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ACTUAL STATE OF TABLE TENNIS RESEARCH THROUGHOUT SPORT DISCUS DATABASE ANALYSIS

Abstract

Introduction. Research activity of a group, institution or country can be defined by scientific production indicators. These indicators, a key piece in bibliometric studies are closely related to the most important scientific databases in the world. The aim of this study is to know the actual state of investigation on table tennis from specific database analysis. **Method.** We've quantified all of scientific publications on tennis table registered by Sport Discus database (last actualization: December 15th, 2006). From Sport Discus' Thesaurus we selected several key words related to table tennis for to combine them in different search fields and to determine: a) matters with the most scientific interest; b) countries with a greater level of scientific production; c) types of publication sources; d) level of understanding; e) publications' language, and f) evolution of number of publications throughout the last years. **Results.** Scientific publications on table tennis only show 0.4% from total of references that are registered in Sport Discus database. The matters most developed are those related with training while France is the country with the most important scientific activity on table tennis. Evidently, English is the predominant language in tennis table publications and it is necessary to remark an important rise in publications during 1981 to 1990 period. **Conclusions.** It's possible to determine the scientific production on table tennis from a bibliometric study based on specific database analysis. There is a lack of investigation on table tennis compared with other sports, especially racket sports.

Key words: *table tennis, database, bibliometrics, research*

Introduction.

Quantitative analysis of scientific production had its origin in the beginning of the last century. Since that moment technical evolution (computerized databases proliferation) have permitted a more quick and precise data treatment. In the last two decades bibliometry, defined like "application of mathematical and statistical methods to books and other mass media" (Pritchard, 1977), have supposed a common tool for the management of the scientific and research politics (European Commission, 1997). It is possible to evaluate research capacity of a group, institution or indeed of a country taking into account several scientific production indicators. These indicators, key pieces in bibliometric studies, are closely related with the most prestigious databases in the world of each one of matters which are sciences recognized. In this sense, there is a great number of investigations in different disciplines: education (Fernández-Cano and Bueno, 1999); physics (De la Viesca and Pérez, 1977); chemistry (Perez et al., 1994); medicine (Myscko, 1990); biology (Ferreiro, 1981), social sciences (Villagrà and Román, 1981), psychology (Carpintero and Tortosa, 1996), and so on.

Although the study of the sport sciences is in full development, is interesting to determine the research lines that are predominant or to know what countries are able to maintain a higher scientific activity into this knowledge area. Several investigations have been carried out over specialized journals and doctoral thesis providing some information about sport research capacity (Calatayud, 1997; Delgado and Medina, 1997). However,

and for to define the actual state of investigation in any sport discipline it is necessary a detailed analysis of the most specialized database: Sport Discus (Schwarz, 1989).

SPORTDiscus database was created in 1986, thanks to a UNESCO's proposal, and with the intervention of the International Council for the Sport Sciences and Physical Education (ICSSPE) and the International Association of Sport Information (IASI) which designed to the Canadian Sport Information Resource Center (SIRC) to be the neuralgic center where this database is elaborated. *SPORTDiscus* is actualized periodically since 1975, although references of publications edited before can be consulted too. *SPORTDiscus* is presented in CD format and can be consulted on line.

SPORTDiscus is the most comprehensive, bibliographic database covering sport, physical fitness, exercise, sports medicine, sports science, physical education, kinesiology, coaching, training, sport administration, officiating, sport law & legislation, college & university sport, disabled persons, facility design & management, intramural & school sport, doping, drugs, health, health education, biomechanics, movement science, injury prevention rehabilitation, physical therapy, rehabilitation, nutrition, exercise physiology, sport & exercise psychology, recreation, leisure studies, tourism, allied health, occupational health & therapy, public health and more. With full bibliographic coverage, this database includes over 750,000 records with journal and monograph coverage going back to 1800; over 20,000 dissertations and theses and reference to articles in 60 different languages. The content also consists of international references from journal and magazine articles, books, book chapters, conference proceedings and more. The search process in *SPORTDiscus* can be structured by different searchable fields, such as any database (Table 1).

Table 1. *SPORTDiscus'* searchable fields list.

