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Orthorexia in Athletes: A Comprehensive Review of its Causes, Impact on Health, and Prevention Strategies

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Abstract

Orthorexia, an emerging eating disorder characterized by an obsessive focus on consuming only "healthy" foods, is becoming increasingly prevalent among athletes, particularly those involved in sports requiring strict control over body mass, physique, or physical performance. This disorder leads to significant metabolic disturbances, resulting in energy deficits and deficiencies in essential nutrients like vitamins.

Aim:

This review aims to explore the prevalence, causes, health impacts, and management strategies for orthorexia nervosa (ON) in athletes, with a focus on the challenges posed by the

lack of standardized diagnostic criteria and the demands of sports that emphasize weight control, physique, and performance.

Materials and Methods:

The analysis is based on a synthesis of existing literature from medical and sports journals, focusing on studies that examine the relationship between ON and factors such as gender, BMI, athletic discipline, and the duration of physical activity. Special attention is given to studies evaluating multidisciplinary approaches to treatment and prevention.

Results:

Athletes, especially those in weight-sensitive and aesthetic sports, exhibit a higher prevalence of ON compared to non-athletes, with female athletes being particularly vulnerable. ON is driven by societal, cultural, and sports-specific pressures, leading to restrictive dietary practices that can cause nutrient deficiencies, metabolic imbalances, energy depletion, and psychological distress. Research findings on the relationship between ON, BMI, and gender are inconclusive, but athletes engaging in over 150 minutes of weekly physical activity, particularly endurance sports, are at higher risk.

Conclusions:

ON poses significant risks to both health and performance in athletes. Early diagnosis and a multidisciplinary treatment approach that integrates psychotherapy, dietary counseling, and nutritional education are critical for managing ON. Preventive measures at the organizational level, emphasizing balanced nutrition and collaboration among coaches, dietitians, psychologists, and physicians, are essential to reducing the prevalence of ON and promoting athlete well-being.

Keywords: Orthorexia nervosa, eating disorder, athletes, metabolic disturbances, nutritional deficiencies, dietary interventions, athlete health.

Introduction

Orthorexia nervosa (ON) is an eating disorder characterized by an obsessive pursuit of consuming exclusively “healthy” foods while eliminating those considered harmful. Although this term was introduced relatively recently, research increasingly highlights its prevalence, particularly within athletic communities. Engaging in regular physical activity and participating in sports is crucial for an individual's physical, mental, psychological, and social growth [1]. Athletes are often seen as the embodiment of health and physical excellence, and a significant portion (40%) of European citizens report participating regularly in sports and physical activities [2]. Athletes, especially those engaged in professional sports, appear to be at a heightened risk for orthorexia nervosa (ON). Individuals with ON exhibited greater eating disturbances and more pronounced obsessive-compulsive symptoms related to food, nutrition, and physical activity compared to those without ON [3].Although research on orthorexia nervosa (ON) has increased in recent years, there remains no consensus on standardized diagnostic criteria [4] General criteria for orthorexia nervosa (ON) have been proposed by Cena et al., 2019, but none are recognized in the Diagnostic and Statistical Manual (DSM-5) or ICD-11. This lack of formal recognition makes ON difficult to diagnose and treat [5]. The current definition describes ON as an obsession, fixation, concern, and preoccupation with maintaining a healthy diet (Cena et al., 2019).The literature suggests that orthorexia can result in severe health consequences, including metabolic and hormonal disturbances and reduced physical performance—challenges that are particularly problematic in competitive sports contexts [1–6]. Diagnosing and treating orthorexia in the athletic population remains a challenge, necessitating an integrated approach combining psychological support, dietary interventions, and preventive measures.

This paper aims to provide a comprehensive review of the literature on orthorexia among athletes, covering its definition, causes, symptoms, impact on physical health and athletic

performance, as well as treatment methods and prevention strategies. The analysis utilizes available scientific resources, including medical and sports journal publications, to ensure reliability and currency.

