Loss of Consciousness in Judo: Not Always a Concussion

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INTRODUCTION

All sports carry injury risks. In the event of loss of consciousness (LOC) in judo, and with an appropriate mechanism of injury, concussion is likely to be high on a list of potential causes. The diagnosis and management of concussion has recently garnered much attention, yet we are only scratching the surface of this complex issue. However, there is another aspect of LOC in judo, which warrants discussion: choking techniques (*shime-waza*). Knowledge of *shime-waza* is vital in judo training and competition, and we try to clarify some aspects of LOC caused by *shime-waza* in judo.

UNDERSTANDING *SHIME-WAZA*

Shime-waza provides judo players with a means to gain control over their opponents in a grappling situation. The arms, collar, and legs of the attacking player can be used to apply pressure to the neck, to settle a contest by way of opponent submission, or eventual LOC.[1] There are 12 recognized *shime-waza*: examples include *nami-juji-jime* (normal cross strangle) and *okuri-eri-jime* (sliding lapel strangle). Although many theories have been proposed, the exact mechanism of LOC resulting from *shime-waza* is not fully understood. Carotid artery compression and airway obstruction are thought to be strongly implicated, with LOC occurring secondary to a restriction in cerebral blood flow and reduced oxygen supply to the brain, respectively.[2] Other possible mechanisms include carotid sinus stimulation, vagus nerve stimulation, and jugular vein compression, which would also decrease blood supply to the brain.[2]

DIFFERENTIATING *SHIME-WAZA* FROM CONCUSSION

A challenge when addressing LOC in judo is the tendency to associate LOC solely with concussion. Concussion is often a consequence of throws, falls, and direct clashes. Thus, concussion and *shime-waza* are likely to present differently. However, in combat sports such as judo, grappling situations combining aspects of throwing and choking techniques are not uncommon. In addition, especially during groundwork, the referee and other officials may find it difficult to monitor the head and neck; therefore, making this distinction during a match may not always be straightforward. While sharing the symptoms of LOC, the underlying physiological mechanisms of concussion and *shime-waza* are unique. When a chokehold is applied by the attacking player, the opponent is at risk of a gradual (10-20 seconds) and intentional (given that the chokehold is applied) LOC if they do not submit.[3] Should LOC occur, players can quickly (12-15 seconds) return to consciousness and baseline functionality following release of the chokehold, without any persistent neurological symptoms.[4] This does not imply that *shime-waza* carries no injury risk, with a recent case report highlighting a possible association between choking techniques and carotid artery dissection.[5] In addition, concussion does not always cause LOC. Rather, LOC may occur instantly following a substantial and unintentional impact.[1] The modalities of return to consciousness can vary, and affected athletes often report symptoms such as headache, confusion, nausea, and memory impairment, which can persist for some time after injury.[6] Recovery is determined by symptom severity but generally consists of an initial rest period and avoidance of activity, followed by a graduated return-to-play. Players who experience LOC during *shime-waza* usually complete a much shorter rest period and do not need to adhere to a specific return-to-play protocol at present.

LONG-TERM CONSEQUENCES

There is growing evidence establishing the link between concussion and chronic traumatic encephalopathy (CTE).[7] Conversely, the long-term effects of LOC from *shime-waza* are relatively unknown: there is currently no evidence

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connecting *shime-waza* techniques to any neurological sequelae. Any speculation surrounding possible neuronal dysfunction caused by intermittent periods of cerebral hypoperfusion/hypoxia appears to have been allayed by factors including the presence of a referee, who would be acting in a "completely nonstandard fashion" if a period of brain oxygen deprivation sufficient enough to cause hypoxic injury were to occur.[8,9] A more recent study found no significant difference in carotid intima media thickness and serum brain injury biomarkers between players in grappling and nongrappling sports, as well as between those with extensive past blunt head trauma and transient choke experience.[10] While a more rapid, symptom-free return to consciousness following chokehold release might imply that players can be choked-out multiple times without consequence, additional research would be hugely beneficial to explore this relationship further and assess whether there are any negative consequences from *shime-waza*.[9] For the time being, it does not seem unreasonable to suggest that repeated LOC from *shime-waza* is unlikely to result in any significant long-term outcomes.

EDUCATION AND AWARENESS

Player safety must continue to be prioritized in all judo situations. To ensure the safe application of *shime-waza*, proper training under the supervision of qualified coaches is crucial for every player. Additional consideration is given to younger age groups (up to 15 years), who at present are not allowed to practice *shime-waza*. However, there is also some concern that LOC may be more frequent in senior competitions if younger players are not taught *shime-waza*. It may be that a universal learning method and practice protocol are necessary to make the practice of these techniques safer. The correct application of *shime-waza* should not result in significant injury: no deaths from *shime-waza* have been reported in judo since its inception in 1882.[3] Critically, the consequences of performing *shime-waza* techniques incorrectly may be severe, and any player who experiences LOC in judo (whether associated with concussion or *shime-waza*) must be removed from play immediately, promptly assessed by a medical professional, and appropriately counseled.

CONCLUSIONS

Loss of consciousness in judo is not always the result of a concussion and can also occur secondary to *shime-waza*. Despite apparent differences in player presentation and mechanism of injury, awareness and ability to distinguish between the 2 is necessary for accurate diagnosis and subsequent player management. More importantly, the lasting effects of being repeatedly choked out are not understood, and further long-term research is vital. By understanding the distinct nature of LOC caused by *shime-waza*, we can work to ensure the continued well-being of judo players and begin to mitigate any associated, but as yet unidentified, risks.

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