CasePerformance

January Newsletter Part II

CasePerformance

“For Sport, For Life”

www.caseperformance.com

Here is the news that we'll cover in Part II of this month's newsletter....

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Hello,

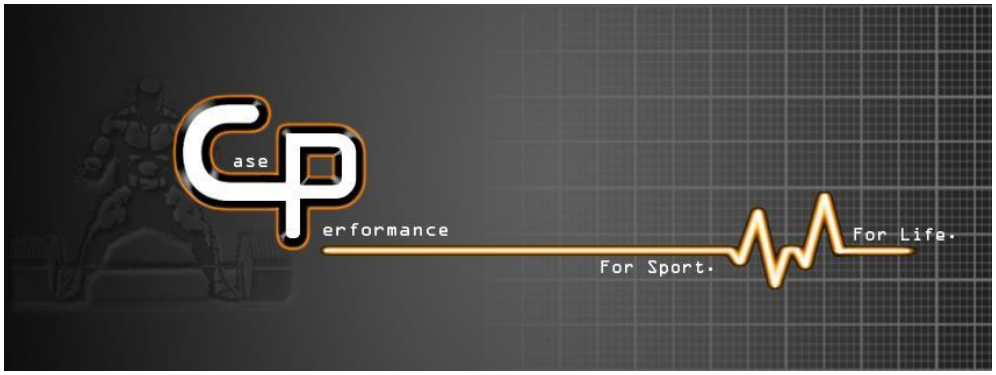
Glad to see that you’re tuning into Part II of our newsletter! I hope you enjoyed Part I which featured an interview with fitness enthusiast Alex Leaf, who shared with us his training background and the strategies he uses to keep his body running smoothly. Following the interview, Dino Tassigiannis shared with us, *Experiences of a Yo-Yo Dieter!* In it, Dino shared his experiences as a yo-yo dieter and how looking at others, rather than at yourself, can be the cause of many physique derailments.

In Part II of our newsletter, we take a quick peek at article news here at CasePerformance,. We then shift gears and look at the the SuppVersity Corner Report before closing with our CP Performance Discussion, *PED Testing 101: Testosterone, Epitestosterone & The Relationship Between Them.*

Respectfully,

Sean Casey

II. CasePerformance vs. Case Performance



Since originally creating the website, I've had various people ask me if I made a "typo" in creating the Facebook account, etc., that is associated with the website. "Shouldn't it be Case Performance vs CasePerformance (1 vs 2 words)?" Likewise, I've had those who correctly assumed that it was correct ask me why I chose to go with the one word title. Thus, I figured it may be appropriate to share the back story as to how the website got its CasePerformance name…

When I was trying to come up with a "name" for the website, I wanted to stay away from anything that included my name because A) I loathe self promotion (seriously, I can't be the only one who is absolutely sick of seeing people slap their names everything) and B) Even from the start, the website has always been **SO** much bigger than one person; Although I'm the primary contributor, many have shared their time and talents on the website via interviews, article writing & coaching consults. Furthermore, multiple individuals have assisted behind the scenes, creating and managing the more technical aspects of the website.

Thus, with high hopes I set off to name the website. Unfortunately every name I could think of [related to human performance] was already taken. Thus I was left with 3 options

A) Have a name that was 10 words long

B) Have a completely esoteric name that maybe 5 people would recognize

C) Go with the generic self-promo name of Casey Performance (Ugh!)

After much frustration on my end, trying to avoid all three of the options mentioned above, I asked around for suggestions. Someone mentioned the name Case Performance (2 words) as they knew that those associated with the website worked with everyone on a "*case* by *case*" basis vs. a generic one size fits all approach. Given the difficulty in naming the website I could handle this compromise… By going with "Case" vs. "Casey", individuals who didn't directly know me wouldn't look at the site and automatically associate the site with a single individual. From there I shortened it to one word, CasePerformance, such that even the remnant of my last name wasn't singled out from the overarching goal of the website; that is, helping you reach your peak physical performance.

III. Donations for CasePerformance Are Welcomed

As you've probably noticed while surfing around the CasePerformance website, we do not litter our pages with advertisements or have "Members Only" sections that require a paid subscription.

Why do we do this?

My goal is to reach as many individuals as possible. If an individual truly wishes to improve their health and performance, I want them to succeed. This holds true regardless if they are a multi-millionaire or those pinching pennies.

