

Full Length Research Paper

Nature and Incidences of musculoskeletal injuries in Nigeria male amateur boxing engagements

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Accepted 27 July, 2012

Boxing is a combat sport in which two men or women fight each other using punching strikes for competition and it is often associated with injuries. Bulk of the studies on injury incidence and prevalence in amateur and professional boxing have concentrated on head and brain injuries with attendant insufficient knowledge on the musculoskeletal injury incidences affecting the other regions of the body. Clear understanding of the incidence and nature of musculoskeletal injuries among amateur boxers will assist in providing preventive measures that can result in enhanced performance of this group of athletes. This study therefore aims at evaluating the nature and incidences of musculoskeletal injuries associated with amateur boxing among Nigerian athletes. Twenty nine (29) male amateur boxers who were in training camps preparatory to the 7th Commonwealth and 10th All African Games (between 2010 and 2011) and competed in an international boxing competition within the period formed the subjects for this study. The camp period lasted for sixteen (16) weeks altogether during which the athletes trained daily, sparred and competed. Data concerning each individual athlete and the injuries sustained within the period were recorded by the team physical therapist. Subjects' ages ranged between 21 and 27 years (mean = 22.50 ± 2.72 years), weight ranged between 50 and 99.35 kg (mean = 71.43 ± 13.42 kg) and height ranged between 1.62 and 1.88 m (mean = 1.75 ± 0.08 m). They are all right hand dominant participants whose competition weight categories ranged between light fly (49 Kg) and heavy weight (91 Kg) categories. The study design is a prospective cohort. Descriptive statistics of mean and percentages were used in establishing the percentage of injuries, incidences, types, patterns and body regions affected. A total of one hundred and thirteen (113) injuries were recorded within the period of the study. There was a 3.9 injury incidence rate per athlete, the upper limb (specifically the hands) was commonest site of musculoskeletal injuries (~54%) while the back (spine) was the least affected part of the body (4.42%). The most prevalent types of injuries were sprains, strains and contusions (59%), while dislocation (0.8%) and nasal cartilage fracture (1.8%) were least prevalent. Recurrent injuries/ acute on chronic injuries (69%) were more than chronic (31%) injuries. The average number of training days the injured athletes missed due to injuries was 2. The findings of this study suggest that amateur boxing is an injury prone sports, though with low incidence rate. Most injuries were acute on chronic that were recurrent in nature and affected the joints structures integrity. The patterns are typical of the sport affecting the hand and face more commonly. Although the injuries were traumatic, they were predominantly mild to moderate and usually not serious injuries. Their managements were effected immediately and spontaneously care to prevent complications and deformities.

Keywords: Amateur boxing, Injuries nature, incidence, male.

INTRODUCTION

Boxing is one of the organized high contact sports with

light rate of combat. It implies using premeditated punches to the opponent's head and body (trunk) in order to achieve victory, both at professional and amateur levels (Khani et al., 2012). A win is also achievable in either of professional or amateur boxing by scoring more

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points than an opponent. It involves delivering more blows to the designated scoring regions of the body (trunk and head), or by an opponent being unable to complete a bout (Zazryn et al., 2006). An analysis of the injuries in each category is important, as different injury patterns may exist (Zazryn et al., 2006).

Involvement in boxing sport has many advantages and its participation is increasing. Unfortunately, injuries in youth sports account for substantial morbidity and cost. Injury prevention interventions have been successful in preventing the occurrence or decreasing the severity of sports injuries through many mechanisms including development and enforcement of safety rules, protective gear, and changes in sports equipment and environments (Cheng et al., 2000).

In spite of safety measures put in place to make amateur boxing a safe sport, its players are still exposed to many musculoskeletal injuries of different types and patterns as in other contact sports (Pappas, 2007). There exists concerns about serious risks for injuries in boxing which have started a debate in the medical community about whether or not boxing should be banned (Pappas et al., 2006; Zazryn et al., 2003). Inflicting damage on your opponent is deliberate and not accidental and that is what distinguishes it from other sports and also makes boxing so controversial and polarizing (Zazryn et al., 2003).

