Effects of surgical excision of endometriosis regarding quality of life and psychological well-being: a review

Nadja Fritzer*1,2, Ayman Tammaa2, Heinrich Salzer2 & Gernot Hudelist2,3

The aim of the present work is to give a critical and detailed reflection on the effects of surgical resection of deep infiltrating endometriosis regarding reduction of symptoms, psychological well-being and quality of life. The current evidence strongly supports the effectiveness of radical laparoscopic resection in relieving endometriosis-associated symptoms and enhancing psychological well-being. In addition, studies suggest a general improvement of quality of life, however, further studies are needed to support this observation.

Endometriosis is a common gynecological disorder affecting women in their reproductive years. It is defined by growth of endometrial tissue outside the uterine cavity. Endometriotic tissue responds to ovarian steroids and reacts in the same way as the endometrium during the menstrual cycle, thereby causing a local inflammatory reaction and stimulation of nerve fibers in extraterine locations during menstruation [1].

Typical symptoms are dysmenorrhea, dyspareunia and/or different levels of infertility. In cases of involvement of the bowel and the urinary bladder, cyclical changes varying with intestinal constipation and/or diarrhea, dyschezia and dysuria are common and predominant complaints. Endometriosis approximately affects 2% of the general female population and approximately 50–70% of symptomatic women in their reproductive years [2]. These facts lead to the conclusion that about 178 million women suffer from endometriosis worldwide [3].

Owing to a lack of awareness and diagnostic skills, the disease is often misdiagnosed/undiagnosed for many years [4–9]. According to a current study from Nnoaham et al. there is an average diagnostic delay of 6.7 years between onset of symptoms and the final diagnosis [10].

Hence, endometriosis-associated discomfort strongly influences the quality of life (QoL) and the psychological well-being. In addition, overall work productivity is significantly impaired in affected women: patients loose an average of 10.8 h per week due to impaired physical well-being during work [10]. Furthermore, the median time of absence from work is 17.8 days per year because of endometriosis-associated pain [11,12]. Endometriosis-associated symptoms often lead to problems regarding the patient’s sexual life, partnership and/or social contacts due to a lack of support/understanding from the social environment or avoidance of intercourse. Particularly infertile women have feelings of guilt toward their partners and believe themselves to be unsuitable for them [13–16]. Furthermore, observations of a negative body image aggravate the burden of endometriosis. Within this, feelings of loss of control over one’s own body, loneliness and mental overload due to (failed) medical treatment impair the self-esteem of women [16].

The primary aim of any treatment is pain relief and improvement of QoL. However, studies showed that medical treatments are often ineffective (e.g., in cases of intestinal endometriosis) [15,16]. Another treatment option is the radical excision of endometriotic lesions. However, owing to the risks of substantial complications, the discussion about the indications of colorectal resection for endometriosis is controversial [17].

Over the past years, several studies have tried to evaluate the effectiveness of laparoscopic treatment of endometriosis not only on symptom reduction, but also on QoL and psychological health. Therefore, the purpose of the present article is to review the evidence on the effect of surgical resection of deep infiltrating endometriosis (DIE) with an emphasis on change of QoL and psychological well-being.

Selection criteria
MEDLINE and PsychINFO databases were searched for relevant studies investigating QoL and psychological well-being in patients with DIE. No case reports or review articles were used. Abstracts of all studies identified were read and manuscripts were then fully reviewed.

Keywords
• laparoscopic surgery
• psychological well-being
• quality of life • symptoms
Endometriosis of the uterosacral ligaments

Dyspareunia is a frequent and serious symptom of endometriosis and quite often the key reason for a surgical procedure. It is a heterogenous disorder, also caused by pelvic adhesions, pelvic inflammatory disease or interstitial cystitis. In cases of endometriosis, pain during/after intercourse is most severe before menstruation and intensity corresponds with depth of infiltration. The prevalence largely varies in different investigations because of differences in the definition of dyspareunia and the survey population heterogeneity [14–16].

Between 60 and 80% [15,18,19] of patients undergoing surgery and between 53 and 90% [20] of those receiving medical treatment suffer from dyspareunia. Furthermore, more than half of the endometriosis patients are affected by primary dyspareunia [15]. The frequency of this symptom increases when endometriotic implants are located on the uterosacral ligaments (USLs) [17]. Not surprisingly, these women have a lower frequency of intercourse per week, lower levels of arousal/desire and often negative attitudes towards sexuality, including feelings of anxiety and avoidance of intercourse. These facts lead to a significant reduction in quality of sex life and problems in their relationships [14].

