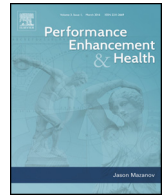




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Post-cycle therapy for performance and image enhancing drug users: A qualitative investigation

Scott Griffiths^{a,b}, Richard Henshaw^c, Fiona H. McKay^d, Matthew Dunn^{d,e,*}

^a Research School of Psychology, Australian National University, Australia

^b School of Psychology, University of Canberra, Australia

^c Queensland Health, Australia

^d School of Health and Social Development, Faculty of Health, Deakin University, Victoria, Australia

^e National Drug and Alcohol Research Centre, University of New South Wales, Sydney, New South Wales, Australia

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ABSTRACT

Anabolic-androgenic steroids (AAS) are synthetic forms of the hormone testosterone and their non-medical use is related to increased muscle size, muscle mass, and strength. A primary concern regarding exogenous AAS use is its potential to suppress endogenous (natural) testosterone production. In response, some users seek out substances to use post-cycle to mitigate problems associated with the resumption of endogenous testosterone production. This study sought to understand issues related to post-cycle therapy (PCT) among a sample of performance and image enhancing drugs (PIED) users in Australia. Semi-structured interviews were conducted with 26 participants ($n = 24$ male) who reported the use of a range of performance and image enhancing drugs (PIEDs), including AAS, human chorionic gonadotropin, growth hormone, clenbuterol, tamoxifen, insulin, and peptides. Interviews were conducted in person or by telephone, recorded, and transcribed. Data were analysed following a process of thematic analysis. Three themes emerged: (1) access to PCT; (2) maintenance of gains, maintenance of health; and (3) PCT and links to mental health. Steroids were seen as easier to access than PCT; as such, participants tended to continue to use steroids rather than taper down their use, leading to health concerns. Participants wanted access to PCT for several reasons, including minimising any loss of muscle or strength gained through their PIED cycle; because they were concerned that they were no longer naturally producing hormones; or because they were concerned about their mental health, particularly when coming 'off cycle', and the need for PCT to help adjust. This study contributes to the existing literature suggesting that PCT may act as a harm reduction measure, allowing PIED users to safely reduce or cease steroid use or to address any negative effects from use, particularly those related to mental health.

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1. Introduction

Performance and image enhancing drugs (PIEDs) are substances used to improve one's sporting performance and/or level of visible body muscularity (Cohen, Collins, Darkes, & Gwartney, 2006; Hildebrandt, Alfano, & Langenbacher, 2010; Ip, Barnett, Tenerowicz, & Perry, 2011; Murray, Griffiths, Mond et al., 2016). Subcategories of PIEDs include muscle-builders, and within this subcategory, anabolic-androgenic steroids (AAS) have received the most public and empirical attention. AAS are synthetic derivatives of testosterone and have been demonstrated to build muscle tis-

sue in humans at a rate that considerably outpaces those who do not use AAS (Bhasin, 2001; Bhasin et al., 1996; Griffiths, Murray, Mitchison, & Mond, 2016).

AAS use is associated with negative health effects in both the short-term (e.g., gynecomastia) and long-term (e.g., cardiovascular morbidity) (Kanayama, Hudson, & Pope, 2008). Of particular concern to users and health professionals, however, are the health effects that emanate from the impact of AAS on the hypothalamic–pituitary–testicular (HPT) axis. Exogenous administration of testosterone (i.e., AAS use) suppresses endogenous production of testosterone (Pope & Brower, 2005; Reyes-Fuentes & Veldhuis, 1993). Many AAS users resume endogenous production of testosterone following the cessation of AAS use (Kanayama et al., 2008). However, there is considerable variability among users in both the degree of recovery and the timeframe of recovery, with some users subject to chronic HPT suppression (Kanayama et al.,

* Corresponding author at: School of Health and Social Development, Geelong Waterfront Campus, Locked Bag 20001, Geelong, Victoria 3220, Australia.
E-mail address: m.dunn@deakin.edu.au (M. Dunn).

2008). The health consequences of chronic HPT suppression are particularly serious and include infertility, impotence, and mood disorders (Kanayama et al., 2008).