Sports managers all over the world are searching for ways of enhancing sports athletes' performance. Injuries sustained during training and competitions are parts of the limiting factors to success in sports. Injury prevention among athletes is therefore of paramount importance in sporting events (Laoruengthana et al., 2009). Sports injuries account for substantial morbidity and medical cost (Cheng et al., 2000) in sports industry. Musculoskeletal injuries constitute the largest class of athletic injuries sustained in sports. Much of the available literature have reported different degrees of injuries among professional boxers (Zazryn et al., 2003; Loosemore et al., 2007; Giovanazzo et al., 1987). However, such reports have focused attention on brain/head and facial injuries with the neglect of or little attention to the regions of other body that are affected in boxing. Moreover, not many studies have reported injury incidences and patterns on amateur boxers and the few available are foreign studies which are also predominantly retrospective analysis of injuries sustained during competitions. Literature abound in other sports like basketball, athletics, taekwondo, hockey and weightlifting but are very scarce for boxing (Backx et al., 1991; Cunningham et al., 1996).

Few literature that are available on amateur boxers' injuries have reported varying degrees of injuries to different body regions. Hand injuries are among the more frequently seen problems in boxing. The majority of these are soft-tissue injuries, sprains and strains but occasional fractures of the hand are also seen though

infrequent (Pappas, 2007; Porters et al., 1996). A few previous studies have reported injuries in female boxing and have concentrated on core medical reports and illnesses which the athletes had during training and competitions, a few of which required hospitalization (Massimiliano et al., 2011; Timm et al., 1993). Some of the previous studies have also reported injuries amongst both male and female boxers (Bledsoe et al., 2005) and some have documented amateur and professional boxers injuries together (Zazryn et al., 2006). Some studies have also accounted for and compared injuries in boxing with those in other combat sports like wrestling and martial arts (Pappas, 2005), and other popular sports like football, basket and soccer (Porters et al., 1996).

It is known that body regions like the head/face, upper extremities and the trunk majorly suffer assaults from amateur and professional boxing training and bouts but to different degrees. In spite of this knowledge, there is still scarcity of current and specific data on the incidences of injuries in amateur boxing, especially in Nigeria and other major parts of Africa. Updated and reliable classification of the nature, type and incidences of injuries is a prerequisite to the development of successful injury prevention strategies and implementation of treatment and management of injuries in any sports.

The aim of this study therefore was to prospectively document the incidences and nature of injuries sustainable during amateur boxing training and competition bouts among Nigerian amateur boxers.

MATERIAL AND METHODS

Participants

Twenty-nine (29) male amateur boxers who were in national training camp preparatory to international events of 7th Commonwealth Games and the 10th All African Games were prospectively studied. The weight classifications ranged between light fly (49Kg) and heavy weight (91Kg) categories.

Procedures

All the injuries sustained during the training camp period that lasted sixteen (16) weeks were assessed and documented. As a pre-requisite for safe participation in the camp, all athletes were medically evaluated for pre-existing injuries and adverse medical conditions by the attached physical therapist and the medical doctor who constituted the medical team for documentation and or possible medical attention. During the camp period, athletes trained twice daily, morning and evening everyday, except on Sunday mornings when they only jogged around the training gymnasium. The boxers participated in international friendly boxing competition

Table 1. Physical and body composition parameters of the participants

Parameters	Mean	SD±	Range
Age (yrs)	22.50	±2.72	17-27
Weight (Kg)	71.43	±13.42	50-99.35
Height (m)	1.75	±0.08	1.62-1.88
BMI (kg/m ²)	23.17	±3.26	
WHR	0.86	±0.03	

SD= Standard Deviation; yrs= years; Kg= Kilograms; Kg/m²= Kilograms per square meter

Table 2. Incidences of musculoskeletal injuries according to affected body region.

