

## COMMON INJURIES OF RECREATIONAL JIU JITSU

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### ABSTRACT

*Jiu Jitsu is a unique martial art style which emphasizes takedowns, throws, joint locks and choke holds to immobilize, control or submit an attacker and the nature of this activity may predispose practitioners to acute and chronic injuries. Sports, especially combat sports, carry an inherent risk of injuries compared to purely exercise-based physical activities. Reports on combat sports injuries mainly focus on injuries obtained during competition and the incidence may not be as severe when done recreationally. The purpose of this research is to evaluate the common injuries in recreational, novice Jiu Jitsu practitioners. A retrospective, descriptive design using a self-inventory of injuries was utilized in this study. The subjects participated in 32 twice-per-week, one-hour No-gi Jiu Jitsu lessons spanning a total of 16 weeks. There was a 77% incidence of injuries among the participants with those injured having an average of 3.9 injuries each. The data revealed that of all reported injuries abrasions, wounds/cuts and strains occurred most frequently while the anatomical regions at risk the most were the feet and knees. Despite the seemingly high incidence rate, they were all considered to be minor, acute injuries with none requiring serious medical attention or causing the participants to discontinue. The recreational practice of Jiu Jitsu is generally safe with an inherent risk for minor injuries that may be further managed with good coaching and personal protective equipment.*

**Keywords:** *Injuries, recreational, Jiu Jitsu, combat sports.*

### 1. INTRODUCTION

Modern day Jiu Jitsu has greatly increased in popularity along with the rise of the sport of mixed martial arts (MMA). It is a unique martial art style which emphasizes takedowns, throws, joint locks and choke holds to immobilize, control or submit an attacker. Based on studies on the physiological responses to the demands of Jiu

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Jitsu, it is considered as a predominantly aerobic activity (Franchini, Bezerra, Oliveira, Souza, & Oliveira, 2005; Del Vecchio, Bianchi, Hirata, & Chacon-Mikahili, 2007; Andreato, Franzói de Moraes, Esteves, Pereira, Gomes, Andreato, & Franchini, 2012) with a high demand for isometric grip strength and muscular endurance.

Sports, especially combat sports, carry an inherent risk of injuries compared to purely exercise-based physical activities. Gould's (1987) research has shown that injury is a major factor in dropout from sports. Svoboda & Vanek (1982) believe that the repeated stress and strain of injury affects longevity in sport for recreational as well as professional athletes. Since the threat of injury is ever ever-present in sport, Heil (1993) warns that the ability to remain relatively injury-free and to recover rapidly when injured is important to any athlete's longevity and success. The risk of injury in combat sports is further increased during competition and continues to increase as the level of competition increases. In a comparative study of injuries in martial arts and combat sports (Kickboxing, Judo, Jiu Jitsu, Karate), Cynarski and Kudlacz (2008) observed an 88.9% occurrence of serious injuries in the competitors' careers not including minor injuries such as bruises and abrasions. These included a 21% occurrence of broken bones and 16% occurrence of damage to knee ligaments with most injuries occurring either during competition or while training in preparation for competition. A one-year retrospective cohort on martial arts injuries by Zetaruk, Violán, Zurakowski, and Micheli, (2005) on Karate, Aikido, Taekwondo and Tai Chi practitioners revealed that the rate of injuries that required time off from training varied according to style as different martial arts showed significantly different types and distribution of injuries. Moreover, martial arts appear to be safer for young athletes especially those at the beginner or intermediate level as those with at least three years' experience were found to be twice as likely to sustain injuries.

James and Pieter's (2003) research on British Judokas revealed a higher degree of injuries in men (48.54 for every 1000) than in women (34.25 for every 1000). As expected, the main cause of injury were throws done during a match. This was previously observed by Sterkowicz (1987) when he estimated that the accident risk in Judo practice is over four times higher than the average risk in other sporting activities. Macan Bundalo, and Romić (2001) found that among male Karate practitioners in Croatia, injuries occurred the least in the young group (17.7%) and got significantly higher in the older groups (juniors, 27% and seniors, 26.7%). Injuries in Kickboxing were found to be more serious (Cynarski & Kudlacz, 2008) wherein the most frequent injury was a broken nose (60%) and other broken bones (16%). Interestingly, they found that most injuries occurred during training for competition (79%) while only 14% happened during competition fights.

