The Impact of Surgical Castration on Sexual Recidivism Risk Among Sexually Violent Predatory Offenders

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The relationship of surgical castration to sexual recidivism in a sexually violent predator/sexually dangerous person (SVP/SDP) population is reviewed. A review of the literature on castrated sex offenders reveals a very low incidence of sexual recidivism. The low sexual recidivism rates reported are critiqued in light of the methodologic limitations of the studies. Better designed testicular/prostate cancer studies have demonstrated that, while sexual desire is reduced by orchiectomy, the capacity to develop an erection in response to sexually stimulating material is not eliminated. The relevance of this literature to SVP/SDP commitment decisions and ethics is discussed. Two vignettes of castrated, high-risk sex offenders illustrate how to address risk reduction. Two tables are presented: the first outlines individual case data from a difficult-to-obtain report, and the second summarizes the most frequently cited castration studies on sexual recidivism. Orchiectomy may have a role in risk assessments; however, other variables should be considered, particularly as the effects can be reversed by replacement testosterone.

Several states have recently enacted laws designed to identify a small group of extremely dangerous incarcerated sexual offenders who represent a threat to public safety if released from custody. These laws are known as the Sexually Violent Predator/Sexually Dangerous Person (SVP/SDP) Acts. The focus on a small group of extremely dangerous sex offenders comprising the SVP/SDP group is illustrated by recent California statistics.[1] Over a seven-and-one-half-year period since the inception of the California SVP Act in January of 1996, approximately 65,000

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sex offenders have been released from state prison. Approximately four percent of these individuals were referred for commitment, with two percent being found by clinical evaluators to meet the criteria. As of July 2003, only 422 (0.6%) were committed by a judge or jury as SVPs.

Generally, the criteria necessary for categorizing an individual as an SVP/SDP include findings that: (1) the person has been convicted of offenses determined by the state to constitute a sexually violent crime; (2) the person suffers from a diagnosed mental disorder; and (3) as a result of that disorder, the person is likely to engage in sexually violent offenses. Not all states use the term "mental disorder"; some use "mental abnormality"; "mental abnormality or personality disorder"; "behavioral abnormality"; "sexual psychopath personality"; "sexual disorder, personality disorder, or other mental disorder or dysfunction"; or "mental illness or serious emotional disturbance."[2] Clearly, these are not formal DSM-IV-TR[3] diagnoses. The SVP/SDP statutes do not specify which DSM-IV TR diagnosis would or

would not qualify as a mental disorder or mental abnormality. However, the most common definition of the required mental condition among the states is similar to that found in California's § 6600(c) Welfare and Institutions Code[4]—that is, one that affects emotional or volitional capacity and predisposes the individual to the commission of criminal sexual acts that pose a menace to the health and safety of others.

Individuals identified as SVPs/SDPs are civilly committed for treatment in designated mental health facilities after serving their prison terms. The use of civil commitment as a method of achieving public safety for these individuals has generated much controversy regarding how efforts to protect society have affected individuals' civil liberties.[5] Recent U.S. Supreme Court cases,[6,7] however, have upheld the constitutionality of the SVP/SDP laws. The Court reasoned that because these persons suffer from a mental condition that places them at risk for sexual reoffense, civil commitment for treatment purposes is not viewed as punishment.

Surgical castration is not considered the standard treatment for the reduction of sexual recidivism. Yet, there has been increasing interest and initiation of surgical castration among men facing or already placed under an SVP/SDP commitment. There are no empirical data as to why persons designated SVP/SDP would consider a radical procedure such as orchiectomy over noninvasive or less-invasive interventions, such as cognitive-behavioral and antiandrogen treatments. However, anecdotal data based on the authors' experience with a California SVP population suggest the following explanations. Persons committed under these laws or in the pre-commitment process may view surgical castration as their only realistic option for release into the community. Such individuals may have rejected traditional treatments such as cognitive-behavioral therapy for several reasons: antipathy toward the SVP/SDP process because they view it as unfair; a belief that they will never successfully complete the program and be recommended for outpatient release; and concern that participation in treatment, particularly discussion of prior offenses, will lead to new charges or sanctions. Antiandrogen treatment may be rejected, as it is coupled with a requirement for participation in psychotherapy. Another reason that antiandrogen medication may be rejected is because it requires dosage-regimen compliance and has side effects (although orchiectomy can produce similar side effects). An additional factor an individual may have for favoring orchiectomy is the belief that mental health professionals, courts, and juries will be positively persuaded to release even high-risk sex offenders into the community if they are castrated. Finally, sex offenders may undergo orchiectomy out of a belief that it will enable them to maintain better self-control over deviant sexual impulses. Psychiatrists and psychologists evaluating a surgically castrated sex offender for an SVP/SDP commitment must face the question of how much risk reduction is associated with orchiectomy.

Two different populations of men who have undergone surgical castration can demonstrate the impact of bilateral orchiectomy on sex drive, capacity to sustain erection, and sexual interest: sex offenders and patients with testicular/metastatic prostate cancer. More recent oncology studies have the benefit of better designs and sample controls than the older surgical castration trials among sex offenders and can offer some empirical markers as to sexual function.

The purpose of this article is: (1) to provide a critical review of the existing studies involving surgical castration of sex offenders; (2) to examine the testicular/prostate cancer literature on orchiectomies with reference to reduction of sexual function; (3) to discuss the ethical ramifications of surgical castration in an involuntarily committed group of sex offenders; and (4) to explore through case vignettes the application of orchiectomy data on risk reduction in an SVP/SDP population.

The article focuses on the efficacy of using castration to lower criminal sexual recidivism of men who may qualify or have already been identified as SVPs/SDPs. These men are not comparable with paraphiliacs or other sex offenders who are not facing the prospect of an indefinite period of involuntary civil commitment. SVPs/SDPs represent a small but extremely dangerous group of sex offenders whose mental conditions render them likely to engage in sexually violent behavior. The legislative findings of some of the SVP/SDP laws have articulated that, because of their personality disorders and/or mental abnormalities, individuals so committed are viewed as unamenable to treatment modalities used in traditional short-term civil commitment. Thus, special commitment statutes were enacted to provide long-term control, care, and treatment for these individuals.[8–11] Therefore, it is possible that SVP/SDP patients may have entirely different motivations for

electing surgical castration than other sex offenders not facing this type of commitment (viz, to obtain a conditional release or discharge from commitment).

Surgical Castration and Sex Offenders

Currently, the predominant form of psychological treatment for SVP/SDP patients is the cognitive-behavioral method. Recent studies suggest that cognitive-behavioral interventions are associated with a moderate reduction in risk.[12–17] Thus, this form of treatment does not reduce the risk of sexual recidivism entirely. Further, in one meta-analysis,[13] treatment effects were found to be stronger among outpatients than among institutionalized individuals; the latter comprise the SVP/SDP population. Therefore, whether cognitive-behavioral treatments are effective for high-risk offenders, such as those who are typically identified as SVP/SDP, remains uncertain.

Before cognitive-behavioral therapy, antiandrogenic hormones were used to treat paraphiliacs and sex offenders. The first time these agents were used was in 1966 at Johns Hopkins (medroxyprogesterone acetate) and the Institute for Sex Research in West Germany (cyproterone acetate).[18] Money[19] found that medroxyprogesterone acetate "suppresses or lessens the frequency of erection and ejaculation and also lessens the feeling of sexual drive and the mental imagery of sexual arousal" (Ref. 19, p 219). Current medical interventions in sex offender treatments include hormones that reduce testosterone levels, such as injectable Lupron (leuprolide acetate depot), Lupron implant, Goserelin, Depo-Provera (medroxyprogesterone acetate), and cyproterone acetate.

Testosterone and dihydrotestosterone are the hormones responsible for maintenance of sexual behavior. The production of testosterone in males occurs primarily through the secretions of the Leydig cells of the testes.[20] The Leydig cells are stimulated by the release of luteinizing hormones from the anterior pituitary gland and related to the release of gonadotropin-releasing hormones from the hypothalamus. Androgen receptors are found in several regions including the midbrain limbic structures (as well as the hypothalamus), the spinal cord, and the penis.[21] Bilateral orchiectomy (i.e., the surgical resection of the testes) results in a dramatic reduction of the production of testosterone. Animal studies demonstrate that castration results in a loss of sex drive and an abolishment of mating behavior and that such drive could be restored by testosterone replacement.[22] While hormonal therapy is more widely accepted as a method to reduce testosterone among sex offenders, surgical castration (i.e., bilateral orchiectomy) is also presently used, albeit to a very limited extent.

The practice of surgical castration on humans is not a recent phenomenon.[23] As far back as the Middle Ages, castration was performed as a form of retribution on those who committed rape or adultery. In Europe, the use of castration of sex offenders as a form of treatment has been in existence since the early 20th century. The Danish pioneered the first laws in 1929, legalizing this type of medical intervention for sex offenders; soon thereafter, Germany (1933), Norway (1934), Finland (1935), Estonia (1937), Iceland (1938), Latvia (1938), and Sweden (1944) enacted similar laws.[23] The theoretical underpinning of the European castration laws was the elimination of sexual urges believed to be the dominant etiological factor in sexual criminal behavior.

