RESEARCH ARTICLE

Bigorexia: Bodybuilding and Muscle Dysmorphia

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Abstract

Muscle dysmorphia is an emerging condition that primarily affects male bodybuilders. Such individuals obsess about being inadequately muscular. Compulsions include spending hours in the gym, squandering excessive amounts of money on ineffectual sports supplements, abnormal eating patterns or even substance abuse. In this essay, I illustrate the features of muscle dysmorphia by employing the first-person account of a male bodybuilder afflicted by this condition. I briefly outline the history of bodybuilding and examine whether the growth of this sport is linked to a growing concern with body image amongst males. I suggest that muscle dysmorphia may be a new expression of a common pathology shared with the eating disorders.

Keywords

bodybuilding; muscle dysmorphia; bigorexia; eating disorders; steroids

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Published online 1 September 2008 in Wiley InterScience (www.interscience.wiley.com) DOI: 10.1002/erv.897

Introduction

It has long been recognised that many women suffer from body image-related anxieties, ranging from simple unhappiness with shape and weight to a serious eating disorder such as anorexia nervosa.

In comparison, little attention has been devoted to the study of men who also display these concerns. In the sport of bodybuilding, men pursue an idealised muscle-bound body image as the primary goal of their training. Developing a healthy body through following an enjoyable exercise routine is undoubtedly a wholesome endeavour; nevertheless, it seems that by focussing overtly upon body image some bodybuilders are led to crave an unattainable figure. Muscle dysmorphia is an emerging condition that primarily affects male bodybuilders. Such individuals obsess about being inadequately muscular. Compulsions include spending hours in the gym, squandering excessive amounts of money on ineffectual sports supplements, abnormal eating patterns or even substance abuse.

In this essay, I illustrate the features of muscle dysmorphia by employing the first-person account of a male bodybuilder afflicted by this condition. I briefly outline the history of bodybuilding and examine whether the growth of this sport is linked to a growing concern with body image amongst males. I suggest that muscle dysmorphia may be a new expression of a common pathology shared with the eating disorders.

What is bodybuilding?

Bodybuilding is the pursuit of a muscular physique through a regime of weight training and a tailored programme of nutrition. Although female bodybuilders exist, it is primarily a male-dominated activity. In the sport of competitive bodybuilding individuals display

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their physiques to a panel of judges, who score each entrant on the basis of the size, symmetry and definition of his (or her) musculature. The aesthetic qualities of bodybuilding differentiate it from the discipline of powerlifting, where the goal is purely to lift the heaviest weight possible; in fact powerlifters often carry excess fat in order to increase the quantity of muscle they can pack onto their oversized frames.

Perhaps the first ever bodybuilder was Eugen Sandow (1867–1925), a Prussian who began his career as a sideshow strongman but soon began displaying his physique as a work of art. The sport grew slowly throughout the twentieth century; by the late 1970s the bodybuilding subculture remained small and largely overlooked, based primarily around its adopted home in Southern California.

The world was exposed to bodybuilding in 1977 with the release of Arnold Schwarzenegger's cult film 'Pumping Iron', a documentary showcasing the bodybuilding lifestyle as the 'Austrian Oak' prepared to take his sixth Mr Olympia title, the highest accolade in competitive bodybuilding. As the ebullient Schwarzenegger rose to stardom as a Hollywood actor, bodybuilding became accepted into mainstream Western fitness culture.

Today, many men across the United Kingdom lift weights as part of their fitness regime. Whilst few may aspire to the overblown bodies of modern Mr Olympia competitors, the male fitness industry is booming. In a quest for toned biceps and 'six-pack' abdominals, more men than ever are joining gyms, reading fitness magazines and experimenting with performance-enhancing supplements.

What is muscle dysmorphia?

As the popularity of bodybuilding increases, evidence suggests that increasing numbers of young men are becoming dissatisfied with their appearance. The nature of this dissatisfaction is not a desire for smaller and slimmer bodies, as is most often the case in women, but rather larger and more muscular ones (Pope et al., 2000a).

