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Oosterhuis, T.

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## **Adherence to rehabilitation after lumbar disc surgery: a qualitative study**

Teddy Oosterhuis  
Marjan J Westerman  
Arnela Suman  
Raymond W Ostelo  
Maurits W van Tulder

*Oosterhuis T, Westerman MJ, Suman A, Ostelo RW, van Tulder MW. Recovery and treatment expectations, practical skills and therapist involvement influence adherence to rehabilitation after lumbar discectomy: a qualitative study.  
Submitted*

## **Abstract**

Question: what are the experiences of people who underwent lumbar discectomy, with performing home exercises and following advice, and which factors play a role in adherence to these exercises and advice? Design: a qualitative study using a phenomenological framework, semi-structured individual interviews and thematic analysis. Participants: twelve people who participated in a trial and received rehabilitation after lumbar discectomy. Results: undergoing discectomy was perceived as a major event whereas neurosurgeons were thought to see discectomy as a minor operation. The main barriers to adherence to exercise and advice were fear of pain aggravation and subsequent activity avoidance immediately after surgery and perceived poor practical skills to cope with all treatment requirements. Key facilitators to adherence were expected recovery and treatment efficacy, perceived sufficient practical skills, and therapist involvement which was tailored to the participant's needs. Conclusion: factors influencing adherence differ widely and it is, therefore, important to assess: practical skills to cope with treatment requirements, recovery and treatment expectations and preferred therapist involvement in the rehabilitation process in each individual patient, to provide patient-centred rehabilitation and to increase adherence to home exercises and advice.

## Introduction

Sciatica, commonly caused by a herniated disc [1], is characterized by lower limb pain radiating below the knee, sometimes with neurological phenomena such as sensory and motor deficits [2]. Surgical treatment is offered if the radiating leg pain persists despite a period of conservative management [2]. The two most common options for management after surgery are rehabilitation or no further treatment [3]. Both options were compared in the REALISE trial to evaluate the effectiveness of post-operative rehabilitation [4]. The main goal of the rehabilitation program was to gradually extend daily activities with full resumption of pre-operative activities in the long term. In the first week, treatment focused on personal care activities and transfers in the home situation. From the second week onward, exercises were taught with increasing intensity, aiming to prepare for the resumption of daily activities. Therapists provided tailored advice on lifestyle and daily activities.

Adherence to the exercises and advice is expected to influence the effectiveness of the rehabilitation program [5,6]. Adherence to this treatment can be defined as the extent to which a patient follows recommendations from the treating therapist [7]. However, exercising happens to be the most common behaviour patients with pain fail to adhere to [8]. Non-adherence to home exercises is since long a known problem [9] as is adherence to advice regarding lifestyle and physical activity [10].

Insight into factors related to adherence to advice and exercise programs is needed to develop strategies to enhance adherence [11]. These factors are unknown for patients who underwent lumbar discectomy. Evidence for predictors of adherence to advice on lifestyle and the execution of daily activities is limited. Many factors, including socioeconomic variables, self-efficacy, self-motivation, social support and influence from a physician predicted adherence to physical activity in various populations, but not specifically in people who underwent discectomy [10]. The following factors were found to influence adherence to advice or exercises: psychosocial factors (locus of control, motivation and self-efficacy [11]; treatment credibility [12]); treatment related factors (patient-provider relationship [11] treatment aligned with previous experiences [12]; providing feedback [13]; number of exercises [14]; treatment effect [13]); physical factors (pain and disability [15]; physical activity level [16]) and contextual factors (time investment and time availability [17]; support from important others [10]). It is, however, unclear

whether these or possibly other factors play a role in adherence to home exercises and advice in people who underwent lumbar discectomy. Therefore, the research question of this study is: what are the experiences of people who underwent lumbar discectomy, with performing home exercises and following advice, and which factors play a role in adherence to these exercises and advice?

## **Methods**

### **Design**

This is a qualitative study using a phenomenological framework. Semi-structured interviews were used to investigate experiences of patients with aspects of post-operative exercise therapy. The Medical Ethics Review Board of the VU University Medical Centre approved the study protocol (registration number NL35897.029.11).

### **Participants**

We included participants of the intervention group of the REALISE trial [4] and used a purposive sample. We selected participants from different age groups and both genders, with diverse scores on three preoperative measures: expectations regarding the two post-operative strategies (Credibility/Expectancy Questionnaire [18]), pain (Numerical Rating Scale [19]) and disability (Oswestry Disability Index [20]). The interviewer (TO) contacted potentially eligible participants by phone to inform them about the study and to ask whether they were interested to participate. Subsequently written information was provided to patients who were interested in participating, details about the procedures were provided and an interview was arranged at the participants' convenience.