Body region affected	N	%
Upper Extremities	60.9	53.89
Back regions (spine)	4.99	4.42
Lower extremities	13.85	12.26
Head/ face injuries	34.2	30.27

N= Frequency; %= Percentage

Table 3. Incidences of injury types

Type of Injury	N	%
Strains/ Sprains	63	59.44
Joint dislocation	1	0.8
Nasal cartilaginous fracture	2	1.8
Nasal bleeding	2	1.8
Facial Lacerations	24	27.12
Bruises	8	9.04

N= Frequency; %= Percentage

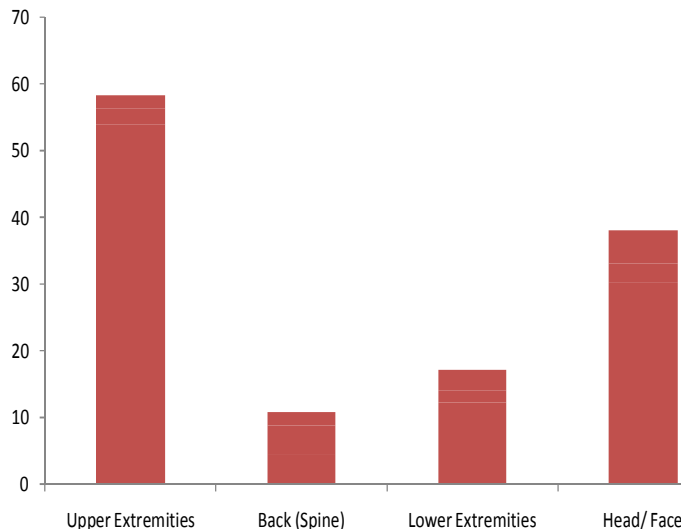
within the period of camping. All resultant injuries at the camp were recorded in the case file of each athlete by the medical team and attentions were given to the injured athletes. Anatomical regions affected by each injury, mechanism and severity, investigative and diagnostic methods, treatment interventions of all injuries were also recorded for each injured athlete.

Ethical permission

Ethical approval was sought and obtained from the Sports Medicine Centre of the National Sports Commission, Nigeria.

Statistical Analysis

Data of injuries obtained were analyzed using the descriptive analysis of frequency counts, means and percentages to determine the frequency of occurrence of a particular injury.

**Figure 1.** Bar chart showing the percentage of injury affectation of different body regions.

RESULTS

As in table 1, the participants ages ranged between 17-27 years (mean= 22.50 ± 2.72 years), and body weight ranged between 50 and 99.35kg (mean= 71.43± 13.42kg) and height ranged between 1.62 and 1.88m (mean= 1.75 ± 0.08m). The mean body mass index of the participants in the study is 23.17±3.26 kg/m² and the mean waist to hip ratio is 0.86±0.03. A total of one hundred and thirteen (113) injuries were recorded within the period of the study. All the athletes sustained one form of injury or the other which brought the incidence rate to 3.9 injuries per athlete. There was 1.0 injury incidence per period. The injuries ranged from mild (58%) to moderate (31%), in terms of severity, most injuries are acute on chronic injuries (69%) rather than chronic injuries (31%). In relating injuries to body regions, about sixty-one (53.89%) of the total injuries were upper extremities injuries, twenty-four (21.23%) were lacerations, ten (9.04%) were bruises and contusions on the face (supra-orbital ridges and zygomatic areas), five (4.42%) were back injuries (neck and lumbar) and there were about 14 (12.26%) affecting the lower extremities (ankle) as reflected in table 2. In terms of specific injury diagnosis, twenty-six (23%) of all the injuries sustained were strain/tenonitis affecting the shoulder (15%), elbow (5.3%) and wrist (2.7%) joints. There were thirty-six (31%) joint sprain injuries affecting the interphalangeal (11.5%), metacarpophalangeal (18.6%) and ankle (1.8%) joints. In addition, there was one (0.88%) incidence of metacarpophalangeal joint dislocation, one (0.88%) incidence of nasal cartilage fracture, two (1.8%) cases of nasal injuries with bleeding and two (1.8%) incidences of fracture of the alveolar bone of the teeth (table 3). The average recommended number of missed days for most injuries was two (2) days except for nasal injuries.