Tag	Description	Tag	Description	Tag	Description
TX	All text	CA	Corporate author	PB	Publisher
AU	Author	CY	Country of publication	RE	Report number
TI	Title	GE	Geographic subject	SO	Source
SU	Subjects (descriptors)	IS	ISSN	PG	Total pages
AB	Abstract	IB	ISBN	PT	Publication type
KW	Key words	LA	Language	PY	Publication year
RW	Book reviews	OL	Language of Origin	SB	Database subset
CO	Company	PE	Person/Team	AB	Abstract
CN	Conference	PS	Products	AN	Accession number

One of the limitations of *SPORTDiscus* database and of this study too is the coexistence of several similar terms referred to a specific concept in Thesaurus. For this reason it is necessary to review carefully the terms contained in *SPORTDiscus'* Thesaururs for to carry out an accurate search. Moreover, in some cases authors don't define appropriate key words in their manuscripts, an aspect that can generate difficulties and put limits to the search possibilities (Lepkowski, 1991). By other side, it is possible that some references are incompletely catalogued or it can exits lack of information in their search fields.

The aim of this study was to define the actual state of table tennis research by quantification of publications indexed in *SPORTDiscus* database, determining the main research lines in this matter.

Methods.

Instrument.

The two basic elements for data collection were *SPORTDiscus* database and its Thesaurus. The online search was developed in February 2007, under license of University of Sevilla.

Procedure.

For to obtain an actualized and complete analysis of table tennis investigation the following information was collected: a) total volume of table tennis references (total volume of other racket sports was determined for comparison); b) number of publications per countries; c) specific areas of investigation; d) document types and e) evolution (number of publications in different time periods).

Keywords related to table tennis were selected from *SPORTDiscus*' Thesaurus and introduced in *subjects* field (SU). As result we obtained the total volume of table tennis references in *SPORTDiscus* database, a starting point to develop the remaining searches. All terms used here were combined by boolean search operators (and, or, not) for the search in each one of the fields.

Results.

a) Total volume of table tennis references.

A total of 1436 references were registered in *SPORTDiscus* until February 2007. Taking into account that *SPORTDiscus* database contains over 750000 references, table tennis publications only represents a 0.2 per cent respect to the total. Comparing with results obtained in other racket sports, table tennis is ranked in fourth place, beyond tennis (20029 references), squash (1738 references), and badminton (1695 references). Paddle tennis (platform tennis) occupies the last position in this ranking with a total of 47 references (Figure 1).

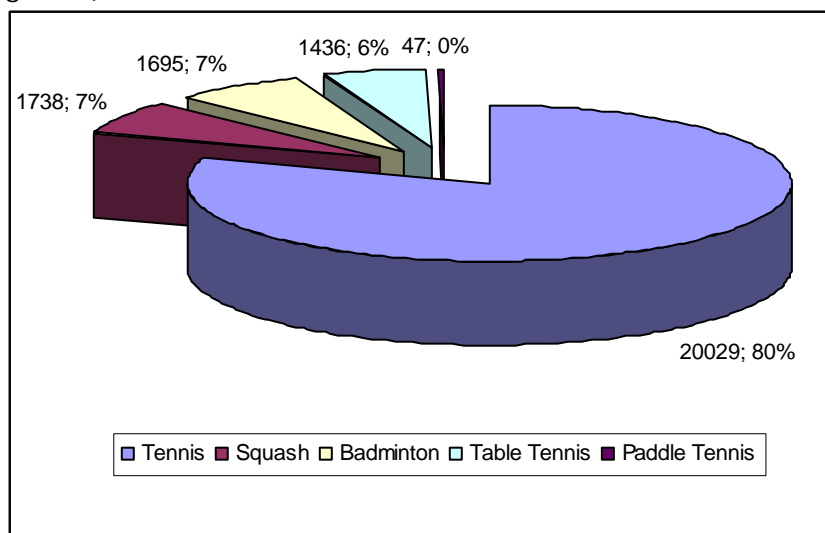


Figure 1. *Distribution of publications on racket sports.*

b) Number of publications per countries.

France is the country with the largest number of publications on table tennis (399 references). Other countries with an important scientific production in this matter are United States, United Kingdom, China and Canada, with all of them above 100

references. By the other side, countries with a poorest production are, between others, Brazil, Bulgaria, Finland, Korea, Norway and Romania (see details in Table 2).

Table 2. *Scientific production (number of publications on table tennis) per country.*

Country	Number of publications	Country	Number of publications
France	399	Israel	4
United States	161	Japan	3
United Kingdom	135	Spain	3
China	111	Croatia	2
Canada	93	Greece	2
Germany	61	Hungary	2
Australia	58	Netherlands	2
Switzerland	20	Sweden	2
Belgium	17	Brazil	1
Italy	17	Bulgaria	1
Argentina	11	Finland	1
Hong Kong	7	India	1
New Zealand	6	Korea	1
Portugal	4	Norway	1
Turkey	4	Romania	1

c) Specific areas of investigation.

