Symptoms of muscle dysmorphia between users of anabolic androgenic steroids with varying usage and bodybuilding experience.

Abstract

Anabolic androgenic steroids (AAS) usage has been repeatedly linked with a body image disorder called Muscle Dysmorphia (MD). However, evidence for how this relationship manifests is currently inconclusive. This study focused on the extent to which MD may precipitate or perpetuate the use of AAS. Utilizing a cross-sectional design, the sample consisted of 57 users (current and lifetime) and 51 non-using (Never used AAS) bodybuilders recruited from two bodybuilding dedicated gymnasiums located in Wales, UK. Significantly higher levels of MD were found in users compared to non-users across training experience duration (0-2, 3-5 & 6+ years). MD levels irrespective of AAS usage (users vs. non-users) were consistent between 0-2 & 3-5 years of training declining however between those of 6+ years training experience. No differences were reported in symptoms of MD between users of AAS with varying lengths of AAS use exposure. This provides preliminary evidence suggesting MD may influence both initiation and maintenance of AAS use however neither regular gym attendance nor prolonged AAS usage may exacerbate MD symptoms.

Keywords: Muscle dysmorphia; body-image; anabolic androgenic steroids; anaerobic weight resistance training.
**Introduction**

Muscle dysmorphia (MD) defines a pattern of pathological thinking about a specific aspect of body image, whereby an individual is persistently and distressingly preoccupied that they are insufficiently muscular, even though they are far more muscular than average (Pope et al., 1997). As a clinical definition, MD is a subcategory of body dysmorphic disorder, although focused on dissatisfaction with muscularity, rather than overall body image (Leone, Sedory, & Gray, 2005). Prevalence rates are around 5.9% in the general population (Bo et al., 2014) however, precise rates are currently unknown due to limited published studies and the taboo nature of the topic. The etiology of MD is currently unclear and is likely to be the expression of a variety of factors (Baghurst, 2008). There is consensus however that MD has causal roots in the way contemporary media and Western culture emphasizes the importance of male muscularity (Kanayama, Hudson & Pope., 2012). Additionally, there also exists an established notion that sports participation and specifically bodybuilding itself may reflect a considerable risk factor for developing MD (Lantz et al., 2001; Olivardia, 2001). This assertion suggests that such highly competitive environments may also have a direct impact on an individual’s distorted perceptions of body image. However, it is important to consider the possibility of other putative societal, cognitive and biological causal factors (Lantz et al., 2001) even if such models are speculative rather than scientific.

There is considerable evidence that MD shares a complex relationship with the use of AAS, although evidence for how this relationship manifests is inconclusive (Mitchell et al., 2017; Rohman, 2009). Kanayama et al. (2003; 2006) showed substantially higher symptoms of MD in users compared to non-users, which were prominent in men with a long history of AAS abuse. Pope and Kanayama (2012) argue that whilst many attributes showed little association with AAS use, conduct disorders and body-image concerns showed strong associations. Cole et al. (2003) found an increase in symptoms of ‘reverse anorexia’ for both
current and former users, when compared to a control group of non-using bodybuilders whereas Collier (2011) found no differences in MD between current and former users. A fundamental question remains as to whether AAS usage functions as a precipitating or perpetuating factor in MD manifestation.

The current study endeavored to explore this potential influence by measuring levels of MD in men with or without AAS experience, engaged in varying lengths of exposure to anaerobic weight resistance training environments. Access to such data places us in a unique position to establish the influence of being surrounded by muscular male physiques in a real-world setting on the manifestation and development of MD. In view of the previously discussed literature, it is predicted that MD levels will be higher in novice trainers who use AAS compared to their non-user peers and that this difference will be more pronounced in trainers with more sustained gym exposure. Levels are predicted to be higher in those with more extended AAS experience supporting previous research.

Method

Participants

N=108 predominately working-class male bodybuilders aged between 18-40 were recruited from two bodybuilding dedicated gymnasiums located in Wales, UK (one city based, one rural based), using opportunistic and snowballing sampling techniques. Gym A was among the 30-50% most deprived nationally for income, employment, health and education, among the 50% most deprived for access to services and housing and among the 10% most deprived for community safety. Gym B was among the 30-50% most deprived nationally for income, among the 50% most deprived for employment, health, education and access to services and among the 10-20% most deprived for community safety. The sample included 57 users (current and lifetime) and 51 non-using (Never used AAS) bodybuilders. The inclusion
criteria required participants to be frequent bodybuilders (3 sessions min per week), and to be male. This criterion was justified as regular exposure to the bodybuilding environment is likely to be critical for the desirability of AAS to become apparent, and as a body image explanation for AAS use has been developed and tested primarily on men.

