

Injuries to the Stomatognathic System during the Practice of Brazilian jiu-jitsu and the Importance of using Mouthguard: A Mini-Review

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Abstract

The practice of sports has become increasingly commonplace in the daily lives of individuals and sports-related injuries vary depending on the sport practiced. Oral and facial injuries are very common in many sports. Brazilian jiu-jitsu is a contact sport in which the stomatognathic system is exposed to injuries, and the most prevalent are soft tissue injuries, such as facial abrasions and lacerations and dental injuries, such as tooth fractures. Although not mandatory in Brazil for the practice of Brazilian jiu-jitsu, a mouthguard is an essential form of protection from orofacial injuries. When a blow is applied to the face, the mouthguard provides absorption and dissipation of force and also reduces of impact to the temporomandibular joint, by redistributing the force. For that, it is therefore of the utmost importance for athletes to visit a dentist periodically for examinations. Such protective devices (mouthguards) may be individualized and crafted by a dentist for better adaptation and less discomfort for the user.

Introduction

The practice of sports has become increasingly commonplace in the daily lives of individuals. In Brazil, the practice of martial arts and other types of fighting increased 109% between 2006 and 2017 and there are currently five million practitioners of these types of sport in Brazil¹. Jiu-jitsu is a type of wrestling brought to Brazil from Japan around World War I and was shared with a Brazilian of the Gracie family, who passed the teachings on to his son. The sport then developed and was adapted in the country, with a focus on wrestling on the ground, grappling, pinning and chokeholds with leveraged movements and without the use of direct strikes with the hands, feet or other parts of the body^{2,3}. The aim of Brazilian jiu-jitsu is to knock down and immobilize the opponent. Practitioners must wear a "gi" (a loose-fitting pant with a jacket that is closed with a cloth belt) and the matches are held on a mat measuring from 64 to 100 square m. Valid moves are those that seek to neutralize, immobilize, strangle, pin and twist joints as well as throw the opponent to the floor^{2,3}.

The large number of practitioners involved in contact sports increases the number of traumatic accidents^{4,5}. As the name suggests, contact sports involved a certain degree of contact between practitioners. Such sports include martial arts, such as Brazilian jiu-jitsu, boxing, taekwondo, muay thai, judo, kempō, kung fu, karate and hapkido, as well as field and court sports, such as baseball, American football, soccer, etc⁶. A survey involving 8,902 respondents of different ages in different regions of Brazil found that Brazilian jiu-jitsu was practiced by 1.3% of Brazilians, which corresponds to

approximately 2.5 million individuals. After Brazilian jiu-jitsu, the most cited martial arts were muay thai (1.1% of respondents), capoeira (1%), judo (0.8%), karate (0.7%), boxing (0.6%) and mixed martial arts (0.4%). Other martial arts totaled 1%⁷.

The aim of this paper was to carry out a brief review on sports injuries, focused in Brazilian jiu-jitsu and to list the advantages of using mouthguards.

Material and Methods

The papers were searched in Pubmed and Scholar Google databases, using keywords as jiu-jitsu, Brazilian jiu-jitsu, contact sports, and Dentistry, selecting, after reading the abstracts, the most relevant ones related to the objectives of the study. Papers in English or Portuguese did not meet the inclusion criteria and were therefore excluded. National and international epidemiological data about sports and information from sports and others entities were also used.

Results

All papers with complete text available fitting the proposed objectives were read and the selected papers were used in this mini-review. A total of 27 references were used, with 19 (70.4%) complete papers, 4 (14.8%) information from class entities (CFO, ADA, AAPD, ASD), 2 (7.4%) Brazilian epidemiological data and 2 (7.4%) books.

From these 27 references, 21 (77.8%) citations were used in the introduction and literature review. From these 21, 7 (33.3%) were used in the introduction and 14 (66.7%) in the literature review. The remaining 6 (22.2%) papers are included in the discussion below.

Literature Review

Brazilian jiu-jitsu is statistically associated with increased injuries, especially to the orofacial region⁸, as the sport involves throwdowns, pinning, grappling, twisting and strangleholds². Practitioners of all ages and skill levels are at risk of suffering tooth injuries during the practice of sports, especially contact sports. However, tooth injuries can be prevented with the use of a mouthguard, which protects all dental and periodontal structures in the dental arch in which is being used^{8,9}. The tooth fracture is the third most prevalent injury in Brazilian jiu-jitsu practitioners⁸.

Sports dentistry is a specialty involving the prevention and treatment of athlete-related orofacial injuries and associated oral diseases. The concept of sports dentistry is based on the study of the effect of sports on the stomatognathic system and how oral health can compromise the physical and psychological performance of athletes. Dentists in this field seek to improve the performance of athletes through the maintenance of oral health as well as preventing and treating injuries stemming from the daily

practice of sports¹⁰. It is therefore of the utmost importance for athletes to visit a dentist periodically for examinations.

