Concussion management by coaches of Taekwon-Do

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Every day 90 New Zealanders sustain a brain injury (Brain injury New Zealand, 2007). The number of concussions occurring is most likely underestimated with research showing that 49% of athletes who sustain a concussion do not report it (Beaumont, 2009). The severity of a sport concussion is not to be underestimated and it is critical for a coach to have adequate knowledge and understanding of traumatic brain injury. This paper will give a brief overview of concussions in the martial art of Tae Kwon Do in order to raise awareness of concussion and its prevention, ringside care and post concussion management as supported by current research.

Concussion is a disturbance in brain function caused by deformation of neural tissue due to direct or indirect trauma to the brain which can occur with or without loss of consciousness (Jordan, 2009). A concussion varies from mild to severe and repeatedly concussion cause a cumulative effect named 'second impact syndrome' (Beaumont, 2009) Second impact syndrome is defined as an acute swelling and bleeding in the brain from a second trauma occurring before the first injury has resolved. This syndrome is common in athletes but is difficult to treat, often resulting in longer lasting post concussion symptoms and death in up to 50% of cases (The New Zealand guideline group, 2006; Brain injury New Zealand, 2007; Beaumont, 2009). Second impact syndrome can lead to chronic traumatic brain injury with serious neurological consequences including physical, cognitive, emotional and behavioural impairment, fatigue and impaired social interaction (brain association; Beaumont, 2009). Research in boxing has provided evidence with approximately 17% of retired professional boxers developed early symptoms of mild confusion and ataxia quickly progressing to a "Parkinsonian" cognitive decline (Beaumont, 2009).

The highest incidence of concussions is in contact sports and are the most common injury that occurs in martial arts. During competition the incidence increases with the head being the most frequent area to receive injury (Langley, Johnson, Slatyer, Skilbeck & Thomas 2010; Yoh, 2002; Pieter, Rostami & Ziaee, 2010). Since Tae Kwon Do competitor numbers in New Zealand are increasing in competitions nationally and internationally our coaches and individuals need a clinical understanding of the pathology and complications of concussion. This knowledge will help the coach and student to make well informed and safe decisions regarding post concussion management. Putukian, Aubry and McCrory (2009) emphasizes that concussions have a higher incidence in non-athletes who are predominantly younger. Although they have a longer recovery time, they often have less resources available to them so rely on parents and coaches to make decisions for their management.

The first section of this paper describes the signs and symptoms of a concussion, when to return to play and finishes with how to prevent concussions occurring in Tae Kwon Do.

What do we do if someone is unconscious?

As previously stated a concussion can occur if somebody is conscious (alert) or not. If someone is not conscious the New Zealand ACC guidelines recommend using the ABC's of life. The first step toward being a safe and effective coach is to keep your first aid certificate updated.

- Airways (If your airway is blocked you are unable to breath)

Open individuals mouth
Remove anything blocking airway

- Breathing

Is the individual breathing? If not, start mouth to mouth resuscitation
Tilt head back to open airway, block individuals nose, slow long breath into the individual

- Circulation

Is there a pulse? If not, start Cardio Pulmonary Resuscitation (CPR)
Place a hand under the individuals armpit, flow that line with your hand to the middle of the chest, start chest compressions.
30 compressions, 2 breaths
Stabilise individuals head and neck, GET HELP
(The New Zealand guideline group, 2006)
How do we identify a concussion?
If you suspect a concussion take the individual to the nearest A&E immediately.
Common symptoms;

- A vacant stare
- Slow responses
- Slurred or incoherent speech
- Forgets events prior to or after impact
- Unable to focus attention
- Disorientated
- Uncoordinated
- Emotionally confused
- Dazed or stunned
- Feeling sick
- Double or fuzzy vision
- Ringing in the ears
- Loss of consciousness
- Headache
    - Pupils different in size
    - Sensitivity to light or noise
- Feeling sluggish, groggy or dizzy
- Concentration or memory problems

(The New Zealand guideline group, 2006)

Symptoms are a physical display of the damage that has occurred (Beaumont, 2009). According to the New Zealand ACC guidelines the majority of people's symptoms resolve within 1-14 days. However, some can persist for 3-6 months post concussion.

When is it safe to return to training and competition?
The importance of appropriate management post concussion and the decision for returning to play can no longer be underestimated and inappropriately managed. Early management is needed to maximise brain recovery and prevent repetitive injury having a cumulative effect

leading to second impact syndrome and chronic traumatic brain injury. This decision after a concussion is one of the most difficult challenges facing the team coach and physician. Currently the criteria is based on expert opinion in contrast to the gold standard of an evidence based medicine approach. At present the return to play criteria lacks knowledge about the validity, reliability and clinical significance therefore a considerable amount of work remains to be undertaken to move from expert opinion to evidence based practise (Beaumont, 2009).

Due to the lack of reliable measures for concussions in Tae Kwon Do individuals, coaches and physicians must rely on post-concussion symptoms both at rest and with exertion to estimate appropriate management (Beaumont, 2009). Other measures that are used are normative data, level of consciousness, steadiness of gait, orientation, and posttraumatic amnesia (Bailes & Hudson 2001; Beaumont, 2009). However it is important to note that at present there is no established criteria for the diagnosis of a concussion (Heilbronner et al, 2009).