### **Data collection**

One interviewer (TO), with previous experience in interviewing, conducted the individual interviews. Written informed consent was obtained prior to each interview. Participants were asked about their experiences with postoperative rehabilitation, focusing on factors that play a role in adherence to home exercises or advice regarding activities of daily living. The interviews were semi-

structured, based on a topic list including items related to: psychosocial [11,12], physical [15,16], treatment-related [11,13,14] and contextual [10,17] factors.

We aimed to capture a broad overview of the experiences that participants had with postoperative rehabilitation. Based on constant comparison analysis, we further included participants with specific characteristics to obtain more in-depth insight into the factors influencing adherence. As most respondents recovered fairly quickly, we sampled additional respondents with high pain and disability scores throughout the 6-month follow-up. All interviews were audiotaped and took place at the respondents' homes, except for one interview at the interviewer's worksite, as preferred by the respondent. Interview duration usually ranged from 35-40 minutes with four interviews lasting for 50-80 minutes. We used member checks to increase the validity by sending participants a summary of their interview, to allow them to check the content and make any additional comments [21].

## Data analysis

We used a thematic analysis approach. The interviews were transcribed verbatim immediately after each interview. Transcripts were first read for general understanding. After repetitively reading for patterns of meaning (themes) and issues of potential interest, relevant data fragments were selected and coded [22]. To increase reliability, initial open coding was independently performed by two researchers (TO and AS) and subsequently discussed (TO, AS, MJW) [21]. Coding of new data was compared to previously analysed data to check if themes could be identified consistently and coding could be used throughout the data set [22]. Data from respondents interviewed shortly after surgery and at long-term follow-up were compared. Reports on the content of treatment or experiences with treatment did not differ between respondents interviewed at short or long-term follow-up. In the last three interviews no new information appeared. Interpretation of the identified themes was discussed amongst two researchers (TO and MJW) as well as amongst all researchers involved (TO, MJW, RWO, MWvT).

# Results

## Participants

The selection of the participants and characteristics of the 12 respondents are presented in figure 1 and table 1. Respondents were nearly or completely pain free immediately after surgery, had aggravated symptoms, experienced pain and limitations for a prolonged time or a recurrence of complaints after an early recovery. All respondents received treatment in a primary care practice; some were treated at home in the first 1-4 weeks. A median of 9 treatment sessions were provided (range: 4 sessions/6 weeks to 33/6 months). Respondents initially received one to two treatment sessions per week. Reports of the content of treatment varied, from predominantly performing stretching and strengthening exercises with or without the use of massage, to performing exercises and receiving advice on daily activities and physical activity with practicing these activities under supervision. Three themes emerged: the impact of undergoing lumbar discectomy, recovery and treatment expectations, contribution of the therapist and the patient to the rehabilitation process.