In this context, Ferrero et al. conducted a prospective follow-up study to investigate the effect of the radical laparoscopic excision of endometriosis on deep dyspareunia – with and without lesions involving the USLs [14]. Only patients with a pain intensity of at least six points on the visual analog scale were included. Preoperatively, the average pain score was 7.1 (standard deviation (SD): 1.0) in cases with no involvement of the USLs and 7.6 (SD: 1.1) in women with USL involvement. Although a significantly higher pain intensity was observed in women with USL endometriosis, there were no significant differences between unilateral 7.8 (SD: 1.1) and a bilateral 8.0 (SD: 1.1) involvement. At 12-month follow-up, both groups exhibited a significant improvement of pain intensity of at least four points on the visual analog scale (with USLs 2.8 (SD: 2.2) and without USLs 2.2 (SD: 1.8)) following surgery without any adjuvant medical treatment.

In addition, a self-administered questionnaire based on the sexual satisfaction subscale of the Derogatis sexual function inventory was applied [21]. This subscale consists of nine items that reflect the level of sexual fulfilment. Within this, women with USLs who had the most severe impairment of sexual function also reported an improvement of the quality of sex lives. The variety of their sex lives and frequency of intercourse per week increased, they had more satisfying orgasms, could relax more easily during sex and were more fulfilled and relaxed after it. Interestingly, similar results were observed in women without involvement of the USLs [14].

Another study by Ferrero et al. compared patients with endometriosis of the USL (group A), patients with endometriosis without an involvement of the USLs (group B) and women without endometriosis (group C). Group A had a significantly reduced frequency of intercourse. In addition, pain negatively affected the intensity of orgasm in this group. Furthermore, the Global Sexual Satisfaction Index, which is a self-rating instrument for evaluating the overall level of sexual satisfaction on a scale from zero to eight, was significantly lower in group A patients compared with the other cohorts [15].

In conclusion, the abovementioned studies showed that complete radical laparoscopic resection of endometriosis not only decreased pain intensity, but also improves quality of sex life in different ways.

Bowel endometriosis

DIE of the bowel, with an estimated occurrence between 5 and 12%, is less common than peritoneal/ovarian endometriosis. The most common locations are the rectum and the rectosigmoid junction with 93% of all intestinal endometriotic lesions [15,17,22,23].

In cases of bowel endometriosis, digestive disorders like diarrhea, constipation, cyclic bowel dysfunction, intestinal cramping, pain on bowel movement/defecation, and rectal bleeding are common, as well as typical endometriosis-associated symptoms.

When open surgery is compared with laparoscopic resection of colorectal endometriosis, Darai et al. observed a significant improvement of digestive, gynecological and general symptoms (back pain and asthenia) for both procedures. QoL was evaluated with the Short Form (SF)-36 Health Status Questionnaire [24], a generic measure that can be used from the age of 14 years, in different diseases and treatment groups. In studies of general and specific populations, comparing the burden of diseases and in differentiating the outcome in various treatments has proved to be a beneficial instrument. It includes four scales for physical health (physical functioning, role-physical, bodily pain and general health) and four scales for mental health (vitality, health).
social functioning, role-emotional and mental health). Altogether, the instrument is composed of 36 items. In both groups, physical and mental health improved significantly, except the scale ‘physical function’, after an average follow-up of 19 months following surgery [25]. 

Similarly, Bassi et al. showed a significant improvement in all pain-related symptoms after laparoscopic segmental resection of the rectosigmoid in cases of DIE of the bowel. All domains of the SF-36 improved significantly after a 12-month follow-up [36].

Dubernard et al. reported similar results after a colorectal resection with a median follow-up of 22.5 months: gynecological symptoms, bowel movement pain, pain on defecation, diarrhea, lower back pain and asthenia improved significantly. No effect was observed for tenesmus, rectal bleeding and constipation. The mean size of the segmental colorectal resection was 10.2 cm and in 15.5% of cases (nine out of 58) postoperative complications were stated. Nevertheless, all items of the SF-36 Health Status and the evaluated QoL score significantly improved after the procedure. Interestingly, no difference in QoL between patients with and without postoperative complications (e.g., rectovaginal [RV] fistula) was observed [17].

These results are in accordance with a study by Thomassin et al. who reported a significant improvement in gynecological and digestive/rectal symptoms following colorectal resection. The QoL score also improved significantly [27].

