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Depression in Competitive Athletes and Antidepressant Treatment: A Narrative Review of the Efficacy of Drugs from Different Classes and Their Impact on Sports Performance

Maria Leśniak

ORCID: <https://orcid.org/0009-0007-2413-6112>

E-mail: marialesniak68@gmail.com

St. Luke's Provincial Hospital in Tarnów, 33-100 Tarnów, Poland

Jan Poleszak

ORCID: <https://orcid.org/0009-0001-4265-0998>

E-mail: jk.poleszak@gmail.com

Student Research Circle at the Chair and Department of Epidemiology and Clinical Research
Methodology, Medical University of Lublin, 20-093 Lublin, Poland

Dominika Wąsek

ORCID: <https://orcid.org/0009-0009-6827-7157>

E-mail: dominikawasek37@gmail.com

Student Research Circle at the Chair and Department of Epidemiology and Clinical Research Methodology, Medical University of Lublin, 20-093 Lublin, Poland

Kornelia Kuchta

ORCID: <https://orcid.org/0009-0008-0272-5968>

E-mail: Kornelia-kuchta@wp.pl

Student Research Circle at the Chair and Department of Epidemiology and Clinical Research Methodology, Medical University of Lublin, 20-093 Lublin, Poland

Corresponding author: Maria Leśniak

marialesniak68@gmail.com

Abstract

The aim of this narrative review was to collect and critically appraise the existing findings on the pharmacological treatment of depression in competitive athletes, with particular emphasis on antidepressant drugs from different classes and their impact on physical performance and anti-doping status. Material and methods. The PubMed, Scopus and Web of Science databases were searched for papers published between 1990 and 2025, combining terms related to depression, competitive sport and individual drug classes. Clinical studies, reviews and expert statements were included. Results. Selective serotonin reuptake inhibitors remain the first-line treatment owing to their favorable safety profile, although their adverse effects may affect training. Serotonin-noradrenaline reuptake inhibitors and bupropion require consideration of cardiovascular and thermoregulatory effects. Tricyclic antidepressants are now used less often because of cardiotoxicity. The anti-doping status of most drugs is permitted, yet some substances are subject to monitoring. Conclusions. Therapeutic decisions in athletes should be individualized, taking into account the discipline, the adverse-effect profile and anti-doping regulations. Randomized trials in this population are lacking.

Keywords: depression, competitive athletes, antidepressants, SSRIs, doping, sports medicine, mental health, overtraining

1. Introduction

For many years it was widely believed that regular physical activity protects against mood disorders and that the world of competitive sport is largely free of mental health problems. This belief rested partly on the observation that moderate physical exercise does indeed have an antidepressant effect in the general population, and partly on the social image of the athlete as a strong, disciplined and resilient individual. Contemporary epidemiological data challenge this simplified picture, indicating that the prevalence of depressive symptoms among competitive athletes is at least comparable to that in the general population, and in some groups – for example among athletes after injury, during career termination or in disciplines with restrictive body-mass control – significantly higher [1,2].

Competitive sport is characterized by a set of burdens that do not occur with such intensity in the general population. These include extreme training loads, performance pressure, public exposure, financial and occupational instability, frequent travel disrupting the circadian rhythm, and the risk of injury that can end a career in an instant. Each of these factors individually constitutes a documented risk element for mood disorders, and their accumulation makes the athletic population particularly vulnerable. The specificity of this environment means that both the recognition and the treatment of depression encounter difficulties absent in typical psychiatric practice.

The culture of competitive sport, based on values such as mental toughness, self-discipline and the suppression of signs of weakness, encourages the concealment of symptoms and delays help-seeking [3]. An athlete fearing the loss of a place in the squad, of sponsorship or of the coach's trust may deliberately mask symptoms, treating them as a threat to the career. The stigmatization of mental illness, although gradually diminishing, remains strong in the sporting environment, as confirmed by studies on the attitudes of athletes and coaching staff [4,5].

Symptoms of depression are, moreover, often masked by or confused with overtraining, whose clinical picture – chronic fatigue, decreased motivation, sleep disturbances, irritability and deteriorating results – largely overlaps with the criteria of a depressive episode [6]. Distinguishing these two states is the first significant clinical problem, because the management of each is different: overtraining requires above all a modification of loads and recovery, whereas a depressive episode may require psychotherapeutic and pharmacological intervention.

The second problem, key for the present work, is pharmacological treatment itself. Antidepressant drugs, well studied in the general population, raise additional questions in the competitive athlete: whether they affect aerobic and anaerobic capacity, thermoregulation during exercise in high ambient temperature, body mass and composition, sleep quality and recovery, and finally – whether they are permitted under anti-doping regulations. These issues are rarely the subject of dedicated research, so therapeutic decisions rely mainly on the extrapolation of data from the general population and on expert opinion [7].

It is worth emphasizing that this problem has not only an individual but also a systemic dimension. Untreated or improperly treated depression in an athlete leads not only to suffering and a reduced quality of life, but also to decreased results, an increased risk of injury resulting from impaired concentration and motor control, and in extreme cases to self-destructive behavior. From the perspective of sports organizations and medical care, this means the necessity of developing coherent management pathways in which pharmacotherapy is one element of a broader model of care. The absence of such pathways leads to a situation in which decisions are made ad hoc, without grounding in unified standards.

The present work is part of the broader trend of growing interest in mental health in competitive sport, visible in recent years in both the scientific literature and the activities of sports organizations [8]. It is increasingly emphasized that care for the mental health of athletes is not merely a humanitarian issue, but also an integral element of professional athletic preparation, affecting the durability of a career and the quality of the results achieved. In this context, reliable knowledge of the possibilities and limitations of pharmacotherapy is an important element of the competence of medical teams working with athletes.

The aim of this narrative review is to collect and critically analyze the existing findings on the pharmacotherapy of depression in competitive athletes, with an emphasis on comparing individual classes of antidepressant drugs in terms of efficacy, the profile of adverse effects relevant to performance, and status under anti-doping regulations. The work is of an ordering character: it does not aspire to the role of a formal systematic review, but seeks to gather dispersed knowledge, appraise it critically and indicate research gaps requiring completion in the future. The structure of the work reflects clinical logic: from epidemiology and mechanisms, through differential diagnosis, to a detailed discussion of individual drug classes and the practical aspects of conducting treatment.