From all areas analyzed, only two showed more than one-hundred references: training (218 references) and coaching (115 references). Other remarkable areas of investigation are teaching (84 references) and women (56 references). Surprisingly, areas such as biomechanics, medicine and technique seem to be less developed (30, 16 and 7 references, respectively). For details, see Table 3.

Table 3. *Main areas of investigation in table tennis.*

Specific areas	Number of publications	Specific areas	Number of publications
Training	218	Technique	7
Coaching	115	Health	5
Teaching	84	Sociology	5
Women	56	Recreation	5
Education	47	Children	4
History	37	Culture	4
Physiology	32	Philosophy	4
Biomechanics	30	Aging	3
Statistics	23	Association	3
Medicine	16	Doping	2
Facilities	11	Mass media	2

d) Document types.

Journal articles are the type of publication preferred for to spread the results of investigation in table tennis. *SPORTDiscus* contains a total of 1093 articles on table tennis, a 76.1% of table tennis references in this database. The second place is occupied

by monographs, with 171 references (11.9% of table tennis references in this database), followed by universal resource locators (URL) or internet sites (97 references; 6.7%), book analytic (81 references; 5.6%), serial publications (31 references; 2.1%), videocassettes (8 references), doctoral thesis (7 references), and microforms (4 references).

e) Publications' language.

There is no doubt that the main scientific language is English. Indeed, table tennis publications written in English are the most numerous in *SPORTDiscus* (631 references; 43.9% of table tennis references in this database). However, and according to the number of publications edited in France and Canada, there is an important amount of table tennis publications written in French (525 references; 36.5%). Other languages are German, Spanish, Russian and Italian (Figure 2).

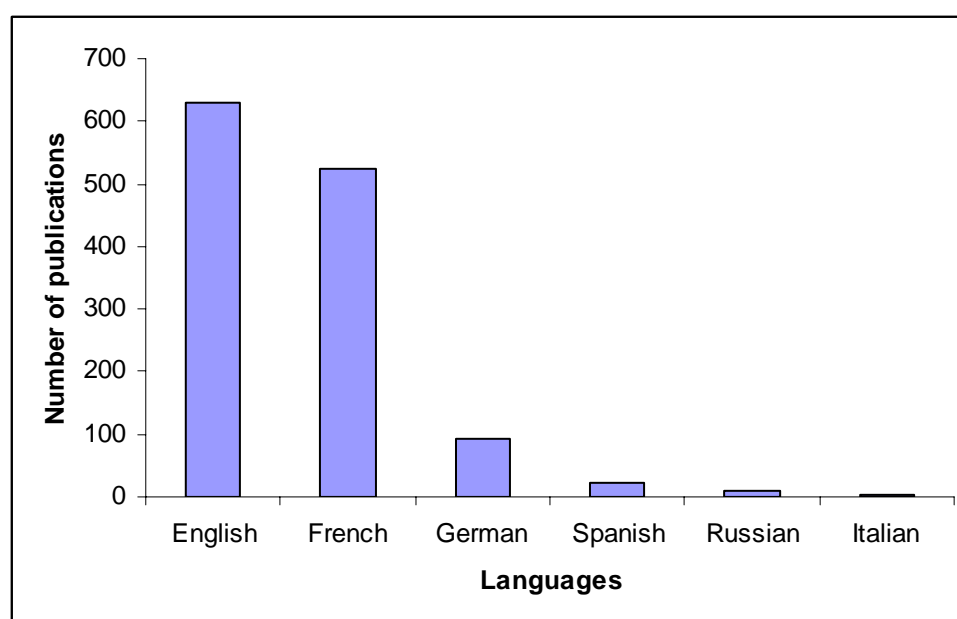


Figure 2. Languages of table tennis publications.

f) Evolution.

Until 1980 there are 291 references on table tennis registered in *SPORTDiscus* database. The 80's decade was the most productive reaching 505 references. From 1991 to 2000, the number of references falls to 411 references, a drop that is being more evident in the last seven years, a period in which the number of references on table tennis only reach 198 (Figure 3).

