

Coital urinary incontinence and female sexual function

Ivan Radoja¹, Oliver Pavlović¹, Nikica Perić¹, Dunja Degmečić²

¹ Department of Urology, University Hospital Center Osijek, Osijek, Croatia

² Faculty of Medicine, Josip Juraj Strossmayer University of Osijek, University Department of Psychiatry, University Hospital Center Osijek, Osijek, Croatia

Corresponding author: Dunja Degmečić, MD, PhD – dunja.degmecec@mefos.hr

Abstract

Urinary incontinence (UI) is an everyday problem among a large proportion of adult women. The prevalence of UI ranges between 15% and 25% and the rate of incidence for each type of UI ranges between 10% and 58%. Because women are concerned about UI during sexual intercourse, it has a negative effect on female sexual health. The incidence of UI during sexual intercourse in incontinent women has been reported to range between 10% and 27%. The prevalence of female sexual dysfunction is estimated to be 43%. There are conservative and surgical methods of treating UI but the number of published scientific articles dealing with the assessment of the effects of these types of therapy on improving sexual health in women treated for UI is deficient.

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Introduction

The International Continence Society (ICS) terminology for lower urinary tract dysfunction (LUTD) from 2003, which can be divided into storage symptoms and voiding symptoms, defines urinary incontinence (UI) as a storage symptom and as the complaint of any involuntary loss of urine (1). UI can also be defined as the inability to control urination which is manifested in the range from temporary leakage of urine to complete involuntary voiding which can be seen as a social and hygienic problem (2, 3). The anatomical structures of the female reproductive and urinary system are closely related, which leads to the conclusion

that urinary problems interfere with sexual health in females (4). According to the current World Health Organization definition, sexual health is a state of physical, emotional, mental and social well-being in relation to sexuality, it is not merely the absence of disease, dysfunction or infirmity (5). The normal male sexual response cycle can be divided into libido, erection, ejaculation, orgasm and detumescence (6). Sexual response cycle in women can be divided into libido, arousal, orgasm and satisfaction (7). Damage of the integrity of the sexual response cycle, which is essential to human sexual functioning, may result in sexual dysfunction (8). Female sexual dysfunction has been characterized as a persistent, recurrent problem

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with sexual response, sexual desire, arousal, orgasm or dyspareunia and vaginismus that distresses the affected or strains the relationship with their partner (9). As reported by the International Urogynecological Association and the International Continence Society in 2010, incontinence during sexual intercourse or coital urinary incontinence (CUI) is defined as the complaint of involuntary loss of urine during coitus (10). The objective of this study was to review the available evidence on incidence, prevalence, pathophysiology and treatment of UI and coital urinary incontinence (CUI) with the attempt to determine the impact of UI and its physical and psychological consequences on women's sexual health and function in order to advise in a timely manner, prevent and treat disorders associated with bladder control issues.

Urinary incontinence – definition, etiopathogenesis, epidemiology

Women seldom visit general practitioners regarding incontinence problems which occur during or independently of the sex act, being that they are not familiar with the possibilities of treatment and mainly because a lot of women are ashamed to admit their "condition" unless they are precisely inquired by specialists or asked to "fill out" related questionnaires (11, 12). UI has a negative impact on sexual health irrespective of whether or not unwanted urine leakage occurs during sexual intercourse (4). UI products (e.g. incontinence pads, diapers) keep women dry but wearing them all day can cause chronic skin changes of the genital region which leads to discomfort and pain especially throughout sexual intercourse (13). Furthermore, worrying about urinary leakage and odor during intercourse can cause feelings of anger, sadness, embarrassment, despair and low self-esteem. Consequently, women abstain from having intercourse, which can cause reduction in the frequency of sexual relations, reduction of sexual desire and ability to achieve an orgasm. What's more, men no longer find their partner sexually attractive and some men even experience erectile dysfunction (14, 15). The pathophysiology and frequency of CUI and impact of CUI on quality of life are still not