2. Material and methods

The present study is a narrative review. The choice of this form was dictated by the nature of the available data, which are heterogeneous in terms of methodology, population and the endpoints assessed, which hinders their quantitative synthesis. A narrative review, by contrast, allows the integration of knowledge derived from various sources – clinical studies, experimental work in exercise physiology, reviews and regulatory documents – and its presentation in the context of clinical practice.

Three bibliographic databases were searched: PubMed, Scopus and Web of Science, covering papers published in English and Polish between 1990 and 2025. Combinations of keywords relating to three thematic areas were used: mood disorders (depression, depressive disorder, mood disorder), the athletic population (athlete, elite sport, competitive sport, exercise, overtraining) and pharmacotherapy (antidepressant, SSRI, SNRI, tricyclic antidepressant, bupropion, mirtazapine, agomelatine). The terms were combined with logical operators, and the results were supplemented by a manual search of the reference lists of the retrieved papers.

The review included original clinical studies, experimental studies in the field of exercise physiology, systematic and narrative reviews, meta-analyses, and position statements of scientific societies and anti-doping organizations. Case reports lacking broader context, conference materials available only as abstracts, and non-peer-reviewed publications were excluded. In assessing the anti-doping status of individual substances, the applicable versions of the Prohibited List of the World Anti-Doping Agency were used [9].

Owing to the narrative character of the work and the heterogeneity of the available data, no quantitative synthesis of the results, meta-analysis or formal assessment of the risk of bias of individual studies was carried out. This should be regarded as a deliberate methodological limitation, discussed in more detail in the section devoted to limitations. The collected information was grouped thematically according to the classes of antidepressant drugs, which corresponds to the structure of the results section and facilitates comparative reference of individual groups.

3. Epidemiology of depression in the athletic population

Epidemiological data on the mental health of competitive athletes were for a long time scarce, and their quality limited by methodological problems such as small and unrepresentative samples, the diversity of the screening tools used, and the influence of

stigmatization on the reliability of self-report. In the last two decades, however, a significant increase in research in this area has been observed, including systematic reviews and meta-analyses, which allow more reliable estimates [1,10].

The available data indicate that the prevalence of depressive symptoms among competitive athletes falls within a range close to or slightly exceeding that of the general population, with clear differences between subgroups. Higher rates are observed among athletes after serious injuries, during rehabilitation, and among athletes ending their careers. Sex, type of discipline and level of competition also modify the risk, although the results of individual studies are sometimes inconsistent, which hinders the formulation of unambiguous conclusions [11].

Some studies suggest a higher prevalence of depressive symptoms among female than male athletes, consistent with observations in the general population, where depression is more frequently diagnosed in women. These differences may result both from biological factors and from different patterns of symptom reporting and differences in exposure to particular stressors. The type of discipline may also be relevant: in individual disciplines, where responsibility for the result rests solely with the athlete, and in disciplines with restrictive body-mass control, higher rates of psychological burden are sometimes observed, although the data in this regard require cautious interpretation [12].

A significant limitation of epidemiological studies in this population remains the dependence on self-report-based tools, whose reliability may be reduced by stigmatization and fear of consequences. For this reason, the actual prevalence of mood disorders in competitive sport may be underestimated, and the increase in the number of diagnoses observed in recent years may reflect not so much a real rise in incidence as growing awareness, better detection and the gradual weakening of stigmatization. Regardless of interpretation, these data unequivocally undermine the myth of the athletic environment's immunity to mental health problems [13].

3.1. Risk factors specific to sport

Among the risk factors for depression particularly relevant in the athletic population, the following are mentioned: chronic stress related to competition, the experience of serious injury, sporting failures and the loss of position in the team hierarchy, as well as relational factors such as conflicts with the coach or isolation resulting from frequent travel[3,8]. A separate category is constituted by traumatic experiences, including instances of abuse in the sporting environment, whose significance for the mental health of athletes has been more strongly

emphasized in the literature in recent years. The accumulation of several of these factors significantly increases the likelihood of a depressive episode [3].

A significant, though ambiguous, factor is the level and volume of training loads. While moderate physical activity has a protective effect on mood, extremely high training loads characteristic of competitive sport may – with insufficient recovery – favor the development of depressive symptoms. This relationship is sometimes described as curvilinear, in which both a deficiency and an excess of exercise are associated with poorer psychological well-being, although the exact shape of this relationship remains the subject of research [14].

Among factors of a biological and clinical nature, importance attaches to previous episodes of mood disorders, a burdened family history, and coexisting somatic conditions, including chronic pain and the sequelae of head injuries, which occur more frequently in certain contact disciplines. Repeated concussions are the subject of growing interest as a potential risk factor for mood disorders and other neuropsychiatric problems later in life, which further emphasizes the importance of prevention and proper management after head injuries.

Factors related to lifestyle and environment cannot be overlooked, such as sleep disturbances resulting from travel and time-zone changes, pressure related to body-mass control, and exposure to substance use. The accumulation of these factors, superimposed on the general burdens of competition, creates a complex picture of risk in which the individual elements mutually reinforce one another. Understanding this multifactorial nature of risk is essential both for prevention and for the holistic planning of treatment, which cannot be limited to pharmacological intervention alone [8,15].

6. Selective serotonin reuptake inhibitors (SSRIs)

Selective serotonin reuptake inhibitors are widely regarded as the first-line drugs in the treatment of depression in athletes, which results above all from their favorable safety profile and low toxicity in the event of overdose [7]. Substances such as sertraline, escitalopram or fluoxetine are relatively well tolerated and do not show significant ergogenic potential, which makes them acceptable from an anti-doping perspective [9]. The mechanism of their action, consisting in increasing the availability of serotonin in the synaptic cleft, is well understood, and many years of clinical experience allow predictable management of treatment [16,17].

