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## A MULTIDISCIPLINARY APPROACH TO SEXUAL DYSFUNCTION IN FEMALE ATHLETES

### MULTIDISCIPLINARNI PRISTUP KOD SEKSUALNE DISFUNKCIJE ŽENA U SPORTU

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#### SUMMARY

Sexual dysfunction is registered as an ever increasing problem that occurs equally in men and women. In women who are actively involved in sports sexual dysfunction has so far not been sufficiently studied. In most cases, the problem of sexual dysfunction is more likely as age increases. Lack of interest in sexual relations and the inability to achieve orgasm in women, as well as premature ejaculation in men, are the most common sexual problems. Etiology of sexual dysfunction is complex and related to changes in the vascular, neurological, endocrine and muscular system. Types of sexual dysfunction in women include reduced sex drive, orgasmic disorders and painful intercourse. Female athletes can have all types of sexual dysfunctions, and alongside complex medical treatment, kinesiology-anthropological analyses and physiotherapy process should also be implemented, which would define the need, type and extent of therapeutic exercises as part of a multidisciplinary treatment.

*Key words: sexual dysfunction, female athletes, multidisciplinary approach*

#### SAŽETAK

Seksualna disfunkcija registrira se kao sve češći problem koji se podjednako javlja kod žena i muškaraca. U žena koje se aktivno bave sportom seksualna disfunkcija do sada je nedovoljno proučavana. U većini slučajeva, problem seksualne disfunkcije izraženiji je porastom životne dobi. Nedostatak interesa za seksualne odnose i nemogućnost postizanja orgazma u žena, te prerana ejakulacija u muškaraca, najčešći su seksualni problemi. Etiologija seksualne disfunkcije je kompleksna i povezana s promjenama na vaskularnom, neurološkom, endokrinom i mišićnom sustavu. Tipovi seksualne disfunkcije kod žena uključuju smanjenu seksualnu želju, poremećaje orgazma i bolne spolne odnose. Žene u sportu mogu imati sve tipove seksualne disfunkcije, a uz složenu liječničku obradu u toj je skupini potrebno provesti i kinantropološke analize uz fizioterapijski proces čime bi se definirala potreba, tip i opseg terapijskih vježbi kao dijela multidisciplinarnog liječenja.

*Ključne riječi: seksualna disfunkcija, žene u sportu, multidisciplinarni pristup*

## INTRODUCTION

Sexual dysfunction in women is a complex multifactorial problem that can significantly affect the quality of everyday life (36). A review of PubMed database showed that there are 27,000 papers which study the problem of sexual dysfunction in general. The aim of this paper is an overview of research in the field of sexual dysfunction in women in sports, that is, the number and types of sexual dysfunctions in female athletes, and whether sport influences the risk of developing a sexual dysfunction. The review of papers which include research in the field of sexual dysfunction associated with women in sports and by using keywords such as sexual dysfunction, sports, women, resulted in only 111 papers. When comparing sexual dysfunction according to gender, McCabe et al. (2015) included all studies on sexual dysfunction after 2009 related to the incidence and prevalence of sexual dysfunction in women and men and their importance in understanding the priorities for epidemiological and clinical research in this field.

There are more studies on the incidence of sexual dysfunction in men than in women and even more research on the prevalence of sexual dysfunction in women and men. The data show that the most common sexual dysfunctions are desire and arousal problems. In addition, there is a large number of women who have multiple sexual dysfunctions (34).

Sexual dysfunction is defined as the inability to participate in sexual relations, in a way and when the person wants, and specific diagnoses include disorders of sexual desire, sexual aversion, arousal, orgasm and painful intercourse which involves vaginismus and dyspareunia which have been analyzed as influenced by psychosexual aspects (APA 1987.; APA 1994) (2,3,) and classified as such since 1998, according to the American Foundation for Urologic Diseases (AFUD) (6).