1.Definition of Orthorexia

Orthorexia nervosa is a specific eating disorder primarily characterized by a pathological commitment to a stringent selection of foods, emphasizing their “purity” and “healthiness.” Individuals with orthorexia exhibit excessive preoccupation with the quality of consumed products, adhering to rigid dietary standards that exclude all components perceived as toxic [5]. Unlike anorexia or bulimia, orthorexia is not directly associated with calorie or body weight control but rather with an obsessive desire to consume “clean” food, leading to pathological dietary restrictions [3].Although the term “orthorexia” was first coined by Bratman in 1997 [6], contemporary medical literature underscores its growing recognition as a distinct diagnostic entity, despite its absence from the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 5th Edition) [5]. Individuals with orthorexia present elements common with compulsive traits, significant neuropsychological [7] and ethiological implications [8].

Psychological Factors:

Individuals with eating disorders often struggle with low self-esteem, using the pursuit of the “ideal” diet as a way to gain control over their lives and satisfy perfectionistic tendencies. Psychopathological mechanisms, such as anxiety about losing control or perceived threats posed by “unhealthy” food, result in chronic food preoccupation. Eating disorders frequently coexists with other mental health conditions, such as obsessive-compulsive disorder (OCD) sharing the same traits of the cognitive feature of repetitive thoughts and preoccupations about a certain feared stimulus, (e.g. EDs: food/body image/weight preoccupation; OCD: obsessive preoccupation with symmetry, contamination, etc) of which is usually followed by some negative affect . [7,8]

Social Factors:

Societal expectations often pressure individuals to maintain a thin, muscular, and healthy appearance to align with cultural ideals. Initially, the focus was on the thin female ideal, but over time, the emphasis shifted to include the muscular male ideal. The erosion of family-based rituals and values around food choices, meal preparation, and consumption, as well as

food's role in emotional regulation, has created a fertile environment for behaviors associated with orthorexia nervosa (ON). Recently, the pursuit of health has become a dominant cultural narrative, leading some individuals to engage in potentially pathological behaviors related to healthy eating—a topic gaining prominence in public discourse. The aspiration for a slim, muscular physique and a perfect healthy lifestyle reflects societal constructs, often resulting in heightened body control through diet and exercise. As these ideals become more demanding, anxiety about appearance intensifies, driving individuals to regulate their bodies and adopt restrictive dietary and exercise routines. [9]

Education and occupation:

Research on the relationship between education and the tendency toward orthorexia nervosa (ON) has yielded mixed results. Some studies indicate that individuals with lower levels of education are more prone to ON [10], while those with postgraduate education show a reduced tendency compared to other educational groups. Conversely, other studies suggest that ON tendencies are unrelated to education level or work experience and are not influenced by parental occupation or educational background[11]. Although, the average prevalence rate for orthorexia was 6.9 % for the general population and 35–57.8 % for high-risk groups, like healthcare professionals, artists, dieticians and athletes [9]

Symptoms of Orthorexia

Orthorexia is characterized by behavioral changes and negative health outcomes resulting from prolonged dietary restrictions. Individuals with orthorexia adopt an excessively restrictive approach to food selection, often eliminating entire food groups perceived as harmful or "impure." Their diet primarily consists of organic, minimally processed foods rich in micronutrients, and any deviation from these strict dietary rules triggers intense guilt and anxiety. Such restrictive eating patterns frequently lead to severe nutritional deficiencies. [12]
A common symptom of orthorexia is the avoidance of social eating, as individuals fear that meals outside their controlled environment might compromise their health. This behavior is further exacerbated by an intense fear of consuming foods that fail to meet stringent health standards. Eating outside their rigid guidelines can cause profound emotional distress, and over time, this anxiety-driven behavior may result in metabolic complications [12]

