Catastrophizing During and After Pregnancy: Associations With Lumbopelvic Pain and Postpartum Physical Ability

Christina B. Olsson, Wilhelmus J.A. Grooten, Lena Nilsson-Wikmar, Karin Harms-Ringdahl, Mari Lundberg

Background. There is a lack of knowledge about the possible role of catastrophizing in lumbopelvic pain during and after pregnancy and in postpartum physical ability.

Objective. The aims of this study were to explore how catastrophizing fluctuates over time during and after pregnancy and to investigate the associations between catastrophizing and lumbopelvic pain and between catastrophizing and postpartum physical ability.

Design. A prospective questionnaire was used.

Methods. The Pain Catastrophizing Scale was used to assess exaggerated negative thoughts about pain experiences in weeks 19 to 21 and weeks 34 to 37 of pregnancy and at 6 months postpartum. The Disability Rating Index was used to assess physical ability at 6 months postpartum. The occurrence of lumbopelvic pain was reported by participants. Parametric and nonparametric tests were used for the analyses.

Results. A total of 242 of 324 women were categorized according to reported levels of catastrophizing. A majority of women (57.9%) reported not catastrophizing at all test occasions, whereas 10.3% reported catastrophizing at all occasions. For the remaining 31.8%, the levels of catastrophizing varied over time. Women who catastrophized at 1 or more of the occasions reported higher proportions of postpartum lumbopelvic pain and had more restricted postpartum physical ability than women who did not catastrophize.

Limitations. The fact that some women did not complete the questionnaire at all test occasions might have reduced the generalizability of the results.

Conclusions. The common idea that levels of catastrophizing are “stable” within personality should be reconsidered, because for 1 of 3 women, the levels of catastrophizing changed over time. A majority of women reported not catastrophizing. However, catastrophizing in relation to pregnancy seems to be associated with lumbopelvic pain and postpartum physical ability. The results indicated that the role of catastrophizing in this context should be studied further.
T here is general agreement that persistent low back pain is a problem with major consequences for society as well as the individual.1 Among women with persistent low back pain, 10% to 25% reported that the onset of back pain occurred during pregnancy.2,3 A 3-year follow-up of women with lumbopelvic pain during pregnancy found that the prevalence of remaining pain was 20%.4 In addition, a review revealed that postpartum lumbopelvic pain was reported by about 25% of all pregnant women and that 5% of those with pain had problems severe enough to seek medical care.5

It has been recommended that pain should be analyzed from a biopsychosocial perspective. Pain is not merely a specific sensation but is a complex perceptual experience that involves sensory, affective, and cognitive components.6 In recent years, there has been a focus on the affective and cognitive components of pain.7–9 Pain catastrophizing is known to be a cognitive aspect of the fear-avoidance model and can be defined as an exaggerated negative orientation toward noxious stimuli.8

According to the cognitive-behavioral fear-avoidance model, fear and catastrophizing lead to disability.10 Cross-sectional studies have shown associations between catastrophizing and heightened disability in various populations with pain.11–14 In a prospective study, catastrophizing at baseline predicted low back pain and disability at follow-up in people with and without initial low back pain.15 Women with lumbopelvic pain during pregnancy reported higher levels of catastrophizing and disability than women without lumbopelvic pain.16

Women in late pregnancy who catastrophized about labor pain expected more pain during delivery and experienced more intense pain at that occasion.17 The same women also had a poorer postpartum recovery in terms of daily physical activities. Another study showed that women who catastrophized about labor pain were more likely to have “maternity blues” and to have decreased social functioning postpartum.18 Furthermore, in pregnant women with lumbopelvic pain in weeks 19 to 21 of pregnancy, higher levels of catastrophizing doubled the risk for lumbopelvic pain at 6 months postpartum.19 However, little is known about how catastrophizing fluctuates over time.

The aims of this study were: (1) to explore how catastrophizing fluctuates over time and after pregnancy, (2) to investigate the associations between catastrophizing and lumbopelvic pain, and (3) to investigate the associations between catastrophizing and postpartum physical ability.

