

# Eating Disorders and Body Image Disturbances among Ballet Dancers, Gymnasium Users and Body Builders

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## Key Words

Eating disorders · Body image · Physical activity ·  
Gymnastics · Ballet · Body-building

## Abstract

**Background:** Eating disorders are frequent among elite performers of certain sports or physical activities; however, little is known about non-professional performers. **Method:** 113 female non-elite ballet dancers, 54 female gymnasium users, 44 male non-competitive body builders, 105 female controls and 30 male controls were evaluated using the Body Uneasiness Test, the State-Trait Anxiety Inventory, the Beck Depression Inventory, and the Eating Disorder Examination 12th edition (EDE-12). **Results:** Non-elite ballet dancers reported the highest prevalence of eating disorders (anorexia nervosa 1.8%; bulimia nervosa 2.7%; eating disorders not otherwise specified 22.1%), followed by gymnasium users (anorexia nervosa 2.6%; eating disorders not otherwise specified 18%). Significant differences ( $p < 0.01$ ) between athletes and their controls were found in the following parameters (median values): Beck Depression Inventory (female dancers 5.7, gymnasium users 6.1, female con-

trols 2.8, body builders 1.6, and male controls 1.3), Body Uneasiness Test (female dancers 1.08, gymnasium users 0.62, female controls 0.54, body builders 0.35, and male controls 0.27), EDE total scores (female dancers 1.6, gymnasium users 1.7, female controls 1.0, body builders 1.0, and male controls 0.4), EDE – restraint subscale scores (female dancers 0.8, gymnasium users 1.6, female controls 0.0, body builders 0.8, and male controls 0.0), EDE – eating concern subscale scores (female dancers 0.4, gymnasium users 0.2, female controls 0.0, body builders 0.0, and male controls 0.0), EDE – weight concern subscale scores (female dancers 2.1, gymnasium users 2.1, female controls 1.6, body builders 1.4, and male controls 0.5), and EDE – shape concern subscale scores (female dancers 2.7, gymnasium users 2.8, female controls 2.0, body builders 2.1, and male controls 0.9). EDE scores were highly related to Body Uneasiness Test scores, especially in non-elite ballet dancers and in non-competitive body builders ( $p < 0.01$ ). **Conclusion:** Non-professional performers of sports emphasising thinness or muscularity, such as ballet and body-building, show a high degree of body uneasiness and inappropriate eating attitudes and behaviours.

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## Introduction

Eating disorders are quite common in Western countries, especially in young females ranging from 13 to 30 years. Anorexia nervosa ranges from 0.5 to 2%, bulimia nervosa from 1 to 3% and eating disorders not otherwise specified (EDnos) from 2 to 13% [1, 2]. Although several factors are known to be relevant in the pathogenesis of eating disorders, body image disturbance is considered to play a notable role among them [3].

According to Slade [4], body image has been defined as 'the picture we have in our minds of the size, shape and form of our bodies, and our feelings concerning characteristics and our constituent body parts'. Since the early 1960s, Hilde Bruch [5] emphasised body image disturbance as a core feature of anorexia nervosa; this observation has been confirmed later and extended to other eating disorders, being now a relevant criterion for their diagnosis [2]. Nevertheless, disturbances of body size estimation are not limited to eating-disordered subjects; in fact, cultural pressure toward thinness has a strong influence on body image, so that the cultures that emphasise thinness have the highest prevalence of eating disorders [6–10].

Among the other facilitating factors, athletic participation has often been linked to a higher prevalence of eating disorders, which are found to be particularly widespread among performers of certain types of sports or physical activities, such as ballet [11–16], gymnastics [17–19], running [20–22] and skating [23, 24]. Several personality characteristics have been claimed to be associated both with eating disorders and sport participation: competitiveness, concern about performance, compulsive concern about body shape and perfectionism [25]. In particular, girls with low self-esteem at early adolescence seem to have a greater risk of developing an eating disorder in the following years. Moreover, performing a sport whose atmosphere is highly competitive, such as ballet, may put them under unbearable pressure [16]. Nevertheless, competition is thought to facilitate the onset of eating disorders only at an elite level, where appearance, a lean body shape and low body weight are emphasised [25].

Although eating disorders are mostly diagnosed in women, their prevalence among males is thought to have been increasing in recent years [26]. Different studies have been performed in order to evaluate the prevalence of eating disorders among males, especially athletes, and some authors described a new clinical feature, firstly known as 'reverse anorexia' [27] and recently renamed 'muscle dysmorphia' [28, 29], which is thought to affect

about 8–9% of male body builders and weight lifters. Its main feature is an altered body size perception that leads to an underestimation of muscles and whole body development [29–31]. These subjects, performing a highly competitive sport and in need of a firm control upon their body weight and shape, often undergo physical hyperactivity, unbalanced diets and use anabolic drugs [32–35]. Unlike anorexia nervosa and bulimia nervosa female patients, they tend to gain the maximum weight they can, increasing exclusively the muscle mass; however, the low carbohydrate diets and compensatory mechanisms they use are almost the same [36, 37].