Risk Factors

The development of orthorexia and orthorexia nervosa is shaped by a multifaceted interplay of psychological, sociocultural, and environmental factors. On an individual level, certain personality traits such as perfectionism, high levels of neuroticism, and a tendency toward obsessive-compulsive behaviors are strongly associated with an increased vulnerability to these conditions. Additionally, factors such as food preferences, inherited differences in taste perception, food neophobia or pickiness, being premorbidly overweight or obese, parental feeding practices, and a family history of eating disorders further contribute to the risk [13].Studies have also highlighted a connection between orthorexic tendencies and traits like preoccupation with appearance, concerns about weight, self-perceived weight status, and insecure attachment styles, particularly fearful and dismissive types. Significant predictors of orthorexia nervosa include an intense fixation on weight, appearance orientation, and a personal or familial history of eating disorders. Together, these findings emphasize the complex and multifactorial nature of the risk factors for orthorexia, reflecting an intricate blend of psychological predispositions and external influences [14].

2. Orthorexia Among Athletes

Specificity of Competitive Sports and Orthorexia

Orthorexia is particularly prevalent among athletes in disciplines requiring strict control of body weight, physique, and physical performance. Sports such as athletics, cycling, gymnastics, fitness, and physique sports often demand peak physical form, heightening the risk of eating disorders, including orthorexia. The pressure to appear and feel “ideal” is frequently driven by societal, media, and sports culture expectations, where physical health is perceived as a success factor rather than a long-term goal [15]. Athletes adhering to restrictive diets, eliminating entire food groups, and prioritizing peak physical condition may face not only health challenges but also psychological ones. Despite initial perceptions of health benefits, such dietary practices can lead to nutrient and energy deficiencies, ultimately reducing physical capacity and athletic performance [15,16]. In sports emphasizing weight control orthorexia is especially pronounced. Athletes often feel compelled to adhere to rigid dietary rules to maintain low body fat levels and optimal performance [15]. Endurance athletes, such as marathon runners or triathletes, may also display orthorexic tendencies, focusing on diets they believe enhance physical endurance. This often involves carbohydrate

elimination or excessive protein consumption, potentially leading to long-term health effects, including energy depletion, metabolic and hormonal disturbances, and impaired recovery capacity[15].

3. Orthorexia Nervosa in Athletes: The Influence of Gender, BMI, and Sport Type

Eating disorders (EDs) are more prevalent in athletes compared to non-athletes, with female athletes being affected more frequently than their male counterparts.[17,18]. These disorders are particularly common in sports that emphasize leanness or have weight-based classifications. Addressing EDs in athletes is most effective through a collaborative approach involving coaches, athletic trainers, parents, physicians, and the athletes themselves, focusing on early recognition, prevention, and treatment [17]. Among female athletes, the prevalence of eating disorders varies depending on the sport and tends to be higher in disciplines with weight classes (e.g., rowing), aesthetic-focused sports (e.g., gymnastics or figure skating), and sports where a lower body mass is perceived as beneficial [18]. Although the literature on gender differences in orthorexia nervosa (ON) symptomatology remains inconclusive. Some studies report a higher prevalence of ON symptoms in women[19], others find a greater prevalence in men [10], while yet others indicate no significant gender differences [20] Also the current literature highlights the need for further investigation into the relationship between BMI and orthorexia nervosa (ON). Existing findings are inconsistent, with some studies reporting a positive correlation between ON symptoms and BMI [21,22] while others have found no significant association [15,23,24]. Significant differences have been observed between inactive individuals and athletes, with higher scores recorded among those engaging in sports for over 150 minutes per week. Furthermore, individuals participating in endurance sports for more than 150 minutes weekly demonstrate scores indicating a greater likelihood of developing orthorexia nervosa compared to those involved in other types of sports.[15]