Sexual dysfunction is also defined as a disorder of sexual functioning, including one or more phases of sexual response or pain during sexual activities (41). The complexity of the problem of sexual dysfunction affects women of all ages and is an often underestimated problem in today's community (19). The symptoms are associated with a variety of physiological and psychological changes resulting from different etiologies (15). Sexual dysfunction can be defined as a lifelong or acquired and situational dysfunction in particular circumstances (19).

For many women it is frustrating and influences the quality of life and interpersonal relationships (45). As such it was recently recognized as a complex issue where the symptoms are related to a variety of physiological changes resulting from many different etiologies, and not just psychological ones as was previously believed (33). Some authors say the reasons from which the problems of sexual dysfunction arise in women are to be found in dissatisfaction and not satisfying the emotional, personal and physical aspects of sexual experience (15,13), and which therefore make it a complex biopsychosocial problem (10).

In 1966 Masters and Johnson divided sexual response in four stages based on physiology (41). These stages include the excitement phase (physiological term that refers to the change in blood flow caused by vasodilation reflex in genital blood vessels), then the plateau phase (largest physiological arousal, achieved when the genital organs contain the maximum amount of blood), orgasm (rhythmic contraction of smooth muscles in and around the genitals) and resolution (period after the orgasm in which the muscles relax and the blood leaves the genitals).

In 1979 Helen Kaplan changed the Masters and Johnson's division by adding sexual desire, and not excitement, as the first phase of human sexual response (41). Her model includes three phases: desire (reflected in the interest in the sexual experience and there may be no significant changes in genital blood flow), followed by arousal and orgasm (follows Masters and Johnson's division) (44). Some of the phases can be excluded from normal sexual reactions which, if absent, constitute a form of sexual dysfunction.

A particularly vulnerable group are women with sexual dysfunction who play sports at a competitive level, especially professional sports. Thus far, not enough research on these health issues in female athletes has been conducted. François et al. conducted a first major systematic study back in 1973 on sexual evaluation of female athletes (18). Former research present multidisciplinary approaches to sexual dysfunction which include several experts in the field kinesiology-anthropological, gynecology, psychiatry, neurology, urology, physiotherapy etc. (17, 16,23,11)

## ETIOLOGY OF SEXUAL DYSFUNCTION IN WOMEN

The etiology of sexual dysfunction may be vasculogenic, neurogenic, hormonal, muscular and psychogenic (9). In vasculogenic etiology, clitoral and vaginal vascular insufficiency are syndromes related to decreased genital blood flow. Decreased blood flow to the pelvis due to atherosclerosis leads to fibrous vaginal wall and smooth clitoris. Finally, it results in vaginal dryness and dyspareunia. In addition to atherosclerosis, changes in estrogen levels associated with menopause may contribute to the changes in clitoral and vaginal area.

Various other conditions may result in a decrease in the vaginal and clitoral blood flow and in complaints about sexual dysfunction, and these are: traumatic injuries of the iliohypogastric or pudendal artery flow due to pelvis fractures, blunt trauma, surgical complications, chronic pressure on the perineal area during cycling, etc. In various neurogenic causes of sexual dysfunction such as spinal cord injury, diseases of the central or peripheral nervous system and injuries of the upper motor neurons in incomplete injuries there is no loss of the feeling of arousal and vaginal lubrication, but there are difficulties in achieving orgasm.

The dysfunction of the hypothalamus and pituitary gland, medical castration, menopause, amenorrhea and

chronic use of birth control pills, are the most common causes of female hormonal sexual dysfunction. A decline in estrogen and/or testosterone levels results in reduced sex drive, vaginal dryness and lack of sexual arousal.

The decline in estrogen levels may cause significant adverse effects on the structure and function of the vagina and clitoris as its normal levels maintain the integrity of the vaginal mucosa and have beneficial effects on vaginal sensitivity, vasocongestion and secretion. Furthermore, the lack of androgen in women is characterized by weakening of sexual function, loss of energy and negative effects on bone mass (9).

