

Cervical Spine Trauma in Cameroonian Judokas: Risk Factors and Prognosis in Three Cases in Yaounde

Muluem O.K¹, Tsiagadigui J.G², Fonkoue L¹, Ndongmoui N.G², Chifen U¹,
Haman N.O¹, Djientcheu V.P¹

Abstract

Cervical spine injuries during the practice of judo rarely occur. When they occur, they can be responsible for serious injuries such as fractures, dislocations and sprains. The objective of our work was to evaluate the factors favoring the occurrence of these lesions, the diagnostic approach, the emergency management and the medium-term prognosis in two Cameroonian judokas.

Keywords: Cervical spine, Injury, Judo, Risk factor, Prognosis

Introduction

Judo is a combat sport with contact that can lead to injuries [1]. These lesions can involve different segments of the body such as the upper and lower limbs, the shoulder and pelvic girdles, the skull and the spine [2, 3, 4]. Cervical spine injuries are uncommon in sports pathology. When they exist, they are dominated by benign cervical sprains and these generally heal without sequelae. But also, they can be potentially serious because of the neurological, medullary or radicular risks [1]. During judo, the poor execution of certain techniques can expose the cervical spine of both the defender and the attacker to certain types of injuries [5]. These lesions vary according to the anatomical structures solicited and are classified into three groups, namely: disco-corporeal, disco-ligamentous and mixed lesions [6]. Thus, when evaluating a traumatized judo practitioner, screening for serious damage to the cervical spine is a priority, so as not to jeopardize the neurological prognosis [1]. Management must be rigorous and must begin in the field until transfer to a medical center where reliable additional investigations will be carried out to decide on the most appropriate treatment [1].

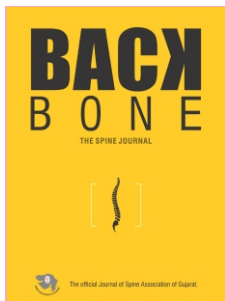
In Europe and America, a few cases of cervical spine trauma in judo practitioners have been reported [7]. In Africa, the

majority of studies on cervical spine trauma are not specific to judo [8, 9]. In Cameroon, we have not found data on cervical spine trauma in judo practitioners to date. The aim of our work was to contribute in improving the management of cervical spine trauma in judokas through two observations. Our objective was to describe the diagnostic approach for cervical spine trauma in judo practitioners, evaluate the factors favoring the occurrence of these lesions, their emergency management and their short and medium term prognosis.

Case 1

Athlete X is a 27-year-old male judo practitioner of the Cameroon national team's black belt category of the less than 100 kilograms, with 15 years of experience in the practice of judo. During a training session in preparation for the African Championship in 2016, he suffered a cervical spine trauma when he performed a self-initiated attack by Uchi-Mata. The clinical examination at the gymnasium noted a Glasgow at 15/15, a protrusion of the spinous process at C6 level, a spinal syndrome associated with tetraparesis (motor force at 4/5 in all four limbs). In an emergency unit at the gymnasium, the patient benefited from cryotherapy, placement of a cervical collar and was transported by non-medical means to a hospital center where an X-ray and a CT Scan of the cervical spine were performed.

The diagnosis of C6-C7 dislocation with spinal cord compression was made. The surgical indication for a dissectomy associated with a C6-C7 arthrodesis was posed and carried out by an anterior approach (Figure 1). The postoperative evolution was simple with appropriate analgesics and antibiotics. The patient was discharged on the 14th postoperative day and began physiotherapy sessions. At 2



¹Department of Orthopaedics, General Hospital, Yaounde, Cameroon.

²Department of Medicine and Biomedical Sciences, Yaounde, Cameroon.

Address of correspondence :

Dr. Muluem Olivier Kennedy,
Department of Orthopaedics, General Hospital, Yaounde,
Cameroon.

E-mail: kennedymuluem@yahoo.fr

Submitted: 08/01/2023; Reviewed: 01/02/2023; Accepted: 10/02/2023; Published: 10/04/2023

Back Bone: The Spine Journal (The Official Journal Of "Spine Association of Gujarat") | Available on www.backbonejournal.com | DOI: <https://doi.org/10.13107/bbj.2023.v04i01.056>
This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial-Share Alike 4.0 License (<http://creativecommons.org/licenses/by-nc-sa/4.0>)
which allows others to remix, tweak, and build upon the work non-commercially as long as appropriate credit is given and the new creation are licensed under the identical terms.