Method

Definitions

In this study, lumbopelvic pain is defined as self-reported pain in the region of the lower back, anterior region of the pelvis, posterior region of the pelvis, or any combination of these locations.16

Study Design

This prospective study included 3 points of measurement. Pregnant women were asked to complete an extensive questionnaire in weeks 19 to 21 and weeks 34 to 37 of pregnancy as well as at 6 months postpartum.

Participants

Pregnant women with and without lumbopelvic pain were included in the study. Participants were recruited from 5 midwife clinics in 3 demographic areas between March 2005 and September 2006. One clinic (10 midwives) was situated in the center of Stockholm, 2 (2 and 3 midwives) were in the outskirts of Stockholm, and 2 (2 and 3 midwives) were in a medium-size town (approximately 130,000 inhabitants). In the Stockholm clinics, women in weeks 19 to 21 of pregnancy were invited to join the study; those who agreed to participate were given a questionnaire by the midwives. At the other clinics, all women visiting before week 19 of pregnancy were invited by the midwives to join the study; those who agreed to participate were sent a questionnaire by one of the authors (C.B.O.). The women were asked to complete the questionnaire and return it within 1 week; 68.9% (324/470) answered the questionnaire in weeks 19 to 21 of pregnancy and were sent the same questionnaire to answer again on the other 2 test occasions. A flow chart is shown in Figure 1. If no response was obtained within approximately 10 days, a reminder was mailed. The study population consisted of the 242 women who completed the Pain Catastrophizing Scale (PCS) on all 3 occasions.

Instruments

The questionnaire included questions about age; marital status; employment/occupation; exercise; number of previous pregnancies; sick leave and reason for sick leave; and the onset, frequency, and location of any lumbopelvic pain.

In the PCS, a 13-item self-report measure, the items reflect painful experiences, and the scores indicate the extent to which respondents have exaggerated negative thoughts.8 Each item is rated on a 5-point scale ranging from 0 (not at all) to 4 (all the time). Total scores range from 0 to 52, with higher scores indicating higher levels of catastrophizing. The PCS conceptualizes catastrophizing as a single construct with 3 dimensions, each with a separately...
summed score: rumination ("I can’t stop thinking about how much it hurts"), magnification ("I worry that something serious may happen"), and helplessness ("There is nothing I can do to reduce the intensity of the pain"). In this study, total scores were used.

The Disability Rating Index consists of 12 visual analog scales that allow respondents to rate their ability to perform daily physical activities. The 12 activities are dressing (without help), walking outdoors, climbing stairs, sitting for a longer time, standing bent over a sink, carrying a bag, making a bed, running, performing light work, performing heavy work, lifting heavy objects, and participating in exercise/sports. The scales range from 0 mm (can perform without difficulty) to 100 mm (cannot perform at all). The mean score of the 12 ratings constitutes

Figure 1.
Flow chart of number of women who were asked to participate and who completed the questionnaire at the 3 measurement occasions, number of women included in the study, and number of women who did not respond or dropped out of the study. PCS=Pain Catastrophizing Scale.
Data Treatment

Catastrophizing was dichotomized by use of the highest tertile of the scores for the whole population in weeks 19 to 21 of pregnancy (n = 324) as the cutoff point. The 2 categories were noncatastrophizing (below or equal to the highest tertile, ≤17) and catastrophizing (above the highest tertile, >17).

Four subgroups of women (A, B, C, and D) were formed on the basis of the number of test occasions, during and after pregnancy, at which each woman reported high levels of catastrophizing: none (A, noncatastrophizing), 1 (B, catastrophizing once), 2 (C, catastrophizing twice), and all 3 (D, catastrophizing).

### Data Analysis

For each of the 3 test occasions, potential differences in characteristics between women in the noncatastrophizing group and women in the catastrophizing group were tested with the t test (age), chi-square test (other variables in Table 1), and Fisher exact test (if 20% of the expected cell frequencies were <5). The Monte Carlo test was used to examine potential differences in proportions of lumbopelvic pain in the 4 subgroups. Potential differences in physical ability in 3 or more subgroups were tested with the Kruskal-Wallis test.