A pathological pre-occupation with overall muscularity and leanness appears to be a relatively new body image disturbance that primarily affects men. The condition first entered the literature in 1993 when Pope, Katz and Hudson described a condition they termed 'reverse anorexia' in a population of male bodybuilders. These men, although they were highly muscular, believed that they appeared inadequately small and weak. They declined social invitations, wore heavy clothes even in the heat of summer and refused to be seen at the beach. The term reverse anorexia was based upon the prevalence of past anorexia nervosa amongst this sample and the similarity in body-related concerns and behaviours to those suffering from eating disorders. These men expressed a desire to gain greater musculature whilst not gaining fat. (Choi, Pope, & Olivardia, 2002).

Pope and his colleagues have since dominated research into this entity, subsequently renaming the condition 'muscle dysmorphia', classifying it as a subtype of body dysmorphic disorder and proposing the operational diagnostic criteria presented in Table 1 (Pope, Gruber, Choi, Olivardia, & Phillips, 1997).

Table 1 Diagnostic criteria for muscle dysmorphia

Pre-occupation with the idea that one's body is not sufficiently lean and muscular. Characteristic associated behaviours include long hours of lifting weights and excessive attention to diet.
The pre-occupation is manifested by at least two of the following four criteria:

(1) The individual frequently gives up important social, occupational or recreational activities because of a compulsive need to maintain his or her workout and diet schedule.
(2) The individual avoids situations where his or her body is exposed to others, or endures such situations only with marked distress or intense anxiety.
(3) The pre-occupation about the inadequacy of body size or musculature causes clinically significant distress or impairment in social, occupational or other important areas of functioning.
(4) The individual continues to work out, diet or use performance-enhancing substances despite knowledge of adverse physical or psychological consequences.

The primary focus of the pre-occupation and behaviours is on being small or inadequately muscular, as distinguished from fear of being fat as in anorexia nervosa, or a primary pre-occupation only with other aspects of appearance as in other forms of body dysmorphic disorder.

Why is nuscle dysmorphia important?

Muscle dysmorphia at its most severe is profoundly distressing. Some men become so pre-occupied with muscle development that they will miss social events, lose their job and even continue training through injury rather than interrupt their fitness schedule. Unable to achieve an unrealistic body image, the afflicted bodybuilder may spend vast amounts of money on nutritional supplements and may eventually experiment with anabolic steroids. These drugs produce rapid increases in lean muscle mass with few immediate side effects. However, prolonged use is associated with raised cholesterol, prostate enlargement, male-pattern baldness, acne, gynaecomastia and testicular atrophy. Withdrawal from a cycle of steroids can lead to depression and has been associated with suicide (Pope & Brower, 2000).

How many people does muscle dysmorphia affect?

The prevalence of muscle dysmorphia is difficult to estimate. Pope claims that up to 10% of the bodybuilders he has studied exhibit prominent symptoms of muscle dysmorphia and that the total number of males of all ages in the USA who have used anabolic steroids may exceed 2 million (Pope, Phillips, & Olivardia, 2000b).

Amongst a population of bodybuilders, some may not meet the formal criteria for muscle dysmorphia but may still be affected by body image concerns that cause them significant levels of distress. Conversely, many bodybuilders displaying severely pathological behaviour, even those abusing anabolic steroids, may feel that their activities are simply part of a healthy lifestyle and will not present to health services.

Why is this study important?

Although Pope and his colleagues have written extensively about the features of muscle dysmorphia little has been published on the phenomenology of the bodybuilding lifestyle. The introverted nature of the bodybuilding community means that outsiders have obtained only a glimpse of a significant underground subculture. Here I present selected excerpts from the experiences of a male bodybuilder as a means to grasp the ontological identity of bodybuilding and its connection to muscle dysmorphia.

Methods and background

The bodybuilder in question became known to the author at a local gymnasium, where both undertake their fitness regimes. Information was collected in the gym through a series of informal interviews and the subject gave his informed consent for the material to be used in this study.

