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# Controlled Prospective Longitudinal Study of Women With Cancer: I. Sexual Functioning Outcomes

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## Abstract

The incidence and etiology of sexual difficulties for women with survivable cancer were studied. Women with early stage gynecologic cancer ($n$ = 47) were assessed after their diagnosis but prior to treatment and then reassessed at 4, 8, and 12 months posttreatment. Sexual and medical outcomes were compared with data from members of two matched comparison groups who were also assessed longitudinally: women diagnosed and treated for benign gynecologic disease ($n$ = 18) and gynecologically healthy women ($n$ = 57). Global sexual behavior disruption did not occur but the frequency of intercourse declined for women treated for disease, whether malignant or benign. In relation to the sexual response cycle, diminution of sexual excitement is pronounced for women with disease; however, this difficulty is more severe and distressing for women with cancer, possibly due to significant coital and postcoital pain, premature menopause, treatment side effects, or a combination. Changes in desire, orgasm, and resolution phases of the sexual response cycle may also occm; but they are of lesser magnitude or duration or both. Approximately 30% of the women treated for cancer were diagnosed with a sexual dysfunction. The nature, early timing, and maintenance of sexual functioning morbidity suggest the instrumental role that cancer and cancer treatments play in these deficits (particularly arousal problems) and suggest that preventive therapies are necessary.

Sexual functioning morbidity occurs for up to 90% of cancer patients who have the disease at the most prevalent sites (Andersen, 1985). These data have provided an impetus for the examination of sexual and fertility outcomes by the American Cancer Society (1987) and the National Institutes of Health (1987) and have led collaborative cancer study groups to address quality of life issues in general and sexuality in particular. For women with cancer, review indicates that there have been few assessments of the sexual outcomes for those with gynecologic disease (Andersen, 1987b). The most common site for gynecologic cancer is the uterus, with disease at the cervix or in the corpus (endometrium) accounting for 70% of all gynecologic tumors. The majority of women with uterine disease are diagnosed early and have

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[2]A psychometric analysis of the Sexual Arousability Index (SAI; Andersen, Broffitt, Karlsson, & Turnquist, 1989) revealed that the SAI indudes five primary factors: Erotica and Masturbation, Body Caressing, Seductive Activities, Oral-Genital and Genital Stimulation, and Intercourse. From the initial to the 4-month follow-up, Factors 2, 4, and 5 significantly declined for the disease group and remained stable for the healthy group. This pattern would indicate that the lowering of arousability for the women with disease is linked to foreplay and intercourserelated behaviors only, rather than a nonspecific arousal deficit.

[3]Menopausal changes in genital anatomy include progressive thinning of the barrier layers of skin and mucous membrane tissue and loss of subcutaneous fat. The vaginal opening shrinks in size, the labia minora and clitoris become smaller, and the labia majora flatten. The vagina becomes shorter, its diameter narrows, and vaginal lubrication is diminished (i.e., atrophic vaginitis). There is also a loss of pelvic muscle tone.

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an encouraging prognosis (i.e., 50-86% 5-year survival). The next major site is the ovary, accounting for an additional 27% of all newly diagnosed patients, and if diagnosis is made when the disease is localized, the prognosis is similarly favorable.

When sexual outcomes have been reported, the estimates of disrupted sexuality for cervical cancer patients range from 10-80%; however, a longitudinal study by Vincent and colleagues (Vincent, Vincent, Greiss, & Linton, 1975) estimated disruption to be 30%. There has been no sexual study of endometrial or ovarian cancer patients, but sexual responses for women with disease at these latter sites would likely be comparable to those of women treated for cervical cancer because the treatments for localized disease are similar. Estimates of the incidence of sexual difficulties do not provide the needed clinical information to design sexual therapies. Thus, this investigation was designed to answer the following questions: What is the nature of sexual difficulties that appear unique to a gynecologic cancer diagnosis and subsequent gynecologic cancer treatment? and What is the time course for sexual problems development or resolution? It is not possible to conduct an experiment to answer these questions because random assignment to conditions is not possible.

We attempted to improve upon previous research in three major ways and to provide several bases for ruling out competing hypotheses for cancer versus noncancer effects. First, we proposed a model and developed a strategy for quantifying the outcome variable “sexual functioning” (see Andersen, 1987a). In previous investigations of cancer patients, single measures of sexuality (e.g., frequency of intercourse, frequency of orgasm) have been used. We operationalized the construct and included three dimensions: sexual behavior, the sexual response cycle, and the diagnosis of sexual dysfunction. Second, we compared sexual functioning for the women with cancer with that of matched comparison groups. The difficulty of making these selections has been discussed (Andersen & Jochimsen, 1987), and two comparison groups were deemed most appropriate. A group of healthy women with no gynecologic disease estimated sexual functioning with normal life circumstances, because the base rate of sexual concerns, difficulties, or dysfunctions among healthy women is not negligible (e.g., Frank, Anderson, & Rubenstein, 1978). A second group, women with a recently diagnosed benign gynecologic disease/condition, provided a noncancer estimate of disruption caused by gynecologic disease and treatment to the pelvis. Although cause-effect statements cannot be made, the effect of the diagnosis of malignant disease and cancer treatment can be estimated from a comparison of the three groups. Third, we used a limited prospective longitudinal design. The prospective aspect is limited in that the initial assessment of the disease groups (both malignant and benign) occurred immediately following their diagnosis but prior to treatment, and sexual functioning during the healthy period prior to the appearance of the disease signs/symptoms was estimated. The longitudinal aspect included three posttreatment assessments, providing different predictions for the three groups across time.

## Method

### Subjects

Before subjects were recruited, women were excluded from participation according to the following criteria: age < 20 or >70 years, history of mental disorder or organic brain syndrome, physically disabling illness or injury, significant sensory deficit, previous cancer or significant gynecologic disease, or current or anticipated pregnancy. There was a 5-15% refusal rate across groups, the primary reason being that women with disease described participation as too distressing under the circumstance of diagnosis and anticipated treatment, whereas healthy women described themselves as too busy or not interested.

