

APPLICATION OF BIOMECHANICAL CONCEPTS IN PROFESSIONAL LIFE OF PHYSICAL EDUCATION TEACHER

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The aim of this study was to determine which biomechanical concepts the physical education teachers apply in their professional life and whether there are differences between those who work in training field or at school. For this purpose a questionnaire was answered by 32 teachers. It was found that in the two areas more than half of the subjects said that apply the concepts, respectively 81% and 69%. The used concepts in training was levers (n=9) and motion analysis (n=8) and at school analysis of movement (n=8). The Physical Education professionals do not recognize the substance content of biomechanics, because movement analysis is an elementary part of biomechanics-qualitatively and quantitatively. We conclude that Biomechanics' teachers in the University should readjust the content of the discipline to fit the needs of the professional.

KEY WORDS: Biomechanics; Applying Concepts; Professional Practice.

INTRODUCTION: Biomechanics has great importance in the study of human movement and is basic knowledge for the physical education teacher, however Duarte & Rezende (2008) argue that many Biomechanics teachers in the University know that students show little interest and a great resistance towards this course, which in some cases appears even before they begin the lessons, usually because they know that this is related to Physics. This also derives from high school difficulties, what decreases the possibility of envisioning the concepts application and leads them to believe that the discipline is only for research and high technical level, in other words, generating an early rejection because they think their knowledge would not be useful for them (Teixeira & Mota, 2007). These difficulties lead the students to evaluate the discipline as something very complex what was reinforced by some Biomechanics' teachers that showed an extremely theoretical approach, based in equations, where the practical application was basically made by the students (Corrêa, 2007). This brings us to the fact that, since Biomechanics became part of physical education, its purposes were erroneously linked to elite sports, with no relevance to schools, justifying minor scientific contribution in this area, approximately 0.98% of the scientific papers published between 1893 and 1980 (Batista, 2001). Re-establishing of the balance would be the suggestion of the author, that can be conducted only by knowing the problems of the teaching process that could be solved by biomechanical studies.

Candotti & Loss (2006) described the themes that prevail in the national publications of Biomechanics: gait appears in the first level of importance followed by neuromuscular biomechanics, development of instruments, analysis of the trunk, among others. This study shows once again that the papers related to biomechanics are neither intended to enhance the methodologies of teaching at undergraduate level, nor concerned about its application in the daily practice of a physical education teacher.

The aim of this study was to determine the content of Biomechanics/Kinesiology that the physical education teachers apply in their daily professional activities - at school and in training.

METHODS: In this descriptive study, it was conducted a semi-structured interview based on Darido (2003) with 32 Physical Education Teachers and thereafter a content analysis was performed (Bardin, 2004). The subjects belonged to two groups (mean age 32 ± 8 years), 16 worked at schools (SG) and 16 with sport training (TG). 38% had a specialization, 3% Masters degree and 6% specialization and Masters degree.

Figure 1 shows the subjects' distribution in relation to the year they completed the undergraduate course. We can observe that 69% of the sample completed the course between 2000 and 2010.

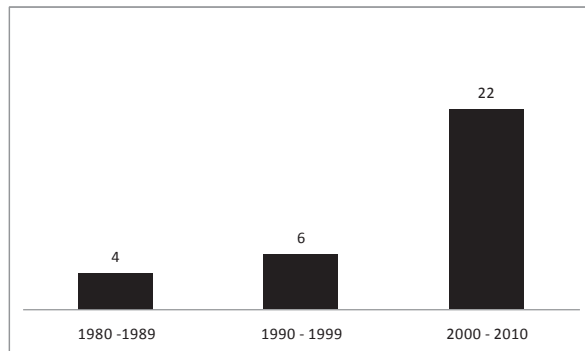


Figure 1: Group's distribution in relation to the year they completed the undergraduate course.

RESULTS: When they were asked about the discipline they had had in the undergraduate course- Biomechanics, Kinesiology or both – the results for the two groups can be seen in Figure 2. As most participants have recently finished the undergraduate course, most of them had already passed through the period in which the discipline Biomechanics was included in undergraduate courses.

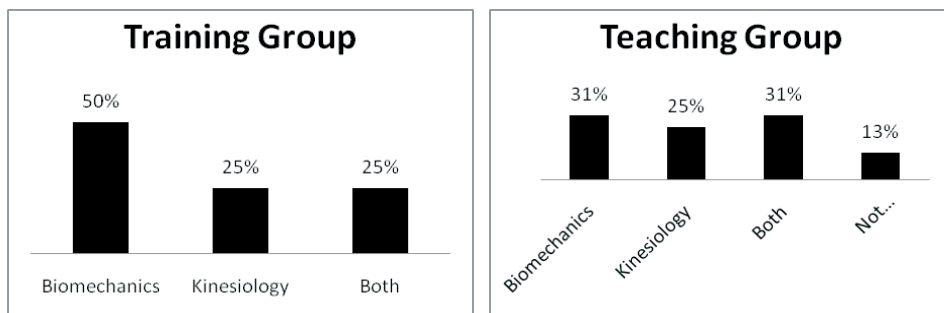


Figure 2: Disciplines in undergraduate courses for both groups.

