



# BMJ Open Qualitative study exploring the views of patients and healthcare providers on current rehabilitation practices after lumbar fusion surgery

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## ABSTRACT

**Objectives** To explore the views of patients and healthcare providers on current rehabilitation after lumbar fusion surgery (LFS) to fuel the development of a novel rehabilitation care pathway.

**Design** A cross-sectional, qualitative study with an interpretive descriptive design.

**Setting** Academic and non-academic hospital setting in Belgium.

**Participants** 31 caregivers from (non)-academic settings and 5 patients with LFS were purposefully sampled and in-depth interviewed.

**Results** Out of the data of all interviews, participants reported opinions on 23 thematic clusters that were expressed in a time-contingent manner from the preoperative, perioperative to postoperative phase. Afterwards, themes were mapped to the Consolidated Framework for Implementation Research, with a larger role for concepts related to the innovation, inner and individual domain. As an overarching theme, the importance of an ‘individualised, patient-centred rehabilitation built on a strong therapeutic alliance with an accessible interprofessional team’ was stressed for patients undergoing LFS. Specifically, participants stated that a biopsychosocial approach to rehabilitation should start in the preoperative phase and immediately be continued postoperatively. No consensus was observed for movement restrictions postoperatively. Uniform communication between the involved caregivers was considered essential for optimal therapeutic alliance and clinical outcome. The precise role and competence of each member of the interprofessional team needs, therefore, to be clearly defined, respected and discussed. An accessible case manager to guide the patient trajectory and tackle problems could further support this. Interestingly, only patients, psychologists and physiotherapists addressed return to work as an important outcome after LFS.

**Conclusions** This qualitative study identified key experiences and points to consider in the current and future rehabilitation pathway for LFS. Future research should incorporate these findings to build a novel rehabilitation pathway for LFS and evaluate its feasibility and cost-effectiveness.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The qualitative research methods in this study offer the opportunity to profoundly understand the experiences and opinions on rehabilitation following lumbar fusion surgery (LFS) in a group of patients and healthcare providers (HCPs) that manage LFS in daily practice.
- ⇒ Although we included HCPs working in both academic and non-academic settings, findings may not fully represent the context of private surgeon practices.
- ⇒ Despite iterative questioning and purposeful sampling methods, perspectives may have been influenced by social desirability or other contextual factors.

**Trial registration number** This study was registered at [clinicaltrials.gov](https://clinicaltrials.gov) (NCT03427294).

## INTRODUCTION

Low back pain (LBP) is one of the most common, costly and debilitating musculoskeletal disorders worldwide.<sup>1</sup> Lumbar fusion surgery (LFS) is an operative technique that joins two or more vertebrae and is increasingly used to alleviate persistent LBP due to degenerative lumbar spine conditions.<sup>2</sup> LFS is thought to mediate ‘biomechanically unstable or malaligned’ spine segments, despite the lack of high-quality clinical trials on its efficacy and poorly defined biomechanical criteria.<sup>3,4</sup> Further but less debated, LFS is commonly performed as an adjunct to nerve root decompression surgery when the decompression inevitably compromises anatomical integrity.<sup>5,6</sup>

No consensus exists on the optimal content and timing of preoperative, perioperative and postoperative rehabilitation in LFS, despite

the fact that its importance has been widely acknowledged.<sup>7,8</sup> This lack of evidence on what can be considered 'good clinical practice' rehabilitation could contribute to unfavourable outcomes after LFS, including poor functional status, ongoing pain and psychosocial burden.<sup>9</sup> For other musculoskeletal disorders such as total knee and total hip arthroplasty,<sup>10,11</sup> evidence-based rehabilitation care pathways have been shown to improve the clinical outcome and to reduce healthcare costs after surgery. However, such care pathways focusing on rehabilitation for LFS are lacking.<sup>4,5</sup> A crucial step in the initial development phase of a care pathway is to understand patients' and experts' opinions on the current and preferred management of a specific condition, here LFS. These opinions are important to detect existing research gaps as well as to identify potential barriers and facilitators for implementing the aimed intervention.<sup>12</sup>

Qualitative methods are particularly suitable for exploring these opinions with a low risk of narrowing down complexity.<sup>13,14</sup> As an important first step in the development of an evidence-based rehabilitation care pathway for patients following LFS, this qualitative study was conducted to fuel further pathway development steps, in particular a Delphi process to reach consensus on key interventions. Therefore, the primary aim of this study was to gain insight into patients' and healthcare providers' (HCPs) opinions regarding the *current* management of LFS. The secondary aim was to obtain these stakeholders' opinions on the *preferred* rehabilitation care pathway for patients undergoing LFS.