6.1. Adverse effects relevant to the athlete

From the athlete's point of view, however, the adverse effects are significant which, in the general population, are regarded as mild, but which may affect training and competition. These

include a transient sensation of fatigue and drowsiness in the initial phase of treatment, increased sweating, gastrointestinal complaints, sexual dysfunction and changes in body mass with longer use. In disciplines with weight categories, even a moderate change in body mass may be of sporting significance, and in aesthetic disciplines also of psychological significance, potentially intensifying symptoms [8].

Endurance disciplines contested in hot surroundings require particular attention. The serotonergic effect on thermoregulation and – with prolonged, intense exercise – the theoretical risk of hyponatremia, which SSRIs may intensify through their effect on vasopressin secretion, are issues requiring vigilance. Although this risk in clinical practice is low, its potential consequences justify caution and the education of the athlete regarding hydration, especially in competition conditions in a hot climate [18].

Sexual dysfunction, although rarely discussed in the context of sport, may constitute a significant problem affecting quality of life and therapeutic cooperation, and may sometimes lead to the discontinuation of treatment on the athlete's own initiative. Openly raising this issue during visits and, if necessary, modifying the treatment favoring the maintenance of therapy [19]. Withdrawal symptoms, in turn, which may occur with abrupt discontinuation of treatment, are an argument for the gradual ending of therapy under supervision and for the education of the athlete so that they do not discontinue the drug on their own – for example out of fear of doping control – which, as emphasized, is a relatively common and potentially harmful behavior in this population [8].

6.2. Effect on physical performance

The available data on the direct effect of SSRIs on physical performance are limited and ambiguous. Experimental studies in healthy individuals have not shown a consistent, significant deterioration of performance parameters after short-term administration of these drugs, although their methodology rarely reproduces the real conditions of competitive training [7]. There are indications that increased serotonergic activity may favor the development of central fatigue, which would theoretically worsen the capacity for prolonged exercise, but the clinical significance of this effect remains undetermined.

In clinical practice the view prevails that the benefits of treating depression considerably outweigh the potential, slight effect on performance, and that any adverse effects can be limited by the gradual introduction of the drug, appropriate monitoring and the selection of a preparation with the most favorable profile for the given athlete [8]. The individualization of

treatment and patient observation of the response remain key here, since the tolerance of individual SSRIs varies between individuals [16].

6.3. Differences between individual preparations

Although SSRIs are usually treated as a group with a similar mechanism of action, individual preparations differ in pharmacokinetic profile and tolerability, which has practical significance when selecting a drug for an athlete. Sertraline and escitalopram are characterized by a relatively favorable interaction profile and predictable pharmacokinetics, which makes them a frequent choice in this population [16,20]. Fluoxetine, owing to its long half-life, provides greater stability of concentration when a dose is missed, but at the same time hinders the rapid withdrawal of the drug in the event of adverse effects or the need to change therapy [20].

Paroxetine, owing to its stronger anticholinergic action, greater tendency to weight gain and more pronounced withdrawal symptoms, is considered less often in the athletic population. When selecting a specific preparation, therefore, account is taken not only of efficacy, but also of the profile of adverse effects relevant to the given discipline, the risk of interactions and the predictability of pharmacokinetics, which is of significance in the context of intense travel and a variable training rhythm. The decision should be made jointly with the athlete, after discussing the expected benefits and potential inconveniences [8].

7. Serotonin-noradrenaline reuptake inhibitors (SNRIs)

Serotonin-noradrenaline reuptake inhibitors, such as venlafaxine and duloxetine, constitute a therapeutic option especially in cases of depression coexisting with chronic pain or with an insufficient response to SSRIs. Their additional noradrenergic component, however, translates into a profile of adverse effects relevant to the competitive athlete [7]. For this reason, the choice of an SNRI requires consideration of the specificity of the discipline and the individual profile of the athlete.

The most important issue is the effect on the cardiovascular system. Venlafaxine, especially in higher doses, may cause an increase in arterial blood pressure and an acceleration of heart rate, which is significant in endurance disciplines, in which hemodynamic parameters during exercise are crucial. In athletes with a tendency to elevated blood pressure, regular monitoring is necessary, and sometimes a preference for drugs with weaker noradrenergic action or a return to SSRIs. Assessment of the circulatory system before and during treatment is an element of good practice in this group [8].

Noradrenergic stimulation is also associated with increased sweating and a potential effect on thermoregulation which – analogously to SSRIs – becomes significant during exercise in high ambient temperature. On the other hand, the activating component is sometimes beneficial in athletes in whom the picture of depression is dominated by slowing, anergia and excessive drowsiness. The decision on the choice of an SNRI should therefore take into account both the discipline and the individual symptom profile, and treatment requires close monitoring in the first weeks [8].

A separate issue is withdrawal symptoms, which in the case of some SNRIs, especially venlafaxine with its short half-life, may be pronounced and troublesome. In an athlete, missing a dose during a period of intense travel or competition may lead to unpleasant symptoms affecting well-being and disposition. For this reason, it is important to ensure the continuity of treatment, to educate the athlete regarding the regular taking of the drug and, if necessary, to plan any withdrawal in a gradual and controlled manner. Duloxetine, owing to its additional action on pain symptoms, is sometimes preferred in athletes with coexisting chronic pain syndromes, frequent in certain disciplines straining the locomotor system [21].

8. Bupropion

Bupropion occupies a special position in the context discussed. As a drug with a dopaminergic-noradrenergic mechanism, it differs pharmacologically from the other groups and is sometimes preferred owing to its neutral or favorable effect on body mass and the low risk of sexual dysfunction – two adverse effects particularly troublesome for athletes using other drugs. Its activating character may be an asset in athletes in whom anergia and anhedonia dominate, where sedation would be unfavorable.

Interest has grown around bupropion, however, resulting from the hypothesis of its ergogenic potential. The dopaminergic mechanism could theoretically delay the perception of fatigue and improve exercise capacity, especially under conditions of elevated temperature, through an effect on the central regulation of exercise and thermoregulation. Experimental studies have yielded ambiguous results: some works suggested an improvement in performance during exercise in hot surroundings, whereas under conditions of moderate temperature such an effect was not observed [22]. For this reason, this substance became the subject of particular attention by anti-doping organizations.