A Potential Downside & What You Can Do To Help

The cost of running a website in conjunction with paying for full access to the various sport science and nutrition research journals I use is extremely expensive. Also, all of the authors at CasePerformance put considerable time into writing the articles for this site. If you enjoy the free information provided on this site, we humbly ask you to show your support by making a small donation. Thanks for your support!

CLICK HERE to make a donation. Please know that **ANY AMOUNT** is greatly appreciated!

IV. Article News at CasePerformance

Three new posts have been added to the CasePerformance library since the last newsletter was sent out including…

Interview with the Expert: Jennifer Gibson with Sean Casey

In this "Interview with the Expert" we have the privilege of talking sports nutrition with Jennifer Gibson, MSc, RD, CSSD, IOC DIP Sport Nutrition. Ms. Gibson is a Sport Dietitian at the United States Olympic Training Center in Colorado Springs, Colorado, where she works primarily with acrobatic and combat sport athletes. Topics include her background, establishing diets, the USOC's approach to supplementation as well as some common nutrition pitfalls made by athletes.

Interview with the Expert: The "Golden Eagle" Tom Platz with Sean Casey

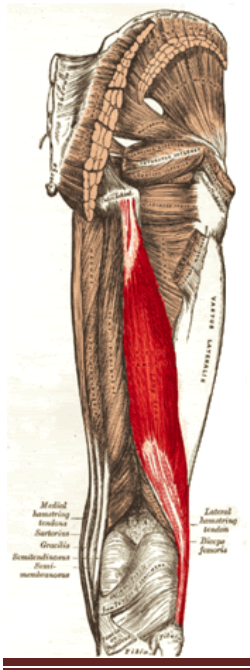
In this "Interview with the Expert" we have the privilege of being joined by bodybuilding legend Tom Platz, aka "The Golden Eagle" and his wife, Dr. Cha. Topics covered include his experiences as a bodybuilder, one of his secrets to success during the '80s and proudest moment as a competitor. Dr. Cha also shares why she can't stand the word "diet" and a few other thoughts.

Interview with the Expert: Brian McWilliams with Sean Casey

In this "Interview with the Expert" we have the privilege of talking training and sports medicine with Brian McWilliams, MS, LAT, CSCS, CEAS, USAT Level II coach. Topics that we cover include his work as an athletic trainer and/or coach in a variety of settings (Industrial, College Sports, NFL, Olympics, triathlons, youth fitness). In addition Brian shares his experiences preparing for Triathlons as well as his involvement with the Wisconsin chapter of myTEAM TRIUMPH.

Top Read Article in January here at CasePerformance…

Rehabilitating Chronic Hamstring Strains



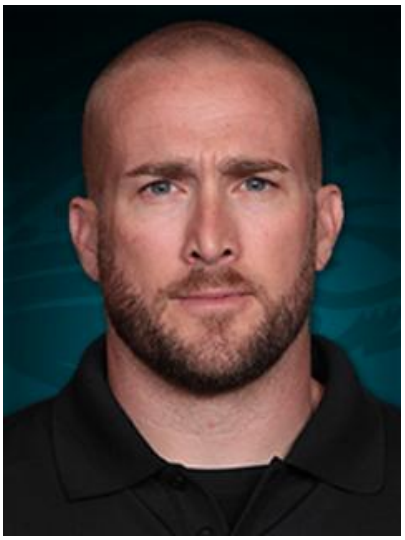
Originally written in 2009…

Hamstring strains are one of the most frustrating injuries for athletes to suffer. It seems that once a hamstring is injured, it's likely to be injured again within a couple of years. In a recent study, it was shown that even when pain-free, previously strained hamstrings lack strength/power during eccentric muscular contractions. In addition there range of motion is limited during hip flexion. Amongst other things, In order to combat this problem, I recommend including more Single Leg Romanian Dead Lifts (SLRDL) into your exercise program.

NFL Superbowl …

For those who enjoy the American football & will be tuning in to watch the NFL Superbowl this Sunday (Feb 2nd), check out the sidelines. If you look close, you may spot my mentor Luke Richesson who is the Physical Preparation Coach for the Denver Broncos. Although I can't predict the outcome of the game, I can say, from a physical preparation standpoint, they'll be ready to rock!