## METHODS

### Study design

A qualitative descriptive interpretive design was applied. The Consolidated criteria for Reporting Qualitative research<sup>15</sup> provided guidance in reporting this study.<sup>16</sup> The current study is part of the Rehabilitation for lumbar Arthrodesis Controlled Trialproject.

### Ethics

The study was approved by the Ethics Committee Research UZ/KU Leuven (S60109) and registered at clinicaltrials.gov (NCT03427294). All participants provided written informed consent.

### Patient and public involvement

As no specific patient society with trained patient research partners for LFS exists, we involved one patient with LFS recruited in our clinic in the design of our study.

### Participants

A total of 36 participants were selected based on their experience with rehabilitation of LFS, either as HCP (n=31) or patient (n=5). Two researchers (TT and MB) recruited and purposefully selected the patients out of two departments in an academic hospital (orthopaedic surgery and neurosurgery). All interviews with the five

patients took place between 1 week and 1 year postoperative. Participation was voluntary. There were 4 HCPs from non-academic hospitals and 27 HCPs from an academic hospital. The purposeful sampling method<sup>12</sup> was used to capture heterogeneity in the expertise and work settings (academic and non-academic hospital setting) of HCPs and in the demographics and clinical outcomes of patients. Details on participants are summarised in [table 1](#).

### Interview procedure

Face-to-face, in-depth interviews were conducted by TT. TT is a musculoskeletal physiotherapist with 18 years of experience in treating patients with LBP. She was trained in conducting semistructured interviews, analysing data in Nvivo and developing clinical care pathways. To increase credibility,<sup>16</sup> the results of the interviews were analysed by two independent researchers (TT and MB). The epistemological background of our research group was dominantly 'constructionism'. MB is a specialist in physical and rehabilitation medicine and trained in conducting interviews and analysing data in Nvivo; he has a special interest in spine pathology. In between, two poor and two rich interviews were also analysed by two independent researchers VVA and TS for verification with the same goal to increase credibility but also reflexivity (ie, critical self-reflection about oneself as researcher). Interviews lasted approximately 45 min and took place at the office of the HCPs in the hospital (except for one patient at home). Data were collected, coded and analysed from 2018 to 2022. Additional interviews were performed until data saturation. All interviews were audio-recorded and transcribed verbatim, except for two participants (one patient and one HCP) who did prefer to conduct the interview without audio-recording.

A topic guide was developed upfront based on a thorough review of the literature<sup>7</sup> and iteratively refined during the interview process. Interview topics and example questions are provided in [table 2](#). The topic guide included questions targeting the (1) participant's preoperative and postoperative perceptions and experiences, (2) underlying attitudes and beliefs towards the LFS procedure, (3) outcome expectations after LFS, (4) facilitators and barriers to recovery after LFS, (5) ideal content of physiotherapy after LFS and (6) experience with rehabilitation and return to prior functioning after LFS.

Strict confidentiality was assured to the participants. Only the two interviewers had access to the original non-anonymised data. The interviews were transcribed verbatim by TT and two research assistants including the non-verbal signals (observed by TT during the interviews). Additionally, a short report about the interviewee and contextual characteristics of the interview was made, supporting data extraction afterwards. All audio-recordings were destroyed after transcription.

