

Muscle dysmorphia: the compulsive pursuit of a muscular body

Characteristics, prevalence, causes, treatment, prevention and nutritional implications

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Abstract

Muscle dysmorphia is a form of body dysmorphic disorder in which the affected persons feel like he/she is not sufficiently fit and muscular despite having a very pronounced musculature and in which the affected persons have thought patterns and behaviors focused on building muscle mass. Muscle dysmorphia was only recently identified as mental health condition: it was described as “reverse anorexia” in the 1990s. Therefore, there is still no clear consensus on how it should be classified and diagnosed. Figures on its prevalence also vary widely between studies. It is assumed that the disorder follows the biopsychosocial model, in which genetic, neurobiological, psychological and sociocultural factors all play a role. Intervention is based on the approach to treating anorexia nervosa and focuses on nutrition therapy in particular. In addition, adequate preventative methods are an important strategy in reducing the likelihood that the disorder will develop. This article provides an overview of the current state of knowledge about the disorder, together with a case study and possible preventative measures.

Keywords: muscle dysmorphia, body dysmorphic disorder, mental illness, exercise addiction, eating disorder

Characteristics and classification of muscle dysmorphia

Diagnostic challenges

The diagnostic classification of muscle dysmorphia (MD) continues to be inconsistent and the subject of debate. For example, in the DSM-5¹, MD is classified as a research diagnosis within the spectrum of obsessive-compulsive disorders as a specification of body dysmorphic disorder (300.7), whereas in ICD-10², it is classified under somatoform disorders as a subtype of body dysmorphic disorder without delusions (F45.21) or other persistent delusional disorders (F22.8). Some authors also call for MD to be classified within the spectrum of eating disorders [1]. Originally, MD was described as “reverse anorexia” [2] because affected persons often exhibit rigid, orthorexic eating behaviors and follow a strict diet plan. This type of eating behavior, which ignores hunger and satiety, is intended to optimize muscle growth. Carbohydrate, protein and fat intakes are carefully controlled in order to enhance the effects of training as much as possible [3]. In fact, Murray et al. (2012) [4] found significantly higher levels of eating behavior psychopathology in patients with MD compared to anorexia patients. Eating rules in particular play a significant role in MD. Common examples of such rules include eating every 3 hours regardless of hunger or satiety, eating 5 g of protein per kilogram of body weight, precise calculation of macronutrient content in food and depriving oneself of “necessary” or good-tasting foods [4].

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¹ Diagnostic and Statistical Manual of Mental Disorders, 5th edition

² International Classification of Diseases

Overview 1: Criteria for body dysmorphic disorder (BDD) (according to [2, 6–8])

- A) Excessive preoccupation with physical flaws that are not noticeable to other people
- B) Recurrent behaviors such as constantly looking at one's body in the mirror, or mental processes such as continually comparing oneself with others
- C) Significant suffering or reduced functioning in the social, family or professional context as a consequence
- D) The symptoms are not better explained by an eating disorder diagnosis

Muscle dysmorphia specifier:

Specify if the person is excessively preoccupied with the idea that their body build is too small or insufficiently muscular. This specifier is used even if the individual is preoccupied with other body areas, which is often the case.

Overview 2: Research criteria for muscle dysmorphia (MD) (according to [2, 9])

- (I) Constant preoccupation with the idea that one's body is not sufficiently lean and muscular.
- (II) This preoccupation manifests as:
 - (IIa) Frequently neglecting important social, occupational, or recreational activities
 - (IIb) Avoidance of situations where the person's body, which is perceived by them as flawed, is exposed to others
 - (IIc) The experience of mental distress caused by this preoccupation, for example in the form of chronic impairment in functioning in a particular area of life
 - (IId) Continuing the exercise behavior despite knowledge of adverse physical or psychological consequences
- (III) The main focus of the preoccupation being thoughts about being too small or insufficiently muscular, as distinguished from fear of being too fat as in anorexia nervosa

Although disordered eating behavior very often is a symptom of muscle dysmorphia, it has not yet been included as a diagnostic criterion in current diagnostic guidelines [3, 5].

Diagnostic procedure

MD is formally diagnosed in two stages using a diagnostic manual (in this case, DSM-5). Both the diagnostic criteria for a general body dysmorphic disorder (BDD) and the criteria for the specifier "muscle dysmorphia" must be met (♦ Overview 1).

