



# On life satisfaction in male erectile dysfunction

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**A consecutive series of 413 impotent men and 109 References rated their satisfaction with life as a whole and with seven different domains of life along a six graded scale ranging from very satisfied to very dissatisfied. In a subsample of impotent men treated with PGE<sub>1</sub> these self-ratings were repeated applying the concept that dissatisfaction reflects an aspirations/achievement gap and successful treatment leads not only to increased sexual well-being but also to increased satisfaction with life as a whole. Regardless of the etiology of impotence pre-treatment level of sexual satisfaction was very low. In assumedly psychogenically impotent men levels of satisfaction with life as a whole, partnership and family life were also low. Using factor analytic technique satisfaction with sexual life was found to be a powerful predictor for satisfaction with life as a whole. In successfully PGE<sub>1</sub>-treated men pre-treatment decreased levels of satisfaction were significantly increased and generally normalization occurred.**

**Keywords:** impotence; sexual disorder; Prostaglandin E<sub>1</sub>; life satisfaction

## Introduction

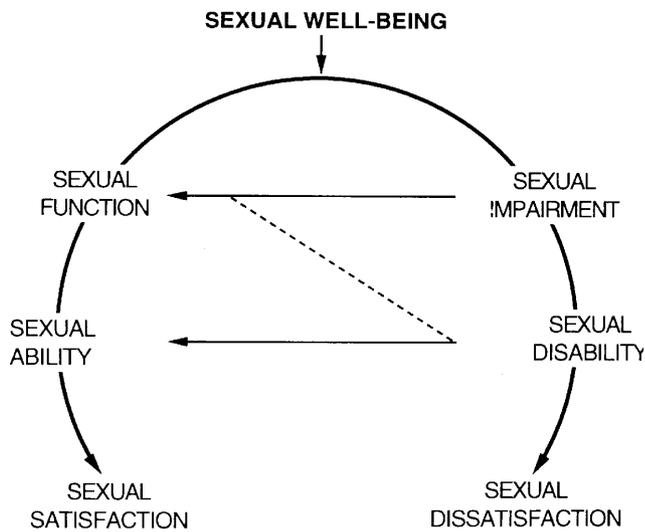
This investigation was designed as an analysis of the impact of impotence on self-perceived satisfaction with life and with seven specific domains of life and also of the effect, on those perceptions, of successful treatment of impotence with self injections of Prostaglandin E<sub>1</sub> (PGE<sub>1</sub>, Alprostadil<sup>®</sup>, Caverject<sup>®</sup>).

In a wealth of publications the beneficial as well as the adverse effects of intracavernosal self-injections of various substances have been reported, and evidently most authors agree that such treatment is often effective in producing erectile sufficiency (see, for example<sup>1,2</sup>). However, little attention has been paid to the self-perception of well-being in impotent men. The conceptual background of our study is illustrated in Figure 1: A man who perceives sexual well-being in himself functions anatomically and physiologically<sup>3</sup> in a manner that allows him to use his abilities (sexual activity repertoires) to achieve his sexual goals. If he achieves his sexual goals he will feel 'domain-specifically' satisfied—that is, satisfied with the sexual domain in his overall life. If being sexually satisfied is an important aspect of his life, his degree of overall life satisfaction will be maintained or enhanced by his sexual satisfaction. In the language of this model erectile disability can

be caused by neurological, vascular or endocrinological impairment, while psychogenic impotence is *per se* a sexual disability. Whether or not impotence is caused by an impairment, it constitutes a sexual aspiration/achievement gap that decreases sexual satisfaction, and the decrease in sexual satisfaction can decrease overall life satisfaction. In the case of physiologic impotence, the treatment usually chosen is biologic—a vacuum device, intracavernosal injections, a penile implant, or perhaps some oral medication. Evidently, in these cases successful treatment will restore function and thus return the subject partly or completely to his previous degree of sexual ability. Although some authorities contend that psychogenic impotence should properly be treated with sexologic counselling or psychotherapy, intracavernosal injection has evidently become a common treatment even for men whose impotence is not organic. For instance, Wagner and Singer-Kaplan<sup>4</sup> have advocated a combination of intracavernosal injection and sexual counselling or psychotherapy for men who are psychogenically impotent.