The regulatory status of bupropion remains a significant element of the therapeutic decision. This substance was placed in the monitoring program of the World Anti-Doping

Agency, which means the gathering of data on its use in sport without a formal ban [9]. Such a status does not limit the possibility of treatment, but requires the awareness of the clinician and transparency of management. Bupropion thus constitutes a good example of the tension between the effective treatment of depression and sporting regulations, and illustrates the need to follow the annual updates of the list of monitored and prohibited substances.

From a safety perspective, it is significant that bupropion lowers the seizure threshold, which requires caution in athletes with risk factors, including those with previous head injuries – relatively frequent in certain contact disciplines. This drug is also not indicated in persons with coexisting eating disorders, which in the athletic population, especially in disciplines with weight categories and aesthetic disciplines, occur more frequently than in the general one. These limitations, although they do not preclude the use of bupropion, emphasize the need for careful assessment of the history before its introduction and for vigilance during treatment. In an appropriately selected group of athletes, however, bupropion remains a valuable option, combining efficacy with a favorable profile regarding body mass and sexual function [8,23,24].

The case of bupropion well illustrates a broader regularity concerning the assessment of the ergogenic potential of psychotropic drugs. The results of studies on the effect of a substance on performance are sometimes strongly dependent on the conditions of the experiment – the ambient temperature, the type and intensity of exercise, the dose and the characteristics of the individuals studied. An effect observed under one set of conditions may not occur under another, which hinders the formulation of general conclusions and warns against the over-generalization of single observations. This variability is of significance not only scientific but also regulatory, since decisions on the classification of substances must take into account the complexity and ambiguity of the available data [8,9].

9. Tricyclic antidepressants (TCAs)

Tricyclic antidepressants, such as amitriptyline and imipramine, currently have limited application in the treatment of depression in athletes, giving way to drugs of newer generations. This is decided above all by their profile of adverse effects, less favorable in this population [7]. Their discussion, however, retains comparative and clinical value, since in selected situations these drugs are still used, and knowledge of their limitations allows a better appreciation of the advantages of newer preparations.

The most serious limitation is potential cardiotoxicity. TCAs affect conduction in the heart muscle and may prolong the QT interval, which in persons subjected to extreme loads on the

circulatory system constitutes a risk factor of significant clinical importance. In a competitive athlete, whose heart is in any case subject to structural and functional adaptations, this risk requires particular caution and close cardiological monitoring, including electrocardiographic examination before and during treatment.

Additionally, the anticholinergic action of these drugs impairs sweat secretion, disturbing thermoregulation – a mechanism particularly dangerous during exercise in high temperature, as it increases the risk of overheating of the organism. Sedative effects and the effect on body mass further limit the usefulness of TCAs in active athletes. In practice these drugs are considered only in selected situations, for example with the coexistence of certain pain syndromes or with the ineffectiveness of other groups, always under close supervision and after careful weighing of the balance of benefits and risks [8,23].

It should also be remembered that TCAs have a narrow therapeutic index and high toxicity in the event of overdose, which is of significant importance in patients with suicidal thoughts. In a population in which access to the drug and the potential risk of self-destructive behavior require particular attention, this is an additional argument in favor of preferring safer drugs of newer generations. For this reason, in most contemporary recommendations TCAs are not first- or second-line drugs in this population [25].

In summary, the role of tricyclic antidepressants in the treatment of depression in athletes is currently marginal and of a mainly reserve character. Their discussion, however, retains educational and comparative value: juxtaposing their profile with that of newer-generation drugs allows a better understanding of why the latter have become the standard of management, and emphasizes the significance of cardiovascular and thermoregulatory safety in a population subjected to extreme physical loads [8,16].

10. Mirtazapine, agomelatine and other drugs with a sleep-promoting profile

A separate group is constituted by drugs whose action on sleep and recovery may be a therapeutic argument in the athletic population. Sleep disturbances are a frequent element of the picture of depression, and at the same time sleep plays a key role in post-exercise recovery, the consolidation of training adaptations and hormonal regulation, which makes this aspect particularly significant in athletes. An improvement in sleep quality may therefore bring a benefit extending beyond the antidepressant action itself [8].

Mirtazapine, owing to its sleep-quality-improving action, is sometimes considered in athletes with insomnia coexisting with depression. Its main limitation, however, is a tendency

to increase appetite and body mass and intensified daytime drowsiness, which in many disciplines – especially those with weight categories or requiring early-morning training – constitutes a significant disadvantage. For this reason, its use is usually limited to selected cases in which sleep disturbances and weight loss dominate [23].

Agomelatine, acting on the melatonergic system, theoretically favors the regulation of the circadian rhythm without a typical effect on body mass, which could be beneficial especially in athletes frequently changing time zones. Data on its use in the athletic population are, however, very limited, and the need to monitor liver function constitutes an additional practical limitation. The common denominator of this group is the potential benefit resulting from the improvement of sleep, but studies are lacking assessing whether this theoretical advantage translates into a real improvement in results or training adaptation, which constitutes a clear research gap [26].

The significance of sleep in the athletic population is difficult to overestimate. Sleep plays a key role in muscle recovery, the consolidation of motor learning, hormonal regulation and cognitive functioning, and its deficiency is associated with deteriorating results, an increased risk of injury and worse mood. In this context, drugs improving sleep quality may theoretically bring a double benefit – antidepressant and recovery-related – but this benefit must be weighed against adverse effects, such as daytime drowsiness or weight gain, which in many disciplines are particularly undesirable [27,28].

It should also be emphasized that the improvement of sleep does not always require pharmacological intervention. Behavioral interventions concerning sleep hygiene, travel planning and the management of light exposure constitute the first line of management in the case of sleep disturbances in athletes and should be implemented regardless of any pharmacotherapy. The choice of a drug with a favorable profile of effect on sleep is therefore only one element of a broader strategy in which non-pharmacological methods play an equally important role [28].