conclusive because there is limited research data. UI is not a disease but a symptom that is caused by disorders of pelvic floor muscles, the urethral sphincter and bladder. UI is most commonly divided into 3 types: stress urinary incontinence (SUI) which is most prevalent (51%), urge urinary incontinence (UUI) (10%) and mixed urinary incontinence (MUI) (39%) (16). In women with SUI, involuntary urine leakage occurs during coughing, laughing, sneezing and other physical activities (e.g. exercise, lifting heavy objects, sexual intercourse). UUI is associated with an overwhelming urge to urinate that cannot be suppressed or delayed and is caused by detrusor overactivity. MUI is defined as the involuntary leakage of urine accompanied by a sense of urgency during physical exertion, exercise, sneezing or coughing. Urine loss during sexual activity may occur during arousal, penetration, orgasm, or resolution. Current research suggests that in women with SUI episodes of urine leakage are more likely to occur with penetration due to pressure on the bladder but in the case of UUI urine is more likely to leak during orgasm (17). In this fashion, we can determine two types of CUI: incontinence during penetration and incontinence at orgasm (17). Risk factors for the occurrence of UI are sex, age, cigarette smoking and high body mass index (BMI) (18). UI is three times more common in women than in men regardless of the type (19). The prevalence of UI increases with age and in women between 15 and 60, it ranges from 10 to 25% (20). In older age groups, the number of incontinent women is higher although the vast majority of older women have acceptable control over their urination. Among women aged 60 and over, prevalence of UI is 38% (21). The prevalence of female sexual dysfunction is estimated to be 43% and it increases with age (22). The incidence for each type of UI in females ranges between 10% and 58% depending on the observed population. It is generally accepted that the etiology of UI in women is associated with vaginal delivery, especially the first vaginal birth, menopause and surgical procedures in the pelvis and abdomen (23). The particular obstetric event that causes incontinence has not been found but it is most likely associated with newborns with an excessive birth weight and

difficult deliveries marked by prolonged pushing phases with or without instrumentation, which lead to nerve and muscle damage that provide a physiologic basis for this association (24). It is important to note that not all women who have had vaginal delivery experience symptoms of UI but they have more bothersome symptoms than women who have never had children. Hormone changes in menopause and surgical procedures can also affect muscle strength in the pelvic region. Cigarette smoking can induce chronic obstructive pulmonary disease with chronic cough that in time weakens the lower pelvic floor muscles and causes symptoms of SUI but on top of that, ingredients of cigarette smoke can cause urinary bladder mucous membrane irritation leading to urgency and UUI (25, 26). High BMI is a strong independent risk factor for UI and the mechanism of the onset of the disorder is that excessive body weight leads to an increase in intra-abdominal pressure which causes increased intravesical pressure, expanded mobility of the bladder neck and urethra, and also causes instability of the bladder detrusor, all leading to involuntary urine leakage (27). Menopause and partner status are important predictors for female sexual dysfunction (28).

Interrelation of urinary incontinence, emotional, mental and sexual health

UI has a negative impact on the quality of life of women, emotional health, physical and mental condition, impairs relationships, affects careers, and is also an additional financial burden (29, 30, 31). All incontinence types are associated with low self-esteem and a higher probability of psychiatric disease (32). The studies show higher levels of anxiety and psychological stress in women with UI (33). Nowadays women lead active lives and are trying to maintain a healthy body condition and normal sex life regardless of age. UI has been recognized as one of the predictors of female sexual dysfunction considering excessive acetylcholine release on the bladder during intercourse, increased intra-abdominal pressure with alteration of the urethrovesical angle and elevation of the bladder neck during intercourse, because of the

fact that squamous epithelium of the trigone and urethra becomes thin and blood flow decreases with reducing estrogen in older postmenopausal women and the function of the main pelvic floor muscles deteriorates with age (34, 35). Urine leakage during orgasm may be caused by involuntary detrusor contraction and relaxation of the urethra (36). Involuntary urine leakage during sex is mainly a female problem because when a man has an erection the internal sphincter at the base of his bladder closes so urine can't pass into urethra (37, 38). Between 25 and 50% of women with UI experience decreased libido and decreased frequency of sexual activity because of the shame and fear of incontinence (39, 40). The incidence of UI during sexual intercourse in incontinent women has been reported to range between 10% and 27% (41). Recent studies reported high prevalence of CUI with results between 60% and 67% (42). The Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ) and its short form version PISQ-12 are validated condition-specific female sexual function questionnaires purposively developed to assess sexual function in women with UI and/or pelvic organ prolapse (43, 44). Patients with a MUI diagnosis had significantly lower mean PISQ-12 scores than the ones with SUI and UUI, and patients with SUI had significantly lower PISQ-12 scores than those with UUI (45). On the other hand, one study showed that among sexually active women with UI, sexual function as assessed by the PISQ-12 does not differ according to type of incontinence (46). The result of one study was similar to most other research and actually established that the rate of overall female sexual dysfunction in women with UUI was higher than in those with SUI, that CUI was more frequent in women with UUI than in those with SUI, but that feelings of pain and impressions of more involuntary urine leakage during sexual intercourse were more common in women with SUI than in those with UUI (40). Some researchers have found that CUI was present to a greater degree in young women than in elderly women and more frequent in women younger than 60 years of age (40, 47). In one study, 80% of women had incontinence during penetration, 93% had incontinence at orgasm and 92% had