The aims of the present study were as follows: (1) to evaluate the extent of body image disturbance and eating disorders in three different groups of non-competitive physically active subjects, and (2) to assess the relationship between body image disturbance and other meaningful psychopathological features related to eating disorders.

## Methods

### *Enrolment*

Three groups of athletes were studied, as well as two non-physically active groups of subjects as control groups. Female dancers were randomly selected from 7 non-professional ballet schools using alphabetical lists supplied by the teachers of the schools. The inclusion criteria were at least 3 h a week of ballet lessons (2 or 3 lessons a week) and participation in the last 2 ballet exhibitions of the school. Students of both classical and modern dance were recruited. Gymnasium users and non-competitive male body builders were recruited in 5 gymnasia from the alphabetical list supplied by the owner of the gymnasium. All the subjects who met the inclusion criteria (going to the gym at least 3 times a week but working out no more than 5 total hours a week and performing no other significant physical activity) were directly contacted. Control subjects were enrolled in local intermediate and high schools and colleges from among those not practising regular physical activity.

Subjects were enrolled provided that they did not meet any of the following exclusion criteria: (1) age below 12 years (some of the psychometric tests applied in the study are not suitable for under 12-year-olds). (2) illiteracy; (3) mental retardation; (4) current psychopharmacological treatment with drugs known to interfere with eating attitudes and behaviour. At the time of first referral, 8 subjects were receiving antidepressants, i.e. selective serotonin reuptake inhibitors ( $n = 5$ ) and tricyclic antidepressants ( $n = 3$ ), and 4 subjects were taking benzodiazepines; they were therefore excluded, and (5) current or previous practice of competitive sports.

The samples consisted of 113 female dancers recruited out of 143 consecutively contacted in 7 non-professional ballet schools; 54 female gymnasium users recruited out of 63 consecutively contacted in 5 gymnasia, and 44 male non-competitive body builders recruited out of 51 consecutively contacted in 5 gymnasia. One hundred and five female subjects and 30 male subjects not performing sports or regular physical activity were randomly recruited out of 110 females

and 32 males from local schools and universities as control groups for female dancers, gymnasium users and male body builders. The control groups were randomly selected from alphabetical lists supplied by the principals and teachers of the schools. No control subject refused to participate in the study. Written informed consent was obtained from all participants. If the subject was aged below 18, consent was obtained from the legal tutor. Age and BMI of the 53 subjects who decided not to participate or who were excluded on the basis of the above criteria did not significantly differ from those who participated.

#### Assessment

The participants completed 3 self-rating questionnaires: Beck Depression Inventory (BDI) [38], State-Trait Anxiety Inventory (STAI) [39] and Body Uneasiness Test (BUT) [40]. After a brief medical examination, all the subjects were administered the Structured Clinical Interview for DSM-IV [41] and the Eating Disorder Examination 12th edition (EDE-12) [42] by a trained psychiatrist (C.R. or T.Z.).

The BDI and STAI were used to assess the level of mood depression and anxiety and their correlation with eating behaviour. Considering that the STAI-State scores resulted substantially at a low level in all the groups, in this paper, we will refer only to the STAI-Trait scores.

The BUT is a self-rating scale which simultaneously explores various areas of body-related psychopathology: (1) dissatisfaction regarding the body and its weight, (2) avoiding and compulsive control behaviour, (3) experience of separation and extraneity regarding the body, and (4) specific worries about certain body parts, characteristics or functions. The term 'uneasiness' seemed particularly adapted to express the complex idea of dissatisfaction which also includes malaise, embarrassment, anxiety, doubt, suspicion, trepidation, worry, mistrust, and misgiving [40, 43]. Subjects were asked to rate 34 different body experiences (BUT-A) and 37 body parts (BUT-B) on a 6-point Likert-type scale (from 'never' to 'always'), indicating how often they happen to dislike each experience or part of their body. Higher scores indicate greater body uneasiness. BUT scores were analysed considering the total score of the test (Global Severity Index, i.e. BUT GSI), the number of the parts of their body that the subject disliked (Positive Symptom Total, i.e. BUT PST) and the mean intensity of the dislike of all disliked body parts (Positive Symptom Distress Index, i.e. BUT PSDI).