Interview with the Expert: Luke Richesson with Sean Casey



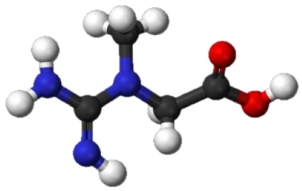
In this installment of "Interview with the Expert" we have the privilege of talking performance training with Luke Richesson. Topics discussed include differences between various coaching environments, appropriate use of kettlebells and early sport specialization.

V. Articles & Interviews on Partner Websites

During the past month, I have contributed two articles to the following website:

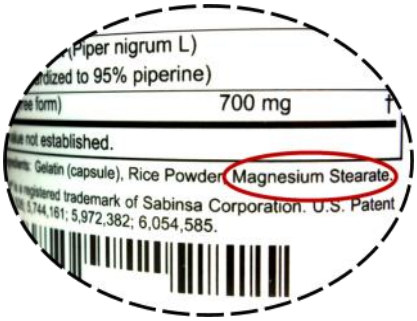
Nucleo: Nutrition Research & Exercise Physiology Blog

* This is a great site for those looking for "quick hit" articles. During the past month I contributed the following two "quick hit" article to this website:



Creatine Beyond Brawn Part I – Diabetes & Glycemic Control

* Everyone knows the muscle building properties of creatine. However, did you know that it also assists with blood sugar control?



Magnesium Stearate – Biofriendly or BioHazard

Is there a secret ingredient found in your supplements that's harming your health… or is this just another case of supplement misinformation put out by those looking to sell their own products???

V. SuppVersity Corner Report!

SuppVersity is one of my favorite sites. It's run by my friend Adel Moussa. One of the things we do on the CasePerformance **FACEBOOK** page is highlight one of their excellent posts each week. In case you missed it…

Week of Dec 30th – Jan 5th

This week ended up being a "tie" as I had trouble narrowing it down to just one article.

1. True or False: Dairy Is a Toxic ☣ Hormone Cocktail That's a Threat to Your Testosterone Levels & Fertility and Promotes Breast, Prostate & Other Forms of Cancer!

CP Quick Thoughts

Within the last 5-8 years there has been an increasingly large concern over the hazardous effects of dairy on human health. In fact, the Paleo diet recommends the complete removal of it from the diet. This SuppVersity article tackles many of the questions related to dairy & cancer.

Reading this article reminded me of Casein Protein and the interesting debate over the A1/A2 ratios in it … a topic I plan to address in a future article (Hopefully March 2014)

2. Cell Swelling Keeps Muscles "Pumped" for 52 hours following a Leg Workout

I found this post particularly fascinating because A) It touched on muscle pumps… and what resistance training enthusiast doesn't like to feel their muscles engorged with blood post workout? And B) It's fascinating to read about how previous studies may have overestimated the hypertrophic effects of a training regime simply due to taking measurements too soon following a training workout… I found myself surprised at how long the water retention lasted post-workout.

Week of Jan 6-12th

Study Says: Prohormone "1-Andro" Works, But It's Bad for You! Plus: What About Other Prohormones or Steroids Such As Androstenedione, DHEA, Testosterone & DECA?

CP Quick Thoughts

The SuppVersity post of the week for Jan 6-12 is the "is the first official evaluation of the viability of prohormone supplements ever since the Anabolic Steroid Control Act was amended in 2004" With that being said, how can it NOT be the chosen article of the week??

It's great to see researchers actually performing tests using pro-hormones so that we have some data to look at besides what BigGunzOhYeah! is posting on random message boards across the internet universe.

Hopefully this is just the 1st of many studies to examine the health and performance effects of (pro)hormones!

Week of Jan 13th-19th

Sex, Drugs and... Exercise? Caffeine, Alcohol, Marihuana and Nicotine - Do All Our Favorite Addictions Clash With Being Healthy, Lean and Athletic?

CP Quick Thoughts

This was a nice review of the physiologic and performance effects of many common everyday drugs (caffeine, alcohol, nicotine, marijuana).

Week of Jan 13th-19th (cont.)

While reading this article I couldn't help but think of the various people who told me that exercising is a good way to get rid of a hangover because it helps you "sweat out" the alcohol. This usually elicits a response from me of "Uh, ok… Hangovers are caused be dehydration so you're telling me that by losing even more body fluid (i.e. – sweat) this is somehow going to help your hangover?!?!"