Similar outcomes regarding gynecological and digestive symptoms were also observed in other studies [15,22,28].

According to Kristensen and Kjer, laparoscopic laser resection of RV pouch and RV segment endometriosis led to a significant improvement in typical endometriosis-associated pain symptoms and rectal pain. QoL measured via ten-point scale rose from an average of three points before intervention to seven points after intervention. Furthermore, frequency of intercourse increased and use of analgesics during menses, work difficulties and sick leave due to pain also decreased significantly [29].

In addition, Ford et al. reported an improvement in QoL after a follow-up period of 12 months measured by the EuroQol-5D [30,31]. This standardized instrument evaluates the health-related QoL and provides a simple descriptive profile and a single index value for health status. It is primarily designed for self-completion by patients and consists of five dimensions (mobility, self-care, usual activities, pain/discomfort and anxiety/depression). Nevertheless, the overall QoL scores were lower in the study population consisting of patients with resected RV endometriosis than in a representative sample [31].

Radical resection of endometriotic lesions is not only associated with a significant improvement of pain symptoms and pain intensity, but also with an improvement of ‘sexual pleasure’, ‘discomfort’ and ‘habit’. Furthermore, QoL and mental health improved but does not always reach levels of a healthy control group [32,33].

Marbrouk et al. demonstrated a significant improvement in every scale of the SF-36 in a prospective study with 100 patients with DIE in a 6-month follow-up. A total of 71% of women received a hormonal therapy after the surgery, but medical treatment had no observable impact on the SF-36 results [34].

Fritzer et al. demonstrated long-term implications on psychological parameters in a study population of 75 women who underwent a radical resection of DIE with segmental resection of the rectosigmoidal bowel. All evaluated psychological variables improved significantly with a median follow-up of 38 months. The scales ‘feelings of physical exhaustion and lack of motivation’, ‘lack of acceptance of ones own body’, ‘feelings of a low mood’ and ‘loss of body control’ postoperatively had significantly decreased. A significant reduction of ‘general anxiety’, ‘lack of understanding and loss of motivation for life’ were also observable after treatment. Furthermore, ‘personal satisfaction’ and ‘feelings of femininity’ increased significantly. The variable QoL, measured on a ten-point scale rose from an average of 4.5 points before intervention, to 8.7 points after intervention [35].

In accordance with previous studies, endometriosis-associated pain symptoms such as dysmenorrhea, acyclic pelvic pain, dyspareunia and dyschezia improved significantly [36].

Among the endometriosis-associated pain symptoms, infertility also has a negative impact on a couple’s well-being. Social pressure, feelings of being an inadequate woman/man and self-reproaches are a few of the burdens infertile couples have to cope with [11]. Monga et al. showed that those couples had a lower QoL and a significantly poorer marital adjustment than controls [37].

The aforementioned results confirm the beneficial role of a radical laparoscopic excision of endometriosis.

Detailed information about the effects of interventions are given in Tables 1, 2 & 3.
Critical issues to address

Although the majority of cited studies show an improvement of pain symptoms, QoL and psychological well-being following surgical intervention, some aspects must be considered critically. First, a heterogeneity of data is observable: there are differences in the study designs (pro- and retrospective), in the average follow-up periods (from 4 to 45.2 months) and in the sample sizes (from 20 to 151 patients). Furthermore, the anatomical locations of endometriosis (e.g., colorectal, rectosigmoidal, USLs and RV pouch/septum) and the depth of endometriotic implants (DIE vs no DIE) are varying in the according studies.

Only very few papers evaluated gynecological, digestive, rectal and general symptoms simultaneously. Most of them do focus merely on gynecological and digestive symptoms. It is difficult to make a detailed statement about the effect of laparoscopic excision regarding specific symptoms and psychological health.

A similar problem is observable in the evaluation of QoL and psychological well-being because of differences in the number and the type of instruments used. It is critical to compare the standardized questionnaires (SF-36/SF-12 and EuroQol-5D) due to their varying dimensions. In cases of the self-administered questionnaires, it should be considered that the quality criteria (reliability, validity and objectivity) are not well known.

All of the cited studies used a generic instrument, although an endometriosis-specific QoL questionnaire, the Endometriosis Health-Profile [38], is available. This patient-generated instrument evaluates the parameters: ‘control’, ‘pain and powerlessness’, ‘social support’, ‘emotional well-being’ and ‘self-image’ [38]. The advantage of this validated instrument is that it is condition-specific and evaluates the health-related QoL in endometriosis.