The EDE is an investigator-based semi-structured interview specifically devoted to the assessment of eating disorder psychopathology. It generates basic descriptive information on the degree of behavioural disturbance as well as a profile of individuals in terms of their scores on 4 subscales designed to assess key aspects of eating disorder psychopathology. Moreover, its twelfth edition (EDE-12) may be used to generate operationally defined eating disorder diagnoses. The EDE provides 3 levels of descriptive data concerning current eating disorder psychopathology: (1) scores on individual items – either frequency or severity ratings for key behavioural and attitudinal aspects of eating disorders; (2) subscale scores – these provide a profile of a patient in terms of 4 major areas of eating disorder psychopathology: restraint (EDE-R), eating concern (EDE-EC), weight concern (EDE-WC), and shape concern (EDE-SC), and (3) total score – this provides a measure of the overall severity of the eating disorder psychopathology (EDE-T).

The discriminant validity of the EDE as a measure of the specific psychopathology of eating disorders was previously established [44],

and the Italian version of the EDE-12 was validated and used in previous studies [45–47].

Diagnosis of eating disorders was performed according to DSM-IV criteria through a face-to-face interview applying a standardised format based on DSM-IV criteria for anorexia nervosa, bulimia nervosa and EDnos, considering the current symptoms at referral. According to the criteria proposed by DSM-IV, the diagnosis of EDnos was made in individuals with an eating disorder of clinical severity, but who did not meet diagnostic criteria for anorexia nervosa or bulimia nervosa [2]. Such a diagnosis was performed in those patients who did not meet the criteria for anorexia nervosa and bulimia nervosa either because of the lack of one of the diagnostic criteria (such as amenorrhoea for anorexia nervosa), or because the symptomatology did not achieve the required threshold (e.g. the frequency requirement of binge eating episodes in bulimia nervosa, or the amount of weight loss in anorexia nervosa). According to Ricca et al. [45], among EDnos patients, those who met all criteria for anorexia nervosa except amenorrhoea and/or underweight were classified as EDnos anorectic type (EDnos-A), while those who met all the criteria for bulimia nervosa, except frequency and/or duration of binge eating and compensatory behaviours, and who did not meet the criteria for binge eating disorder were classified as EDnos bulimic type (EDnos-B) [45]. According to Fairburn and Cooper [42], diagnosis of body image disturbance was performed by means of the EDE, considering as positive those subjects who reported a score higher than 4 (on a Likert-type scale from 0 to 6) on the items 'importance of body shape', 'importance of body weight' and 'feeling fat'.

#### Statistical Analysis

Values of normally distributed variables were expressed as mean  $\pm$  SD; values of skewed variables were expressed as median value, and quartile values (25th and 75th percentiles) were also reported. Statistical analysis was performed by means of the Statistical Package for Social Sciences for Windows (release 11.0.0; SPSS Inc.) and EpiCalc 2000 (version 1.02; Gilman & Myatt, freeware) using the Kruskal-Wallis H test followed by the Mann-Whitney U test to evaluate the differences between 3 or 2 different samples, the Spearman rho correlation test to assess the correlation between independent variables among the same sample, and the Yates' corrected  $\chi^2$  test to assess the different prevalence of diagnoses among 3 or 2 samples.

## Results

Sex, age and number of school years of each sample were comparable with those of the respective control group (table 1).

BMI of subjects from the female dancer group was significantly lower than that observed in the gymnasium user and female control groups ( $p < 0.01$ ; table 1). Overweight (BMI  $> 25$  kg/m<sup>2</sup>) affected 2% of female dancers, 32% of gymnasium users (vs. 10% of female controls,  $p < 0.01$ ), and 39% of body builders (vs. 33% of male controls,  $p =$  n.s.), while 30% of female dancers and 11% of gymnasium users were underweight (vs. 14% of female controls;  $p < 0.01$  vs. female dancers,  $p =$  n.s. vs. gymnasium users).

**Table 1.** Age, school years and BMI of the five groups

	Ballet dancers	Gymnasium users	Female controls	Body builders	Male controls
n	113	54	105	44	30
Sex	F	F	F	M	M
Age, years	16.2±4.1	19.6±6.0	17.5±6.3	28.3±7.3	28.3±6.8
School years	10.0±2.9	10.1±3.4	10.9±3.6	12.2±3.2	13.8±3.4
BMI	19.1±2.1*	22.1±3.5	21.8±2.7	23.3±2.8	22.8±2.3

\*  $p < 0.001$  vs. gymnasium users and female controls; the Kruskal-Wallis H test followed by the Mann-Whitney U test. Data are expressed as mean ± SD.