## Subjects and methods

Our study enrolled a consecutive series of 413 men with a diagnosis of impotence who had been referred to the Department of Clinical Sexology at the University Hospital, Umeå. The subjects' average



**Figure 1** A conceptual model for the analysis of sexual problems and their potential effect on sexual satisfaction.

age, ranging from 19–87 y, was 55. A series of 109 nonselected clinically healthy men ranging from 25–76 y of age (average, 50) served as Reference sample. This was recruited with the assistance of the official census bureau.

All subjects first met with a sexologist who recorded their sexual case histories. After that first visit, 354 of the 413 subjects (86%) were seen by a physician who reviewed their medical case histories and performed physical examinations that included assessments of (a) genital normality and reflexes; (b) hand, foot, and penile-shaft vibratory thresholds, as measured by Vibrometer<sup>®</sup>, and (c) systolic blood pressure in the radial and dorsal penile arteries, as measured by Doppler ultrasonography.

Among the 59 men in whom laboratory assessment was not performed, 25 so clearly had a psychogenic background of their impotence that it was deemed meaningless to seek for organic etiology. Fifteen did not consent to laboratory assessment or were missed by us. These 15 were all classified as ‘unknown’ etiology. Among the remaining 19 men, 12 had a spinal cord injury, while 7 men had other diseases, where the case history was so clearly related to the onset of impotence that an organic etiology appeared inevitable.

Two hundred seventy two (66%) of the subjects then underwent diagnostic intracavernosal injection of papaverine (early patients), or PGE<sub>1</sub> (later patients). Both before and after the injections, the dorsal and the profound penile arteries were auscultated and the quality of erection was noted. As indicated for diagnostic information, some subjects underwent additional studies, including PGE<sub>1</sub>-enhanced penile Doppler ultrasonography (71 subjects), pudendal angiography, dynamic (PGE<sub>1</sub>)

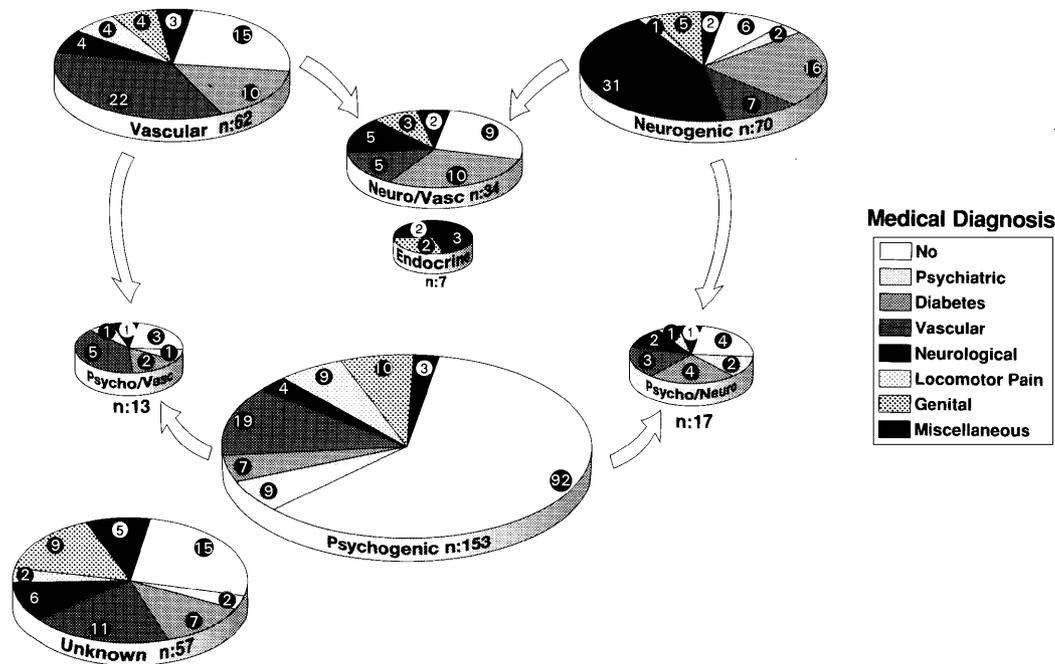
cavernosography, endocrinologic screening, and (in a few cases) penile electromyography.

Based on the combination of the sexological and medical case histories, the medical and—in most cases—laboratory assessments an operational sexological diagnostic distribution of the 413 subjects was as follows: 183 men were judged to have impotence of psychogenic or combined psychogenic-organic cause (the Psychogenic group). In 173 men (the Organic group), the impotence was judged to be primarily of organic cause, in 57 men (the Unknown group), the cause of impotence was not established. We are, of course, well aware of the fact that organic cases of impotence may not be revealed by the simple diagnostic screenings used in this investigation (for a contemporary idea of the biologic complexity of erection (see for instance<sup>5</sup>), the distribution of the subjects according to medical (if any) and sexological diagnoses is given in Figure 2.