Facial fractures due to impact suffered during the practice of contact sports can keep competitors temporarily away from the sport. The head region is the most affected in contact sports and oral soft tissue injuries, such as lacerations, abrasions and tooth injuries, are quite prevalent^{11,12}. Indeed, the prevalence of sports-related injuries is higher than that found among non-practitioners and varies depending on the sport practiced^{13,14}. According to Macedo-Filho et al.⁸, the injuries to the head and neck that most affect practitioners of Brazilian jiu-jitsu are soft tissue injuries, as lacerations of the oral mucosa (43%) and facial abrasions (33%), and tooth fractures (11.5%).

When used correctly, a mouthguard minimizes the risk of orofacial injuries. The purpose of such a device is to protect the teeth, soft tissues and other intraoral structures by absorbing and distributing the impact, with the maxillary mouthguard protecting mainly the anterior teeth and soft tissues from maxilla, and the mandibular mouthguard avoiding mandibular contusions or fractures, dislocations and trauma to the temporomandibular joint¹⁵.

Although the use of a mouthguard is not mandatory during the practice of Brazilian jiu-jitsu, it is highly recommended, especially during competitions. To ensure adequate protection, a mouthguard should be precisely adapted to the oral structures and should be made from durable material, covering all teeth and preferably used on the maxilla. It should also be comfortable and not exert a negative impact on either speech or breathing^{16,17}. It should be physiologically compatible with the anatomic structures of the user, be relatively easy to clean and have the ability to absorb high-impact energy and reduce the forces transmitted by the impact¹⁸. According to the American Society for Testing and Materials (ASTM), mouthguards may be individualized (custom-made), prefabricated (mouth-formed) or universal (stock)^{19,20}. The stock protectors are ready to be used without any further preparation. The mouth-formed are the most commonly used mouthguard. They need to be immersed in boiling water and formed in the mouth by using finger, tongue, and biting pressure. But they often do not cover all the posterior teeth²⁰.

For the purposes of safety, a mouthguard should offer adequate retention, comfort and adjustment during the practice of sports. A custom-made mouthguard is the most appropriate for preventing oral injuries²¹. It should be fabricated under the supervision of a dentist so that it has adequate quality and thickness (3-4mm), is safe and comfortable and is not ejected from the mouth during use^{16,20}.

Problems with breathing and speaking, difficulty removing the device, nausea, trauma and pain are some of

the drawbacks of mouthguards. These are the main reasons why most athletes do not use this protective device, making them more susceptible to orofacial injuries⁸.

Discussion

Like all contact sports, Brazilian jiu-jitsu exposes practitioners to orofacial injuries, the most common of which are contusions^{22,23}, lacerations and tooth fractures⁸ or avulsions²⁰. Intraoral, perioral, and facial lacerations are all common occurrences in competitive and recreational sport, and eighty percent of all dental injuries occur in the four maxillary incisor teeth. Dental injuries are the most common type of orofacial injury sustained during participation in sports²⁰. Rainey²³ found that professional athletes of mixed martial arts had significantly more injuries (threefold higher injury rate) than amateur athletes. The most commonly injured body region was the head/neck/face (38.2%) and the most common type of injury found was contusion (29.4%).

Although not mandatory for the practice of jiu-jitsu in Brazil, mouthguards can minimize harm to the stomatognathic system and are therefore highly recommended for the practice of this and any other contact sport. In Brazil, a mouthguard is only mandatory in boxing²⁴. Preference should be given to custom-made mouthguards fabricated under the supervision of a dentist in accordance with the individual anatomy of each athlete^{19,25}. However, the use of a mouthguard is met with resistance due to the cost as well as the discomfort, nausea and difficulty breathing²⁶. Most athletes acquire pre-fabricated mouthguards due to the greater accessibility, but such devices are not well adapted to the mouth⁸. Moreover, pre-fabricated mouthguards can be dislocated at the moment of impact and do not adequately redistribute the force of the impact^{27,20}. A properly fitted mouthguard must have excellent retention, fit, and sufficient thickness in critical areas. Also, it must be protective, comfortable, resilient, tear resistant, odorless, tasteless, not bulky and cause minimal interference to speaking and breathing²⁰. The mouthguard should be used both during training and competitions. Indeed, a large portion of orofacial injuries occur during training sessions, which is when athletes are less likely to wear a mouthguard⁸.

Final considerations

The practice of contact sports, such as Brazilian jiu-jitsu, exposes the head region to injuries, such as contusions, lacerations and tooth fractures. Such injuries to the stomatognathic system can be minimized with the use of a mouthguard, preferably on the maxilla and custom-made under the supervision of a dentist to ensure full customization.

Conflict of Interest

There is no conflict of interest

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