Kinesiology-anthropological analyses confirm the importance of the functional anatomy of the urogenital area for normal sexual function. The muscles of the pelvic floor, levator ani and perineal membrane, are involved in and are responsible for sexual function in women. Perineal membrane consists of bulbocavernosus and ischiocavernosus muscle, and when they voluntarily contract, sexual arousal and orgasm increase. In addition, they are responsible for involuntary rhythmic contractions during orgasm. Levator ani modulates motor responses during orgasm and it also modulates vaginal sensitivity. In hypertonus of those muscles vaginismus and dyspareunia can develop.

In hypertonia of the abovementioned muscles vaginismus, dyspareunia or other pain disorders may develop during sexual intercourse. In hipotonia of those muscles vaginal hypoesthesia, anorgasmia and urinary incontinence may develop during sexual intercourse or orgasm.

In women, the presence or absence of organic diseases, emotional or social problems, significantly affect sexual arousal. Problems such as self-esteem, body image and quality of the relationship with a partner can affect a woman's sexual ability. In addition, depression and other psychological and mood disorders, are related to female sexual dysfunction. Furthermore, the medicines used to treat depression affect sexual intercourse by reducing sex drive and arousal and more difficulty in achieving orgasm (9).

## SEXUAL DYSFUNCTION IN WOMEN

A good understanding of etiopathogenesis, structure and substance in normal sexual function, as well as the significance of changes that come with different age, help in proactive assessment of the issue and adequate approach to women with sexual dysfunction (45). Sexuality is a complex process coordinated by neurological, vascular and endocrine system. It also includes family, social and religious beliefs and it changes with age, health status and experience. Damage to any of these areas can result in sexual dysfunction (38).

The incidence of female sexual dysfunction increases with older age in most cases. Epidemiological data have shown that about 40-45% of adult women suffer from at least one sexual dysfunction (32).

Lauman et al. (2005) presented the results of their research on the prevalence of female sexual dysfunction on the global scale (31). They presented the incidence of sexual problems lasting two or more months. In most cases, the prevalence of sexual problems was higher in East and Southeast Asia than in other regions of the world. Lack of interest in sexual intercourse and the inability to achieve orgasm are the most common sexual problems worldwide, namely 26-43% of women complain about these problems.

Goldstein et al. (2006) reported on the incidence of female sexual dysfunction in the United States and Europe (22). As for the US, their research indicates that 5-22% of women have problems with sexual desire, 4-14% with sexual arousal, 5-16 % with orgasmic problems and 7-19% with painful intercourse. In Europe, even 10-20% of women complain about sexual desire, 6-17% of women have problems with sexual arousal, up to 19% of women have problems reaching orgasm, and 15-18% of women complained about painful intercourse.

## CLASSIFICATION OF SEXUAL DYSFUNCTION IN WOMEN

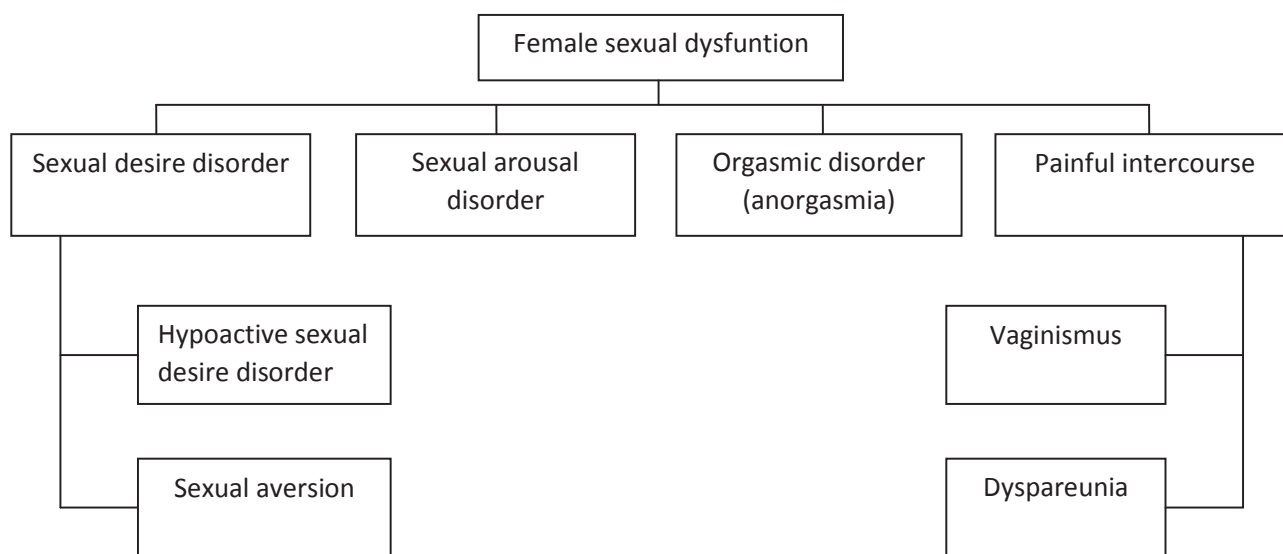
Classification of sexual dysfunction according AFUD (1998) refers to a disorder of sexual desire, sexual aversion disorder, sexual arousal disorder, orgasmic disorder and painful intercourse (Scheme 1) (6).