DISCUSSION

Much of the studies on injury incidence and prevalence in amateur and professional boxing have concentrated on head and brain injuries (Ryan, 1988; Khani et al., 2012; Loosemore et al., 2007; Giovinazzo et al., 1987; Zazryn et al., 2003), with only a few directly investigating and reporting musculoskeletal injury incidences affecting the other regions of the body. This is the first known study prospectively collecting data on musculoskeletal injuries sustained during training and competition among amateur boxers in Nigeria and possibly in Africa. The results of the present study have revealed that amateur boxing, though an injury prone sports, has low incidence of injury. It revealed an incidence rate of 3.9 injuries per athlete and 1.0 rate weekly per period of the camp. The highest number of injuries affected the upper extremities and the least involving the back. The results have also showed that most amateur boxing injuries are acute on chronic injuries. Moreover, most injuries are localized in the hand (knuckles) with sprains of the metacarpophalangeal joints being the most frequent. Low incidence of injuries among amateur boxers as found in this study is similar to the reports of other studies (Casey et al., 2011; Porter et al., 1996; Timm et al., 1993; Massimiliano et al., 2011). This study, however, revealed 3.9 injury incidences per athlete while Casey et al., (2011) reported 0.57 mean injury per athlete while Porter et al., (1996) recorded 0.92 injury incidence per man-hour of play. The outcome of this study recording highest incidence of injuries on the upper extremities (hands specifically) is supported by the findings of other researchers (Casey et al., 2011; Timm et al., 1993; Porter et al., 1996; Massimiliano et al., 2011) who also recorded hands being the most common site of injuries in amateur boxing. The finding in this study which recorded sprains and strains as the most common injuries in amateur boxing agrees with the results of Timm et al., (1993) who put together joint-based soft tissue injuries as joint and muscle strains and tendonitis.

The present study has found injuries involving the head and face in form of lacerations, contusions and bruises as second next common injuries among the amateur boxers. The observation is in line with the record of Timm et al., (1993) who also recorded head and face injuries as the second most common injuries among the amateur boxers studied by them.

The present study recorded 12.26% and 4.42% for lower extremities and back (spine) respectively, representing the third and fourth most common injury sites in amateur boxers. Timm et al., (1993) have also reported similar observation of lower extremities and spinal column, representing 15% and 9% injuries as the third and fourth common injuries among the United States-based amateur boxers in their research.

The knee joint (located in the lower extremity body region) was also found to be the third most common injury site along with nose at the same frequency in the

study of Casey et al., (1993) among amateur boxers in Ireland. However, Porter et al., (1996) found knee along with shoulder joint injuries as most debilitating in their study among amateur boxers in Ireland.

Soft tissue facial lesions, zygomatic bruise and eyelid hematoma were found to be among the most common mild injuries amongst female boxers in Italy (Massimiliano et al., 2011).

Specifically, the present study found 3.6% nasal injuries involving nasal cartilaginous fracture and bleeding among the participants. This result is in agreement with the findings of other author in this area (Massimiliano et al., 2011). However, this finding is not in consonance with the observations of Casey et al., (2011) and Timm et al., ((1993) who found 8.6% nasal injuries and 19% head/face injuries respectively among their participants.

The present study revealed that the bulk of the injuries sustained in male amateur boxing were mild to moderate and not severe/serious injuries that required hospitalization. This observation is in agreement with the findings of most other related literature (Timm et al., 1993; Porter et al., 1996).

CONCLUSION

The present study provides clear evidence that male amateur boxing is associated with musculoskeletal injuries mostly soft tissues which affect the upper extremities (specifically the hands) most commonly and the head/ face as the next common injury prone body part with the back (spine) least affected. The most common types of injuries are strains and sprains, which are majorly recurrent. Facial contusions, lacerations and bruises are moderately common while fractures and dislocations occur rarely. It is concluded that serious injury risks in male amateur boxing are minimal. Adequate rehabilitation programme is required to prevent chronic hand injuries.

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