P values of less than or equal to 5% (P ≤ .05) were regarded as statistically significant. Statistical analyses were performed with version 17.0 of the SPSS software package (SPSS Inc, Chicago, Illinois), except for the Monte Carlo test, for which StatXact 9 software (Cytel Software Corp, Cambridge, Massachusetts) was used.

### Table 1

Characteristics of Women in Noncatastrophizing and Catastrophizing Groups at 3 Test Occasions

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Weeks 19–21 of Pregnancy</th>
<th>Weeks 34–37 of Pregnancy</th>
<th>6 Months Postpartum</th>
</tr>
</thead>
<tbody>
<tr>
<td>% in Noncatastrophizing Group (n=170)</td>
<td>% in Catastrophizing Group (n=72)</td>
<td>P</td>
<td>% in Noncatastrophizing Group (n=169)</td>
</tr>
<tr>
<td>Lumbopelvic pain</td>
<td>39.4</td>
<td>51.4</td>
<td>.09</td>
</tr>
<tr>
<td>Age, X</td>
<td>31.59</td>
<td>29.68</td>
<td>&lt;.01&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Married/cohabiting</td>
<td>97.6</td>
<td>94.4</td>
<td>.24</td>
</tr>
<tr>
<td>Employment&lt;sup&gt;c&lt;/sup&gt;</td>
<td>86.4</td>
<td>81.7</td>
<td>.43</td>
</tr>
<tr>
<td>Exercise before pregnancy&lt;sup&gt;d&lt;/sup&gt;</td>
<td>74.6</td>
<td>66.7</td>
<td>.21</td>
</tr>
<tr>
<td>Exercise at present&lt;sup&gt;d&lt;/sup&gt;</td>
<td>58.6</td>
<td>43.7</td>
<td>.05&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Previous pregnancies</td>
<td>58.0</td>
<td>47.2</td>
<td>.16</td>
</tr>
<tr>
<td>Sick leave&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1.8</td>
<td>12.5</td>
<td>&lt;.01&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pregnancy benefit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternity leave</td>
<td>19.5</td>
<td>23.6</td>
<td>.49</td>
</tr>
</tbody>
</table>

<sup>a</sup> Catastrophizing was dichotomized by use of the highest tertile of the scores for the whole population in weeks 19 to 21 of pregnancy (n = 324) as the cutoff point. The 2 categories were noncatastrophizing (below or equal to the highest tertile, ≤17) and catastrophizing (above the highest tertile, >17).

<sup>b</sup> Significant difference (P ≤ .05) between noncatastrophizing and catastrophizing groups (t test, chi-square test, or Fisher exact test).

<sup>c</sup> Percentage of women working at present (not including students and women on maternity leave or sick leave).

<sup>d</sup> Minimum of 45 min/wk.

<sup>e</sup> Percentage of women on sick leave, full or part time.
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Table 2.
Catastrophizing and Physical Ability for All Women and for Women in Noncatastrophizing and Catastrophizing Groups at 3 Test Occasions

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Test Occasion</th>
<th>All Women</th>
<th>Noncatastrophizing Group</th>
<th>Catastrophizing Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n Median (95% CI)</td>
<td>n Median (95% CI)</td>
<td>n Median (95% CI)</td>
</tr>
<tr>
<td>Pain Catastrophizing Scale</td>
<td>Weeks 19–21</td>
<td>242 12.0 (11.00–14.00)</td>
<td>170 8.0 (7.00–10.00)</td>
<td>72 23.5 (22.00–25.00)</td>
</tr>
<tr>
<td></td>
<td>Weeks 34–37</td>
<td>242 12.0 (10.00–14.00)</td>
<td>169 8.0 (7.00–10.00)</td>
<td>73 23.0 (21.00–25.00)</td>
</tr>
<tr>
<td></td>
<td>6 months postpartum</td>
<td>242 8.5 (7.00–10.00)</td>
<td>196 6.0 (5.00–8.00)</td>
<td>46 23.0 (20.00–26.00)</td>
</tr>
<tr>
<td>Disability Rating Index</td>
<td>Weeks 19–21</td>
<td>241 15.4 (12.95–18.08)</td>
<td>170 12.1 (9.29–15.08)</td>
<td>71 23.4 (19.04–35.62)</td>
</tr>
<tr>
<td></td>
<td>Weeks 34–37</td>
<td>242 43.9 (40.00–48.95)</td>
<td>169 40.9 (34.70–45.58)</td>
<td>73 55.1 (44.58–63.70)</td>
</tr>
<tr>
<td></td>
<td>6 months postpartum</td>
<td>241 2.3 (1.45–3.45)</td>
<td>195 1.6 (1.12–2.62)</td>
<td>46 9.7 (3.20–15.58)</td>
</tr>
</tbody>
</table>