Table 1. Improvement of symptoms after laparoscopic excision of deep infiltrating endometriosis.

<table>
<thead>
<tr>
<th>Study (year)</th>
<th>Study design</th>
<th>Procedure</th>
<th>Individuals (n)</th>
<th>Median follow-up (months)</th>
<th>Dysmenorrhea</th>
<th>Acyclic pelvic pain</th>
<th>Dyspareunia</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
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<td>Dubernard et al. (2006)</td>
<td>Prospective</td>
<td>Colorectal resection</td>
<td>51</td>
<td>22.5</td>
<td>Sig. (&lt;0.05)</td>
<td>NA</td>
<td>Sig. (&lt;0.05)</td>
<td>[17]</td>
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<td>Prospective</td>
<td>Colorectal resection</td>
<td>26</td>
<td>19</td>
<td>Sig. (&lt;0.05)</td>
<td>NA</td>
<td>Sig. (&lt;0.05)</td>
<td>[25]</td>
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<td>Thomassin et al. (2004)</td>
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<td>Colorectal resection</td>
<td>25</td>
<td>NA</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>[27]</td>
</tr>
<tr>
<td>Seracchioli et al. (2007)</td>
<td>Prospective</td>
<td>Rectosigmoidal resection</td>
<td>20</td>
<td>36</td>
<td>Sig. (&lt;0.05)</td>
<td>NS</td>
<td>Sig. (&lt;0.05)</td>
<td>[28]</td>
</tr>
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<td>Bassi et al. (2010)</td>
<td>Prospective</td>
<td>Rectosigmoidal resection</td>
<td>151</td>
<td>12</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>[26]</td>
</tr>
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<td>Fritzer (2010)</td>
<td>Retrospective</td>
<td>Rectosigmoidal resection</td>
<td>75</td>
<td>38</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>[36]</td>
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<tr>
<td>Ford et al. (2004)</td>
<td>Prospective</td>
<td>RV resection</td>
<td>48</td>
<td>12</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>[31]</td>
</tr>
<tr>
<td>Kristensen et al. (2007)</td>
<td>Retrospective</td>
<td>RV pouch/septum resection</td>
<td>48</td>
<td>17.9</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>[29]</td>
</tr>
<tr>
<td>Ferrero et al. (2006)</td>
<td>Prospective</td>
<td>Resection</td>
<td>68</td>
<td>12</td>
<td>NA</td>
<td>NA</td>
<td>Sig. (&lt;0.05)</td>
<td>[14]</td>
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<td>Fleisch et al. (2005)</td>
<td>Retrospective</td>
<td>Resection with bowel/bladder involvement</td>
<td>23</td>
<td>45.2</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>[22]</td>
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<tr>
<td>Garry et al. (2000)</td>
<td>Prospective</td>
<td>Resection</td>
<td>57</td>
<td>4</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>[33]</td>
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<tr>
<td>Mabrouk et al. (2011)</td>
<td>Prospective</td>
<td>Resection</td>
<td>100</td>
<td>6</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>Sig. (&lt;0.05)</td>
<td>[34]</td>
</tr>
</tbody>
</table>

Significance set below 5%.
NA: Specific data not available; NS: Not significant; RV: Rectovaginal; Sig.: Significant.
Table 2. Improvement of digestive/rectal/urinary and general symptoms after laparoscopic excision of deep infiltrating endometriosis.

