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Serious Traumatic Injuries to Cameroonian Judoka During Competition

Muluem Olivier K[1,3*], Mefo Nono Fah Annick Cindy[2,3], Nyekel Justine[2], Koum Njoh Hyppolite[3], Tankeng Leonard T[2], Ngatchou Djomo William[2]

Abstract

Introduction: Giant cell tumor of bone (GCTB) is a locally aggressive tumor with low metastatic potential. Giant cells express RANK ligand (RANKL), contributing to osteolytic destruction. Denosumab, a monoclonal antibody against RANKL, inhibits osteoclast activity.

Aims & Objectives: To evaluate the role of denosumab in GCTB management and assess its risks and benefits.

Methods: Fifteen patients (aged ≥12 years, weight ≥45 kg) with Campanacci grade 2/3 GCTB received denosumab (120 mg SC monthly for 3–4 months, with loading doses on days 8 and 15). Calcium (500 mg) and vitamin D (400 IU) were supplemented. Assessments included clinical, radiological (X-ray, CT, MRI), and biochemical (CBC, calcium, phosphate) monitoring every 4 weeks.

Results: Denosumab showed high tumor response rates, improved quality of life, reduced pain, and decreased need for extensive surgery. Toxicity was acceptable.

Conclusion: Denosumab is effective as adjunct therapy in advanced GCTB, though complications (hypocalcemia, ONJ, atypical fractures, recurrence) require monitoring.

Keywords: Judo; Serious trauma; Cervical spine; Competition; Cameroon

Introduction

According to the International Judo Federation, judo is practiced by more than 20 million people in over 200 countries across five continents [1,2]. Given such a high participation rate in a combat sport and the relatively high risk of injury that comes with it [3], the safety of practitioners is a top priority. A study conducted by Kujala et al. [4] showed that judo has the second highest injury rate after karate [4]. The reported injury incidence rate per 1,000 athletes exposed (during combat) ranges from 41.2% to 81.6% [5]. The most common injuries are sprains and contusions, usually to the knee, shoulder, and fingers. The most common cause of these injuries is being thrown. Serious injuries are quite rare and are mostly dislocations, fractures, and ligament ruptures, with the most fatal ones involving the brain and spine [6,7]. Olsen et al. [8] defined serious injuries as those that require a break from competition and training for more than 21 days [8]. Treatment for these injuries varies depending on their location and severity. It may be surgical (osteosynthesis, ligament or tendon repair) or orthopedic (cast immobilization, soft support). These injuries and treatments can be detrimental to the rest of an athlete's career [6,7,9,10].

Very few studies have been reported in Africa on the practice of judo

Affiliation:

[1]Department of Surgery and Specialties, Faculty of Medicine and Biomedical Sciences, University of Yaounde 1, Ngoa-Ekelle, Yaoundé, Cameroon

[2]Department of Sports Medicine, Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Avenue de la Douala, B.P. 2701 Douala, Cameroon

[3]Medical Commission, Cameroon Judo Federation, Palais Polyvalent des Sports (PAPOSY), Yaoundé, Cameroon

***Corresponding Author:**

MULUEM Kennedy Olivier, Department of Surgery and Specialties, Faculty of Medicine and Biomedical Sciences, University of Yaounde 1, Ngoa-Ekelle, Yaoundé, Cameroon.

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[10-12]. In Cameroon, a few studies have been conducted on injuries sustained while practicing judo, such as the study by Douryang et al. [11] conducted during the 2019 Dschang University Games, which found an incidence rate of injuries in judo of 18.4%. It ranked judo as the second sport with the highest injury rate after wrestling [11]. In 2023, Muluem et al. [10] reported on traumatic cervical spine injuries in Cameroonian judokas: four observations [10].

The objective of our study was to establish the epidemiological, clinical, therapeutic, and prognostic profile of Cameroonian judokas who suffered serious trauma during judo competitions.