The subject of this study is a 27-year-old male with a past psychiatric history of depression and bulimia nervosa. Both were diagnosed and treated by a psychiatrist using a combination of fluoxetine and cognitive behavioural therapy. The course of treatment for bulimia nervosa ended over 4 years ago although he still takes citalopram for his low mood; for this he consults his general practitioner. He has not received a formal diagnosis of muscle dysmorphia because he has not sought treatment, although he meets the criteria outlined by Pope in Table 1.

Pope and colleagues (Kouri, Pope, Katz, & Oliva, 1995) have devised a mathematical formula to estimate a man's muscularity. The 'fat-free mass index' (FFMI) is calculated using the subject's height, weight and approximate percentage of body fat. The resulting number correlates with the body type of the subject. A man with a FFMI of 16 would be frail or flabby; a FFMI of 20 is of average build; one of 23 corresponds to a man who is noticeably muscular. The authors believe that it is impossible to achieve a FFMI of over 26 without the assistance of anabolic steroids, which permit a user to break through the 'biological ceiling' of natural muscularity. The FFMI of this bodybuilder is 28.

On discovering bodybuilding:

. . .I guess I've always been fixated with my body shape. As a kid I was scrawny and I used to envy the popular athletic boys on the rugby team. I began lifting weights when I was about 14, using this tiny multi-gym in the school lunch hour. I discovered I was pretty strong for my size and quickly I began to see results. . . My mates and I used to mess about on the back seat of the school bus, flexing our biceps to try and impress the girls; pretty soon I found had the biggest arms, it made me feel good about myself. . .

On past experiences of diet and exercise:

. . .When I arrived at university I got into boxing in a big way. My coach encouraged me to diet down from 70kg to 57kg in my first year so that I could fight as a featherweight. It was a ridiculous thing to be doing to my body but that was the only way he would let me compete. Basically, I had to live on a diet of Slim-Fast milkshakes, whilst still keeping up this six day-a-week training routine of running, sparring and weightlifting. I became fixated on food; after a hard training session I wanted to eat a big plate of pasta like other normal sportsmen, but I had to content myself with an apple and protein shake! I checked on the Internet and my new weight made me officially anorexic, which was something I was actually proud of at the time because it proved how hard I'd had to work. . .

On current attitudes to weightlifting:

. . .Each session I concentrate on a different body part; for example in a given week I might work chest on Monday, back on Tuesday, legs on Wednesday etc. Splitting the different muscle groups lets me really blast each one and allows me to train more regularly without getting fatigued. For each muscle group, I have a repertoire of exercises that I've picked up over the years, just from watching other bodybuilders and from reading magazines. I find which ones work for me and stick with them, but I'm always looking to incorporate new techniques so as to shock the muscles into growth. I have a little notebook in which I chart all the exercises I do and the weights I lift, so that when I analyse my workouts I can see if I'm getting stronger. . . I definitely think about how the weights I'm lifting are going to affect my appearance. For example, I might choose to train legs twice per week if I feel my quads are lagging, or change the angle of a bench press so that it accentuates my upper chest. . . I'm very serious about my training; if I haven't pushed myself to the limit then I feel like I've wasted my time. If the gym is crowded and I can't complete all the exercises in my program then I get really irritable...

On current attitudes to diet:

. . .When I'm bulking I always try to keep my muscles supplied with protein and carbs so they can grow. Each day I'm aiming to eat 3 grams of protein for every kilogram of my bodyweight, taking a meal every couple of hours to keep my muscles topped up, even if I'm not hungry. . . When I'm in a cutting phase I'll restrict my carb intake to almost nothing so as to lean up and make my muscles stand out. I read about this carb-cycling diet in Flex magazine, which some of the top pros use to help them shred body fat. It does involve controlling every gram of carbohydrate that you take in each day, which is frankly almost impossible, but I try to follow it as best I can. . . I do prepare all my food in advance so I can be sure I'm getting clean calories and I never have to fall back on junk food from the cafeteria. It is really hard to keep this kind of diet up and maintain any kind of normal life, but I persevere because that's what it takes to build the kind of body I want. . .