Post-cycle therapy (PCT) is an important feature of PIED use. PIED users refer to the period when they are using as “on-cycle” while the period when they are not using PIEDs is referred to as “off-cycle” (Hildebrandt, Langenbucher, Lai, Loeb, & Hollander, 2011). PCT refers to the period immediately following cessation of AAS (and of PIEDs more generally), and can be any combination of drugs and behaviours that PIED users consume and engage in after they have decided to go “off-cycle” or otherwise discontinue their PIED use. PCT is therefore one major element of the broader strategies that PIED users employ to minimise the negative health effects of PIED use, including both during and after use (see Adair (2015) for an overview of these non-PCT strategies). The specific reasons that PIED users conduct PCT might include the restoration of one’s natural hormonal functioning (i.e., functioning prior to using PIEDs) more quickly than would otherwise be possible without PCT; to more quickly reverse or mitigate the side-effects associated with PIED use (e.g., testicular atrophy); to avoid or mitigate the side-effects associated with discontinuing PIED use (e.g., mood fluctuations arising from resumption of endogenous testosterone production); and to conserve gains in sporting performance and subjective body appearance made during the period of PIED use. The evidence for these motivations, however, is largely conjectural and anecdotal.

Efforts to effectively target PIED users in the context of prevention, early-intervention, treatment, health promotion, and harm reduction are predicated on our understanding of the phenomenon of PIED use. PCT, as a component of PIED use, requires a much-improved empirical understanding; however, to date we are unaware of any published research that has specifically investigated the practice of PCT among PIED users. Therefore, the aim of this study was to provide insights, using qualitative methods, into the practice of PCT among PIED users living in Australia.

2. Method

2.1. Sampling and recruitment

A purposive sample of PIED users was recruited through personal contacts, advertisements posted on Internet discussion boards, and snowball sampling. Participants were eligible to be included if they reported the use of any PIED, though participants were screened for entry based on any non-medical or non-prescribed PIED use, such as AAS or HGH, to ensure that participants were not solely using legally available PIEDs such as creatine. Interested participants were asked to contact one of the researchers for inclusion in the study. Ethical approval was granted from the Deakin University Human Research Ethics Committee.

2.2. Data collection

Interviews were conducted between March and October 2014 and were between 10 and 60 min in duration. Participants were offered the choice of a face-to-face or telephone interview. Interviews were conducted by the second and fourth authors. All interviews were digitally recorded and transcribed. A semi-structured interview schedule was used. The questions included a uniform set of ‘prompts’; some were designed and used to build rapport with the participants (such as asking about their exercise habits), while others were related to the study and its aims (such as asking about the types of PIEDs used, routes of administration, what health professionals they had visited, what health effects they had

experienced, any identified barriers or facilitators to service use). Participants were reimbursed with a \$20 gift voucher for their time.

2.3. Data analysis

All data were thematically analysed. Thematic analysis is an inductive technique that allows for the identification of ideas and perspectives present in each transcript, with a focus on the qualitative aspect of the text (Marks & Yardley, 2004). Thematic coding was used to broadly examine themes within the interview transcripts. The analytic process began as soon as the data were collected. The transcripts were inductively analysed through a process of open coding using QRS Nvivo to help manage the data. Within this process the transcripts were read and re-read by two of the authors in order to gain a comprehensive understanding of the content of the interviews (Denzin & Lincoln, 2011). By continuously reading and re-reading the text of the transcripts using a constant comparative method as advocated by Miles and Huberman (1994) a number of themes were identified and later refined. These themes were then grouped and categorised to enable comparison across themes and to ensure that minimal overlap was present. This process allowed for the collapsing of some themes, and the expansion of others. During this process the research team met frequently to discuss the emerging themes and to suggest new areas for investigation. Themes were refined through discussion amongst the team. The presentation of the results in this paper includes representative quotes from the two key themes. These quotes are used to demonstrate the finding. To maintain anonymity of the participants, all participants’ quotes are identified with a number.

3. Findings

In total 26 participants (24 males, two females) consented to be interviewed. The mean age was 34 years (range 21–62 years). Of these, 22 were from Queensland, two from Victoria, one from Western Australia and one from New South Wales. That the majority were from Queensland reflected the contacts of the fourth author, who through their role as a health promotion worker and involvement in the gym culture was able to build rapport with a number of participants. Most were engaged in some form of bodybuilding. All participants had used, or were using, a form of AAS such as nandrolone, methandrostenolone, trenbolone, and oxandrolone. Participants also had used or were currently using other PIEDs such as human chorionic gonadotropin, growth hormone, clenbuterol, tamoxifen, insulin, and peptides. The analysis presented in this article relates to participant’s experience with post-cycle therapy. Three themes were identified in the analysis of the data: (1) access to PCT, (2) maintenance of gains, maintenance of health, and (3) PCT and links to mental health.

3.1. Theme 1: access to PCT

Many participants discussed the challenges they had faced in accessing any type of PCT. For these participants, accessing or acquiring steroids was comparatively easy compared to the difficulty in accessing any form of PCT. This meant that many participants were not accessing or using any form of PCT, resulting in long periods on steroids, or for some, not discontinuing their use at all and remaining on cycle permanently.

