

# Muscle Dysmorphia: A Comparison Between Competitive Bodybuilders and Fitness Practitioners

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**Abstract:** *Objective:* The primary aim of this study was to investigate the features of Muscle Dysmorphia and other body image-related concerns in a sample of competitive male bodybuilders. *Method:* We screened 217 male athletes, 119 bodybuilders and 98 fitness practitioners, recruited in 12 gymnasiums in Southern Italy, by means of an *ad hoc* socio-demographic schedule, the Muscle Dysmorphia Inventory (MDI) and the Muscle Appearance Satisfaction Scale (MASS).

*Results:* Twenty one of the bodybuilders (17.6%) show high levels of preoccupation and dissatisfaction with their muscularity, 45.4% (N=54) a marked dependence on bodybuilding; 35.3% (N=42) follow a high-protein diet and 35.3% (N=42) used vitamin supplements to improve their weightlifting performances and favor post-training physical recovery. In addition, forty-three (36.1%) also report use of substance while nine subjects (7.6%) declare to avoid situations in which their body might be seen or manifest high levels of distress when this happens. The ANCOVA (Exercise Frequency per Week as a covariate) results indicate that bodybuilders, compared to fitness practitioners, report significant elevations in all measures. Moreover, considering only the bodybuilders sample, who report a regular use of substance scored higher in Dietary Behavior, Body size-symmetry, Physique Protection, Supplement Use MDI scales and on Body building Dependence, Muscle Checking and Injury MASS subscales.

*Discussion:* Our findings seem to suggest that the practice of the bodybuilding is associated to the proposed criteria of muscle dysmorphia if compared with regular fitness practice. In particular, we found that a regular use of substance was associated with greater dissatisfaction with muscularity.

**Keywords:** Muscle Dysmorphia, drive for muscularity, bodybuilding, anabolic steroids, survey descriptive study.

## INTRODUCTION

The last twenty years have witnessed a growing interest in a "new" primarily male pathology, i.e. Reverse Anorexia (RA) [1]. The main psychopathological characteristic of this clinical picture, later named Muscle Dysmorphia (MD) [2] is the presence of a pathogenic idea whereby the subject is never satisfied with his muscularity, despite the presence of muscle hypertrophy. This pathological preoccupation leads to a perseverance in attempting to increase the muscular mass through physical exercise, namely weightlifting [3-4], the adoption of dysfunctional eating behaviours such as high-protein diets and strategies to counter body fat increase [5], the use of nutritional supplements or anabolic steroids [1, 6-7]. The latter behaviour seems to be present in 46% of subjects with MD [8] and in 44% of bodybuilders [9]. In addition to the complications deriving from the intake of these substances, the subjects also show impaired social and occupational functioning in association with their condition [10-11]. These men may neglect important social and family relationships or occupational activities in order to spend more time at the gym [2] or often they refuse to be seen in public because they believe that they will appear too small and weak [1].

It has been suggested that bodybuilders may be high-risk group for the development of muscle dysmorphia [12-13], and that this may be associated with unhealthy behaviours such as anabolic steroid abuse [9]. In a study by Lantz, Rhea & Cornelius [14], a sample of competitive bodybuilders, compared to power lifters, were more likely to engage in features associated with MD. In a research carried out by Mangweth *et al.* [15], a group of 28 male bodybuilders was compared to a group of 30 males diagnosed with Eating Disorder (ED) and a control group (N=30). The results obtained shown preoccupation for physical appearance as well as psychological characteristics that are typically associated with EDs, which made the sample of bodybuilders more similar to the group of males with mental anorexia than to the control males. The significant difference was that the bodybuilders, as compared to the male anorexics, focused their attention on the development of muscular mass rather than on weight loss. Babusa & Tury [16] emphasize the relationship between MD symptoms, eating disorder characteristics and steroid use also in the Central-Eastern European region.

Although other studies aimed at monitoring comorbidity between muscle dysmorphia and eating disorders highlight the resemblance of some traits [8, 13, 17-23], conceptually, MD is included in the Body Dysmorphic Disorder, and the concern for not being sufficiently muscular is assumed to be determined by a distorted perception of one's body image [2, 8, 24].

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It should be borne in mind that MD is not currently included in the Diagnostic and Statistical Manual of Mental Disorders - IV (DSM-IV; 25), which has made the studies aimed at monitoring its epidemiology, clinical description and comorbidity not completely reliable. An attempt to systematise the diagnosis of MD was made by Pope *et al.* [2].

On the basis of these observations, the aims of this study were to investigate psychological characteristics and the features of muscle dysmorphia in a sample of competitive bodybuilders and to offer preliminary evidence about its frequency, that may be useful for further research and preventive actions.