On steroid use:

. . .I've done three cycles of steroids in the past year. I don't see it as cheating, because everyone else in the gym is using them and besides, even on gear you still have to put all the hours in at the gym and stick to the same diet, they're not magic. . . I know steroids are bad for you in the long run but frankly I'm not that bothered about how healthy I am in twenty years; I want to feel good about myself now. And are steroids that much more unhealthy than living off junk food like most other men my age? Those people are messing up their bodies too. . . The medical profession are always very quick to highlight the dangers of steroids, but I reckon that's motivated just as much by some puritanical desire to control what people put in their bodies than by hard fact. My doctor knows no more about anabolic steroids than the average man on the street whereas I've read up on all the different chemical structures of the various steroids, how they get metabolised in the body and all the side effects, so I've educated myself and I feel I've reduced the risk. . . Although when I came off my last 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 now because I've seen the results and I don't want to lose that edge. . .

On quality of life:

. . .Bodybuilding is my life, so I make sacrifices elsewhere. I'm always thinking about the nutritional content of food and how it would affect the way I look, so I can never eat out at restaurants or go to a friend's for dinner because it would mess up my diet. And I

spend so much money on stuff like protein-powders and fat-burning pills that I have no money left to go out drinking; to be honest I don't have that many friends anyway. Not enough time for them... I often arrive to work late or leave early because I have to train, and even when I am there my mind is always on my next meal or gym session. I guess my ideal job would to be a personal trainer, then I could just live in the gym...

On muscle dysmorphia:

...Do I have a problem? I guess so. I sometimes wonder what the point of my life is. I work so hard at my body but underneath I still hate the way I look. In my mind I know I am bigger than most of the guys on the street but I still feel inadequate. I don't like undressing in front of my girlfriend and I don't enjoy sex because I'm too busy worrying about the way I look. Even just looking at my body in the mirror when I come out of the shower makes me feel horrible...

Is muscle dysmorphia a type of eating disorder?

Individuals with muscle dysmorphia demonstrate a specific maladaptive pattern of behaviour, namely an obsessive drive to exercise and to restrict their diet. As mentioned previously, Pope and his colleagues originally labelled muscle dysmorphia 'reverse anorexia' based on the apparent links between the two conditions. Nevertheless, Pope's proposed diagnostic criteria for muscle dysmorphia categorise it instead as a subtype of body dysmorphic disorder, defined as a pre-occupation with an imagined or exaggerated deficit in appearance that has the characteristics of an overvalued idea, is not amenable to re-assurance and leads to significant distress plus impairment of functioning. In the tenth version of the International Classification of Diseases (ICD-10), body dysmorphic disorder is classified in section F45.2 as a hypochondriacal disorder, which thus groups it with a diverse range of presentations known as 'somatoform'.

This shift in nosology seems to be based upon the profound distortion of body image present in those severely affected by the condition, coupled with the dominance of pathological exercise behaviour over abnormal eating behaviour alone. Olivardia's (2001) phenomenological analysis contends that in the anorexic patient, the primary disturbance is one of eating, to which may be added excessive exercise as a secondary characteristic. The reverse applies to the patient with muscle dysmorphia.

The overwhelming feature of the somatoform disorders is the generation of medically unexplained physical symptoms (somatisation). This is not a principal feature of either body dysmorphic disorder or muscle dysmorphia. Some academics have already suggested that body dysmorphic disorder might be more appropriately conceptualised as an obsessive-compulsive spectrum disorder on the evidence of an overlapping psychopathology—namely intrusive, obsessional fears and compulsive rituals (Philips, Gunderson, Mallya, McElroy, & Carter, 1998). Bodybuilders with muscle dysmorphia also report pre-occupations and obsessional thoughts about muscularity as well as compulsive exercise and checking of muscularity (Olivardia, 2001).