**Table 2.** BDI, STAI and BUT scores

	Ballet dancers	Gymnasium users	Female controls	Body builders	Male controls
BDI	5.7 <sup>b</sup> (2.0; 10.0)	6.1 <sup>a</sup> (1.0; 11.0)	2.8 (0.0; 8.0)	1.6 (0.0; 4.0)	1.3 (0.0; 2.0)
STAI-T	40.3 (33.0; 47.7)	38.6 (32.0; 50.0)	36.7 (30.0; 44.0)	34.1 (29.0; 40.0)	34.4 (28.0; 41.0)
BUT GSI	1.1 <sup>b,c</sup> (0.6; 1.5)	0.6 (0.1; 1.2)	0.5 (0.3; 0.9)	0.4 <sup>a</sup> (0.3; 0.6)	0.2 (0.1; 0.4)
BUT PST	13.8 <sup>b,c</sup> (8.0; 20.0)	9.2 (5.0; 16.0)	8.8 (5.0; 13.0)	8.2 <sup>a</sup> (4.0; 14.0)	4.5 (2.0; 7.0)
BUT PSDI	2.3 <sup>b</sup> (1.8; 2.8)	2.1 <sup>a</sup> (1.5; 2.8)	1.9 (1.4; 2.5)	1.3 (1.0; 1.8)	1.7 (1.0; 2.8)

<sup>a</sup>  $p < 0.05$ ; <sup>b</sup>  $p < 0.01$  vs. respective controls; <sup>c</sup>  $p < 0.01$  vs. gymnasium users; the Kruskal-Wallis H test followed by the Mann-Whitney U test. Data are expressed as median, with quartiles (25th and 75th percentiles) in parentheses.

Only 2% of body builders were underweight (vs. 0% of male controls;  $p = n.s.$ ).

BDI scores were significantly higher in female dancers and gymnasium users than in female control subjects, while no significant differences between body builders and male control subjects were observed. No significant difference of STAI scores between the different groups was observed. Body uneasiness (BUT GSI), as well as the number of disliked parts of the body (BUT PST) and the intensity of the dislike (BUT PSDI) were significantly higher in female dancers with respect both to gymnasium users and female controls. In the body builder sample, BUT GSI and BUT PSDI scores were significantly higher than in male controls (table 2).

EDE-T score as well as subscale scores were significantly higher in athlete samples when compared with respective controls, with the only exception of the body

builder group, whose eating concern scores (EDE-EC) did not differ from controls (table 3).

Correlation analysis showed that eating-related psychopathology (expressed as EDE-T score) significantly correlated with body uneasiness (expressed as BUT GSI;  $p < 0.01$  in all samples). However, EDE-T scores did not correlate with STAI and BDI scores in female athletes (data not shown), but they did in the control groups ( $\rho = 0.33$ ,  $p < 0.001$  and  $\rho = 0.44$ ,  $p < 0.001$ , respectively). In addition, BUT GSI scores correlated with STAI and BDI scores in gymnasium users and female controls, but not in female dancers (STAI  $\rho = -0.08$ ,  $n.s.$ ; BDI  $\rho = -0.11$ ,  $n.s.$  – G: STAI  $\rho = 0.52$ ,  $p < 0.05$ ; BDI  $\rho = 0.24$ ,  $p < 0.05$  – DGc: STAI  $\rho = 0.56$ ,  $p < 0.001$ ; BDI  $\rho = 0.55$ ,  $p < 0.001$ ). On the other hand, body builders showed the same positive correlation between BDI and BUT scores observed in female controls, which was conversely absent

**Table 3.** EDE-12 total and subscale scores

	Ballet dancers	Gymnasium users	Female controls	Body builders	Male controls
EDE-T	1.6 <sup>b</sup> (0.9; 2.5)	1.7 <sup>b</sup> (0.9; 2.6)	1.0 (0.6; 1.4)	1.0 <sup>b</sup> (0.6; 1.7)	0.4 (0.2; 0.6)
EDE-R	0.8 <sup>b,c</sup> (0.0; 1.6)	1.6 <sup>b</sup> (0.4; 3.0)	0.0 (0.0; 0.6)	0.8 <sup>b</sup> (0.0; 1.2)	0.0 (0.0; 0.2)
EDE-EC	0.4 <sup>b</sup> (0.0; 1.0)	0.2 <sup>a</sup> (0.0; 0.6)	0.0 (0.0; 0.2)	0.0 (0.0; 0.0)	0.0 (0.0; 0.2)
EDE-WC	2.1 <sup>b</sup> (1.2; 3.2)	2.1 <sup>b</sup> (1.2; 3.8)	1.6 (1.0; 2.2)	1.4 <sup>b</sup> (0.0; 2.4)	0.5 (0.0; 1.0)
EDE-SC	2.7 <sup>b</sup> (1.7; 4.1)	2.8 <sup>b</sup> (1.6; 3.8)	2.0 (1.3; 2.7)	2.1 <sup>b</sup> (1.3; 3.3)	0.9 (0.7; 1.4)

<sup>a</sup>  $p < 0.05$ ; <sup>b</sup>  $p < 0.01$  vs. respective controls; <sup>c</sup>  $p < 0.01$  vs. gymnasium users; the Kruskal-Wallis H test followed by the Mann-Whitney U test. Data are expressed as median, with quartiles (25th and 75% percentiles) in parentheses.