## METHOD

### Participants

The sample consisted of 217 male athletes, 119 bodybuilders and 98 non-bodybuilders, recruited in 12 gymnasiums in Southern Italy. The groups were similar in terms of educational levels ( $\chi^2_{(1)} = .697$ ;  $p = .404$ ) and in the mean age ( $F_{(1, 215)} = .042$ ;  $p = .838$ ), while there were time spent at the gym differences ( $\chi^2_{(1)} = 99.940$ ;  $p = .000$ ) (Table 1).

Bodybuilders were defined as athletes who worked out at least 3-6 hours per week with free weights and/or machines. Each trainer was also asked to identify if they were competitive bodybuilders.

### Procedure

All subjects were fully informed and provided informed consent. Questionnaires were completed during regular training and under the supervision of researchers, present at all times to answer all possible queries and clarify items when needed.

### Assessment Instruments

#### Demographic Information

An *ad hoc* socio-demographic form was performed to assess subject's age, weight and height, education, current occupation, family composition, father's and mother's education, as well as the time the subject devotes to physical activity.

#### Muscle Dysmorphia Inventory

The Muscle Dysmorphia Inventory (MDI; 14) is a 27-item inventory, designed to identify the psychological and behavioural characteristics associated with Muscle Dysmorphia. The MDI yields

five scale (Dietary Behavior, Body size-symmetry, Bodybuilding Dependence, Physique Protection, Supplement Use) and appears to possess acceptable psychometric properties.

#### Muscle Appearance Satisfaction Scale

The Muscle Appearance Satisfaction Scale (MASS; 26) is a brief, 19-item self-report measure for the assessment of the cognitive, affective and behavioral dimensions of the construct of Muscle Dysmorphia. All sub-scale (Bodybuilding Dependence, Muscle Checking, Substance Use, Injury, Muscle Satisfaction) have been found to have acceptable internal consistency, test-retest reliability, construct validity, and a stable factor structure replicated across samples of male weight lifters.

#### Statistical Analyse

Categorical variables were compared using  $\chi^2$  analyse, while group differences in MDI and MASS scores were examined using multivariate analysis of covariance (MANCOVA), with "Exercise Frequency per Week" as a covariate. Significant multivariate findings were followed by analysis of covariance (ANCOVA).

Finally, we reasoned that time spent at the gym may moderate the relationship between substance use and scores on the MDI and MASS scales. Considering only the bodybuilders sample, a 2 (Substance Use) X 2 (Exercise Frequency per Week) analyses of variance (ANOVA) was performed across all measures.

The values were considered statistically significant at  $\alpha < 0.05$ .

## RESULTS

Four (3.4%) bodybuilders seem to meet the proposed diagnostic criteria for Muscle Dysmorphia. 17.6% (N=21) show high levels of preoccupation and dissatisfaction with their muscularity, 45.4% (N=54) a marked dependence on bodybuilding; 35.3% (N=42) follow a high-protein diet and 35.3% (N=42) used vitamin supplements to improve their weightlifting performances and favor post-training physical recovery. In addition, forty-three (36.1%) also report use of substance while nine (7.6%) declare to avoid situations in which their body might be seen or manifest high levels of distress when this happens (Table 1).

The multivariate procedure reveals a significant effect of "Group" on the six MDI scales (Wilk's  $\lambda_{(2, 214)} = .643$ ;  $p = .000$ ) and on all the MASS

**Table 1: Socio-Demographic Characteristics and the Cut-Off Values at the Muscle Dysmorphia Inventory (MDI) Scales for Bodybuilders (N=119) and Non Bodybuilders (N=98)**

	Bodybuilders (N=119)	Non-Bodybuilders (N=98)
	<b>Mean (SD)</b>	
<b>Age (years)<sup>*</sup></b>	30.63 ±7.850	30.86 ±8.669
	<b>N (%)</b>	
<b>Educational level<sup>*</sup></b>		
Low education	77 (64.7%)	58 (59.2%)
High education	42 (35.3%)	40 (40.8%)
<b>Exercise Frequency per Week<sup>**</sup></b>		
0-3 hours	0	57 (58.2%)
3-6 hours	30 (25.2%)	20 (20.4%)
over 6 hours	89 (74.8%)	21 (21.4%)
<b>Muscle Dysmorphia Diagnoses</b>	4 (3.4%)	0
<b>Cut-off levels</b>		
Dietary Behavior	42 (35.3%)	0
Body size-symmetry	21 (17.6%)	1 (1%)
Bodybuilding Dependence	54 (45.4%)	4 (4.1%)
Physique Protection	9 (7.6%)	0
Supplement Use	42 (35.3%)	1 (1%)
Pharmacological Use	43 (36.1%)	6 (6.1%)