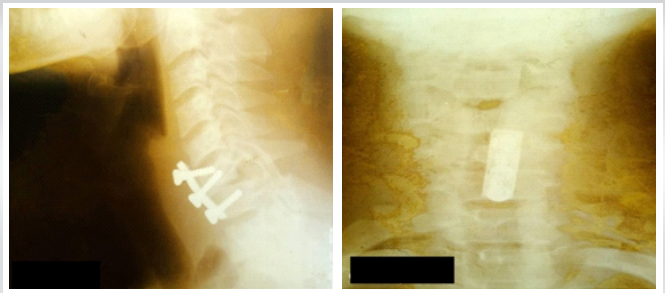


Figure 1: Control X-ray of Patient X showing C6 - C7

months postoperatively, there was a total recovery from tetraparesis with muscle strength rated at 5/5. The resumption of sports activity was possible at 1 year 8 months at the same level.

Case 2

Athlete Y aged 20, a female judokate for the Cameroon national team's brown belt category of less than 57 kilograms, with 6 years of experience in the practice of judo. During a fight organized in November 2019 in Yaoundé, she suffered a cervical spine trauma following a "Tomoe Nage" technique initiated by the opponent after which she fell and remained lying on the tatami mat. The fight was immediately stopped by the referee. The clinical examination on the tatami mat noted: a transient alteration of consciousness with Glasgow at 10/15. The athlete was placed in the lateral safety position. A brief clinical examination revealed pain in the spinous processes of C4 and C5, which prompted the placement of a cervical collar. The athlete was transported by medical means to a local hospital. The examination on arrival revealed a gradual recovery of consciousness with a Glasgow score of 14/15, pain in the C4 spines, and an absence of neurological signs. An X-ray (Figure 2A) and CT scan (Figure 2B) of the cervical spine were performed. The diagnosis of C5 vertebral body fracture with posterior wall retraction was made. The following day, the patient was operated on and the surgical procedure consisted of a C4-C5-C6 dissection + hemicorpectomy of C5 and a C4-C6 arthrodesis (Figure 2C, 2D). The postoperative course was simple with analgesics and antibiotics. On the 14th



Figure 2: A: X-ray of the cervical spine showing the C5 vertebral body fracture of Patient Y
B: CT scan of the cervical spine showing the anterior C5 vertebral body fracture with posterior wall retraction of Patient Y

postoperative day the athlete was released. At 6 months' follow-up, mild neck pain was still noted. 2 years later, the athlete resumed judo but just limited to training.

Case 3

This was an 18-year-old judoka (patient Z), junior national team athlete in the under 57 kg category, who during a Harai goshi technique, she was countered by her opponent and fell with landing on the head in flexion. She presented with Frankel A cervical spine trauma. Examination on the playground showed neck pain and quadriplegia. She was rushed to hospital by a medical ambulance where a CT scan of the cervical spine showed a C5-C6 dislocation (Figure 3A, 3B). She received corticosteroid therapy and the indication for C5-C6 arthrodesis under fluoroscopy was placed and performed the next day. The postoperative course was marked by wound healing on the

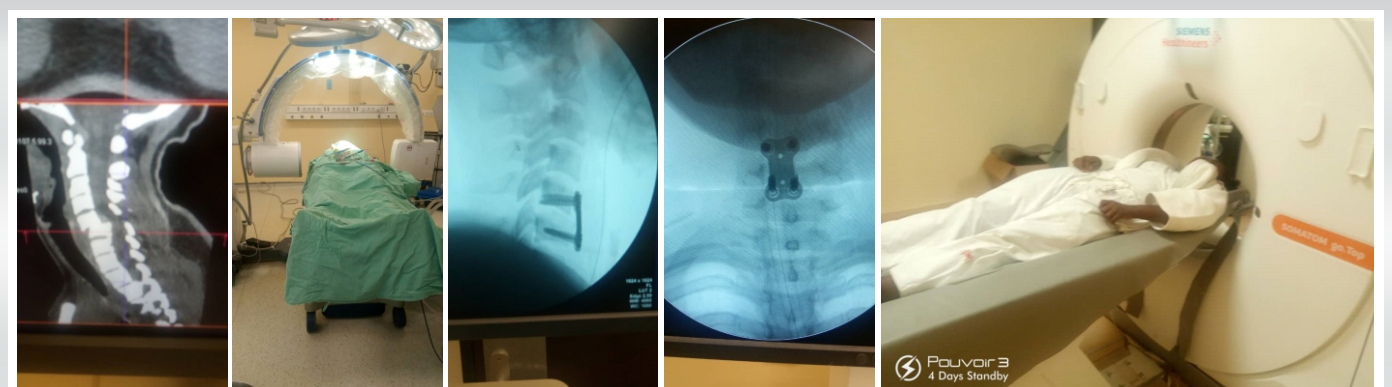


Figure 3: Surgical procedure C4-C5-C6 dissection + hemicorpectomy of C5 and a C4-C6 arthrodesis

14th day. She benefited from rehabilitation sessions for more than 4 months. A reassessment at the 6th month revealed a partial recovery of the neurological deficit. She went from Frankel A to Frankel B.

