

The Big Gut: Are Excess GH and Insulin to Blame?

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A lot has already been said over the last two decades about the decline of symmetry and aesthetics in bodybuilding. Traditionally, elite level bodybuilders were graced with Olympian lines, similar to the figures Michelangelo and other classical artists and sculptors carved and drew in places of worship. These visages were gradually replaced in the late 1980's with more exaggerated physiques, and in some cases big guts!

The Foundation Principles

The big gut has not escaped the notice of the leadership of the IFBB who recently posted a mandate dictating a change in judging criteria.¹ Recalling the founding principles on which the sport of bodybuilding was created, the IFBB is reaffirming the significance of balance, proportion and classic attributes such as the "V"-taper and a flat, muscular abdomen. The mandate didn't state what pressures may have incited the de facto change in judging criteria, but noted that distended abdomens and distorted muscles negatively impact symmetry and natural aesthetics, detracting from the overall physique.

As the mandate clearly comments on the proliferation of distended abdomens and the distorted muscles that have become the hallmark of contemporary bodybuilders, it's important for competitive bodybuilders to understand the potential causes for this appearance. There have been numerous message board discussions debating the relative contribution of a number of factors, some with merit and others without. Muscle distortion likely refers to the unnatural lumps and bulges appearing in the muscle bellies from the use of inflammatory compounds such as nolutil and synthol.^{2,3} Injecting these compounds causes the muscle tissue to swell around the area of the injection depot. Done properly, this can lead to significantly enlarged muscle, but poor technique can lead to unsightly lumps, suggesting a golf ball-sized tumor is growing in the deltoid or biceps.

Abdominal distension is a completely separate issue. Younger followers of bodybuilding may not be aware of the classical appearance, which personified the golden era of the sport. Bodybuilders used to appear as heavily muscled athletes, gracefully portraying the images adorning Greek temples or the fantasy artwork of Boris Vallejo.⁴ During the later half of the 1980's, changes began to appear in the professional bodybuilders' physique, culminating in the look now dominating the field of competitors.

Gone are the days when the waistline of a bodybuilder was waspishly tiny, replaced by abdominal girths equaling the titanic proportions of the chest and upper back. When the trophies are handed out and the champions receive back-slapping hugs from other competitors, it looks more like a tachi-ai charge in a sumo match. Yet, unlike their sumo counterparts, today's bodybuilders are extremely lean, even more so than their more aesthetic forebears.

Despite the prodigious guts, which look capable of launching a reptilian creature, like a scene from the movie "Alien," the skin is so thin and subcutaneous fat so low that muscles, veins and tendons are readily apparent. Those in the know are aware of the direct causes of abdominal distension, while others guess. It's important to dispel irrelevant factors, as they serve only to confuse the issue. The abdominal distension seen in today's bodybuilders isn't due to intestinal gas, obesity due to overeating or use of powerlifting movements. Today's bodybuilders are very sophisticated in regard to diet and it's extremely unlikely that any, let alone every pro would be downing grams of maltitol or fiber laxatives immediately before walking on stage. As was stated earlier, the bodybuilders of today have extremely low subcutaneous body fat. The guts aren't due to generalized obesity. In the off-season, many of these athletes relax their standards and tend to accumulate body fat, some to the point of obesity, but this isn't a factor on stage during competition.

Causes for the Big Gut

While power movements are still part of the training regimen for many bodybuilders, such moves don't account for the gut. Powerlifters tend to have a more portly appearance, but this is due to higher body fat levels, low aerobic capacity and weakening and/or stretching of the abdominal wall from repeated high intra-abdominal pressure exercises. Powerlifters may also acquire hernias, which can deform the abdominal wall.⁵ The primary factors leading to the dramatic belly bulging are the abusive levels of GH and insulin use.

GH, human growth hormone, was originally provided in very limited supply to dwarf children as it was sourced from the brains of cadavers.⁶ During the 1970's, advances in genetic engineering allowed for the relatively unlimited production growth hormone using recombinant technology.⁷ By the late 1980's, GH was readily available and being used by athletes in many sports, including football, cycling and bodybuilding.⁸ GH was found to be effective in promoting connective tissue health, speeding recovery, reducing body fat and enhancing anabolic growth.⁹

As is the case with most drugs, bodybuilders applied trial and error to determine the optimal dosing schedule of GH for achieving maximum growth. During this time, endorsements and trophies were won by those who achieved the most exaggerated growth. This system of rewards promoted the use of excessively high doses of GH, upward to 36 International Units (IU) per day.

Despite the relative benefits of extreme muscular growth, bodybuilders began to develop adverse side effects. For those familiar with the field of endocrinology, the study of hormones' effects on the body, these side effects were not unexpected. Strange, disfiguring growths of the ears, nose and jaw change facial shape, hands and feet enlarge and the abdomen protrudes being pushed outward by the growth of thoracic (chest) and abdominal (gut) organs.^{10,11}

These features are identical to those experienced by people suffering from the disease acromegaly, which is caused by tumors producing high levels of GH in an unregulated fashion.¹² Acromegaly is similar to gigantism, a disease state which begins in childhood, resulting in extreme height and features of acromegaly. The primary difference is the lack of effect of acromegaly on height, as the growth plates of adults are fused, preventing further height changes.

The question might be raised "Why use so much GH and could less be used?" It's impossible to say who started using GH, but it's likely the first bodybuilders mimicked the doses used to treat dwarf children who are very short due to GH deficiency. These children are provided weekly with 0.3 milligrams per kilogram (2.2 pounds bodyweight); extrapolating those numbers to massive adult bodybuilders' size results in a daily dose of 15–25 IU per day.¹³

Obviously, some bodybuilders have exceeded even those numbers as the price of GH has dropped with the introduction of Asian imports. The high dose of GH is desirable, or was in the days of size for size's sake, because the anabolic effects of GH are dose dependent. The more GH used, the larger the muscles (head, organs, hands and feet) grew.¹⁴ However, as has been seen on stage and in the clinical realm, exceeding a reasonable dose of GH can lead to problems.

Studies have shown levels as low as six IU per day can lead to early signs of acromegaly, which include physiological changes (insulin resistance) as well as the disfiguring alterations in appearance.^{15,16} When GH is low in adults, clinical features are noted, including: central (waist) obesity, weak bones, unhealthy cholesterol and fat levels, reduced muscle, decreased exercise tolerance, depression and anxiety.^{17,18} These features are resolved with GH replacement therapy, which can be used safely for years if IGF-1 levels are measured to ensure excess hormone isn't being administered.^{18,19} IGF-1 is a protein growth factor, which is produced in response to GH and is responsible for many of its anabolic effects.

Ironically, though GH provides wonderful benefits up to a point, when it's provided beyond what the body can tolerate, it can induce the disfiguring changes of acromegaly and lead to the development of the metabolic syndrome. The metabolic syndrome is a collection of risk factors relating to poor health and early death.

The Pathway to Ultimate Size

The central features of the metabolic syndrome are: obesity (especially intra-abdominal fat), dangerous cholesterol and fat levels in the blood, fatty buildup in the liver, insulin resistance, high blood pressure, type 2 diabetes and heart attacks.¹⁷ Inflammation has also been suggested to be part of the metabolic syndrome.²⁰ The exceedingly high levels of GH used by some bodybuilders predispose them to symptoms of metabolic syndrome by interfering with the body's ability to respond to insulin.^{19,21} This leads to elevated levels of both insulin and sugar, causing fat cells to grow, making it difficult to break down stored fat and get sugar for energy into the muscle cell. The fat releasing (lipolytic) effect of GH appears to be strong enough to counteract the insulin resistance of fat cells in the subcutaneous layer, but another very important reservoir of fat, the visceral fat surrounding the abdominal organs, grows. As the visceral fat deposit enlarges, physiologic changes occur in the body which make the metabolic syndrome more pronounced, worsen heart health and promote cardiovascular disease.^{22,23}

These effects compound the heart-altering effect of anabolic steroids and GH, placing many of these bodybuilders at

great risk for a heart attack.^{24,25}

Beyond the gut-bulging effect of GH (acting by increasing heart, liver, spleen and intestine size as well as increasing the visceral fat), there's also the effect of insulin. Not only do these bodybuilders already have high natural insulin levels due to the GH-induced insulin resistance, but they also administer insulin for its potent anabolic effect.²⁶ Insulin is the primary anabolic hormone of the body, funneling sugar and other nutrients into active tissue and maintaining fat stores for periods of starvation. Though it's less popular now than it was five to 10 years ago, bodybuilders felt taking insulin before meals, along with daily GH injections, was the pathway to ultimate size. In a way, they were right, in that the amount of size put on by these athletes was tremendous. Unfortunately, insulin can lead to a severe hypoglycemic reaction, a potentially fatal drop in blood sugar, which hospitalizes many diabetics every year.²⁷ The use of insulin to induce a fatal hypoglycemic event was implicated in the attempted murder case of tycoon Claus von Bulow, whose wife remains in a coma after 20 years.²⁸ Many others have used insulin as a murder weapon, including serial killer William Archerd of California.²⁹

The size insulin puts on a bodybuilder is not quality size. Muscle growth does occur, especially in the presence of insulin resistance, but fat content is also higher, as is water retention. All fat cells will grow in the presence of insulin, including visceral fat content.³⁰ Bodybuilders can control subcutaneous fat with lipolytic drugs (GH, clenbuterol, etc.) and water retention with diuretics, but visceral fat is very difficult to combat in the setting of insulin resistance. Given the lack of significant additional muscular growth, potential risks and need for additional drugs to counteract the negative effects of insulin, it's falling out of favor.

A big belly— it has a place in the last trimester of a pregnancy, but not on stage in bodybuilding. The introduction of recombinant human growth hormone and a relative abundance of supply make this the drug of choice to support the anabolic effects of steroids and drop body fat to previously unattainable levels. Unfortunately, the more is better mentality, fueled by the dose-response relationship between GH, IGF-1 and anabolic effects, has led to an epidemic of as many as three unwanted and dangerous side effects. Chronic overdosing of GH may lead to: 1) growth of the organs of the chest and abdomen causing the "GH gut" look and risking heart failure, 2) facial disfigurement and abnormal growth of the hands, and 3) feet and symptoms of the metabolic syndrome (vascular disease, diabetes and high blood pressure). Adding insulin to the chemical arsenal increases many of these risks, promotes the growth of the visceral (intra-abdominal) fat, increases water retention and exposes bodybuilders to potentially fatal hypoglycemic events.

There really is no place for insulin in a healthy pursuit of bodybuilding. It's a potent anabolic hormone, but its benefits don't outweigh the risks and the side effect of fat storage and water retention also need to be addressed. GH is being used with great benefit in a broad range of people, including athletes. Many of its benefits can be experienced using much more moderate doses of one to five IU per day, six days per week.^{9,18,31-33} It's important to monitor IGF-1 levels to ensure the body isn't being overexposed to GH as each person's need are individualized and may vary over time.³² The benefits of connective tissue healing, fat mobilization and augmenting the anabolic effect of exercise and steroids can be experienced with these lower and more rational doses.⁹

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