[I]t’s a lot easier to find a vial of steroid than what it is to find a packet of PCT. It’s really hard to find and that’s why I think a lot of guys will go on and use a lot of gear, but then they’ve got to turn around and basically shut themselves down because they don’t have the proper post-cycle therapy in place (Participant 7).

These participants were concerned about the long-term health consequences of sustained steroid use, or the alternative of cycling off without any PCT.

Yep, if you haven't got PCT you don't want to cut off, so you stay on and then ultimately, in the long run, you're doing yourself more damage (Participant 7).

For some, the absence of PCT was due to a lack of planning – they had only considered a need for PCT when they were planning to cycle off steroids – or having placed more emphasis on accessing steroids in the pre-cycle phase:

I see a lot of people they start their cycles, obviously they don't – they just think they're going to pick up some kind of drug at the end of it. Or the majority – I could honestly say that probably about 60 per cent of people I know don't even bother doing any post cycle therapy drugs at the end of their cycles (Participant 22).

For others, it was not a lack of planning, but rather lack of access to the specific drug that they were seeking for PCT:

I used to seek things from the doctor I saw which they use in fertility, a fertility drug [Pregval] so trying to really kick start your own testosterone and things like that. . .but in the end they couldn't supply that, or they wouldn't supply it and that's disappointing so you've got to choose things like Clomid and all those things (Participant 10).

3.2. Theme 2: maintenance of gains, maintenance of health

Participants described two main reasons for wanting PCT. The first was related to concerns about their health, while the second was related to a concern that when cycling off without any PCT, they would lose the muscle size and strength gains they had achieved. For some, the realisation that they needed PCT as part of their cycle became more apparent with age:

Sometimes your system can never go back up. Sometimes your own levels can never come back. You need something like HCG or Pregnyl to bring your own natural levels back, they can be just shut off permanently, like they have been in my case (Participant 1).

This was especially important for the participants who had found themselves in a situation where, after years of use, they were experiencing negative health effects related to inadequate health care:

After I finished my career as a bodybuilder and decided to have kids, I went to get my bloods done and my sperm count done to check on my sperm levels and they weren't very good. They sent me to an IVF clinic. . . he was anti-bodybuilders, you could tell by the way he looked at me when I walked in the door, and he actually said to my wife "You should go and buy a dog or find another guy." Rather than wanting to try and help me. . . Unfortunately, I wouldn't have been in that situation had I been able to go to someone and get them to monitor me properly (Participant 7).

These participants described situations where after many years of use, they were reliant on some form of permanent hormone replacement therapy. While these participants were happy to have access to this therapy, the use was often surrounded by a degree of secrecy.

I used to cycle. I would go on and come off. I have been on a prescribed hormone replacement therapy for the last four years that, in my mind, is no doubt the amount of cycles that I've done between age 25 and say 40. Each time you come back from a cycle, there is that potential that you'll never quite hit the natural levels your body was producing again, that is always a fighting risk but also as

you get older, you know, this is where we start to talk about legitimate testosterone replacement therapy in men. It's still a huge taboo (Participant 25).

The older participants also expressed concern that some of the younger users were not taking adequate precautions, and were putting themselves at potential risk later down the track.

A lot of the younger guys are still bullet proof and don't think anything will happen to them. But I guess some of us older fellows have had issues of various types and for myself it was early on, I did quite the stupid very large cycles, we never got off you know, back when I was competing we took quite a lot of stuff and stayed on all the time. Like I ended up at one point there I stayed on for two years and then when I decided to come off I've actually shattered my – I already had a flaky natural testosterone level, like it wasn't the best and then I pretty much just destroyed it. If I'm not on steroids I have to be on HRT, which is where it's ended up for me (Participant 22).

While general health concerns were discussed by many participants, for some of the older participants, risk related fertility were the key concern, particularly in their discussions about younger users.

I've always been really big on either blocking oestrogen or kicking my nuts back in PCT afterwards because I always was worried about having kids afterwards. Also, I suppose right at the beginning I had some really good advice about not allowing your body to shut down completely. I was pretty healthy. I've got guys now that are 19 and say to me "I don't want to ever have kids so I'm just going to take gear all year round." And I'm like "Now you don't want to have kids when you're 19 for sure but I never wanted to have kids when I was 19 but I guarantee you'll want them when you're 29" (Participant 11).

However, the concerns for younger participants were typically related to more immediate considerations around not losing gains that had been made through the previous cycle.