**Table 4.** Prevalence of eating disorders and body image disturbance in the different groups

Diagnosis	Ballet dancers (n = 115)	Gymnasium users (n = 54)	Female controls (n = 105)	Body builders (n = 44)	Male controls (n = 30)
Any eating disorder	30 (26.6) <sup>a</sup>	8 (20.6) <sup>a</sup>	15 (14.7)	0	0
Anorexia nervosa	2 (1.8)	1 (2.6)	0	0	0
Bulimia nervosa	3 (2.7)	0	3 (3.2)	0	0
EDnos	25 (22.1)	7 (18)	12 (11.5)	0	0
Body image disturbance	46 (40.7) <sup>b,c</sup>	8 (20.6) <sup>a</sup>	15 (14.7)	17 (43.2) <sup>b</sup>	1 (3.3)

<sup>a</sup>  $p < 0.05$ ; <sup>b</sup>  $p < 0.0001$  vs. respective controls; <sup>c</sup>  $p < 0.01$  vs. gymnasium users; Yates' corrected  $\chi^2$  test. Figures indicate number of patients with percentages in parentheses.

in male controls (body builders: BDI rho = 0.46,  $p < 0.01$  – male controls: BDI rho = -0.15, n.s.). Furthermore, the presence of eating concern (EDE-EC) or restraint (EDE-R) never correlated with BMI in the 3 athlete samples. This correlation was at a significant level in control groups (female controls: rho = 0.36,  $p < 0.01$  EDE-R/BMI; rho = 0.35,  $p < 0.01$  EDE-EC/BMI – male controls: rho = 0.44,  $p < 0.05$  EDE-R/BMI; rho = 0.53,  $p < 0.01$  EDE-EC/BMI).

Diagnosis of eating disorders was made in 26.6% of female dancers, 20.6% of gymnasium users, 14.7% of female control subjects, and in no case in male samples. Body image disturbance was present in every subject affected by eating disorder, and was also a quite frequent

finding in non-eating-disordered dance students (14.1%), and in body builders (43.2%; table 4). When considering the different diagnostic groups, the group of patients with EDnos was the most represented one. In particular, in the female dancer group, we found that 15 out of 25 subjects fulfilled the EDnos-A criteria and 10 fulfilled the EDnos-B criteria. In the gymnasium user group, 3 out of 7 subjects fulfilled the EDnos-A criteria and 4 fulfilled the EDnos-B criteria. Finally, among control females, 6 out of 12 subjects fulfilled the EDnos-A criteria and 6 fulfilled the EDnos-B criteria.

No significant difference was observed between performers of classical and modern dance in the female dancer group (data not shown).

## Discussion

The prevalence of eating disorders in ballet students and gymnasium users was considerably higher than in controls. Moreover, a relevant prevalence of eating disorders (bulimia nervosa or bulimia nervosa-like EDnos, particularly) was observed even in the female control group. While this result differs from most studies performed using self-report questionnaires and lay interviewers [48], it is consistent with investigations performed on similar samples by clinical interviewers, using either semistructured instruments [49] or validated self-report tests [50]. The absence of diagnoses of eating disorders among body builders seems to confirm the low prevalence of eating disorders of a clinical relevance in a non-professional sample; these data are also enforced by the fact that no subject satisfied the criteria proposed for muscle dysmorphia [28, 29]. Furthermore, the BMI of body builders was quite similar to that of male controls, confirming that the standard of athletic participation of these subjects was at a non-professional level. The BMI of male controls resulted slightly over that expected for Italian males; this is obviously because performing any physical activity was an exclusion criterion for this group.

The attitude towards the body image is a multidimensional concept that includes interfaced cognitive, emotional and behavioural elements. In this regard, we faced the problem of the psychometric assessment of body image disorders on the basis of some preliminary considerations: (1) the malaise regarding body image can be expressed as a specific dissatisfaction regarding parts or characteristics or functions of the body, but also as a more diffused or general uneasiness, difficult to circumscribe and describe; (2) this feeling can determine avoiding (up to social phobia) and compulsive control behaviours (e.g. long and painful self-observations in the mirror), and (3) it may determine a state of extraneity and separation, up to somatopsychic depersonalization.

It is therefore possible to suppose that the malaise connected to the body image comprises several dimensions that must be faced globally, not only concerning therapy but also psychometric assessment.

Body image disturbance was present in all subjects suffering from eating disorders, confirming its pivotal role in their development. Body image disturbance was also quite common in dancers and in body builders, independently of BMI and the presence of a eating disorder diagnosis. Some level of body uneasiness was also present regardless of weight in most ballet dancers and body builders not suffering from body image disturbance.