Fifty-seven among the 205 men in whom the PGE<sub>1</sub>-test produced erection accepted enrollment in a long-term follow-up program. Twenty-nine (mean age 55 ± 9.5) of these were categorized as psychogenically and 28 (mean age 59 ± 12) as organically impotent. All subjects were carefully instructed about injection technique, and all received sexologic counselling both before beginning the program and at follow-up examinations. The PGE<sub>1</sub>-dose was 5 µg in men with a spinal cord damage and 10 µg or 20 µg for the rest of the sample. The intervals from the prescription to the first follow-up visit ranged from 1–19 months (median: 2 months). The between-visit intervals and the numbers of follow-up visits were determined by practical circumstances, such as the distance from the study site to the subject’s home, for example, some subjects lived far (up to 700 km) from the department in the sparsely populated region of northern Sweden.

Upon enrollment in the study, all 413 subjects filled in a checklist on life satisfaction (Figure 3), a method that we have used successfully in other investigations as a set of social indicators of perceived well being in subjects both with<sup>6,7</sup> and without<sup>8</sup> impairments or disabilities. In this investigation the checklist encompassed one overall item (satisfaction with life as a whole) and seven domain-specific items, namely specific aspects of life satisfaction. For each item, subjects were asked to report their actual level of life satisfaction as represented by a six-graded scale ranging from 1 (very dissatisfied) through 6 (very satisfied). All 57 subjects who accepted to join the follow-up study repeated the self-assessment at each follow-up visit.

During those follow-up visits, the subjects were asked whether any major life event unrelated to erectile capacity had occurred since their last visits. In none of the 57 cases reviewed had such an event occurred.



**Figure 2** Diagnostic distributions of 413 impotent men. Circle diagrams indicate (operational) sexual diagnoses, while segments of circle denote the medical diagnoses which were based on case histories and medical examinations.

How satisfactory are these different aspects of your life?  
Indicate the number which best suits your situation.

- |                          |                       |
|--------------------------|-----------------------|
| 1 = Very dissatisfying   | 4 = Rather satisfying |
| 2 = Dissatisfying        | 5 = Satisfying        |
| 3 = Rather dissatisfying | 6 = Very satisfying   |

Life as a whole is	1	2	3	4	5	6
My sexual life is	1	2	3	4	5	6
My partnership relation is	1	2	3	4	5	6
My family life is	1	2	3	4	5	6
My contacts with friends and acquaintances are	1	2	3	4	5	6
My leisure situation is	1	2	3	4	5	6
My vocational situation is	1	2	3	4	5	6
My financial situation is	1	2	3	4	5	6

**Figure 3** Life satisfaction check-list.

### Statistical analysis

Simple cross tabulations ( $\chi^2$  tests) were generally used in comparisons of groups. In the analysis of intrapersonal changes in life satisfaction, Wilcoxon's test was used. To determine whether particular combinations of domain-specific life-satisfaction responses occurred, *factor analysis* with Varimax rotations was applied. Factor analysis is a statistical technique by which groupings of closely interrelated variables can be identified, while Varimax rotations are used to minimize the number of variables that are of particular importance (high loadings, see below) for a factor. Only factors with

Eigenvalues of at least 1.0 were considered because an Eigenvalue, that is an indicator of the total variance explained by a factor, of less than 1.0 generally explains only an insignificantly small proportion of the total variance. The chosen cut-off point for factor loadings to be considered significant contributors to a factor was 0.50; as lower loadings usually indicate that the particular variable has little contributory value. On the other hand a loading approaching 1.0 (the maximum obtainable loading) may be considered 'unique', being the sole variable of interest for a particular factor. The Unknown group was excluded from the factor analysis, partly because of diagnostic uncertainty and partly because of the small sample size.

The factors that actually emerged for the Psychogenic and the Organic groups were used in *Discriminant analyses* to assess the predictive effect of those factors on satisfaction with life as a whole, which for simplification was categorized as either 'satisfied' (responses: 5 and 6) or 'not satisfied' (responses: 1-4) as we have done in previous investigations.<sup>6,7</sup> All computations were performed with the Systat<sup>®</sup> program, and the chosen level of significance was  $P < 0.05$ .