*Catastrophizing was dichotomized by use of the highest tertile of the scores for the whole population in weeks 19 to 21 of pregnancy (n=324) as the cutoff point. The 2 categories were noncatastrophizing (below or equal to the highest tertile, ≤17) and catastrophizing (above the highest tertile, >17). Medians and 95% confidence intervals (CI) are shown for the total score of the Pain Catastrophizing Scale (0–52) and for the Disability Rating Index (0–100 mm). High scores indicate high levels of catastrophizing (Pain Catastrophizing Scale) and low levels of physical ability (Disability Rating Index).

Role of the Funding Source

Financial support was provided through a regional agreement on medical training and clinical research (ALF) between the Stockholm County Council and Karolinska Institutet, which approved the design of the study, but did not control the conduct of the research team, including recruitment, patient participation, data analyses, and manuscript preparation.

Results

The 242 women who completed the PCS were divided into 2 groups (noncatastrophizing and catastrophizing) at all 3 test occasions according to the reported levels of catastrophizing. The characteristics of the women in these 2 groups at each of the 3 measurement occasions are shown in Table 1. At the first occasion, in weeks 19 to 21, there were significant differences between the groups concerning age (P<.01) and exercise (P=.05). Women in the catastrophizing group were 2 years older and exercised less during the present pregnancy than women in the noncatastrophizing group. In weeks 19 to 21 and 34 to 37 of pregnancy, significantly higher numbers of women in the catastrophizing group were on sick leave (P<.01 and P=.02, respectively). There were no differences between the groups in reported lumbopelvic pain at any of the 3 test occasions.

Levels of catastrophizing and physical ability for all women, for women in the noncatastrophizing group, and for women in the catastrophizing group at each of the 3 test occasions are shown in Table 2. Levels of catastrophizing decreased postpartum for the whole group of women and for women in the noncatastrophizing group but remained at the same level as during pregnancy for women in the catastrophizing group. The most limited physical ability was reported by women in late pregnancy.

Figure 2 shows the fluctuation of catastrophizing (below or equal to the highest tertile, ≤17, and above the highest tertile, >17) over time and the frequency of lumbopelvic pain in women in the noncatastrophizing and catastrophizing groups, respectively, during and after pregnancy. Subgroup A (noncatastrophizing at all 3 test occasions) contained 140 women (57.9%), 23.6% of whom (35/140) had postpartum lumbopelvic pain. Subgroup B (catastrophizing at 1 occasion) contained 38 women (15.7%), 42.1% of whom (16/38) had postpartum lumbopelvic pain. Subgroup C (catastrophizing at 2 occasions) contained 39 women (16.1%), 38.5% of whom (15/39) had postpartum lumbopelvic pain. Finally, subgroup D (catastrophizing at all 3 occasions) contained 25 women (10.3%), 36.0% of whom (9/25) had postpartum lumbopelvic pain. There was a significant trend (P=.04) toward unequal proportions of women reporting postpartum lumbopelvic pain in the 4 subgroups. Fewer women in subgroup A (noncatastrophizing) than in subgroups B to D (catastrophizing at 1 or more of the test occasions) reported postpartum lumbopelvic pain.