Note: <sup>\*</sup>p>0.05; <sup>\*\*</sup>p=0.000.

sub-scales (Wilk's lambda<sub>(2, 214)</sub> = .827; p=.000). Subsequent univariate ANCOVA results indicate that bodybuilders, compared to non-bodybuilders athletes, report significant elevations on Dietary Behavior ( $F_{(1, 217)}=89.007$ ; p=.000), Body size-symmetry ( $F_{(1, 217)}=54.598$ ; p=.000), Bodybuilding Dependence ( $F_{(1, 217)}=44.888$ ; p=.000), Physique Protection ( $F_{(1, 217)}=21.840$ ; p=.000), Supplement Use ( $F_{(1, 217)}=80.293$ ; p=.000), Pharmacological Use ( $F_{(1, 217)}=9.290$ ; p=.003) scales of the MDI and on Bodybuilding Dependence ( $F_{(1, 217)}=28.245$ ; p=.000), Muscle Checking ( $F_{(1, 217)}=30.564$ ; p=.000), Substance Use ( $F_{(1, 217)}=33.251$ ; p=.000), Injury ( $F_{(1, 217)}=30.284$ ; p=.000) sub-scales of the MASS, even after controlling for effect time spend at the gym. No differences in Muscle Satisfaction scale was observed ( $F_{(1, 217)}=.059$ ; p=.808) (Table 2).

ANOVA values for substance consumption and exercise frequency per week are presented in Tables 3 and 4. The mean analyses indicate that bodybuilders who report a regular use of substance (anabolic steroid, diuretic and laxatives) or work out for more than 6 hours per week scored higher in all measures. The 2X2 analyses of variance revealed how the Substance Use scale have main effects on Dietary

Behavior ( $F_{(1, 119)}=4.991$ ; p=.027), Body Size-Symmetry ( $F_{(1, 119)}=16.990$ ; p=.000), Physique Protection ( $F_{(1, 119)}=16.292$ ; p=.000), Supplement Use ( $F_{(1, 119)}=5.522$  p=.020) MDI scales and Body building Dependence ( $F_{(1, 119)}=15.244$ ; p=.000), Muscle Checking ( $F_{(1, 119)}=9.335$  p=.003) and Injury ( $F_{(1, 119)}=13.719$ ; p=.000) MASS sub-scales. For "Exercise Frequency per Week" main effects were found for Bodybuilding Dependence ( $F_{(1, 119)}=4.938$ ; p=.028) and Physique Protection ( $F_{(1, 119)}=7.730$ ; p=.006) scales of the MDI and Body building Dependence ( $F_{(1, 119)}=4.712$ ; p=.032), Muscle Satisfaction ( $F_{(1, 119)}=4.991$ ; p=.027) and Injury ( $F_{(1, 119)}=3.873$ ; p=.045) scales of the MASS. There were no interactions (all p values ≥ of 0.05).

## DISCUSSION

Our findings seem to confirm the hypothesis that competitive bodybuilding practice can be considered a risk factor for developing muscle dysmorphia if compared with regular weightlifting practice.

Four (3.4%) of the assessed bodybuilders met the proposed diagnostic criteria for MD [2], a high

**Table 2: Multivariate Analysis of Covariance (MANCOVA) for Muscle Dysmorphia Measures**

			Average scores	
	F <sub>(1, 217)</sub>	p	Bodybuilders (N=119)	Non-Bodybuilders (N=98)
<b>Muscle Dysmorphia Inventory</b>				
Dietary Behavior	89.007	.000	22.45	10.98
Body size-symmetry	54.598	.000	17.59	8.86
Bodybuilding Dependence	44.888	.000	18.61	9.96
Physique Protection	21.840	.000	14.88	7.50
Supplement Use	80.293	.000	16.49	6.60
Pharmacological Use	9.290	.003	4.71	3.12
<b>Muscle Appearance Satisfaction Scale</b>				
Bodybuilding Dependence	28.245	.000	14.41	8.02
Muscle Checking	30.564	.000	10.21	5.31
Substance Use	33.251	.000	9.73	5.07
Injury	30.284	.000	9.09	5.11
Muscle Satisfaction	.059	.808	11.25	9.55

Note: Exercise Frequency per Week as a covariate.