The empirical studies examining the impact of surgical castration on sex offender recidivism were conducted in Europe (predominantly in Germany and Denmark) and date from the pre- and post-World War II periods. The original literature is difficult to assess because research methodology in these older studies was not well-specified or performed to current standards. Freund[24] provided a review of pharmacological sex drive reduction, including use of surgical castration. The present review reflects a compilation of data from studies published in English and reviewed by Freund and others, as well as a summary of other European articles that were translated and subsequently reviewed by Heim and Hursch.[23] In addition, data are reviewed from one U.S. study of castrated sex offenders conducted in California.[25]

Europe

The largest number of castrations occurred in Germany and Denmark. In Germany, the practice of castration during the period 1934 to 1945 arose from the Nazi German Act of November 24, 1933, which resulted in the involuntary castration of sex offenders.[23] Germany also enacted laws governing voluntary castration of sex offenders that remained effective after 1945. Between 1934 and 1944, at least 2,800 sex offenders were compulsorily castrated in Germany, and, between 1955 and 1977, 800 sex offenders were castrated in West Germany.

Denmark

Danish laws governing castration were first enacted in 1929 and stemmed from the government's intent to protect society from recidivistic rapists.[26] However, the law allowed for persons to be castrated if they believed that their sexual drive placed them in danger of committing a crime. The law was amended to include castration of persons whose sexual drive produced considerable psychological suffering or social devaluation. Heim and Hursch[23] estimated that from 1929 to 1973, there were approximately 1,100 cases of orchiectomy in Denmark. At the Treatment Institution at Herstedvester, Denmark, a penal institution, 285 surgical castrations were performed on the inmates between 1935 and 1970.[27] Of these 285 individuals, less than 10 percent were serious sex offenders.

Stürup[26] reported findings from the early Danish studies in a 1968 monograph. Results were published of 900 patients who were castrated throughout Denmark between 1929 and 1959 and followed for at least six years, with 39 percent followed for more than 10 years.[26,28] Stürup provided a review of the original study conducted by Sand *et al.*[29] Of the subjects, 40 percent had committed one sex crime, 18 percent had been sentenced on a second occasion, and 24 percent had been sentenced on more than two occasions. Further, 18 percent of the subjects had committed no sex crimes, even at the time of castration. During the follow-up period, it was noted that only 10 individuals, or 1.1 percent of the sample, had recidivated in an obviously sexual manner. In addition, there were another 10 "borderline cases" in which there were criminal acts with "sexually colored behavior." The sexual recidivism rate was extremely low among the surgically castrated persons, and, by Stürup's report, 82 percent of the subjects were described as sex offenders, with 42 percent repeat offenders prior to castration. Although there was reference to serious sex offenders forming a portion of the sample, the nature of the sex crimes was not specified for the 900 subjects. Stürup,[26] however, did identify diagnostic subgroups. Forty-four percent were identified as "mentally defective", 25 percent as "psychopaths"; 13 percent as "sexually abnormal", 10 percent as "borderline cases" of sexual deviancy, 4 percent as "psychotics", and 4 percent as either "miscellaneous" or "unclassified." The large proportion of mentally defective subjects (44%) in relation to clearly identified sexually abnormal individuals (13%) potentially limits the findings of this study. The counterargument to this conclusion is that the 25 percent psychopathic and 13 percent sexually abnormal cases constitute a large enough group to apply the low rate of sexual recidivism after castration to modern-day sex offenders.

In 1997, a review by Hansen and Lykke-Olesen[27] of the treatment of sex offenders in Denmark summarized the history of the Treatment Institution at Herstedvester. Hansen[30] observed 43 inmates who were sentenced to Herstedvester for extended detention because of committing violent rape or other violent crimes (murder, attempted murder, or severe bodily injury in connection with a sexual offense). Originally, 24 inmates refused surgical intervention and remained incarcerated for an extended period, and 19 underwent castration. However, of those who initially refused, two later underwent castration after they were released and then sexually reoffended. Thus, in the follow-up study period, there were 21 inmates who opted for surgical castration and early release on probation (i.e., 6–18 months after the operation). Two of the 21 castrates committed other sexual crimes more than 15 years after orchiectomy. These new sex crimes occurred after their physicians gave both individuals testosterone substitution therapy. Of the 22 who were not castrated, 8 sexually reoffended. Their new crimes occurred despite a lengthy incarceration for their original sexual crimes (noncastrated persons spent an average of eight years in detention versus two years for the castrated individuals). Therefore, the comparative rates for sexual recidivism were 10 percent (more than 15 years after surgery and after being provided replacement testosterone) in the castrated group, and 36 percent in the noncastrated group (unknown follow-up period).

Norway

In 1959, Bremer[31] published data on 216 male Norwegian castrated persons. Heim and Hursch[23] provided detailed information on the Bremer study. Of the sample group in which 215 were observed, only 7 percent (*n* = 16) were described as "sexual deviates." The majority (51%, *n* = 109) were identified as oligophrenics, followed by schizophrenics (25%, *n* = 53), psychopaths (11%, *n* = 24), epileptics (5%, *n* = 10), and other (1%, *n* = 3). Thirty-two percent (*n* = 68/215) asked for castration and 68 percent (*n* = 147/215) were castrated at the request of another person. Of the 215 persons followed, re-

cidivism was noted in only 102 individuals. Of these, 58 percent ($n = 59$) reoffended prior to the castration, with 34 percent having more than one previous reoffense. Within this group of 102 subjects, the follow-up period ranged from 1 to 10 years, and the rate of sexual reoffenses was 2.9 percent ($n = 3$). However, the observation period was long for only a subsample of 41 cases that were followed up for 5 to 10 years. With this longer follow-up group, the recidivism rate was calculated at a maximum of 7 percent. Of the group of 102 castrated persons for whom information regarding their attitudes toward castration was available ($n = 89$), 41 percent ($n = 37$) were satisfied with the operation, 26 percent ($n = 23$) were dissatisfied or bitter, and 33 percent ($n = 29$) were indifferent.

Heim and Hursch[23] provided additional findings with respect to changes in sexual function, somatic state, and psychological functioning for subgroups of the subjects of Bremer.[31] As to changes in sexual function, data were available for a subgroup of 157 subjects. Sixty-six percent ($n = 103/157$) indicated that they had lost all sexual interest. Of those reporting loss of sexual interest, 72 percent ($n = 74$) indicated that the asexualization occurred immediately or shortly after orchiectomy. The remaining 28 percent ($n = 29/103$) indicated that the sexual urge disappeared gradually over the course of a few months to a year. Changes in somatic state were reported for a subgroup of 201 subjects, of which 69 percent ($n = 139$) stated they had no complaints other than the standard postcastration changes in secondary sex characteristics. However, 18 percent ($n = 37/201$) noted problems including weight gain, aged appearance, weakness, and deterioration in general health. Data as to psychological functioning after surgical castration were available for 175 subjects. Twenty-five percent ($n = 44/175$) described symptoms of dysphoria.

An argument for the use of these data supporting therapeutic castration is that 66 percent ($n = 103/157$) of the subjects reported complete loss of sexual interest. Thus, surgical castration could be highly effective in reducing sexual recidivism among those sex offenders whose behavior is driven by sexual psychopathology. The counterpoint to this argument is that the Bremer sample comprised primarily those who were mentally handicapped or psychotic (75%, $n = 162/215$) with only 7 percent ($n = 16/215$) described as sexual deviates. The generalizability of

these data to those whose sex crimes are driven predominantly by sexual psychopathology is limited, and use of these data in a paraphilic population to argue for dramatic risk reduction would be highly speculative. Another methodological limitation of the study was the lack of a comparison group of noncastrated individuals.

Germany and Switzerland

Heim and Hursch[23] reviewed many of the significant European castration articles, including those by Langelüddeke[32] in 1963 and Cornu[33] in 1973. Both of these studies were written originally in German. Heim and Hursch's review provided an English translation of the data.

According to Heim and Hursch, Langelüddeke's data consisted of an archival review of criminal records of 1,036 German castrated sex offenders released into the community (the criminal records dated back to 1953). The castrated group consisted of 638 males who were castrated between 1934 and 1938, 259 castrated between 1939 and 1941, and 139 castrated between 1942 and 1944. These sex offenders were released soon after involuntary castration. The comparison group consisted of 685 released, noncastrated sex offenders.

With respect to sexual recidivism, 84 percent ($n = 870$) of the 1,036 castrated sex offenders had at least two convictions (numbers ranged from two to more than eight) for sexual crimes before castration. After castration, the sexual recidivism rate for the castrated persons dropped to 2.3 percent (24 of the 1,036 castrated persons reoffended at least once after surgery). This rate rose to 2.6 percent when corrected for those individuals who died—that is, a 10 percent assessment was taken of the total sample, thus reducing the sample to 932 with 24 castrated recidivists. The nature of the sexual crimes (e.g., contact, noncontact, child molestation, or rape) was not specified. Ten of the recidivists were castrated between the ages of 20 to 30, and these offenders showed a higher recidivism rate than offenders castrated at an older age. The time interval for recidivism after castration and release ranged between six weeks and 20 years. Castrated inmates who were sent to prison once or twice had a lower rate of recidivism than those castrated persons with three or more convictions. Nine of the 24 castrated persons who reoffended sexually did so five years after release. Twenty committed nonsexual offenses in addition to sexual crimes. The

noncastrated sex offenders had a sexual recidivism rate of 39.1 percent ($n = 268$).