11. The anti-doping context

The anti-doping dimension is an element distinguishing the pharmacotherapy of depression in competitive athletes from treatment in the general population and deserves a separate, systematic discussion. The vast majority of antidepressant drugs, including SSRIs, SNRIs and tricyclic antidepressants, do not appear on the list of prohibited substances and methods, which means that their use does not require a therapeutic use exemption and does not expose the

athlete to disciplinary consequences [9]. From a practical perspective, this is information of fundamental significance, since it removes one of the main psychological barriers standing before the initiation of treatment.

The situation becomes more complicated in the case of substances with potential ergogenic or stimulant action. Bupropion, as mentioned in the section devoted to it, was in the monitoring program, whose aim is the observation of patterns of use without the imposition of a ban. The clinician treating an athlete should know the current status of every prescribed drug, since the list is updated annually, and the transfer of a substance between categories is possible depending on the data gathered. The status from the previous season cannot automatically be treated as binding [9].

A practical consequence is the necessity of documenting treatment and maintaining transparency. In situations in which an indicated drug would be subject to restrictions, the therapeutic use exemption procedure applies, requiring appropriate medical justification and proper documentation. This procedure, although associated with additional administrative obligations, constitutes a route foreseen by the regulations enabling the use of the necessary treatment, and not an obstacle preventing therapy [9].

Awareness of the regulations should, however, never lead to the abandonment of effective treatment of depression – this state, untreated, constitutes a threat considerably more serious than formal procedural requirements. From a systemic perspective, it would be desirable to increase the availability of clear, updated information on the status of individual drugs, intended for physicians treating athletes, as well as the education of the athletes themselves. This would reduce the risk both of unwitting violations and of the unjustified abandonment of treatment resulting from a mistaken conviction about a ban [8,15].

12. Comparison of antidepressant drug classes in the sporting context

In order to synthetically summarize the discussed groups of drugs, a comparative table is presented below, capturing the features of individual classes most important from the perspective of the competitive athlete: the dominant mechanism of action, the key adverse effects relevant to performance and notes concerning anti-doping status. The summary is of an illustrative character and does not replace individual clinical assessment (Table 1.).

Class	Mechanism	Effects relevant to performance	Anti-doping status
SSRIs	Serotonin reuptake	Fatigue, sweating, body-mass changes, risk of hyponatraemia	Permitted
SNRIs	Serotonin and noradrenaline	Increased blood pressure and heart rate, sweating, thermoregulation	Permitted
Bupropion	Dopamine and noradrenaline	Activating action, possible effect on exercise in heat	Permitted; was monitored
TCAs	Multi-mechanism	Cardiotoxicity, thermoregulation disturbances, sedation	Permitted
Mirtazapine	Noradrenergic-serotonergic	Sleep improvement, increased appetite and body mass, drowsiness	Permitted

Table 1. Illustrative comparison of antidepressant drug classes relevant to the athletic population.

13. Interactions and practical aspects of conducting treatment

Conducting pharmacotherapy in a competitive athlete requires consideration of potential interactions with other substances frequently used in this population, including dietary supplements, analgesics and over-the-counter preparations. Some supplements, especially those containing components with stimulant or serotonergic action, may enter into unfavorable interactions with antidepressant drugs and, in extreme cases, increase the risk of serotonin syndrome.

A significant practical issue is the moment of initiating treatment in the context of the competition calendar. Since the antidepressant action develops gradually, and the initial phase of treatment may be associated with transient adverse effects, it is beneficial – if the clinical state permits – to begin therapy in the preparatory period rather than just before key competitions. Such a decision must, however, always yield priority to safety considerations: in

the case of severe depression, treatment should be implemented immediately, regardless of the competition calendar.

The risk of serotonin syndrome requires particular attention – a potentially dangerous state resulting from excessive serotonergic activity, which may occur when combining drugs with serotonergic action. In the athletic population this risk is sometimes increased by the simultaneous use of supplements, certain analgesics and over-the-counter preparations, not always reported by the athlete. For this reason, a thorough history concerning all substances taken and education regarding the risk of uncontrolled combination of preparations constitute an important element of treatment safety.

A separate practical aspect is the effect of drugs on the results of laboratory tests and the interpretation of the athlete's state by the medical staff. Some adverse effects, such as changes in body mass, sleep parameters or resting heart rate, may be erroneously attributed to training factors if the team is not aware of the treatment being conducted. For this reason, within the limits set by consent and confidentiality, appropriate communication within the medical team favors the correct interpretation of the observed changes and the safety of the athlete [8,15].

The model of care based on interdisciplinary cooperation is of key significance. The optimal management of an athlete with depression requires the coordination of the actions of the psychiatrist, sports medicine physician, psychologist and – with the athlete's consent – the coaching staff, while maintaining confidentiality and the patient's autonomy. The education of the athlete regarding the nature of the treatment, the expected course and potential adverse effects increase therapeutic cooperation and limits the risk of unauthorized discontinuation of treatment, which in this population is sometimes frequent out of fear about the effect on results [8,15].

13.1. A proposed management scheme

On the basis of the collected data, a general, illustrative management scheme can be proposed, which requires individualization in each case. In the first step it is necessary to carefully confirm the diagnosis and distinguish a depressive episode from overtraining syndrome, with an assessment of the severity of symptoms and of risk. In mild cases it is reasonable to consider psychotherapy as the first-choice method, with a modification of training loads and interventions concerning sleep.

In cases of moderate to severe intensity, or with the absence of a response to psychotherapy alone, the introduction of pharmacotherapy is indicated, usually beginning with an SSRI with

a favorable profile, such as sertraline or escitalopram. The choice of the specific drug should take into account the discipline, the symptom profile, the risk of particular adverse effects and the anti-doping status. In the absence of a response or with intolerance, a change of preparation within the group or a transition to another class is considered, depending on the dominant symptoms – for example bupropion with dominant anergia and the need to avoid weight gain, or an SNRI with coexisting pain.

