REVIEW ARTICLE
Journal of Andrological Sciences 2008;15:130-134

Stilettos, schizophrenia and sexuality

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Summary

Objective. In the collective imaginarium there is a close relationship between high heel shoes and sexuality but it is not clear whether or not this statement is based on scientific evidence or it comes from the common idea that all women that dress up can look sexy. Certainly in the collective imaginarium heeled footwear are not related to schizophrenia, although a medical hypothesis suggested this kind of relationship, alarming generation of women who usually wear heeled footwear, self-sentenced to complain of this severe mental disorder. On the other hand sexual functioning has received little attention as an important aspect of patient care for those suffering from schizophrenia. We tried to define possible relationships between stilettos, schizophrenia and female sexuality.

Materials and methods. We performed a review of published in scientific journals and literature using as key words "sexuality", "schizophrenia", "footwear" and similar words. We widened our search using also articles not retrieved by our search, but quoted by retrieved papers.

Results. With a multiple keyword search we found only a letter concerning this intrigating issue. Only the already mentioned paper took into account a possible relationship between schizophrenia and heeled footwear. Several studies aimed at investigating female sexuality and sexual dysfunction in women with and without mental disorders such as schizophrenia. An increasing interest in female sexuality emerged and women are trying to recover their own sexual independence becoming from sexual subject to object, striving to conquer the equality in sex matter, respecting partners expectation as well.

Conclusions. Sexual wellbeing is one of the most complex parts of women life, being dynamic and multidimensional, and including biologic, psychological, socioeconomic, and spiritual components. In this holistic view, also little changes in initial parameters concerning apparently anatomically distant areas might lead to considerable and unexpected events, thus explaining possible relationship between foot, schizophrenia, and sexuality.

Keywords
Schizophrenia • Sexuality

"*… all women that dress up can look sexy, so ladies do your thing please!*" (SKG, Amsterdam, Netherlands)
"*See how many heads turn when an average looking woman walks by a group of men when wearing flats. Try the same thing with a woman wearing 5-inch spikes … Her self-esteem will surely increase with the added height*" (Steve, Rossville, Georgia, USA)
"*Hot women with fetching limbs in stiletto heels certainly enhance my sense of well-being*" (Tony, Royal Oak, USA)

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All the above mentioned comments on Roger Dobson's article published in the Sunday Times (February 3, 2008) entitled "*Stilettos take women's sex life to higher level*", underline once again the strict relationship between high heel shoes and sexuality in the *collective imaginarium*. Probably many women like heeled shoes because, although sometimes uncomfortable, try to appear more slender and taller, also gaining male approval. History taught us that male plaudit concerning female sexuality has been extremely important for the collective imaginarium, often without taking into account what really women asked and wanted. As a matter of fact, until the recent recognition of female sexual dysfunction (FSD) as a unique physiological and psychosocial complex, historical information and data for sexual-active women have taken the form of anecdotal evidence collected incidentally to research of male sexuality, extrapolated into a compendium of partner-related maladjustments [1]. We have to wait until 1974 to have initial scientific constructs (such as social environment, personal knowledge, past experience, and current expectations all influencing satisfactory sexual functioning) able to validate female sexuality as an independent, as well as an interdependent, system [1 2]. For the first time women were offered the hope that someone, somewhere, believed that equality in all matters finally included sex [2]. As stressed by Bean in 2002 [1], defining a role for the women in a sexual relationship is not difficult and can no longer be hidden by the guise of complexity: actually the difficulty was, and continues to be, in striving to characterize and classify the expressions of female sexuality. In 2008 all women, even separated by generation, education, and occupation, are clamouring at the same time for independence and knowledge and believe that the progression of women's sexuality from subject to object is at hand [1]. Therefore, women have to take back all emblems labelled by the male collective imaginarium as "female sexual symbols", revising them according to their own sexual wellbeing. This aspect of female quality of life is strictly related to pelvic floor wellbeing. Pelvic floor is an anatomical structure, characterized by muscles, fasciae, and nerve fibres, whose role is fundamental in order to maintain a correct upright standing, avoiding a falling down of abdominal viscera. But it is also an opening for life (childbirth), death (urine and faeces expulsion; violence; sexual transmitted diseases; HIV), and pleasure (intercourse). Nevertheless, female sexuality and, on the other hand, any possible "*dissatisfaction with the female's self perception of sexuality*" [1] may not be confined to the genital area alone, but have to be inserted within an holistic view of the feminine being, with its own manifold interrelations. This may explain why women's sexuality can be altered, temporarily or permanently, by acute or chronic illnesses. These latter often plays a much greater part in affecting women's sexuality. Women worry about the changes in their bodies, fulfilling their relationships, and meeting the needs of their partner and family, as well as about having to communicate about their sexual needs and desires in ways they did not have to previous to their illness [3]. Chronic health gynaecologic (endometriosis or premenstrual syndrome) and non gynaecologic (diabetes, hypertension, chronic obstructive pulmonary disease, arthritis, several forms of cancers) diseases may affect sexuality, as well as mental health problems. Acute mental distress related to loss, death, or other situations may cause a temporary alteration in women's sexual functioning. Women with developmental delays or mental retardation have sexual desires and are able to engage in sexual activities. Typically, it is their families or guardians who try to limit sexual expression in these women, believing that they will be abused, that they cannot participate fully so should not be sexual at all, or that they will become pregnant [4]. Serious and chronic mental health problems, such as depression, schizophrenia, and bipolar disease, may have persistent negative sexual consequences [5], and, although therapies may cure the health problem, many treatments may also cause sexual problems, during the therapy or permanently. Actually, many medications and drugs [such as antipsychotics, antidepressants, and selective serotonin uptake inhibitors (SSRIs)] may alter sexuality in women, decreasing sexual desire, vaginal lubrication, and orgasm. Moreover, sexuality is an important life issue in people with severe mental disorders such as schizophrenia, but too little is still known about the natural history of sexual functioning in these people, mainly for two reasons: reluctance from psychiatric staff members to discuss sexual concerns with patients [6-9]; literature reports focusing on sexual functioning evaluated people only during treatment with conventional antipsychotics [10]. It is striking how little attention has been paid to the area of sexual functioning and schizophrenia. Patients with schizophrenia are open to discussing sexual issues, and more than 75% of those with severe mental illness believe that discussing sexual issues may actually be beneficial for their outcomes [11]. Proper sexual education and counselling must be integrated into the treatment planning of patients with schizophrenia. Given the high rate of sexual dysfunction among patients with schizophrenia and its negative relationship to compliance, it is troubling that more