incontinence in both cases, indicating CUI as a common symptom during sexual activity in women with SUI and suggesting urethral dysfunction as the possible explanation of CUI (11). Maximal urethral closure pressure < 30 cmH₂O was associated with CUI pointing out that urethral function plays a vital role in maintaining continence during coitus (48). In another report, 46% of women had UUI which led to the termination of sexual activity without orgasm and the rate of female sexual dysfunction was detected to be higher in women with UUI compared to that in the general population (49). Gynecologists and urologists need to pay more attention to sexual dysfunction in women with UI in their clinical practice. Additionally, one important thing to take into account is detailed medical history and sexual history of the occurring disorders during intercourse.

Treatment options

Once inflammation or anatomical disorders of the urinary system, neurological disease or cancer are ruled out, the following conservative and surgical treatment methods are available, most of which are scientifically proven with a high level of evidence and explained in the 2017 European Association of Urology guidelines: open communication with one's sexual partner, counseling with a therapist who specializes in sexual and relationship problems, bladder training, urinating prior to sexual intercourse, deferring intercourse, interrupting intercourse prematurely, avoiding certain positions, hurrying through sex, avoiding orgasm, regular physical activity and weight loss, smoking cessation, exercises to strengthen pelvic muscles, drug therapy (anticholinergics and β_3 -agonist), periurethral bulking agents, intravesical Onabotulinumtoxin A injections, midurethral synthetic sling insertion, colposuspension and pubovaginal slings (50, 51, 52, 53, 54). The success rate is around 51% to 91% depending on the method, definition of cure and follow-up of every patient (55). In most cases, women try to perform the exercises of the pelvic floor on their own, in the comfort of their home, but without much success because they're not doing the

exercises correctly. The efficiency of exercises can be increased if women exercise together with a specialized pelvic floor therapist. Oral anticholinergics and β_3 -agonists are the mainstay of pharmacological treatment, but they have side effects leading to a high discontinuation rate. It has been observed that in 60% of cases anticholinergic therapy leads to improvement of disorders during intercourse in women with UI (56, 57). Intradetrusor injection of 100 units of Onabotulinumtoxin A significantly decreased the daily frequency of UI with clinically relevant improvement of symptoms and health related quality of life in patients inadequately treated with anticholinergics (58, 59). The midurethral synthetic sling insertion has become the "gold standard" of surgical treatment of SUI (60). In women who do not wish to have surgery or in whom surgical options are restricted (e.g. after irradiation), bulking agents should be considered as an alternative strategy because they are a minimally invasive approach to treat SUI (61). Their use should not be proposed as first-line treatment in women seeking a permanent cure for both primary and recurrent SUI (61).

Conclusion

UI is associated with a profound sense of humiliation and it is subject to social stigma and prejudices (4). UI and incontinence during sexual intercourse is still a taboo subject and many women feel uncomfortable talking openly about it. According to some estimates only 20% of women with UI seek help because of the problems that arise during sexual intercourse. There are many methods women can use to reduce the possibility of uncontrolled leakage during sex while working on a durable solution. It isn't an easy topic to discuss with one's sexual partner but the talk is necessary if the outcome is returning to the previous pleasurable sexual life. The treatment of UI and incontinence during sexual intercourse requires multidisciplinary teamwork and cooperation among specialists, sexual partners and society. Conservative and surgical treatment of UI, irrespective of the type, can improve quality of life and enhance

sexuality, but for more distinct conclusion further studies are needed.