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**Cancer—**Forty-seven women participated. Disease site and stage included cervix (*n* = 21 Stage I, *n* = 12 Stage II), endometrium (*n* = 9 Stage I), and ovary (*n* = 5 Stage I). All women received treatment consisting of surgery (e.g., radical hysterectomy, *n* = 23), radiotherapy (e.g., external beam plus intracavitary cesium, *n* = 13), or combination therapy (*n* = 11). A demographic analysis revealed that the mean age was 42 years (range = 25-65), that 75% of the sample were premenopausal, that the length of time with the current sexual partner was 17 years (range = 1-47), and that 100% of the sample were White.

**Benign—**Eighteen women participated. All had gynecologic diagnoses (e.g., endometriosis) and received surgical treatment (e.g., simple hysterectomy). A demographic analysis revealed that the mean age was 39 years (range = 22-59), that 67% of the sample were premenopausal, that the length of time with the current sexual partner was 14 years (range = 1-35), and that 100% of the sample were White.

**Healthy—**Fifty-seven women participated. A demographic analysis revealed that the mean age was 42 years (range = 24-61), that 75% of the sample were premenopausal, that the length of time with the current sexual partner was 16 years (range 1-42), and that 100% of the sample were White.

## Measures

Listed below are the a priori statistical groupings of the measures. A factor analysis of the sexual data supported the validity and reliability of these groupings.[1] The cutoff for the Pearson reliability correlations is .26, indicating that all the reliabilities provided below are significant. The interval for the test-retest reliabilities was 4 months.

**Sexual behavior—**Four measures were used: (a-c) Subjects provided the frequencies of sexual intercourse, partner kissing, and sexual fantasy during the previous month. Test-retest reliabilities were intercourse (.67), kissing (.76), and fantasy (.72). (d) The Current Sexual Activities scale from the Derogatis Sexual Functioning Inventory (DSFI; Derogatis & Melisaratos, 1979) provided a measure of the range of sexual activity. The scale includes 24 heterosexual sexual behaviors, and women endorsed each activity that had occurred in the last month. Scores range from 0 to 24. Test-retest reliability was .72, and Kuder-Richardson internal consistency was .84 (Andersen & Broffitt, 1988).

**Sexual response cycle—**Three measures of desire were used: (a) Signs: Subjects were asked the presence or absence of five desire signs (e.g., no interest in initiating sexual activity, refusal of intercourse/foreplay) noted by Kaplan (1979) and Masters and Johnson (1966). A total score from 0 to 5 was used. Internal consistency was .75. (b-c) Subject and evaluator judgments of the presence of a problem: A 5-point rating scale ranging from *no problem* (0) to *always a problem* (4) was used for the subject to rate the frequency of current desire phase difficulty. If a problem was present, a 5-point rating scale ranging from *absolutely no distress* (0) to *extremely distressing* (4) was used for the subject to rate her current distress about the desire problem. A similar procedure, a 5-point rating scale ranging from *no problem* (0) to *extreme problem* (4), was used by the evaluator to judge the likelihood and magnitude of a desire phase difficulty for the subject. The correlation between the two judgments was .87.

[1]A factor analysis was conducted with the initial assessment data from all subjects (*N* = 122) to determine if the conceptual factors for the sexual behavior and response cycle measures were empirically justified. A five-factor principle components analysis accounted for 72% of the variance. The five factors were Desire Measures (21%), Excitement Measures (15%), Orgasm Measures (15%), Sexual Behavior Measures (11%), and the Resolution Measures (10%). These analyses indicated that the general separation of behavior from response cycle measures was appropriate and that the empirical sorting of the response cycle measures occurred on the hypothesized dimensions.

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Scales (b-c) were also used for ratings of the subject's judgment of the presence of a problem and distress and for the evaluator's judgment of a problem for the excitement, orgasm, and resolution phases.

Five measures of sexual excitement were used: (a) Signs: Subjects were asked their awareness of six excitement signs (e.g., breast enlargement, nipple erection, or both; sex flush; vaginal lubrication) noted by Masters and Johnson (1966) and Hoon and Hoon (1978). A total score from 0 to 6 was used. Internal consistency was .57. (b) Sexual arousal: The Sexual Arousability Inventory (Hoon, Hoon, & Wincze, 1976) includes 28 sexual/erotic experiences for which subjects rate each activity from *adverse effect* (-1) to *always sexual arousal* (5). The items are summed for a total score ranging from -28 to 140. Test-retest reliability was .90, and Kuder-Richardson internal consistency was .92 (Andersen, Broffitt, Karlsson, & Turnquist, 1989). (c) Sexual anxiety: The Heterosexual Behavior Hierarchy—Female Form (Benfler, 1968) includes 21 autoerotic and couple sexual behaviors. Each item was rated on a scale ranging from *no anxiety* (0) to *very much anxiety* (7). Items were summed for a total score from 0 to 147. Test-retest reliability was .68, and Kuder-Richardson internal consistency was .90. (d-e) Subject and evaluator judgments of the presence of a problem: The correlation between the two judgments was .95.

Four measures of orgasm were used: (a) Signs: Subjects were asked their awareness of five orgasm signs (e.g., awareness of vaginal contractions, change in respiration) as noted by Masters and Johnson (1966), Hoon and Hoon (1978), and Newcomb and Bentler (1983). A total score from 0 to 5 was used. Internal consistency was .51. (b) Frequency of orgasm: This was the subject's current estimation in percentage of occasions attempted during intercourse. Test-retest reliability was .76. (c-d) Subject and evaluator judgments of the presence of a problem: The correlation between the two judgments was .97.

Four measures of resolution were used: (a) Signs: Subjects were asked their awareness of six resolution signs (e.g., general muscular relaxation, feelings of general release) noted by Masters and Johnson (1966). A total score from 0 to 6 was used. Internal consistency was .60. (b) Global sexual evaluation: A 9-point scale ranging from *could not be worse (0) to could not be better* (8), with *adequate* (4) as the midpoint, was used for subjects to rate their view of their sexual life during the resolution period following intercourse. Test-retest reliability was .62. (c-d) Subject and evaluator judgments of the presence of a problem: The correlation between the two judgments was .84.