Heim and Hursch[23] reviewed the data of 89 interviewed castrated individuals in the Langelüddeke sample. Sixty-five percent ($n = 58$) reported that their libido and potency were extinguished immediately or soon after castration, 17 percent ($n = 15$) reported significant fading followed by the extinction of sex drive, and 18 percent ($n = 16$) stated that they were still able to have sexual intercourse more than 20 years after castration. Of the 15 castrated individuals over the age of 50 (aged 51–70), 80 percent ($n = 12$) described extinction of potency soon after castration, 7 percent ($n = 1$) described potency as obviously weaker, and 13 percent ($n = 2$) described potency as still present or weakened slightly. For those in the 31- to 40-year-old age group ($n = 28$), 64 percent ($n = 18$) experienced extinction of potency soon after castration, 21 percent ($n = 6$) described obvious weakening of potency, and 14 percent ($n = 4$) stated that potency was still in effect or slightly weakened. A small percentage of the sample had somatic sequelae. Nine percent ($n = 8$) had subcutaneous fat tissue similar to that of women, 10 percent ($n = 9$) had "strong" gynecomasty, and 25 percent ($n = 22$) developed "weak" gynecomasty. Fifty-one percent ($n = 45$) of the individuals had soft or more compliant skin, 17 percent ($n = 15$) had weaker beard growth, and 66 percent ($n = 59$) had reduced body hair. Only one of the individuals developed osteoporosis. Twenty percent ($n = 18$) stated that the operation had a positive influence on their lives, with reports of feeling calmer and more balanced; however, 30 percent ($n = 27$) complained that since the operation they were more depressed and felt inadequate, isolated, and passive. Fifty-two percent ($n = 46$) said they were content with the outcome of the operation, while 26 percent ($n = 23$) were ambivalent. The remaining 22 percent ($n = 20$) expressed marked discontent.

The second study reviewed by Heim and Hursch[23] was conducted by Cornu[33] in 1973 in Switzerland. The sample size of 127 castrated persons was much smaller than in Langelüddeke's study. These castrated individuals were sex offenders released to the community after surgery, who were evaluated at least five years following discharge. The comparison group consisted of 50 noncastrated sex offenders who refused to undergo the procedure. The follow-up period ranged from 5 to 35 years. In the 121 castrated subjects assessed during follow-up, the recidivism rate before the operation was 76.86 percent. Following orchiectomy, 7.44 percent ($n = 9$) sexually reoffended. In contrast, 52 percent ($n = 26$) of the comparison group sexually recidivated within 10 years after castration was recommended to them (mainly within the first 5 years), and their reoffenses were often influenced by alcohol. It was reported that there were no substantial differences between the castrated group and the comparison group with respect to sexual deviation and marital status. However, there was contradictory information as to group differences with regard to psychiatric diagnosis and life history. The noncastrated group may have had greater rates of diminished mental soundness and come from more disruptive family backgrounds.

Sixty-eight of the castrated persons in the Cornu sample were later interviewed. Sixty-three percent ($n = 43$) described that libido and potency extinguished quickly after castration, while 26 percent ($n = 18$) said that there was a gradual decline of sex drive. Ten percent ($n = 7/68$) of those castrated stated that they were able to achieve sexual intercourse 8 to 20 years after castration. Significant somatic sequelae included 51 percent ($n = 21/41$) who were extremely overweight and 82 percent ($n = 49/60$) who developed osteoporosis. Of those dissatisfied with having been castrated, 13 percent ($n = 9/68$) felt effeminate and mutilated, and 32 percent ($n = 22/68$) reported feeling miserable after the operation with complaints of depression, irritability, and isolation. Forty percent ($n = 27/68$) of the castrated group described feeling calmer, happier, and more active after the operation. Seventy-one percent ($n = 48/68$) of the subjects interviewed were accepting of and content with the decision to be castrated. These individuals cited the positive benefits of castration as having decreased their abnormal sex drive, prevented their confinement, or improved the possibility of marriage.

Both the Langelüddeke and Cornu studies could be criticized on several methodological grounds. While the Langelüddeke data offer large numbers of castrated sex offenders, the findings are limited by the context of the castrations—that is, during the Nazi regime, under which the sterilization of so-called undesirables was a practice. An additional concern is that in the Langelüddeke sample, the castrated subjects had a sexual recidivism rate of 84 percent prior to the surgery, while the noncastrated subjects

had a sexual recidivism rate of 39.1 percent. These rates suggest that the two groups differed beyond their surgical status. That is, the noncastrated group appeared to be at a lower recidivism risk by base rate and may not have represented an adequate comparison group. It is possible that those subjects who were in the comparison noncastrated group were not selected for castration because of a perceived low recidivism risk. Other than castration, it was unclear whether the individuals in both Langelüddeke's and Cornu's studies were treated differently (e.g., whether there was a higher level of social control during community supervision for the castrated group). Also unknown was whether the castrated and comparison groups came from the same time cohorts and were followed for an equal length of time. Cornu's matched group consisted of those who refused castration and had to endure a long period of confinement. In addition, these noncastrated individuals in Cornu's sample appeared to have a higher rate of alcoholism, were described as exhibiting diminished mental soundness, and seemed to come from more disruptive family backgrounds than the castrated group. Further, the nature of the sex crimes (e.g., pedophilia, exhibitionism, or rape) were not specified for either the Langelüddeke or Cornu samples.

Another study from Germany was conducted by Heim.[34] He examined the sexual behavior of 39 West German sex offenders released from prison after voluntary surgical castration with no follow-up as to sexual recidivism. The offenders consisted of 12 (31%) rapists, 12 (31%) heterosexual pedophiles, 4 (10%) homosexual pedophiles, 4 (10%) bisexual pedophiles, 1 (3%) sexual murderer, and 6 (15%) homosexuals. Thirty-three (85%) offenders committed two or more sex crimes prior to castration. Their mean age was 49.3 years (range, 32–69). The mean age at castration was 42.5 years (range, 25–59). The median time the offenders were in the community was 4.3 years (range, 4 months to 13 years). This study used questionnaires and assessed the subjects' sexual functioning before and after orchiectomy. Overall, the subjects reported a statistically significant decrement in the frequency of sexual intercourse, masturbation, and sexual thoughts after castration. Of the 35 subjects who experienced coitus before castration, 11 of the 35 reported the ability to have sexual intercourse after castration, even though the procedure had occurred several years (mean, 4.8 years; range, 1.3–9.5) previously. This study found

that castration had the strongest effect on sexual behavior in those who were castrated between the ages of 46 and 59. The study is hampered by the lack of objective assessment of sexual functioning and interest (e.g., plethysmograph) relying instead on self-report data. In addition, the recidivism rates of these castrated individuals were not reported.

Wille and Beier[35] reported recidivism rates of both castrated and noncastrated applicants to the general medical counsel in Germany for the period between 1970 and 1980. Initially, there were 104 castrated and 53 noncastrated applicants. The noncastrated subjects consisted of those who were not castrated because their applications were rejected by the authoritative commission ($n = 17$), they canceled the application before the commission could render a decision ($n = 30$), or they canceled the application after the commission granted the request ($n = 6$). Both the narrative and tables in this report were not clear as to what constituted the criminal history of the subjects—that is, whether the "offenses prior to application for castration" preceded the instant offense or were the instant offense. Given this limitation, we cannot provide information regarding the sexual recidivism rates prior to application for castration. Wille and Beier described offense type (unspecified as to when they occurred) for both the castrated and noncastrated subjects. In particular, among the castrated, 22 percent ($n = 23$) were described as "aggressive" offenders (consisting of one individual whose offense was homicide and 22 whose offenses were rape, attempted rape, or sexual assault) and 73 percent ($n = 76$) as pedophilic offenders. Of those who were not castrated, 28 percent ($n = 15$) were described as aggressive offenders (consisting of three individuals whose offense was homicide and 12 whose offenses were rape, attempted rape, or sexual assault) and 49 percent ($n = 26$) as pedophilic offenders. In examining only those subjects with sexual offense charges (again unclear as to whether this referred to the instant offense, prior sex offenses, or a combination), the average number of charges was fairly similar for the two groups. The castrated offenders ($n = 103$) had an average of 3.27 charges and the noncastrated offenders ($n = 45$) had 2.87. Of note, Wille and Beier offered conflicting numbers as to the offense charges of the noncastrated group, citing either six or eight as having committed no sex offense. Without clear information regarding sexual recidivism rates prior to castration, we have limited

ability to compare the subjects from this study with known high recidivistic sex offenders.

For purposes of assessing recidivism, certain individuals from both the castrated and noncastrated groups were excluded from the analysis. They included those who had no sexual offenses prior to the application for castration ($n = 4$), those for whom castration was not permissible under German Law ($n = 2$), those who were castrated due to psychosis ($n = 2$), those who were not traceable ($n = 7$), and those for whom there was no valid follow-up ($n = 8$). These exclusions reduced the number to 99 castrated and 35 noncastrated applicants. Among the castrated group, three sexually reoffended, yielding a recidivism rate of 3 percent. Of the noncastrated applicants, 16 sexually reoffended, for a 46 percent recidivism rate.