Hypoactive sexual desire disorder represents a spectrum of disorders which cause personal suffering due to permanent or recurring absence of sexual fantasies and thoughts and insensitivity to sexual activity. Medically induced menopause, depression and its treatment, endocrine disorders, are the most common causes that can disrupt a woman's hormonal balance, which ultimately results in hypoactive sexual desire disorder. Long-term conflicting relationships have also proved to have negative effects on sexual desire. Research has not shown a decrease in sexual desire associated with recreation and sports.

Sexual aversion disorder is related to persistent or recurring phobic aversion leading to avoidance of sexual contact. This is mainly an emotional or psychological problem that can occur due to physical and sexual abuse or childhood trauma and is not considered to be related to recreation or sports in women.

Sexual arousal disorder is a disorder in which it is impossible to achieve or sustain sexual arousal. Sexual arousal disorder can be perceived in the absence of subjective excitement, somatic response or genital secretion. Decreased sensation of the labia and clitoris and the lack of vaginal smooth muscle relaxation may lead to this disorder. Psychological factors also play an important role in the development of disorders of sexual arousal.

Orgasmic disorder (anorgasmia) is an orgasm disorder that manifests as a complete lack of orgasm or in having great difficulty achieving orgasm after sufficient sexual stimulation. It is divided into a primary and secondary anorgasmia. Primary anorgasmia includes women who



Scheme 1. Classification of sexual dysfunction in women  
(source: Fočić and Schuster, 2014.)

Shema 1. Klasifikacija seksualne disfunkcije kod žena  
(izvor: Fočić and Schuster, 2014.)

have never reached an orgasm, and the causes are emotional trauma or sexual abuse. Secondary anorgasmia includes women who were previously able to have an orgasm, and are now not able to. The reason for this is lack of hormones, surgical trauma or medications.

Painful sexual intercourse refers to two types of sexual pain disorders, and they are vaginismus and dyspareunia (4,11). International Classification of Diseases (ICD)-10 categorizes vaginismus as a “pain disorder” or “sexual dysfunction” comprising spasm of the pelvic floor muscles surrounding the vagina (30). In vaginismus there is involuntary contraction or spasm of the pelvic floor muscles which occurs when there is an attempt to insert an object like a tampon, penis or Pap smear speculum into the vagina. Such muscle contractions cause pain that can range from mild discomfort to unbearable pain. In dyspareunia there is pain during sex or immediately after in the area of sexual organs. The causes can be various acute and chronic diseases and conditions of the genitals. The pain can be induced due to stimulation of sexual organs during endometriosis, genital herpes or vestibulitis. Dyspareunia is also present in women with reduced vaginal secretion (41). Painful intercourse is a disorder that in a great way negatively affects sexual activity, and thus is the most common cause of sexual dysfunction (11).

