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Evaluation of Mechanisms and Types of Injuries in Jiu-Jitsu Athletes

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ABSTRACT

Barreto AP, da Silva WM, Santos NVS, de Matos DG, Lima DJL, Santos CRR, Costa EB, Silva LP, FL Vasconcelos, Aidar FJ. Evaluation of Mechanisms and Types of Injuries in Jiu-Jitsu Athletes. JEPonline 2017;20(2):10-16. The purpose of this study was to evaluate the mechanisms, conditions, and types of injuries that occur during jiu-jitsu practice. A total of 126 male jiu-jitstu fighters (mean age: 26.0 ± 7.93) were evaluated. The data were obtained through the identification and analysis of athletes subject to the Orthopedics and Physiotherapy Services of the University Hospital of the Federal University of Sergipe. The results indicate significant differences between the amateur and professional groups. The findings may contribute

to a better understanding of injuries and a better recovery in jiu-jitsu athletes.

Key Words: Jiu-Jitsu, Injuries, Athletes

INTRODUCTION

Jiu-Jitsu is a martial art that originated in Japan. Jiu-Jitsu is a new martial art based on timing, leverage, body movements that are natural as oppose to using speed, strength and speed. There are a large number of practitioners from around the world, but primarily they are in Brazil, Japan, and the United States. The intention of the jiu-jitsu athlete is to defeat the opponent through takedowns, joint locks, positional control, projections, bottlenecks, torsions, and immobilizations that result from tensional forces on joints (5,10,17).

The articular forcing techniques in jiu-jitsu tend to increase the incidence of knee and shoulder injuries (18,20), where injuries tend to occur as a result of direct or indirect trauma (8,19). The explanation for the high index of lesions in the upper limbs in jiu-jitsu appears to be due to the biomechanics involved in the movements of the fight (2,10). However, research related to jiu-jitsu injuries is still scarce (11,9).

The purpose of this study was to evaluate the mechanisms involved in situations and types of injuries due to jiu-jitsu practice. This is important since the practice of jiu-jitsu is growing with both an increase in practitioners and the prevalence of injuries.

METHODS

Subjects

A total of 126 male jiu-jitstu fighters (mean age \pm SD: 26.0 \pm 7.93) were evaluated. The evaluations were performed at the Orthopedics and Physiotherapy Services of the University Hospital of the Federal University of Sergipe - Sergipe - Brazil. They presented mean of 5.77 \pm 5.07 yrs of sports practice and 4.82 \pm 1.70 days of training·wk⁻¹ and training sessions of 2.4 \pm 1 hr training·session⁻¹.

Also, it is important to point out that the subjects were required to have minimum experience of 2 yrs of fighting. All subjects were evaluated by an orthopedic medical professional of which anamnesis was performed to verify the occurrence of orthopedic injuries, the moment the last lesion occurred, body segments already affected by the injuries, whether it was the subject's own or the opponent's blow, the severity of the injury at the last lesion, and the treatment performed for the lesion.

All procedures were consisted with the ethics in research with humans in accordance with the resolution n° 466, of 12/12/2012 of the National Council of Health, normative of research involving human beings, which is in agreement with the ethical principles contained in the Declaration of Helsinki (1964, reformulated in 1975, 1983, 1989, 1996, 2000 and 2008) of the World Medical Association. The athletes were informed of the specifics of the study and, subsequently, signed the term of free consent and willingness to participate.

Procedures

All data were obtained through a search for athletes by way of the Orthopedics and Physiotherapy Services of the University Hospital of the Federal University of Sergipe. The hospital is a majority entity in the public orthopedic care for athletes of diverse modalities in the State of Sergipe. Evaluations were made by the orthopedic medical staff. The anamnesis consisted of the following questions that addressed the subject's name, date of birth, weight, age of sports practice, practice time without interval, current range, dominant side, if competing, level of competition, frequency of training per week and hours per training, and injury sites during practice that involved the skull, neck, shoulder, arm, elbow, forearm, wrist, hand, fingers, hip, thigh, knee, leg, ankle, foot, mouth, teeth, nose, and ear.

Statistical Analyses

Statistical analysis was performed using the Statistical Package for Social Science (SPSS), version 22.0. The central tendency measures, mean \pm standard deviation (M \pm SD) were used. The data are represented by percentage, means and standard deviations in the form of graphs and tables. For the analysis of the data, descriptive statistic was used. The differences between groups were considered significant with an alpha level of P<0.05.

RESULTS

Table 1 shows the data of the subjects and the distribution by graduation (color of the track), as practiced by jiu-jitsu (professional or not), which is the dominant member, time of experience in the fight, other activity, frequency and weekly practice time.