In New Zealand the national guidelines are written by ACC & The New Zealand guiedlines group state an individual should not return to contact training or competition for a period of three weeks following concussion and medical clearance is to be given before returning. The only exception is a senior individual in an international competition who can return to competition earlier if they are symptom-free and have authorization from a recognised neurological specialist (The New Zealand guideline group, 2006). Putukian, Aubry & McCrory (2009) states that although at an elite level you often have the increased resources and therefore a rapid diagnosis and management plan there is no evidence for shorter durations of recovery before returning to play. Therefore being an athlete at an elite level does not make the recovery time shorter.

There are many different opinions and guidelines for post concussion management and how to use post concussion tools however a clinical understanding of the condition is needed to make safe and appropriate decisions reguarding post concussion return to play (Putukian, Aubry & McCrory, 2009). In a perfect world it would be individualised to the sport, age and history of the individual and all concussions would be looked after an expert in their field. Since is not yet possible a standardised method for post concussion management was constructed in Prague 2004 ‘SCAT’. The SCAT tool is a step by step symptom-limited program that effectively demonstrates the stages of progression for post concussion management (Beaumont, 2009).

The SCAT
1. No activity, complete rest. Once asymptomatic, proceed to level 2.
2. Light aerobic exercise such as walking or stationary cycling, no resistance training.
3. Sport specific exercise - progressive addition of resistance training at steps 3 or 4.
4. Non-contact training drills.
5. Full contact training after medical clearance.
6. Game play (Beaumont, 2009)

Even though this is a clear guideline for post concussion management it is important that the final decision should be from a medical professional.

When is it time to stop competing in contact sparring?

Heilbronner et al (2009) states that currently it is unknown how many punches, fights, knock outs and years of fighting an individual can withstand before developing signs and symptoms of chronic traumatic brain injury. Evidence suggests that the longer one engages in contact sparring, the greater the risk for sustaining permanent brain damage from concussive or multiple sub-concussive head blows (Heilbronner et al, 2009.) Chronic traumatic brain injury is clearly demonstrated by Mahammad Ali. Guidelines for identifying chronic traumatic brain injury is the presented prominently in two clinical changes; elongated duration of post-concussive symptoms and the amount of force needed to produce a concussion (Heilbronner et al, 2009).

How do we prevent a concussion occurring?

In a contact sport it is virtually impossible to eliminate the possibility of a concussion, therefore our effort should be put into minimising the risk of a concussion and facilitating appropriate early intervention. Current research found that Tae Kwon Do tournaments that emphasise limited contact, protective equipment and medical supervision are relatively safe (Burke et al, 2003). These studies demonstrated minimal injuries were sustained majorly due to protective gear (Burke et al, 2003; Lystad, Pollard, Grayham, 2008). Emphasising the need for protective equipment to be used in Tae Kwon Do training and competition. In correlation with current research and the New Zealand ACC guidelines have summarised essential points to minimise the risk and facilitate appropriate intervention for concussions in Tae Kwon Do.

- Safety education regarding the pathology and complications of acute and chronic concussions helps to facilitate appropriate intervention and prevention.

- During competition a qualified medical professional needs to be easily accessible.

- Research supporting the use of a custom made mouth guard to reduce the risk of concussion is inconsistent. However it is highly recommended by research and ACC New Zealand to wear a custom made mouth guard to help prevent to facial injury (Knapik ;The New Zealand guideline group, 2006)

- Current research for the guidelines for headgear use in contact sport is inconsistent (Rodolpo, 2011). However many contact sports encourage the use of wearing a helmet designed for the sport, well fitted and maintained. At present research is inconsistent but it is better to be conservative and responsible than have regrets when it comes to brain injury.

- Practise and encourage good sportsmanship, already being demonstrated in the tenants of Tae Kwon Do ‘self control’ and our oath ‘i shall never misuse Tae Kwon Do’.

- Follow the safety rules and the rules of the sport shown in Tae Kwon Do as not hitting to the back if the head, controlled techniques and touch contact.

After a concussion has occurred;

- Proper evaluation of the individual by a medical professional at ringside and then followed up by the individuals GP to evaluate the severity of the injury and plan of action for recovery

- ONLY panadol as pain relief as other medications may increase bleeding or mask symptoms

- 3 week stand down period before returning to sport (The New Zealand guideline group, 2006)

- Individual must have medical clearance before returning to training or competition

- Individual must be asymptomatic before returning to training or competition

- Follow the SCAT guideline for return to sport

Concussions are a common sports-related injury that are too often dismissed as minor and insignificant by physicians, coaches, sports reporters, and athletes themselves (Kelly et al, 1991). Severe injuries and concussions almost always occur when the preventative measures discussed above are disregarded and opinions reguarding concussions need to be changed and seen as major medical concerns. This paper has given an brief overview of a concussion in order to raise awareness about concussions, provide appropriate ringside care, post concussion management and prevention in the martial art of Tae Kwon Do. From research discussed in this paper, it is suggested that coaches and students in Tae Kwon Do should be appropriately educated on concussion pathology, post-concussion management and be proactive in the use of safety equipment during training and competition.
Most importantly if you have had a concussion or think you have a concussion
TAKE IT SERIOUSLY, see your doctor.

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