**Table 3: Influence of Substance Use and Exercise Frequency Per Week on the Individual Muscle Dysmorphia Inventory Scales in the Bodybuilders Sample (N=119)**

	Average Scores					F	p
	Substance Use		Exercise Frequency				
	Use	No Use	3-6 hours	over 6 hours			
<b>MDI Scales</b>							
Dietary Behavior	24.26	21.43	21.67	22.72	SU	4.991	.027
					EF	.470	.494
					SU x EF	.001	.971
Body size-symmetry	21.44	15.41	15.90	18.16	SU	16.990	.000
					EF	2.766	.099
					SU x EF	.678	.412
Bodybuilding Dependence	19.21	18.28	16.80	19.22	SU	1.501	.223
					EF	4.938	.028
					SU x EF	.569	.452
Physique Protection	19.74	12.13	11.13	16.15	SU	16.292	.000
					EF	7.730	.006
					SU x EF	.254	.615
Supplement Use	19.00	15.07	15.40	16.85	SU	5.522	.020
					EF	1.727	.191
					SU x EF	1.422	.235

Note: MDI= Muscle Dysmorphia Inventory; SU= Substance Use; EF= Exercise Frequency per Week.

**Table 4: Influence of Substance Use and Exercise Frequency Per Week on the Individual Muscle Appearance Satisfaction Scale Scales in the Bodybuilders Sample (N=119)**

	Average Scores					F	p
	Substance Use		Exercise Frequency				
	Use	No Use	3-6 hours	over 6 hours			
<b>MASS scales</b>							
Bodybuilding Dependence	17.47	12.68	12.30	15.12	SU	15.224	<b>.000</b>
					EF	4.712	<b>.032</b>
					SU x EF	.025	.874
Muscle Checking	12.30	9.03	8.97	10.63	SU	9.335	<b>.003</b>
					EF	1.352	.247
					SU x EF	.093	.761
Substance Use	12.79	8.00	8.67	10.09	SU	29.354	<b>.000</b>
					EF	1.132	.290
					SU x EF	.068	.795
Injury	10.88	8.08	7.77	9.54	SU	13.719	<b>.000</b>
					EF	3.873	<b>.045</b>
					SU x EF	.080	.778
Muscle Satisfaction	11.02	11.38	10.03	11.66	SU	.046	.831
					EF	4.991	<b>.027</b>
					SU x EF	.643	.424

Note: MASS= Muscle Appearance Satisfaction Scale; SU= Substance Use; EF= Exercise Frequency per Week.

percentage (45.4%) show strong dependence on exercise and significant levels of weight and shape preoccupation (17.6%). Despite doing competitive body building, 7.6% of the athletes experience extreme anxiety and distress, as shown by the Physique Protection scale of the MDI, which go as far as total social closure and the embarrassment of being seen in public, the refusal of going to the beach and the choice of loose, heavy clothes even in summer, as a consequence of the perception of having a small and weak body.

Despite the awareness of the negative consequences on their physical or psychic health, 35.3% of bodybuilders strictly monitor food intake [15, 27], eat the same food for several days in a row and regularly use vitamin supplements (35.3%) and drugs (36.1%) to increase their muscular mass [28].

Even after controlling for effect time spend at the gym, male bodybuilders, compared to non-bodybuilders athletes, exhibit more severe body dissatisfaction, bodybuilding dependence and abnormal eating behaviour. They engage in harmful and unhealthy behaviours such as continuing to lift

weights even when they are injured and using supplement or anabolic steroid [8].

Moreover considering only the research group, the bodybuilders who report a regular use of substance (anabolic steroid, diuretic and laxatives) or work out for more than 6 hours for week obtain higher mean values in all measures.

The time devoted to physical exercise and substance use seem to be, therefore, an important variable to differentiate bodybuilders with higher or lower dissatisfaction about their muscularity and slimness and, in our opinion, needs to be analysed in more depth.

In conclusion, these findings seem to suggest that the bodybuilding practice, even controlling by the time spent at the gym, could be considered as a risk factor for meeting Muscle Dysmorphia criteria, in particular among competitive bodybuilders who regularly use anabolic steroids [1-2, 9, 29-30].

This study is still ongoing. It is aimed at a clinical and epidemiological understanding of the

phenomenon. Most of these subjects report sexual problems that they link to the ineffectiveness of their physical appearance, in particular to their masculinity, which seems to be characteristic of an insufficiently muscular body. The study by Mangweth *et al.* [15] showed that 4% of bodybuilders and 10% of the subjects diagnosed with anorexia reported a bisexual or homosexual orientation, and that 32% and 43% respectively reported a loss of sexual desire (as compared to 7% of the control sample).

Starting from those evidences in our opinion would be necessary investigate, with an appropriate procedure, any possible link between the perception of having a small and weak body, even with a muscular hypertrophy, and the strengthen of masculine identity in the bodybuilders population. And, therefore, considering the possibility that MD would be the masculine variant of the feminine AN [31].

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