Yeah, definitely, yeah, definitely come off properly, otherwise there's no point when you come off and you lose everything you've worked so hard for (Participant 7).

3.3. Theme 3: PCT and links to mental health

Almost all participants described their experiences with poor mental health. Many participants spoke of their own experiences with depression while coming off cycle. This ranged from feeling a little down, or feeling fatigued:

Apart from my recovery time it goes down after a few weeks I feel the same, apart from I do feel a little bit more drained. Not so energetic and I do feel a little bit down per se, you know. . . Yeah. I didn't find mentally low. I found that I was still pushing hard in the gym. I was pushing hard at work, but just the fatigue side of things. It just brought me down, yeah (Participant 20).

To experiencing more serious depression:

I've had bouts of depression, particularly coming off with nothing, and just I think, at one point there I may have, in hindsight, probably a silly decision, but with a girl that was quite controlling and she wouldn't have a bar of it so to keep the relationship, I sacrificed taking the drugs which probably shouldn't be seen as too big a deal, but, yeah I just came off cold turkey and crashed pretty bad. It took months actually to feel better (Participant 22).

Others described their experiences with anxiety when coming off cycle:

Participant: *One of the last courses I did, I did really feel like crap afterwards, I didn't feel like me. I had no – I didn't really want to go outside my house I was that frigging. . .*

Interviewer: *Depressed?*

Participant: *Yeah literally scared to go outside in case somebody – there was confrontation in my life. It was pretty shit; I didn't want to feel like that again (Participant 5).*

Their sexual health, and their relationship with sexual partners was discussed by several participants. Much of this discussion was related to their low sex drive when coming off cycle at times when they had not used PCT.

I've been to the point where I've had no sexual drive whatsoever, I mean I wouldn't even want to go near the girl but it seems to – I did do the post-cycle this time and I've never felt better, never been happier (Participant 5).

While for others, the experience of coming off cycle with no PCT resulted in a range of unstable or unfamiliar emotions:

I've heard stories of guys that bloody end up watching movies with their girlfriends on PCT and end up bawling their eyes out because they're emotions are just – hormones are that out of whack they don't know what's going on (Participant 7).

4. Discussion

Non-medical use of AAS is associated with adverse health effects. Many AAS users anticipate these health effects and engage in a practice called PCT – a phenomenon ubiquitous to AAS use and about which little is known. Therefore, the aim of this study was to provide insights into the practice of PCT among PIED users living in Australia. This study found that PCT is one way in which PIED users attempt not only to maximise the physical gains they have attained during their PIED cycle, but also to minimise any harms that may be experienced when coming off cycle. Many of the participants understood the need to engage in PCT, but restricted access meant that it was easier to continue a cycle of PIEDs rather than cease use. PCT was also seen as important both because of the perceived links to mental health but also to ensure good health, but in the short and long term. This is the first study, to our knowledge, to explore PCT and has important implications for responding to health concerns in this population.

The overall consistent understanding of the need for PCT among the participants is consistent with research showing that users are highly concerned with their health (Dennington et al., 2008). PCT was believed to be important not only for maintaining the physical gains attained throughout the PIED cycle, but also for minimising the negative health effects that may result from use. While PCT was viewed as important for health, there was a challenge not only in accessing PCT but also seeking advice from medical and other health practitioners. The tension between PIED users seeking medical assistance and advice, and the professions' negative view of PIED users, has been documented (Dunn, Henshaw, & McKay, 2016). It has been suggested that medical practitioner stigma toward PIED users may be a form of prevention (Dunn et al., 2016), but this may also serve to keep PIED use a hidden activity, and foster negative health outcomes due to lack of consultation and treatment. In addition, many who use PIEDs perceive medical practitioners as uninformed about steroids and therefore do not choose to seek treatment or health checks without disclosing their use (Dunn et al., 2016; Pope, Kanayama, Ionescu-Pioggia, & Hudson, 2004). Efforts to educate medical practitioners on the social, mental and physical effects of PIEDs while both on and off cycle may lead to improved

health seeking behaviour, foster better dialogues between patient and health care provider, and better outcomes for the patient.