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References

- Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, van Kerrebroeck P, Victor A, Wein A; Standardisation Sub-committee of the International Continence Society.. The standardization of terminology of lower urinary tract function: report from the standardization sub-committee of the international continence society. *Neurourol Urodyn* 2002;21(2):167-78.
- Blaivas JG, Appell RA, Fantl JA, Leach G, McGuire EJ, Resnick NM, Raz S, Wein AJ.. Definition and classification of urinary incontinence: Recommendations of the Urodynamic Society. *Neurourol Urodyn* 1997;16: 149-151.
- Abrams P, Andersson KE, Birder L, Brubaker L, Cardozo L, Chapple C, Cottenden A, Davila W, de Ridder D, Dmochowski R, Drake M, Dubeau C, Fry C, Hanno P, Smith JH, Herschorn S, Hosker G, Kelleher C, Koelbl H, Khoury S, Madoff R, Milsom I, Moore K, Newman D, Nitti V, Norton C, Nygaard I, Payne C, Smith A, Staskin D, Tekgul S, Thuroff J, Tubaro A, Vodusek D, Wein A, Wyndaele JJ; Members of Committees; Fourth International Consultation on Incontinence. Evaluation and treatment of urinary incontinence, pelvic organ prolapse, and fecal incontinence. *Neurourol Urodyn* 2010;29(1):213-240.
- Mota RL. Female urinary incontinence and sexuality. *Int Braz J Urol* 2017;43(1):20-28.
- World Health Organization, Department of Reproductive Health and Research. Report of a technical consultation on sexual health, 28-31 January 2002, Geneva.
- Kandeel FR, Koussa VK, Swerdloff RS. Male sexual function and its disorders: physiology, pathophysiology, clinical investigation, and treatment. *Endocr Rev* 2001;22:342-88.
- Derogatis LR, Burnett AL. The epidemiology of sexual dysfunctions. *J Sex Med* 2008;5:289-300.
- Ho CC, Singam P, Hong GE, Zainuddin ZM. Male sexual dysfunction in Asia. *Asian J Androl* 2011;13: 537-42.
- Lewis RW, Fugl-Meyer KS, Bosch R, Fugl-Meyer AR, Laumann EO, Lizza E, Martin-Morales A. Epidemiology/risk factors of sexual dysfunction. *J Sex Med* 2004;1:35-39.
- Haylen BT, de Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN.. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Int Urogynecol J* 2010;21:5-26.
- Moran PA, Dwyer PL, Ziccone SP. Urinary leakage during coitus in women. *J Obstet Gynaecol.* 1999;19:286-288.
- Moreira ED Jr, Brock G, Glasser DB, Nicolosi A, Laumann EO, Paik A, Wang T, Gingell C; GSSAB Investigators' Group. Help-seeking behaviour for sexual problems: the global study of sexual attitudes and behaviors. *Int J Clin Pract* 2005;59(1):6-16.
- Whitehead F, Giampieri S, Graham T, Grocott P. Identifying, managing and preventing skin maceration: a rapid review of the clinical evidence. *J Wound Care.* 2017 Apr 2; 26(4):159-165.
- Madhu C, Hashim H, Enki D, Yaasin M, Drake M. Coital incontinence: what can we learn from urodynamic assessment? *Urology.* 2015; 85:1034-1038.
- Keles MO, Caliskan S, Gokce AM, Gunes M. Assessment of sexual functions in partners of women with complaints of urinary