While all castrates in the Wille and Beier sample experienced a reduction in sexual interest and activity, erotic fantasies, and capability of spontaneous or stimulated erection after surgery, an examination of their sexuality five years after surgery revealed various degrees of libido and sexual activity. Of a total of 81 subjects for whom data were available, the effects of castration on post-surgical sexual functioning at five years were reported. Among the castrated individuals in the 30- to 44-year age group, 33.3 percent ($n = 16/48$) could function sexually; that is, 20.8 percent ($n = 10/48$) required intensive stimulation, and 12.5 percent ($n = 6/48$) reported that their sexual activity and libido were reduced, but not drastically. On the other hand, in the same age group, 66.7 percent ($n = 32/48$) identified sexual activity as practically extinct after six months. Among those aged 45 to 59 years, 10 percent ($n = 2/20$) reported sexual activity with intensive stimulation, 5 percent ($n = 1/20$) reported nondrastic reduction of activity and libido following castration, and 85 percent ($n = 17/20$) reported extinction of sexual activity and libido. Among castrated persons aged 60 and over, only 7.7 percent ($n = 1/13$) experienced reduced sexual capacity, whereas 92.3 percent ($n = 12/13$) reported practically extinct libido and sexual activity. These data underscore that castration was most effective in the reduction of libido and sexual activity among those aged 45 years or more. While castration rendered libido and sexual activity practically extinct at six months for two-thirds of the youngest age group (30–44 years), one-third reported the ability to function sexually five years after castration.

Seventy-seven of the castrated applicants were evaluated regarding their satisfaction with their current situation and the surgical procedure. Seventy-one percent ($n = 55$) said that they were pleased, 20 percent ($n = 15$) said that they were undecided, and the remaining 9 percent ($n = 7$) said that they were dissatisfied. Methodologically, this study offered descriptors of the offense types as well as a comparison group of noncastrated persons with a similar average number of sexual offenses prior to intervention as the castrated group. The very low reoffense rate in the castrated group (3%) compared with the much higher rate in the noncastrated group (46%) could be argued more credibly as being related to surgical intervention.

United States

One report from the 1952 California legislative subcommittee on sexual crimes stated that 60 individuals had undergone orchiectomy in San Diego County since 1937.[25] Following surgery, there was a zero percent rate of sexual recidivism; that is, "the records reflect that not one of these individuals has committed a further sex offense" (Ref. 25, p 47). However, nonsexual crimes were committed in some cases. The document provided limited information on 44 convicted sex offenders who underwent surgical castration between 1937 and 1948 and were released from custody. The document was unclear as to the period of follow-up for each individual after orchiectomy or when they were released into the community. It noted that a preliminary report was filed on March 8, 1950, and as best as can be determined, this date may represent the end of the follow-up period. However, the report was so limited in explanation that an assumption about the individuals' date of release into the community could not be made.

Despite the sparseness of data reported in this legislative document, it contained some case information with details that provided a picture of the types of offenders who did not reoffend sexually after orchiectomy. Of the 44 cited cases, the instant offenses for 40 individuals met the criteria for clear "hands on" sexual offenses such as rape and/or child sexual molestation. With respect to the demographic breakdown of these 40 cases, the legislative document described 39 as white and one as Mexican; 39 were employed largely in lower middle- to middle-class occupations, with the one unemployed individual described as having subnormal intelligence. Regard-

ing marital status, 15 were married, 12 were single, 7 were divorced, 4 were separated, and 2 were widowed. The age range of the castrated offenders was between 24 and 72 years. The level of education ranged from persons with a second-grade level of education ($n = 1$) to those with a medical degree ($n = 2$).

The limited description of the 40 offenders and their offenses restricts an assessment of their risk level prior to surgical castration. Examination of the subjects' criminal history prior to the instant sex offense revealed that 60 percent ($n = 24$) of the sample had no prior crimes, 27.5 percent ($n = 11$) had a prior sexual offense, and 12.5 percent ($n = 5$) had a history of nonsexual offenses.

This legislative report is a highly relevant document that describes and follows several convicted sex offenders who were surgically castrated in the United States. However, it is not readily available within the public domain. Therefore, specific information from the report is presented in Table 1 for those who may want to view data on the 40 individual cases.

Summary

A summary of the sexual recidivism rates for the European and U.S studies is depicted in Table 2. The overall rate of sexual recidivism following castration is very low, ranging between 0 and 10 percent. Parenthetically, the 10 percent rate occurred in a small sample ($n = 21$) after both of the reoffending castrated persons were given testosterone injections. The low sexual recidivism findings remained consistent across the studies, even though they varied in methodology and had a variety of limitations. Many of the studies were hampered by the following: no pre-surgery base-rate risk for sexual recidivism, lack of a true comparison group, no baseline data regarding pre-intervention offending and offense types, or small sample sizes. Further, there was a lack of post-surgery corroboration of deviant sexual interest via use of penile plethysmography, a method useful for assessing sexual deviant interest among those seeking community release.[36]

The theory underpinning these studies was that the elimination of testosterone via orchiectomy would lead to a significant reduction of sexual deviancy, thereby assuring safe release of sex offenders into the community. However, these studies did not address directly whether there was an established linear relationship between low or near-absent levels of testosterone and sexual interest, drive, and erectile capacity following orchiectomy.

Orchiectomy and Sexual Behavior in Testicular and Prostate Cancer Studies

Testicular and prostate cancer studies that examined sexual functioning among normal males after surgery offer one body of empirical data by which to examine the relationship between serum testosterone levels and behavior. These studies, in contrast to those of surgical castration of sex offenders, have the advantage of controlled designs that offer demonstrated markers of sex hormone level, drive, and function.

Testicular cancer occurs primarily among young men. Sexual functioning after surgical intervention in this patient population has been addressed by two means: erectile response in laboratory settings and questionnaires.[37,38] While it is generally accepted that sexual drive and activity are decreased significantly following bilateral orchiectomy, the effect is not absolute. Van Basten et al.[39] examined the effects of intramuscular testosterone injections on sexual functioning among seven men who underwent bilateral orchiectomy for testicular cancer. Injections were given every three weeks, and sexual function was assessed by both self-report and erectile performance as elicited by visual erotic stimulation (video). These assessments occurred over three periods: one day after injection, a period halfway between injections, and just before the next injection. One day after the injection, the serum testosterone level increased; levels in five of seven patients were in the upper normal range (greater than 35 nmol/L). This was followed by a rapid decline of plasma testosterone levels to below the normal reference range (below 10 nmol/L) in six of seven patients for the remaining two follow-up periods. Three of the patients reported loss of libido, decreased arousal, and erectile dysfunction; however, this was not evident on readings of tumescence attained through visual erotic stimulation. Sexual functioning did not appear to be affected by fluctuating plasma testosterone levels. Of specific relevance to risk assessments of bilaterally castrated sex offenders is the finding of Van Basten et al.[37] of laboratory confirmation of erectile capacity in those who self-reported such difficulty. These results highlight the need for laboratory corroboration of self-reports of diminished or absent sexual desire and

capacity among sex offenders who have been surgically castrated.

In aging sex offender populations, an important consideration is whether surgical castration has a cumulative, and thereby more significant, impact on sexual functioning among older males. One assumption is that as men age, there is an association of overall testosterone reduction with reduced sexual function. Rhoden *et al.*[40] studied erectile function and testosterone levels in 965 normal aging men with a mean age of 60.7 years (age range, 40–80); however, erectile function was measured only by self-report. This group had various degrees of reported sexual dysfunction (11.9% severe, 6.3% moderate, 14.1% mild to moderate, 21.5% mild) and highly variable overall testosterone levels. While the mean total serum testosterone did not vary significantly across age groups, there was a higher percentage of men with subnormal testosterone levels who were in the group older than 70 years in comparison to those in the 40 to 49 age group. Overall, the researchers found that testosterone was largely within a normal reference range in the majority of the sample. Total serum testosterone levels were not associated with reported erectile dysfunction. Age-related sexual dysfunction was attributed to the effect of medical illness in the group older than 70 years. The overall prevalence of reported erectile dysfunction was 53.9 percent. When examined by age group, the rate of erectile dysfunction was 36.4 percent in those aged 40 to 49 years, 42.5 percent in those 50 to 59, 58.1 percent in those 60 to 69, 79.4 percent in those 70 to 79, and 100 percent in those 80 and older. The study by Rhoden *et al.* supported other studies of aging men,[41,42] which concluded that testosterone levels did not correlate with erectile dysfunction.

The findings of Rhoden *et al.*[40] have implications for risk assessment among older sex offenders. Sexual dysfunction appeared at the highest level in those who were older than 70. However, of those in the 60 to 69 years age group, almost 42 percent reported no erectile dysfunction. Further, these studies found that older men did not necessarily have subnormal testosterone levels. Therefore, it should not be assumed that older men have low testosterone levels and consequently low sexual interest, deviant or otherwise.

