

# Commentary: Sildenafil in Phallometric Testing—An Evidence-Based Assessment of Sexual Offenders

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The field of medicine has moved toward best practices based on evidence. There is pressure on all medical disciplines, including forensic psychiatry, to adopt this approach. Some areas of forensic psychiatry have a stronger scientific basis that clearly fits the definition of evidence-based medicine than do other areas. One of these areas is the assessment and treatment of sexual offenders, which has a strong scientific basis and meets the definition of evidence-based medicine, as defined by Sackett *et al.* in 2007. Phallometric testing is an objective, physiological indicator of deviant sexual preferences that support the diagnosis of paraphilias and the assessment of sexual offenders. The current article by Kolla *et al.* is an effort to improve the reliability of phallometric testing related to diagnosis by pharmacologic stimulation.

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Sex is a basic biological drive. Animal and human sexual research has provided considerable information about the neurobiological and neurohormonal basis of sexual drive, arousal, and performance. As well, there are evidence-based studies on the neuropharmacology of sexual behavior, summarized in a recent review by Bradford<sup>1</sup> and a recent chapter on the neurobiology of the paraphilias.<sup>2</sup> In 2010, the World Federation of Societies of Biological Psychiatry published guidelines for the biological treatment of the paraphilias that clearly documented evidence-based pharmacologic treatment of these conditions.<sup>3</sup>

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All major explanations of sexual offending suggest that the paraphilias contribute significantly to sexual aggression.<sup>4</sup> The current diagnostic criteria for the paraphilias are based on Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR).<sup>5</sup> Several criticisms have been directed toward the use of nosologic criteria related to the paraphilias, specifically as they are used in high-profile legal proceedings.<sup>6–8</sup> Problems associated with subjective judgment in making reliable and valid diagnosis suggest that objective measures might resolve this problem.<sup>8–12</sup>

The study of sexual offenders within an evidence-based paradigm includes the assessment of individuals in an attempt to diagnose the type of their paraphilia, their risk of sexual offense recidivism, whether the risk of future sexual violence can be moderated by treatment, what treatments are available, and their impact on recidivism. All of these areas have been the subjects of considerable research and fit the definition of evidence-based medicine.<sup>13</sup>

The broadest and most generic phrase used in forensic psychiatric practice to classify sexual violence would be “any sexual behavior against a nonconsenting partner” (Ref. 14, p 527). Sexual offenders are a heterogeneous group of individuals, most of whom have a sexual deviation or a paraphilia, in DSM-

IV-TR terms.<sup>5</sup> There is considerable comorbidity between the paraphilias, with a crossover in any given individual between hands-on and hands-off paraphilias.<sup>15,16</sup> The phenomenon of comorbidity in the paraphilias emphasizes the need for a careful diagnostic evaluation, based on the pathognomonic feature of all paraphilias or sexual deviations, which is deviant sexual arousal.<sup>17,18</sup> This evaluation then forms the basis for the objective measure of sexual arousal, which in turn enables an objective diagnosis of the paraphilia or sexual deviation.

The objective measurement of sexual arousal is made possible by the measurement of penile tumescence in a laboratory setting.<sup>19</sup> Although there is not yet a completely standardized approach to the evaluation of sexual offenders, in specialized centers a typical approach is a forensic psychiatric diagnostic and evaluative clinical examination with a detailed psychiatric history, a mental status examination to diagnose associated psychiatric conditions, and an examination for general medical conditions.<sup>20</sup> The specific assessment for deviant sexual behavior consists of a sex hormone profile, a variety of sexual behavior questionnaires, and objective measures of sexual interest by penile tumescence testing or visual reaction time.<sup>20</sup> The sex hormone profile consists of free and total testosterone (freeT and totalT), follicle-stimulating hormone (FSH), luteinizing hormone (LH), estradiol, prolactin, and progesterone. The sex hormone profile is important in forming the basis of the diagnosis of conditions affecting sexual endocrinology that may be associated with paraphilias, such as Klinefelter's syndrome. It also provides a baseline for subsequent pharmacologic intervention. The sexual behavior questionnaires are usually self-reported information measuring overall sexual performance, drug and alcohol usage, sexual drive measures, general measures of impulsivity, measures of aggression, quantitative and qualitative measures of sexual fantasy, a detailed sexual behavior inventory, some measure of deception, and measurement of cognitive distortions.<sup>20</sup> Physiological measures of sexual preference (phallometry) complete the overall comprehensive assessment.<sup>20</sup> Sexual offense recidivism risk is calculated through a risk-assessment instrument, such as the Static 99,<sup>21</sup> and psychopathy is often measured with the Hare Psychopathy Checklist.<sup>22</sup> The importance of sexual arousal testing is emphasized by a finding of deviant sexual

preference, which is considered to be among the strongest predictors of sexual offense recidivism.<sup>23</sup>