Week of Jan 20th- Jan 26th

High Protein Diets, Acid Load, Calcium Loss, Osteoporosis and a 50% Increase in Diabetes Risk - Is There a Link?

CP Quick Thoughts

When I was going through my nutrition and dietetic studies one of the concerns expressed by course instructors was that high protein diets would lead to weak brittle bones due to alterations in blood pH levels. This article examines the latest human based research … Is protein really going to turn your bone structure into that of a 90 year old?

One of the terms Adel uses in the article is **PRAL**. For those not familiar with this term, it stands for **P**otential **R**enal **A**cid **L**oad. According to Remer et al, PRAL"…*provides an estimate of the production of endogenous acid that exceeds the level of alkali produced for given amounts of foods ingested daily.*"[1] In other words, higher daily PRAL values indicate that your food is more acidic in nature whereas a negative value (or one closer to zero) indicates that it will have more of an alkalizing effect on your body. (Technically speaking, PRAL reflects renal net acid excretion… ie - urine) As Adel notes in this attached article, higher total PRAL has been implicated in various diseases.

References

1. Remer T, Dimitriou T, Manz F.Dietary potential renal acid load and renal net acid excretion in healthy, free-living children and adolescents. Am J Clin Nutr. 2003 May;77(5):1255-60.

VI. CP Performance Discussion

In the weeks ahead, athletes along with their coaches & trainers will come together and compete for the coveted medal stand at the 2014 Winter Olympics in Sochi, Russia. Another competition, behind the scenes, will also be taking place at these games; That is, the battle between the drug testers and the athletes taking banned performance enhancing drugs (PED's). In this CP Performance Discussion, I'm going to highlight one test which likely garners the most attention in the public's eye during the Olympic games - the testosterone to epitestosterone ratio test (T:E).

PED Testing 101: Testosterone, Epitestosterone & The Ratio Between Them

By: Sean Casey

When one thinks of performance enhancing drugs (PED's), the first thing that likely comes to the mind are anabolic steroids such as testosterone and various derivatives of the testosterone molecule. Despite the fact that anabolic steroid use is banned in sport play, many athletes still take them due to their profound effect on muscle growth and recovery.

With respect to PED testing, the first line of defense used by drug testers in catching those who take anabolic steroids is measuring the athlete's testosterone to epitestosterone ratio (**T:E**) via the good ol' pee test. Although it was originally implemented by the International Olympic Committee in 1983,[3] I didn't hear of it being

referenced by the typical diehard professional sport fan until ~ 2011-2012 (at least here in the USA). It was at this time that Ryan Braun, the 2011 MLB Most Valuable Player, produced a "dirty" urine test. According to the media, he had a T:E ratio of 20:1;[4] far above the 4:1 threshold. Since then I've seen/heard more and more questions related to this ratio and with the 2014 Winter Olympics, I anticipate more may be coming … What does this test actually measure? How is it used? If an athlete doesn't test positive, does it mean that he/she's clean? Etc. etc. etc

Testosterone **Epitestosterone**

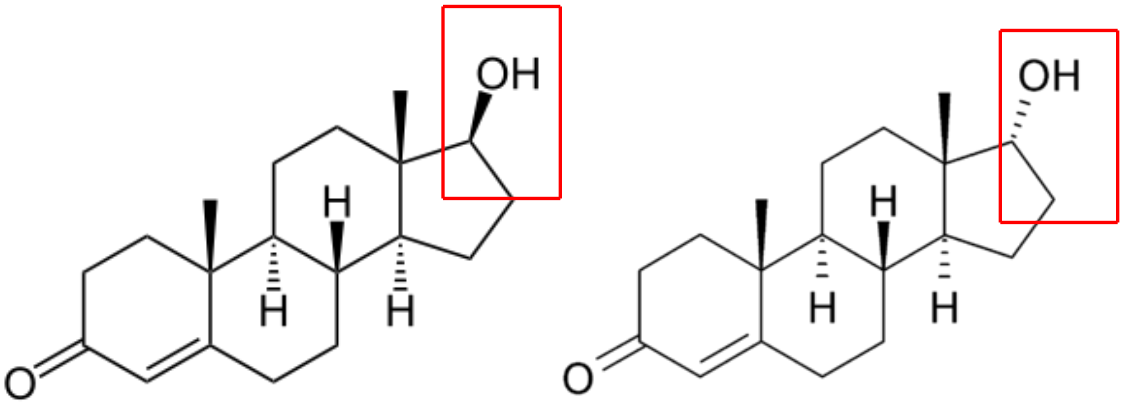


Figure 1. Testosterone (left), Epitestosterone (right). Adapted from original Sources[1,2]