Materials and Methods

We conducted an observational, retrospective, and prospective study at the Cameroonian Judo Federation (FECAJUDO) and at various competition venues during the study period. The study period ran from January 2020 to May 2024. The study included all judokas aged 16 or older who suffered a serious traumatic injury during a judo competition. The data collection procedure was carried out in three phases:

The first consisted of a thorough review of the federation's medical records to identify serious injuries during competitions such as: Africa Open, African Games, National Individual Championship, African Kata Championship, Cameroon Team Cup.

During the second phase, we attended national and international judo competitions that took place during the study period and recorded cases of serious injuries.

The third phase consisted of following up with these athletes to evaluate their treatment and the time it took them to return to sport.

The following variables were studied: age, gender, weight category, performance level, number of years of practice, region of the body injured, type of injury, presence of vascular and/or nerve complications, imaging tests performed, type of treatment administered, and time to return to judo.

We used the 2020 International Olympic Committee consensus statement [13] for the collection and reporting of epidemiological data. Statistical analyses were performed using SPSS version 26 software.

Results

Over a period of four years, we identified 21 judokas who suffered serious injuries during judo competitions. Of the 21, we found 17 in the federation's medical records and identified four judokas during the prospective phase.

Epidemiological profile

The average age was 22.14 ± 3.14 years, ranging from 16 to 28 years. There were 11 (52.4%) female judokas, with a male-to-female ratio of 0.9. The -57 kg category was the most represented with (n=5; 23.8%) judokas. Nine (42.9%) judokas were black belts, followed by (n=6; 28.6%) blue belts and (n=5; 23.8%) brown belts. In terms of performance level, (n=12; 57.1%) judokas were at international level and (n=9; 42.9%) judokas were at national level. The average length of experience in judo was 11.19 ±4.1 years, ranging from 5 to 17 years. We recorded a total of 21 serious traumatic injuries during the study period for a total of 1,980 judokas who participated in competitions, representing an incidence rate of 1.06%.

Clinical profile

Topography of lesions

The most commonly affected area of the body was the neck (n=5; 23.8%), followed by the shoulder (n=4; 19%), elbow (n=4; 19%), and knee (n=3; 14.3%) (Table 1).

Table 1: Distribution of lesions according to topography.

Region	Body parts	Number (n=21)	Percentage (%)
Head and neck	Neck	5	23,8
Upper limb	Shoulder	4	19
	Arm	2	9,5
	Elbow	4	19
Lower limb	Thigh	1	4,8
	Knee	3	14,3
	Ankle	2	9,5

Type of injury

The main injuries were dislocations and severe sprains, with (n=7; 33.3%) cases of each injury recorded, followed by fractures (n=6; 28.6%). (see Table 2). Fractures and dislocations were much more common among female judokas, while severe sprains were more common among male judokas (see Table 3).

Table 2: Distribution by type of injury.

Type of injury	Number (n=21)	Percentage (%)
Dislocation	7	33,3
Severe sprain	7	33,3
Fractures	6	28,6
Muscle strain	1	4,8

Table 3: Distribution of types of injury by gender.

	Fracture	Dislocation	Muscle strain	Severe sprain
Male	2	3	1	4
Female	4	4	0	3
Total (n=21)	6	7	1	7

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Nature of injuries

Among serious injuries, severe sprains involved the medial collateral ligament of the elbow (n=2; 9.5%) in the upper limb and the anterior cruciate ligament (n=2; 9.5%) of the knee and the lateral collateral ligament (n=2; 9.5%) of the ankle in the lower limb. Dislocations mainly affected the cervical spine (n=2; 9.5%) and the shoulder (n=2; 9.5%) (Table 4).

Table 4: Distribution of injuries according to their nature.