In the research context, the proposed diagnostic criteria of Murray et al. (2013) [9], based on the article by Pope et al. (1997) [2], are often used (♦ Overview 2).

Criticism of the diagnostic procedure

In practice, it is common for not all of the diagnostic criteria to be taken into account. Often, the diagnosis is largely based on the overall clinical impression [10]. Although a standardized diagnostic tool does exist—the Muscle Dysmorphic Disorder Inventory (MDDI) [11]—this is based solely on self-reporting in a questionnaire.

Therefore, a range of different approaches are used to determine the diagnosis: clinical impression, diagnostic manuals and diagnostic criteria, which makes research results more difficult to categorize and compare.

The ♦ case study demonstrates the difficulties inherent in classifying MD in terms of differential diagnostics. For instance, diagnostic criteria for obsessive compulsive disorder are present, including a distressing preoccupation with one's own body that lasts throughout the day, but also thoughts and behaviors similar to anorexia nervosa—a rigid diet plan and functionalized eating behavior in the absence of hunger, as well as worries about individual body areas that are perceived as "too fat" [9]. Since the patient's main focus is on exercise behavior and the focus of their self-imposed eating rules and body concerns is on a perceived lack of muscularity and on optimal building of muscle mass, as is the case with most MD patients [4], MD is diagnosed in this case.

Prevalence

There are no concrete figures available on the prevalence of muscle dysmorphia in the total population. Estimated prevalence varies widely in the literature, ranging from 1% of the general population to 54% in at-risk groups such as body builders and competitive athletes; the average age of onset of the condition is stated as 19.5 years [12, 13].

The determination of prevalence of the condition relies on clinical impressions and self-reporting. As mentioned above, this results in divergent diagnostic classification and cut-off criteria, differences in methods of assessment and diagnosis and problems with assessment and diagnosis, as well as poor insight into the condition among patients, plus it makes it more difficult to generalize and compare results [2, 12, 13].



Case study

Mr. M presents at the insistence of his concerned family. He reports that he exercises more than three hours a day, which he says has led to him having a low body fat percentage and strong muscle growth, even though more recently he has been experiencing some symptoms of excessive strain on the body such as sprains and fractures (*MD criterion II d*). He says he is very tired in the evenings and so tends to be rather withdrawn at that time. For this reason, he says that recently, he has not taken part in family celebrations or activities because he does not have the energy for it, because the timing of the activities was in conflict with his exercise regimen, or because the food did not fit with his diet plan (*BDD criterion C / MD criterion II a*).

Mr. M himself describes his behavior as necessary in order to maintain the muscularity of his body. He says that his body is not sufficiently fit compared to others, especially on the hips and the belly, where he says there are still cushions of fat (*BDD criterion A / possible criterion for a differential diagnosis of an eating disorder according to criterion D/MD criterion III*). Furthermore, he says he thinks his arms are not sufficiently fit and muscular and he feels weedy and “gangly”, particularly compared to other people at the fitness studio (*BDD criterion B / differential diagnostic thoughts about low muscularity as a clear criterion for muscle dysmorphia according to criterion III*). He reports that his preoccupation with his perceived low muscularity takes a lot out of him on a mental and behavioral level and his thoughts rarely leave him in peace.

He says he pays very close attention to eating rules as part of his training and follows them carefully. He says he now finds it almost impossible to consume short-chain carbohydrates after training. The only carbohydrate-rich foods he says he can eat are foods like wholegrain rice, but even these he says he can only eat if he can do plenty of exercise afterwards. He reports that the bulk of his nutrition—and especially his post-exercise nutrition—comes from quark, raw vegetables and fish or chicken without any sauces or anything added to it (*clarification of criterion D—strict diet plan with a focus on optimizing training results*). He said he completely avoids other foods.

Causes and mechanisms of persistence

The condition is understood on the basis of a biopsychosocial model.

Biological factors

There have been hardly any studies on biological causes of MD specifically. Studies on BDD have had to be used in their place. Various factors are currently being discussed:

- **Neurocognitive processes:** It has been demonstrated that individuals suffering from BDD can exhibit deficits in basic executive functions at the functional level in terms of planning, organizing and response inhibition compared to a healthy population

[14]. Currently, there is no consensus on whether differences in how emotional stimuli are processed cause BDD or MD [15].