Greenstein *et al.*[43] examined erectile function among older bilaterally castrated men who were sexually functional prior to castration for metastatic prostate cancer. In their group of 16 patients, 8 were bilaterally surgically castrated, 2 both surgically and chemically castrated, and 6 only chemically castrated. The mean age was 67.4 years (range, 62–75). In the eight patients with surgical castration only, all reported reduction in libido. No patient reported spontaneous erection nor had they attempted intercourse. These same patients reported strong libido and good erections prior to castration. A recording device measured erectile function during the presentation of an erotic video (visual sexual stimulation) 4 to 59 months (average was 21 months) after orchiectomy. Four (50%) of the surgery-only patients reported functional erection, which was corroborated during the period of visual sexual stimulation. None of the chemically castrated men achieved a functional erection during presentation of the video. However, 9 of the 10 castrated men (combining the eight surgery-only and the two surgical and chemical-castration patients) reported poor to absent libido after surgery. Greenstein *et al.* concluded that castration was associated with marked reduction in both libido and erectile function, but not uniform elimination of capacity.

Overall, the testicular and prostate cancer studies did not support a complete lack of sexual capacity and erectile dysfunction following bilateral orchiectomy. The major findings are summarized as follows:

- Testicular cancer patients who underwent bilateral orchiectomy and who received intramuscular testosterone injections reported loss of libido, decreased arousal, and erectile dysfunction. While sexual desire is uniformly reduced or eliminated by bilateral orchiectomy, the capacity to have an erection to sexually stimulating material is not eliminated.
- Self-reports of lack of erectile capacity in the testicular cancer studies were not confirmed by laboratory tumescence readings associated with visual erotic stimulation.
- Among bilaterally castrated men with metastatic prostate cancer who were in their 60s, erectile function measured in the laboratory demonstrated that 50 percent could achieve a functional erection after orchiectomy.
- Highly variable overall testosterone levels were found in a large sample of noncastrated, older male non-sex offenders. Erectile dysfunction

Table 1 1952 California Legislative Subcommittee Report: Cases of 40 Castrated Sex Offenders Who Did Not Reoffend Sexually

Case	Prior Criminal History	Instant Sexual Offense	Age	Castration Year	Probation Year	Follow-up Years*
1	None	Fondled 9-year-old girl	57	March 1937	July 1946	13 years
2	Intoxication	Fondled/oral copulation with 6-year-old boy	33	February 1940	June 1944	10 years 1 month
3	None	Raped 2 girls ages 11 and 16	60	June 1944	Active status	5 years 9 months
4	Burglary; lewd/lascivious behavior	Raped disabled adult female	30	September 1941	Active status	8 years 6 months
5	None	Masturbated 13-year-old boy and other boys	32	January 1938	July 1939	12 years 2 months
6	None	Masturbated 12- and 13-year-old boys	26	May 1941	February 1942	8 years 10 months
7	None	Attempted intercourse with daughter age 9; nonsanctioned sex acts with older daughter	48	December 1944	January 1949	5 years 3 months
8	Intoxication	Exhibited self/fondled penis of 8-year-old boy	61	November 1941	Active status	8 years 4 months
9	Annoy/molest a child; attempted rape	Fondled 14-year-old female	25	January 1940	August 1943	10 years 2 months
10	None	Digital penetration and placing penis between legs of 12-year-old girl	41	November 1939	July 1944; died	4 years 8 months
11	Burglary; voyeurism; prowling	Fondled private parts of 13-year-old girl after cutting her clothes off; nonsanctioned fondling of other girls and women	51	July 1941	July 1946	8 years 8 months
12	None	Lewd/lascivious acts with 9-year-old boy	29	October 1941	February 1949	8 years 5 months
13	None	Sodomy of 18-year-old male; nonsanctioned sodomy of 16-year-old boy	51	January 1940	November 1948	10 years 2 months
14	None	Oral copulation with 15-year-old boy; made sexual advances to other boys	34	December 1941	December 1947	8 years 3 months
15	None	Intercourse (numerous times) with 12-year-old daughter	38	February 1947	Active status	3 years 1 month
16	None	Oral copulation (10–15 times) with 14-year-old boy	59	June 1947	Active status	2 years 9 months
17	None	Fondled private parts of 9-year-old girl	54	September 1945	May 1946	4 years 6 months
18	None	Oral copulation with 14-year-old boy	58	May 1939	May 1944	10 years 10 months
19	None	Oral copulation with 14-year-old boy; nonsanctioned oral copulation with 14-year-old boy	66	October 1940	March 1949	9 years 5 months
20	Lewd/lascivious behavior	Masturbation of 2 boys ages 11 and 13; nonsanctioned oral copulation/sexual deviance	52	February 1948	Active status	2 years 1 month
21	None	Fondled private parts/rubbed penis between legs of 8-year-old girl	61	March 1948	Active status	2 years
22	Robbery/assault	Placed penis between legs and fondled penis of 13-year-old boy	25	July 1947	Active status	2 years 8 months
23	Tampering with electric lines	Placed penis between thighs of 13-year-old boy	49	October 1947	Active status	2 years 5 months
24	Exhibitionism (to child victims)	Exposed self to 9-year-old girl; tried to get her to fondle penis; lewd suggestions to other girls of similar age	55	June 1944	June 1948	5 years 9 months
25	Larceny	Placed penis between legs of 7-year-old girl and ejaculated	48	February 1939	February 1944	11 years 1 month
26	Indecent exposure; disorderly conduct; lewd/dissolute	Rubbed his hands on 4 ½-year-old girl's vagina; kissed her vagina	44	June 1948	Active status	1 year 9 months
27	Lewd/lascivious acts; lewd/dissolute behavior	Fondled, orally copulated with, and sodomized 13-year-old boy	52	May 1948	Active status	1 year 10 months
28	None	Fondled penis of 13-year-old boy; non-sanctioned fondling of 13-year-old boy	38	January 1950	Active status	2 months
29	None	Attempted sodomy, fondling, and oral copulation with 14-year-old boy	36	February 1941	Active status	9 years 1 month
30	Debauchery	Placed penis against buttocks of 12-year-old boy; alleged to have sodomized boy	55	November 1939	Active status	10 years 4 months

Table 1   (continued)

Case	Prior Criminal History	Instant Sexual Offense	Age	Castration Year	Probation Year	Follow-up Years*
31	Lewd/lascivious behavior	Oral copulation with 8-year-old boy; placed penis between boy's legs	24	July 1941	July 1941	8 years 8 months
32	None	Placed penis on 13-year-old daughter's vagina; incest with older daughter	38	October 1938	October 1939	11 years 5 months
33	Lewd and indecent acts; delinquency of minor	Fondled penis of 14-year-old boy	54	April 1938	April 1940	11 years 11 months
34	None	Had 10-year-old girl fondle his penis; nonsanctioned act of 8-year-old girl fondling his penis	46	February 1946	January 1950	4 years 1 month
35	None	Fondled private parts of 11-year-old girl; nonsanctioned same acts with minor girls	72	November 1939	October 1944	10 years 4 months
36	Sodomy	Oral copulation with 10-year-old boy; oral copulation with 16-year-old boy	41	September 1943	None; released after operation	6 years 6 months
37	None	Had 11-year-old boy perform oral copulation on him several times	48	December 1943	Active status	6 years 3 months
38	None	Had 5-year-old girl fondle his penis; placed penis in mouth of 7-year-old boy; exhibited self to 8-year-old daughter	42	October 1948	Active status	1 year 5 months
39	None	Fondled daughters ages 10 and 15; attempted digital penetration; sexual intercourse with 15-year-old daughter	41	April 1948	Active status	1 year 11 months
40	None	Digital penetration/rubbing penis between legs of 6-year-old girl; same with girls ages 5 ½ and 7 years	34	February 1939	March 1942	11 years 1 month

* Follow-up period from date of orchiectomy to preliminary report date of March 1950

was associated with aging, but not with total serum testosterone. Almost 42 percent of those in the 60 to 69 years age group reported no erectile dysfunction.

- The study by Greenstein et al.[43] of castrated elderly normal men demonstrated that all eight who were only surgically castrated reported reduction in libido and loss of spontaneous erection. These data coupled with the findings of Wille and Beier[35] on sex offender castrated persons aged 60 years and over, in which only 1 of 13 experienced sexual capacity, suggest that orchiectomy may be an effective method of reducing both libido and sexual recidivism among elderly sex offenders.

While orchiectomy can decrease the intensity of sexual motivation, it does not always eliminate sexual capacity. That is, castrated individuals can achieve erections after surgery. The data from normal males suggest that erectile capacity occurred in response to stimuli they found to be erotic. It could be argued that erectile capacity in castrated sex offenders does not mean they will sexually recidivate, only that they are capable of sexual intercourse. However, when the arousing stimuli for the castrated sex offender remain deviant, then the prudent evaluator would need to consider erectile capacity as a variable in sexual recidivism risk.