### Data analysis

The data analysis was guided by the Qualitative Analysis Guide of Leuven.<sup>17</sup> Accordingly, an elaborate preparation

**Table 1** Participants' demographic details (n=36)

Participant number	Gender (M/F=male/female)	HCP/patient	Age (years)	Professional experience (years)	Expertise LFS rehabilitation* (NRS 0=low, 10=high)
1	F	Physiotherapist	31	5–10	6
2	M	Physiotherapist	48	>20	7
3	M	Orthopaedic surgeon	35	5–10	7
4	M	Physical and rehabilitation medicine	49	>20	7
5	M	Orthopaedic surgeon	38	5–10	7
6	F	Physiotherapist	27	5–10	7
7	F	Physiotherapist	24	<5	6
8	F	Social assistant	24	<5	6
9	F	Nurse	57	>20	6
10	M	Patient	45	/	4
11	F	Physiotherapist	30	5–10	5
12	F	Physiotherapist	51	>20	7
13	F	Occupational therapist	51	5–10	7
14	F	Patient	42	/	1
15	F	Physiotherapist	49	10–20	7
16	M	General practitioner	53	>20	4
17	F	Nurse	46	>20	8
18	F	Physiotherapist	52	>20	6
19	F	Patient	62	/	/
20	M	Anaesthetist	59	>20	9
21	M	Physical and rehabilitation medicine	65	>20	8
22	M	Patient	69	/	7
23	F	Physiotherapist	34	10–20	7
24	F	Physiotherapist	29	<5	4
25	F	Nurse	55	>20	2
26	F	Psychologist	43	>20	6
27	M	Physiotherapist	35	10–20	7
28	F	Social assistant	31	5–10	5
29	F	Patient	74	/	5
30	F	Anaesthetist	39	5–10	3
31	M	Orthopaedic surgeon	51	>20	8
32	M	Neurosurgeon	48	10–20	7
33	M	Physiotherapist	50	>20	7
34	M	Neurosurgeon	36	10–20	3
35	M	Neurosurgeon	45	10–20	5
36	F	Occupational therapist	41	10–20	5

\*NRS=5 non-academic HCPs+27 academic HCPs+5 patients.  
HCP, healthcare provider; LFS, lumbar fusion surgery; NRS, numerical rating scale.

of the coding process was performed before the actual coding with the aid of computer-assisted software (Nvivo, developed by QSR international, V.12). Iterative processes of going deep in the data and repetitive moving between the various stages of the process were performed.<sup>17 18</sup>

First, the data were coded independently and analysed into meaningful concepts by two researchers (TT and MB). Next, the finalised code list was applied to all

transcripts. A conceptual scheme was made from each interview, highlighting and summarising the emerging themes. Through a process of repetitive interpretation, synthesising and theorising, themes were identified. Transcripts were re-read several times, and the selected themes were finalised into a hierarchical conceptual framework based on consensus discussion between the two principal researchers.

**Table 2** Topic list of experiences, attitudes and/or expectations with example questions

Topics	Example questions
Experiences in preoperative period	What are your thoughts on the preoperative approach?
Experiences in postoperative period	What are your thoughts on the postoperative approach?
Expectations from surgery	What does surgery need to accomplish for patients?
Facilitators to recovery	What is important in patient's recovery from LFS?
Barriers to recovery	What are the main obstacles to recovery?
Rehabilitation	Do you feel rehabilitation is important for patients undergoing LFS? What is the optimal content of rehabilitation?
Return to normal functioning	When do you feel a patient is ready to go back to work, return to sport, etc?
LFS, lumbar fusion surgery.	

## RESULTS

A description of the different identified themes and supporting extracts from the interviews is reported below. [Figure 1](#) provides a graphical summary of all themes. In the final steps of conceptualisation, these themes were aggregated into a framework ([figure 2](#)) and additionally linked to the Consolidated Framework for Implementation Research (CFIR).<sup>19 20</sup> See online supplemental appendix A for this detailed mapping for each theme.

### Time-contingent clinical reasoning

Participants had the natural tendency to organise their opinions according to specific consecutive timepoints from patient intake to final follow-up. Consequently, the emerging themes were expressed in a time-contingent manner, that is, from the prehospitalisation phase through the hospitalisation phase to the postoperative period after discharge. This can be interpreted as sensitivity to process management for all stakeholders (see online supplemental appendix A, C1).

### Prehospitalisation

#### Assessment of functioning to align expectations and build confidence

Most HCPs acknowledged the importance of a preoperative assessment, preferably performed by a physiotherapist, to evaluate the patients' global functioning (C4), rehabilitation goals and expectations, as well as to retrieve information concerning prior interventions. This was contrasted with current HCP practices where patients undergoing LFS are not systematically appointed to a physiotherapist preoperatively. HCPs were also convinced that unrealistic expectations and maladaptive cognitions and beliefs should be addressed in the prehospitalisation phase (C2); patients' expectations that are more in line

with those of the treatment team would improve patients' satisfaction and compliance.