- **Serotonin hypothesis:** Comparative studies have shown imbalances in the serotonin balance of BDD patients, however it is still unclear how this imbalance relates to the condition [16, 17].
- **Heredity:** Having a family member with BDD increases a person's likelihood of having BDD fourfold. Furthermore, having a direct lineage relation with OCD increases the risk sixfold [18]. However, more research is required to determine exactly how genetic predispositions affect the likelihood of developing the disorder [17].

Psychological factors

There are various psychological factors that play a role in the development and persistence of MD:

- **Lack of self-esteem:** A lack of self-esteem and the associated dissatisfaction with one's body together with self-objectification (treating the self as an object rather than the subject) appear to play a key role in the development and persistence of MD [19–21]. However, it is not clear in which direction these factors play a role and what the mediating factors are. Is it that low self-esteem leads to dissatisfaction with one's body and self-objectification and thus to muscle dysmorphia, or is it that a negative perception of the self, a negative body image and a high level of self-objectification in the context of MD lead to low self-esteem? [22–25]
- **Bullying and victimization:** Experiences of bullying and victimization in childhood or adolescence have been emphasized as important psychological factors in the development of muscle dysmorphia. Wolke and Sapouna [26] demonstrated a clear association between such experiences and the development of MD: bullying and victimization directly mediate MD, self-esteem and comorbid psychopathology (e.g. anxiety, depression and obsessive-compulsive symptoms) also have mediating effects.
- **Sensitivity and perfectionism:** Furthermore, somatization tendencies, hostility and especially interpersonal sensitivity appear to increase the risk of developing MD [27]. Perfectionism has also been identified as an additional predisposing personality characteristic, as is the case with anorexia nervosa [28, 29].
- **Visual processing:** Preoccupation with one's own perceived physical flaws—one

of the main features of MD and BDD—could be attributable to altered visual processing and attentional control. For example, BDD patients have been found to have a much stronger attention to detail when visually processing faces and have been found to have a heightened ability to perceive asymmetry in the body [30–32].

Social and societal factors

It seems natural that frequent media exposure to the beauty ideal of the strong, muscular man who appears to be free from pain and emotionally unassailable can have negative effects on perception of one's own body. Leit et al. [33] demonstrated that in men who watched advertisements depicting muscular men, the concept of the ideal body was much more muscular than in a control group who watched neutral advertisements that did not depict muscular men. Therefore, internalization of slim and muscular beauty ideals is associated with MD [27, 34].

Other sociocultural factors include the availability of gyms, steroids, surgeries and nutritional supplements, as well as the importance of physical appearance and beauty in society—factors that also play a role in BDD [35].

Triggers

The biological/genetic, social and psychological factors described here predispose a person to developing BDD or MD. Many models of how these conditions develop also describe concrete triggers that start the development of the condition, such as comments on the person's appearance, experiencing rejection and critical life events [16, 35].

Case study

Mr. M says that he never used to think much about his body or his diet. He reports that he used to enjoy eating and never had any problems with his weight. Furthermore, he reports that there was no particular focus on body weight in his family. He says everyone in his family is sporty, but they exercise for fun and not because they feel pressured to do it. The only important thing, he says, was to finish well whatever you started (*perfectionism*). He says the opinions of other people also played a major role (*external sources of self-worth*), and he learned to pay close attention to the feelings and evaluations of others (*interpersonal sensitivity*).

After a very painful breakup with his girlfriend of many years, Mr. M started paying more attention to his weight (*trigger*). He says she left him because he was not sporty enough for her and in her eyes, he had let himself go too much. He also reports that he wanted to show her he has the discipline and willpower to be sporty and muscular. The grief and rage that Mr. M feels are apparent when talking with him. He reports that since the breakup, he has been doing three to four hours of exercise a day, as well as eating a protein-rich, low-carbohydrate diet in order to optimize the effects of his training. However, he is now noticing that his body is becoming ever weaker, that he frequently experiences signs of fatigue and often sustains injuries.