At each stage the following are key: systematic monitoring of the response and of safety, education of the athlete, attention to the continuity of treatment and the planning of any changes in relation to the competition calendar. This scheme is of a framework character and in no case replaces individual clinical assessment and decisions made jointly with the athlete, respecting their autonomy and preferences. Its value lies in ordering the logic of management, and not in imposing a rigid algorithm.

15. Monitoring of treatment and its duration

The effective and safe conduct of pharmacotherapy requires systematic monitoring, whose scope in the athletic population is broader than in typical practice. Besides the standard assessment of the severity of depressive symptoms, the response to treatment and any suicidal thoughts, in an athlete it is purposeful to observe parameters relevant to performance and exercise safety, such as body mass and composition, arterial blood pressure and heart function, sleep quality and the subjective sensation of training fatigue. This allows the early detection of adverse effects that may affect training and the appropriate modification of treatment [8].

In the initial phase of treatment, usually comprising the first weeks, more frequent follow-up visits are recommended, since this is the period of greatest risk of adverse effects and, in some cases, of transient intensification of anxiety before the appearance of the therapeutic effect. Particular vigilance concerns younger athletes, in whom increased observation is required in this phase. The gradual increase of the dose and patient awaiting of the development of the full antidepressant action, which usually requires several weeks, are elements of good practice limiting the risk of prematurely deeming the treatment ineffective [25,29].

A significant issue is the duration of treatment. In accordance with the general principles of the therapy of depression, maintenance treatment after improvement is obtained should be continued for an appropriately long period in order to limit the risk of relapse, and the decision on its termination should be made gradually and in a controlled manner. In the athletic population, an additional factor is the planning of this process in relation to the competition

calendar, so that any fluctuations in the mental state associated with the modification of treatment do not coincide with the period of key competitions. Abrupt, unauthorized discontinuation of the drug, frequent out of fear about the effect on results, carries the risk of withdrawal symptoms and relapse, and therefore the education of the athlete in this regard is of particular significance [8,25].

Monitoring should also include an assessment of therapeutic cooperation and of any use of other substances, including supplements and over-the-counter drugs, which in this population are sometimes used commonly and not always reported spontaneously. Open, non-judgmental communication favors the disclosure of such information and allows the early identification of potential interactions. The whole monitoring process is best realized within coordinated care, with a clear division of roles between the psychiatrist and the sports medicine physician [8,15].

A helpful tool in monitoring the response to treatment is the systematic use of symptom severity rating scales, which allow the objectification of changes over time and the detection of both improvement and any deterioration. Regular, structured assessment reduces the risk of overlooking significant changes in the mental state, which in a population inclined to mask symptoms could remain unnoticed. The results of such assessments should, however, always be interpreted in the context of the holistic clinical picture, and not treated as an independent decision-making indicator [30].

Particular vigilance is required during the period of modification of treatment – whether increasing the dose, changing the drug or withdrawing it – since at these moments the risk of fluctuations in the mental state and of adverse effects is greatest. In the athletic population, an additional challenge is the reconciliation of these periods of increased risk with the requirements of the competition calendar and with the intense regime of travel and training. Careful planning of treatment changes, in advance and in cooperation with the athlete, allows the risk of an unfavorable coincidence to be limited and increases the safety of the whole therapeutic process [8,25].

17. Effects of Antidepressant Therapy on Sports Performance

Despite better understanding, the relationship between antidepressant therapy and sports performance remains a complex issue in sports medicine. Athletes represent a unique population in which pharmacological treatment of depression must be managed in a way that not only alleviates symptoms but also avoids impairing patients' physiological adaptation, recovery processes, motivation, cognitive function, and competitive performance. On the other

hand, abovementioned aspects can be negatively affected by the disease itself due to reduced motivation, impaired concentration, disturbed sleep, increased perception of fatigue, decreased training adherence, and impaired recovery following physical exertion [3,8]. Consequently, effective treatment of depressive symptoms in some cases may contribute to an athlete's overall well-being and, as a result improve consistency of training.

As previously mentioned, antidepressant therapy, particularly with SSRIs, represents one of the most commonly used pharmacological approaches in the treatment of depressive disorders ranging from moderate to severe that impact daily functioning. SSRIs such as sertraline, escitalopram, and fluoxetine are frequently preferred because of their favorable safety profile and relatively limited cardiovascular effects [17,25]. Current evidence suggests that SSRIs do not cause substantial reductions in maximal oxygen uptake ($\text{VO}_{2\text{max}}$), muscular strength, or endurance capacity in most individuals. However, the negative side effects of such drugs may vary, because of individual characteristics of the users, as well as the dosage they are being prescribed, duration of treatment, and the specific demands of the sport [8,31].

The initial phase of antidepressant treatment is considered one of the most crucial in terms of athletic performance, as in the beginning it can temporarily influence training quality. Common early side effects include fatigue, reduced energy, gastrointestinal symptoms, dizziness, sleep disturbances, and changes in motivation [17,25]. These symptoms may affect the ability to maintain high training loads and may be interpreted by athletes as a decline in performance. However, such effects are usually transient and often decrease after several weeks of treatment adaptation [25]. Importantly, untreated depression may have a substantially greater negative impact on performance than appropriately monitored pharmacological therapy [3,8]. Alterations in serotonin neurotransmission may influence perceived exertion, mood regulation, motivation, and tolerance to prolonged physical effort. Although theoretical concerns exist that serotonergic modulation could negatively affect endurance performance, available clinical data do not confirm a consistent impairment of athletic capacity associated with SSRI treatment [31]. In some athletes, improvement in mood, sleep quality, and psychological stability may indirectly enhance training adaptation and competitive readiness.

Serotonin–norepinephrine reuptake inhibitors (SNRIs), including venlafaxine and duloxetine, may provide additional therapeutic benefits, particularly in patients presenting with fatigue, low energy, or chronic pain symptoms. However, increased noradrenergic activity may influence cardiovascular responses, including possible elevations in heart rate and blood pressure, which should be considered in endurance athletes and individuals exposed to repeated

high-intensity exercise [17,32]. Monitoring of cardiovascular parameters may therefore be appropriate in selected cases [33].

