipment is classified as follows: (1) Equipment is classified according to sports items, such as track and field equipment, cycling equipment, skiing equipment, etc. (2) According to the nature classification of sports equipment, it can be generally divided into four categories: designated equipment, self-provided equipment, field equipment and other equipment. (3) According to the use classification of sports equipment, it can be divided into competitive sports equipment and auxiliary equipment [1]. In sports competition, the difference of equipment used by athletes is mainly competitive self-contained equipment, and this kind of equipment mainly includes the following categories: sports shoes, sportswear and other allowed self-contained sports equipment.
3. Design and manufacture of sports equipment

3.1. Design concept of sports equipment
Under the guidance of the spirit of “faster, higher and stronger”, athletes can surpass themselves and climb the peak bravely through arduous training. At the same time, sports equipment researchers are also pursuing and competing in the field of technology, improving the performance of sports equipment by improving the design of sports equipment, using high-tech materials, and innovating technical means. Through investigation and induction, it is found that the following factors are usually considered in the design of sports equipment:

3.1.1. Safety based on lifting movement process. Under the guidance of the Olympic spirit of “faster, higher and stronger”, athletes always challenge themselves and fight bravely. In this process, there will be some risk factors, sports equipment designers must take this situation into account to avoid sports injury accidents. For example, in bicycle sports, the protection function of “helmet” for athletes and the development of some sports protective equipment in ice and snow sports are all to improve the safety of sports, achieve the purpose of protecting athletes, and save the lives of athletes at the critical moment.

3.1.2. Based on avoiding or slowing down sports injuries. Sports is an important factor to improve the quality of human life. Many countries regard the participation of citizens in sports as an important means to enhance national strength. With more and more ordinary people joining the ranks of sports, improper sports methods are likely to bring some sports injuries. Therefore, sports equipment designers should consider how to improve sports equipment to avoid or slow down sports injuries. For example, in the design of many sports shoes, the elastic design of the enhanced soles is generally considered, so that the foot can play a protective role when landing.

3.1.3. Based on improving the appreciation of sports competitions. With the increasing social function of sports, the economic value of sports has been greatly explored. The appreciation of sports is an important indicator of its economic value development. Therefore, in order to enhance the appreciation of sports, both professional sports associations and sports equipment designers are racking their brains to dig. For example, in table tennis, by making the diameter of table tennis bigger, we can slow down the speed of the ball and increase the round of the game, which enhances the appreciation of this item; in addition, we can use the improved production technology to produce “seamless ball” to weaken the rotation of table tennis and increase the competition round of mobilization, so as to improve the appreciation of the game.

3.1.4. Based on the concept of “environmental protection”. Protecting the environment is an important theme in modern society. Sports equipment may bring environmental pollution in the process of manufacturing and using. Many sports equipment production process will produce some toxic and harmful substances, such as: arsenic, lead, mercury, cadmium phthalate and polycyclic naphthene, how to reduce these toxic substances, which should become a key consideration of sports equipment manufacturing enterprises. Environmental protection should also be taken into account by individual sports associations and competition organizers.

3.1.5. Based on improving “sports performance”. It is the long cherished wish of every competitive athlete to get excellent sports results, which also contains great commercial value. The owner of these excellent sports results is “sports star”. Sporting goods companies can get more business benefits by cooperating with sports “stars”. Sporting goods companies and “stars” athletes have their own needs. This design concept with the primary purpose of improving sports performance will come into being.
3.1.6. Based on improving the experience. It is also the design concept of many sports equipment designers to improve the “user experience”. A good sense of use can directly stimulate consumers’ desire to buy, thus bringing direct economic benefits.

In the design process of sports equipment, the above factors are not single. Many sporting goods design will take these factors into account. In a word, the sports equipment designer should keep the advanced design concept, consider the user and sports itself in the design, and take into account the economic and social benefits.

3.2. Improvement of sports equipment

With the progress of science and technology and the development of sports events, the design, production and use of sports equipment are also in constant change. It is imperative to eliminate unreasonable sports equipment and design and produce sports equipment, which is in line with the characteristics of modern sports events and the level of modern science and technology. The improvement measures of sports equipment can be started from the following aspects:

3.2.1. Scientific design and innovation. Design is the premise of manufacturing, and scientific design is the necessary condition to effectively improve the function of sports equipment. The design of sports equipment is the process of conveying the use of sports equipment through reasonable planning, careful planning and various feeling forms. In the process of design, even the introduction of a concept and the innovation of a function may have an important impact on sports equipment.

3.2.2. Improve manufacturing process. The progress of science and technology will inevitably lead to the progress of production technology. Production process refers to the work, method and technology that production workers use production tools and equipment to process or process various raw materials, materials and semi-finished products, and finally make them become finished products. With the progress of science and technology and the renewal of production equipment, the production technology of sports equipment is constantly improved. Improving the production technology of sports equipment is an important guarantee to improve the quality of sports equipment.

3.2.3. Use of high-tech materials. With the progress of science and technology, more and more high-tech materials are used in the field of sports equipment manufacturing, which makes the performance of sports equipment get unprecedented improvement. Nowadays, in the field of sports equipment manufacturing, the common use of carbon fiber materials is the representative. Carbon fiber materials have the characteristics of light weight, high strength, corrosion resistance and easy processing. In the field of high-end equipment, carbon fiber is almost a necessary material for classy sports equipment [2].