In Taekwondo, the foot receives about 18 percent of the injuries usually during sparring according to Burks and Satterfield (1998). The toes are easily jammed, resulting in contusion, dislocation or fracture. More serious foot injuries can occur in sparring, particularly fracture of the metatarsals (Birrner, 1996). Fractures also occur due to the stresses placed on the foot during kicks and jumps (Shamus & Shamus, 2001). Of the traumas of the extremities, however, most occur at the knee. Knee traumas are predominantly soft-tissue in nature (Burke, Barfoot, Bryant, Schneider, Kim, & Levin, 2003). The knee is prone to both accidental and intentional trauma in Taekwondo. Classic injuries caused by a kick to the lateral aspect of the knee are fractures of the proximal fibula, contusions on the shin, and sprains to the knee joint (Birrner, 1996).

Research by Bledsoe Hsu, Grabowski, Brill, and Li, in 2006 concerning professional MMA competitions documented that the majority of recorded injuries were on the face/head region. Hand injuries were the second most common injury followed by injuries to the nose and eyes. They also stated that the giving and receiving of high-velocity blows seems to show the best correlation of whether a sport will have an increased risk of injury. Styles that include striking - such as Boxing (Bledsoe, Li, & Levy, 2005), Kickboxing (Gartland, Malik & Lovell, 2001; Zazryn, Finch, & McCrory, 2003), and Taekwondo (Kazemi & Pieters, 2004) - have been shown to have a higher incidence of injury than styles that involve only grappling (Jarret, Orwin, & Dick, 1998) such as Wrestling, Judo and Jiu Jitsu. Strikes from elite athletes, especially professional boxers, can generate a significant amount of force (Walilko, Viano, & Bir, 2005) which seems to explain why many injuries in the striking arts are prevalent not only in the target areas of the face and torso, but also the extremities used for striking such as the hands for boxing and the upper and lower extremities in kickboxing and karate.

In Jiu Jitsu competitions, a 6-year injury review by Scoggin, Brusovanik, Izuka, van Rilland, Geling, and Tokumura (2014) observed an injury incidence of 9.3 per 1000 exposures. Orthopedic injuries were the most common accounting for 78% of all injuries followed by rib injuries and lacerations requiring medical care. The elbow was found to be the most commonly injured joint during Jiu Jitsu competition with the arm bar - a joint lock which involves forcefully hyperextending an opponent's elbow - being the most common cause. They further stated that compared to injury data from Judo, Taekwondo, Wrestling and MMA competition, Jiu Jitsu competitors were at a substantially lower risk of injury.

Reports on combat sports injuries mainly focus on injuries obtained during competition. As established earlier, most injuries are reported to occur either during competition or when training in preparation for competition. The less competitive nature of recreational practice of combat sports may lead to fewer as well as less severe injuries as compared to competitive practitioners. Since most people who

engage in sports are recreational practitioners rather than serious competitors, information from this research will cater to a larger proportion of sports enthusiasts especially those involved in Jiu Jitsu.

Thus, the purpose of this study is to evaluate the common injuries in recreational, novice Jiu Jitsu practitioners. Specifically, the study aimed to determine the incidence rate of injuries, injury types and anatomical regions affected through a self-reported injury inventory. The participation of uninjured, novice Jiu Jitsu practitioners aimed to limit the contributing factors to any injuries that may have occurred. Furthermore, this may help in the risk awareness and expectations of people who may want to start engaging in Jiu Jitsu but are hesitant due to the nature of the sport and physical dangers it may pose.

## **2. METHODS AND MATERIALS**

### **2.1 Participants**

35 Filipino males (Mage 18 + 1.7 years), previously-untrained (novice) in Jiu Jitsu, participated in the study. A survey of the subjects' injuries was done at their training area during the respective training sessions for their convenience.