Region	Body part	Nature of the injury	Number (n=21)	Percentage (%)
Head and neck	Neck	C5-C6 Dislocation	2	9,5
		C5 Fracture	2	9,5
		Severe sprain	1	4,8
Upper limb	Shoulder	Deltoid muscle strain Clavicular fracture	1 1	9,5 4,8
		Dislocation	2	9,5
	Arm	Humerus fracture	2	9,5
	Elbow	Dislocation	2	9,5
		MCL severe sprain	2	9,5
Lower limb	Thigh	Femur fracture	1	4,8
	Knee	Dislocation	1	4,8
		ACL severe sprain	2	9,5
	Ankle	LCL severe sprain	2	9,5

LCL: Lateral Collateral Ligament; MCL: Medial Collateral Ligament; ACL: Anterior Cruciate Ligament

Associated injuries

Nerve injuries were those associated with serious injuries, including spinal cord compression in (n=4; 66.6%) judokas, compression of the ulnar nerve (n=1; 16.6%), and compression of the popliteal nerve (n=1; 16.6%).

Mechanism of injury

The mechanism of injury was indirect in 13 (61.9%) serious injuries (Figure 1).

Additional tests performed

Standard X-rays were the most commonly used imaging method (n=19; 73.1%), followed by CT scans (n=4; 15.4%) and ultrasound scans (n=3; 11.5%).

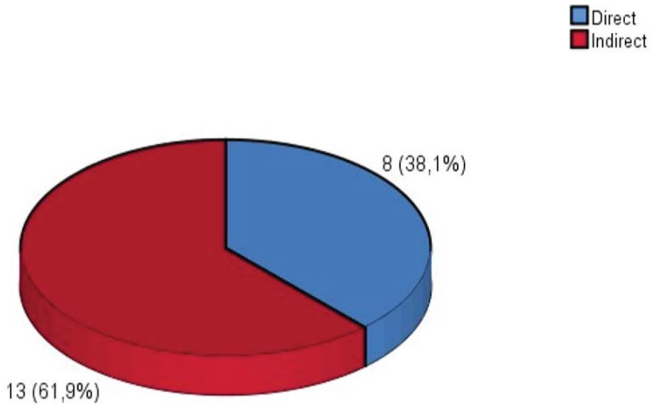

Figure 1: Distribution according to the mechanism of injury.

Table 5: Time to resume judo depending on the nature of the injury.

				Judo resumption period (%)		
Region	Body part	Nature of the injury	Number (N=18)	[3-6[weeks	[6-12[weeks	≥12 weeks
Head and neck	Neck	C5-C6 Dislocation	1	-	-	5,5
		C5 Fracture	1	-	-	5,5
		Severe sprain	1	-	5,5	-
Upper limb	Shoulder	Deltoid strain	1	-	5,5	-
		Clavicle fracture	1	-	-	5,5
		Dislocation	2	11,1	-	-
	Arm	Humerus fracture	1	-	5,5	-
	Elbow	Dislocation	2		11,1	
		MCL severe sprain	2	5,5	5,5	
Lower limb	Thigh	Femur fracture	1	-	-	5,5
	Knee	Dislocation	1	-	-	5,5
		ACL severe sprain	2	-	-	11,1
	Ankle	LCL severe sprain	2	-	11,1	

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Treatment profile

***Time to treatment*:** Treatment began within one hour of the injury in all judokas who participated in our study.

***Duration of treatment*:** The median duration of treatment was 30 [30-62.2] days, with extremes ranging from 21 to 180 days.

***Treatment methods*:** Soft splinting was the most commonly used treatment method (n=14; 66.7%), followed by surgery (n=7; 33.3%) and plaster casts (n=2; 9.5%). All judokas received painkillers and rehabilitation sessions.

Prognosis

Time to return to judo

The median time to return to judo was 51 [45–90] days, counted from the day after the injury, with extremes ranging from 45 to 730 days.

Fractures in general had the longest recovery times (see Table 5).

Discussion

Serious traumatic injuries in judokas can occur at any age. In our study, the average age was 22.14 (± 3.94) years, which is similar to the results obtained by Douryang et al. [11] and Akoto et al. [6], who reported average ages of 24 (22-25) years and 21.8 (±8.6) years, respectively, in their series. This could be explained by the fact that it is at this age that athletes train and compete intensively.

The slight predominance of female judokas (52.4%) could be explained by their low muscle mass and hormonal changes that affect physical fitness on competition day.