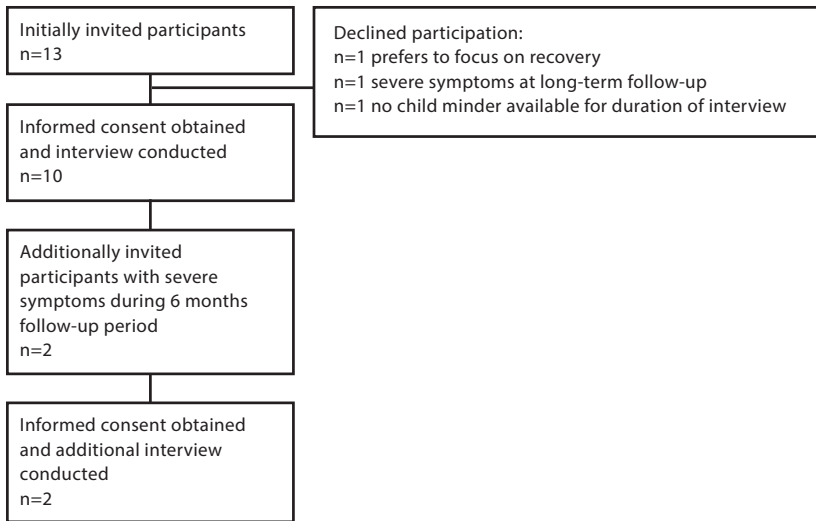


Figure 1 Selection of participants



Table 1 Characteristics of participants

nr	age	gender	pain back	pain leg	disability	expect interv	expect control	education	time since surgery
1	55	m	10	10	bed bound	7	3	high	11 mo
2	68	f	5	6	moderate	9	9	low	11 mo
3	43	f	8	9	severe	6	5	middle	6 mo
4	21	f	8	7	moderate	5	6	middle	10 mo
5	23	m	9	7	severe	7	7	middle	6 wk
6	40	m	2	4	moderate	7	7	high	14 mo
7	41	m	3	3	moderate	5	9	middle	18 mo
8	33	f	8	7	severe	4	5	middle	8 mo
9	66	f	8	7	severe	7	7	middle	14 mo
10	53	f	8	8	severe	7	8	middle	12 mo
11	40	f	5	7	crippled	7	5	middle	12 mo
12	59	m	8	9	crippled	6	7	low	19 mo

Pain back/leg: pain intensity in the past week (Numerical Rating Scale 0-10; higher scores reflecting more pain); expect: expectations of intervention (early rehabilitation) and control (no referral for rehabilitation) (Credibility/Expectancy Questionnaire: 1-9; higher scores reflecting positive expectations)

## Impact of undergoing lumbar discectomy

Surgery was perceived as inevitable due to severe radiating pain or subsequent limitations in daily activities. Surgery was often experienced as a major event, in contrast to the neurosurgeons, who saw lumbar discectomy as a minor operation according to the respondents. After surgery some respondents were insecure and feared an increase in pain and, therefore, were cautious when performing exercises or avoided being physically active. Opportunities to ask questions and receiving information and reassurance were welcomed and mentioned as helpful to overcome this barrier.

*“You’re having surgery and then you’re in the hospital for a day, and you’re sent home, and, well, that’s it. And of course you have many questions and at one point you start thinking, well, maybe I do feel something, right? And with [the therapist] I could at least deliberate: well, is that normal, and what experiences were there*

*with other people that had surgery” (Respondent 6).*

## **Recovery and treatment expectations**

Respondents held various beliefs about receiving treatment after surgery. The main beliefs can be categorised into: knowledge about symptoms and the experience of symptoms, the expected course of the illness and time scale of the symptoms, and the cure or controllability of the illness (i.e., coping behaviours and the efficacy of treatment) [23].

Immediately after surgery, respondents expected recovery to be possible. Nearly all respondents considered receiving treatment after surgery to be logical and needed to reach their recovery goals which were all related to resuming their usual daily activities, regaining independence and preventing recurrent pain. Only one respondent, who was immediately pain free after surgery, doubted the necessity of continuing rehabilitation, but adhered because he agreed to participate in a trial. For all others, the expectation that treatment was needed to recover was a main driver of their motivation to adhere to the rehabilitation process.

*“That I could fully recover. That was my goal. That’s just why I managed [to adhere]” (Respondent 8).*

The symptoms respondents reported after surgery differed widely, from pain free to aggravated symptoms. Experiencing pain during or after exercises led to different strategies. It could lead to discontinuing the use of exercises because exercises were perceived as harmful, to temporarily decreasing the amount of exercises being done or to adhering to the exercise regimen. The main reason to fully or partially adhere in the presence of symptoms was the belief that recovery necessitates exercise. A decrease in pain or other symptoms and the expected preventative effect, which were attributed to performing exercises or following advice regarding daily activities, were the most important facilitators to adherence in the short term and up to one year after surgery.

*“Every morning when I wake up I first stretch my legs, because you feel it, right. So that’s just pleasant. And then I got an exercise to grease your back. That’s an odd posture [laughs], because when [the therapist] did it, I said, that looks strange, and I won’t do it when someone’s around [laughs], I said, but it helps” (Respondent 2).* Optimistic expectations about the course and the duration of the symptoms

and rehabilitation process prevailed, including amongst respondents with high pain scores at long-term follow-up that required revision surgery. This optimism enhanced adherence to both performing exercises and following advice. Two respondents eventually expected only restricted recovery and sustained limitations. These respondents experienced symptoms for a prolonged time or recurrence after initial recovery, with moderate to low pain scores during the first 6 months after surgery. This more pessimistic view coincided with a limited adherence to performing exercises and following advice, e.g., gradually increasing physical activity or distributing demanding tasks over the day or week.