### Results

The levels of satisfaction with sexual life were considerably and significantly lower for all three groups of impotent men (Psychogenic, Organic, and

Unknown) than for References ( $\chi^2$ , 5 df,  $P < 0.0001$ ) (Table 1). Moreover, the Psychogenic group had lower level of satisfaction with life as a whole ( $P < 0.05$ ), with partnership relations ( $P < 0.005$ ), and with family life ( $P < 0.005$ ) than was the case for References. In those three domains neither the Organic group nor the Unknown group differed significantly from the References, but the level of satisfaction with friend- and acquaintances contacts was significantly greater for Organic group subjects than for References ( $P < 0.01$ ).

As compared with Organic group subjects, the Psychogenic group subjects were significantly less satisfied with sexual life ( $P < 0.05$ ), partnership relations ( $P < 0.05$ ), and contacts with friends and acquaintances ( $P < 0.0005$ ); but, with exception for sexual satisfaction, no significant intergroup differences between the Organic and Unknown groups were evident. Moreover, levels of satisfaction with leisure, financial and vocational situations were nearly identical for all groups, including the References.

Factor analyses were performed on the References, the Psychogenic and the Organic group entering the four domain specific items that differed between either of the latter two groups and the References (sexual life, family life, partnership relations, and contact with friends and acquaintances). Some subjects from the Psychogenic and

Organic groups had failed to check all items, primarily because they had no regular partnership. Thus, data from only 90% of Psychogenic subjects and 86% of Organic subjects could be obtained for analysis. As shown in Table 2, only one factor, encompassing all four items with loadings  $> 0.50$  and explaining 65% of the variance, emerged to characterize the References, whereas two factors emerged for the Psychogenic group. In this group, factor I incorporated satisfactions with sexual life and with partnership relations (37% of the variance), and factor II (36% of the variance) encompassed satisfaction with family life and satisfaction regarding contacts with friends and acquaintances. Two somewhat different factors emerged for the Organic group: one circumscribed satisfaction with partnership relations, family life, and contact with friends and relatives (43%), while factor II was limited to satisfaction with sexual life (27%).

Individual factor scores were then used in discriminant analyses to examine the combined effect of the domain factors on the gross level of satisfaction with life as a whole (grades 5 and 6 vs grades 1–4). Table 3 demonstrates that both for the Psychogenic group and for the Organic group the two factors had considerable power in classifying gross (satisfied vs not satisfied) level of satisfaction with life as a whole, as about 2 out of 3 subjects in both groups were correctly classified.

**Table 1** Mean values ( $\pm$  s.d.) for the References and for the three groups of impotent men

	References mean ( $\pm$ s.d.)	Psychogenic mean ( $\pm$ s.d.)	Organic mean ( $\pm$ s.d.)	Unknown mean ( $\pm$ s.d.)
Life as a whole	4.8 ( $\pm$ 1.1)	4.4 ( $\pm$ 1.1)	4.5 ( $\pm$ 1.1)	4.5 ( $\pm$ 1.2)
Sexual life	4.4 ( $\pm$ 1.4)	2.0 ( $\pm$ 1.1)	2.1 ( $\pm$ 1.3)	2.0 ( $\pm$ 1.0)
Partnership relation	4.8 ( $\pm$ 1.4)	4.1 ( $\pm$ 1.6)	4.7 ( $\pm$ 1.4)	4.5 ( $\pm$ 1.5)
Family life	5.1 ( $\pm$ 1.2)	4.6 ( $\pm$ 1.2)	4.9 ( $\pm$ 1.1)	4.9 ( $\pm$ 1.1)
Contacts	4.6 ( $\pm$ 1.0)	4.5 ( $\pm$ 1.1)	5.0 ( $\pm$ 0.9)	4.9 ( $\pm$ 1.1)
Leisure	4.6 ( $\pm$ 1.1)	4.6 ( $\pm$ 1.0)	4.7 ( $\pm$ 1.2)	4.7 ( $\pm$ 0.9)
Vocational situation	4.5 ( $\pm$ 1.3)	4.5 ( $\pm$ 1.2)	4.4 ( $\pm$ 1.4)	4.6 ( $\pm$ 1.4)
Economy	4.4 ( $\pm$ 1.1)	4.5 ( $\pm$ 1.1)	4.6 ( $\pm$ 1.1)	4.6 ( $\pm$ 1.3)