**Diagnosis of sexual dysfunction—**The presence/absence of four sexual dysfunctions from the Diagnostic and Statistical Manual of Mental Disorders (DSM-III; American Psychiatric Association, 1980) was noted by the evaluator: inhibited sexual desire, inhibited sexual excitement, orgasm, and dyspareunia. For a diagnosis, reports of both behavioral disruption and accompanying significant distress from the woman were needed. The intrarater reliabilities were calculated using a tetrachoric correlational model and were desire (.75), excitement (.61), orgasm (.89), and dyspareunia (.78).

**Medical status—**Two measures were used: (a) System evaluation: The subject's physician rated on a scale from *no condition/normal* (0) to *most severe and/or life threatening* (4) any disease and therapy for the following systems: cardiovascular; pulmonary, gastrointestinal, neurologic, endocrine, hepatic, hematologic, and musculoskeletal. Test-retest reliability across systems was .71. (b) Estrogen deficiency symptoms/signs: Ten common symptoms/signs (e.g., hot flushes, disturbed sleep from night sweats, headaches) following hysterectomy or with menopause or both were assessed with a 5-point scale ranging from *normal/no symptom* (0) to *extreme* (4). Test-retest reliability was .61.

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### Procedure

All subjects were outpatients in the Department of Obstetrics and Gynecology at a university hospital. Because they were at a large tertiary care center, many more cancer patients meeting criteria were referred during the study period, in contrast with those with benign disease. Potential subjects for the healthy outpatient group with comparable age (±5 years) and menopausal status as women in the cancer group were recruited from women receiving a routine examination. Interviews were conducted in the outpatient clinic by a female research assistant (evaluator). Other psychological data (e.g., mood, interpersonal adjustment, and employment; Andersen, Anderson, & deProsse, 1989) were gathered, and descriptions of sexual functioning were obtained after rapport was established. The women were also queried about their partner's current sexual functioning. The initial assessment occurred during the tumor/disease workup 4-7 days prior to treatment for the cancer and benign patients and occurred within I week (usually the same day) of the outpatient appointment for the healthy subjects. At this same time, medical examinations were conducted. Follow-up assessments at 4, 8, and 12 months posttreatment documented current sexual and psychological functioning and medical status.

## Results

### Preliminary Analyses and Overview

To assess limitations of the data, two analyses were conducted. The first examined the matching strategy and tested for initial group differences on demographic and sexual variables. No significant differences were found on age, menopausal status, length of time with the current sexual partner, and frequency of intercourse; these variables relate to the level of sexual activity among women (Kinsey, Pomeroy, Martin, & Gebhard, 1953; Newman & Nichols, 1960).

A second analysis determined whether subject mortality was systematic. The reasons for subject loss for any follow-up differed across the groups. Within the cancer group they included lost to hospital follow-up ($n = 1$), study dropout ($n = 1$), and cancer recurrence ($n = 6$). For the benign group they included lost to hospital follow-up ($n = 1$), study dropout ($n = 3$), and moving ($n = l$). Within the healthy group they included study dropout ($n = 8$), moving ($n = 2$), and pregnancy ($n = 1$). Analyses were conducted between study “completes” and “incompletes” on matching and outcome variables for all subjects as a group and for each group. For the former, only age, $F(I, 123) = 4.73$, $p < .05$, was significant for all subjects, but analyses for each group were not. The means revealed a trend for study dropouts to be significantly younger ($M = 37.4$ years) than women completing the study ($M = 42.2$ years). This finding is consistent with the nondisease reasons (i.e., younger women were “too busy” to continue participation) and disease reasons (i.e., women younger at cancer diagnosis likely have more virulent tumors) for dropout. For the sexual variables, there were no significant differences.

For the sexual behavior and response cycle data, a 3 (Group: cancer, benign, and healthy) × 4 (Time: initial and 4, 8, and 12 months posttreatment) repeated measures design was used, and Group × Time interactions were of primary interest. A three-step plan was used. (I) A 3 × 4 multivariate analysis of variance (MANOVA) was conducted using the factor groupings. (2) If the Group × Time interaction was significant, follow-up univariate analyses of variance (ANOVAS) for each measure, again looking for a significant Group × Time interaction, were conducted. (3) If the interaction for a measure was significant, two follow-up orthogonal ANOVAS were conducted: (a) The first ANOVA contrasted the women with disease (cancer and benign groups combined, hereinafter referred to as disease group) with the healthy group in order to determine the magnitude of sexual disruption duc to any gynecologic disease and treatment, and (b) the second ANOVA contrasted the cancer versus benign groups to determine the magnitude of disruption caused specifically by malignant gynecologic disease and gynecologic cancer

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treatments. When considering the factor of time, we first contrasted the initial with the 4-month assessment to test for change in sexual functioning expected in the earliest posttreatment months. Secondly, we contrasted the 4-month with the 8-and 12-month assessments to determine whether early sexual difficulties would later resolve.

Since the data analysis plan was a priori, $p$ values $.05 < p \leq .10$ were examined for evidence convergent with any findings at $p$ values $< .05$, because we were interested in finding consistent patterns of sexual difficulty within the factors. A table of the means and standard deviations for each variable within groups and across time can he obtained from the authors. The longitudinal design is a powerful one to detect group differences, because the four replications essentially quadruple the sample sizes for each group.

## Sexual Behavior

The interaction from the 3 × 4 MANOVA for the four measures assessing the construct of sexual behavior was significant, $F(24, 1150) = 1.62$, $p < .05$. The 3 × 4 univariates for each measure indicated that the effect was largely due to the measure of intercourse frequency, $F(6, 279) = 2.08$, $p = .06$, as the $p$s for the other behavior measures (i.e., kissing, fantasy, and sexual activities) ranged from .25 to .56.