<table>
<thead>
<tr>
<th>Study (year)</th>
<th>Study design</th>
<th>Procedure</th>
<th>Individuals (n)</th>
<th>Median follow-up (months)</th>
<th>Digestive/rectal/urinary symptoms</th>
<th>General symptoms</th>
<th>Ref.</th>
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</thead>
<tbody>
<tr>
<td>Dubernard et al. (2006)</td>
<td>Prospective</td>
<td>Colorectal resection</td>
<td>51</td>
<td>22.5</td>
<td>Dyschezia: Sig. (&lt;0.05)</td>
<td>Rectal pain/rectorrhagia: NA</td>
<td>Bowel movement pain/ cramping: NA</td>
</tr>
<tr>
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<td>Prospective</td>
<td>Colorectal resection</td>
<td>26</td>
<td>19</td>
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<td>Bowel movement pain/ cramping: NA</td>
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<td>Prospective</td>
<td>Colorectal resection</td>
<td>25</td>
<td>NA</td>
<td>Dyschezia: Sig. (&lt;0.05)</td>
<td>Rectal pain/rectorrhagia: NA</td>
<td>Bowel movement pain/ cramping: NA</td>
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<td>Seracchioli et al. (2007)</td>
<td>Prospective</td>
<td>Rectosigmoidal resection</td>
<td>20</td>
<td>36</td>
<td>Dyschezia: Sig. (&lt;0.05)</td>
<td>Rectal pain/rectorrhagia: Sig.</td>
<td>Bowel movement pain/ cramping: Sig. (&lt;0.05) (decreased)</td>
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<tr>
<td>Bassi et al. (2010)</td>
<td>Prospective</td>
<td>Rectosigmoidal resection</td>
<td>151</td>
<td>12</td>
<td>Dyschezia: Sig. (&lt;0.05)</td>
<td>Rectal pain/rectorrhagia: NA</td>
<td>Bowel movement pain/ cramping: NA</td>
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<td>Retrospective</td>
<td>Rectosigmoidal resection</td>
<td>75</td>
<td>38</td>
<td>Dyschezia: Sig. (&lt;0.05)</td>
<td>Rectal pain/rectorrhagia: NA</td>
<td>Bowel movement pain/ cramping: NA</td>
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<td>Ford et al. (2004)</td>
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<td>RV resection</td>
<td>48</td>
<td>12</td>
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<td>Bowel movement pain/ cramping: NA</td>
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<td>Kristensen et al. (2007)</td>
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<td>17.9</td>
<td>Dyschezia: NA</td>
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<td>Resection</td>
<td>57</td>
<td>4</td>
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<td>Rectal pain/rectorrhagia: NA</td>
<td>Bowel movement pain/ cramping: NA</td>
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</table>

Significance set below 5%.
C: Constipation; D: Diarrhea; NA: Specific data not available; NS: Not significant; RV: Rectovaginal; Sig.: Significant.

*Bowel movement pain decreased after surgery because of de novo constipation and diarrhea.
Table 3. Improvement of quality of life and mental health after laparoscopic resection of deep infiltrating endometriosis.

<table>
<thead>
<tr>
<th>Study (year)</th>
<th>Study design</th>
<th>Procedure</th>
<th>Individuals (n)</th>
<th>Median follow-up (months)</th>
<th>Measuring instruments and outcomes</th>
<th>Ref.</th>
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<td>Physical: sig. (&lt;0.05) Mental: sig. (&lt;0.05) QoL (1–10) Sig. (&lt;0.05) NA NA NA</td>
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<td>Physical: sig. (&lt;0.05) Mental: sig. (&lt;0.05) NA NA NA NA</td>
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<td>QoL-score (1–10)</td>
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<td>s.-a. qu.ª 'mental well-being'</td>
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<td>Kristensen et al. (2007)</td>
<td>Retrospective</td>
<td>RV pouch/ septum resection</td>
<td>48</td>
<td>17.9</td>
<td>QoL-Score (1–10)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sig. (&lt;0.05) NA NA NA NA</td>
<td>[29]</td>
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<tr>
<td>Ferrero et al. (2006)</td>
<td>Prospective</td>
<td>Resection</td>
<td>68</td>
<td>12</td>
<td>s.-a. qu. 'sex life'</td>
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<td>Physical: NS Mental: NS EQ-5D Sig. (&lt;0.05) Sexual activity questionnaireº</td>
<td>[33]</td>
</tr>
<tr>
<td>Mabrouk et al. (2011)</td>
<td>Prospective</td>
<td>Resection</td>
<td>100</td>
<td>6</td>
<td>SF-36</td>
<td></td>
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<td>Physical: sig. (&lt;0.05) Mental: sig. (&lt;0.05) NA NA</td>
<td>[34]</td>
</tr>
</tbody>
</table>

Significance set below 5%.

'SF-36 Health Status Questionnaire includes 4 physical and 4 mental health domains; 36 items.

'SF-12 Health Status Questionnaire; 12 items.

'EQ-5D.

'Sexual activity questionnaire includes sexual habit, discomfort and pleasure.

'Self-administered questionnaire.

'Quality of life (rating scale 1–10).

'Except the scale 'physical functioning'.

'EQ-5D: EuroQol-5D; NA: Specific data not available; NS: Not significant; QoL: Quality of life; RV: Rectovaginal; s.-a. qu.: self-administered questionnaire; SF: Short Form; Sig.: Significant.
In addition, six separate areas (e.g., work, sexual relationships and feelings about treatment) are available, which can be used depending on the issue and the individual situation of the patient.

