

practitioner reflections

The health demands of drug enhanced athletes

Despite our strong professional drive towards cleaner sporting contests, there still exists open competitions, such as bodybuilding, that do not test for drugs.

Paul Ehren works in this arena – he reflects on the health challenges that a practitioner might face in the case of a drug enhanced athlete.

In this article, it is my intention to touch upon the reality of performance enhancing drugs (PED) use throughout elite and recreational sport, especially within the power and strength sport arena where I work. I will then consider some of my integrative clinical thinking, that comes heavily into play when I encounter drug-enhanced athletes.

Just about every sport has its drug(s) of choice available for mis-use. We can take the power/physique sports, track and field, cycling and endurance events for granted, but even the likes of golf, snooker and darts have been shown to be tainted by the use of beta blockers, for example. A truly scary scenario is, I believe, waiting to happen within the fighting sports or serious contact sports such as rugby. How long will it be before someone becomes seriously injured by a participant who is subsequently found to have used PEDs? This will open up a complete Pandora's box of issues within the particular governing bodies, as well as the potential litigation that it will attract.

Here is an abbreviated list of some of the substances that have found their way to the athlete's medicine cabinet:

Anabolic/androgenic steroids, selective androgen receptor modulators, anti-oestrogens, appetite stimulants, appetite suppressants, diuretics, erythropoietic agents, sympathomimetics, thyroid medication, growth hormone and peptides, hypoglycaemics, liver detoxification medication, masking agents, reductase inhibitors, and testosterone stimulators.

PED use – 'canaries in the coal mine'

I have often referred to elite athletes as the 'canaries in the coal mine' and this statement is more true than ever for those who use PEDs. Whatever your thoughts on the subject, enhanced athletes are putting themselves in the position of experimental laboratory animals and they generally need to interpret results themselves, because due to obvious funding and moral problems, there is an absolute dearth of research studies in this field.

PEDs are also taken at an incredibly wide spectrum of dosages, meaning that subjective comparisons of efficacy becomes hugely difficult. To use the example of testosterone, a man in his early twenties may

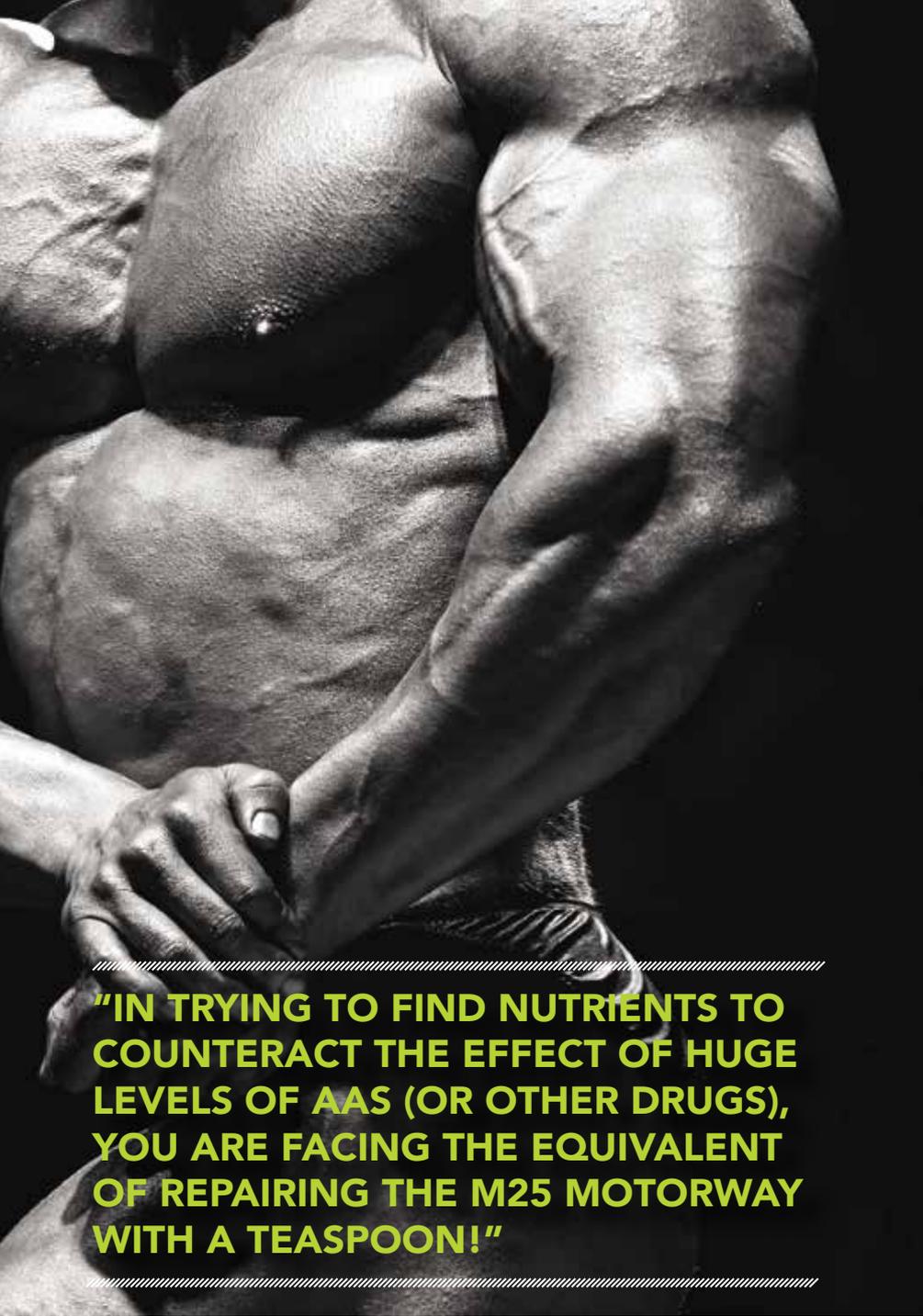
be naturally producing 10mg per day. In the field of testosterone replacement therapy (TRT), creams or gels are used to mimic optimum natural production. However, I've regularly heard of 200mg or 250mg injections being administered every 10 days. At this level, I would expect a shutdown of the hypothalamus-pituitary-gonadal (HPG) axis. Withing sport, many physique athletes competing at a national level, will be using around 1000mg anabolic/androgenic steroids per week.