For the frequency of intercourse, the interaction for the disease versus healthy ANOVA was significant, $F(3, 282) = 2.87$, $p < .05$. Multiple comparisons indicated that there was a significant decline in the frequency of intercourse for the women with gynecologic disease (whether malignant or benign) from the initial ($M = 9.5$) to the 4-month posttreatment ($M = 6.1$) assessment in contrast with a stable frequency of intercourse ($M$s = 7.8 and 7.5, respectively) for the healthy women during the same period. For the 8- and 12-month assessments there were no significant changes between the two groups ($M$s = 6.0-7.5). In contrast with these data, the interaction for the cancer versus benign ANOVA was not significant ($p = .40$).

We also examined the reasons for and frequency of women becoming sexually inactive. In the cancer group, 3 women were inactive for one assessment period each: one with a vaginal infection, one with radiation therapy-related vaginal bleeding, and one whose husband died prior to the 12-month assessment. Two additional patients had difficulties resuming intercourse, and both couples stopped intercourse after two failed attempts. In both cases the male partners had histories of prior erectile difficulties for which the onset was correlated with the diagnosis and treatment of hypertension. Also, both women reported dyspareunia, and it appeared that their complaints may have contributed to the men's erectile capabilities becoming more vulnerable. By 12 months, intercourse did not resume despite the women's interest. Two women in each comparison group reported periods of inactivity. In the benign group, one woman never resumed intercourse because of relationship discord, and another woman was inactive at the 12-month assessment as a result of her partner's legal difficulties (jail). In the healthy group, one woman separated and divorced during the 8- and 12-month assessments. The husband of another woman had temporary erectile difficulties, possibly caused by newly prescribed antihypertension medication.

## Sexual Response Cycle

**Desire—**The interaction from the 3 × 4 MANOVA for sexual desire was not significant ($p = .47$). In the interest of clinical information, inspection of the 3 × 4 univariates indicated that only the evaluator's judgment of desire phase difficulties was noteworthy, $F(6, 276) = 1.94$, $p = .08$. The interaction for the disease versus healthy ANOVA was of the same magnitude, $F(3, 279) = 2.29$, with $p = .08$, but the comparison of the cancer versus benign groups was not significant ($p = .26$). These data indicate that if there was a diminution of sexual desire for individual

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women, the trained evaluator was more likely to have rated the problem among women treated for disease, whether malignant or benign.

**Excitement—**The interaction from the 3 × 4 MANOVA for sexual excitement was significant, $F(30, 1337) = 2.61$, $p < .01$. The 3 × 4 univariate analyses for all measures except sexual anxiety ($p = .58$) were significant: excitement signs, $F(6, 252) = 2.15$, $p < .05$; Sexual Arousability Inventory, $F(6, 267) = 3.72$, $p < .01$; subject's judgment of difficulty, $F(6, 267) = 3.72$, $p < .01$; and evaluator's judgment of difficulty, $F(6, 261) = 5.47$, $p < .01$.

For the measure of excitement signs, the interaction for the disease versus healthy ANOVA wag significant, $F(3, 255) = 3.78$, $p < .05$. Follow-up multiple comparisons indicated that there were comparable levels of excitement signs between the two groups at the initial assessment ($M = 3.6$ for disease and $M = 4.0$ for healthy, indicating awareness of approximately four of the five signs). At the 4-month assessment, women with disease continued to report generally the same number of signs ($M = 3.5$), whereas the healthy women reported a significant increase ($M = 4.8$). This difference between the disease and healthy groups continued through the 4- and 12-month follow-ups; women with disease reported awareness of 3.9 signs at both assessments, whereas scores for the healthy group were 4.9 and 5.0 for 8 and 12 months, respectively. For the cancer versus benign ANOVA, the Group × Time interaction was not significant ($p = .76$), indicating that awareness of the signs of sexual excitement was similar for the benign and cancer groups prior to and following treatment. In summary, these data indicate that during the year posttreatment, women with disease consistently reported less awareness of the signs of sexual excitement. Inspection of the data indicated that all women were unaware of one sign (sex flush) during sexual excitement, and the women with disease reported a general lessened awareness across the remaining signs. No differential absence of the signs of sexual excitement was noted by the women with cancer.

For the Sexual Arousability Inventory, the interaction for the disease versus healthy ANOVA was significant, $F(3, 261) = 7.72$, $p < .01$. Follow-up multiple comparisons indicated that the two groups reported comparable levels of arousability at the initial assessment (disease $M = 92$, healthy $M = 102$); however; by 4 months posttreatment the women with disease reported a significant decline in arousability ($M = 79$), whereas that for the healthy group remained at the same level ($M = 106$). There was no change from the 4-month arousability levels for either group at the 8- and 12-month follow-ups (i.e., the significant difference between groups remained across time). For the second ANOVA of cancer versus benign, the interaction was not significant ($p = .45$). Thus, these data indicate that for the entire posttreatment year, women treated for disease reported a significant decline in their arousability to a variety of sexual behaviors and activities, whereas arousability for the healthy women remained stable and higher. Also, no differential decline in arousability was indicated for the women with cancer.

For the subjects' judgments of sexual excitement difficulty, the interaction for the disease versus healthy ANOVA was significant, $F(3, 270) = 3.42$, $p < .05$. Follow-up multiple comparisons indicated that women with gynecologic disease judged themselves as having significant excitement phase difficulties at 4 months posttreatment ($M = .2$, indicating *rarely*), whereas this was not the case at the initial assessment ($M = .5$, indicating *never*). Also, this report of excitement difficulties occurring *rarely* by the women treated for disease continued for the remaining assessments at 8 and 12 months ($M$s = .8). In contrast, the healthy women always judged themselves as not having any difficulty with sexual excitement across the four assessments ($M$s = .1-.3, indicating *never*). For the cancer versus benign ANOVA, the interaction was significant, $F(3, 138) = 2.72$, $p < .05$. Follow-up multiple comparisons indicated that the aforementioned disease versus healthy results were due to the significantly negative self-evaluations by the women with cancer only. Specifically, self-evaluations for the women with benign disease remained stable ($M$s = .4-.6) across all four assessments and in the *never* range.