A study by Maida and Armstrong (2005) used validated questionnaires to assess committed male weightlifters on measures of muscle dysmorphia, tendency to somatise, features of obsessive-compulsive disorder and characteristics of disordered eating, amongst others. Not only did the researchers identify that symptoms of muscle dysmorphia are strongly related to certain measures of eating disorder (body dissatisfaction and perfectionism) and obsessive-compulsive disorder, but also that symptoms of muscle dysmorphia were not at all related to somatisation.

The fact remains that the distinctive cognitions and rigorous lifestyle of the obsessive bodybuilder in his pursuit of bigness parallel the phenomenology of the man with an eating disorder in his pursuit of thinness. I suggest that if the core psychopathology in anorexia nervosa is over-evaluation of eating, shape and weight; a similar over-evaluation occurs in muscle dysmorphia, but in a different direction. Both disorders value leanness and demonise adiposity.

Men with anorexia nervosa, bulimia nervosa and binge eating disorder consistently show marked dissatisfaction with their body image (Olivardia, Pope, Mangweth, & Hudson, 1995). Bodybuilders, although concerned with gaining muscle rather than losing fat, also display an increased pre-occupation with their body image, food and exercise (Mangweth et al., 2001). An examination of the severe dieting practices prevalent in the sport of competitive bodybuilding indicates that such men are at increased risk of developing a

traditional eating disorder and many already practice abnormal body image modifying behaviour on a regular basis (Anderson, Barlett, Morgan, & Brownell, 1995).

Different types of eating disorder, namely anorexia nervosa, bulimia nervosa and eating disorder not otherwise specified (EDNOS), share a distinctive psychopathology and are not stable over time, with substantial migration of patients between diagnoses. However, the overall concept of eating disorder does show considerable stability and suggests that these disorders might best be considered as a single entity (Milos, Spindler, Schnyder, & Fairburn, 2005). It is my contention that a trans-diagnostic view of the eating disorders might therefore also include muscle dysmorphia.

What causes muscle dysmorphia?

If it seems likely that muscle dysmorphia represents a novel manifestation of a universal pathology involving body image, eating and exercise, then one must wonder what factors have shaped the emergence of this new phenomenon.

In his book 'The Adonis Complex' Pope considers the growing number of ordinary men who are dissatisfied with the muscularity of their bodies and lays the blame for this trend at the door of contemporary Western culture. The modern child is given action figurines that portray heroes with implausibly muscled physiques (Pope, Olivardia, Gruber, & Borowiecki, 1999). Men are now targeted by marketing campaigns that seek out their body image insecurities, just as females have been for many years. And just as semi-naked females have long been used to sell everyday products, the stripped male torso is now a frequent advertising tool (Pope, Olivardia, Borowiecki, & Cohane, 2001).

Worryingly, today's society tells us that the steroid-enhanced, lean, muscular physique embodies not only the healthy lifestyle to which we should all aspire, but also the minimum physical standard that all men are expected to attain.

Why is it important for the 21st century man to have muscles? As gender roles change and women outperform males in education and in the workplace, males find their traditional status challenged. An insecure gender identity may partly explain the growth of bodybuilding, a hypermasculine and narcissistic enterprise. Although women have always been attracted to athletic males, most do not find an excessively muscular body desirable. Perhaps the bodybuilder seeks a good body so that he can feel good about himself?

Does bodybuilding predispose to muscle dysmorphia?

Has the growth of the bodybuilding culture facilitated the appearance of muscle dysmorphia in men with body image concerns? It is possible that some individuals with pre-existing psychopathology gravitate towards bodybuilding, eventually culminating in the development of frank muscle dysmorphia. Clinical case studies suggest that muscle dysmorphia is almost always found in individuals heavily involved in bodybuilding rather than simple weightlifting. In a comparison of a population of bodybuilders (who lift weights to develop an attractive body) and powerlifters (who lift weights purely to increase strength) the bodybuilders were far more likely to display features of muscle dysmorphia (Lantz, Rhea, & Cornelius, 2002).