Discussion

Cervical spine injuries in judo are rare, but when they do occur they are potentially serious and life-threatening. We will successively discuss the circumstances and mechanisms of occurrence, the predisposing factors, the diagnosis and the emergency management of these lesions.

In our study, we report two cases of injury in two experienced judokas, aged 20 years for the girl and 27 years for the boy. The former presented lesions of the lower cervical spine at the C4-C6 level and the latter at the C6-C7 level. This agrees with data from the literature where it is established that the majority of cervical spine injuries during the practice of judo are located on the lower cervical spine, the area most used in experienced judokas for the execution of complicated attacks [4, 5, 7, 10].

However, age and level of experience were not contributing factors given that our two athletes were senior judokas with over 72 months of experience. On the other hand, Kamitani et al, reported in their study that the occurrence of cervical spine injuries during the practice of judo was a risk factor of young age and inexperience [7]. For them, the location of the lesions differs depending on the level of experience. Younger practitioners typically present with upper cervical spine injuries sometimes associated with concussion [7, 10].

The circumstances of occurrence of these lesions were different for our two athletes. In athlete X, and Z, "Uchi-Mata" and "Harai goshi" was the technique that caused the trauma which resulted in a fall in anteflexion and rotation of the neck. This is in agreement with the results of Kamitani et al [7] who found that the relationship between experience, mechanism (uchi-mata) and lesions was more relevant in the attacking judoka than in the defending judoka. This assertion is in accordance with that of E. Pocecco et al [4], Uzel et al [5], K. Kansoue et al [10] who reported in their series that the uchi-mata was the most injury susceptible gesture in judokas.

However, several other techniques are related to cervical spine trauma in judoka, namely "Harai-goshi" reported by K. Kansoue et al [10], "Osoto-gari" reported by Kamitani et al [7]. The 20-year-old Athlete Y, on the other hand, suffered a "Tomoe Nage" attack from her opponent during her trauma. This mechanism has not yet been described in the literature. In effect, the defending athlete would have landed on the flexed neck instead of landing on the shoulders and then rolling. The patient declares having lost 4 kilograms in seven days by water and food restriction. This could also be a contributing factor to trauma. This was reported by Brito et al; Langan Evans et al

who affirm that the weight loss techniques used in judokas are food restriction, diuretics, laxatives and clothing in plastic fabric which is a source of dehydration, muscle wasting and weakening of bones favoring the occurrence lesions [11, 12].

The diagnosis of trauma to the cervical spine during the practice of judo is not specific. Nevertheless, it must begin on the tatami mat with an assessment of consciousness, inspection and palpation of the spines, and a summary neurological examination [13]. In our study the clinical orientation was much based on neck pain as a complaint of judokas. After a neurological examination, we found tetraparesis in athlete X. A standard X-ray and a CT scan made it possible to make the diagnosis of injury in these two athletes. According to some authors, the standard Anteroposterior, lateral and oblique X-rays must be performed as first intention, followed by CT Scan with 3D reconstruction in the event of the X-ray's limitations [4, 5, 7, 10, 13].

Doran et al [14] noted the interest of MRI in spinal cord involvement and in the event of cervical dislocation before and after reduction, which allows the study of the intervertebral disc and the spinal cord. This assertion is consistent with the findings of Rizzolo et al [15] who report the existence of 40% of herniated discs during uni-articular dislocations on the one hand and Eismont et al on the other hand who report cases of neurological aggravation after reduction by disc retropulsion [16]. Our two patients did not benefit from an MRI for financial reasons.

The management of trauma to the cervical spine begins on the mat with the wearing of a rigid collar and transport respecting the head-neck-trunk axis. This was respected only for the girl who was injured during an international competition. The boy suffered his trauma during club training and was transported by non-medical means to a hospital. This could explain the occurrence of tetraparesis in the latter. In general, the management of dislocations can be done by reduction with temporary placement of external traction (Gardner's stirrup), or by manual traction under general anesthesia. The reduction is completed by an interbody osteosynthesis-graft of the level in question, performed via an anterior approach. For fractures and dislocations, they are approached by an anterior surgical approach, by performing a dissectomy or a corpectomy + graft + osteosynthesis [6]. In our study, athlete X was treated by dissectomy + C6-C7 arthrodesis via the anterior approach, which is the technique used to manage the dislocation. Athlete Y underwent a C4-C5-C6 dissectomy + C5 hemi-corpectomy + graft + C4-C6 arthrodesis. Both of these surgical techniques are consistent with literature data. Although the posterior surgical approach can be discussed in certain irreducible lesions or in the event of a compressive posterior bone fragment, the anterior surgical approach

remains the most used, allowing the often associated disc problem to be resolved.