**Table 2** Results of factor analyses performed on the 2 groups (Psychogenic and Organic) of patients and on the References. Factor loadings  $< 0.50$  are disregarded

	References (n: 109)	Psychogenic (n: 165)		Organic (n: 149)	
	Factor I	Factors		Factors	
		I	II	I	II
Satisfaction with					
Sexual life	0.79	0.86	—	—	0.95
Partnership relations	0.87	0.72	—	0.75	—
Family life	0.87	—	0.69	0.80	—
Contacts friends/acquaintances	0.71	—	0.86	0.72	—
Eigenvalue	2.6	1.9	1.0	1.8	1.0
Variances explained by factors (I/II)	(65%)	(37%/36%)		(43%/27%)	
Total	65%	73%		71%	

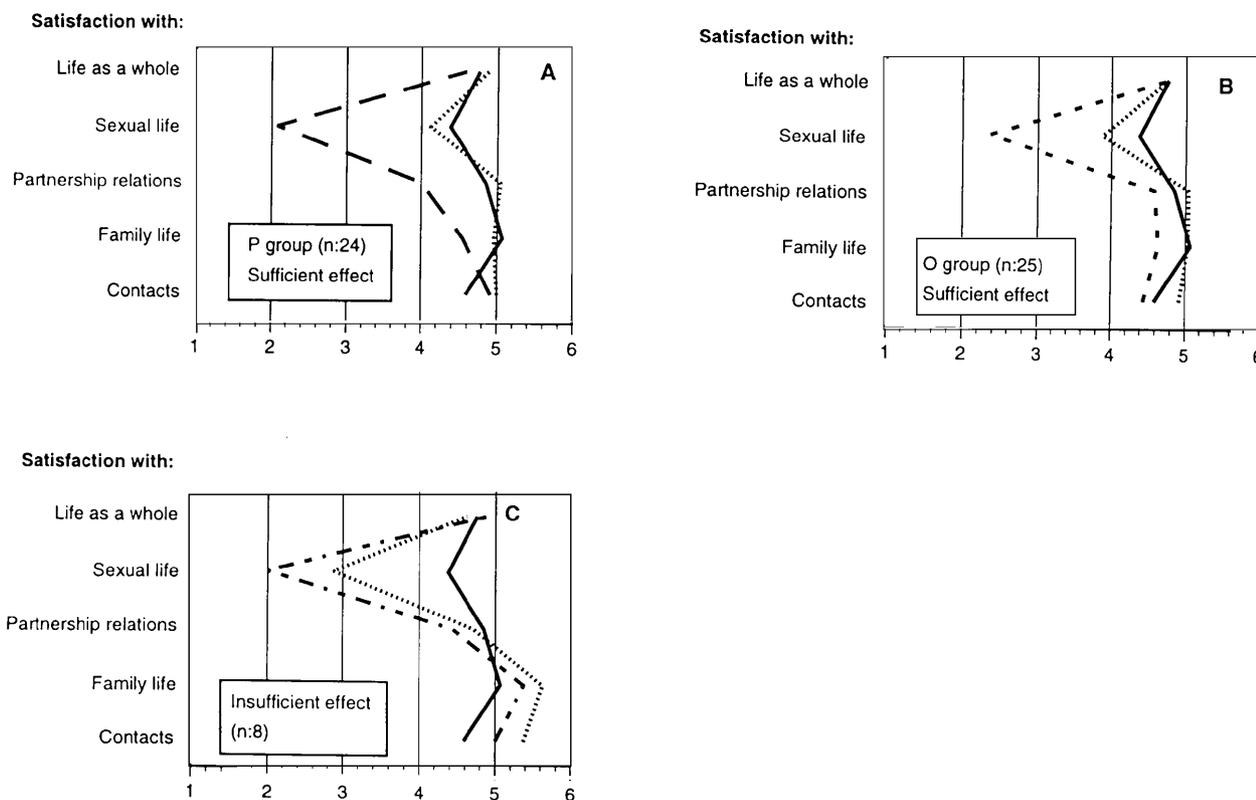
n denotes number of subjects.