Age	Mean ± SD (Range)	26.0 ± 7.93 (18-35)
	White	22.2 (28)
	Blue	33.3 (42)
Belt	Purple	20.6 (26)
	Brown	10.3 (13)
	Black	13.6 (17)
	No	76.60%
Professional Athlete	Yes	23.40%
	Left	8.80%
Dominant Member	Right	91 20%
		0112070
Experience Time (vrs)	Average	5.77
	No	78.80%
Other Mode Training	Yes	21 20%
	. 30	21.2070
Training Time per Week (hrs)	Average	11.91 ± 1.74

Table 1. Data Regarding Subje	ects in Relation to Gradu	ation, Professional or Non-
Professional Performance, Do	minant Members, Trainii	ng Frequency, and Experience.

It was verified that professional athletes trained more than the non-professionals with a training frequency of $15.78 \pm 1.58 \text{ d} \cdot \text{wk}^{-1}$ versus the non-professionals of $10.53 \pm 1.6 \text{ d} \cdot \text{wk}^{-1}$, respectively (P<0.031). Table 2 shows the distribution of the damage, the cause of the last lesion observed, and the blow struggles and event where the lesion occurred. Table 3 presents the description of the prevalence by types of lesions.

Table 2. Distribution as to I	Mechanisms and	Moment of Occu	rrence of Injuries.
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	Opponent's blow struggle	59	47.00%
Mechanism of Injury	Own blow struggle	35	28.00%
, ,	Other factor	32	25.00%
	lese hilization (and an lar		
Type of Blow Struggle Responsible	wrenches / bottlenecks	87	69.05%
for Injury	Projection / fall	37	29.36%
	Others	2	1.59%
	Tesisian	00	75.000/
Situation of Injury		88	75.20%
, ,	Competitions	29	24.80%

Table 3. Distribution of Injuries in Jiu-Jitsu.

Types of Injuries	Quantity	%
Sprain	77	61.11%
Contusion	17	13.49%
Dislocation	15	11.90%
Fracture	13	10.33%
Muscular Distension	4	3.17%

DISCUSSION

The findings in this study indicate that most athletes practiced jiu-jitsu in a recreational matter. The average practice experience of the athletes was 5 yrs. Most of the athletes did not engage in other physical activities, and the average time of weekly training was ~12 hrs. The primary reasons for the injuries was were blows from opponents, immobilizations, arm or leg wrenches, and bottlenecks, which would generally take place during training.

Oliveira and colleagues (14) reported that athletes with longer training periods and more advanced degrees were injured more frequently due to being more vulnerable to trauma and chronic injuries. Moreover, according to Corso and Gress (6), the majority of the injuries were due to dislocations during training. Without question, according to Buse (4) and Loosemore et al. (12), combat sports tend to present the highest incidence of injuries during training periods.

In relation to the mechanism of the injuries, most of the fighters were injured by an adversary blow, which is in agreement with the findings of McPherson and Pickett (13). They reported that 42.8% of the injuries resulted from the blows of the opponent.

Regarding the type of blow responsible for the injuries, Scoggin et al. (16) indicated that the application of the lever mechanism in the joint region in jiu-jitsu was responsible for the high incidence of lesions. Thus, grapping fights that use blow struggles and braces tend to be the primary mechanism of injury with resulting damage to the knee and shoulder joints aside from other body parts (1,7).

As to the type of injury in the present study, it was a higher incidence of sprain accompanied by bruises, dislocations, fractures, and muscular distensions. Corroborating these findings, McPherson and Pickett (13) evaluated 46 jiu-jitsu athletes and found that most showed sprain during sport practice. In the study by Oliveira and colleagues (14), it was reported that most of the athletes had dislocations while the number of fractures was smaller with an incidence of 5.26% among the black belts. In the grapping fights, Pappas (15) reported the incidence of injuries by sprains and dislocations was high with a prevalence of 42.3%.

Limitations of this Study

The findings of the present study should be considered in light of the fact that some athletes may have omitted or underestimated their injuries due to the fear of being excluded from competition or training. This behavior was verified in a previous study by Birrer and Birrer (3) that also evaluated the frequency of injuries.

CONCLUSIONS

We observed a statistical difference in the frequency of training with a higher prevalence in professional Brazilian jiu-jitsu athletes versus the non-professionals. In addition, there was a predominance of injuries in training situations when compared to championships. Regarding the mechanism of injury, the majority came from opponent's blow struggle by immobilizations and joint blocks. Ligament sprain was the most prevalent lesion found. It is really important to analyze the mechanisms, situations, and types of injuries to provide a better functional recovery of the jiu-jitsu athlete.

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