The women in subgroup A also reported significantly (P<.001) higher levels of postpartum physical ability than the women in subgroups B to D. Table 3 shows the medians and confidence intervals for reported postpartum physical ability in the 4 subgroups.
Discussion

This prospective study adds to knowledge about the role of catastrophizing in lumbopelvic pain during and after pregnancy and in postpartum physical ability. The majority of women reported not catastrophizing at all 3 test occasions, and 10.3% reported catastrophizing at all 3 occasions. For the remaining 31.8%, catastrophizing varied over time. At all 3 test occasions, there were no differences between the noncatastrophizing group and the catastrophizing group in reported lumbopelvic pain. The present study did not demonstrate the same stability of catastrophizing over time that has been shown in other studies.\textsuperscript{8,22} The results of an experimental study indicated that in the absence of interventions, catastrophizing did not change over time.\textsuperscript{8} However, there also has been discussion of whether catastrophizing is more of a personal factor, stable over time, or more of a situational factor, dependent on the situation.\textsuperscript{23} It seems that pregnancy is unusual in this respect: it is a time-limited condition that ends with delivery and becoming a mother. Worry about giving birth, fear that something might be wrong with the baby, or concern about being unable to take care of a newborn might have affected the reported levels of catastrophizing. These and other factors, such as meetings with health care professionals, including midwives and physical therapists, might have contributed to the changes in catastrophizing in the present study. More knowledge is required about how catastrophizing fluctuates over time for women who are pregnant and the possible role of health care professionals in that process.

We believe that the present study is the first to explore the associations between catastrophizing during and after pregnancy and postpartum physical ability in the context of lumbopelvic pain. Physical ability was investigated with 4 subgroups based on the number of test occasions at which each woman reported high levels of catastrophizing: none (A), 1 (B), 2 (C), and all 3 (D).
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Table 3.
Physical Ability for Women 6 Months Postpartum

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>No. (%) of Women</th>
<th>Median</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (noncatastrophizing)</td>
<td>140 (57.9)</td>
<td>1</td>
<td>0.75–2.00</td>
</tr>
<tr>
<td>B (catastrophizing once)</td>
<td>38 (15.7)</td>
<td>5</td>
<td>1.66–8.00</td>
</tr>
<tr>
<td>C (catastrophizing twice)</td>
<td>39 (16.1)</td>
<td>6</td>
<td>0.83–11.40</td>
</tr>
<tr>
<td>D (catastrophizing)</td>
<td>25 (10.3)</td>
<td>10</td>
<td>3.20–17.58</td>
</tr>
</tbody>
</table>

Subgroups A to D were formed on the basis of the number of occasions, during and after pregnancy, at which each woman reported high levels of catastrophizing: none (A), 1 (B), 2 (C), and all 3 (D). The subgroups included both women with and without postpartum lumbopelvic pain. Medians and 95% confidence intervals (CI) are shown for the Disability Rating Index (0–100 mm). High scores indicate low levels of physical ability. Potential differences in physical ability were tested with the Kruskal-Wallis test. P values of less than or equal to 5% (P≤.05) were regarded as statistically significant. Women in subgroup A reported significantly (P<.001) higher levels of postpartum physical ability than women in subgroups B to D.

It has been indicated that patients with high levels of catastrophizing benefit from cognitive behavioral therapy. Furthermore, interventions such as education, active exercises, treatment aimed at activity, and exposure in vivo all reduced catastrophizing and led to increased physical ability. However, little is known about the mechanisms that might be involved when a change in catastrophizing occurs. One reason for such a change could be that performing activities or exercises in a controlled environment challenges the idea that pain is menacing and may cause harm. Further studies are required to determine the most effective ways to target catastrophizing, and more knowledge is needed about the underlying mechanisms. Also of interest is determining whether catastrophizing can be prevented by information and support. Catastrophizing has never, to our knowledge, been evaluated in relation to outcome of treatment for lumbopelvic pain during and after pregnancy.

Catastrophizing in relation to lumbopelvic pain during and after pregnancy is a new area of research. In the present study, women who catastrophized at 1 or more of the test occasions reported higher presence of postpartum lumbopelvic pain and more restricted postpartum physical ability than women who did not catastrophize. Catastrophizing has been shown to contribute to disability even after controlling for pain intensity, and clinical research has indicated that catastrophizing is a stronger predictor of pain-related disability than pain itself. Furthermore, catastrophizing has been associated with disability in both acute back pain and chronic back pain. However, most women in the present study scored rather low on the Disability Rating Index, and the differences among the 4 subgroups formed postpartum were small. The significant difference in postpartum physical ability between women who did not catastrophize and women who catastrophized at one or more of the test occasions might have been due to measurement error.