Among non-physically active subjects, body uneasiness was always related to overweight, as shown by the positive correlation between the BUT scores and BMI. This suggests that the relevance of body shape and body weight in ballet students and in body builders could lead to an altered perception of the shape of the body, increasing the risk of developing an eating disorder. Furthermore, according to previous reports [51], our data show that a severe body uneasiness is always related to relevant concerns with weight and shape.

Body image disturbance was significantly more frequent in dancers and body builders, even when compared with gymnasium users. This finding confirms that body uneasiness is not a consequence of physical activity, but it is related to the type of sport performed. In fact, as suggested by several authors, the drive for thinness, which is present in several types of sports and is strictly related to the performance (e.g. ballet), plays a relevant role in influencing the perception of body shape [16, 52, 53]. Furthermore, it seems reasonable that young females who enrol in a ballet school, even if not yet affected by body uneasiness, may develop it, under the pressure of teachers and parents [54, 55]. Unlike other reports [12], ballet students enrolled in our study did not undergo any entry examination to be admitted to the ballet school, so that their distinction from the general population on the basis of a more pronounced body image disturbance is not attributable to a pre-enrolment selection. This is confirmed by the fact that ballet students did not show any correlation between body uneasiness and mood depression or anxiety, as conversely observed both in gymnasium users and female controls. We may therefore suppose that their dissatisfaction with the body is determined by the competitive environment (and not only by physical activity, being notably lower in gymnasium users), and is not mediated by the development of anxiety and mood depression, which conversely appear to influence body uneasiness in gymnasium users.

Young males who decide to perform body-building show a high degree of body image disturbance, even if, in our sample, none of them fulfilled the diagnostic criteria for muscle dysmorphia. Extreme physical exercise aimed at increasing body muscles could be considered a way to improve their mood. In fact, while few successful competitive body builders report very positive feelings about their bodies, a considerably high number of them report feelings of anxiety, depression and isolation [31]. Our results confirm that body image disturbance is a quite frequent finding in male body builders [37, 56], even at a non-professional level, and its correlation with eating

behaviour was interestingly more similar to that seen in females than in males from the general population. Body uneasiness was in fact related to pathological eating behaviours and mood depression, as observed in gymnasium users and in female controls. This is in keeping with the findings of Davis and Scott-Robertson [57], who described psychopathological similarities between male body builders and female patients suffering from anorexia nervosa.

It seems reasonable to assume, as previously proposed [40], that the primary feeling leading to body image disturbance may be the vague and indefinite sensation of uneasiness; the specific dissatisfaction regarding particular aspects or functions of the body may simply represent an attempt to find a cause for this uneasiness, a dark malaise whose origin is not understood.

## Conclusions

Our results seem to confirm that athletes, especially ballet dancers, have a high degree of body uneasiness and disordered eating attitudes and behaviours. However, the

prevalence of eating-related psychopathology is not correlated with the grade of physical activity, and even subjects with a low level of athletic participation show a high degree of body uneasiness and abnormal eating behaviours. The present data do not support the hypothesis that low levels of competition, per se, could be a protective factor with respect to the development of an eating disorder.

Many young girls enrolling in a ballet school, although a non-professional one, show a relevant body uneasiness and, in order to achieve a more performing silhouette, inappropriate eating behaviours.

Finally, body-building, a physical practice emphasising muscularity, may attract many male subjects suffering from body uneasiness, whose psychopathological features seem to be closer to eating-concerned women than to control males.