Ethics Ramifications Regarding Surgical Castration

The involuntary castration of sex offenders of the type conducted in pre-World War II Germany under the Nazi regime fell clearly within an unethical realm. Many of these surgeries were performed under the auspices of "experimentation," with poor methodology, with no benefit for or consent from the individual, and for the purpose of assembly-line sterilization of undesired populations. Such "experiments" were often difficult to differentiate from frank torture. Presently, it could be argued that prisoners and mentally ill persons are two groups of vulnerable populations in which even "voluntary" agreement to orchiectomy may be suspect. Involuntary civil commitment, such as that found under SVP/SDP laws, could be considered a situation of high coercive potential. Alternatively, some sex offenders might view castration as the only method of release from potentially lifetime commitment to a state hospital or similar locked facility. Thus, they could argue that it is unethical to deprive them of an intervention

Table 2 Summary of Surgical Castration Studies Regarding Sexual Recidivism

	Castrated Sex Offenders				Noncastrated Sex Offenders
Study	Number of Subjects	Sex Crime History Prior to Current Offense	Follow-up Period	Sexual Recidivism After Orchiectomy	Sexual Recidivism of Noncastrates in Same Follow-up Period
Legislative Report (California, 1952)[25]	60	27.5%*	2 months to 13 years	0%	No comparison group
Bremer (Norway, 1959)[31]†	102	58%‡	1 to 10 years	2.9%§	No comparison group
Langelüddeke (Germany, 1963)[32]†	1036	84%‖	6 weeks to 20 years	2.3%	N = 685 (39.1%)
Cornu (Switzerland, 1973)[33]†	121	76.86%‖	5 to 35 years	7.44%	N = 50 (52%)
Sand et al./Stürup (Denmark, 1964,[29] 1972[28])	900	42%‖	6 to more than 10 years	1.1%	No comparison group
Wille & Beier (Germany, 1989)[35]	99	Unclear¶	11 years, average	3%	N = 35 (46%)
Hansen (Denmark, 1991)[30]#	21	No information	More than 15 years	10%**	N = 22 (36%)

* Data for 40 of the 60 subjects (Table 1); one or more arrests and/or convictions.
† Data from this study reported in Heim and Hursch.[23]
‡ One or more incidents of sexual relapse before castration (unclear whether arrests and/or convictions).
§ For those 41 subjects observed for 5 to 10 years, 7% recidivism rate.
‖ Two or more convictions.
¶ Data unclear as to whether sexual charges reflect instant offense only, prior sex offenses, or a combination.
# Data from this study reported in Hansen and Lykke-Olesen.[27]
** After two subjects took exogenous testosterone.

that might restore their freedom to live in the community.

Ethics arguments have been promulgated both against and in favor of the use of surgical castration for recidivistic sex offending. These arguments involve competing ethics obligations to the individual and to society. Key ethics concepts relevant to these issues include respect for individual autonomy, beneficence, and justice. One argument against the use of surgical castration stems from the individual's point of view. It could be argued that a person who chooses to undergo surgical castration while being restrained in a psychiatric hospital (or prison) may not have made a fully voluntary decision. Rather, it might be more accurate to state that the individual was coerced by his circumstances, given his status as an involuntary committee facing protracted periods of custody, as well as his perception that castration will persuade courts that he is sufficiently nondangerous to be released into the community. Some question the very capacity of a person in this situation to choose autonomously and voluntarily between two such onerous outcomes, thus calling into question the validity of an "informed" decision to be castrated.

In their review of nine states where chemical and/or surgical castration statutes have been enacted, Scott and Holmberg[44] raised similar ethics concerns as to the capacity of convicted sex offenders to make an informed decision regarding surgical or chemical castration. Whether this type of treatment is medically appropriate is another ethical consideration. As Berlin *et al.*[45] noted, such intervention may be medically appropriate under narrow circumstances—that is, when there is evidence that the sex offender's actions are mediated by intense, obsessional, and recurrent paraphilic urges and fantasies. In some of the states with castration statutes, there is no requirement for a psychiatric evaluation of the offender; therefore, the medical appropriateness of such treatment cannot be determined.[46]

Additional debates on ethics could be viewed from a traditional medical analysis regarding the risks and benefits of a procedure. From a risk perspective, the surgical procedure is irreversible, thereby reducing an individual's autonomy through a severe reduction in sexual desire. It might also result in osteoporosis and increased risk of suicide. From a benefit perspective, surgical castration reduces compulsive sexual preoccupation for some sex offenders, may not eliminate

sexual capacity for some sex offenders, and lost desire might be reinitiated through exogenous testosterone for some sex offenders.

In contrast, these reductions in autonomy are not unique in medicine. Many medical and surgical procedures limit a person's future autonomy, including prophylactic mastectomy for risk of future breast cancer, use of Antabuse, tubal ligation, and vasectomy. Many more medical interventions carry with them potential harmful effects—for example, permanent neurological damage (antipsychotic medication), loss of hearing (antibiotics), damage to other organs of the body (anti-seizure medications), and death (general anesthesia). Such medical risks should be considered in light of the availability of alternative treatments that have demonstrated some level of effectiveness. With respect to sex offenders, are there effective alternatives to bilateral castration that reduce deviant sexual behavior? Both cognitive-behavioral therapy and pharmacological interventions, such as specific serotonin reuptake inhibitors (SSRIs), antiandrogen medications, and the luteinizing hormone-releasing hormone (LHRH) agonists, have shown at least moderate levels of effectiveness. Neither cognitive-behavioral therapy nor antiandrogen treatment can be viewed as absolute in their reduction of sexual recidivism risk.

Some professional organizations have taken a position against surgical castration as an intervention for sex offenders based on the availability of antiandrogen medications that can achieve similar results.[47] However, it could be argued that, under certain circumstances, the most invasive treatment may be the only effective alternative for a high-risk sex offender. While antiandrogen and hormonal agents are noninvasive alternatives, these interventions have problematic side effects such as weight gain, nausea, feminization, osteoporosis, and increased risk of diabetes mellitus and deep vein thrombosis.[48,49] These side effects may in some individuals exceed those associated with surgical castration. It could be argued further that surgical castration is an appropriate alternative under circumstances when chemical suppressants have been tried and discontinued due to intolerable side effects or risk of life-threatening conditions.[50]

Additional support in ethics for castration for sexual offenders involves the assertion of choice to remain offense free in the community and to be rid of aberrant and compulsive impulses. Based on the few published castration studies conducted on sex offenders, bilateral orchiectomy was related to some success in preventing recidivistic sexual violence. Surgical castration may provide a method of showing the patient's commitment to public safety or at least his commitment to attempting to control his deviant sexual behavior. There may also be positive psychological benefits to the sex offender resulting from the operation. In this regard, Langelüddeke found that 52 percent and Cornu found that 71 percent of the castrated sex offenders were accepting of and content with their decision to be castrated.[23] The quality-of-life choice in being free of forced institutionalization for the price of surgical castration could be viewed by some sex offenders as a valid option, especially for those who view themselves as unlikely to be released given their past crimes.

While beyond the scope of this article, it should be noted that in addition to the ramifications in ethics regarding castration as a method of treatment for sex offenders, legal issues have been raised on its use, including whether this intervention may be considered a medically appropriate treatment. Winslade _et al._[51] outlined circumstances under which surgical castration of pedophiles may be legally and morally defensible. The authors stated that proponents of castration must face such questions as whether the procedure is medically appropriate, the risks are known and minimal and can be mitigated, there is informed consent, there are procedural safeguards to assure that the incarcerated individual is competent to make treatment decisions and elects to undergo the surgery on a voluntary basis and under no coercion, and there is an outside professional review of the request for castration.

Assessing Risk Reduction Among SVP/SDP Surgical Castrates

The orchiectomy studies highlight the complex nature of sexual functioning in males who have undergone bilateral removal of the testes. Men with low or no testosterone levels were still able to perform sexually and achieve functional erections, as demonstrated in cancer studies measuring penile tumescence in response to erotic visual stimulation. The studies of non-sex-offender males who underwent bilateral orchiectomy demonstrated that while testosterone may mediate physical sexual arousal, it is not uniformly essential to male sexual functions.

With respect to sex offenders who underwent chemical castration only, hormonal treatments such as MPA (medroxyprogesterone acetate) or CPA (cyproterone acetate) reduced testosterone levels and affected sexual deviance.[52–54] However, these studies used self-report to measure decreases in deviant sexual drive, fantasies, and behavior—a methodology with questionable reliability.

As Table 2 summarizes, every study that examined sexual recidivism in castrated sex offenders found a marked reduction in sexual offending (0–10 percent). Sexually Violent Predator/Sexually Dangerous Person laws use a risk threshold that is defined as "likely" or "more likely than not" to meet the standards for commitment.[2] Thus, a castrated sex offender may argue that his risk level falls somewhere between 0 and 10 percent, based on previous research, and is substantially lower than the threshold of risk mandated by the SVP/SDP laws. Indeed, such a probabilistic percentage of risk range would comport with a low-risk label, according to one widely used actuarial rating scale for sexual recidivism risk, the Static 99.[55]

Does bilateral orchiectomy provide a substantial treatment for high-risk sex offenders that justifies unconditional release of these individuals into the community? Three considerations must be examined in answering this question. The first is whether the existing orchiectomy data can be applied reliably to high-risk individuals such as those subsumed under the SVP/SDP commitment process. The second point concerns whether the individual will have access to exogenous testosterone. The third consideration is the extent to which nonhormonal factors, such as psychologically driven needs for intimacy and neurobiological pleasure mechanisms can potentiate relapse.

