

Evolution of Biomechanics Research Groups in Brazil: from 2000 to 2013

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SUMMARY

This study verified the evolution and geographic distribution of Brazilian Biomechanics Research Groups (BBRG) from 2000 to 2013. A search was conducted in the Conselho Nacional de Pesquisa (CNPq) Research Groups Database using the Portuguese keyword “Biomecânica” (or Biomechanics in English). The active research groups found in the database between the years 2000 and 2013 were analyzed considering their geographic distribution in Brazil and the main thematic research areas were determined. Results showed a 520% increase in the number of BBRG in the last thirteen years. The most common thematic areas of study in the field of Biomechanics were physical education, physiotherapy and occupational therapy, odontology, biomedical engineering and mechanical engineering. Despite the largest investment (30% of the total country’s investment) in research in the poorest regions of Brazil (Northeast and North), the observed increase in BBRG occurred in the most economically developed regions (Southeast and South) of Brazil.

INTRODUCTION

In the last decades the number of research groups in the field of Biomechanics has significantly increased in Brazil, with higher participation of researchers from physical education, physiotherapy and engineering areas [1, 2].

The oldest Brazilian universities are located in the Southeast region of Brazil. Therefore, this region has a higher number of BBRG. Southeast and South regions of Brazil are also known as having higher economical investment for higher education [3,4].

Especially in the last ten years the Brazilian government has encouraged the creation of new Universities in order to expand higher education and scientific research in Brazil, with especial attention for those regions where higher education was unavailable.

However, it is unclear whether this expansion had a significant impact in the number of BBRG. In addition, CNPq is obliged by the Brazilian Government to invest 30% of the country’s research money in the North and Northeast regions of Brazil. Here we performed an analysis of the number of BBRG, their geographic distribution and the main areas of research in the field of biomechanics

conducted in the country in order to answer the above two questions.

METHODS

A search for BBRG was conducted using online tools available at the CNPq research groups’ database. The Portuguese term “Biomecânica” and applied filters were used for advanced search concerning the geographic location of the groups, as well as their main knowledge or research areas. All groups with a clear description of their research areas and that mentioned the word “biomechanics” as one of their areas of investigation were included in the analysis. Data collection was performed considering the time range between March 2010 and January 2013. The data were analyzed using Excel (Microsoft Office 2007). Results are presented considering descriptive statistics and the distribution according to the regions of Brazil and the main research areas.

RESULTS AND DISCUSSION

There was an increase of 520.45% (2000=44; 2013=229) (figure 1) in the number of BBRG working in the last thirteen years.

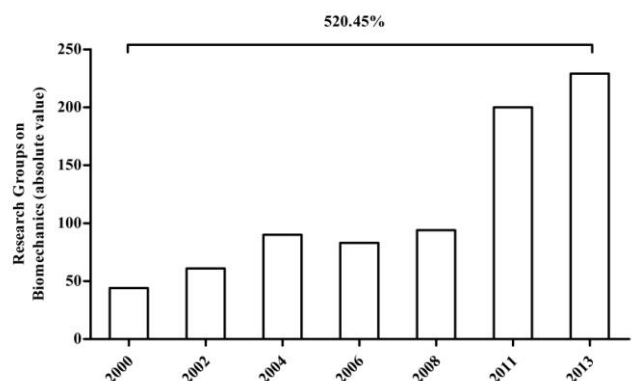


Figure 1. Number of Brazilian Biomechanics Research Groups registered in CNPq database from 2000 to 2013.

These results are evidence of a large growth of Biomechanics in Brazil. The number of regions where biomechanics research is conducted also increased, although this increase was not proportional to the government’s

investment in research funding. The largest number of BBRG is located in the Southeast (São Paulo, Rio de Janeiro, Espírito Santo and Minas Gerais States) and South (Rio Grande do Sul, Santa Catarina and Paraná States) regions of Brazil. This higher concentration of BBRG in these two Brazilian regions is probably a result of the country's investments in postgraduate courses in the 80's [5]. Areas such as physical education, physiotherapy, occupational therapy, odontology (or dentistry), biomedical engineering and mechanical engineering were the most cited in the active BBRG during the year 2000 (table 1). In the 90's, the Brazilian government made significant effort to fund research in Sports Sciences, and most of the Biomechanics laboratories were installed at the Universities of the Southeast and South regions of the country [6], which still have the highest number of researchers in the field. It seems that the Brazilian government, despite its efforts, experienced difficulties to disseminate Biomechanics researchers in regions such as the North and Northeast of Brazil, despite the existence of a law that determines that 30% of all CNPq funding should be invested in these two areas. This difficulty might be related to the fact that most of the industrial areas of Brazil are located in the Southeast and South of Brazil, and therefore there seems to exist more funding opportunities, more technical support and more infrastructure in the more developed areas, the reason why most researchers do not want to move to new remote areas and remain close to the universities where they graduated from.

CONCLUSIONS

BBRG presented a significant increase in the last ten years. However, most of the researchers are still distributed in the same region of the country as observed 20-30 years ago. Further analysis should verify if the areas where most of the BBRG are located are also the more productive regions considering research and development.

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Table 1. Distribution of Biomechanics research groups considering the different areas of knowledge in Brazil.

	2000	2002	2004	2006	2008	2011	2013
	Absolute Values						
Main research areas							
Health Science	27	39	61	52	64	123	134
Engineering	14	17	24	24	24	51	60
Research subareas							
Physical Education	13	19	32	29	34	62	63
Physiotherapy and Occupational Therapy	5	6	5	7	13	26	33
Odontology	4	11	16	12	11	24	25
Biomedical Engineering	3	4	10	11	9	14	24
Mechanical Engineering	8	7	9	9	12	20	19