It is doubtful, however, that all bodybuilders are at risk of a pathological body image disturbance. One might even expect that a rise in physicality would parallel a rise in self-esteem, especially if coupled with positive feedback from others.

In this vein, Pickett, Lewis, and Cash (2005) compared a group of competitive bodybuilders to a group of men who trained with weights and with a group of athletically active men who did not use weights at all. Although competitive bodybuilders were more likely to display disordered eating attitudes, the authors assert that competitive bodybuilders were no more muscle dysmorphic in comparison with either group. In fact, bodybuilders were more likely to have a favourable self-evaluation of body image. Their finding contradicts those of Lantz *et al.*, although the authors seem to ignore this issue.

However, a number of methodological flaws detract from the merit of this study (Smith, Wright, Bruce-Low, & Hale, 2005). Most importantly, the authors failed to use a validated, multidimensional measure of muscle dysmorphia that takes account of its many facets, instead relying on measures that only partially approach the muscle dysmorphia construct. A suitable tool might have been the muscle dysmorphia inventory

(MDI), developed by Rhea, Lantz, and Cornelius (2004), which provides a global assessment of all of the behaviours associated with this entity.

As the prime motivation of bodybuilding is to become bigger and leaner, one must wonder if it is possible to distinguish between a healthy enthusiasm for bodybuilding and muscle dysmorphia given that the underlying rationale for both is the same. It is difficult to separate the two populations in a formal study without introducing a tautological selection bias, but one study claims that individuals with muscle dysmorphia differ from normal weight-lifting men on the basis of measures such as body dissatisfaction, eating attitudes, prevalence of anabolic steroid use and lifetime prevalence of DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, fourth edition) mood, anxiety and eating disorders (Olivardia, Pope, & Hudson, 2000).

Is muscle dysmorphia a true disorder? It is clear that it lies at the severe end of a dimensional spectrum of body image concerns. However, bodybuilders who display an ordinary level of dedication to their sport do not experience the profound body image disturbance, subjective distress and impaired functioning reported by individuals with frank muscle dysmorphia. It is crucial to distinguish those men for whom bodybuilding represents a tool for self-improvement from men for whom it has become a manifestation of a pathological obsession with body shape.

Individuals at risk of anorexia nervosa can receive an education in self-starvation and purging strategies from popular magazines, from their peers and from pro-anorexia websites on the Internet. In the same way bodybuilders develop a resource of tested behaviour from other bodybuilders in the gym, from fitness magazines and from bodybuilding websites on the Internet. A bodybuilder at risk of developing muscle dysmorphia can find a wealth of instructional information covering everything from specific diet plans to the correct technique for an intra-muscular injection of steroid. In this way the obsessive lifestyle is supported.

Conclusion

In this essay, I have described the experiences of one man with muscle dysmorphia. Many young men experience some level of concern about their appearance or their muscularity; many men enjoy lifting weights in the gym as an enjoyable and healthy pursuit. However, if physical exercise behaviour in men is motivated primarily by physical appearance, as more men take to the gym in order to increase their musculature more may be at risk of developing muscle dysmorphia.

The literature on muscle dysmorphia is almost exclusively dominated by Pope and his colleagues. It is important that other clinicians also examine this phenomenon, in order to stimulate a constructive debate.

References

Anderson, R. E., Barlett, S. J., Morgan, G. D., & Brownell, K. D. (1995). Weight loss, psychological and nutritional patterns in competitive male bodybuilders. *International Journal of Eating Disorders*, *18*, 49–57.

Choi, P. Y. L., Pope, H. G., Jr., & Olivardia, R. (2002). Muscle dysmorphia: a new syndrome in weightlifters. *British Journal of Sports Medicine*, *36*, 375–377.

Kouri, E. M., Pope, H. G., Jr., Katz, D. L., & Oliva, P. (1995). Fat-free mass index in users and nonusers of anabolic-androgenic steroids. *Clinical Journal of Sports Medicine*, *5*, 223–228.