In our study, we reported a disappearance of paresthesias at the first follow-up at 2 months and a consolidation at 4 months in judoka X, but the resumption of judo was done at 20 months. In judoka Y, consolidation was obtained at 6 months and return to sport at 28 months. Uzel et al, in their case, obtained consolidation at 3 months and a return to sport at the same level at 9 months [5]. This can be explained by the precautions taken by the surgeon who extended the recovery time in order to avoid early dismantling of the material and re-dislocation which could be fatal for the athlete.

References

- [1] Akoto R, Lambert C, Balke M, Bouillon B, Frosch KH, Höher J. Epidemiology of injuries in judo: a cross-sectional survey of severe injuries based on time loss and reduction in sporting level. *Br J Sports Med* 2018 ;52(17) :1109—15.
- [2] Godt P, vogelsang P. Uncommon judo injuries. Cervical disc herniation and acute high cervical cord damage associated with congenital stenosis of the cervical spinal canal. *Unfallheilkunde*, 1979 ; 82 : 215-218.
- [3] Wirbel R, Pistorius G, Braun C, Eichler A., Mutschler W. Bilateral vertebral artery lesion after dislocating cervical spine trauma. A case report. *Spine*, 1996 ; 21 : 1375-1380
- [4] Elena Pocco 1, Gerhard Ruedl, Nemanja Stankovic, Stanislaw Sterkowicz, Fabricio Boscolo Del Vecchio, Carlos Gutiérrez-García, Romain Rousseau.
- Injuries in judo: a systematic literature review including suggestions for prevention. *Br J Sports Med*. 2013 Dec ;47(18) :1139-43
- [5] A-P. Uzel, R. Massicot, O. Delattre, F. Lemonne. Fracture-luxation uni-articulaire C5-C6 lors d'une compétition de judo : L'uchi-mata en cause. *J. Traumatol. Sport* 2005, 22, 65-69
- [6] Campus de Neurochirurgie. Traumatology vertebra-médulaire.s.d
- [7] Takeshi Kamitani, Yuji Nimura, Shinji Nagahiro, Seiji Miyazaki and Taisuke Tomatsu *Am J Sports Med* 2013 41: 1915 originally published online June 13, 2013
- [8] Mr wadii BNOUHANNA, S.AIT BEN ALI : prise en charge des traumatismes du rachis cervical inférieur ; thèse /03/2007
- [9] Adil HABBAB, Y. Quamous, A. AKHADDAR : Prise en charge du rachis cervical traumatique en milieu de réanimation chirurgicale à l'hôpital militaire Avicenne à-propos de 20 cas ; thèse 140.
- [10] K.Kansoue , T Ogawa, M Fukano, T Fukubayashi. Severe head and neck injury and its prevention in judo. *Sport injuries and prevention*. Springer 2015 pp 75-85
- [11] Brito CJ, Castro Martins Roas AF, Souza Brito IS, et al. Methods of body-mass reduction by combat sport athletes. *Int J Sport Nutr Exerc Metab* 2012; 22:89–97.
- [12] Langan-Evans, Carl , Close, Graeme L , Morton, James P. Making weight in combat sports. *Strength Cond J* 2011 ;33 :25–39.
- [13] Lahlah Ismahane , Moussaoui Kahina : traumatisme du rachis cervical de l'enfant . thèse 2017/2018 CHU BEJAIA
- [14] Doran SE, Papadopoulos SM, Ducker TB, Lillehel KO. Magnetic resonance imaging documentation of coexistent traumatic locked facets of the cervical spine and disc herniation. *J. Neurosurg*, 1993 ; 79 : 341-345.
- [15] S J Rizzolo 1, M R Piazza, J M Cotler, R A Balderston, D Schaefer, A Flanders . Intervertebral disc injury complicating cervical spine trauma. *Spine*, 1991; 16 S: 187-189.
- [16] DE CREE Carl. Traumatic Atlanto-Axial Rotary Subluxation (AARS) in a 6-YearOld Child during Recreational Jūdō Practice: A Case Report and Mini-Review of Serious Neck Injuries in Jūdō. *Arch Sports Med* 3(1) 2019 :134-148.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

Conflict of Interest: NIL
Source of Support: NIL

How to Cite this Article

O.K Muluem, J.G. Tsiagadigui, L Fonkoue, N.G. Ndongmoui, U Chifen, N.O. Haman, V.P. Djientcheu | Cervical Spine Trauma in Cameroonian Judokas: Risk Factors and Prognosis in Three Cases in Yaounde | *Back Bone: The Spine Journal* | April 2023-September 2023; 4(1): 24-27 | <https://doi.org/10.13107/bbj.2023.v04i01.056>