The effects of antidepressants on body composition and metabolic factors may also be relevant for athletic performance. Some medications may contribute to weight gain, altered appetite, or sedation. Mirtazapine, for example, may improve sleep disturbances but is associated with increased appetite and body mass gain in some patients, which may negatively influence athletes participating in weight-class sports, endurance disciplines, or sports requiring strict body composition control [17]. Conversely, bupropion is characterized by a lower risk of weight gain and sedation, although its use requires consideration of individual medical factors and clinical indications [33].

Sleep represents another important mechanism through which antidepressant treatment may influence performance. Depression frequently disrupts sleep architecture, reduces recovery quality, and increases fatigue perception. Since adequate sleep is essential for neuromuscular recovery, hormonal regulation, cognitive function, and adaptation to training loads, successful treatment of depressive symptoms may indirectly improve athletic capacity [27,28,34]. Some antidepressants may improve sleep continuity, although excessive sedation may negatively affect daytime alertness and training readiness.

Recent literature specifically addressing antidepressant use in elite athletes emphasizes the need for individualized prescribing strategies. Current evidence remains limited, as randomized clinical trials evaluating antidepressant effects on elite athletic performance are scarce. Available data indicate that treatment decisions should consider the athlete's psychiatric condition, sport characteristics, competition schedule, adverse-effect profile, and personal response to medication [2,8,20]. The review published in *Quality in Sport* highlights that SSRIs are generally well tolerated but may affect fatigue and motivation in some athletes, while other antidepressant classes require careful consideration due to their side-effect profiles and potential influence on recovery and adaptation processes [20].

Overall, antidepressant therapy should not be viewed primarily as a potential limitation to athletic performance but as an intervention aimed at restoring mental health and functional capacity. When appropriately selected, monitored, and combined with psychological support, pharmacological treatment may allow athletes to return to stable training, improve recovery, and maintain competitive participation. The current evidence supports an individualized,

multidisciplinary approach involving psychiatrists, sports physicians, psychologists, and coaching staff [8,15].

18. Ethical and regulatory aspects

The treatment of depression in a competitive athlete is associated with specific ethical dilemmas, extending beyond the typical physician-patient relationship. On the one hand, the principle of respect for autonomy and confidentiality applies; on the other, the competitive sport environment is characterized by the presence of many stakeholders, including the coaching staff, sports organizations and sponsors, whose expectations may remain in tension with the good of the athlete. The treating physician must in these conditions unequivocally guard the interest of the patient.

Particular attention is required by the issue of the confidentiality of information about psychiatric treatment. The disclosure of such data without the athlete's consent may have serious consequences for their career and position, and therefore the maintenance of medical confidentiality has in this population a dimension not only legal but also protective. All forms of cooperation with the staff should take place with the informed consent of the athlete and within the scope accepted by them [9].

The regulatory dimension, discussed earlier in the anti-doping context, also has an ethical component. The necessity of taking into account the status of a substance should never lead to a situation in which the athlete remains without effective treatment owing to procedural concerns. In cases in which an indicated drug would be subject to restrictions, the appropriate route is the therapeutic use exemption procedure, and not the abandonment of treatment. The priority of the athlete's health constitutes here an overriding principle, to which sporting and formal considerations should be subordinated [9].

19. Screening and return to competition

The early detection of depression in the athletic population requires an active approach, since – as indicated earlier – the spontaneous reporting of symptoms is reduced by stigmatization and concerns about the career. For this reason, the inclusion of mental health assessment in the routine periodic examinations of athletes, on a par with the assessment of physical state, is increasingly postulated. Systematic screening, conducted with respect for privacy and confidentiality, may facilitate the identification of persons requiring in-depth diagnosis before the symptoms reach an intensity threatening health or career [3,8].

An effective screening program should fulfil several conditions. Firstly, it must be based on tools of confirmed reliability, preferably adapted to the specificity of the athletic population. Secondly, a positive screening result should trigger a clearly defined pathway of further management, comprising in-depth clinical assessment and, if necessary, referral to a specialist. Thirdly, the program must be embedded in an environment of trust, in which the athlete does not fear that the disclosure of symptoms will automatically entail negative sporting consequences. Without the fulfilment of this last condition, even the best screening tools will remain ineffective [1,8].

A separate, significant issue is the return to training and competition after a depressive episode. The decision on the return should be made individually, based on an assessment of the mental state, the response to treatment and the athlete's ability to cope with loads. A return that is too early, under the pressure of the competition calendar or the expectations of the surroundings, carries the risk of relapse and deterioration of state, whereas excessive and unjustified exclusion may deepen the sense of loss of identity and isolation. This requires a balanced approach and the constant cooperation of the medical team with the athlete [8,15].

In the process of return, the gradual increase of loads is helpful, with the ongoing monitoring of both physiological parameters and the mental state, and the maintenance of psychological support also after the formal return to competition. Such an approach, analogous to the gradual return protocol after physical injuries, treats mental health with the same care as somatic health and favors the durability of the improvement obtained. However, unified, evidence-based protocols for return to competition after a depressive episode are lacking, which constitutes another gap requiring completion [3,8].

20. Discussion and directions for future research

The collected data indicate a clear discrepancy between the clinical significance of depression in competitive athletes and the state of knowledge about its pharmacological treatment in this specific population. The choice of drug today rests predominantly on the extrapolation of data from the general population, supplemented by considerations concerning the profile of adverse effects relevant to performance and the anti-doping status. SSRIs remain a rational first choice, whereas the other groups find application in particular situations, each with its own set of benefits and limitations.

The most serious limitation of the available literature is the almost complete absence of randomized clinical trials conducted directly on competitive athletes. Most conclusions

concerning the effect of drugs on performance derive from studies in healthy individuals, not reflecting the realities of training and competition, or from expert opinions. The heterogeneity of disciplines, differences in physiological loads, the small size of this population and the ethical difficulties associated with conducting placebo-controlled studies in persons with depression further hinder the obtaining of data of high methodological quality [16].