4. Treatment Methods and Prevention of Orthorexia in Athletes

The treatment of orthorexia nervosa (ON) lacks a standardized therapeutic protocol, as there is no universally recognized definition or diagnostic criteria for the condition. Consequently, interventions must be tailored to the individual, addressing their specific symptoms and underlying issues. Current literature suggests that a multidisciplinary approach is most effective, involving collaboration among physicians, psychotherapists, and dietitians. [25,26]. Physicians play a critical role in managing physical health concerns, such as addressing

nutritional deficiencies, monitoring weight, and treating any medical complications resulting from prolonged dietary restrictions. Psychotherapists focus on identifying and modifying cognitive distortions, such as obsessive thoughts about food and perfectionism, while also addressing comorbid conditions like anxiety or depression. Dietitians provide guidance on balanced nutrition, helping patients reintroduce previously restricted food groups and develop healthier attitudes toward eating.In severe cases, especially those involving significant weight loss or malnutrition, hospitalization for refeeding and medical stabilization may be necessary. Additionally, psychoeducation for patients and their families can enhance understanding of the condition and support long-term recovery. While the absence of standardized guidelines presents challenges, an individualized, team-based approach remains the cornerstone of effective treatment for ON.[25,26] Cognitive-behavioral therapy (CBT) is often recommended in conjunction with pharmacological treatments, including selective serotonin reuptake inhibitors (SSRIs) like fluoxetine, sertraline, and paroxetine. This approach integrates the benefits of pharmacology, psychotherapy, and psychoeducation, providing a comprehensive framework to address both the psychological and physiological aspects of the condition[27].Psychotherapy should address not only the dietary choices of patients but also their behaviors and thought patterns related to food. This includes exploring how they shop for groceries, prepare meals, and perceive the food they consume, providing a holistic approach to understanding and modifying their relationship with food[26]. Treatment can typically be managed on an outpatient basis; however, hospitalization is advised for refeeding in cases of severe weight loss or malnutrition. [28]

5. Conclusions

Orthorexia nervosa (ON) is an eating disorder marked by an obsessive focus on "healthy" eating, posing significant risks to athletes due to the demands of their sport. Despite increasing research, the lack of standardized diagnostic criteria complicates its recognition and treatment. ON can lead to severe health issues, including metabolic imbalances and reduced performance. This review highlights the causes, impact, and management of ON in athletes, emphasizing the need for multidisciplinary approaches to prevention and care.Orthorexia is particularly common among athletes in sports that emphasize weight control, physique, and performance. Driven by societal, media, and sports culture pressures, these athletes often adopt restrictive diets and rigid dietary rules, leading to nutrient deficiencies and decreased performance. While initially perceived as beneficial, such practices

can result in long-term health consequences, including metabolic imbalances, energy depletion, and psychological distress, highlighting the need for awareness and balanced approaches to nutrition in athletic contexts. Eating disorders (EDs), including orthorexia nervosa (ON), are more prevalent in athletes than non-athletes, with female athletes often at greater risk, particularly in sports emphasizing leanness, aesthetics, or weight classifications. Gender differences in ON remain inconclusive, with studies showing varying prevalence between men and women. Research on the relationship between BMI and ON also presents mixed results, highlighting the need for further investigation. Athletes engaging in over 150 minutes of physical activity weekly, especially in endurance sports, show a higher likelihood of ON, underscoring the importance of early recognition and a multidisciplinary approach to prevention and treatment.Early diagnosis of orthorexia is critical in preventing long-term health consequences. Treatment of this disorder requires a multidisciplinary approach that integrates psychotherapy with dietary interventions aimed at restoring nutritional balance. Nutritional education, especially within the athletic environment, should promote a balanced approach to diet that does not involve the elimination of large food groups but instead seeks to optimize caloric intake and nutrient supply.

Prevention of orthorexia among athletes should involve preventive measures at the level of sports organizations, promoting a healthy approach to nutrition that addresses both the physiological and psychological needs of athletes. Collaboration between coaches, dietitians, psychologists, and physicians is crucial in creating a health-promoting environment that minimizes the risk of developing this disorder.

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