*“At the moment I just accept that the pain will never disappear. (...) That thing over there [points at an object] is pretty heavy, and I carried it myself. I don’t wait till somebody else is around” (Respondent 4).*

Coping behaviours differed across respondents, from unhelpful beliefs and limited self-efficacy, to being able to interpret symptoms and respond effectively. Respondents differed in their perception how easily exercises and advice were incorporated in their daily lives. Perceived limited practical skills to cope with symptoms, performing exercises and finding solutions for any barriers led to lower adherence to performing exercises and following advice, and perceived sufficient practical skills led to maintained adherence.

*“That I’m, well, scared to do things wrong, that you don’t have the assurance of a mentor. And actually, the practical stuff. To find it difficult, where should I do [the exercises]. Just in between your household chores, so to say. So partly a limitation I impose on myself and some practical reasons” (Respondent 10).*

*“I still, continuously, pay attention to what I’m doing, so that is, I think, that’s just the right thing to do” (Respondent 5).*

A topic often mentioned was the time needed and available to perform home exercises. The exercise regimen that respondents received differed widely in the number of exercises and repeats. Views on the time needed varied from very time consuming and, therefore, unrealistic, to only a short time required to performing exercises, which enhanced adherence. Respondents with a strong belief that exercises were needed for recovery remained adherent, and found solutions to any perceived time constraints. Shortly after surgery most respondents dedicated time to performing exercises more easily than several

weeks later. This was related to the resumption of daily activities over time with a decrease in the time available, and a perceived decreased need to do exercises due to decreased symptoms.

*“It kept me busy. At least once, twice, three times 20 or 25 minutes a day. And, well, that is, that really is a lot. (...) So I was, when I clearly recovered, I quickly stopped” (Respondent 1).*

*“I never completed that, well that regimen at once. I always divided it, just the way it worked out best. (...) They really kept you busy” [laughs] (Respondent 11).*

## **Contribution of the therapist and the patient to the rehabilitation process**

Respondents reported three types of processes, with respect to the role of the therapist, and their own contribution. A first type was characterised by the patient taking responsibility for his or her own recovery, using the information from the therapist. The patient experienced sufficient practical skills and had optimistic expectations about the course of the illness and possibility to recover. Any previous experiences with sports were seen as a contributing to adherence, i.e., being used to perform exercises, including continuing exercises despite fatigue or pain and interpreting consequences like myalgia as normal. Some respondents shifted from following the advised exercises regimen and activities to their own exercises or sport activities. Thus, they did no longer adhere to the therapist’s exact advice but kept training and remained physically active. The role of the therapist was seen as providing information regarding exercises, daily activities and rehabilitation in general and answering questions.

*“Those are the things I manage myself, it’s my body. And I have to live with it” (Respondent 9).*

A second type was characterised by a predominantly therapist-led process. The patient had limited practical skills and either positive or fairly negative to negative views on both the course of the illness and treatment efficacy. The patient needed a structured approach and mainly performed exercises when being supervised by the therapist, and only partly and temporarily adhered to the physical activity recommendations due to limited practical skills. Visiting the therapist’s practice enhanced adherence to exercises, as time was then

specifically dedicated to rehabilitation. Respondents who were normally not engaged in sports mentioned that 'not being a sports person' impeded adherence to an exercise program, and extensive motivation or supervision by the therapist was needed. One of the respondents acknowledged his limited practical skills and would have liked but did not receive this extensive therapist involvement and structure to overcome this barrier of limited practical skills. A second therapist was consulted after the initial treatment to receive this more structured approach.

*"Yeah well, if you just gotta show up three times a week to do your exercises, and you simply follow the whole trajectory" (Respondent 7).*

The third type was characterised by an equal contribution of the patient and the therapist to the rehabilitation process. The patient had sufficient practical skills and positive views on both the illness course and treatment effect. Experiences with symptoms varied. The process of rehabilitation was described as collaboration between patient and therapist, with the patient reporting information such as experiences with symptoms and the execution of exercises or daily activities, asking questions and using the advice and information from the therapist. The therapist's role was then to provide information and advice, inquire about the patient's experiences, provide feedback, be a motivator and enhance practical skills if needed. Two respondents that preferred but did not receive this collaborative type of rehabilitation consulted another therapist.

*Because I can read it all from a paper, but you never know if your posture is right. So, when lifting, I lift it that far, he says, no this far is good enough. So it is rather useful if one of them is there and watching (Respondent 12).*

The role of the therapist, in terms of providing information and especially motivation, was partly adopted by important others. Most respondents reported support from family members and relatives, neighbours, friends and colleagues or practical help – mainly during the first few weeks after surgery. This support was seen as helpful and contributing to adherence to exercises and advice and thus to recovery. It allowed the respondents to dedicate larger amounts of time to their exercise program, helped to remember doing exercises and enabled them to resume the execution of daily tasks step by step. One respondent, however, called this support paternalistic, as she felt she was capable of executing far more activities than relatives would allow

her. Not receiving practical help immediately after surgery was seen as a barrier to only gradually increase the resumption of daily activities, as some tasks, from personal care to household chores, simply had to be done.