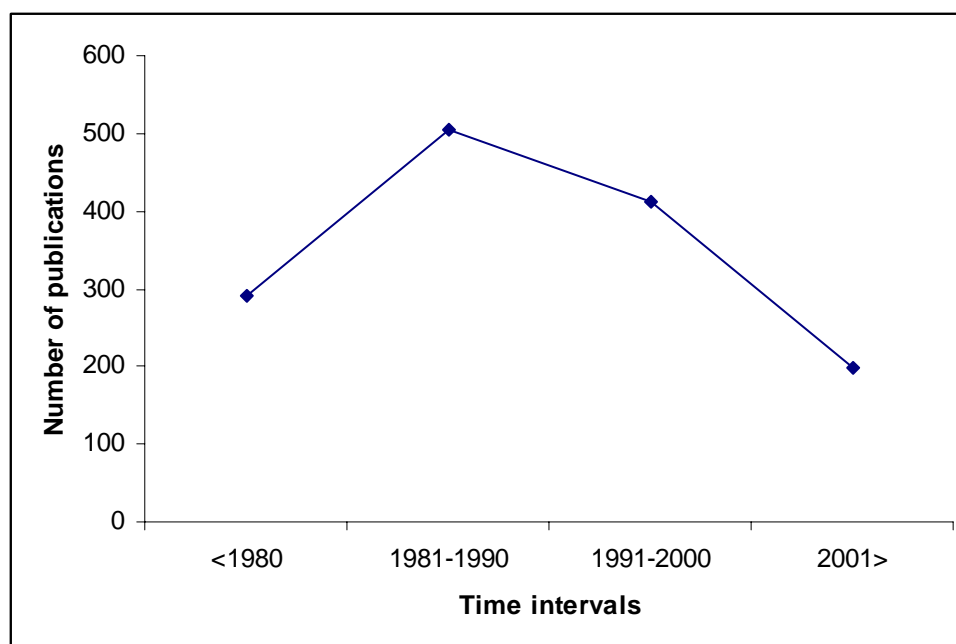


Figure 3. Evolution of table tennis publications.

Discussion.

The aim of this study is to offer a global and actual vision of table tennis research. A simple bibliometric analysis permits to quantify the scientific production taken into account references registered in a specific database. In this case, we've used *SPORTDiscus*, the most important database on physical activity and sport sciences.

Research on table tennis is poorly developed. The number of references on table tennis only represents a 0.2 per cent of the total registered in *SPORTDiscus* database. However, this lack of investigation is more evident when it is compared to the number of publications related to tennis. Number of references on table tennis is very similar to publications on badminton and squash but in any case this scientific production is ten times minor than tennis one. Nature and characteristics of sport, level of practice, and economy associated to tennis can be the causes of a higher interest of sport scientists.

Attending to the origin of publications, that is to say, country of publication, it seems clear that there is no correspondence between sport performance and scientific production. While France is the country with a greater number of publications on table tennis (the sum of number of publications of United States, United Kingdom and China is slightly higher than the France's production), China is the main country that dominates the world ranking.

The results show a strong scientific interest in table tennis training. In this sense the highest number of publications is related to specific areas like training, coaching and teaching. However, physiology, biomechanics, medicine, and technique are important areas that present a lack of investigation. It is possible that a great number of publications under the search field "training" are related to the study of physiological/medical parameters or biomechanical analysis of table tennis technique. One of the limits of this type of investigations is the use of a single term in descriptors search field because in many occasions authors don't select the correct terms to describe their manuscripts. In any case, the influence of table tennis in social environment is poorly investigated since health, sociology, culture, and association areas have a little scientific production.

As was to be expected, journal articles are the type of publication that have higher number of references. *SPORTDiscus* collect the main journals of sport sciences, many of them indexed in the Journal Citation Report with impact factor. Experimental research under a rigorous review process is the principal content of these journals so it is

remarkable that more than a 75% of the table tennis references is corresponding to this publications. Monographs and URL or Internet sites, with more general information, sum a total of 268 references, a 23.6% of total volume. Doctoral thesis, an academic and scientific document, have only 7 references a poor quantity that indicates a lack of table tennis treatment at universities.

English is the main language in table tennis publications. International publications, especially journal articles, are written in English and for this reason we've registered a great number of publications in this language. However, and if it take into account that France and Canada present an important volume of publications, it is easy to understand the high percentage of publications written in French.

Lastly, and referred to publications' evolution, we've perceived an important rise in publications during 1981 to 1990 period following by an evident decrease of number of publications in the last 17 years, a negative trend that must be broken in the next years.

In conclusion, it is possible to determine the scientific production on table tennis from a bibliometric study based on specific database analysis. There is a lack of investigation on table tennis compared with other racket sports, especially tennis, being table tennis training the main interest of the sport scientists.

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