### **2.2 Procedure**

The survey instrument used was the Sports Injury Report adopted from Duco (2005) and Reyes (2005). Data obtained included name, age and gender. The injury inventory was divided into 20 different anatomical regions namely head/face, neck, spine, upper back, lower back, shoulders, ribs, abdominals, arms, elbows, forearms, wrists, hands, groin, thighs, knees, shin and calves, ankles, feet and toes. From the 20 anatomical regions, twelve (12) different types of injuries were identified and defined in the questionnaire for the respondent's convenience. The defined types of injuries were abrasion, concussion (for the head), contusion, crushing, dislocation, fracture, inflammation, sprain, strain, stress fracture, tendinitis and wound/cut.

The subjects participated in 32 twice-per-week, one-hour No-gi Jiu Jitsu lessons spanning a total of 16 weeks. An additional two days were needed – the first day for orientation and introduction and a final “refresher” day to review all the techniques that were covered in the 16-week activity program. Letters asking for consent for participation were handed out prior to data collection. The researcher explained the purpose of the study and was available for questions or clarifications if the respondents had any as they read through the information and the instructions page. The subjects were clearly instructed to indicate all injuries

incurred from participating in the program. Their ability to accurately indicate all their injuries was thus limited to their ability to recall.

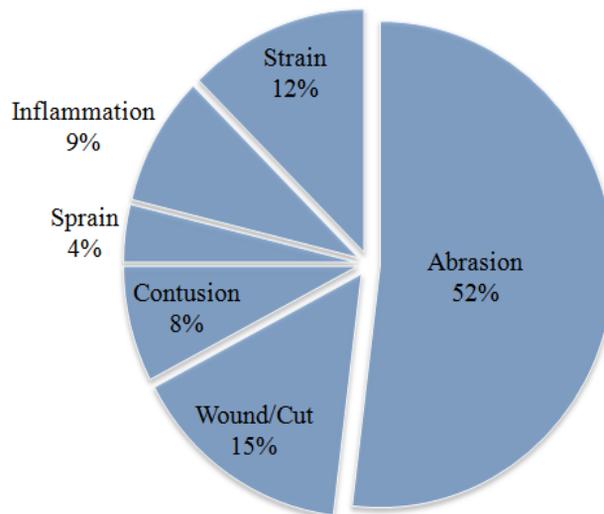
### 2.3 Statistical Analysis

Data gathered was interpreted using descriptive statistics and presented in frequency and percentage distribution tables. Graphs are also used to present the data while pictographic views on the summary of injuries are employed to provide a portrait of injury trends in novice Jiu Jitsu participation.

## 3. RESULTS

There was a 77% incidence of injuries among the participants. Those injured had an average of 3.9 injuries each. Despite this rate and occurrence, none of the injuries required serious medical attention and/or hospitalization. The data revealed that of all reported injuries, the following occurred most frequently: abrasions (52%), wounds/cuts (15%) and strains (12%). The percentage distribution of injury type is outlined in Figure 1.

**Figure 1: Percentage distribution of injury types**



Of all the injuries, the overwhelming majority were abrasions (52% of all injuries). Of these, most were on the feet (35%), knees (20%) and toes (15%). The occurrence of abrasions in other anatomical regions was less than 15 percent. Table 1 summarizes the result for the occurrence of abrasions.

**Table 1: Descriptive statistics on the occurrence of abrasions**

	Frequency	%
Feet	19	35
Knees	11	20
Toes	8	15
Elbows	4	7
Hands	3	6
Arms	3	6
Forearms	2	4
Neck	1	2
Head/Face	1	2
Ankles	1	2
Abdomen	1	2
<b>TOTAL</b>	<b>54</b>	<b>100</b>

The second most common injuries were wounds and cuts accounting for 15% of all reported injuries. Wounds and cuts were reported on the hands (38%), head/face (31%), forearms (13%) and neck (13%). The descriptive statistics on the occurrence of wounds and cuts is presented in table 2.