It's essential to chart a patient's objectives and expectations, to ask what they want to do and what their motives are for having the treatment. So, when needed, they can be corrected, or alternatives can be offered. In essence, we need to ask what makes that person happy, what improves his/her quality of life. (Physiotherapist)

In addition, also patients considered a prehospitalisation assessment reassuring and improving their self-confidence (C3).

I believe the preoperative assessment by the physiotherapist can be extremely important. So, you know already in advance, roughly, what you can do and expect postoperatively. You feel more confident. (Patient)

### Individualised education

The interviews showed that a prehospitalisation contact with a HCP (C4) should have five patient-tailored objectives (C6): (1) to inform patients about the postoperative course, (2) to reduce movement-related fear, (3) to establish a strong therapeutic alliance, (4) to teach ergonomic postures and (5) in particular to provide pain education to correct maladaptive beliefs. Both patients and HCPs are convinced that preoperative sessions should be organised individually and not in group, because of the variability in the needs of patients (C5).

You have to give a good explanation. It is a relationship of trust, of course. (Surgeon)

There should always be an individual moment, to evaluate what type of patient you are working with. The patient must be given the chance to tell his story so you can find ways to rehabilitate him. (Psychologist)

### Psychological assessment and consideration to refer to a psychologist

When psychological factors interfere with a patient's functioning or there is a history of psychiatric comorbidity, the HCPs should refer to a psychologist (C6). In contrast with existing practice, the need for an 'explicit' biopsychosocial approach (C7) was acknowledged. Some HCPs also argued that an optional psychological session should be offered to patients to educate them on how to cope with pain. An interdisciplinary dialogue between HCPs and treated patients was considered very useful (C8).

Referral to a psychologist is useful for the patients to gain a better understanding on what strategies are available in pain management. This will also increase the psychological flexibility that people will need to deal with their postoperative situation. (Psychologist)

## INNOVATION DOMAIN

### Mixed opinions on 'content, evidence strength and quality', hampering the implementation of uniform interventions

#### Consensus:

- preoperative intake to build therapeutic alliance, set realistic patient-driven goals and screen for risk factors (C2,6)
- individualised approach to patient care within a biopsychosocial framework implemented by an interprofessional care team and starting before surgery (C5,7,18)
- importance of immediate mobilisation and fear avoidance reduction postoperatively (C9,15)
- uniform communication and adequate follow-up to enhance long-term outcomes especially work and daily activities (C10,21)

#### Disagreement:

- no consensus between disciplines on overall content and timing of rehabilitation, especially in relation to postoperative advice on restrictions (C11,14)
- negative impact of interventional pain management on early mobilisation (C23)

### Need for change driven by perceived 'relative clinical advantage' and 'cost' reduction

- clear focus on a future perspective that contrasts with 'as is' situation (C20)
- early mobilisation to reduce the length of stay (C16)

## INDIVIDUALS DOMAIN

### Acknowledge and handle the complexity of problems patients undergoing LFS face via an accessible case manager

- support from an accessible case manager to guide and tackle problems (C22)
- Need for biopsychosocial assessment of patients (C2, C3, C4, C5, C19)

**Figure 1** Detailed summary of themes from qualitative interviews (n=36), also mapped onto the Conceptual Framework for Implementation Research (CFIR).

## Hospitalisation

### Need to balance pain management

Both patients and physiotherapists experienced the use of Patient Controlled (Intravenous) Analgesia pumps (PC(I) A-pump) as a big barrier for early mobilisation, because of the physical hindrance and frequently occurring side effects such as nausea and sedation (C23). However, a few surgeons deemed a PC(I)A-pump as necessary to control their pain adequately. It seemed that the use of PC(I) A-pumps is mostly surgeon dependent and that there are no clear guidelines.