## SEXUAL DYSFUNCTION IN FEMALE ATHLETES

Sexual dysfunction in female athletes has rarely been researched and studied. It mainly includes several studies conducted in the field of cycling, horseback riding and

running (37). Even though cycling can be both a recreational and professional activity, in some cases it can cause sexual dysfunction in women. Partin et al. (2014) examined the impact of cycling on the development of sexual dysfunction (37). Neurovascular damage which is caused by cycling arises due to the effect of pressure from the bicycle saddle on the pelvic floor. The pudendal nerve entrapment was first described in male cyclists as male genital and perineal paresthesia and hypoesthesia (28). Recent studies show that pudendal nerve injury is caused by nerve stretching during cycling which occurs between sacrospinous and sacrotuberous ligaments. It also causes nerve compression due to the saddle irritating the perineum and symphysis (14). There is the risk of the saddle causing changes to the pelvic floor in women, particularly the risk of developing urologic problems, which was researched by Carpes et al. (2009) (12).

In 2002, Baeyens et al. defined the term “bicyclists’ vulva” which is characterized by permanent, unilateral swelling of the labia majora, which is associated with professional female cyclists (7). The symptoms were more prominent after long training and were the result of impaired lymphatic flow in the genital area (20).

Anthropological analyses of female cyclists emphasize anatomically wider pelvis, lower center of gravity and greater thoracic tilt (7,42). Sauer et al. (2007) compared the anatomical position of women and men while riding a bicycle and found an averagely greater anterior tilt in women and a significant difference in saddle pressure distribution during seated cycling (42). Due to these functional differences special attention is given to the design and ergonomic adjustment of the saddles that can



cause changes in the functional biomechanics of body movement while cycling (40).

The study by Brugmann University Hospital in Brussels included 60 competitive female cyclists, analyzed the clinical problems and proved that 1 out of 6 cyclists has lymphedema. 70% of the cyclists had folliculitis and temporary numbness of the clitoris (26).

The first comparative study of women in sports has shown that in a group of women cyclists there is a decrease in genital sensation in the perineal area which was not present in women runners (24). In this study, none of the cyclists or runners suffered from any sexual dysfunction.

Munarriz et al. (2002) showed that the reaction of pudendal nerves may result from trauma while cycling (35). 77% of cycling injuries were caused by trauma to the pelvic floor on the longitudinal rod of the bicycle. An analysis of 26 women with sexual dysfunction with or without a history of blunt perineal trauma led to the conclusion that blunt perineal trauma leads to a decrease in genital sensation (35).

Alanee et al. (2009) analysed the risk factors for sexual dysfunction and urinary difficulties in recreational sports among the members of the equestrian and swimming clubs, accompanied by monitoring the data on cycling habits (1). Results showed no significant correlation between horse riding and symptoms of the lower urinary tract and sexual dysfunction in men, but in women the correlation between horse riding and stress urinary incontinence was established. Long term cycling and unadjusted saddle is related to an increase in the prevalence of symptoms of the lower urinary tract in women. Regular horse riding is not significantly related to an increase in the prevalence of lower urinary tract symptoms or sexual dysfunction, although it may be related to the reduction in the prevalence of stress urinary incontinence. Cycling may be associated with high prevalence of lower urinary tract symptoms in women (1).

Arnouk et al. (2009) studied the lack of sexual desire as the most common dysfunctional interference among women (5). However, the factors that affect sexual desire in women are rarely studied. Little is known about the specific patterns of brain activation and sexual interest or response even though the role of the brain in various aspects of sexual intercourse is significant and includes sensory, motivational and motor aspects of sexual intercourse.

Hermans et al. conducted a study on 350 women members of the Dutch Cyclist's Union and 350 members of the Association of Women Runners (25). The aim of the study was to determine the prevalence and duration of urogenital injuries and sexual dysfunction.

After two hours of cycling genital sensitivity increased and unilaterally and bilaterally swollen vulva was present in 35.1% of women. 18.4% of women who rode a bicycle had a change of sexual sensation, 12.8% reported difficulty in achieving orgasm. The study concludes that the urogenital injury and sexual problems are highly prevalent among women cyclists (25).

