

# cannabis and sport

Cannabis is the most widely used illicit drug in the Western world and, correspondingly, is frequently detected via urine testing<sup>1,2</sup> in the workplace and in competitive sport.<sup>3</sup> Urine testing in the workplace is conducted under the assumption that the substance in question reduces productivity and increases risk of workplace accidents (thus is an ‘ergolytic’ drug).<sup>4</sup> However, urine testing in competitive sport is conducted under the assumption that the substance in question unfairly increases performance (thus is an ‘ergogenic’ drug).<sup>5</sup> This begs the question, what role does cannabis really play in competitive sports?

Participation in competitive sports has been shown to be a protective factor against drug use<sup>6</sup> with the notable exception of anabolic steroids and other performance enhancing substances.<sup>7-12</sup> It has been posited that some athletes are driven to use a range of substances, including alcohol, due to increased pressure resulting from difficulties in balancing a social life along with full course loads, as well as sport practice and work outs.<sup>13,14</sup> Studies on the prevalence of performance enhancing substances in competitive sport highlight that two to three per cent of adolescents (most studies are conducted with students) have used at least one substance, although the frequency of performance enhancing substance use is likely to be higher for males compared to females, older competitors compared to younger competitors and for competitors in a higher or more intensive level of competition.<sup>15-22</sup> However, the information available on the frequency of cannabis and other illicit drug use by athletes is less clear.

Cannabinoids have been included in an annually updated list of substances that are prohibited to elite athletes kept by the International Olympic Committee (IOC) and more recently by the World Anti-Doping Agency.<sup>23</sup> The world Anti-Doping Agency was established in 1999 as an international independent agency composed and funded equally by the sport movement and governments of the world. The World Anti-Doping Code was created in 2004 and the revision of the Code in 2009 does not impact on any of the information provided from sources that pre-date this. Before competition and during periods of training, elite athletes are regularly checked via urine testing to determine if prohibited substances have been used and to sanction punishment where detected. Cannabinoids are treated differently to most other drugs on the prohibited drug list in two ways. Firstly, the prohibition is subject to an amount of cannabis in the urine greater than 15ng/ml in urine tests<sup>24</sup> so as to allow for the possibility of passive inhalation.<sup>25</sup> Secondly, the penalties for using cannabinoids are not explicitly outlined in the prohibited substances list and instead remain disparate and left to the particular sport’s federation rules.<sup>26</sup>

Recent research has highlighted the importance of making a distinction between drug use with the intent to enhance performance and recreational use. Waddington and colleagues<sup>27</sup> investigated the percentage of English football players who personally knew of other players that used substances and found that recreational drug use was up to eight times more common than performance enhancing drug use. This finding was supported in a survey of 392 student athletes and 504 matched non-athletes regarding motivation to use cannabis. Analysis showed athletes were significantly more likely than non-athletes to use cannabis for recreational purposes.<sup>28</sup> Recently Dunn and colleagues<sup>29</sup> investigated the drug use patterns of 974 Australian athletes. In this study one-fifth (21%) of the sample reported

having ever used ('lifetime use') cannabis and a small group (3.7%) reported past-year use ('recent use').

A recent meta-analysis has shed some light as to whether participation in competitive sport influences rates of alcohol, tobacco and illicit drug use.<sup>11</sup> The authors concluded that the majority of research indicates that rates of alcohol use were increased while rates of tobacco and illicit drugs were decreased among competitive athletes. Regarding cannabis in particular, four of the articles reviewed found that this relationship was moderated by sport and gender.<sup>6,30-32</sup> These articles found that cannabis use was higher in male athletes (particularly hockey players although not for soccer players) and that a 'U-Curve' between intensity of activity (taken as hours per week spent training) and drug use was found only in males and only for cannabis use. A recent article not included in this meta-analysis found that among Polish athletes, cannabis use was most popular in male competitors, aged 16-24 years, competing in the disciplines of rugby, skating, boxing, badminton, body building and acrobatic sports during periods of sport preparation (i.e., out of competition).<sup>33</sup>

In the sporting arena, using a substance or method which is potentially harmful to an athletes' health and/or capable of enhancing performance is referred to as 'doping'.<sup>34</sup> Despite some recent debate regarding the utility of urine screening for doping,<sup>35</sup> there is some evidence that athletes themselves approve of these tests. The majority of athletes surveyed in two studies endorsed testing for banned substances as an effective way of deterring drug use and believed that the associated punishments for using these substances were appropriate.<sup>27,36</sup>

## cannabis as an ergolytic drug

As described by Campos et al,<sup>37</sup> many authors clearly consider cannabis as an ergolytic drug, and that "the intent to use [them] to enhance performance in sports activities will fail ... Consequently, there are no circumstances in which they may be useful". This is partly due to the increasing cardiac frequency and alterations to motor performance that cannabis produces.<sup>38</sup> In particular, cannabis is known to increase heart rate while decreasing cardiac stroke volume, resulting in diminished peak performance. Several studies have supported this by directly investigating the effects of cannabis on the performance of cyclists,<sup>39,40</sup> healthy non-athlete volunteers,<sup>41</sup> and in a litany of driving capability studies.<sup>42</sup> In addition, cannabis is harmful to the respiratory system when smoked and increases the risk of respiratory tract infection, bronchitis and lung cancer.<sup>43</sup> This would result in greater difficulty for athletes to intake sufficient oxygen for peak performance. Further, cannabis use would result in reduced sport performance through slowed reaction time, problems of motor coordination, problems of hand-eye coordination, and problems of perceptual accuracy.<sup>44</sup> It is apparent that the use of cannabis could be potentially dangerous in sports that rely on quick reactions and fast decision-making.

Despite these observations, a study on Australian athletes has shown that almost two thirds (60%) believed cannabis to be an ergolytic drug, but were unable to clearly explain how cannabis use would negatively impact on athletic performance.<sup>45</sup> Indeed, a small number (3%) of athletes indicated that they believed cannabis use would not impact negatively on their performance. These athletes referred to ergogenic effects including relaxation and calming and increased confidence, although these effects were identified to depend on frequency and timing of use.

## cannabis as an ergogenic drug

Some authors have recognised that cannabis could have indirectly ergogenic effects, such as producing a euphoric effect, reducing anxiety and increasing the sociability of a player.<sup>46-49</sup> This may result in a more balanced performance from a competitor who may otherwise be too nervous before an important event. Lorente and colleagues<sup>47</sup> reported that relaxing, pleasure, and improved sleeping were the main motivations for using cannabis as indicated by French students.

However, to date no research has objectively demonstrated that cannabis use has resulted in observable increases in performance through relaxing the athlete or improving their sleeping patterns. In contrast, for some users, the acute adverse effects of cannabis use have been demonstrated to result in increased anxiety, panic, nervousness and restlessness, thus causing disruption to sleeping patterns.<sup>50</sup>

## the role of cannabis in sport

Cannabis is thought by the majority of authors and athletes to have a negative impact on performance. Despite this, a minority of athletes persist with using cannabis – a percentage significantly lower than the general population. The likelihood that an athlete uses cannabis appears to be moderated by the actual sport and level of competition as well as gender. Available evidence suggests that those at greatest risk are adult males in intensive sports that involve a greater number of hours spent in training and are in a high level of competition.

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