**Design**

Categorical measures were collected via four questions: *Motivation for bodybuilding* (*physical appearance, physical fitness, sport or strength*), *Bodybuilding experience* (how long engaged in anaerobic exercise), *User vs. non-user status* and *AAS use experience* (if used, length of usage). These measures were selected based on two previous studies which found the factors underpinning usage appeared to change over time (Harris et al., 2017), with body image concerns becoming more prominent as duration of AAS use increased (Harris et al., 2016). Symptoms of MD were measured using the Muscle Dysmorphic Disorder Inventory (MDDI) (Hildebrandt, Langenbaucher, & Schlundt, 2004). The MDDI is a 13-item measure of MD symptomology, with items rated on a 5 point Likert scale, providing a total of between 13-65. The MDDI questions pertain to cognition, emotions and behaviour including three core measures of MD symptomology: Drive for Size (thoughts of being smaller, less muscular, and weaker than desired), Appearance Impairment (negative beliefs about one’s body and resulting appearance anxiety or body exposure avoidance), and Functional Impairment (behaviors related to maintaining exercise routines, interference of negative emotions when deviating from exercise routines, or avoidance of social situations), which have demonstrated good reliability (Cronbach’s α = .77-.85; test-retest reliability r = .81-.87), and construct validity (Zeeck et al., 2018). The mean MDDI score for the overall sample of 34.9 (38.1 and 31.7 for users and non-users respectively) was consistent with those reported by male bodybuilders in previous studies (Zeeck et al., 2018).
Results

Data was collected from $n=57$ users (current and lifetime) and $n=51$ non-users (never used) with varying levels of training experience (see Fig 1. below) and for users, with varying lengths of usage experience (see Fig 2. below).

![Figure 1.](image)

**Figure 1.** Mean MD scores for users and non-users of AAS across years of training experience. Values = Mean ±SEM.

**Analysis 1**

Conductance of a 2-way between-subjects ANOVA with factors of anaerobic training duration [0-2 years ($n=13$ and $n=15$ for users and non-users respectively), 3-5 years ($n=19$ and $n=12$ for users and non-users respectively) and 6+ years ($n=25$ and $n=24$ for users and non-users respectively)] and AAS use (user/non-user) revealed a significant main effect of training duration [$F_{2,102} = 4.52, p < .05$, partial $\eta^2 = .09$] and AAS use [$F_{1,102} = 10.17, p < .05$, partial $\eta^2 = .15$], however no training duration x AAS use interaction was reported [$F_{2,102} = .78, p > .05$, partial $\eta^2 = .01$]. Simple pairwise comparisons showed significantly lower MD levels in those training for 6+ years (irrespective of user/non-user status) compared to those
with 3-5 years training experience only \((p<0.05)\). Overall, a mean score of 38.1\((SD=2.5)\) was reported by users compared a mean score of 31.7\((SD=2.2)\) for non-users.

**Analysis 2**

MD levels did not differ statistically across duration \([0-2\text{ years (n=31), 3-5 years (n=12) and 6+ years (n=14)]\) of AAS exposure \([F_{2.54}=.25, p>.05, \text{partial } \eta^2 = .009}\].

![Figure 2](image.png)

**Figure 2** Mean MD scores for users of AAS across years of AAS use experience. Values = Mean ±SEM

**Discussion**

The present study aimed to compare levels of MD between gym attendees who either use or do not use AAS. Subsumed within this core aim was to measure and compare the influence of sustained exposure (on both users and non-users of AAS) to other male physiques (as evident in a competitive anaerobic training environment) on levels of MD and between AAS users with varying lengths of AAS exposure. Results suggested a more complex relationship between MD, bodybuilding and AAS usage than previously suggested (cf. Pope, Khalsa & Bhasin, 2017). It would appear that MD may compel vulnerable individuals to embark on an
AAS regimen as users exhibit higher MD scores compared to non-users during the initial phases of bodybuilding. However, importantly, as no increase in MD in users and non-users develops over time this suggests that accumulative exposure to a training environment (other male bodybuilders and possibly bodybuilding paraphernalia) does not exacerbate self-concern over muscular inadequacies. Indeed, levels of MD appear to be mitigated in those with extensive gym experience irrespective of AAS usage following an initial period of MD stability. This challenges somewhat the argument that the development of MD arises due to unrealistic comparisons being made between the individual and those with socially-constructed, desirable physiques. Similarly, the analysis revealed no differences in symptoms of MD between users of AAS with varying lengths of AAS use contradicting recent qualitative findings (Harris et al., 2016). Harris et al. (2017) have reported a similar finding regarding levels of intra-sexual competition in a competitive bodybuilding environment. Such findings are somewhat at odds with the widespread belief that continual exposure to media imagery of muscular physiques creates both MD and overly aggressive individuals. If it does, then this influence may be restricted to media-generated, 2-dimensional imagery but that influence does not extend to a real-world gym environment. Plausibly, MD symptomology (irrespective of its etiology) may predispose certain individuals to initiating a bodybuilding/AAS use regime, rather than a bodybuilding/AAS use regime increasing MD symptomology in certain at-risk individuals.

The current study utilized a cross-sectional design limiting any firm conclusions pertaining to the developmental nature of MD, as does the utilization of self-report measures of AAS. Future research would undoubtedly benefit from adopting a longitudinal approach. Whilst a considerable body of future research is required surrounding the relationship between MD and AAS use, these findings suggest a treatment intervention aimed at addressing maladaptive body image concerns (i.e. MD symptomology) could be promising
for reducing or preventing AAS use and a counter-intuitive intervention strategy may be to encourage individuals with body image concerns to take up weight-resistance exercise within a supportive social environment.

References:


