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Sport and Recreation Alliance Concussion in School Sport Working Party –
Safeguarding in Martial Arts Working Group.

Input at request of Karate Union of Great Britain.

I am writing to discuss the issue of concussion in school sport, specifically relating to martial arts and Shotokan karate. I will discuss:

1. The definition of martial arts and relevance to school sport.
2. The definition of concussion and significance in all age groups and specifically in school age children.
3. The rationale why concussion in all sports including karate must be minimised.
4. Ways forward to improve safety in martial arts in school sport.

1. The definition of martial arts and relevance to school sport.

‘Martial arts’ is a general term that encompasses a variety of different sports and disciplines. A Wikipedia definition is that ‘martial arts are codified systems and traditions of combat practices which are practiced for a variety of reasons: as self defence, military and law enforcement applications :as competition, physical fitness, mental and spiritual developmentAlthough the term martial art has become associated with the fighting arts of eastern Asia, it originally referred to the combat systems of Europe.’

It is clear that one type of martial art such as karate can be very different from another such as judo and as such using the generic term martial arts may not be helpful in discussing specific injury rates or patterns.

For the purpose of discussing injury rates and specifically concussion in martial arts or any combat sport, a practical distinction is to divide them into two groups. Group 1 where full contact to the head is sanctioned and Group 2 where full contact is specifically prohibited.

In group 1 a knockout or injury that prevents further continuation is rewarded with a win to the participant delivering the blow, kick or submissive technique. This is a result of training in full contact blows with the aim of causing injury. This group includes professional boxing, mixed martial arts eg UFC, cage fighting, Muay Thai boxing, full contact Karate. Medical assessment of participants may confirm fitness to participate but does not prevent against injury. The use of protective gloves, foot guards or head guards does not prevent the development of brain injury, either concussion or more serious injury such as subdural haematoma (bleeding of the brain).

Group 2 is characterised by specific rules and regulations prohibiting full contact to the head with punches or kicks. If injury occurs then the participant delivering the technique is penalised and possibly disqualified. Education and regulation of referees is important. The emphasis of training is therefore on control of techniques and avoidance of dangerous techniques. Whilst injuries and concussion can sometimes occur this is not the aim of training or competition. (This may be analogous to collision sports such as rugby union where poor tackling technique such as shoulder tackling without arms has been shown to increase the rate of concussion and has been banned.) Shotokan Karate as practiced by the Karate Union of Great Britain is in this group as are other martial arts recognised by Sport England such as Tae Kwon-do.

2. The definition of concussion and significance in all age groups and specifically in school age children.

Concussion is derived from the Latin term 'to shake violently'. Concussion is a brain injury and is defined as a complex pathophysiological process affecting the brain, induced by biomechanical forces. (Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012).

Initially it was thought that an impact that lead to concussion only produced a temporary disturbance of brain function caused by neuronal, chemical, neuroelectrical or vascular changes without gross structural damage. There is now increasing evidence that, whilst there may be a complete recovery, for many people suffering concussion there may be structural damage to blood vessels, neurons (nerve cells) and glial cells (supporting brain cells). The brain is increasingly vulnerable following a concussion which can lead to post concussional syndrome, increased likelihood of a second concussion following return to sport, increased risk of catastrophic second impact syndrome following early return and if there are repeated

concussions long term chronic traumatic encephalopathy may occur (dementia pugilistica or punch drunk syndrome).

Concussion may occur without loss of consciousness or 'knockout' and can include one or more of the following clinical domains:

Symptoms—somatic (eg, headache), cognitive (eg, feeling like in a fog) and/or emotional symptoms (eg, lability);

Physical signs (eg, loss of consciousness (LOC), amnesia);

Behavioural changes (eg, irritability);

Cognitive impairment (eg, slowed reaction times);

Sleep disturbance (eg, insomnia).

The symptoms may recover in 80-90% of people in 7-10 days but this recovery may be longer in children and adolescents. Following full recovery of orientation and new memory formation a post concussional syndrome may exist of irritability, poor short-term memory, fears, sleep disorders, learning difficulties, easy fatigability and headaches. This has significant implications for students of school age especially if facing important academic examinations. The occurrence of a concussion has been documented as a risk factor for further head injuries in both children and adults.

In conclusion concussion is not a trivial injury and has potentially significant short term and long term consequences. Every effort should be made to minimize the risk of concussion for school sport.

3. The rationale why concussion in all sports including karate must be minimised.

There has been significant media interest recently in the long term effects of repetitive head injuries and concussion in soccer from heading the ball, American football with chronic traumatic encephalopathy and in rugby union. An historic initial resistance to accept the significance of concussion in these sports has now changed to a recognition and emphasis to promote safe play and minimize the risk. For sports, such as Group 2 martial arts (as above) where the aim is not to cause injury then there should be a continuous emphasis on

minimizing risk of concussion. Group 1 sports, which allow full contact blows and kicks to the head, I feel, should have no place in school sports and for school age children.

4. Ways forward to improve safety.

Education: Children and parents – precise information should be available as to the potential risk of any martial art being undertaken, eg rules of competition, training, whether contact to the head is allowed.

Instructors and referees – any organisation should have defined rules and regulations as to competition and training, including the environment, protective equipment, medical facilities etc. Education as to the symptoms and signs of concussion and removal from competition and seeking medical advice should be prescriptive.

Documentation/data collection:

Injury surveillance systems have been introduced in many sports allowing informed decisions to be made. The Sport and Recreation Alliance should consider promoting data collection and analysis of concussion in school sport.

5. Conclusions:

Morally and ethically it is not possible to justify teaching children any sport which allows full contact blows or kicks to the head (Group 1- as defined above) due to the inevitable brain injury that will occur. Any organisation that does sanction this would need to clarify its legal position in view of the significant evidence of the long term effect of any head injury including concussion and the informed consent of its participants.

I am writing from my experience as a Consultant Neurosurgeon at Brighton and Sussex University Hospitals NHS Trust and Honorary Clinical Senior Lecturer at Brighton and Sussex Medical School. I am a member of the British Neurotrauma Group and the Sports and Exercise Medicine Section of the Royal Society of Medicine. I have written articles on the epidemiology of head injuries and injury rates in Shotokan karate. I have been a member of the Karate Union of Great Britain for over 30 years. I receive no payment from the KUGB and confirm that these views are my own.

Giles Critchley 8th April 2016

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