3.2.4. Specialized and detailed classification of sports equipment. With the development of sports events, sports equipment classification is more specialized and meticulous, less and less accessories. Sports equipment designers should also firmly grasp this trend to improve and innovate sports equipment. For example, in badminton, in addition to the professional racket, racket line, hand glue (PU material and towel glue), antiskid powder and other equipment are all available.

In addition, there are a lot of improvement measures for sports equipment. Each improvement of sports equipment is made on the basis of scientific design and precision processing. Through the use of sports participants, it promotes the refined innovation of sports equipment.

4. The role of sports equipment development

With the diversification of sports events, the types and specifications of sports equipment have been developed. The sports equipment with good quality, stable performance, safety and reliability can not only ensure the fair, open and fair competition, but also create the necessary material conditions for promoting the improvement of sports level.
Sports equipment and sports depend on each other and promote each other. The development of sports equipment can not only improve the performance of athletes, and even lead to the emergence of new sports techniques and tactics, but also improve the difficulty of sports events and change the rules of sports, so as to promote the development of the sport. Of course, the emergence of these situations is not achieved overnight, but in the long run, the trend has become more and more obvious.

4.1. Directly affect sports performance
Sports technology is an important factor affecting competitive sports, which has been improving with the improvement of field equipment and clothing, promoting the development of competitive sports [3]. There are many examples to improve the performance of athletes by improving the design of sports equipment. For example, in the event that the speed determines the outcome, the design of lightweight sports equipment to improve sports performance is a good example.

4.2. Change the rules of sports competition
The change of sports rules is closely related to the improvement of sports equipment. Usually, there are special clauses for sports equipment in the rules of competition. These Provisions have normative limits on sports equipment. However, with the development of science and technology, the research and development of many sports equipment is advanced. For example, the appearance of “sharkskin swimsuit”, once popular in the swimming world, was the finally aware of the problem and introduced laws and regulations to prohibit athletes from wearing such swimsuit to participate in the competition.

4.3. Promote the development of special sports technology
The development of sports equipment has an important influence on the evolution of special sports technology. Due to the improvement of sports equipment, there are a number of examples of special technical changes. For example, the continuous evolution of tennis racket, to a large extent, affects tennis. This kind of influence is from the technical level to exert influence on tennis. For example, some scholars have found that the evolution of tennis racket improves the accuracy, speed, strength and rotation of hitting, and promotes the development of tennis to the direction of “fast”, “accurate”, “hard” and “spinning”.

4.4. Promote the adaptability of athletes' physical quality
In many competitions, due to the improvement of equipment, athletes need faster response ability, faster movement, greater physical strength and other physical qualities to complete the whole competition process. This requires athletes to have a comprehensive physical quality to adapt to this change. At the same time, some events also require athletes to highlight a certain physical quality to adapt to the changes of sports caused by changes in equipment.

4.5. Enhance the ornamental value of sports competitions
It is greatly important to improve the appreciation of sports competition for promoting the development of sports. To a large extent, the improvement of the appreciation of sports competition is achieved by modifying the rules of competition and improving the sports equipment. For example, in order to enhance the appreciation of table tennis, the International Table Tennis Federation requires improvement of table tennis.

5. Rational thinking on the role of sports
The development of sports equipment can play a positive role in sports, but the improper use of sports equipment may also have some negative effects. How to treat these problems rationally, which should arouse our attention and take effective measures to avoid the negative effects caused by the improper use of sports equipment.
5.1. Challenge the dominant position of “people” in sports
In sports, people are in the main position. However, with the maximization of sports potential and the improvement of sports technology, people place the hope on the improvement of sports equipment, which leads to the challenge of people's main position in sports. This has formed a contradictory phenomenon: on the one hand, the improvement of objective factors such as sports equipment has greatly improved the performance of athletes; on the other hand, the elimination of the sense of existence of these technical means has made people ignore the occupation of the main position of people [4].

5.2. Challenges to fair play
As high-tech equipment is always more expensive in the early stage of its production, which leads to the fact that only a few athletes can use it in the early stage of the birth of high-tech equipment, which makes this part of athletes take the lead and easily win in the competition. Therefore, in a sense, this leads to the emergence of unfairness, which violates the Olympic spirit of “fair competition”. In order to make the research and development and use of sports equipment conducive to the spread of the Olympic spirit, it is necessary to avoid losing the fairness and dignity of sports due to excessive pursuit of sports achievements [5].

5.3. Increase the risk of sports injuries
First of all, for athletes, the change of sports equipment usually forces them to have strong physical quality to participate in the fierce competition. In order to adapt to this change, athletes will inevitably increase the amount and intensity of training, which will increase the risk of sports injuries. Secondly, another phenomenon needs to be vigilant: many non professional sports people blindly pursue “sports stars” or sports equipment used by professional athletes, which results in sports injuries in the process of sports due to the lack of necessary sports technology and physical quality. This also makes the good wishes of strengthening the body and increasing the quality of life through sports come to nothing.

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