Intervention and relevance in terms of nutrition therapy

At present, there are no manuals or guidelines on the treatment of MD. Therefore, the use of available guidelines and manuals on related conditions is recommended. The therapeutic approach to MD should be based on the approach used for BDD and eating disorders (with a focus on anorexia nervosa), and should aim to treat the patient on three levels:

- 1) Somatic rehabilitation and nutritional therapy
- 2) Individual psychotherapy
- 3) Systemic work with the family [36, 37]

Psychotherapy

In terms of psychotherapy, the interventions that are offered focus on self-esteem [38], the importance of appearance and how to take a loving approach towards one's appearance (e.g. through mirror exposure) [16], as well as on perceived ideals about roles and gender, and on emotional perception and emotional regulation [39]. Furthermore, psychotherapy works on uncovering chains of behavior that reinforce the disordered behavior [40] and on replacing dysfunctional conflict behavior with functional strategies, for instance through social skills training [41].

Systemic work

On the systemic level, psychoeducation of the relatives is key [42].

Nutrition therapy

Nutrition and dietetics are particularly important in the treatment of muscle dysmorphia. Although restrictive eating behavior and a strict diet plan aimed at optimizing muscle gain are understood as secondary symptoms in the diagnosis of MD, eating behavior issues in MD patients are closely related to symptoms of a preoccupation with muscle building [43].

Manuals and guidelines on the treatment of eating disorders mention the psychosocial consequences of highly restrictive eating behavior (e.g. mood swings, cognitive impairment, and social withdrawal as a result of not eating together with others) [44, 45]. Normalization of eating behavior therefore usually leads to an improvement in the psychosocial area.

Tackling the rigid eating behavior present in MD can provide a way to access rigid thought patterns and behavioral patterns. The experience of becoming more flexible and relaxed in



the approach to eating and learning to enjoy eating can be transferred to psychotherapy, where it can lead to greater flexibility in thought patterns in the context of experience-oriented cognitive behavioral therapy.

In terms of rehabilitation and nutrition therapy, because of the similarities between MD and eating disorders, the therapeutic approach for MD can be based largely on the approach taken to treating eating disorders [46].

Whether treatment takes place in the outpatient or inpatient setting, the approach is similar. The first step is taking a detailed history of current eating behavior, for example using explorative food diaries. Goals are set based on the history, and these goals form the foundation of an eating plan. Foods to which the patient has an aversion or “forbidden” foods are integrated into the diet, with a particular focus on exposure to these foods during treatment (in therapy sessions and in exercises to be done as part of everyday life) in order to dismantle rigid patterns or increase flexibility towards them. Attention should also be paid to mixing foods: keeping carbohydrate-rich foods and protein-rich foods separate is to be avoided.

The focus is on enjoyment and satiety. The objective is to reduce eating behaviors that are solely focused on obtaining training re-

sults and to practice eating with pleasure. This is because people with MD have often trained themselves not to eat according to hunger and satiety cues and they often eat beyond satiety (“force-feeding”) [4]. Orthorexic thoughts and behaviors—i.e. a fixation on (supposedly) healthy foods and on how they affect the body and its muscularity—are addressed and discussed in a dialectic manner.

At the same time, psychoeducation focusing on particular foods and metabolic processes can be integrated into the treatment in order to uncover any “nutrition myths” the patient may believe and to broaden the patient’s knowledge about nutrition beyond purely exercise-focused knowledge. Topics may include how hunger and satiety act as physical signals and the issues that a skewed view of nutrition can cause, such as symptoms of deficiency. It is important to bear in mind that many patients have in-depth knowledge of the composition and functions of foods.

Exposure therapy can be carried out with the patient attempting it alone, but it can also be carried out in the presence of therapists, family members or other patients in order to help the patient experience the pleasure of cooking and eating in the context of social interaction. Patients mindfully eat foods they find difficult in order to explore feelings, thoughts and behaviors and in order to reintegrate anxiety-triggering foods into their everyday diet. The procedure is similar to that of mindfulness training aimed at increasing enjoyment: it focuses on the perception of taste and the resulting bodily sensations and emotions [47]. In nutrition therapy, difficulties and abnormalities are reflected upon in order to strengthen flexible, pleasure-promoting thought patterns and behaviors. Possible next steps or changes to the eating plan are also discussed in this context.