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In contrast, the judgments for the cancer patients significantly changed from *never* at the initial assessment ($M$ = .4) to *sometimes* for the first posttreatment assessment at 4 months ($M$ = 1.3). By the 8- and 12-month follow-ups, excitement problems were occurring less frequently for the cancer patients ($M$s = .9, indicating *rarely*). Thus, only the women with cancer judged themselves as having excitement phase problems, which appeared immediately following treatment. After I year, the problems remained but occurred less often.

The data on the evaluator's judgment of the women's excitement phase difficulties paralleled the preceding data on the women's self-evaluations of excitement difficulty. For the evaluator's judgment, the interaction for the disease versus healthy ANOVA was significant, $F(3, 264) = 4.13$, $p < .01$. The multiple comparison data indicated that the evaluators judged the women with disease as having a greater likelihood of sexual difficulties at the 4-month assessment ($M$ = 1.6, indicating an excitement problem was present and *moderate*) rather than at the time of the initial assessment when both groups were judged *as not having an excitement problem* ($M$s = .4 and .7). This significantly negative evaluation of excitement responsiveness for the women treated for disease was also obtained from the evaluators at the 8- and 12-month assessments ($M$s = 1.3). The second ANOVA, of cancer versus benign was also significant, $F(3, 129) = 5.43$, $p < .01$. Follow-up multiple comparisons indicated that the aforementioned disease versus healthy results were due to the evaluators judging excitement problems as likely for the women with cancer only. Evaluations of the women with benign disease remained stable ($M$s = .5-1.0), indicating *mild problem*) across all assessments. In contrast, the evaluators judged the women with cancer to have significant excitement difficulties and to have them with greatest severity at the 4-month assessment ($M$ = 1.9, indicating *moderate problem*). Evaluators judged that the women with cancer improved somewhat at 8 ($p$ = .04) and 12 ($p$ = .11) months ($M$s = 1.3 and 1.4, respectively, indicating *mild* problems). Thus, evaluators judged only cancer patients as having significant problems with sexual excitement following treatment. In the early months these problems were regarded as of *moderate* severity, although they improved with follow-up.

**Orgasm—**The 3 × 4 MANOVA interaction for orgasm approached significance, $F(24, 1124) = 1.30$, $p$ =. 16. In the interest of gleaning some clinical information, inspection of the 3 × 4 univariate analyses revealed that the two significant measures were judgment ratings: the subject's judgment of orgasmic difficulty, $F(6, 249) = 4.18$, $p < .001$, and the evaluator's judgment of orgasmic difficulty, $F(6, 267) = 2.57$, $p < .05$. The two other measures were subjects' reports of orgasm symptomatology ($p$ =. 19) and orgasm frequency ($p$ = .21).

Inspection of the subjects' and evaluators' judgments of sexual orgasm difficulty indicated that only the interaction for the disease versus healthy ANOVA was significant. For the women, the negative judgments of orgasmic difficulty appeared transitory: At 4 months the mean orgasm frequency during intercourse across groups was in the expected direction (i.e., cancer = 40% < benign = 51% < healthy = 67%), but by the 12-month assessment the means were all within the same range (i.e., cancer = 51%, benign = 47%, and healthy = 62%). This same general pattern was found with the evaluator data, with a greater likelihood for the evaluators to judge only the cancer patients as having more severe and longer lasting orgasmic difficulties.

**Resolution—**The interaction from the 3 × 4 MANOVA for resolution was significant, $F(24, 1094) = 1.71$, $p < .05$. Examination of the 3 × 4 univariate analyses revealed that three of the four measures were significant: global sexual evaluation, $F(6, 276) = 2.77$, $p < .05$; the subject's judgment of resolution difficulty, $F(6, 249) = 2.97$, $p < .01$; and the evaluator's judgment of resolution difficulty, $F(6, 264) = 2.59$, $p < .05$. The resolution signs measure was nonsignificant ($p$ = .23).

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For the global sexual evaluation, the interaction for the disease versus healthy ANOVA was significant, $F(3, 279) = 4.14$, $p < .01$. Follow-up multiple comparisons indicated that women with disease viewed their sexual life significantly less positive at 4 months posttreatment ($M = 4.4$, indicating *average*) in comparison with the period prior to diagnosis and treatment ($M = 5.5$, indicating *above average*). Furthermore, these evaluations were maintained for the 8- ($M = 4.5$) and 12-month ($M = 4.2$) assessments. In contrast, the evaluations for the healthy women remained stable across the four assessments (*M*s = 5.0-5.2, indicating *above average*). The second ANOVA of cancer versus benign was not significant ($p = .37$). Thus, women treated for disease evaluated their sexual life as having significantly changed and, in fact, as being less positive immediately following treatment and during recovery. Also, no differential disruption was found for the women with cancer.

For the subjects' judgments of resolution difficulty, the interaction for the disease versus healthy ANOVA was not significant ($p = .50$). However, the interaction for the cancer versus benign ANOVA was significant, $F(3, 126) = 2.82$, $p < .05$. Follow-up multiple comparisons indicated that women with gynecologic cancer judged themselves as having resolution phase difficulties at the 4-month assessment ($M = .8$, indicating *rarely*), whereas they reported no difficulties at the initial assessment ($M = .2$, indicating *never*). This view by the women treated for cancer remained through the 8- and 12-month assessments (*M*s = .6 and .5, respectively). In contrast, women treated for benign disease reported no difficulties with resolution at any point posttreatment (*M*s = .0-.2, indicating *never*). Thus, only women treated for cancer reported significant disruption of the resolution phase; women reported this difficulty in the immediate posttreatment period and with continued follow-up.