Testosterone & Epitestosterone

To answer these questions, let's first look at the molecules of interest, testosterone & epitestosterone. As shown in Figure 1, testosterone and epitestosterone are virtually identical molecules. The only difference between them is the hydroxyl group (–OH) that I've highlighted in the red box. If one can imagine these molecules lying flat on a table, the –OH group of testosterone would be elevated off the table whereas the –OH group of epitestosterone would sink into the table (for the budding chemist out there, they're referred to as epimers; a term that refers to the fact that they're virtually the same molecule except they differ in absolute configuration at one location).

Although similar in name and structure, epitestosterone does not appear to be related to testosterone from a functionality standpoint. Furthermore, testosterone is not converted to epitestosterone (at least not to any significant degree). In other words, epitestosterone is produced concomitantly with testosterone rather than as a byproduct of it. However, it's not in a 1:1 ratio; older research indicated T:E was produced in a 33:1 ratio;[16] However, Patrick Arnold indicated to me that it may be closer to 20:1.

Despite their differences, they share a common method of elimination; bonded to glucuronic acid and excreted in urine. However, only a small portion of testosterone is eliminated via this route. In contrast epitestosterone is primarily excreted in its glucuronic acid form.[16] Thus, despite testosterone being produced in far greater amounts, the T:E ratio is normally around 1:1 to 2:1. In the case of testosterone, ~1% of circulating testosterone gets converted to testosterone glucuronide form (i.e. testosterone + glucoronic acid) via the enzyme UGT2B17 which, as we'll see, can play a role in the T:E test results.[5, 6]

Taking into account the metabolic and elimination properties of these two molecules, one can easily see how the T:E ratio assists in detecting those taking anabolic steroids; If one increases his/her testosterone levels via artificial means (i.e. – oral or injectable steroids), it will rise without a parallel increase in epitesterone; therefore, at least theoretically speaking, increasing his/her T:E ratio.

How is the test used?

As discussed above, since testosterone is excreted in urine as testosterone glucuronide (TG), if one increases their testosterone via artificial means, the amount of TG in their urine also increases skewing the T:E ratio. When that ratio exceeds the 4:1 threshold, it gets "flagged" for further review.[7]

Although a test may be flagged under these conditions, it still doesn't mean that the ratio is skewed via artificial means. Some people will naturally have a ratio higher than 4:1.[5] Thus, the sample gets sent for more sophisticated testing via Isotope Ratio Mass Spectrometry (IRMS) analysis which can assess if the elevated T:E results were the result of "playing dirty" or simply high natural levels.[3]

IRMS pinpoints these differences by comparing the ratio of two carbon isotopes within the sample, ^{13}C and ^{12}C. Synthetic sources of testosterone contain less ^{13}C than that naturally produced by the body. [3] This occurs as synthetic steroids are "*largely derived from stigmasterol and sitosterol, plant sterols obtained from ^{13}C depleted soy*."[8] In contrast, the human diet includes plants (or animals that eat plants) that are rich in ^{13}C

(For reference 90% of all plants are of the ^{13}C type[8].) Thus, a low $^{13}C/^{12}C$ vs. that of a standard reference is indicative of anabolic steroid use.

I know what you all may be asking right now… "Why don't athletes simply sidestep the whole IRMS test by 're-balancing' the T:E ratio via injecting epitestosterone simultaneously with any anabolic steroid agents?" Although tempting, urine samples indicating *"presence of concentration of testosterone or epitestosterone (equivalent to the glucuronide) greater than 200 ng/mL*" also get flagged.[7] Thus, it too winds up being sent to further IRMS testing.

If an athlete doesn't test positive are they clean?