attention has not been paid to its assessment and much more attention to this topic is needed to improve treatment and outcomes for those who suffer from this devastating illness.

Moreover, concerning women sexuality, most studies on sexuality and schizophrenia addressed their attention only to male sexual dysfunction. Thus, the relationship between sexuality and schizophrenia is complex and although it is important to examine the relationship between medication and sexual disturbances in schizophrenia patients, it is also important to take into account patients' gender and all their possible underlying neuro-endocrine disturbances that pre-exist or contribute to sexual disturbances that occur [12]. Concerning these last remarks, few years ago a medical hypothesis on the relationship between heeled footwear and schizophrenia was published, alarming generation of women who usually wear high heel shoes, self-sentenced to complain of schizophrenia [13]. It is a historical research across the centuries in support of the very close association between the use of heeled footwear and schizophrenia. This statement might be questioned in many instances but it very hard to confute this hypothesis because all findings reported would seem to support that in all facts without contradiction. We do not have the skills to refute or confirm this hypothesis, but let's see the advanced pathophysiologic mechanisms underlying this medical hypothesis. During walking synchronised stimuli from mechanoreceptors in the lower extremities increase activity in cerebellothalamo-cortico-cerebellar loops through their action on NMDA-receptors. Using heeled shoes leads to weaker stimulation of the loops. Reduced cortical activity changes dopaminergic function which involves the basal gangliathalamo-cortical-nigro-basal ganglia loops, predisposing to schizophrenia development. But this is a deductive hypothesis based on the literature suggestion that electrode stimulation of the anterior parts of the cerebellum could improve functioning in schizophrenia [14], and being these parts normally stimulated by impulses from stretch receptors in the lower extremities, bicycling would reduce depression in schizophrenia, probably due to the improved lengthening contractions of the triceps surae [13]. An extremely interesting point is that, according to this pathophysiologic hypothesis, shoes look quite flat but providing with insoles that are somewhat thicker in the heel part, would function as heeled shoes as well: thus we all must always walk barefoot in order to avoid schizophrenia! Joking apart, currently there are neither cross-sectional prevalence studies assessing the association between the use of heeled footwear and schizophrenia in immigrants from regions with a warmer climate or in groups of people who began to wear shoes at different ages, nor studies evaluating the effects of the use of heeled and flat shoes during shorter or longer periods of time on cortical excitability, and on connectivity in cerebellar and basal ganglia loops in patients with schizophrenia. It is important to stress that, if any thickness in the heel part might be involved in the development of schizophrenia, another interesting research area could be the study of the so called "plantar fat pad" in people with schizophrenia and other mental disorders [15]. Thus, foot, sexuality and mental disorders seem to be tightly linked, although these areas of interest look so distant each other.