It can be assumed that pain pumps, or at least morphine pumps, give a certain self-control for the

## INNER SETTING DOMAIN

### Quality of 'networks and communication'

- need for adequate interprofessional communication (C8)

### Organization's perceived 'tension to change'

- clear focus on a future perspective that contrasts with 'as is' situation (C20)

### Organization's safe 'learning culture'

- hierarchy disturbs team discussions and the impact of each team member's opinion (C13)

### 'Available resources' to implement interventions

- key expert health care professionals available (C4,C6), but limited staff appointment overall, especially in the weekend (C17)
- need for case manager to guide follow-up and facilitate interprofessional collaboration (C8, C22)
- psychologists are rarely consulted but often indicated (C19)

## OUTER SETTING DOMAIN

### Local policies hamper resources to align with all patient needs

- need for preoperative assessment to address unrealistic expectations and maladaptive cognitions and beliefs (C2)
- pre-hospitalisation assessment considered as reassuring and improving their self-confidence (C3)

## IMPLEMENTATION PROCESS DOMAIN

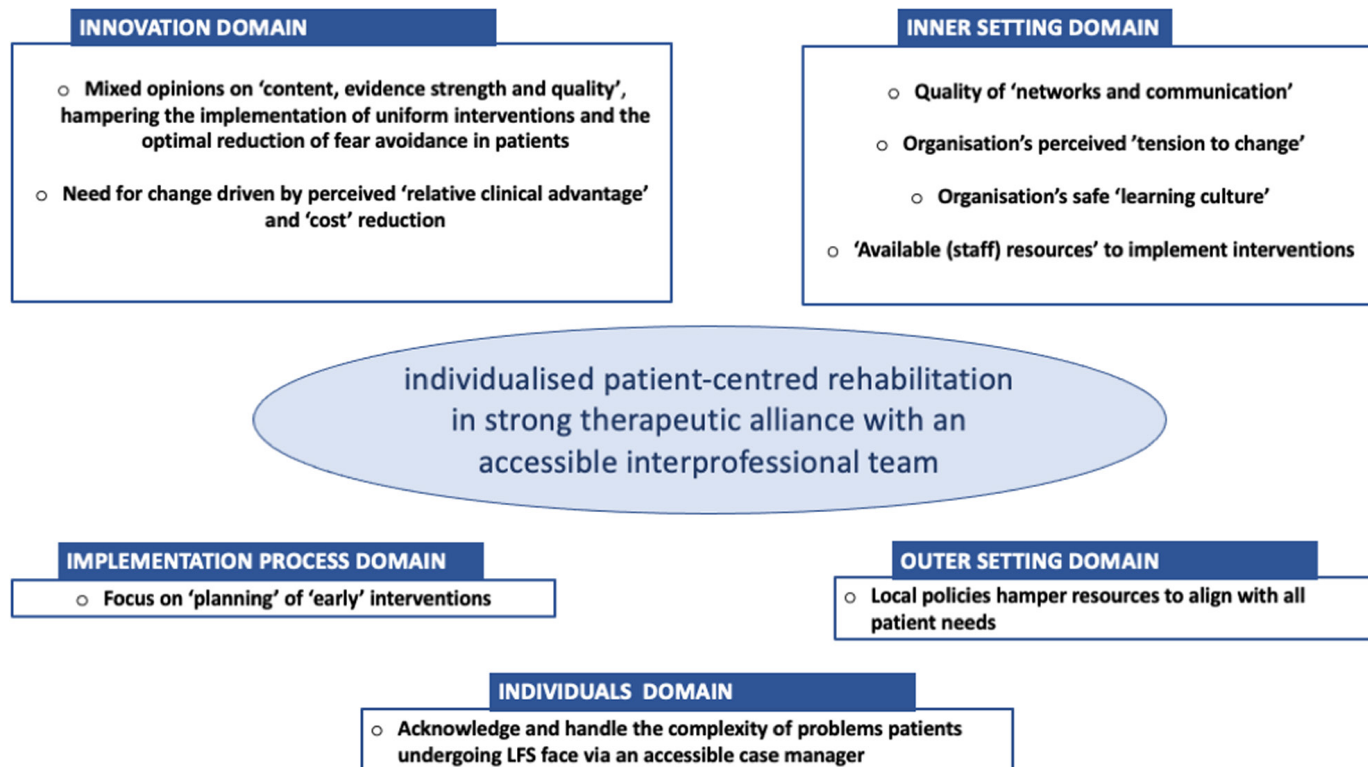
### Focus on 'planning' of interventions

