

# Dentofacial injuries in contact sports in Yaounde, Cameroon

M. A. Agbor, C. C. Azodo<sup>1</sup>, N. E. F. Ngagoue

Department of Dental, Nkwen Baptist Health Centre, Bamenda, Cameroon, <sup>1</sup>Department of Periodontics, University of Benin, Benin City, Nigeria

Address for correspondence:

Dr. C. C. Azodo,  
Department of Periodontics,  
New Dental Complex,  
University of Benin Teaching Hospital,  
P.M.B. 1111 Ugbowo,  
Benin City, Edo State, Nigeria.  
E-mail: clementazodo@yahoo.com

## ABSTRACT

**Background:** Dentofacial injuries constitute serious problems among competitive and recreational athletes, worldwide. **Objective:** To determine the prevalence of dentofacial injuries and related factors among individuals participating in contact sports in Yaoundé, Cameroon. **Materials and Methods:** This cross-sectional study among individuals participating in karate, judo, basketball, handball, football and wrestling in Yaoundé, Cameroon was conducted between January and April, 2012. **Results:** Of the 240 athletes interviewed, 115 and 89 of them reported bodily and dentofacial injuries giving 47.9% and 37.1% prevalence, respectively. The bodily injuries were limbs-(60.0%), chest-(23.5%), abdomen-(11.3%) and neck- (5.2%). Mouth and face accounted for 52.8% and 37.1% of the dentofacial injuries, respectively. Other dentofacial injuries were teeth-(6.7%) and mandible-(3.4%). Older athletes and years of participation were more likely to experience dentofacial injuries. Karate was the most common cause of dentofacial injuries followed by wrestling. The prevalence of the dentofacial injuries was similar among both genders and was equally prevalent during training and competition. The personal protective equipment use reduced the likelihood of dentofacial injuries among the athletes. **Conclusion:** The prevalence of dentofacial injuries were high while the personal protective equipment use was low among the individuals participating in contact sports in Yaoundé, Cameroon.

## Key words

Dentofacial injuries, football, karate

## INTRODUCTION

Dentofacial injuries vary from very minor to extremely complex injuries and constitute serious health problems among competitive and recreational athletes worldwide.<sup>[1]</sup> The consequences of dentofacial injuries are substantial because of the potential for pain, emotional distress, psychological impact, and economic implications. It has been reported that untreated dentofacial injuries exhibit greater impact on daily living than other bodily traumatic injuries.<sup>[2]</sup> The extreme injuries essentially result in lifelong disability and deformity if the functional and cosmetic deformities from the injuries are untreated or not adequately treated.<sup>[3]</sup>

Cost analysis and evaluation showed that the mean cost

of maxillofacial and dental injuries are more than double the mean cost relating to all bodily injuries sustained in contact sports.<sup>[4]</sup> The treatment for sport-related dentofacial injury accounts for substantial treatment and care time in Maxillofacial and Accident and Emergency Departments of hospitals.<sup>[5]</sup> In ear nose and throat (ENT) Department of University hospital, sports-related head and neck injuries was reported as constituting about one-fifth of all the injuries related admissions.<sup>[6]</sup>

Sport-related dentofacial injuries occur in unacceptably high rate in both contact and non-contact sports partly due to the prominence of the face and relatively poor adherence to personal protective equipment use during sporting activities.<sup>[7,8]</sup> The increasing participating of individuals of varied age in sporting activities, from organized teams to the occasional weekend activities as professional, for self defense, health, recreational and relaxation purposes also contributes to the increasing prevalence of dentofacial injuries.<sup>[9]</sup>

Sporting activities has been reported as the most common cause of mandibular fractures,<sup>[10]</sup> the second most common cause of craniomaxillofacial trauma<sup>[11,12]</sup> and orodental injuries.<sup>[13]</sup> It accounted for one-sixth to

| Access this article online  |                                  |
|---|----------------------------------|
| Quick Response Code:  | Website:<br>www.ejgd.org         |
|  | DOI:<br>10.4103/2278-9626.101351 |

one-tenth of facial bone fracture<sup>[7,10]</sup> and approximately one-fifth of all maxillofacial fractures.<sup>[14]</sup> Tuli *et al.*<sup>[15]</sup> in Austria reported that sport accidents are six times and three times more likely to cause facial injuries than work accidents and violence or traffic accidents respectively.