**Table 2: Descriptive statistics on the occurrence of wounds and cuts**

	Frequency	%
Hands	6	38
Head/Face	5	31
Forearms	2	13
Neck	2	13
Feet	1	6
<b>TOTAL</b>	<b>16</b>	<b>100</b>

The third most common injuries were strains which represents 12% of all reported injuries. The neck and shoulders seem to be the most vulnerable to strains, accounting for almost half of all reported strains. Table 3 further details the occurrence of strains.

**Table 3: Descriptive statistics on the occurrence of strains**

	<b>Frequency</b>	<b>%</b>
Neck	3	23
Shoulders	3	23
Thighs	2	15
Lower Leg	2	15
Abdomen	1	8
Lower Back	1	8
Wrists	1	8
<b>TOTAL</b>	<b>13</b>	<b>100</b>

Other types of injuries reported were inflammation (9%), contusion (8%) and sprain (4%). Table 4 shows the occurrence of these other injuries. They represent a much smaller proportion of the reported injuries and as mentioned earlier, none of the injuries were severe enough to require serious medical attention or withdrawal from participation. Based on this, Jiu Jitsu may be perceived as a relatively safe activity with minor inherent risks. Additionally, casual conversations with the participants revealed that even at the moment of injury they still continued on until the end of the session. They perceived their injuries as not being serious enough for them to consider taking the rest of a session off.

**Table 4: Descriptive statistics on the occurrence of inflammations, contusions and sprains**

	<b>Inflammation</b>	
	<b>Frequency</b>	<b>%</b>
Neck	2	22
Shoulders	2	22
Arms	2	22
Lower Back	1	11
Spine	1	11
Upper Back	1	11
<b>TOTAL</b>	<b>9</b>	<b>100</b>
	<b>Contusion</b>	
Ribs	3	38
Groin	3	38
Neck	1	13

<b>Head/Face</b>	<b>1</b>	<b>13</b>
<b>TOTAL</b>	<b>8</b>	<b>100</b>
<b>Sprain</b>		
<b>Ankles</b>	<b>2</b>	<b>50</b>
<b>Elbows</b>	<b>1</b>	<b>25</b>
<b>Wrists</b>	<b>1</b>	<b>25</b>
<b>TOTAL</b>	<b>4</b>	<b>100</b>

Regarding the anatomical regions at risk, injuries commonly occurred at the feet (19%), and knees (11%). All other injury sites were reported to be injured at a rate of less than 10%. Table 5 outlines the occurrence of injuries per anatomical region.

**Table 5: Descriptive statistics on the incidence of injuries per anatomical region**

<i>Injury Site</i>	<i>Frequency</i>	<i>%</i>
<b>Feet</b>	<b>20</b>	<b>19.2</b>
<b>Knees</b>	<b>11</b>	<b>10.6</b>
<b>Neck</b>	<b>9</b>	<b>8.7</b>
<b>Hands</b>	<b>9</b>	<b>8.7</b>
<b>Toes</b>	<b>8</b>	<b>7.7</b>
<b>Head/Face</b>	<b>7</b>	<b>6.7</b>
<b>Shoulders</b>	<b>5</b>	<b>4.8</b>
<b>Arms</b>	<b>5</b>	<b>4.8</b>
<b>Elbows</b>	<b>5</b>	<b>4.8</b>
<b>Forearms</b>	<b>4</b>	<b>3.8</b>
<b>Ribs</b>	<b>3</b>	<b>2.9</b>
<b>Groin</b>	<b>3</b>	<b>2.9</b>
<b>Ankles</b>	<b>3</b>	<b>2.9</b>
<b>Lower Back</b>	<b>2</b>	<b>1.9</b>
<b>Abdomen</b>	<b>2</b>	<b>1.9</b>
<b>Wrists</b>	<b>2</b>	<b>1.9</b>
<b>Thighs</b>	<b>2</b>	<b>1.9</b>
<b>Lower Legs</b>	<b>2</b>	<b>1.9</b>
<b>Spine</b>	<b>1</b>	<b>1.0</b>
<b>Upper Back</b>	<b>1</b>	<b>1.0</b>
<b>TOTAL</b>	<b>104</b>	<b>100</b>

Being the most injured anatomical region, injuries at the feet were also observed to be due to abrasions 95% of the time. This is mainly due to mat burns caused by the rough texture of the mats and may be avoided through the use of athletic tapes. As with the feet, abrasions were the main cause of injuries on the knees. In fact, 100% of reported knee injuries were abrasions. This may be avoided by wearing knee pads.