For the evaluator's judgment of resolution phase difficulties, the interaction for the disease versus healthy comparison was not significant ($p = .29$). However, the interaction for the cancer versus benign comparison was noteworthy, $F(3, 135) = 2.38$, $p = .08$. The multiple comparison data indicated that the evaluators judged the women with cancer as having resolution difficulties at the 4-month assessment ($M = 1.0$, indicating *mild* problem), and this had not been the case at the initial assessment ($M = .3$, *no problem*). This negative evaluation of the women's responsiveness was maintained for the 8- and 12-month assessments (*M*s = 1.0-1.1, indicating *mild problem*). In contrast, women treated for benign disease were not viewed as having resolution difficulties at any time posttreatment (*M*s = .0-.5, indicating *no problem*). Thus, only the women with cancer were judged as having resolution problems; they were of *mild* severity, appeared immediately posttreatment, and continued for at least 1 year following therapy.

## Sexual Dysfunction

For these categorical data, a three-step plan was used:

1. A chi-square statistic was calculated for each of the four diagnoses, taking into account the change from no dysfunction at the initial assessment to the presence/absence of dysfunction at any time posttreatment (i.e., at 4, 8, or 12 months). If this Group analysis was significant, it was followed by disease versus healthy and cancer versus benign contrasts.
2. A 3 (Group: cancer, benign, healthy) × 2 (Time: 4- and 12-month posttreatment) log-linear model (Bishop, Feinberg, & Holland, 1975) compared the presence/absence of sexual dysfunction at the 4-month assessment with the presence/absence of sexual dysfunction at the 12-month assessment. If significant, disease versus healthy and cancer versus benign contrasts were conducted. This analysis is an extension of the ANOVA procedure that uses logarithms of the cell proportions to examine changes in dysfunction frequencies (Bishop et al., 1975).

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3. For clinical detail, the women's ratings of distress accompanying the dysfunctions were inspected.

**Inhibited sexual desire—**For the first analysis, there was a significant difference among the three groups in the incidence of desire dysfunction during the posttreatment year, $\chi^2(2, n = 85) = 20.57$, $p < .001$. The disease versus healthy contrast was significant, $\chi^2(1, n = 85) = 13.89$, $p < .001$, indicating that 58% of the disease sample and 11% of the healthy group were diagnosed with inhibited sexual desire at some point during the follow-up year. The cancer versus benign contrast was not significant ($p = .50$).

The second analysis examining whether or not the incidence of desire dysfunction changed across groups from the 4- to the 12-month follow-up was significant, $\chi^2(6, n = 98) = 15.11$, $p < .05$. There was a main effect for group, $\chi^2(2, n = 98) = 12.99$, $p < .01$, although the effects for time ($p = .29$) and the interaction ($p = .80$) were not significant. Taken together, these tests indicated a significant difference among the groups in the incidence of desire dysfunction that did not significantly change from the 4-month to the 12-month follow-up. The first follow-up contrast, disease versus healthy, was significant, $\chi^2(1, n = 98) = 9.72$, $p < .01$, indicating the significant differences between the two groups at both the 4-month (34% of disease group vs. 11% of healthy group) and 12-month (26% of disease group vs. 9% of healthy group) follow-ups. The second contrast, cancer versus benign, was of interest, $\chi^2(1, n = 53) = 2.69$, $p =. 11$. Inspection of the data revealed the expected pattern: The cancer group had a slightly increased incidence of desire dysfunction over the benign group at both the 4-month (37% of the cancer group vs. 13% of the benign group) and the 12-month follow-up (32% of the cancer group vs. 13% of the benign group).

The women's ratings of the distress accompanying desire diagnoses were examined. The mean distress ratings during the follow-up year for the women with benign disease were in the *slight* to *moderate* range, and the women treated for cancer consistently provided ratings of *moderate* distress.

**Inhibited sexual excitement—**There was a significant difference among the groups in the incidence of newly acquired excitement dysfunction during the posttreatment year, $\chi^2(2, n = 89) = 16.85$, $p < .001$. There was a significant disease versus healthy contrast, $\chi^2(1, n = 89) = 5.71$, $p < .05$, indicating that 50% of the disease sample and 15% of the healthy group were diagnosed with inhibited sexual excitement at some time during the follow-up year. There was also a noteworthy cancer versus benign contrast, $\chi^2(1, n = 48) = 3.69$, $p = .06$, indicating that 58% of the cancer sample and 25% of the benign sample were diagnosed during the follow-up year.

The analysis of the incidence of excitement dysfunction from the 4-month follow-up to the 12-month follow-up was also significant, $\chi^2(6, n = 98) = 21.06$, $p < .01$. There was a significant main effect for group, $\chi^2(2, n = 98) = 19.09$, $p < .001$, although the effect for time and the interaction were not significant ($ps > .38$). Both follow-up contrasts were significant. The first, disease versus healthy, $\chi^2(1, n = 98) = 14.43$, $p < .001$, indicated a significant difference between the two groups in the incidence of excitement dysfunction that did not change from the 4-month (32% of disease group vs. 4% of healthy group) to the 12-month follow-up (26% of disease group vs. 9% of healthy group). The second contrast, cancer versus benign, $\chi^2(1, n = 53) = 4.27$, $p < .05$, indicated significant differences between the groups in the incidence of excitement dysfunction: At 4 months posttreatment 39% of the cancer patients versus 13% of the benign patients were diagnosed, and at 12 months 29% of the cancer patients and 20% of the benign patients were diagnosed.

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The ratings during the follow-up year for the women with benign disease indicated *slight* distress, whereas the women treated for cancer indicated *moderate* distress accompanying the excitement dysfunction.

**Inhibited sexual orgasm—**There was a significant difference among the groups in the incidence of orgasmic dysfunction from the initial assessment to the posttreatment, $\chi^2(2, n = 90) = 23.50$, $p < .001$. The disease versus healthy contrast was significant, $\chi^2(1, n = 90) = 6.52$, $p < .05$, indicating that 46% of the disease sample and 7% of the healthy group were diagnosed with inhibited orgasm at some point during the follow-up year. The cancer versus benign contrast was also significant, $\chi^2(1, n = 48) = 4.71$, $p < .05$, indicating that 56% of the cancer sample and 17% of the benign sample were diagnosed during the follow-up year.