The prevalence, nature, severity and impact of these injuries vary with geographical location, the age, gender and professionalism of the athletes, personal protective equipment use, types, nature and organization of the sports.<sup>[16-24]</sup> The majority of the sports-related traumatic dental injuries are preventable with the use of appropriate, properly fitted athletic equipment such as helmets, facemasks, and mouthguards.<sup>[24,25]</sup> These personal protective equipments which are highly recommended in collision and contact sports are critical in protecting against soft tissue lacerations, damage to the periodontium, mandibular and maxillary fractures, TMJ injuries and concussions. However, the use of personal protective equipments are still not mandatory, or rules not enforced, in many sporting activities in developing countries.<sup>[1]</sup>

Data on the prevalence and the prevention of dentofacial injuries in Cameroon are lacking in the literature despite the increasing participation across cities in the country. The objective of the study was to determine the prevalence dentofacial and bodily injuries and related factors among individuals participating in contact sports in Yaoundé, Cameroon.

## MATERIALS AND METHODS

This was descriptive cross sectional study of athletes involved in six different sports (karate, judo, basketball, handball, football and wrestling) in National Institute of Youth and Sport (NIYS), and other sport arenas within Yaoundé metropolis between the January and April, 2012.

The reason for the choice of these sports in this study is their increasing popularity and participation and their association with high prevalence of dentofacial injuries and sport-related dental injury claims in developed countries.<sup>[26-31]</sup>

Yaoundé is the political capital of Cameroon and also the second largest metropolitan city in the country with a population of approximately 1.5 million people. It lies in the center of the nation at an elevation of about 750 meters (2,500 ft) above. Yaoundé is the headquarters of the National Sports Academy and the Higher Institute of Youths and Sports where most coaches, sports teachers and trainers are trained. Apart from these institutions, there are other numerous sports grounds owned by the government, sports and recreational sports organizations in Yaoundé. The tool of data collection among participants was close and open-ended questions

containing questionnaire. The data elicited with the questionnaire include age, sex, duration of involvement in sporting activities, main reason for involvement in sporting activity, personal protective equipment use, ownership of family or personal dentist, injury experience and site in the last 12 months and actions taken in the event of injury. The questionnaires were hand distributed to athletes at the end of the training session for them to fill and return thereafter. The literate participants filled the questionnaires themselves while the researchers helped in filling of the questionnaires for the illiterates. Informed consent was obtained from participants after being informed of the research objective. Confidentiality and anonymity of participants were strictly taken into consideration during the data collection. Ethical approval for this research was obtained from the Ministry of Higher Education and Scientific Research of the Republic of Cameroon.

Data collected were subjected to descriptive statistics in form of frequencies, percentages and cross-tabulations using Statistical Package for the Social Sciences (SPSS) version 17.0. Age distribution of the participants were 11-20 years-88 (36.7%), 21-30 years-121 (50.4%) and 31-50 years-31 (12.9%) while the gender distribution were male-194 (90.8%) and female-46 (19.2%).

## RESULTS

Of the 240 athletes interviewed, 115 and 89 of them reported having experienced bodily and dentofacial injuries giving prevalence of 47.9% and 37.1%, respectively. The distribution of the bodily injuries were limbs-69 (60.0%), chest-27 (23.5%), abdomen-13 (11.3%) and neck-6 (5.2%). Mouth and face accounted for more than half (52.8%) and more than one-third (37.1%) of the dentofacial injuries, respectively. Other dentofacial injuries were teeth 6 (6.7%) and mandible 3 (3.4%). Older athletes in terms of age and years of participation were more likely to experience dentofacial injuries [Table 1]. Karate was most common of dentofacial injuries followed by wrestling. The prevalence of the dentofacial injuries was similar among both genders and was equally prevalent in training and competition [Table 1]. Professional athletes and athletes who have personal or family dentist were slightly less likely to experience dentofacial injuries than their counterparts [Table 1]. The majority of athletes that experienced dentofacial injuries sought dentist consultation [Table 1]. The use of personal protective equipment reduced the likelihood of dentofacial injuries among the athletes [Table 1].