## References

- Shisslak CM, Crago M, Estes LS: The spectrum of eating disturbances. *Int J Eat Disord* 1995; 18:209–219.
- American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, ed 4, Text Revision (DSM-IV-TR). Washington, American Psychiatric Association, 2000.
- Cash TF: The treatment of body image disturbances; in Thompson JK (ed): *Body Image, Eating Disorders and Obesity*. Washington, American Psychological Association, 1996.
- Slade PD: Body image in anorexia nervosa. *Br J Psychiatry Suppl* 1988;2:20–22.
- Bruch H: Perceptual and conceptual disturbances in anorexia nervosa. *Psychosom Med* 1962;24:187–194.
- Dorian L, Garfinkel PE: Culture and body image in Western society. *Eat Weight Disord* 2002;7:1–19.
- Jaeger B, Ruggiero GM, Edlund B, Gomez-Perretta C, Lang F, Mohammadkhani P, Sahleen-Veasey C, Schomer H, Lamprecht F: Body dissatisfaction and its interrelations with other risk factors for bulimia nervosa in 12 countries. *Psychother Psychosom* 2002;71:54–61.
- Fisher S: *Development and Structure of the Body Image*. Hillsdale, Erlbaum, 1986.
- Cash TF, Pruzinsky T: *Body Images: Development, Deviance and Change*. New York, Guilford Press, 1990.
- Thompson JK: Assessment of body image; in Allison DB (ed): *Handbook of Assessment Methods for Eating Behaviours and Weight-Related Problems*. Thousand Oaks, Sage, 1995, pp 119–148.
- Abraham S: Eating and weight controlling behaviours of young ballet dancers. *Psychopathology* 1996;29:218–222.
- Bettle N, Bettle O, Neumarker U, Neumarker KJ: Adolescent ballet school students: Their quest for body weight change. *Psychopathology* 1998;31:153–159.
- Neumarker K, Bettle N, Neumarker U, Bettle O: Age- and gender-related psychological characteristics of adolescent ballet dancers. *Psychopathology* 2000;33:137–142.
- le Grange D, Tibbs J, Noakes TD: Implications of a diagnosis of anorexia nervosa in a ballet school. *Int J Eat Disord* 1994;15:369–376.
- Abraham S: Characteristics of eating disorders among young ballet dancers. *Psychopathology* 1996;29:223–229.
- Bettle N, Bettle O, Neumarker U, Neumarker KJ: Body image and self-esteem in adolescent ballet dancers. *Percept Mot Skills* 2001;93: 297–309.
- Petrie TA, Stoeber S: The incidence of bulimia nervosa and pathogenic weight control behaviours in female collegiate gymnasts. *Res Q Exerc Sport* 1993;64:238–241.
- O'Connor PJ, Lewis RD, Kirchner EM: Eating disorder symptoms in female college gymnasts. *Med Sci Sports Exerc* 1995;27:550–555.
- O'Connor PJ, Lewis RD, Kirchner EM, Cook DB: Eating disorder symptoms in former female college gymnasts: Relations with body composition. *Am J Clin Nutr* 1996;64:840–843.
- Yates A, Leehey K, Shisslak CM: Running – an analogue of anorexia? *N Engl J Med* 1983;308: 251–255.
- Weight LM, Noakes TD: Is running an analog of anorexia? A survey of the incidence of eating disorders in female distance runners. *Med Sci Sports Exerc* 1987;19:213–217.
- Hulley AJ, Hill AJ: Eating disorders and health in elite women distance runners. *Int J Eat Disord* 2001;30:312–317.
- Rucinski A: Relationship of body image and dietary intake of competitive ice skaters. *J Am Diet Assoc* 1989;89:98–100.
- Garner DM, Rosen LW, Barry D: Eating disorders among athletes. Research and recommendations. *Child Adolesc Psychiatr Clin N Am* 1998;7:839–857.
- Smolak L, Murnen SK, Ruble AE: Female athletes and eating problems: A meta-analysis. *Int J Eat Disord* 2000;27:371–380.