## DISCUSSION

Lack of research into the presence of sexual dysfunction in female athletes (different types according to the classification of sexual dysfunction) emphasizes the need for additional research. The impact of most sports on sexual dysfunction has still not been sufficiently studied, as well as the level of intensity of practicing these sports in terms of participation at professional level. Furthermore, there is a lack of papers in the field of recreation and sexual dysfunction which needs further investigation due to a large number of women engaged in recreational activities.

It all indicates to the fact that sexual function improves in women who are physically active in contrast to women who lead a sedentary lifestyle.

McCabe et al. (2016) included all studies on sexual dysfunction after 2009 which dealt with the incidence and prevalence of sexual dysfunction in women and men and their importance of understanding the priorities for epidemiological and clinical research in this field (34). There are more studies on the incidence and prevalence for men than for women, and even more research on the prevalence for women and men. Data show that the most common sexual dysfunction in women is the disorder of sexual desire and arousal. In addition, there is a large proportion of women who have multiple sexual dysfunctions. McCabe et al. (2016) concluded that the results of the research on sexual dysfunction are variable due to different research methodological approaches and that there is a need for future research which would include cultural differences (34).

Jamali et al. (2014) investigated the infertility and sexual dysfunction in the study including 502 women (27). The study showed high prevalence of sexual dysfunction in infertile women. What was also significant was the presence of a high BMI (body mass index), which may affect fertility. Although there is no documented research on sexual dysfunction in relation to infertility and sport according to previous research the impact of physical activity should be positive.

Braekken et al. (2015) conducted a randomized study of 50 women who had spent six months training pelvic floor muscles (PFMT) and 59 women who were a control group in order to determine whether strengthening the pelvic floor can improve sexual function (8). The results showed that sexual function can be improved with an increase in pelvic floor muscles endurance, which also supports the importance of preventive and clinical intervention forms of exercise.

There are no papers relating to research of sexual dysfunction in female athletes with disabilities. Plinta et al. (2015) conducted a study on Polish athletes who were persons with special needs (disabilities) (39). There was a statistically significant difference present in arousal and orgasm disorders which prevailed among women with disabilities who were not athletes (39). Results showed

that sport has a positive impact on the reduction of sexual dysfunction in women with disabilities, and has a favorable effect on sexuality in men and women with disabilities.

According to research so far, the highest risk of sexual dysfunction occurs in the period after giving birth. Kolberg et al. (2016) conducted a study on the effect of pelvic floor training on vaginal symptoms, dyspareunia and coital incontinence in primiparas who had a vaginal delivery and had problems with levator ani muscle (29). Results showed that the problems reduced in primiparas who underwent pelvic floor muscle training. However, there was no difference in the group of women who suffered from sexual dysfunction and had undergone or had not undergone any training.

Since research show that pelvic floor muscle training can improve the function of the pelvic floor (21) it is assumed that such improvements are possible in cases with reduced sexual dysfunction. However, it is necessary to examine the differences of influence by type of sexual dysfunction. As far as the research show, there is a correlation between weaker sensation in the pelvic floor and the weakness of the pelvic floor muscles. This affects the stimulation of the proprioceptors and thus possible sensation, and it also affects reduced sexual desire or arousal. In this case, the training of the pelvic floor muscles should be included in

the mandatory physical activity for women in general, and in order to control the pelvic floor it should also be included in the training process of athletes and during recreation as well.

Sexual dysfunction in women is a complex problem that has, according to Angel (2010), attracted a substantial interest of researchers in the last 15 years and has been distinguished as a multidisciplinary problem in which the symptoms are correlated with a variety of physiological changes resulting from a number of different etiologies (4). Women in sports have a reduced risk of developing a sexual dysfunction but sports such as cycling and horse riding present a risk, since they can be a potential trigger for the development of an urological disorder which is one of the risk factors for the incidence of sexual dysfunction.

## CONCLUSION

Sexual dysfunction is not well researched in women in sport and in women (43) with disabilities, or in women who take up sport recreationally. It takes a multidisciplinary approach to implement kinesiology-anthropological and physiotherapy analyses according to the type of sexual dysfunction based on standardized classification.

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