- incontinence. *Int Braz J Urol* 2016; 42(5):999-1004.
16. Correia S, Dinis P, Lunet N. Urinary Incontinence and Overactive Bladder Syndrome. *Arq Med* 2009; 23:13-21
 17. Hilton P. Urinary incontinence during sexual intercourse: a common, but rarely volunteered symptom. *BJOG* 1988; 95:377-381.
 18. Luber KM. The Definition, Prevalence, and Risk Factors for Stress Urinary Incontinence. *Rev Urol* 2004; 6(Suppl 3): S3-S9.
 19. Markland AD, Richter HE, Fwu C-W, Eggers P, Kusek JW. Prevalence and Trends of Urinary Incontinence in Adults in the United States, 2001 to 2008. *J Urol* 2011 Aug; 186(2): 589-593.
 20. Thomas TM, Plymat KR, Blannin J, Meade TW. Prevalence of urinary incontinence. *Br Med J* 1980; 281: 1243-1248.
 21. Diokno AC, Brock BM, Brown MB, Herzog AR.. Prevalence of urinary incontinence and other urological symptoms in the noninstitutionalised elderly. *J Urol* 1986; 136:1022-1025.
 22. Simons J, Carey MP. Prevalence of Sexual Dysfunctions: Results from a Decade of Research. *Arch Sex Behav.* 2001; 30(2):177-219.
 23. Thom DH, Brown JS. Reproductive and hormonal risk factors for urinary incontinence in later life: a review of the clinical and epidemiologic literature. *J Am Geriatr Soc* 1998; 46(11):1411-7.
 24. Brubaker L. Postpartum urinary incontinence: The problem is clear, but there is no simple solution. *BMJ* 2002; 324(7348):1227-1228.
 25. Bump RC, McClish DK. Cigarette smoking and urinary incontinence in women. *Am J Obstet Gynecol* 1992; 167(5):1213-8.
 26. Tampakoudis P, Tantanassis T, Grimbizis G, Papaletsos M, Mantalenakis S. Cigarette smoking and urinary incontinence in women - a new calculative method of estimating the exposure to smoke. *Eur J Obstet Gynecol Reprod Biol* 1995; 63(1):27-30.
 27. Subak LL, Richter HE, Hunskaar S. Obesity and Urinary Incontinence: Epidemiology and Clinical Research Update. *J Urol* 2009; 182(6 Suppl):S2-S7.
 28. Patel AS, O'Leary ML, Stein RJ, Leng WW, Chancellor MB, Patel SG, Borello France D. The relationship between overactive bladder and sexual activity in women. *Int Braz J Urol* 2006; 32:77-87.
 29. Ozkan S, Ogce F, Cakir D. Quality of life and sexual function of women with urinary incontinence. *Jpn J Nurs Sci* 2011; 8:11-9.
 30. Coyne KS, Wein A, Nicholson S, Kvasz M, Chen CI, Milsom I.. Economic burden of urgency urinary incontinence in the United States: a systematic review. *J Manag Care Pharm* 2014; 20:130-140.
 31. Corcos J, Beaulieu S, Donovan J, Naughton M, Gotoh M. Quality assessment in men and women with urinary incontinence. *J Urol* 2002; 168(3):896-905.
 32. Sinclair AJ, Ramsay IM. Review The psychosocial impact of urinary incontinence in women. *Obstet Gynaecol* 2011; 13:143-148.
 33. Asoglu MR, Selcuk S, Cam C, Cogendez E, Karateke A. Effects of urinary incontinence subtypes on women's quality of life (including sexual life) and psychosocial state. *Eur J Obstet Gynecol Reprod Biol* 2014; 176:187-90.
 34. Lewis RW, Fugl-Meyer KS, Bosch R, Fugl-Meyer AR, Laumann EO, Lizza E, Martin-Morales A. Epidemiology/risk factors of sexual dysfunction. *J Seks Med* 2004; 1:35-39.
 35. Castagna G, Montorsi F, Salonia A. Sexual and bladder comorbidity in women. *Handb Clin Neurol* 2015; 130:165-176.

