

Infographic. Doping without drugs

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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 characterized by a sudden increase in systolic blood pressure (SBP) >20 mmHg 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 (e.g. a tight shoelace or belt) below the level of injury. Without prompt resolution, severe cases of AD may result in cerebral hemorrhage, myocardial ischemia, 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.

Performance of athletes with high-level SCI may be limited by an impaired autonomic response to exercise[3] and thus boosting can provide a means to increase sympathetic activity below the level of the injury and achieve a ‘normal’ response to exercise (i.e. an increase in blood pressure, heart rate, sweating). The inset demonstrates the mechanisms triggering increased sympathetic activity below the level of the SCI. Boosting can result in performance benefits of approximately 7-10%,[4,5] which are substantial in elite sporting competitions.

Boosting is banned by the IPC. Susceptible athletes may be tested pre-competition and if SBP >160mmHg they are re-tested 10 minutes later.[6] If SBP is again >160mmHg the athletes’ case will be reviewed and he/she may be disqualified from competition. This threshold was recently revised (from >180 mmHg), 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 178mmHg (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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