"*I could figure out how to take a fair amount of testosterone and you'd never catch me, and if I can say that, a lot of others can too"*

- Don H. Catlin, founder of the Anti-Doping Research Institute, 2007. [9]

As indicated in Don Caitlin's above comment – testing negative does not equate to being clean. Things really haven't changed a whole lot since 2007 either. A test less than 4:1 doesn't necessarily mean that an athlete is "clean." Various masking agents can be used to distort this ratio.[10]

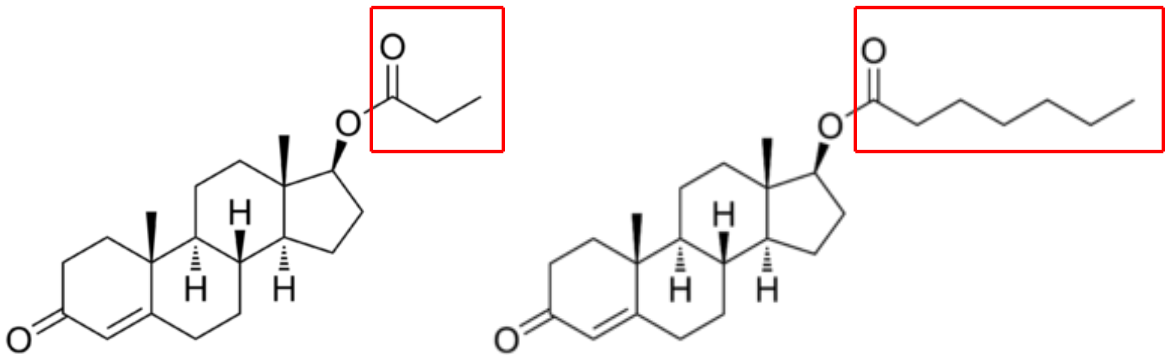


Figure 2. Testosterone proprionate (left) and Testosterone ethanate (right). Proprionate and enathate side chains highlighted in red box. Adapted from original Sources[13,14]

Besides the use of masking agents, athletes can also use short ester testosterones (a testosterone molecule attached to a carboxylic acid) which are metabolized at relatively quick speeds due to fewer carbons in their side chains. For instance, as highlighted in

Figure 2, testosterone proprionate has a three carbon side chain and is metabolized much quicker than something like testosterone enanthate which has seven carbons in its side chain (active life = ~2-3 days vs ~ 10.5 days; detection time = ~2-3 weeks vs. 3 months).[11,12] The quicker it's metabolized, the less likely it'll still be in the athletes system when tested. Also worth noting is that various alkalyted oral steroids are in and out of the system in mere hours. Furthermore, there are designer steroids which don't have reference samples for comparison.

In addition to the masking agents, the use of quickly metabolized testosterone derivatives along with the designer steroids mentioned in the proceeding paragraphs, some "lucky" athletes lack a fully functioning and/or presence of the enzyme UGT2B17, which as mentioned earlier is responsible for converting testosterone into testosterone glucuronide. Thus, testosterone fails to be converted to the compound which the drug testers are attempting to measure in the T:E test. In fact, as shown in a study completed by Schulze et al, even when injected with a dose of 500 mg testosterone enanthate, 40% of individuals lacking a fully functional UGT2B17 failed to trip the 4:1 threshold. [5]

In their article, Steroids, Crossfit & the Crossfit Games: Who & How, which I strongly recommend you read, Anthony Roberts & John Romano mention two shining examples of how the system can routinely be beaten by those who know what they're doing. The first one is 6 time Tour de France champion Lance Armstrong who, despite hundreds of test, was never caught despite later admitting to using testosterone. In addition, they point to MLB superstar Alex Rodriguez who, although suspended, never actually tested positive for anabolic steroids. Rather he was rather "dimed" out by others. As Roberts and Romano state…

" ..The idea that passing a drug test – even an Olympic drug test – means that the athlete is clean is a fallacy. A drug test is an IQ test. Only fucking idiots fail them…"[15]

Also worth noting, as it relates to being "clean" is the fact that I've only touched on anabolic steroids. There are many other anabolic peptide compounds (ie- non steroidal) that are virtually undetectable. Add into the mix various hard to detect banned stimulants and similar which may be of equal concern (as it relates to general use of banned PED's), one can easily see how even a "clean" athlete may in fact be playing in the dirt.

Bottom Line

As things stand today, the T:E and IRMS test sound good on paper and theory. However, in application, many anabolic steroid users slip through the cracks, or should we say canyons, of these tests.

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That wraps up this CasePerformance newsletter. Thanks for being a part of the team. We look forward to hearing your feedback on anything and everything so drop us a note on **FACEBOOK.**

And as always... Train smart, train hard and leave the excuses to someone else!

Sincerely,

The CasePerformance Team