Infographic. Doping without drugs: how para-athletes may self-harm to boost performance

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This infographic provides a summary of the use of boosting by athletes with spinal cord injury (SCI); its causes, warning signs and dangers, and the current approach of the International Paralympic Committee (IPC) to testing.

Boosting is the intentional induction of autonomic dysreflexia (AD) to enhance performance. AD is a potentially life-threatening condition experienced by many individuals with a SCI, typically at or above the T6 spinal level. It is characterised by a sudden increase in systolic blood pressure (SBP) >20mm Hg above baseline due to a noxious or non-noxious stimuli below the level of injury, that excites sympathetic preganglionic neurons resulting in vasoconstriction of blood vessels in the lower extremities and trunk.1 Triggers include, but are not limited to, bladder distension, injury or an innocuous stimulus (eg, a tight shoe-lace or belt) below the level of injury. Without prompt resolution, severe cases of AD may result in cerebral haemorrhage, myocardial ischaemia, seizures, arrhythmias or death.2 While prolonged hypertensive crises are rare in athletes, repetitive asymptomatic AD events present a substantial long-term health consequence and may partially explain the heightened cardiovascular mortality risk in individuals with SCI.

Boosting is banned by the IPC. Susceptible athletes may be tested pre-competition and if SBP >160 mm Hg they are retested 10 min later.6 If SBP is again >160 mm Hg the athletes’ case will be reviewed and he/she may be disqualified from competition. This threshold was recently revised (from >180 mm Hg) to more closely resemble clinical guidelines for when pharmacological management of AD is advised.1 Despite the perceived prevalence of boosting, to date no athlete has ever tested positive for this banned practice. However, these data were collected using the previous threshold, with values noted as high as 178 mm Hg (now classified as boosting).7 We strongly advocate that practitioners identify athletes’ at risk of boosting and make them aware of the causes, signs and symptoms, and dangers identified in this infographic to ensure long-term athlete health.

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Infographic: Pathophysiology of boosting

Dangers
Without prompt resolution, severe cases of AD may result in cerebral haemorrhage, myocardial ischaemia, seizures, arrhythmias, or death. Daily exposure to even asymptomatic AD events can present a substantial long-term health consequence for athletes with SCI.

Exercise Performance
Boosting has been reported to enhance performance by as much as 10% by providing athletes with SCI a means to mount a ‘normal’ response to exercise.

1Treatment involves identifying and resolving the AD trigger. If unsuccessful and SBP remains elevated then pharmacological management is advised. A decision algorithm for AD can be found at www.ahfsicdsnowmasscontent/module-4/preventions-to-guidelines/

References: 1Khan & Krassioukov, J Spinal Cord Med 2014; 37:2-10; 2Bussmann, et al., Clin J Sport Med 1994: 41:10; 3Schmidt, et al., Int J Sports Med 2001: 22:2-7; 4Abbreviations: ACh, Acetylcholine; AD, autonomic dysreflexia; IMI, intermediomedial nucleus; NE, norepinephrine; SBP, systolic blood pressure; SCI, spinal cord injury.
Infographic

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