## DISCUSSION

Participating in sports at almost any age, provides health benefits like offering great cardiovascular exercise, developing hand-eye coordination and fosters team

**Table 1: Prevalence of bodily and dentofacial injuries and related factors among the participants**

| Variables                         | Total N (%) | No injury n (%) | Other parts n (%) | Dentofacial variables n (%) |
|-----------------------------------|-------------|-----------------|-------------------|-----------------------------|
| Age group                         |             |                 |                   |                             |
| 11-20                             | 88          | 15 (17.0)       | 43 (48.9)         | 30 (34.1)                   |
| 21-30                             | 121         | 19 (15.7)       | 61 (50.4)         | 41 (33.9)                   |
| 31-50                             | 31          | 2 (6.5)         | 11 (35.5)         | 18 (58.1)                   |
| Sex                               |             |                 |                   |                             |
| Female                            | 46          | 8 (17.4)        | 21(45.7)          | 17 (37.0)                   |
| Male                              | 194         | 28 (14.4)       | 94 (48.5)         | 72 (37.1)                   |
| Type of sports                    |             |                 |                   |                             |
| Basketball                        | 25          | 3 (12.0)        | 14 (56.0)         | 8 (32.0)                    |
| Football                          | 63          | 7 (11.1)        | 37 (58.7)         | 19 (30.2)                   |
| Handball                          | 36          | 6 (16.7)        | 18 (50.0)         | 12 (33.3)                   |
| Judo                              | 82          | 15 (18.3)       | 39 (47.6)         | 28 (34.1)                   |
| Karate                            | 15          | 4 (26.7)        | 0 (0.0)           | 11 (73.3)                   |
| Wrestling                         | 19          | 1 (5.3)         | 9 (47.4)          | 9 (47.4)                    |
| Sport                             |             |                 |                   |                             |
| 1-5                               | 107         | 25 (23.4)       | 44 (41.1)         | 38 (35.5)                   |
| 6-10                              | 77          | 8 (10.4)        | 40 (51.9)         | 29 (37.7)                   |
| 11-15                             | 38          | 3 (7.9)         | 22 (57.9)         | 13 (34.2)                   |
| 16-20                             | 18          | 0 (0.0)         | 9 (50.0)          | 9 (50.0)                    |
| Reasons                           |             |                 |                   |                             |
| Distraction                       | 57          | 11 (19.3)       | 30 (52.6)         | 16 (28.1)                   |
| Health/Hygiene                    | 55          | 10 (18.2)       | 27 (49.1)         | 18 (32.7)                   |
| Professional                      | 108         | 13 (12.0)       | 51 (47.2)         | 43 (39.8)                   |
| Self defense                      | 9           | 1 (11.1)        | 0 (0.0)           | 8 (88.9)                    |
| Training                          | 11          | 0 (0.0)         | 7 (63.6)          | 4 (36.4)                    |
| Care seeking behavior for injury  |             |                 |                   |                             |
| No action taken                   | 116         | 17 (14.7)       | 58 (50.0)         | 41 (35.3)                   |
| Self medication                   | 65          | 10 (15.4)       | 34 (52.3)         | 21 (32.3)                   |
| Traditional healers               | 26          | 4 (15.4)        | 18 (69.2)         | 4 (15.4)                    |
| Consult dentist                   | 18          | 3 (16.7)        | 1 (5.6)           | 14 (77.8)                   |
| Visited doctor/nurse (13.3)       | 15          | 2               | 4 (26.7)          | 9 (60.0)                    |
| Event when injury occurred        |             |                 |                   |                             |
| Competition                       | 120         | 17 (14.2)       | 59 (49.2)         | 44 (36.7)                   |
| Training                          | 120         | 19 (15.8)       | 56 (46.7)         | 45 (37.5)                   |
| Personal protection equipment use |             |                 |                   |                             |
| Yes                               | 103         | 18 (17.5)       | 56 (54.4)         | 29 (28.2)                   |
| No                                | 137         | 18 (13.1)       | 59 (43.1)         | 60 (43.8)                   |
| Family/personal dentist           |             |                 |                   |                             |
| Yes                               | 31          | 6 (19.4)        | 14 (45.2)         | 11 (35.5)                   |
| No                                | 209         | 30 (14.4)       | 101 (48.3)        | 78 (37.3)                   |