Another issue to consider is the evaluation of a multidimensional character such as QoL with only one brief instrument, especially when this instrument only evaluates certain parameters, affecting the construct. It also must be considered that not merely physical well-being improves QoL after a surgical intervention, but also social support, coping skills and resilience factors of the patient.

Another influencing aspect regarding QoL after laparoscopic surgery is the status of family planning at the time of the postoperative survey. It should be considered that unfulfilled pregnancy affects QoL distinctly, even if the woman experiences a reduction of symptoms. We therefore suggest to apply more specific instruments covering the most important domains for evaluation of QoL.

One explicit observation from the present work is that women affected by endometriosis have a distinctly lower QoL compared with healthy controls. Not only endometriosis-associated pain and subfertility, but also the long diagnostic delay may have a significant effect on mental well-being and does add to the problem. Some reasons for that delay may be the normalization of pain by patients, the inability to differentiate between normal and pathological menstruation pain and anxiety, or the shame to speak about such an intimate matter. Furthermore, physicians sometimes do not believe patients regarding their severity of symptoms and the pain intensity. To suppress the complaints, hormonal treatments such as oral contraceptive pills are prescribed, but often cannot treat the symptoms sufficiently. In the majority of patients, pain recurs after cessation of hormonal therapy. Not uncommonly the pain is present again, sometimes more severe than before.

When medical treatment is ineffective, distress and anxiety may result and a further increase in psychological discomfort can be observed. Over time, women react with negative emotions such as hopelessness, resignation, depressive symptoms and/or social isolation as a consequence of the disease.

These and many other factors lead to a chronification of the disease. Therefore it is not surprising that these patients have significantly lower QoL and negatively affected mental well-being.

Apart from relief of symptoms due to successful treatment, the final diagnosis has striking psychological benefits. For example, the patient receives the confirmation of real suffering caused by physical disease thereby excluding somatisation disorders. In addition, women often obtain much more social support after being diagnosed a disease.

So it is hardly surprising that mental health of women suffering for many years from endometriosis-associated pain may not change as rapid as physical health does.

The data conclude that patients not only need medical support, but rather a multidisciplinary healthcare system, as the majority of the patients have to cope with physiological symptoms and strongly reduced QoL, as well as psychological and psychosocial problems.

**Conclusion**

Pain is a very subjective feeling influencing psychological well-being significantly. This article provides evidences that the physical and psychosocial burden of DIE in patients can be minimized by surgical excision. Furthermore, the intervention fulfills its essential objective of improving QoL and psychological well-being.

**Future perspective**

At the moment, there is a lack of prospective studies concerning psychological well-being and QoL in cases of DIE. Therefore, one aim for the future should be to focus on psychosocial burdens in the same way as we focus on physical ones. Another aim should be for interdisciplinary care in the hospital setting consisting of surgical/medical therapy, pain therapy and clinical psychology.

**Financial & competing interests disclosure**

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

No writing assistance was utilized in the production of this manuscript.
Executive summary

Epidemiology
- Endometriosis affects approximately 2% of the general female population and approximately 50–70% of symptomatic women in their reproductive years.
- Typical endometriosis-associated symptoms are dysmenorrhea, dyspareunia, different levels of infertility, dyschezia and/or dysuria.

Endometriosis of the uterosacral ligaments
- Dyspareunia is a frequent and serous symptom in cases of deep infiltrating endometriosis (DIE).
- The frequency increases when endometriotic implants are located on the uterosacral ligaments.
- Dyspareunia affects women’s psychological well-being and quality of life, for example, women have a lower frequency of intercourse per week, lower levels of arousal/desire and often negative attitudes towards sexuality, including feelings of anxiety and avoidance of intercourse.
- A surgical excision of endometriosis on the uterosacral ligaments leads to a significant improvement in dyspareunia.

Bowel endometriosis
- DIE of the bowel has an estimated occurrence between 5 and 12%.
- Typical symptoms are digestive disorders like diarrhea, constipation, intestinal cramping and rectal bleeding.
- Resection of DIE on the bowel improves pain intensity, quality of life and psychological well-being significantly.

Future perspective
- More prospective studies concerning psychological well-being and quality of life in cases of DIE are necessary.
- Interdisciplinary care in the hospital setting, consisting of surgical/medical therapy, pain therapy and clinical psychology, should be focused on.

References
Papers of special note have been highlighted as:
• of interest
•• of considerable interest
•• Review describing the psychosocial impacts on patients.