Participants noted the importance of PCT not only for reasons of physical health, but as an important aspect of good mental health when coming off cycle. It is apparent when viewing literature and education pieces on the negative effects of steroid use that the focus has primarily been on the physical effects and again generally while on cycle. The mental health impact of steroid use tend to largely focus on aggression (Kanayama et al., 2008), however our findings suggest that there is a broader risk around mental health. Although little is known about the cumulative or long term effects of steroid use, depressive symptoms have been documented (Kanayama et al., 2008). These symptoms usually appear during times of withdrawal, which could be linked to the suppression of endogenous testosterone. There is also some suggestion that the dysphoric feelings from being hypogonadal could cause some users to resume their steroid use, and therefore further delaying the recovery period which could lead to a cycle of dependence (Kanayama, Brower, Wood, Hudson, & Pope, 2010). This is a concern given the links that have been identified between steroid use and an increased likelihood of suicide, homicide and death at a younger age, when compared to other substance users (Petersson et al., 2006). The risks associated with long term AAS use highlights the importance of adequate information and education being made available to this population. The concern here is that without this information, it could be expected that a PIEDs user may not completely understand the role of these drugs on their overall wellbeing, and the long term side effects.

An improved understanding of PCT is critical not only for interventions and treatments aimed at curtailing PIED use, but also for interventions and treatments aimed at mental health problems for which PIED use is common. For example, AAS is reported by some 50% of individuals with muscle dysmorphia – a condition akin to 'reverse anorexia' in which individuals experience preoccupation with building a muscular body (Olivardia, Pope, & Hudson, 2000; Pope et al., 2005). Treatment for muscle dysmorphia is complicated by the negative mental health correlates of discontinuing PIED use (Griffiths & Murray, in press). Comments made by a PIED-using male diagnosed with muscle dysmorphia interviewed by Mosley (2009) are instructive: ". . . when I came off my last [steroid] cycle I got really depressed and even felt suicidal for a few weeks, which really worried me. But I don't want to stop juicing [using steroids] now because I've seen the results and I don't want to lose that edge" (Mosley, 2009, p. 194). The negative mental health correlates of PCT, and perhaps even more importantly, the correlates associated with *not* undertaking PCT, may explain why some 50% of individuals with muscle dysmorphia report attempting suicide at least once during their lifetime (Griffiths & Murray, in press; Pope et al., 2005). In the current study, PIED users noted a relationship between discontinuing PIED use, or coming 'off-cycle', and the emergence of mental health problems, including anxiety, depression, and emotional instability. Greater efforts are needed to understand the links between discontinuation of PIED use and mental health, including the role that PCT may have in mitigating these negative symptoms, to inform the development treatment and intervention programmes aimed at PIED users.

Furthermore, an improved empirical understanding of PCT is important because much of the information about PCT that is readily available to PIED users is of dubious quality. Most PIED users obtain and share their knowledge of PCT on Internet forums whose major or sole contributorship is other PIED users – a phenomenon labelled "virtual ethnopharmacology" (Smith & Stewart, 2012). There also exists a collection of Internet websites that contain dubious information and messages regarding PIEDs, referred to as "pro-muscularity" – a muscularity-focused analogue of "fitspiration" and "thinspiration" (Murray, Griffiths, Hazery et al., 2016).

Much of this PIED-related information, including that related to PCT, is incorrect and/or dangerous, and appear on websites that advertise or sell PIEDs to the public (Murray, Griffiths, Hazery et al., 2016). While it is likely that some forms of PCT have merit insofar as they might mitigate the adverse health effects of discontinuing PIED, others may be ineffective or even harmful, potentially leading to additional health risks and/or delaying the restoration of normal hormonal functioning. For example, the use of human chorionic gonadotropin (HCG) – common amongst the participants in this study – is used ostensibly to 'kick-start' endogenous testosterone production and promote fertility. However, there is evidence to suggest that HCG may be counterproductive when used for PCT. For example, Karila, Vignau, Alter, and Reynaud (2005) found a significant association between the cumulative amount of HCG used during concomitant use of steroids and percentage of morphologically abnormal sperm.

4.1. Limitations

There are limitations with the current study. Firstly, most participants were from Queensland and their experiences may differ to those who live in other states and territories in Australia. However, Queensland has experienced a large increase in people reporting PIED use as indicated by the annual Needle and Syringe Program Survey (Iversen & Maher, 2015), so it may be that our recruitment efforts tapped into a larger pool of potential participants. It was the experience of the research team that while participants were willing to be interviewed, few wanted to consent to the interview being recorded, and this resulted in only having the interview transcripts of the 26 participants included in this study. Furthermore, this also accounts for the large variation in the interviews, with some of the recorded interviews being shorter than others. Having credibility with this group was important, and a large part of this project was building and holding that credibility.

5. Conclusion

PCT is one way in which PIED users attempt not only to maximise the physical gains they have attained during their PIED cycle, but also to minimise any harms that may be experienced when coming off cycle. Restricted access to PCT could mean that PIED users engage in long-term PIED use rather than cycle off, which in turn may have long-term negative health effects. More research into PCT use in this population is needed.

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