*I suppose I did more than the average person with a partner who can take care of things. So, that maybe didn't help too much, that I did more than I should've done (Respondent 3).*

## Discussion

This study shows that the main factors that influence adherence to exercise programs and advice regarding daily activities differ widely between patients and include: the perceived impact of surgery, recovery and treatment expectations, and the type of patient and therapist involvement in the rehabilitation process. These factors can be taken into account when designing rehabilitation programs.

Some facilitators and barriers were previously described in other musculoskeletal disorders. Fear of pain aggravation and exercise or activity avoidance due to having undergone surgery were barriers to adherence similarly to those reported by people with chronic low back pain [13]. Confidence in recovery post-discectomy, also seen in an earlier trial [29], was an important facilitator. Therapists should keep these modifiable surgery-related factors in mind when providing information, advice and reassurance to lessen the impact of surgery if needed.

It is suggested that a combination of various pain-related beliefs influences adherence [24]. Several of the facilitating beliefs reported in our study were found to predict adherence to treatment in musculoskeletal conditions, including self-efficacy, locus of control [11,15,24] and motivation [15]. Positive treatment effect and wanting to avoid recurrent pain were related to adherence in previous qualitative studies in musculoskeletal disorders [13]. Exercises and activities that increased pain were seen as harmful and impeded adherence in some respondents, as seen in various physiotherapy recipients [11,1], but not in others. This was due to their strong belief that recovery was possible and performing exercises enabled recovery. For patients perceiving pain as a barrier, therapists could explain that early resumption of activities post-discectomy has shown not to be harmful [25]. Optimistic expectations about

recovery and treatment efficacy, whether or not reinforced by therapists, are therefore important facilitators to adherence.

Being used to physical activity was a facilitator to adherence, especially to those exercises or activities that were common to the respondent. Conversely, not being used to sports was seen as a barrier to perform exercises. Lower levels of physical activity have also been reported as barrier in others using physiotherapy [11], and higher levels as a facilitator [16]. Respondents that were physically active preoperatively and coped adequately with fatigue or pain, tended to deviate from the advised exercises and activities. This shift in type of exercise or activities was previously reported in people with arthritis, with physically active people adjusting the exercise program to their needs, including in response to symptoms [26]. Therapist should, therefore, assess preoperative levels of activity and patient preferences regarding type of exercises and activities when designing rehabilitation programs.

To our knowledge, this is the first study that found that three types of patient and therapist involvement were described by the respondents. These resembled the types of decision making, i.e., informed, paternalistic and shared [27], with respect to sharing information, deliberating and deciding. Our study concerned decisions about performing exercises and following advice rather than competing treatment options, as in the decision making model. Respondents who felt well equipped to take full responsibility mainly needed therapist involvement to obtain information and instructions, as in informed decision making. The other types required more therapist involvement, with mainly the therapist making decisions (paternalistic) or both the patient and therapist (shared decision making). Tasks of the therapist predominantly described in the latter two types included providing motivation [13,15], feedback [13] and supervision [13,15], which have been found to predict adherence. Several respondents preferred more therapist involvement than received and contacted a second therapist to ensure this involvement. These findings stress the importance for therapists to elicit preferences about decision making and adjust their role to the needs of the patient, thus providing patient-centred rehabilitation [28]. Therapists should focus on enhancing practical skills, specifically to incorporate exercises and advice in daily life [13], deal with time constraints [13,17], and possibly involve important others for support [11] to improve adherence.

Strengths of this study include conducting interviews at the respondents' preferred location, member checks, initial coding by two researchers, regular discussion of results and sampling respondents based on preliminary analysis. A limitation is the timing of the interviews, which was on average 11 months after surgery. This may have led to recall bias. However, report of experiences immediately after surgery between respondents interviewed 6 weeks or at long-term follow-up did not substantially differ. We conducted 12 interviews and it is unclear whether saturation was reached. However, no new information came up in the last three interviews, respondent characteristics greatly differed and we captured a broad range of experiences. Therefore, this study seems to present a good first overview of factors influencing adherence post-discectomy. Therapists may use these results to assess which patient characteristics influencing adherence are present and offer a personalised, patient-centred rehabilitation program.



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