36. Khan Z, Bhola A, Starer P. Urinary incontinence during orgasm. *Urology* 1988; 31:279–282.
37. Brooks JD, Chao WM, Kerr J. Male pelvic anatomy reconstructed from the visible human data set. *J Urol* 1998; 159(3):868–72.
38. Strasser H, Klima G, Poisel S, Horninger W, Bartsch G. Anatomy and innervation of the rhabdosphincter of the male urethra. *Prostate* 1996; 28(1):24–31
39. Kim YH, Seo JT, Yoon H. The effect of overactive bladder syndrome on the sexual quality of life in Korean young and middle-aged women. *Int J Impot Res* 2005; 17:158–163.
40. Oh SJ, Ku JH, Choo MS, Yun JM, Kim DY, Park WH. Health-related quality of life and sexual function in women with stress urinary incontinence and overactive bladder. *Int J Urol* 2008; 15:62–67
41. Serati M, Salvatore S, Uccella S, Nappi RE, Bolis P. Female urinary incontinence during intercourse: a review on an understudied problem for women's sexuality. *J Sex Med* 2009; 6:40–48.
42. Jha S, Strelley K, Radley S. Incontinence during intercourse: myths unraveled. *Int Urogynecol J* 2012; 23:633–637.
43. Rogers RG, Kammerer-Doak D, Villarreal A, Coates K, Qualls C. A new instrument to measure sexual function in women with urinary incontinence and pelvic organ prolapse. *Am J Obstet Gynecol.* 2001; 184:552–558.
44. Rogers RG, Coates KW, Kammerer-Doak D, Khalsa S, Qualls C. A short form of the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12). *Int Urogynecol J Pelvic Floor Dysfunct.* 2003; 14(3):164–168.
45. Coksuer H, Ercan CM, Haliloğlu B, Yucel M, Cam C, Kabaca C, Karateke A. Does urinary incontinence subtype affect sexual function? *Eur J Obstet Gynecol Reprod Biol* 2011;159(1):213–7.
46. Urwitz-Lane R, Ozel B. Sexual function in women with urodynamic stress incontinence, detrusor overactivity, and mixed urinary incontinence. *Am J Obstet Gynecol.* 2006 ; 195(6):1758–61.
47. Gordon D, Groutz A, Sinai T, Wiezman A, Lessing JB, David MP, Aizenberg D. Sexual function in women attending a urogynecology clinic. *Int Urogynecol J Pelvic Floor Dysfunct* 1999; 10:325–328.
48. Lau H-H, Huang W-C, Su T-H. Urinary leakage during sexual intercourse among women with incontinence: Incidence and risk factors. Coppola D, ed. *PLoS ONE.* 2017;12(5):e0177075.
49. Salonia A, Zanni G, Nappi RE, Briganti A, Dehò F, Fabbri F, Colombo R, Guazzoni G, Di Girolamo V, Rigatti P, Montorsi F. Sexual dysfunction is common in women with lower urinary tract symptoms and urinary incontinence: results of a cross-sectional study. *Eur Urol* 2004; 45:642- 648.
50. Kizilkaya Beji N, Yalcin O, Ayyildiz EH, Kayir A. Effect of urinary leakage on sexual function during sexual intercourse. *Urol Int* 2005; 74(3):250–255.
51. Roos AM, Thakar R, Sultan AH, Burger CW, Paulus AT. Pelvic floor dysfunction: women's sexual concerns unraveled. *J Sex Med* 2014; 11(3):743–752.
52. Burkhard FC, Lucas MG, Berghmans LC, et al. Guidelines on Urinary Incontinence. EAU Guidel Ed. Present 30th EAU Congr Madrid. 2016.
53. Grewar H, McLean L. The integrated continence system: a manual therapy approach to the treatment of stress urinary incontinence. *Man Ther.* 2008; 13:375–86.
54. Wood LN, Anger JT. Urinary incontinence in women. *BMJ Br Med J.* 2014; 349:1-11.
55. Barber MD, Dowsett SA, Mullen KJ, Viktrup L. The impact of stress urinary incontinence *Southeastern European Medical Journal,* 2017; 1(2)

- on sexual activity in women. *Cleve Clin J Med.* 2005; 72:225-32.
56. Mamik MM, Rogers RG, Qualls CR, Morrow JD. The minimum important difference for the Pelvic Organ Prolapse-Urinary Incontinence Sexual Function Questionnaire. *Int Urogynecol J* 2014; 25:1321-1326.
57. Rogers RG, Bachmann G, Scarpero H, Jumadilova Z, Sun F, Morrow JD, Guan Z, Bavendam T. Effects of tolterodine ER on patient-reported outcomes in sexually active women with overactive bladder and urgency urinary incontinence. *Curr Med Res Opin* 2009; 25:2159-2165.
58. Nitti VW, Dmochowski R, Herschorn S, Sand P, Thompson C, Nardo C, Yan X, Haag-Molkenteller C; EMBARK Study Group. OnabotulinumtoxinA for the treatment of patients with overactive bladder and urinary incontinence: results of a phase 3, randomized, placebo controlled trial. *J Urol* 2013; 189(6):2186-93.
59. López Ramos H, Torres Castellanos L, Ponce Esparza I, Jaramillo A, Rodríguez A, Moreno Bencardino C. Management of Overactive Bladder With OnabotulinumtoxinA: Systematic Review and Meta-analysis. *Urology* 2017;100:53-58.
60. Bailly GG, Carlson K. The pubovaginal sling: Reintroducing an old friend. *Can Urol Assoc J* 2017; 11(6Suppl2):S147-S151.
61. Leone Roberti Maggiore U, Bogani G, Meschia M, Sorice P, Braga A, Salvatore S, Ghezzi F, Serati M. Urethral bulking agents versus other surgical procedures for the treatment of female stress urinary incontinence: a systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol* 2015; 189:48-54.