work. However, there is no absolute safe kind of sport as participation in sporting and recreational activities is associated with increased risk of injuries among athletes. Of the 240 athletes interviewed in the study, 115 and 89 of them reported having experienced bodily and dentofacial injuries giving prevalence of 47.9% and 37.1%, respectively. These signify that bodily and dentofacial injuries occur in unacceptably high rate in contact sports in developing countries. The increasing popularity of sporting activities, the physical nature of the sporting activities and inadequate umpiring may explain the high prevalence of the injuries among the athletes. The prevalence of dentofacial injuries were higher than bodily injuries in individual sports (karate,

judo and wrestling) than team sports (football, handball and basketball) while the prevalence of bodily injuries were higher than dentofacial injuries in team sports than individual sports. The higher chances of falls, collision with players and devices and injury precipitating contact could be the explanation for the higher prevalence of bodily injuries in team sports. The fact that attack in the dentofacial region help an athlete in subduing the opponent may have contributed to the higher prevalence of dentofacial injuries in individual sports.

The constant improvement in the quality of life and growing interest in sporting activities have resulted in an increased use of sport at amateur level as common

leisure thereby contributing to steady increased in sport injuries since the late 1980s.<sup>[32]</sup> The prevalence of dentofacial injuries in this study was comparable to 34.5% documented among athletes in Nigeria<sup>[19]</sup> but lower than 57.9% documented in a National sports fiesta in Nigeria.<sup>[33]</sup> The enthusiastic participation of individuals of all ages and skill levels in sports activities due to the exciting nature is potential high risk for injuries. The face accounted for more than one-third (37.1%) of the dentofacial injuries in this study reflecting that the prominence of the face is a contributory risk factor for sports injuries. The other dentofacial injuries in this study included injuries to the mouth, mandible and teeth. It is known that dentofacial injuries are more commonly associated with contact sports than non-contact sports presenting as fractured facial bones, concussions, abrasions, bruises, tooth/teeth avulsion, tooth and alveolar fractures, soft tissue lacerations with bleeding and temporomandibular joint problems.<sup>[34]</sup> The association of facial injuries with significant morbidity, deformity, disability long lasting aesthetic and functional implications<sup>[7,8]</sup> due to their relative permanency, disfiguring nature and universally expensive nature of the treatment coupled with the undue questionable prognosis of injured teeth even the presence of appropriate and adequate treatment necessitates the need for preventive measures.

As established in a previous study, the prevalence of dentofacial injuries differed in various contact sports in this study with karate (73.3%) being the most common cause of dentofacial injuries followed by wrestling (47.4%) and judo (34.1%). These prevalence were higher than reported values in other studies on martial arts (32.1%)<sup>[35]</sup> and wrestling (33%).<sup>[31]</sup> The increased participation of athletes in these sports for self defense may have propelled them into excesses and extremism under inadequate umpiring leading to dentofacial injuries. Kvittem *et al.*<sup>[29]</sup> reported dentofacial injuries among approximately three-quarters of the wrestlers which was higher than reported prevalence in this study. The lower personal protective equipment use and the predominance of young athletes in the compared study were the possible explanation. In football, the prevalence of dentofacial and bodily injuries were 30.2% and 58.7% certifying it as the greatest and least cause of bodily and dentofacial injuries respectively in this study. The prevalence of dentofacial injuries among footballers in this study was comparable to 32.3% documented among Japanese high school soccer players<sup>[36]</sup> but higher than 20% reported by Teo *et al.*<sup>[31]</sup> among Singapore schoolboys, 23.1% by Ferrari *et al.*<sup>[35]</sup> among Brazilian competitive athletes and 27.6% by Kvittem *et al.*<sup>[29]</sup> among athletes attending Minnesota high schools.

As shown in this study, bodily injuries were higher than dentofacial injuries among basketball player which is tandem with the fact that foot, ankle, knee, back, and

hand injuries were found to occur most commonly among basketball players.<sup>[37]</sup> In basketball, the prevalence of dentofacial injuries was 32.0%. This was higher than 19% documented by Teo *et al.*<sup>[31]</sup> but lower than the 34%, 36.4%, 55.4% and 62.8% in basketball documented and reported by Flanders and Bhat,<sup>[38]</sup> Ferrari *et al.*<sup>[35]</sup> Kvittem *et al.*<sup>[29]</sup> and Azodo *et al.*<sup>[39]</sup> respectively. The relatively more popularity of basketball and presence of laurel winning competition in compared countries may be the explanation. One-third (33.3%) of handball players experienced dentofacial injuries which is lower than 37.1% reported by Ferrari *et al.*<sup>[35]</sup> among Brazilian competitive athletes.