#### **4. DISCUSSION**

Anecdotal follow-ups on the subjects indicated that the abrasions were in the form of mat burns (friction burns on the skin) as a result of brushing against the padded floor. Padded floors or mats are a prerequisite in combat sports like Jiu Jitsu, Judo and Wrestling so as to protect the practitioners from hard impact on the floor. The mats, usually in the form of Judo mats or Wrestling mats, need to have some texture so as not to be slippery. As a result, abrasions are almost inevitable in body parts that are in constant contact with the mats. They can be minimized through protective measures such as athletic tapes, knee pads and elbow pads. Naftulin and McKeag (1994) have previously advised that protective equipment is most important in combat sports. These should prevent injury and protect injured areas from further injury. Ideally, the equipment should not interfere with function and performance nor be harmful to other athletic participants. Hutson (1996) further reports that major strides in injury prevention have been made in certain sports though progress is slow particularly where there are financial implications.

Wounds and cuts on the hands and forearms would have been completely avoidable as the respondents noted that these were brought about by inadvertent scratches from the opponent. Just like all grappling sports, controlling the opponent is important. One of the ways to control an opponent is by grabbing the wrists and hands. Long fingernails combined with the resistance by the other combatant sometimes leads to scratches. Since the first session, which includes the orientation and introduction, the participants were reminded to keep their fingernails short. However, as the weeks went on and as their fingernails grew back, some may not have remembered to clip their nails regularly. As such, inadvertent scratches occur as they try to grab an opponent's wrist and hands. Thus, it is important to constantly remind Jiu Jitsu practitioners to maintain short fingernails. Furthermore, keeping nail clippers at the training area is deemed necessary.

The respondents also commented that wounds and cuts in the head/face region were on the lips and mouth area and incurred as a result of defending against chokes- strangle holds that are meant to cut-off the opponent's breathing causing them to either submit or pass out. In order to effectively defend against chokes, one has to tuck the chin down towards the upper chest thereby protecting the neck from

the opponent's pressure. In the process, however, the chin and mouth take on the pressure instead of the neck. When the attacker does not let go, the lips continue to push against the teeth and this sometimes causes wounds and cuts on the inner lips. As a precaution, this can be avoided by using mouthguards.

The participants were quick to comment that strains on the neck were caused by opponents attacking with a choke - the squeezing around the neck combined with the flexion of the neck makes it particularly vulnerable to strains during chokes. The shoulder muscles were susceptible to strains during the application of shoulder locks - twisting the shoulders towards an awkward angle but not to the extent of dislocation. Just like the occurrence of wounds and cuts, strains were most likely to occur during an attempt to defend against an opponent's attack. Since choke holds and joint lock are the essence of Jiu Jitsu offense, practitioners should be more conscious about tapping out or letting go before serious damage occurs.

## 5. CONCLUSIONS

There was a 77% incidence of injuries among the participants. Those injured had an average of 3.9 injuries each. The data revealed that of all reported injuries, the following occurred most frequently: abrasions (52%), wounds/cuts (15%) and strains (12%). Of all the injuries, the overwhelming majority were abrasions (52% of all injuries). Of these, most were on the feet (35%), knees (20%) and toes (15%). The occurrence of abrasions in other anatomical regions were less than 15 percent. Despite the high incidence of injuries, they were all considered to be minor, acute injuries with none requiring serious medical attention or causing the participants to discontinue the course. These minor injuries may be further minimized through the use of personal protective equipment such as mouthguards, knee pads and elbow pads.

The researcher thus concludes that the recreational practice of Jiu Jitsu is generally safe with an inherent risk for minor injuries that can be further managed with good coaching and personal protective equipment. Instructors and practitioners alike should thus be aware of these risks and take precautionary measures to further minimize the probability of injury.

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