**Table 3** Discriminant analyses for classification of satisfaction with life as a whole (scale grades 5–6 vs 1–4) by factor- scores obtained through factor analyses (Table 1 and text) in two groups (Psychogenic and Organic) of impotent men

	Psychogenic		Organic	
	Satisfied 5–6	Not satisfied 1–4	Satisfied 5–6	Not satisfied 1–4
Number of subjects	89	76	84	65
Per cent correctly classified:				
by group	67	62	67	71
total		65		68
Discriminant coefficients:				
Factor I		0.67		0.93
Factor II		0.78		0.44

For the Psychogenic group, the discriminant coefficients of factor I and factor II were very similar, indicating equal predatory powers. In contrast, for the Organic group, factor I (satisfaction with partner relation, with family life, and with contacts with friends and acquaintances) was the primary predictor of level of satisfaction, but factor II (satisfaction with sexual life) was also significantly predictive.

PGE<sub>1</sub> intracavernosal injection treatment was successful, namely regularly led to sufficiently rigid erection for penetration, for 24 of the 29 Psychogenic group men and for 25 of the 28 in the Organic group. The effect of successful PGE<sub>1</sub> treatment on the five pertinent life-satisfaction domains is shown in Figure 4. For successfully treated men in the Psychogenic group (Figure 4A), the levels of all four life satisfaction items at the first follow up were



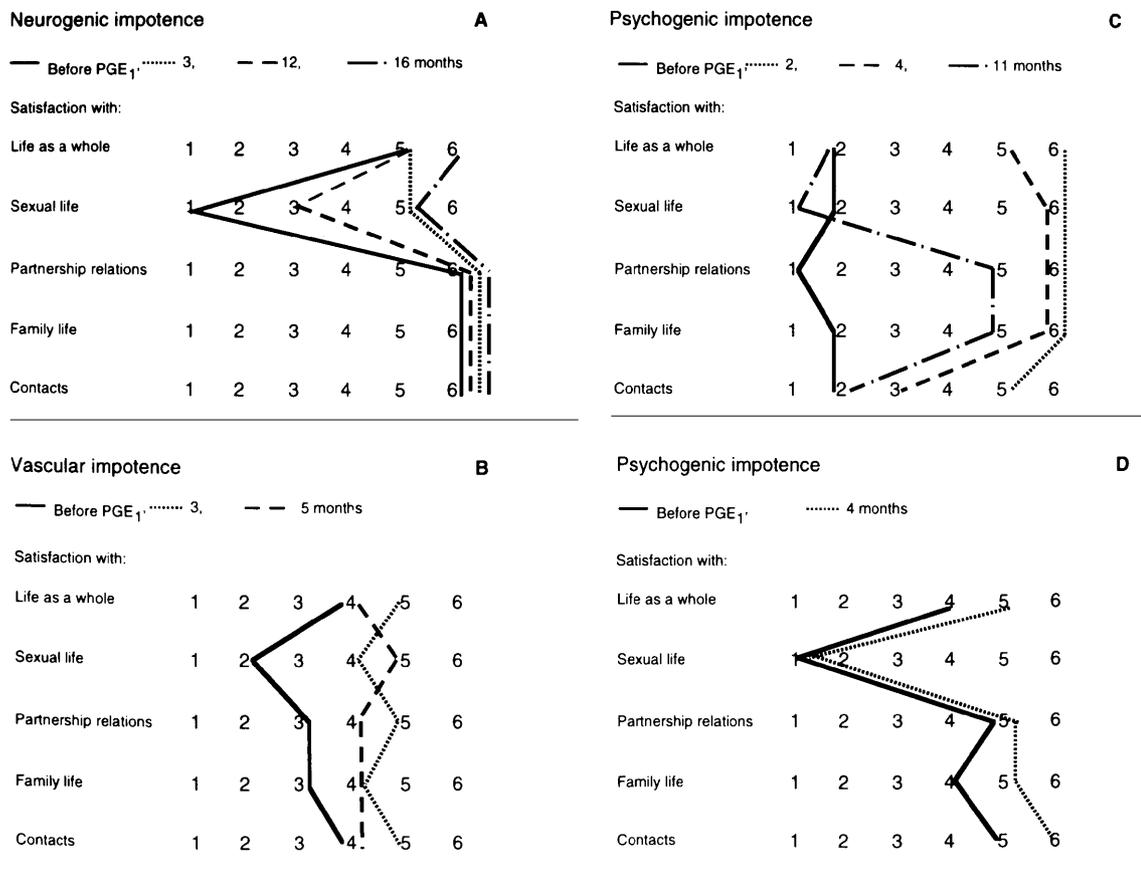
**Figure 4** A, B and C: Mean self-reported levels of satisfaction with life as a whole and with sexual life, partnership relations, family life and contacts with friends and acquaintances in successfully and unsuccessfully PGE<sub>1</sub>-treated men. P group: Psychogenic impotence, O group: Organic impotence. References: —; Psychogenic group before PGE<sub>1</sub>; — —; Organic group before PGE<sub>1</sub>; - - - -; Before treatment with PGE<sub>1</sub> which later proved to have insufficient effect: - - - - -; All PGE<sub>1</sub> treated groups at follow up: ·····.