### Physiological Measures of Sexual Arousal

Phallometric testing (penile plethysmography; PPG) is an objective, physiological indicator of deviant sexual behavior that provides reliable evidence of sexual preference in the absence of an accurate diagnosis.<sup>24,25</sup> Several studies have shown that PPG results are associated with sexual and violent recidivism.<sup>23,26</sup> Further, PPG assessment of deviant sexual preference helps to corroborate or challenge self-report data. Despite the obvious advantages of an objective physiological measure of sexual deviance, the utility and overall psychometric properties of this tool have been questioned. One such criticism has been the extent to which the tool can detect sexual preference in the absence of an adequate erectile response. Approximately 10 percent of males undergoing PPG testing exhibit insignificant erectile responses to audio, visual, and video depictions of gender and age categories of stimuli.<sup>27</sup> A low erectile response correlates with age and may be the result of a variety of factors, including vascular, neurological, and psychogenic factors. Some investigators have found that inclusion of low responders did not affect the sensitivity of the assessment,<sup>29</sup> but others have found that including participants with low response profiles can significantly distort the data, particularly when utilizing *z*-score transformations.<sup>30</sup> More recent data have shown poor discriminate classification of deviant and nondeviant sexual preference when the overall output index is low.

Kolla *et al.*<sup>27</sup> have completed a pilot study examining the effect of prescribing 50 mg sildenafil to mitigate the problem of low responses in phallometric studies. Sildenafil is a pharmacologic agent that increases the blood flow in small vessels and therefore enhances penile tumescence. In this study, sildenafil was used in a nonforensic population to evaluate its effect on penile tumescence and phallometric responses. The results indicated that the pretest administration of sildenafil increased peak penile response to audiotape narratives and slides of nude models representing different age categories by 28 percent, when compared with testing without the administration of the pharmacological agent. In a follow-up investigation, Kolla *et al.*<sup>28</sup> completed a double-blind, placebo-controlled trial that examined the effect of a higher dose of 100 mg sildenafil on penile

tumescence and phallogometric responding in a larger nonforensic sample ( $n = 22$ ). Sildenafil produced a 50 percent increase in responding relative to the untreated condition (versus a 28 percent response in the pilot study) thereby confirming a dose-dependent relationship between sildenafil and penile tumescence and rigidity reported in other studies.<sup>31,32</sup>

The results were also separately examined in individuals with either a consistent or inconsistent phallogometric profile, based on an examination of the congruence between the physiological results and self-reported sexual preference. Significantly, the results showed that participants responded with similar relative magnitude responses to stimulus categories, both with and without the administration of sildenafil. The findings can be interpreted as showing that the administration of sildenafil did not distort the classification of the individuals into the subcategories of pedophile, hebephile, or no deviant preference. This result is important, as one potential concern related to the use of sildenafil to enhance penile tumescence is that it might increase the rate of false positive responses. Finally, the results revealed that peak responding increased significantly under the drug administration state for consistent responders to adult women, suggesting that the administration of sildenafil as a pretest agent to enhance penile tumescence may be best suited for men who prefer adults but are prone to low response.

The study supports the use of sildenafil as a pre-treatment enhancement for phallogometric testing to overcome the problem of low responders. This study shows that men who have a sexual preference for adult females (heterosexual and teleiophilic) are likely to benefit the most from pretest enhancement with sildenafil. The data also show that individuals with something to conceal (pedophiles) may be more likely to attempt to resist testing on sildenafil. This theory could be further explored in studies on faking responses during phallogometric testing.

Kolla et al.<sup>28</sup> are among the first to test sexual preference scientifically in a pharmacologic enhancement paradigm. In the current study, they examined nonforensic participants. Whether pharmacologic enhancement is ethically permissible or clinically justified in outpatient sex offenders remains to be determined.

In conclusion, this study expands the field of phallogometric testing in the diagnosis of the paraphilias and in the overall evaluation of sexual offenders.