Blood tests – monitoring an enhanced athlete's health

Blood tests are always interesting and the first thing to bear in mind is the context of the test. An elite, or even recreational athlete, will quite likely test positive for markers that would be indicative of a disease state in Mr or Mrs Normal. You therefore need to be aware of the physiological effects of all exercise forms before attempting to interpret tests. Some out-of-range markers may or may not represent the presence of PED use.

I will go through a number of blood analytes that I routinely check with the





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athletes that I support. In particular, I will note the negative effects that PEDs might have on the measurement:

Glucose regulation – blood glucose, insulin, HbA1c

Exercise is generally protective of blood glucose levels, but in some extreme cases, exogenous insulin and/or high levels of growth hormone are used by an athlete, which may well disrupt normal levels of blood glucose and insulin.

Renal function – eGFR, nitrogenous wastes, electrolytes

Kidney function is obviously an area of health which needs to be regularly monitored. High protein diets, poor diets, and use of oral anabolic/androgenic drugs have all been causative factors in kidney issues arising. Be aware, however, that spot dehydration can also show as a reduction in eGFR and spike urea levels. I have previously written an *FSN* article on renal function if you

would like to learn more (1).

Metabolic status – uric acid, creatine kinase

If high levels of uric acid are recorded, I would firstly consider the possible high consumption of purine containing foods, such as beef, liver, game meats, some oily fish, and meat extracts such as Oxo and Bovril.

Creatine kinase can be a useful indication, together with other factors, of overtraining (catabolism).

Liver function – aspartate transaminase (AST), alanine transaminase (ALT) and gamma GT

This is an important test for athletes using AAS because liver stress is almost an inevitable consequence of use. Some controversy does exist, however, on using these markers as a true reflection of liver health. My opinion is that I would not be totally influenced by what test results may

be considered 'normal', but neither would I ignore markers that are beyond what I see on a regular basis.

Iron markers

As an acute phase molecule, high levels of iron can be an inflammatory response to high intensity training. Mine have been high in the past, but they have settled down on re-testing, which does help reinforce the training hypothesis.

Lipid profile

From a PED point of view, anabolic/androgenic medication is well known for inhibiting HDL, which in turn will throw any ratio calculations out. I have seen some blood work where the individual's levels have been well in excess of normal even when their diet has been very well controlled. However, elevated cholesterol levels have also been associated with cortisol, and we know that elite sports people are under a lot of stress.

Hormones

Any AAS use will likely have an effect on natural hormone production and levels will be heavily influenced by the timings of tests and drugs taken. Levels are likely to be spiked close to drug administration, but often depleted during a withdrawal period, before the body's own hormone production has risen again to normal levels (after being inhibited during administration).

Red and white blood cell status

Haemoglobin and haematocrit levels are both heavily influenced by AAS use, growth hormone and the blood boosters such as EPO. Physique athletes tend to use the drugs to 'volumise' muscles, making them look fuller when working towards competition in a calorie deficit state.

Nutritional support of enhanced athletes

Having discussed the scope, nature and physiological effect of a variety of PEDs, let us now take a look at the nutrient issues that their use can cause. In my experience, this will fall into two distinct camps. Firstly, the nutrient requirements that will enable the enhanced athlete to capitalise upon the 'over-reach' that the PEDs will make possible, and secondly, nutrients that may be required to help buffer the detrimental effects on general health, that may be brought about by drug use.

If we can consider our athlete in a pre-enhanced state, we are already dealing with a high-performance machine, but all of a sudden, we are adding a duel turbo, NOx injected engine. We therefore need to 'feed the machine'.