Furthermore, the patient’s training/exercise behavior is explored with the patient and is either recorded in the food record and the eating plan or is recorded separately. The objective here is to gradually reduce the extent of exercise, rediscover the pleasure of exercise, and reduce adherence to rigid exercise regimens. Alternative strategies for coping with aversive feelings (for concrete examples see: [39]) should be discussed and practiced because patients often use exercise as a way of regulating emotions.

In addition, the use of medication to build muscle must be discussed. If the patient uses anabolic steroids or similar substances, treat-

Case study

The sessions with Mr. M were divided into three sections, with his agreement. The first section involved a discussion of his combined food and exercise record, talking about both difficulties and successes. All progress made was recorded in the diary in order to have a record on hand of everything “already achieved” during treatment. Where necessary, certain aspects were explained through psychoeducation.

The second section consisted of cognitive behavioral therapy interventions to work on psychological factors contributing to the persistence of the disorder. Using Mr. M’s own reflections, the food record and the partially structured medical history taking process, key themes were identified. These included: “sources of self-worth”, “the importance of appearance”, “the importance of the opinions of others” and “being strong as a man”. During the further course, the therapeutic processing of Mr. M’s breakup with his partner and the associated rage, grief and rejection of his own body became the focus of treatment.

At the end of each session, the eating and exercise plan was adjusted for the period until the next session. By working towards the goals set at the start of treatment, the patient slowly but surely succeeded in integrating “forbidden” foods into his diet, in dismantling his restrictive and strictly controlled eating behavior and in learning to enjoy eating again. Mr. M was also able to reduce his training sessions and slowly began to enjoy exercise again. Motivational interviewing techniques proved to be particularly effective in terms of motivation to continue treatment and motivation to make a change.



ment should include psychoeducation about how they work and about the risks and side effects and it should also aim to slowly phase out the use of these substances with the support of an endocrinologist.

Prevention

As part of a practice-focused research project in cooperation with *Caritas-Fachambulanz für Essstörungen München* (Caritas Outpatient Clinic for Eating Disorders Munich), several Bachelor and Master theses at the Faculty of Social Work at Landshut University of Applied Sciences involved the development of an MD prevention course unit and a psychoeducation video for the prevention of MD.

Preventative workshop

This module was developed by Kolbeck and Mayer [48] and is designed for adolescents aged 11 to 13 years. It is taught in a co-educational manner in mixed-gender classes. This is because although muscle dysmorphia mainly affects boys and men, girls and women can also develop this type of body dysmorphic disorder. In the workshop, the adolescent participants explore what muscle dysmorphia is, how it develops and what the consequences of the condition are. There is also a focus on how men and women are depicted in the media and on social media.

The preventative course unit comprises a series of exercises that are carried out by the class as a whole or in small groups. The first exercise is the “fitness bag”. The bag contains various objects and pictures to do with the topic (e.g. a measuring tape, a protein shake and dumbbells) and the pupils say what they think about them. In the group work that follows, the pupils divide into small groups and work through the characteristics of muscle dysmorphia, its consequences and the effects of the consumption of food supplements and performance-enhancing substances, using the texts supplied to support their exploration. Another key topic in the preventative course unit is how the media depicts the “ideal” man and woman, paired with critical thinking and discussion about the perceived roles of women and men in society, which are illustrated using advertisements. The course unit concludes with the “ball of wool game”: a resource-oriented exercise that spins a web of threads representing positive mutual feedback between the pupils [49].

Psychoeducation video

What exactly is muscle dysmorphia? How can it be recognized? And what can you do if you are affected by it or if you think someone you know is being affected by it? The psychoeducation video by Perras [50] answers these questions.

The video describes the course of MD in the video’s protagonist, Ben, from the perspective of his best friend Lukas, who is sticking by Ben’s side despite the change in his behavior. The psychoeducation video shows how Ben is withdrawing from the people around him in his social environment and is increasingly neglecting his obligations, for example in his job. The video also deals with the worries and thoughts of the people close to a person with the

disorder. At the end, contacting the counseling center for muscle dysmorphia in Munich is presented as a possible way to intervene and in the video, Ben’s friends get in touch with the center at first and then eventually, Ben contacts the center himself.

The psychoeducation video therefore provides information about the disease and demonstrates ways to better understand or cope with it. It can be accessed at → www.youtube.com/watch?v=uz8Z1Zx94V4.

Conflict of Interest

The authors declare no conflict of interest.

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