In the 1960's the meteorologist and mathematician Edward Lorenz was attempting to simulate the behaviour of the atmosphere on a computer. At that time it was assumed that all that was needed to provide the perfect weather report was the right model and big enough computing grunt … What Lorenz had shown was that the future state of the system was very sensitive to the initial conditions used for the calculation and hence even a deterministic system could be inherently unpredictable in the long-term. With reference to Lorenz's strange attractor the famous statement on chaos says that "*the flapping of a butterfly's wings in Tokyo can cause a tornado in Texas*". Applying Lorenz's idea to the human body and following the hypothesis that in a complex system (such the human body is) little changes in initial parameters might lead to considerable and unexpected events, also in apparently anatomically distant areas, the relationship between foot, schizophrenia, sexuality and (don't forget!) pelvic floor wellbeing may be easily explained.

Thus, heeled shoes may be linked to sexuality and pelvic floor wellbeing not only by the collective imaginarium but also by real physiological pathways that have to be still well analysed.

Three years ago the hypothesis that in an upright position different ankle inclinations might effectively facilitate pelvic floor muscles activity through enhanced pelvic tilt was published in the literature [16]. Few years later we started an interdisciplinary collaboration in order to corroborate the hypothesis that variations ankles inclination might affect pelvic floor muscles performance. Our preliminary study results (still in fieri!) would seem to corroborate the initial hypothesis [17]. We realized that our experimental model using a basculant platform reproduced what worldwide happens when a women rests upon the

heel of the shoes. This intuition lead us to turn, using a suitable formula, the different platform inclination degrees into heel height. The following steps will be the assessment of heel influence on pelvic floor muscles using a model of female daily activities in order to suggest applicable and pleasant tools aiming at reducing daily pelvic floor impairment discomfort. When we talk about stilettos we must take into account not only the heel height but also its width. The width of the heel may affect ankles stability, thus resulting in further pelvic floor muscles adjustments. This is a further effect we want to investigate in the next future. Changing ankles inclinations (thus wearing heel shoes) might represent a valid adjunctive option in order to teach and learn pelvic floor muscles training exercises in women during their daily life.

Concerning possible implication on female sexuality, there is an emerging opinion in the current literature stating that in women with genital problems such as chronic pelvic pain (an highly spread and debilitating condition affecting both males and females) a hypertonus of the pelvic floor muscles is able to produce and maintain pain poorly localized to the perirectal and perigenital areas [18]. A relaxation of this muscles group induced by heels, might have beneficial effects reducing the burden of this distressing condition. But, as Karl Popper teaches, this is a further hypothesis that we are trying to refute.

Moreover, when wearing heeled shoes, the pelvis tilts posteriorly, the promontory moves superiorly and posteriorly, and the tip of the coccyx moves anteriorly [16 19]. This position would seem to be similar to that assumed during intercourse in missionary position [20].

Conclusion

In this era of women's emancipation, the interest in female sexuality is increasing. Women are trying to recover their own sexual independence becoming from sexual subject to object, striving to conquer the equality in sex matter, respecting partners expectation as well. Therefore, women have to take back all emblems labelled by the male collective imaginarium as "female sexual symbols", revising them according to their own sexual wellbeing. This aspect is one of the most complex parts of women life, being dynamic and multidimensional, and including biologic, psychological, socioeconomic, and spiritual components. In this holistic view, also little changes in initial parameters concerning apparently anatomically distant areas might lead to considerable and unexpected events, thus explaining possible relationship between foot, schizophrenia, and sexuality. Therefore when we think of women sexuality we cannot forget Lorenz butterfly!!

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Editorial comment

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Women loving stiletto heels you can go on walking quietly on stilts!!!

This is the result from a study of Maria Angela Cerruto from the Urologic Clinic of University of Verona; stiletto suits to women a wonderful gait, but also the possibility to increase the male erotic fancy and probably increases sexual pleasures stimulating those pelvis muscles that are involved with the orgasm [1]!

Whereas on the one end we should be glad for strengthening our sex appeal and improving our performances on the aspect of the sexual quality of life, on the other hand some researchers showed a direct connection between stilettos and mental illness.

Jarl Flensmark of the Malmo University in Sweden states that can demonstrate that the first cases of schizophrenia appeared with the invention of the high-heeled dizzy shoes one thousand years ago; he maintains that the first boots with heel appeared in the Mesopotamian area, in which where observed the first schizophrenic patients.

In North American natives, that use flat shoes, they don't observe so much mental illness [2]. Their scientific explanation in based upon the hypothesis that when we walk "sole on ground" the movements of the foot stimulates the receptors of our limbs and increase the activity of brain cells; walking with the heel lifted causes a lower stimulation of the inner production of dopamine, that is known for being an important factor in the genesis of schizophrenia.

Is difficult to refute those observations because all the result seem to be in agreement with this theory! Sexuality, mental illness and foot health seems then to be correlated despite the distance among all those several areas of interest!!! Should we walk barefooted to avoid psychiatric pathologies?

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