- 26 Nelson WL, Hughes HM, Katz B, Searight HR: Anorexic eating attitudes and behaviors of male and female college students. *Adolescence* 1999;34:621-633.
- 27 Pope HG Jr, Katz DL, Hudson JI: Anorexia nervosa and 'reverse anorexia' among 108 male bodybuilders. *Compr Psychiatry* 1993;34:406-409.
- 28 Pope HG Jr, Gruber AJ, Choi P, Olivardia R, Phillips KA: Muscle dysmorphia. An under-recognized form of body dysmorphic disorder. *Psychosomatics* 1997;38:548-557.
- 29 Olivardia R, Pope HG Jr, Hudson JI: Muscle dysmorphia in male weightlifters: A case-control study. *Am J Psychiatry* 2000;15:1291-1296.
- 30 Walberg JL, Johnston CS: Menstrual function and eating behavior in female recreational weight lifters and competitive body builders. *Med Sci Sports Exerc* 1991;23:30-36.
- 31 Andersen RE, Barlett SJ, Morgan GD, Brownell KD: Weight loss, psychological, and nutritional patterns in competitive male body builders. *Int J Eat Disord* 1995;18:49-57.
- 32 Sundgot-Borgen J: Prevalence of eating disorders in elite female athletes. *Int J Sport Nutr* 1993;3:29-40.
- 33 Sundgot-Borgen J: Nutrient intake of female elite athletes suffering from eating disorders. *Int J Sport Nutr* 1993;3:431-442.
- 34 Olivardia R: Mirror, mirror on the wall, who's the largest of them all? The features and phenomenology of muscle dysmorphia. *Harv Rev Psychiatry* 2001;9:254-259.
- 35 Kanayama G, Gruber AJ, Pope HG Jr, Borowiecki JJ, Hudson JI: Over-the-counter drug use in gymnasiums: An underrecognized substance abuse problem? *Psychother Psychosom* 2001;70:137-140.
- 36 Weeda-Mannak WL, Drop MJ: The discriminative value of psychological characteristics in anorexia nervosa. Clinical and psychometric comparison between anorexia nervosa patients, ballet dancers and controls. *J Psychiatr Res* 1985;19:285-290.
- 37 Mangweth B, Pope HG Jr, Kemmler G, Ebenbichler C, Hausmann A, De Col C, Kreutner B, Kinzl J, Biebl W: Body image and psychopathology in male bodybuilders. *Psychother Psychosom* 2001;70:38-43.
- 38 Beck AT: Beck Depression Inventory. St Antonio, The Psychological Corporation, 1987.
- 39 Spielberg CD, Gorsuch RL, Lushene RE: Manual for the State-Trait Anxiety Inventory (Self-Evaluation Questionnaire). Palo Alto, Consulting Psychologists Press, 1970.
- 40 Cuzzolaro M, Vetrone G, Marano G, Battacchi MW: BUT, Body Uneasiness Test: A new attitudinal body image scale. *Psichiatria infanz adolesc* 1999;66:417-428.
- 41 First MB, Spitzer RL, Gibbon M, Williams JBW: Structured Clinical Interview for DSM-IV™ Axis I Disorders (SCID-I), Clinician Version. Washington, American Psychiatric Publishing Inc, 1995.
- 42 Fairburn CG, Cooper Z: The Eating Disorder Examination, ed 12; in Fairburn CG, Wilson GT (eds): *Binge Eating: Nature, Assessment and Treatment*. New York, Guilford Press, 1993, pp 317-360.
- 43 Dotti A, Fioravanti M, Balotta M, Tozzi F, Cannella C, Lazzari R: Eating behavior of ballet dancers. *Eat Weight Disord* 2002;7:60-67.
- 44 Cooper Z, Cooper PJ, Fairburn CG: The validity of the eating disorder examination and its subscales. *Br J Psychiatry* 1989;154:807-812.
- 45 Ricca V, Mannucci E, Mezzani B, Di Bernardo M, Zucchi T, Paionni A, Placidi GPA, Rotella CM, Faravelli C: Psychopathological and clinical features of outpatients with an eating disorder not otherwise specified. *Eat Weight Disord* 2001;6:157-165.
- 46 Ricca V, Mannucci E, Mezzani B, Moretti S, Di Bernardo M, Bertelli M, Rotella CM, Faravelli C: Fluoxetine and fluvoxamine combined with individual cognitive-behaviour therapy in binge eating disorder: A one-year follow-up study. *Psychother Psychosom* 2001;70:298-306.
- 47 Mannucci E, Tesi F, Ricca V, Pierazzuoli E, Barciulli E, Moretti S, Di Bernardo M, Travaglini R, Carrara S, Zucchi T, Placidi GF, Rotella CM: Eating behavior in obese patients with and without type 2 diabetes mellitus. *Int J Obes Relat Metab Disord* 2002;26:848-853.
- 48 Steinhausen HC, Winkler C, Meier M: Eating disorders in adolescence in a Swiss epidemiological study. *Int J Eat Disord* 1997;22:147-151.
- 49 Holderness CC, Brooks-Gunn J, Warren MP: Eating disorders and substance use: A dancing vs a nondancing population. *Med Sci Sports Exerc* 1994;26:297-302.
- 50 Jones JM, Bennett S, Olmsted MP, Lawson ML, Rodin G: Disordered eating attitudes and behaviours in teenaged girls: A school-based study. *CMAJ* 2001;165:547-552.
- 51 Garfinkel PE, Lin B, Goering P, Spegg C, Goldbloom D, Kennedy S, Kaplan A, Woodside B: Purging and non-purging forms of bulimia nervosa in a community sample. *Int J Eat Disord* 1996;20:231-238.
- 52 Abraham SF, Mira M, Beumont PJ, Sowerbutts TD, Llewellyn-Jones D: Eating behaviours among young women. *Med J Aust* 1983;2:225-228.
- 53 Pierce EF, Daleng ML: Distortion of body image among elite female dancers. *Percept Mot Skills* 1998;87:769-770.
- 54 Pike KM, Rodin J: Mothers, daughters, and disordered eating. *J Abnorm Psychol* 1991;100:198-204.
- 55 Striegel-Moore RH, Kearney-Cooke A: Exploring parents' attitudes and behaviors about their children's physical appearance. *Int J Eat Disord* 1994;15:377-385.
- 56 Blouin AG, Goldfield GS: Body image and steroid use in male bodybuilders. *Int J Eat Disord* 1995;18:159-165.
- 57 Davis C, Scott-Robertson L: Psychological comparison of females with anorexia nervosa and competitive male bodybuilders: Body shape ideals in the extreme. *Eating Behav* 2000;1:33-46.