statistically indistinguishable from those reported by References ( $\chi^2$ , 1 df); while both before treatment and at the follow up the successfully treated among the Organic group (Figure 4B) had levels of satisfaction with life as a whole similar to that of the References at the follow-up visit. On the other hand level of satisfaction with sexual life in these men, in spite of a significant increase, remained significantly lower than that of the References.

Twenty two subjects (12 in the Psychogenic group and 10 in the Organic group) were seen at a second follow-up visit, which occurred between 4–8 months (median, 6 months) after the beginning of PGE<sub>1</sub> treatment. No further significant change in any of the five pertinent life-satisfaction ratings had occurred between the first and second follow-up measurements. At the first follow-up visit after beginning PGE<sub>1</sub> treatment, eight men (14%) reported that erections resulting from the intracavernosal injections were not adequate for penetration. Although the men did report some increase in sexual satisfaction (Figure 4C), the increase was not significant, and at follow-up visits their level of

satisfaction remained significantly less than that of References ( $P > 0.05$ , Fisher's exact probability test). After further counselling, one of the eight men (from the Psychogenic group) chose to continue the PGE<sub>1</sub> self-injection program and later reported good effect with a concomitant increase in sexual satisfaction. The other seven withdrew from the treatment program. Hence, the total number of men successfully treated with intracavernosal self-injection of PGE<sub>1</sub> was 50 of 57 (87%). Four of the 57 PGE<sub>1</sub>-treated men (7%) reported having had local pain at least once after a self-injection. Although all four had satisfactory erectile effect, only one chose to continue the treatment (and did achieve success).

Figure 5 shows the questionnaire responses of four men who were followed for as long as 16 months after the beginning of PGE<sub>1</sub>-treatment. Diagram A records the self-ratings of a psychologically well adjusted 47-year-old man with a long history of progressive multiple sclerosis. His impotence was clearly neurogenic. His level of satisfaction with sexual life increased from 1 (very dissatisfied) before treatment to 5 (satisfied) at the



**Figure 5** Graphic illustrations of self-reported life satisfaction (5 items) in four impotent men treated with PGE<sub>1</sub>. For further explanations see text.

first follow-up visit. He continued with the PGE<sub>1</sub> self-injections but after about 10 months the effect had become poor, and by the 12-month follow-up visit, his satisfaction with sexual life had decreased. After further instruction and additional sexologic counselling, however, his injections were effective again, and by the 16-month follow-up visit, his satisfaction with sexual life had increased. Diagram B is the record of a 61y old man with vascular impotence. By the time of the first follow-up visit (at 3 months), the beneficial effect of the injection treatment had produced a pronounced increase in satisfaction with sexual life; but also with other aspects of life satisfaction. The obtained improvements were, generally, maintained at the second follow-up visit. The records of two men from the Psychogenic group are shown in diagrams C and D. The 45-year-old man whose responses are recorded in diagram C was seen in follow-up visits at 2, 4 and 11 months. From very low pre-treatment levels of satisfaction, marked increases were reported at the first follow-up visit, with only minor decreases from those scores two months later. However, at about 11 months he reported that self-injection of PGE<sub>1</sub> had no effect, and concomitantly his satisfaction with life as a whole and with sexual life decreased steeply. Finally, an example of insufficient therapeutic effect in a 61y old man is given in diagram D. This patient discontinued intracavernosal self-injections of PGE<sub>1</sub>.

## Discussion

The single case-history diagrams shown in Figure 5 serve to illustrate that the method used to measure the well being of impotent men may be a reasonable and quite sensitive way to characterize individual subjective experienced effects of interventions against impotence.