Lantz, C. D., Rhea, D. J., & Cornelius, A. E. (2002). Muscle dysmorphia in elite-level power lifters and bodybuilders: a test of differences within a conceptual model. *Journal of Strength and Conditioning Research*, *16*, 649–655.

Maida, D. M., & Armstrong, S. L. (2005). The classification of muscle dysmorphia. *International Journal of Men's Health*, *4*, 73–91.

Mangweth, B., Pope, H. G., Jr., Kemmler, G., Ebenbichler, C., Hausmann, A., De Col, C., *et al.*(2001). Body image and psychopathology in male bodybuilders. *Psychotherapy and Psychosomatics*, *70*, 38–43.

Milos, G., Spindler, A., Schnyder, U., & Fairburn, C. G. (2005). Instability of eating disorder diagnoses: prospective study. *British Journal of Psychiatry*, *187*, 573–578.

Olivardia, R. (2001). Mirror, mirror on the wall, who's the largest of them all? The features and phenomenology of muscle dysmorphia. *Harvard Review of Psychiatry*, *9*, 254–259.

Olivardia, R., Pope, H. G., Jr., & Hudson, J. I. (2000). Muscle dysmorphia in male weightlifters: a case- control study. *American Journal of Psychiatry*, *157*, 1291–1296.

Olivardia, R., Pope, H. G., Jr., Mangweth, B., & Hudson, J. I. (1995). Eating disorders in college men. *American Journal of Psychiatry*, *152*, 1279–1285.

Philips, K. A., Gunderson, C. G., Mallya, G., McElroy, S. L., & Carter, W. (1998). A comparison study of body dysmorphic disorder and obsessive-compulsive disorder. *Journal of Clinical Psychiatry*, *59*, 568–575.

Pickett, T. C., Lewis, R. J., & Cash, T. F. (2005). Men, muscles, and body image: comparisons of competitive bodybuilders, weight trainers, and athletically active controls. *British Journal of Sports Medicine*, *39*, 217–222.

Pope, H. G., Jr., & Brower, K. J. (2000).Anabolic-androgenic steroid abuse. InSadock, B. J. &Sadock V. A. (Eds.),*Comprehensive textbook of psychiatry VII*. Philadelphia: Lippincott Williams & Wilkins.

Pope, H. G., Jr., Gruber, A. J., Choi, P., Olivardia, R., & Phillips, K. A. (1997). Muscle dysmorphia. An underrecognised form of body dysmorphic disorder. *Psychosomatics*, *38*, 548–557.

Pope, H. G., Jr., Gruber, A. J., Mangweth, B., Bureau, B., deCol, C., Jouvent, R., *et al*.(2000a). Body image perception among men in three countries. *American Journal of Psychiatry*, *157*, 1297–1301.

Pope, H. G., Jr., Katz, D. L., & Hudson, J. I. (1993). Anorexia nervosa and "reverse anorexia" among 108 male bodybuilders. *Comprehensive Psychiatry*, *34*, 406–409.

Pope, H. G., Jr., Olivardia, R., Borowiecki, J. J., III, & Cohane, G. H. (2001). The growing commercial value of the male body: a longitudinal survey of advertising in women's magazines. *Psychotherapy and Psychosomatics*, *70*, 189–192.

Pope, H. G., Jr., Olivardia, R., Gruber, A., & Borowiecki, J. (1999). Evolving ideals of male body image as seen through action toys. *International Journal of Eating Disorders*, *26*, 65–72.

Pope, H. G., Jr., Phillips, K. A., & Olivardia, R. (2000b). *The Adonis complex: The secret crisis of male body obsession*. New York: Free Press.

Rhea, D. J., Lantz, C. D., & Cornelius, A. E. (2004). Development of the Muscle Dysmorphia Inventory (MDI). *Journal of Sports Medicine and Physical Fitness*, *44*, 428–435.

Smith, D., Wright, C., Bruce-Low, S., & Hale, B. (2005). "Read with caution": a reply to Pickett *et al*. *British Journal of Sports Medicine*, *39*, 874–875.