The analysis examining the incidence of orgasmic dysfunction across the 12-month follow-up was also significant, $\times^2(6, n = 98) = 13.70$, $p < .05$. There was a main effect for group, $\times^2(2, n = 98) = 13.49$, $p < .01$, although the effect for time and the interaction were not significant (*ps* > .63). The first contrast, disease versus healthy, was significant, $\times^2(1, n = 98) = 9.79$, $p < .01$, indicating a significant difference between the two groups in the incidence of orgasmic dysfunction both at the 4-month (28% of disease group vs. 4% of healthy group) and the 12-month follow-up (25% of disease group vs. 7% of healthy group). The second contrast for cancer versus benign was not significant ($p =. 18$), although the group means were in the expected direction for the 4-month (i.e., 32% of the cancer patients vs. 20% of the benign disease patients were diagnosed) and 12-month assessments (29% of the cancer patients and 13% of the benign disease patients were diagnosed).

The mean distress rating during the follow-up year for the women with benign disease indicated *slight* to *moderate*, whereas women treated for cancer consistently indicated *moderate* distress accompanying the orgasm dysfunction.

**Dyspareunia—**There was a significant difference among the groups in the incidence of dyspareunia from the initial assessment to the posttreatment year, $\times^2(2, n = 94) = 24.05$, $p < .001$. The disease versus healthy contrast was significant, $\times^2(1, n = 94) = 9.35$, $p < .01$, indicating that 47% of the disease sample and 7% of the healthy group were diagnosed at some point during the follow-up year. The cancer versus benign contrast was also noteworthy, $\times^2(1, n = 49) = 3.73$, $p = .06$, indicating that 56% of the cancer sample and 23% of the benign sample were diagnosed during the follow-up year.

Change in the incidence of dyspareunia across the 12-month follow-up was also significant, $\times^2(6, n = 98) = 20.36$, $p < .01$. There was a main effect for group, $\times 2(2, n = 98) = 24.14$, $p < .001$, the time effect was noteworthy ($p =. 10$), and the interaction was not significant ($p = .51$). The first follow-up group contrast, disease versus healthy, was significant, $\times^2(1, n = 98) = 19.16$, $p < .001$, indicating a significant difference between the two groups for both the 4-month (36% of disease group vs. 4% of healthy group) and the 12-month follow-up (25% of disease group vs. 2% of healthy group). The second contrast for cancer versus benign was not significant ($p = .17$), although again the group means were in the expected direction for the 4-month (i.e., 39% of the cancer patients vs. 27% of the benign disease patients were diagnosed) and 12-month assessments (29% of the cancer patients and 13% of the benign disease patients were diagnosed). The noteworthy time effect indicated that there was a general trend across groups for fewer dyspareunia diagnoses to be given (i.e., 21% of the entire sample diagnosed at 4 months and 14% diagnosed at 12 months).

The pain ratings and the evaluation of disruption to intercourse were examined. Raw data and figures can be obtained from the authors. The data indicated higher levels of pain during coitus than postcoitally and generally higher levels of pain for women with cancer, although the

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disruption to sexual activity that the pain caused generally declined across time (Ms: 4 months = 4.4, indicating *extremely disruptive;* 8 months = 2.3, indicating *moderately disruptive;* and 12 months = 2.5, indicating *moderately* to *very disruptive*).

**Summary—**The clinical picture is provided in Table 1 and summarizes the differential rates of sexual dysfunction within the groups across time. These data indicate that among women who had no sexual dysfunction prior to undergoing cancer treatment, approximately 50% were diagnosed with at least one dysfunction (and usually two, such as inhibited excitement and dyspareunia) during the posttreatment year. While some cases improved, others worsened as women acknowledged distress about the chronicity of the sexual changes. By 12 months posttreatment and full recovery, approximately 30% of the sample were sexually dysfunctional.

### Medical Status

**System evaluation—**The ANOVA assessing the presence of coincidental disease and therapy for body systems at the initial assessment was significant, $F(2, 118) = 4.57$, $p < .05$. Followup multiple comparisons indicated that the values for the healthy and cancer groups were not significantly different (. 10 and. 13, respectively) and that the values for the cancer and benign groups were not significantly different (. 13 and .24, respectively). The absolute level of values for all groups was low, refleeting good health except for the presence of any gynecologic disease. The second ANOVA found no significant differences among the groups for any of the follow-up assessments (scores ranged from .10 to .20). This indicated that the general good health for all subjects continued.

**Estrogen deficiency signs/symptoms—**The one-way ANOVA for group differences at the initial assessment was significant, $F(2, 117) = 10.9$, $p < .001$. Follow-up multiple comparisons revealed that the healthy and benign groups were not significantly different (*Ms* = .04 and .18, respectively) and that the benign and cancer groups were not significantly different (*Ms* = .18 and .25, respectively). This indicates an expected pattern for more signs/ symptoms for women with disease.

For the second ANOVAS, there were significant group effects at 4 months, $F(2, 105) = 26.27$, $p < .001$; 8 months, $F(2, 99) = 27.31$, $p < .001$; and 12 months posttreatment, $F((2, 91) = 32.4$ l, $p < .001$. As expected, there was no change across time in the symptom level for the healthy group. At the 4- and 8-month assessments, both disease groups reported similar significant elevations in symptom levels when compared with the healthy group. However by 12 months posttrcatment there were no significant differences between the benign and healthy groups but continuing high levels of symptoms for the cancer group. Thus, indications of induced menopause (e.g., hot flushes) appeared temporarily for the benign group and continuously for the cancer group.