Older athletes in terms of age and years of participation were more likely to have experienced dentofacial injuries. The increasing years of participation increases the chances of exposure which has been established among wrestlers in which older and more experienced athletes had greater total injury experience.<sup>[40]</sup> It may be related to the fact the incidence of dental and oral injuries is related to the length of training time.<sup>[22]</sup> It is also known that the risk of injury increases with higher level of competition when players are more committed and have more exposure. However in some sports, it is shown that younger age group is most at risk for dental injury because they were learning and that they play more frequently.<sup>[41,42]</sup>

No difference was found between males and females in total injury rate among children participating in Taekwondo competition with majority occurring in the lower extremities.<sup>[43]</sup> The prevalence of the dentofacial injuries was similar among both genders and was equally prevalent in training and competition. This differed from established findings in the literature giving the possibly clue to the fact that the pattern of dentofacial injuries in developing countries is significant varied with that in developed countries.<sup>[44]</sup>

Professional athletes and athletes who have personal or family dentist were slightly less likely to experience dentofacial injuries than their counterparts. Professionalism and organized nature in sporting activities among professionals and positive preventive health practices are possible factors that reduce the prevalence of dentofacial injuries. In contrast, professionals are significantly more likely than amateur athletes to experience of oral soft tissue laceration and dental injuries in basketball practice.<sup>[22]</sup> The majority of athletes that experienced dentofacial injuries sought dentist consultation and could be due to ownership of personal or family dentist thereby improving accessibility.

Participation in contact sports whether for an athletic competition or leisure activity is expected to be done using personal protective equipment. This is based on the fact that the sports activity which is a significant

source of enjoyment causes dentofacial injuries with their attendant morbidity.<sup>[42]</sup> Labella *et al.*<sup>[45]</sup> reported that custom-fitted mouthguards do not significantly affect rates of concussions or oral soft tissue injuries, but can significantly reduce the morbidity and expense resulting from dental injuries in basketball. In this study, the use of personal protective equipment resulted in less likelihood of dentofacial injuries among the athletes. These justified the need for mandatory personal protective equipment use as face guard and mouthguard legislation resulted in reduction in the incidence of orofacial injuries in sporting activities.

## CONCLUSION

The prevalence of bodily and dentofacial injuries were high while the use of personal protective equipment was low among the individuals participating in contact sports in Yaoundé, Cameroon. The need for policy formulation and preventive education geared towards improving periodical medical check-ups, an adequate level of umpiring and protective personal equipment use and decrease in the prevalence of dentofacial injuries.