We used the highest tertile of the PCS score, 17, as the cutoff point between the noncatastrophizing group and the catastrophizing group; this choice was based on the whole population, both with lumbopelvic pain and without lumbopelvic pain, in weeks 19 to 21 of pregnancy. When the data were analyzed, fewer than 5% of the women were found to be close to the cutoff point, indicating that the choice of 17 as the cutoff point was adequate. The finding in the present study that fewer women who did not catastrophize reported postpartum lumbopelvic pain than women who catastrophized partially replicated the findings of an earlier study, in which a PCS score of greater than 17 in pregnancy was shown to predict postpartum lumbopelvic pain. Other studies reported mean PCS scores of 10 in a community sample, 14 in another community sample, and 22 in an outpatient sample.

In terms of the clinical implications of the findings, it has been indicated that measuring catastrophizing and fear may be important to physical therapists and may provide guidance in treatment decisions. There is some evidence that catastrophizing moderates the outcome of treatment with exposure in vivo for patients with nonspecific spinal pain. Studies also have indicated that
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catastrophizing may mediate the outcome of treatment for chronic low back pain. A recent review showed that education and information have positive effects on pain-related fear and catastrophizing. However, actual experience is needed to change behavior. According to another review, both graded exercise and graded exposure in vivo may have effects on persistent low back pain and related consequences.

Both women with and without lumbopelvic pain were included in the present study, enabling us to examine the relationship between catastrophizing and lumbopelvic pain. Moreover, we believe that this prospective study has made it possible, for the first time, to monitor fluctuations of catastrophizing over time, during and after pregnancy. These factors must be considered strengths of the present study.

All data were self-reported, and there were no other sources of verification, such as behavioral tests or physical examinations. Of the 470 eligible women, 324 women answered in weeks 19 to 21 and 242 women answered at all 3 occasions and hence were included in the present study. This factor might have reduced the generalizability of the results. However, the 82 women excluded from the analysis did not differ from the 242 women included in the analysis in terms of characteristics and levels of catastrophizing at the first test occasion. In addition, the percentages of women with and without lumbopelvic pain in the present study were in accordance with those in other studies.

Of the 242 women included in the present study, 73 (30.2%) reported postpartum lumbopelvic pain. A large study group would have been required from the beginning of pregnancy to make it possible to divide women into groups based on postpartum catastrophizing and to include certain numbers of women with and without lumbopelvic pain. Thus, we chose to combine groups to reach statistical power for comparisons between groups.

The findings of the present study add to increasing evidence that catastrophizing is associated with lumbopelvic pain and physical ability during and after pregnancy. However, the design of the study did not allow us to draw any conclusions about whether catastrophizing is a mediator or a predictor of disability.

Conclusion
The common idea that levels of catastrophizing are “stable” within personality should be reconsidered, because for 1 of 3 women, the levels of catastrophizing changed over time. A majority of women reported not catastrophizing. However, catastrophizing in relation to pregnancy seems to be associated with lumbopelvic pain and postpartum physical ability. The results indicated that the role of catastrophizing in this context should be studied further.

References

Dr Olsson, Associate Professor Nilsson-Wikmar, Professor Harms-Ringdahl, and Dr Lundberg provided concept/idea/research design. Dr Olsson, Associate Professor Groten, and Dr Lundberg provided writing. Dr Olsson and Associate Professor Nilsson-Wikmar provided data collection, project management, fund procurement, and participation. Dr Olsson, Associate Professor Groten, Professor Harms-Ringdahl, and Dr Lundberg provided data analysis. Associate Professor Groten, Associate Professor Nilsson-Wikmar, and Professor Harms-Ringdahl provided consultation (including review of manuscript before submission).

The submitted manuscript, without revisions, was completed for Dr Olsson’s doctoral thesis at Karolinska Institutet.

Approval of the project’s goals and methods was obtained from the Regional Ethics Committee at the Karolinska Institutet, Stockholm, Sweden (031006, Dnr 03–503).
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