## Discussion

The sexual functioning morbidity reported by women following the diagnosis and treatment of gynecologic cancer is, in many respects, similar to that reported by women undergoing treatment for benign disease. Women treated for disease, whether malignant or benign, reported posttreatmcnt declines in intercourse frequency, a diminution of sexual excitement (by their own evaluation as well as by that of a trained evaluator), and a less positive global evaluation of their sexual life. Also, there was a three- to sixfold increase in the incidence of sexual dysfunction diagnoses in comparison with the rates for the healthy women. With the exception of dyspareunia, which declines with time, the desire, excitement, and orgasm dysfunctions remained following recovery.

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There may be additional morbidity that accrues from a malignant diagnosis and the more radical treatment it imposes. For the women with cancer, reports of lowered arousal with sexual activity with their partners 2 are accompanied by judgments that responsiveness is significantly impaired (an opinion shared by evaluators) and by distress with their arousal deficits. A similar pattern is found for resolution phase problems. Rather than feelings of relaxation, contentment, or sexual release (hallmarks of an unimpaired resolution response), women report disruption and distress. Although a high frequency of sexual dysfunction characterizes both disease groups, there is a significantly higher incidence of excitement diagnoses for women treated with cancer.

Some suggest that anxiety plays a causal role for sexual problems in general (Wolpe, 1958) and arousal problems in particular (Kaplan, 1979) among healthy individuals. Similar suggestions have also been made for the sexual difficulties for cancer patients (e.g., Andrykowski & Redd, 1987) and women with gynecologic cancer in particular (Capone, Good, Westie, & Jacobson, 1980). Experimental data have indicated that anxiety may facilitate arousal for nondysfunctional individuals but may inhibit sexual arousal in sexually dysfunctional subjects (see Barlow, 1986, for a review). Here, the consistency of effects across the excitement/arousal measures and absence of any change on the measure of sexual anxiety would indicate that the arousal problems for the women with disease were not anxietybased.

One possible etiology for the decline in sexual excitement was the co-occurrence of significant disruptors. It is notable that 47% of the women with disease were diagnosed with dyspareunia at some time following treatment. Another possible disruptor (and a likely contributor to the dyspareunia) is a diminution in vaginal lubrication. Although we did not obtain biochemical assays or psychophysiologic measures, the medical ratings of estrogen deficiency symptoms provide relevant data. Many of the benign and cancer patients experienced a surgical- or radiationinduced menopause, and a major effect of estrogen deprivation is a general aging of the genitals and atrophic vaginitis 3 (Walling, Andersen, & Johnson, in press). For those with benign disease, estrogen hormone replacement therapy was a possibility. It could not be given to the cancer patients with estrogen-sensitive tumors; and for the subset of those who received radiation (which has a side effect of reducing the vasocongestion and lubrication capacity of the vaginal tissues abruptly and more completely than menopause), estrogen therapy has limited effectiveness (Kaufman, Topek, & Wall, 1961; Pitkin & van Voorhis, 1971). To address this circumstance, physicians instructed the women with cancer to use a sterile lubricant, and our other data indicate that compliance was high. Thus, these data may underestimate the incidence and severity ofdyspareunia. The case is strong for differential rates of treatment-induced dyspareunia for the benign and malignant groups, and it would not be unexpected if dyspareunia accounted for the more severe and disturbing excitement deficits of the cancer group.

These data provide directions for the design of interventions for women with cancer, and we conclude with the most obvious clinical illuminations. First, couples do not necessarily need prompting to engage in their previous repertoire of activities as has been suggested (Witkin, 1975). The lower frequency of intercourse, per se, appears to be due to problems during intercourse. Second, arousal enhancing rather than anxiety reduction therapies would seem to be treatment possibilities for the significant excitement phase problems. Third, more effective medical therapies are needed to treat dyspareunia, particularly for the woman for whom estrogen replacement therapy is not possible or is limited in effectiveness. Fourth, in concert with the medical treatment of dyspareunia, suggestions for the woman's control of the intercourse position, depth of penetration, and so forth, would be important. Fifth, the fact that the women with cancer did not feel emotionally or physically comfortable following sexual activity with their partner was troubling, suggesting that it is important to provide (a) supportive components to any intervention and (b) information about the woman's distress with the sexual

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changes to the sexual partner, if she or he is to be included. Sixth, it is likely that there are individual difference variables that predict sexual morbidity risk. The literature of the sexual problems of women with cancer (Andersen, 1986)and our studies of other gynecologic cancer patients (e.g., in situ vs. invasive vulvar disease patients: Andersen, Turnquist, LaPolla, & Turner, 1988; Andersen & Hacker, 1983; Andersen, 1986) suggest, for example, that the magnitude of treatment is important. And seventh, if sexual ditficulty develeps, for the majority of women it will appear as soon as intercourse resumes; and if sexual function morbidity is to be eliminated or reduced following the diagnosis and treatment of caneer, preventive models may be optimal.

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**Table 1**

*Percentage of* DSM-III Sexual Dysfunction Diagnoses by Group at 12 Months Posttreatment Considering Diagnoses at 4 Months Posttreatment

| | Status at 12 months posttreatment | | | |
|---|---|---|---|---|
| **Dysfunction by group** | **Never dysfunctional** | **Continuing dysfunction** | **New late dysfunction** | **Resolved dysfunction** |
| Inhibited desire | | | | |
| Cancer | 47% | 16% | 16% | 21% |
| Benign | 60% | 0% | 13% | 27% |
| Healthy | 82% | 2% | 7% | 9% |
| Inhibited excitement | | | | |
| Cancer | 47% | 16% | 13% | 27% |
| Benign | 67% | 0% | 20% | 13% |
| Healthy | 87% | 0% | 9% | 4% |
| Inhibited orgasm | | | | |
| Cancer | 58% | 18% | 11% | 13% |
| Benign | 73% | 7% | 7% | 13% |
| Healthy | 91% | 2% | 4% | 2% |
| Dyspareunia | | | | |
| Cancer | 53% | 21% | 8% | 18% |
| Benign | 67% | 7% | 7% | 20% |
| Healthy | 93% | 0% | 2% | 4% |

*Note. Diagnostic and Statistical Manual of Mental Disorders (DSM-II1;* American Psychiatric Association, 1980).