The following vignettes are composite portrayals of individuals who qualified for an SVP evaluation. They are used to illustrate the difficulties in applying the orchiectomy research to a specific high-risk population in assessing potential for recidivism among SVP/SDP respondents petitioning for release based on surgical castration. Just as a particular psychotherapeutic approach should not be viewed as an absolutely effective treatment intervention or a probabilistic estimate based on actuarial tools should not be the sole determinant for assessing recidivism risk,[56] castration should not be the only factor used for determining whether an individual is likely to reoffend

sexually. Rather, the orchiectomy data should be applied in conjunction with other factors and in a clinically reasoned manner. The careful use of these data is crucial, as there is no empirical evidence on whether the existing orchiectomy findings on sex offenders is generalizable to an SVP/SDP population.

Vignette A: The Castrated Serial Rapist

Mr. A. was 54 years old with an arrest history of six rapes and an adolescent onset of sex offending. Despite serving prison terms for two of the rapes, Mr. A. committed a third set of offenses at the age of 40. In the most recent offenses, there was an escalation in violence that involved the torture and mutilation of an adolescent female victim and of an adult female prostitute. At the time, he was in a live-in relationship with a woman 20 years his senior. When Mr. A. was 51 years old and eligible for release from prison for these last offenses, he was diagnosed with the mental condition of Paraphilia Not Otherwise Specified, found to meet the SVP criteria, and thereby committed to a state hospital for treatment.

During his SVP commitment, Mr. A. chose not to participate in any form of psychological treatment, including the cognitive-behavioral treatment program for sex offenders. Now 54, Mr. A. petitioned for release on the basis of having undergone a court-approved bilateral orchiectomy four months previously.

State hospital notes described Mr. A. as reclusive and remaining verbally hostile toward female staff members. After orchiectomy, he became more irritable and passive and gained weight. He repeatedly articulated his view that he suffered from no sexual or psychological disorder. If released, Mr. A. would not be under any parole supervision or other type of conditional release. Moreover, he now has neither family nor financial resources available to him in the community.

Mr. A. argued that his continued commitment following orchiectomy was unwarranted, as he currently had no sexual drive, deviant or otherwise. A penile post-surgical plethysmograph was performed, the results of which showed no significant sexual arousal in response to scenes depicting sexual aggression, to other sexual deviant stimuli, or to normal stimuli. Blood levels drawn after surgery in the state hospital confirmed insignificant testosterone levels.

In assessing Mr. A.'s risk of sexual reoffending and whether he should remain committed as an SVP, two issues related to orchiectomy are pertinent: the application of orchiectomy data to high-risk sex offenders and the impact of potential access to exogenous testosterone on risk for recidivism.

Applying Existing Castration Studies to a High-Risk Sex Offender

The pre-surgery recidivism risk level of those sex offenders who underwent orchiectomy was variable across the published sex-offender castration studies summarized in Table 2. The following studies have very limited applicability to a nonpsychotic, sadistic serial rapist such as Mr. A:

- Stürup[26] did not specifically identify what type of sex crimes the 900 men in Denmark committed before their castration; therefore, the data offer no direction on how to apply their findings to a person such as Mr. A.
- The German Langelüddeke[23,32] data set also contain a large number of subjects ($n = 1,036$). However, the types of sex crimes committed by the subjects before orchiectomy are not well specified. Therefore, this study has the same limitations as Stürup.[26]
- The Swiss data set reported by Cornu in 1973,[23,33] again, has the same limitations as noted by Stürup[26] and Langelüddeke.[32]
- The Norwegian study conducted by Bremer[31] consisted primarily of subjects who suffered from mental retardation or schizophrenia.
- While the German study reported by Wille and Beier[35] is not clear as to pre-surgical sex offense recidivism rates, it does describe the type of offenders who underwent castration—that is, there was a high rate of pedophilic offenders and a low rate of aggressive sex offenders. Consequently, it has little applicability to a violent and serially sexually assaultive individual such as Mr. A.
- The 1952 California legislative report[25] contains information dated to 1950 for some of the sex offenders who were castrated as detailed in Table 1. However, none of these offenders was similar to Mr. A. in the critical factors of the degree of violence and repeated sexual assault. Therefore, the low-risk recidivism rates of this group after orchiectomy cannot be generalized reliably to Mr. A.

The follow-up of Hansen[30] of aggressive rapists and others who committed serious assaultive crimes against persons appears to be the closest fit to Mr. A. Even so, there are limitations in this study. There was no information as to the subjects' pre-surgical rate of sex offending. The sample size was small: 21 who were surgically castrated and 22 who were not. A 10 percent rate of sexual recidivism more than 15 years after release occurred only after two of the released castrated offenders received exogenous testosterone. However, can data from a small European sample be used to justify a conclusion of low risk due to surgical castration, given Mr. A.'s history and nature of offending? The Hansen and Lykke-Olesen[27] article did not offer information as to the characteristics of their subjects: were they similar to Mr. A. in escalation of sadistic violence; did they have a pattern of multiple prior offenses followed by criminal sanction, release, and reoffense; were they offered psychological treatment that they refused; was there a support system available to them after orchiectomy and after release; and were they under supervision after discharge into the community? The absence of such details argues against a persuasive application of the study's low recidivism rates to Mr. A. Therefore, the assumption of a low-level of recidivism risk for Mr. A. as supported solely on orchiectomy-based probabilistic estimates would not be warranted.

Access to Exogenous Testosterone as a Risk Factor

The physical side effects of orchiectomy might lead sex offender surgically castrated individuals to seek testosterone replacement for symptom relief. The Langelüddeke[23,32] study of sex offenders who were castrated reported several somatic effects after surgery, including enlarged breasts (11%), slack and flabby skin (51%), reduced body hair (69%), hot flashes and vertigo (42%), heart and respiratory disorders, night sweating or chronic pain (19%). Thirty-one percent reported psychological symptoms of depression, isolation, and passivity since the castration. While Mr. A. experienced some unpleasant side effects, he might suffer from additional ones as the years since the orchiectomy increase. It therefore is quite possible that he might seek exogenous testosterone for symptom relief. In the sample that was the "closest fit" to Mr. A., the only two castrated sex offenders who reoffended more than 15 years after release into the community did so subsequent to receiving testosterone injections.

It is not inconceivable that some physicians believe that a small dose of exogenous testosterone to reduce the side effects of orchiectomy in sex offenders would not result in sexual reoffending. However, there is research demonstrating that even low levels of testosterone can restore sexual capacity. One study[57] found that after serum testosterone levels in normal males were pharmacologically suppressed by Lupron (a gonadotropin-releasing hormone agonist), relatively low amounts of exogenous testosterone restored both erectile function and sexual activity and feelings. Thus, for the castrated sex offender, these data would have significant implications if the offender were to obtain even small doses of exogenous testosterone that restored his sexual function, drive, and physiology.

Clearly, there is no guarantee that Mr. A. will not seek exogenous testosterone; particularly, if the side effects increase or worsen, if he tires of them, or if he develops an interest in preserving the excitement he gained earlier from his paraphilic desires. The critical issue in this case is Mr. A.'s motivation in submitting to a voluntary orchiectomy. There is no evidence that such an action was motivated by his awareness of his psychiatric condition and its relationship to his documented dangerous sexual behavior. Rather, it appears that he elected the surgery as a means by which to gain discharge from his commitment and return to the community. Following orchiectomy, Mr. A. remained essentially psychologically unchanged. He continued to demonstrate hostility toward female staff members, a trait that could be related arguably to misogynistic attitudes. If released, he will not be under parole supervision or any other community social control mechanism. Releasing an individual such as Mr. A., whose history includes legal sanctions with poor responsiveness, in the hope that he will not seek exogenous testosterone does not appear prudent. He has experienced side effects from the castration and may, at minimum, seek symptom relief with medication. Further, it could be argued that the sadistic traits long exhibited by Mr. A. are non-testosterone-based factors that are firmly entrenched and present, thus rendering him at risk of sexually recidivistic behavior, despite orchiectomy.

Vignette B: The Castrated Serial Pedophile

Mr. B. was a 49-year-old individual who had lived alone his entire adult life. His pattern of sex offending began at age 16 when he molested a young boy.

Since then, he had been placed in custody on three separate occasions for sex offenses against five boys under the age of nine. While on parole at age 35, he was arrested for oral copulation with three boys to whom he showed pornographic videos and pictures and gave money for sexual favors. These acts were alleged to have occurred over a six-month period.

At the end of Mr. B.'s last prison term, he was found to be an SVP and committed to a state hospital. Initially, while in the hospital's sex offender treatment program, he was hesitant to disclose but soon participated fully in the groups. His SVP commitment was renewed, and he has since completed most of the phases of the treatment program. One year ago, he chose to undergo surgical castration. Since then, his testosterone levels were confirmed as low. Currently, he views himself as cured of sexual deviancy. A penile plethysmograph (PPG) conducted recently confirmed no sexual arousal in response to young boys. Mr. B., however, demonstrated sexual arousal in response to images of teenage boys on the PPG. Six months after orchiectomy, the hospital staff found a stash of pictures of young boys in Mr. B.'s locker that were cutouts from "family-type" magazines. Mr. B. denied that the pictures belonged to him.