Future studies should aim at assessing the effect of individual drugs on performance parameters under conditions close to real training, as well as at determining whether the benefits resulting from the improvement of sleep or mood translate into real training adaptation and sporting results. The development of dedicated guidelines taking into account the specificity of disciplines, special populations and the dynamically changing anti-doping regulations would also be valuable. Studies on the role of combined treatment, linking pharmacotherapy with psychotherapy and interventions concerning sleep and training loads, would moreover be valuable [15,35].

It is also worth noting that the development of methods for assessing mental health in sport, including screening tools adapted to the specificity of this population, could improve the early detection of depression and facilitate the making of therapeutic decisions. The integration of such tools with systems for monitoring training loads and recovery creates the possibility of a more holistic view of the athlete's state, in which mental health is treated on a par with physiological parameters. This direction, however, requires validation and caution, in order to avoid excessive medicalization and the violation of athletes' privacy [1,8].

From a broader perspective, the collected data emphasize that effective care for the mental health of athletes requires not only pharmacological knowledge, but also a cultural change in the sporting environment – a departure from stigmatization, the normalization of help-seeking and the building of trust between athletes and medical personnel. Pharmacotherapy, although it constitutes an important element of management, is only one of the components of the system of care, whose effectiveness depends equally on organizational, educational and cultural factors [3,8,15].

The design of future studies in this population encounters real methodological difficulties that are worth clearly naming. The small size and heterogeneity of the population of competitive athletes hinder the obtaining of adequate statistical power, and ethical considerations limit the possibility of conducting placebo-controlled studies in persons with an active depressive episode. A solution could be multicenter studies, observational registries

gathering data from clinical practice, and well-designed studies comparing individual treatment strategies in terms of both antidepressant efficacy and effect on parameters relevant to the athlete [3,8].

A valuable direction would also be the inclusion in studies of endpoints relevant from the perspective of the athlete themselves, such as quality of life, the capacity for training and competition, the subjective sense of recovery and the durability of the improvement obtained. Traditional studies usually focus on the reduction of depressive symptoms, whereas in the athletic population functional indicators, directly translating into the possibility of continuing a career, may be equally important. The inclusion of athletes in the process of defining relevant endpoints would increase the practical value of future studies and better respond to the real needs of this population [8,15].

21. Limitations of the review

The present work is of a narrative review character and is subject to the limitations resulting from this. No formalized procedure for the selection of works or quantitative synthesis of results was applied, which means that the choice and interpretation of sources may to some extent be burdened with subjectivity. A formal assessment of the risk of bias of individual studies was also not carried out, which limits the possibility of weighing the strength of the evidence.

An additional limitation is the very state of the available literature, in which works of low sample size, studies on non-athletic populations and expert opinions predominate. The antidoping status of substances was described on the basis of the applicable documents; however, owing to the annual updates of the list, it each time requires verification in the current version at the moment of making a clinical decision. The practical conclusions formulated in the work should therefore be treated as a framework for management, and not as rigid recommendations.

It should also be noted that the present review focuses on the pharmacotherapy of depression as the main subject of interest, which by assumption limits the scope of discussion of non-pharmacological methods and of other mental disorders coexisting in the athletic population, such as anxiety disorders, eating disorders or addictions. These disorders frequently coexist with depression and may modify both the clinical picture and the choice of treatment; however, their detailed discussion exceeds the framework of this work. The reader interested in these issues should be referred to studies devoted to them directly.

Finally, the dynamic development of knowledge in the area of mental health in sport means that some of the findings cited may with time require updating. This concerns both epidemiological data and anti-doping regulations and emerging new therapeutic options. The present review should therefore be treated as a reflection of the state of knowledge at the moment of its creation, constituting a point of departure for further, in-depth analysis, and not as a closed and definitive treatment of the subject.

22. Conclusions

Depression in competitive athletes is a clinically significant problem, often underestimated and requiring careful differential diagnosis, especially in relation to overtraining syndrome. The pharmacotherapy of this population should be individualized, taking into account the discipline, the profile of adverse effects relevant to performance, special populations and the current anti-doping status of the substances used.

Selective serotonin reuptake inhibitors remain the first-choice drugs owing to their favorable safety profile, whereas SNRIs, bupropion, TCAs and drugs with a sleep-promoting action find application in particular situations, each with its own set of benefits and limitations. The fundamental barrier remains the absence of dedicated clinical trials in the athletic population, which makes further work in this area an urgent need.

Effective treatment of depression should always remain a priority, and performance and regulatory considerations – an element of optimization, and not a reason for the abandonment of therapy. The model of care based on interdisciplinary cooperation, the education of the athlete and respect for their autonomy currently constitutes the best available response to the complexity of this problem, until the research gaps are filled by high-quality studies dedicated to this population.

From the perspective of clinical practice, several clear pointers emerge from the present review. Firstly, depression in an athlete should be actively recognized and distinguished from overtraining syndrome, without assuming a priori that the sporting environment protects against mood disorders. Secondly, the choice of drug should be individualized, with a preference for SSRIs with a favorable profile as first-choice treatment and the conscious use of other groups in particular situations. Thirdly, performance and anti-doping issues should be taken into account, but never at the expense of the efficacy of treating a state which, untreated, threatens the health and life of the athlete.

Ultimately, care for the mental health of athletes requires not only appropriate pharmacological decisions, but also a favorable environment in which help-seeking is the norm rather than a sign of weakness. Pharmacotherapy, although it constitutes an important tool, best fulfils its role as an element of a broader, integrated system of care. Further progress in this field will depend both on scientific research dedicated to the athletic population and on lasting cultural changes in the sporting environment itself.

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Author contributions.

Conceptualization: Maria Leśniak

Data curation: Maria Leśniak, Jan Poleszak, Dominika Wąsek, Kornelia Kuchta

Writing- original draft preparation: Maria Leśniak, Jan Poleszak, Dominika Wąsek, Kornelia Kuchta

Writing- review and editing: Maria Leśniak, Jan Poleszak, Dominika Wąsek, Kornelia Kuchta

Visualization: Maria Leśniak, Jan Poleszak, Dominika Wąsek, Kornelia Kuchta

Supervision: Maria Leśniak

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