Besides the nearly truistic finding that the level of satisfaction with sexual life is very low in men who seek professional help for their impotence, one important finding of this study is that regardless of the cause of impotence (psychogenic or organic), successful treatment with intracavernosal self-injection of PGE<sub>1</sub> leads to significantly increased sexual satisfaction which may (but our long-term followed sample was small!) be long-lasting. With appropriate testing and counselling, most PGE<sub>1</sub>-treated men will have adequate effect. As all the men had been assessed as having a sufficient-for-penetration erection at the laboratory testing and all had been given a thorough instruction, the 14% rate of insufficient erections appears somewhat bewildering. Whereas it is conceivable that the lack of effect was due to inadequate injection technique, we believe that the reason may rather be sought in psychogenic factors.

In this context it is worth noting that 5 of the 8 unsuccessful men were from the psychogenic group. The 7% rate of local pain is quite low as compared with the results from other investigations (see for instance<sup>5</sup>) but we have no clear explanation for this somewhat peculiar fact. Very speculatively it may, however, be that northern Swedish men could be—inadequately?—stoic concerning the pain experiences.

The significant increase in level of sexual satisfaction appears to be consistent with that recently reported by the PGE<sub>1</sub>-treated subjects in a study by Glick *et al.*<sup>9</sup> It is also generally consistent with the findings of Althof *et al.*,<sup>10,11</sup> who in a series of studies found that sexual satisfaction increased with improved erectile ability in men who successfully used intracavernosal self-injection of papaverine and phentolamine. Glick and his colleagues<sup>9</sup> also found that their subjects' general quality of life increased somewhat (although not significantly) while 'interpersonal sensitivity' and 'mental health' improved significantly.

Our findings that psychogenic impotence was concomitant with low levels of satisfaction, not only with sexual life but also with partnership relations and family life, appear to confirm the findings of others<sup>12,13</sup> that impotent men and their partners experience tension in their relationship. Those findings are further supported by the factor analytic structure (factor one) that emerged in our investigation. The causality is of course obscure, that is, does impotence lead to partnership discord, or vice versa? If the observed effect of successful PGE<sub>1</sub> treatment proves to be demonstrable in larger samples of psychogenically impotent men, we might expect that restoration of erectile ability would lead not only to reinstatement of a satisfying sexual repertoire but also to the ameliorization of discord and thus the achievement of partnership goals. The net result would be normal level of domain-specific as well as overall life satisfaction.

In contrast we report that among organically impotent men, satisfaction with sexual life constituted a factor by itself and that sexual satisfaction, although significantly increased by successful intracavernosal treatment, was not fully normalized. That observation indicates that such men isolate their impotence as an impairment, that is: a 'symptom', that neither causes nor is caused by interpersonal discord and may be compensated for but not cured by intracavernosal self-injection.

The conceptual basis of our investigation (as discussed in the Introduction) appears to be sustained by the discriminant-analytic findings that satisfaction with sexual life by itself (as represented by Organic group subjects) or in combination with satisfaction with partnership relations (as in the Psychogenic group) are powerful predictors of satisfaction with life as a whole. Those findings

clearly show that the loss of sexual activity-repertoires, with concomitant low levels of domain-specific satisfaction, are so important for impotent men (who seek professional assistance) that their overall life satisfaction decreases accordingly. In this context we shall attempt to explain, briefly, the difference in factor structuring, namely grouping of the variables, between the References and the two groups of patients. Whereas normally (as in the References) satisfaction within the four emotional domains of life are closely interwoven, a change in partnership dynamics, whether or not caused by erectile disability, leads to disruption of that emotional entity. Hence, in impotent men, emotional satisfaction is at least partly fragmented.

Several investigators have demonstrated that successful intracavernosal self-injection treatment increases generally psychologic and social well being,<sup>9,14,15</sup> and Althof<sup>11</sup> has shown that in psychogenically impotent men, such treatment decreases anxiety and depression and increases self-esteem. Unfortunately, none of those studies included reference-subjects. In the light of our findings and those of others, however, intracavernosal self-injection treatment appears to be at least a starting point for the treatment of psychogenic impotence and at the moment probably is the biologic treatment of choice for organic impotence.

## Conclusions

This investigation highlights that men who seek professional help for erectile dysfunction have low level of satisfaction with their sexual life. Both in assumedly psychogenically and organically impotent men characteristic and explainable conglomerations of different life satisfaction items are demonstrated and have high predictive power for satisfaction with life as a whole. Successful intracavernosal treatment with PGE<sub>1</sub> (Caverject<sup>®</sup>) enhances levels of life satisfaction—particularly so in assumedly psychogenic erectile dysfunction.

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