## REFERENCES

- MacAfee KA 2<sup>nd</sup>. Primary care management of maxillofacial injuries in sports. *Penn Dent J (Phila)* 1994;93:16-7.
- Cortes MI, Marcenes W, Sheiham, A. Impact of traumatic injuries to the permanent teeth on the oral health-related quality of life in 12- to 14-year old children. *Comm Dent Oral Epidemiol* 2002;30:193-8.
- Kaufman BR, Heckler FR. Sports-related facial injuries. *Clin Sports Med* 1997;16:543-62.
- Sane J, Ylipaavalniemi P. Maxillofacial and dental soccer injuries in Finland. *Br J Oral Maxillofac Surg* 1987;25:383-90.
- Hill CM, Burford K, Martin A, Thomas DW. A one-year review of maxillofacial sports injuries treated at an accident and emergency department. *Br J Oral Maxillofac Surg* 1998;36:44-7.
- Frenguelli A, Ruscito P, Bicciolo G, Rizzo S, Massarelli M. Head and neck trauma in sporting activities: Review of 208 cases. *J Cranio-Maxillofac Surg* 1991;19:178-81.
- Tanaka N, Hayashi S, Amagasa T, Kohama G. Maxillofacial fractures sustained during sports. *J Oral Maxillofac Surg* 1996;54:715-9.
- Echlin P, McKeag DB. Maxillofacial injuries in sport. *Curr Sports Med Rep* 2004;3:25-32.
- Padilla R, Balikov S. Sports dentistry: Coming of age in the '90s. *J Calif Dent Assoc* 1993;21:27-34.
- Emshoff R, Schöning H, Röthler G, Waldhart E. Trends in the incidence and cause of sport-related mandibular fractures: A retrospective analysis. *J Oral Maxillofac Surg* 1997;55:585-92.
- Gassner R, Tuli T, Hächl O, Moreira R, Ulmer H. Craniomaxillofacial trauma in children: A review of 3,385 cases with 6,060 injuries in 10 years. *J Oral Maxillofac Surg* 2004;62:399-407.
- Gassner R, Tuli T, Hächl O, Rudisch A, Ulmer H. Cranio-maxillofacial trauma: A 10 year review of 9,543 cases with 21,067 injuries. *J Craniomaxillofac Surg* 2003;31:51-61.
- Levin L, Samorodnitsky GR, Schwartz-Arad D, Geiger SB. Dental and oral trauma during childhood and adolescence in Israel: occurrence, causes, and outcomes. *Dent Traumatol* 2007;23:356-9.
- Antoun JS, Lee KH. Sports-related maxillofacial fractures over an 11-year period. *J Oral Maxillofac Surg* 2008;66:504-8.
- Tuli T, Hächl O, Hohlieder M, Grubwieser G, Gassner R. Dentofacial trauma in sport accidents. *Gen Dent* 2002;50:274-9.
- Mischkowski RA, Zöller JE. Athletic injuries in mouth, jaw and facial surgery. *Sportverletz Sportschaden* 1998;12:152-61.
- Hill CM, Burford K, Martin A, Thomas DW. A one-year review of maxillofacial sports injuries treated at an accident and emergency department. *Br J Oral Maxillofac Surg* 1998;36:44-7.
- Levin L, Friedlander LD, Geiger SB. Dental and oral trauma and mouthguard use during sport activities in Israel. *Dent Traumatol* 2003;19:237-42.
- Onyeaso CO. Oro-facial trauma in amateur secondary school footballers in Ibadan, Nigerian: A study of mouthguards. *Odontostomatol Trop* 2004;27:32-6.
- Cornwell H. Dental trauma due to sport in the pediatric patient. *J Calif Dent Assoc* 2005;33:457-61.
- Mourouzis C, Koumoura F. Sports-related maxillofacial fractures: a retrospective study of 125 patients. *Int J Oral Maxillofac Surg* 2005;34:635-8.
- Ma W. Basketball players' experience of dental injury and awareness about mouthguard in China. *Dent Traumatol* 2008;24:430-4.
- YeşilDuymuş Z, Gungor H. Use of mouthguard rates among university athletes during sport activities in Erzurum, Turkey. *Dent Traumatol* 2009;25:318-22.
- Hwang KG, Chung H. The dental trauma in general hospital. *J Hard Tissue Biol* 2005;14:55-5.
- Ranalli DN. Sports dentistry in general practice. *Gen Dent* 2000;48:158-64.
- Lee-Knight CT, Harrison EL, Price CJ. Dental injuries at the 1989 Canada games: An epidemiological study. *J Can Dent Assoc* 1992;58:810-5.
- Kujala UM, Taimela S, Antti-Poika I, Orava S, Tuominen R, Myllynen P. Acute injuries in soccer, ice hockey, volleyball, basketball, judo, and karate: Analysis of national registry data. *BMJ* 1995;311:1465-8.
- Kvittem B, Roettger M. Prospective epidemiological study of orofacial injuries in high school sports. *J Public Health Dent* 1998;58:288-93.
- Kvittem B, Hardie NA, Roettger M, Conry J. Incidence of orofacial injuries in high school sports. *J Public Health Dent* 1998;58:288-93.
- Love RM, Carman N, Carmichael S, MacFadyen E. Sport-related dental injury claims to the New Zealand Accident Rehabilitation and Compensation Insurance Corporation, 1993-1996: Analysis of the 10 most common sports, excluding rugby union. *N Z Dent J* 1998;94:146-9.
- Teo CS, Stokes AN, Loh T, Bagramian RA. A survey of tooth injury experience and attitudes to prevention in a group of Singapore schoolboys. *Ann Acad Med Singapore* 1995;24:23-5.
- De Giovanni PP, Mazzeo R, Servadio F. Sports activities and maxillofacial injuries. Current epidemiologic and clinical aspects relating to a series of 379 cases (1982-1998). *Minerva Stomatol* 2000;49:21-6.
- Onyeaso CO, Adegbesan OA. Oro-facial injury and mouthguard usage by athletes in Nigeria. *Int Dent J* 2003;53:231-6.
- Badel T, Jerolimov V, Pandurić J, Carek V. Custom-made mouthguards and prevention of orofacial injuries in sports. *Acta Med Croatica* 2007;61(Suppl 1):9-14.
- Ferrari CH, Ferreria de Medeiros JM. Dental trauma and level of information: Mouthguard use in different contact sports. *Dent Traumatol* 2002;18:144-7.
- Yamada T, Sawaki Y, Tomida S, Tohnai I, Ueda M. Oral injury and mouthguard usage by athletes in Japan. *Dent Traumatol* 1998;14:84-7.
- Henry JH, Lareau B, Neigut D. The injury rate in professional basketball. *Am J Sports Med* 1982;10:16-8.
- Flanders RA, Bhat M. The incidence of orofacial injuries in sports:

- A pilot study in Illinois. *J Am Dent Assoc* 1995;126:491-6.
39. Azodo CC, Odai CD, Osazuwa-Peters N, Obuekwe ON. A survey of orofacial injuries among basketball players. *Int Dent J* 2011;61:43-6.
  40. Pasque CB, Hewett TE. A prospective study of high school wrestling injuries. *Am J Sports Med* 2000;28:509-15.
  41. Holmes C. Mouth protection in sport in Scotland- A review. *Br Dent J* 2000;188:473-4.
  42. Lim LH, Moore MH, Trott JA, David DJ. Sports-related facial fractures: A review of 137 patients. *Aust N Z J Surg* 1993;63:784-9.
  43. Pieter W, Zemper ED. Head and neck injuries in young taekwondo athletes. *J Sports Med Phys Fitness* 1999;39:147-53.
  44. Linn EW, Vrijhoef MM, de Wijn JR, Coops RP, Cliteur BF, Meerloo R. Facial injuries sustained during sports and games. *J Maxillofac Surg* 1986;14:83-8.
  45. Labella CR, Smith BW, Sigurdsson A. Effect of mouthguards on dental injuries and concussions in college basketball. *Med Sci Sports Exerc* 2002;34:41-4.

**How to cite this article:** Agbor MA, Azodo CC, Ngagoue N. Dentofacial injuries in contact sports in Yaounde, Cameroon. *Eur J Gen Dent* 2012;1:24-9.  
**Source of Support:** Nil, **Conflict of Interest:** None declared.

## Author Help: Online submission of the manuscripts

Articles can be submitted online from <http://www.journalonweb.com>. For online submission, the articles should be prepared in two files (first page file and article file). Images should be submitted separately.

1) **First Page File:**

Prepare the title page, covering letter, acknowledgement etc. using a word processor program. All information related to your identity should be included here. Use text/rtf/doc/pdf files. Do not zip the files.

2) **Article File:**

The main text of the article, beginning with the Abstract to References (including tables) should be in this file. Do not include any information (such as acknowledgement, your names in page headers etc.) in this file. Use text/rtf/doc/pdf files. Do not zip the files. Limit the file size to 1 MB. Do not incorporate images in the file. If file size is large, graphs can be submitted separately as images, without their being incorporated in the article file. This will reduce the size of the file.

3) **Images:**

Submit good quality color images. Each image should be less than 4096 kb (4 MB) in size. The size of the image can be reduced by decreasing the actual height and width of the images (keep up to about 6 inches and up to about 1800 x 1200 pixels). JPEG is the most suitable file format. The image quality should be good enough to judge the scientific value of the image. For the purpose of printing, always retain a good quality, high resolution image. This high resolution image should be sent to the editorial office at the time of sending a revised article.

4) **Legends:**

Legends for the figures/images should be included at the end of the article file.