- time-contingent clinical reasoning interpreted as sensitivity to process management (C1)
- need for clear and explicit roles for each stakeholder in the rehabilitation process to avoid contradictions (C12)

patients over his pain. But at the same time, a morphine pump has the annoying disadvantage of making people extremely nauseous. (Anaesthetist)

### Uniform messages from HCPs to prevent or reduce fear of movement

The most reported theme in the hospitalisation phase was the importance of reducing kinesiphobia, fear of reinjury and fear of avoidance (C9). To accomplish this, a relationship of trust between patients and their team of HCPs is needed to stimulate self-efficacy. Uniform messages concerning rehabilitation content from different HCPs



**Figure 2** Conceptual summary model based on the topics derived from qualitative interviews (n=36). LFS, lumbar fusion surgery.

during hospitalisation (C10) were considered crucial for building this trust relationship.

I think that the worst thing that can happen to a patient is to provide non-uniform information; so there must be alignment. (Physiotherapist)

Similarly, also patients articulated this need. HCPs reported a lot of uncertainty and even disagreement about the starting point of manual mobilisation techniques and movements that were allowed during hospitalisation (C11). As a consequence, patients received conflicting messages, and HCPs considered this detrimental for the confidence of the patients affecting their overall outcome and satisfaction.

Caregivers should not only be limited to their own role, they should know that their role is part of a chain, and that they should actually be aware of what the other caregivers are doing, making sure that there are no contradictions between the various caregivers (C12). (Surgeon)

#### Interprofessional hierarchy perceptions by HCPs

During the interviews, some HCPs addressed that they could not speak freely during interdisciplinary discussions or felt that their opinion did not have the same impact compared with the opinions of other disciplines involved (C13). This was mainly attributed to the hierarchy within the team, which was expressed by non-verbal communication during the interviews.

#### Interprofessional disagreement about postoperative advice and/or restrictions

Contrasting opinions between disciplines were expressed regarding the postoperative advice on restrictions (eg, sitting duration/day) (C14). More specifically, the physiotherapists believed that as few restrictions as possible should be given to avoid or reduce kinesiophobia. Furthermore, they preferred to give a positive message by affirming what patients were allowed to do. In contrast, some surgeons stated that explicit restrictions should be given to reduce or prevent complications from surgery such as wound dehiscence. The psychologists stated that imposed restrictions should be determined preoperatively by the patient's characteristics, for example, avoidance versus persistent coping behaviour. So, a strong disagreement between disciplines was noticed in this study.

Providing information about pain and movement immediately postoperatively is also important for the patient's confidence. So the patient knows what is possible and allowed, instead of deciding purely on the presence and severity of pain, because the link between pain and what you do is not very clear. (Physiotherapist)

In contrast to the variability in postoperative restrictions, there was a consensus that immediate mobilisation after the LFS procedure would reduce hypervigilance and kinesiophobia (C15), which would improve the clinical outcome and shorten the hospital length of stay (C16).

In my opinion the sooner these patients are moving, the less chance they have to develop antalgic contractures and rigidity afterwards. (Physiotherapist)

In contrast to current practice, all participants recommended a more extensive rehabilitation with more time for education and to practice activities of daily living during the hospitalisation period. A barrier to optimal rehabilitation following LFS is an insufficient physiotherapy appointment, especially during weekends, to start early on bedside mobilisation (C17).

#### Psychological assessment and consideration of referring to a psychologist

Most participants felt that anxiety, maladaptive coping strategies or catastrophising thoughts (could) interfere with further rehabilitation (C18). Some participants therefore felt that a psychological consult during hospitalisation should be planned for every patient undergoing LFS. This is in contrast with the current practice, where a psychologist is consulted rarely (C19 and C20).

These are people who are in chronic pain, who more often than not have biopsychosocial complications and where you make an investment to improve them. You have to see that you get the best out of it and see the treatment of the patient as a whole. (Surgeon)

#### Immediate posthospitalisation

##### Immediate, individualised rehabilitation trajectory with long-term follow-up

In general, participants stated that active rehabilitation should be continued immediately after hospitalisation discharge. The physiotherapist is believed to have an important role in further guiding the patient. Most importantly, it was advised to motivate and reassure fearful patients, but also to guide patients in gradually resuming work and leisure activities (C21).