Mr. B. has never had age-appropriate relationships, and during group sessions he admitted freely to being afraid of rejection by adults. He said that he was more comfortable with male children. Mr. B.'s release plan is to live in a facility that assists parolees with community reentry. Staff contact with the organization revealed that they were unaware of Mr. B.'s offense history and identified their primary mission as providing temporary shelter and job referrals. If released from his SVP commitment, Mr. B. would be under no mandated community supervision, as his term of parole has expired.

Orchiectomy Data Application

Of the seven castration data sets listed in Table 2, six did not appear generalizable to Mr. B. These studies were limited as to information on the rate of pedophilic offenders, included only aggressive rapists or other seriously assaultive individuals, or did not specify the nature of the sex crime. One data set may be applicable to Mr. B. The study from Germany by Wille and Beier[35] reported recidivism rates for castrated sex offenders between 1970 and 1980. The castrated sample included 73 percent who were de-

scribed as pedophilic offenders while the noncastrated group included 49 percent pedophilic offenders. The sexual recidivism rate was 3 percent for all of the castrated individuals, as opposed to 46 percent for all of the noncastrated persons. These findings seem to suggest that the surgical intervention was related to reducing sexual recidivism, especially given the fact that the castrated group was composed almost entirely of individuals who were sex offenders; however, their pre-surgical rate of sex offense was not specified. Therefore, based on the study by Wille and Beier, it could be argued that Mr. B.'s probabilistic risk for sexual recidivism is very low (i.e., three percent). Would this be an accurate assessment for Mr. B.? Before making such a conclusion, it is important to consider other factors that remain salient to risk of sexual recidivism.

Neurobiological Factors That Are Non-testosterone Dependent

The reduction or elimination of testosterone might not affect the neurotransmitters (such as dopamine) that play a role in the maintenance of sexual behavior.[53,58,59] Dopaminergic midbrain pathways associated with the interpretation of pleasure could also have relevance for sexual behavior. The mesolimbic dopaminergic neuronal pathway has been long described as integral to the processing of pleasure or reward. This pathway (via the nucleus accumbens) may play a role in interpreting pleasure derived by visual stimuli. There has been empirical evidence that the midbrain pleasure pathways are reactive to visual stimuli of a quasi-sexual nature. For example, one functional magnetic resonance imaging (fMRI) study found that the mesolimbic dopaminergic pathway was selectively activated in young heterosexual males when exposed to faces of beautiful women. Such a finding did not occur when the subjects were exposed to faces of ordinary-appearing women.[60] Moreover, there are emerging data suggesting that visual erotic stimuli are processed differently by normal and paraphilic persons, with different areas of the brain stimulated by deviant sexual stimuli.[61]

What impact do visual stimuli have on sexual arousal? Cancer studies of bilaterally castrated patients found that exposure to erotic visual stimuli remains sexually arousing despite the absence of testosterone.[39] Although Mr. B. did not demonstrate any sexual arousal in response to pictures of young boys on the post-orchiectomy PPG, he was aroused by images of teenage boys despite low testosterone

levels. This finding indicated that his non-testosterone-based pleasure mechanisms remain robust. In addition, Mr. B. was found in possession of pictures of young boys after surgery. Exposure to innocuous stimuli could be sexually arousing to paraphilic males, as one study of pedophiles found. In this study, pedophiles admitted to finding television and print advertisements using child models sexually arousing.[62] Given Mr. B.'s response to and possession of pictures of juvenile males, it could be argued that he continues to have pedophilic interests, despite surgical castration and low testosterone levels.

An important factor to consider is that the castration studies of sex offenders preceded current computer technology that offers avenues for visual pornographic stimuli. The freedom of communication with computers (e.g., chat rooms, and electronic mail) could also provide sex offenders easy access to potential victims and may motivate the castrated sex offender to engage in inappropriate sexual contacts with children or adults. Haywood and Cavanaugh described chat rooms as "opening up new vistas for sexual deviance" (Ref. 36, p 388).

Psychological Factors

Sexual behavior is not exclusively determined by sex hormones. Therefore, as with other behavior, past experiences as well as needs and interpersonal skills determine the form and intensity of sexual behavior, both normal and deviant. An inadequate capacity to bond emotionally with adults may lead to deviant attraction to underage minors. Throughout his life, Mr. B. had no age-appropriate partners; rather, he had a long-standing deviant interest in male children. Mr. B.'s proposed residence upon release offers little in the way of helping him address and cope with his needs and impulses. Therefore, there is a substantial likelihood that he will find himself in a position of little social support, factors that are only apt to heighten emotional distress.

In an examination of released sex offenders, Hanson and Harris[63] found that intimacy deficits such as lacking age-appropriate partners, emotional identification with children, and social rejection were associated with an increased risk of sexual recidivism. Among sex offenders, deviant sexual fantasies have been linked as a coping mechanism for emotions, such as anger, depression, and loneliness, that become precursors to sexual recidivism.[64] Pre-existing deficits in the ability to form appropriate social rela-

tionships as well as poor capacity to bond with others may only be heightened by surgical castration. Heim and Hursch[23] reported follow-up findings from a subsample of German castrated sex offenders and noted that almost a third complained of feelings of depression, inadequacy, and isolation after surgery. In the Swiss sample, they reported the finding that 32 percent of the castrated group complained of feeling miserable after the operation, with some expressing complaints of depression, irritability, and isolation. While the rate of sexual recidivism was low in both groups, these psychological factors cannot be ignored as potential risk elements that may increase the likelihood of sexual recidivism. In sum, the extent of protection against sexual recidivism offered by castration alone for Mr. B. appears to be overestimated.

Conclusion

The studies of bilateral orchiectomy are compelling in the very low rates of sexual recidivism demonstrated among released sex offenders. However, as this review has underscored, the studies are methodologically suboptimal and the generalizability of findings to a present-day, high-risk sex offender remains problematic. Sample generalizability is a critical issue that should inform the application of research findings to the individual patient. The process of utilizing research findings in clinical practice is called "evidence-based medicine." The findings that have the greatest applicability to the individual patient are those where that person is similar to those studied.[65] When the research sample differs greatly from the individual patient, the clinician cannot apply confidently the study findings to that person. In the sex offender castration studies that were reviewed, the sexual recidivism percentages were calculated from groups of highly variable castrated sex offenders, whose types of sex offenses and conditions of release were not well specified. This is a key shortcoming when evaluators attempt to apply the recidivism risk percentages from these sex offender orchiectomy studies to an SVP/SDP sample that represents a small subgroup of extremely dangerous individuals.

A recurrent pattern of sex offending suggests the ingrained nature of deviant sexual interests. Orchiectomy alone, without attendant psychological change, may be insufficient to mitigate sexual recidivism in a person who is in the community and subject to temptations. Conversely, it may be difficult to mea-

sure the true extent of reduction of deviant sex drive by use of nonhormonal treatments; that is, there is no strong empirical base that the effects of cognitive-behavioral treatment administered in institutions will remain robust once the offender is released into the community, free from social control. Of primary concern to public safety is that there are few empirical data regarding the recidivism rate of high-risk sex offenders who are surgically castrated and released under no community supervision. For those individuals who harbor entrenched pedophilic or sadistic sexual preoccupations, the removal of the testes without accompanying cognitive-behavioral interventions may leave potent psychological risk factors in place. Conditional, as opposed to absolute, release into the community allows a safer way of monitoring *in vivo* how the high-risk sex offender copes with stress and how he handles risky situations (e.g., going to the grocery store and seeing young boys). It could also allow for assessing access to exogenous testosterone via blood tests.

As Hansen and Lykke-Olesen[27] noted, surgical castration is a treatment of symptoms and not a cure. The latter must be emphasized, as orchiectomy in high-risk offenders may create an artificial sense of safety. This is not to suggest that the existing orchiectomy data are of no value in current sex offender risk assessment. Rather, the risk analysis should reflect a prudent application of the orchiectomy data to the assessment of the individual sex offender. As the vignettes illustrate, each assessment should address some, if not all, of these four points:

- Is the data set to be used sufficiently detailed that the clinician can have a high degree of confidence that the sex offender being evaluated is similar to those examined within the study sample?
- Are there non-testosterone-dependent neurobiological factors present that could drive sexual recidivism?
- Are there psychological risk factors present that could increase sexual recidivism?
- What is the risk that this individual will secure exogenous testosterone, if released?

The low probabilistic sexual recidivism rates found in the sex offender orchiectomy studies may be applied under the following conditions: to those individuals for whom a persuasive argument can be made in support of their similarity to a sex offender

orchiectomy data set; when there is no evidence of continued preoccupation with children or that aggressive material arouses sexual pleasure; when there is a pattern of involvement in interventions that demonstrate awareness of psychological and other risk factors and the individual appears to have made substantial internal and behavioral changes; and when, as a result of these and other factors, the likelihood of accessing exogenous testosterone is low. Under such circumstances, it could be concluded that the confluence of variables, with orchiectomy as one, suggests that the individual would not present a "likely risk" and could be released into the community even with little to no supervised control.

The current review highlights the difficult decisions regarding the ethical use of surgical castration for select populations. This procedure, in and of itself, is not a complete treatment for sex offenders. Consequently, the deliberate evaluator should consider carefully the impact of bilateral orchiectomy on the reduction of risk in an SVP/SDP population and should not weigh this variable with either an inflated or deflated degree of importance.

Acknowledgments

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