Regarding the application of biomechanics knowledge in the professional life, 81% from the TG said they apply the knowledge while only 69% from the SG said the same.

In relation to the concepts they apply, TG listed mainly the terms levers and motion analysis, while the SG emphasized motion analysis. Only the TG mentioned muscles and their insertions. (Figure 3).

Another question was related to the subjects standpoint about the importance of maintaining or not the disciplines of Biomechanics and Kinesiology in the curriculum of the Physical Education course. 100% of the TG said that the disciplines should be kept in the curriculum, and 94% of the SG said the same.

DISCUSSION: Amadio & Serrão (2004) described that at that time the major reason for the lack of practical use of Biomechanics in Brazil was that the Physical Education Professionals didn't have Biomechanics in their curriculum. This was not the case with the sample we analyzed, more than 60% of both groups did have Biomechanics in their undergraduate courses. It is important to observe that 13% from the SG didn't answer the question about the discipline they attended in undergraduate course.

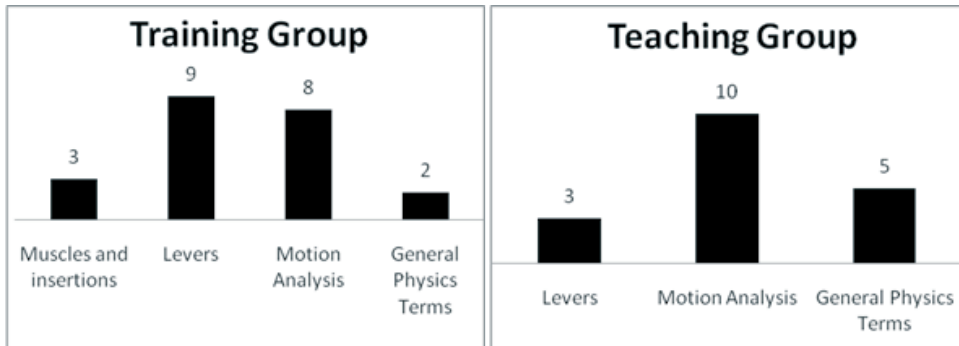


Figure 3: Concepts applied in professional life for both groups.

When we observe the data presented by our subjects in relation to applying the substance of Biomechanics in their professional practice, although having a large percentage, for both groups, once more the SG group showed a larger percentage of non-apppliers. Sanders & Sanders (2001) address the fact that the knowledge derived from research is not accessible to professionals of physical activity and sport and authors like Batista (2001) described that the interaction between pedagogical – biomechanical disciplines in Physical Education is a research area in development. Duarte & Rezende (2008) proposed a hypermedia learning system, in which information is presented in the form of sound, image, animation, text and simulations that allow the student to obtain information by different means and to link them together in order to build their own knowledge. Lobo da Costa & Santiago (2007) also believe that the materials are fundamental to attract students, especially those who came from high school frustrated with the sciences. Also to allow a better understanding of concepts, with the laboratory being a place of experiments to facilitate the learning process. A qualitative approach would be a way to broaden students' skills of undergraduate courses level to analyze the movements and see their quality, their errors and possible causes, and be able to propose changes and adjustments in order to improve them. Authors like Corrêa & Freire (2004) advocated the use of Biomechanics in education, proposing situations in which the teacher can use the concepts of Newton's three laws to aid in the correction of movements during the teaching process, turning the biomechanics into a great ally in the analysis of movements, one of the most cited concepts among the subjects.

When we analyze the concepts that both groups apply it is interesting to notice that TG gives a special importance to lever's concept while for the SG it is not very important. If we think that lever is linked directly to the torque concept and this is the bases for any rotation, how is it possible to analyze a movement without using this concept? The TG seems to be more involved in trying to understand and analyze the movement than SG. But if we think that every child must take part in Physical Education classes, where they learn how to move correctly. Consequently, where do we need more a professional with biomechanical skills? Many times when the children begin to train a specific sport, they already have several mechanical problems due to customary movements not corrected by the physical education teacher. Even though, some will be great athletes, and others will practice daily for a better health, they will be exposed to injuries due to a lack of knowledge. Biomechanics can give a great contribution to the educational process, making both teachers (Teixeira & Mota, 2007) and students more conscious about its advantages)

The results also showed that the great majority of the subjects supports the maintenance of Biomechanics' discipline in the curriculum, even if part of the subjects do not apply its concepts in their daily practice. That is curious and show that the professionals still believe that although they were not able to withhold the concepts for themselves, these concepts should be taught to the future professionals. Villas-Boas (2001) recognized that to answer the demands of future physical education teachers, the discipline requires a re-adjustment,

but that should be not radical, since the author believes that the knowledge should be taught with more details in post-graduation courses.

CONCLUSION: We conclude that the Physical Education professionals do not recognize the substance content of biomechanics, because movement analysis is an elementary part of biomechanics - qualitatively and quantitatively. The professionals associated with a high performance level are still the ones who apply more the biomechanical concepts, especially those related to analysis of motion and levers. Nevertheless the Biomechanics' teachers in the University should readjust the content of the discipline to the specific area of School Physical Education but also for the training group. Giving support for the concepts involved in the learning process developed by the children and also for the technical improvement of the athletes in general.

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