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BRIEF NOTE

Prevalence of pain and associated factors in elite swimmers

Prévalence et facteurs associés à la douleur chez les nageurs d'élite

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Summary
Introduction. — The main focus of sport sciences has been related to athletic performance. In this context, there are relatively few studies that examined occurrence of pain in higher elite athletes.
Summary of facts. — Prevalence of pain and related factors in 42 swimmers who participated in world championships was investigated. Self-reported questionnaires were applied. Prevalence among men was 18% and 75% among women. Swimming styles showed association with the onset of pain ($p < 0.05$).
Conclusion. — Potential health care is needed and more attention must to be paid to the injury mechanisms in elite swimmers. Issues for future studies were pointed.

MOTS CLÉS
Nage ;
Athlètes ;
Douleur ;
Santé

Résumé
Introduction. — Jusqu'à présent le principal sujet de recherche des sciences du sport a été lié à la performance athlétique. Cependant, seulement quelques une de ces recherches ont examiné l'apparition de la douleur chez les nageurs d'élite.
Résumé des faits. — La prévalence et facteurs associés à la douleur ont été étudiés chez 42 nageurs qui ont participé à des championnats mondiaux. Les nageurs ont répondu à des questionnaires autodéclaratifs. La prévalence chez les hommes était de 18% et 75% chez les femmes. La différence de style de nage a montré une association avec l'apparition de la douleur ($p < 0,05$).

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Conclusion. — Des soins de santé sont potentiellement nécessaires ainsi qu'un suivi attentif des mécanismes de blessures chez les nageurs d'élite. Des questions ont été soulevées pour de futures recherches.

1. Introduction

Science has focused on studying the athletes' performance. However more recently, from a public health approach, there is growing concern with the athletes' health and well-being, which goes beyond performance-oriented technical, technological and biomechanical assessments. In that context, athletes, who take part in high-level sporting competitions, representing their countries at the international level, make up the group of people who spend most hours per week on their physical/sports training. For that reason, they are more liable to suffer some kind of sports-related injury. From the literature, it is common for swimming athletes to experience pain in certain parts of the body, most commonly the shoulder, followed by the knee [1]. Furthermore, factors involved in the injury process may be anatomical and or biomechanical. In that light, understanding the anatomical relationships among bones, muscles and tendons in the body segment or joint in question can help swimmers and trainers to identify the limits of the physical structure, and contribute to preventing injuries [1]. Accordingly, biomechanical studies of swimming techniques have been the subject of major interest among researchers, suggesting techniques and training strategies that promote injury prevention [2]. In fact, shoulder pain is so frequent in swimmers that it has been called ''swimmer's shoulder'' [2], although elite swimmers also experience pain in other body segments.

The importance of epidemiological research into the health of such athletes, underlines the relevance of this study, given the lack of scientific literature that has focused on factors affecting the health and well-being of swimming athletes at the international level.

The purpose of this study was to investigate the prevalence of pain and related factors in high-performance swimmers who took part in world championships.

2. Summary of facts

All swimming athletes participated at world championships in 2010 and/or in 2011, among them were achieved places between 3rd and 8th, which means that they participated in the finals. Questionnaires self-administered were used to assess occurrence of pain, physical training and preparation factors, and biological aspects. It was conduced following all the ethical guidelines of the Helsinki Declaration of 1975 revised in 1983.

Questionnaire used covers the following aspects: gender, age, weight, height, time for sports in years, hours and mileage (km) of training per week, types of competitive proves), anatomical region of the occurrence of pain with only four options closed (shoulder, hip, spine and knee) and one open (others), and the occasion that pain occurs (swimming or complementary activities) (Appendix 1).

Exploratory and descriptive analyses were performed. The associations were examined with the χ^2 test and simple and multiple logistic regression (via generalized linear models). The confidence level in all analyses was 95%. Missing data were withdrawn from the analyses.

The study population comprised 42 elite swimmers (52% men and 48% women) who participated at world championships. Mean age was 23 (±4) years, and the athletes swam a mean of 46 (±19) km per week and had been competitive swimmers for a mean of 14 (±7) years.

Prevalence of pain was 45%, among men being 18% and among women, 75%. Twenty-six percent of the athletes presented pain during both swimming and complementary activities. The distribution by anatomical region and by sex is described in Table 1, where it can be seen that shoulder pain affected women much more than men (0.035). Prevalence of pain by training activity (swimming and complementary training) was much higher in women (45%) when compared to men (14%) ($p < 0.05$). Swimming backstroke

Table 1 Association of pain according to anatomical region by sex.

Anatomical region	Shoulder		Knee		Hip		Back[a]		Other[b]	
	p									
	n (%)									
	0.035		0.512		0.427		0.093		0.962	
Men	1	(4.5)	2	(9.1)	0	(0.0)	0	(0.0)	1	(4.5)
Women	7	(35.0)	0	(0.0)	2	(10)	4	(20)	6	(30.0)
Total swimmers	8	(19.1)	2	(4.8)	2	(4.8)	4	(9.5)	7	(16.6)

Association of pain according to anatomical region by sex; χ^2.
[a] Lumbar Spine.
[b] Muscle pain in legs, rhomboid, ankle.