The most represented weight category was -57kg, similar to the results obtained by Akoto et al. [6]. This could be explained by the fact that this is the weight category with the most female participants. Most judokas (57.1%) were international level and had an average of 11.19 (±4.1) years of experience. These results differ from those found by Frey et al. [14] and Akoto et al. [6], in which the majority of injuries were found among regional-level judokas, followed by national- and international-level judokas. This could be explained by the fact that in our study we only took into account national and international competitions.

In terms of injuries, dislocations (33.3%) and severe sprains (33.3%) were the most common types of trauma, which is consistent with the literature [6,7,11,15]. The most commonly affected area of the body was the head and neck, with (n=5; 23.8%) cervical spine injuries, followed by the shoulder and elbow, which each had (n=4; 19%) injuries. These results are similar to those found by Pocceco et al. [7]. Indeed, the cervical spine is a highly stressed area in judo practice during landing techniques, while the upper limbs are used more during grabs and attack techniques. However, our results differ from those found by Akoto et al. [6], in whose study the most affected body region in cases of serious trauma was the knee, followed by the shoulder. In the series by Wieslaw et al. [15], the shoulder was the area most affected by serious trauma, followed by the elbow. This difference could be explained by the fact that their study was conducted on a larger population of judokas, including all performance levels, and over a long period (15 years). Nerve injuries were the only associated injuries in our series, dominated by spinal cord compression (66.6%). This could be explained by the fact that the most affected area of the body in our study was the cervical spine. The Haraï goshi, Tomoe nage, and Uchi mata techniques were the most common causes of cervical spine injuries. Results similar to those found by Muluem et al. [10] and Kamitani et al. [16], which could be explained by the fact that these are throwing techniques, where the landing on the ground can be on the head or neck.

Coverage of judo competitions by competent and well-equipped medical staff is essential, as this reduces treatment delays and improves treatment duration, as we highlighted in our study. The majority of injuries were treated with soft splints, which shows the importance of conservative treatment even for experienced judokas. The fact that all the judokas in our series benefited from rehabilitation sessions was an important factor that enabled a rapid return to judo with a median delay of 51 [45-90] days. Elbow dislocations had the shortest recovery times compared to other injuries, which is consistent with the results reported by Akoto et al. [6]. This could be explained by the fact that the elbow joint is not a weight-bearing joint and the two joint surfaces fit together perfectly even after reduction. In our series, spinal injuries had the longest recovery times for judo because most were dislocations and fractures of the cervical spine, which take a long time to heal. Akoto et al. [6] had different results because their series included more anterior cruciate ligament injuries.

It should be noted, however, that three judokas did not resume judo: one had a humeral shaft fracture that was slow to heal because he had removed his cast without the medical team's knowledge. One had a femur fracture and another had a C5-C6 dislocation with spinal cord compression; both stopped judo permanently. We noted one death in this series, which occurred in hospital, of an athlete who had a fracture-dislocation of the C5 vertebra with spinal cord compression. This death was thought to be due to respiratory failure caused by spinal cord compression at the C5 level.

Conclusion

Serious traumatic injuries among Cameroonian judokas are relatively rare. The nature of the injuries varies, with the most common being dislocations and severe sprains of the

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cervical spine and upper limbs. The most affected area of the body was the neck, more specifically the cervical spine, which was accompanied by nerve damage in the form of spinal cord compression. Conservative treatment was used as a first-line approach, with surgery reserved for cases where it was absolutely necessary. The athletes were able to resume judo fairly quickly, aided by early rehabilitation tailored to the care they received. The specific nature of serious traumatic injuries in judo involving the cervical region, requires that the medical kit for competitions be appropriately equipped, and that officials and athletes must be trained in the recognition and transport of spinal trauma patients.

Conflict of interest: None

Contributions of authors: MOK: conception of study, manuscript correction, MNF: data collection, manuscript editing NJR: proofreading, KNH: data colletion, TL: translator, NW: supervisor.

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