## References

1. Bradford JM: The neurobiology, neuropharmacology, and pharmacological treatment of the paraphilias and compulsive sexual behaviour. *Can J Psychiatry* 46:26–34, 2001
2. Bradford JM: Neurobiology of the paraphilias, in *Sex Offenders: Identification, Risk Assessment, Treatment, and Legal Issues*. Edited by Saleh FM, Grudzinskas AJ Jr, Bradford JM, et al. New York: Oxford University Press, 2008, pp 36–46
3. Thibaut F, De La Barra F, Gordon H, et al: The World Federation of Societies of Biological Psychiatry (WFSBP) guidelines for the biological treatment of paraphilias. *World J Biol Psychiatry* 11: 604–55, 2010
4. Ward T, Polaschek D, Beech AR: *Theories of Sexual Offending*. Chichester, UK: John Wiley & Sons, Ltd., 2006
5. American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, DC: American Psychiatric Association, 2000
6. Levenson JS: Reliability of sexually violent predator civil commitment criteria in Florida. *Law Hum Behav* 28:357–68, 2004
7. Marshall WL: Diagnostic problems with sexual offenders, in *Sexual Offender Treatment, Controversial Issues*. Edited by Marshall WL, Fernandez YM, Marshall LE, et al. Chichester, UK: John Wiley & Sons Ltd., 2006, pp 33–45
8. Kingston DA, Seto MC, Firestone P, et al: Comparing indicators of sexual sadism as predictors of recidivism among adult male sexual offenders. *J Consult Clin Psychol* 78:574–84, 2010
9. Eccles A, Marshall WL, Barbaree HE: Differentiating rapists and non-offenders using the rape index. *Behav Res Ther* 32:539–46, 1994
10. Marshall WL, Kennedy P, Yates P: Diagnosing sexual sadism in sexual offenders: reliability across diagnosticians. *Int J Offender Ther Comp Criminol* 46:668–77, 2002
11. Kingston DA, Firestone P, Moulden HM: The utility of the diagnosis of pedophilia: a comparison of various classification procedures. *Arch Sex Behav* 36:423–36, 2007
12. Kingston DA, Yates PM, Firestone P, et al: Long-term predictive validity of the risk matrix 2000: a comparison with the static-99 and the sex offender risk appraisal guide. *Sex Abuse* 20:466–84, 2008
13. Sackett DL, Rosenberg WM, Gray JA, et al: Evidence based medicine: what it is and what it isn't. *Clin Orthop Relat Res* 455:3–5, 1996
14. Bradford JM: On sexual violence. *Curr Opin Psychiatry* 19:527–32, 2006
15. Bradford JM, Boulet J, Pawlak A: The paraphilias: a multiplicity of deviant behaviours. *Can J Psychiatry* 37:104–8, 1992
16. Abel GG, Becker JV, Cunningham-Rathner J, et al: Multiple paraphilic diagnoses among sex offenders. *Bull Am Acad Psychiatry Law* 16:153–68, 1988
17. Bancroft JH, Jones HG, Pullan BR: A simple transducer for measuring penile erection with comments on its use in the treatment of sexual disorders. *Behav Res Ther* 4:239–41, 1966
18. Money J: Paraphilias: phenomenology and classification. *J Psychother* 38:164–79, 1984
19. Fedoroff J, Kuban M, Bradford J: Laboratory measurements of penile response in the assessment of sexual interests, in *Sex Offenders: Identification, Risk Assessment, Treatment, and Legal Issues*. Edited by Saleh FM, Grazinkus A, Bradford J, et al. New York: Oxford University Press, 2009, pp 89–100
20. Bourget D, Bradford JM: Evidential basis for the assessment and treatment of sex offenders. *Brief Treat Crisis Intervent* 8:130–46, 2008
21. Hanson RK, Thornton D: *Static 99: Improving Actuarial Risk Assessments for Sex Offenders (User report 99-02)*. Ottawa, ON, Canada: Department of the Solicitor General of Canada, 1999

22. Hare R: Hare Psychopathy Checklist Revised (PCL-R) (ed 2). Toronto, Ontario, Canada: Multi-Health Systems, 2003
23. Hanson R, Bussiere MT: Predicting relapse: a meta-analysis of sexual offender recidivism studies. *J Consult Clin Psychol* 66: 348–62, 1998
24. Freund K, Blanchard R: Phallometric diagnosis of pedophilia. *J Consult Clin Psychol*; 57:100–5, 1989
25. Freund K, Watson RJ, Dickey R: Sex offenses against female children perpetrated by men who are not pedophiles. *J Sex Res* 28:409–23, 1991
26. Hanson RK, Broom I: The utility of cumulative meta-analysis: application to programs for reducing sexual violence. *Sex Abuse* 17:357–73, 2005
27. Kolla NJ, Blanchard R, Klassen PE, et al: Effect of sildenafil citrate on penile plethysmography responding: a pilot investigation. *Arch Sex Behav*. Published online May 27, 2009
28. Kolla N, Klassen PE, Kuban ME, et al: Double-blind, placebo-controlled trial of sildenafil in phallometric testing. *J Am Acad Psychiatry Law* 38:502–11, 2010
29. Harris GT, Rice ME, Quinsey VL, et al: Maximising the discriminant validity of phallometric assessment data. *Psychol Assess* 4:502–11, 1992
30. Barbaree HE, Mewhort DJK: The effects of z-score transformation on measures of relative erectile response strength: a reappraisal. *Behav Res Ther* 32:547–58, 1994
31. Boolell M, Gepi-Attee S, Gingell JC, et al: Sildenafil, a novel effective oral therapy for male erectile dysfunction. *Br J Urol* 78:257–61, 1996
32. Boolell M, Allen MJ, Ballard SA, et al: Sildenafil: an orally active type 5 cyclic GMP-specific phosphodiesterase inhibitor for the treatment of penile erectile dysfunction. *Int J Impot Res* 8:47–52, 1996