Looking at strength and power sports, the obvious place to start is with protein levels. The use of super-physiological doses of AAS drugs and growth hormone will enable

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► bodybuilders to utilise far higher levels of protein than would normally be the case. Some strength and power athletes may take their levels up to five grams per kilo body mass for short periods, particularly when in a training phase of calorie restriction. If health is of any consideration, periodisation is the key and it is also one reason why we run comprehensive blood work with bodybuilders and strength athletes after the competitive season is over.

On an even more basic level than protein requirements, if we look at super heavy weight bodybuilders, weight lifters, power lifters, or strong men, we need to support athletes with a bodyweight in excess of 20 stones (127kg). Simply the amount of food, and therefore calories, required to maintain and fuel such bulk is considerable. Amounts of 10,000 to 12,000 Kcals per day are not unusual.

This number of calories would be an enormous amount of 'clean food', so more often than not, the diet will be bulked out by calorie dense/nutrient poor food stuffs of the 'junk food' variety.

I have two questions about such regimes. Firstly, for these extreme athletes, would better food choices possibly improve their performance? Secondly, by establishing healthier food choices during a competitive career, could we reduce their risk of long term health issues when they have retired from sport and evolved into a more sedentary lifestyle?

Bringing in a functional approach

When nutritionally supporting enhanced athletes, it is extremely difficult to design a detailed nutrient formula because there are simply so many factors to take account of: drug utilisation, dosage, sport of choice, medical status and history, lifestyle etc. My own approach to nutrient manipulation with my athletes (macro and micronutrients) is to run an integrative screen on both: a) the athlete and b) the demands of his/her sport. From this base of information, I will be able to paint a picture of their food/supplement requirements. The enhanced athlete will be capable of performing faster, further or stronger than their normal physiology would allow, so arguably my most important task is to try and keep this person healthy, both in and out of competition.

Working with the functional medicine matrix is a great place for me to start with my athletes because it covers all the vital elements of their physiological health: energy production/oxidative stress, detoxification, hormonal and neurotransmitter imbalances, mind and spirit, structural imbalances, gastrointestinal health, and immune and inflammation issues. All of these areas of

Cardiovascular system	Cholesterol/lipid anomalies, enlarged heart, heart muscle damage, hypertension, blood clotting anomalies, changes to blood viscosity, increased homocysteine levels, vascular endothelial dysfunction
Endocrine system	Hair loss, abnormal hair growth and vocal changes in females, gynecomastia (man boobs), birth defects, menstrual irregularities, libido problems, fertility issues, prostate enlargement, testicular atrophy, insulin resistance, acne
Immune system	Immunosuppression
Liver and kidneys	Renal and/or hepatic damage, some cancers, water and electrolyte retention

Some expected physiological imbalances in drug enhanced athletes

health need to be considered.

Moving away from athletes for a moment, I truly believe that hormonal manipulation will continue to play an increasing role in the functional medicine armoury when looking at a myriad of conditions relating to our clients. Physiological endocrine balance is already being used therapeutically to help individuals with a variety of conditions, such as age-related sarcopenia, cardiovascular disease, mental disorders, post-traumatic stress disorders, loss of libido, age related mental decline, severe menopause symptoms, and many others.

In this scenario of trying to return unhealthy people to 'normal', it is not sufficient to look at replacement hormones, such as testosterone, oestrogen and growth hormone, in isolation, because everyone looking for an answer will be biochemically unique. And so it is with enhanced athletes who are using hormonal manipulation for performance gains; as a practitioner, it is necessary for me to assess the athlete's hypothalamus-pituitary-adrenal, gonadal and thyroid axes, mitochondrial function, neurotransmitters, nutrient deficiencies, and gut health before even starting to think about treatment protocols.

Micronutrient support for enhanced athletes

The whole question of micronutrient support to balance the possible health consequences of athletic drug use is an absolutely minefield and is lacking in research. Possible drug related side effects that may require nutritional support depends on a number of factors, including the substances (ab)used, the dosages taken, the nature of the athletic event, and genetic susceptibility.

However, a reasonable list of physiological imbalances that may need support could include the categories considered in the table above.

I can never cover all of the potential physiological pitfalls, which makes dealing

with enhanced athletes such a challenge. I can really only assess what I have in front of me, be aware of what may go wrong, test for general health and nutrient deficiencies the best I can, and realise that at the supraphysiological dosages being used, I can do very little to prevent problems that an individual may be predisposed to. In trying to find nutrients to counteract the effect of huge levels of AAS (or other drugs), you are facing the equivalent of repairing the M25 motorway with a teaspoon!

I hope that this article has given you some insight to both my professional experience with power and strength athletes, and some of the thought processes that I go through in relation to nutrient requirements in the case of a drug enhanced athlete. In essence, I go through the same functional thinking as I do with clean athletes; it's just that the clinical complexity of the individual can be somewhat enhanced! **fsn**

References

1. Ehren P (2015). Kidney compromise may be a side-effect of performance. *FSN magazine*. March/April 2015. Pp12-14.



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