I believe it's very important to provide sufficient training in work hardening, return to sports. So, they could return faster to part-time work. (Physiotherapist)

I still think that I could start working much faster because of a good guidance by the physiotherapist. (Patient)

#### A central point of contact

Some participants expressed the need for a central point of contact (case manager) who coordinate care for patients undergoing LFS, starting from intake until all the rehabilitation goals are met. In current practice, there is no contact person. This case manager could be contacted by patients at any time in case of concerns or questions. It was stated that this would reassure patients, reduce anxiety, improve confidence and eventually also should improve clinical outcomes. It was perceived that this role would ideally be fulfilled by a physiotherapist.

I do feel that people appreciate that (available case manager) as a form of: okay, if there is a concern, I can contact them (C22). (Physiotherapist)

## DISCUSSION

To the best of our knowledge, this qualitative interview study is the first to explore the perspectives of both HCPs and patients regarding the preoperative, perioperative and postoperative rehabilitation of LFS. Starting from their opinions on the current rehabilitation practices, suggestions for a more optimal rehabilitation pathway for patients undergoing LFS pathway emerged.

Although the interviews adopted a neutral stance towards status quo versus change in current practice, participants predominantly focused on discussing the ideal care pathway for LFS. In this way, critique on the contemporary pathway could be positively and safely formulated, and the central theme of this work, namely, the need to change current LFS care, received maximal focus. This early finding immediately stressed the role of contextual factors and the complexity of implementing care pathways, which motivated us to summarise study findings into an implementation science framework.<sup>21</sup> The 2022 updated CFIR<sup>19 20</sup> provides an evidence-based menu of constructs that are associated with effective implementation and fit our findings best (figure 1). CFIR comprises five major domains: the 'innovation domain' with factors related to the implemented pathway itself, the 'inner domain' and 'outer domain' referring to the micro to macro setting in which the innovation is implemented, the individual's domain' including roles and characteristics of all stakeholders including patients and the 'implementation process domain' pointing to the activities and strategies used to implement the innovation. As participants' opinions touched all and often multiple domains (online supplemental appendix A), the multidimensional nature of CFIR could be confirmed with a larger role for concepts related to the innovation, inner and individual's domains. Below key emergent concepts are discussed.

Our results highlight that the *precise role and competence of each member of the interdisciplinary team needs to be clearly defined, respected and discussed*. A possible barrier could be an excessive hierarchy between different disciplines of the team.<sup>22 23</sup> Some participants perceived this hierarchy and expressed this by non-verbal communication during the interviews rather than by specific quotes. This finding aligns with the plea for care pathway development with bottom-up co-creation involving all healthcare and research community stakeholders equally.<sup>5 24-27</sup> Similarly, all participants in this study emphasised the crucial role of uniform communication. An example given was the mixed messages by different HCPs towards patients on when activities were allowed postoperatively.

A central point of contact, mostly assigned to an extended scope physiotherapist, was considered useful by interviewees to ensure this 'one voice' expert communication,

given the large number of HCPs involved in the rehabilitation of LFS. Oestergaard *et al*<sup>28</sup> did however not find any added benefit of preoperatively started case management by a social medicine doctor, an occupational therapist or a social worker with late postoperative (telephone) support on clinical and work outcomes. We speculate that the professional background of the case manager and the exact timing or time investment may indeed affect results.

Somewhat related, participants believed that establishing a *strong therapeutic alliance* is essential for a positive clinical outcome following LFS rehabilitation. Indeed, a positive therapeutic alliance was associated with improvements in key clinical outcomes such as pain and disability in the broader literature of LBP research, but data in LFS are still lacking.<sup>29</sup> Therapeutic alliance is known to be nurtured by agreement on treatment goals, shared decision-making and assignment of treatments, as well as by an adequate emotional bond between patient and HCP.<sup>30</sup> Correspondingly, it was stressed by the participants that *patients should be encouraged to express their expectations, preferences and views in a shared decision-making process during the rehabilitation after LFS*.<sup>31</sup> Participants therefore considered the *preoperative period as the perfect 'window of opportunity'* to initiate the rehabilitation pathway for LFS, ideally with a thorough assessment by a physiotherapist once there is an indication set for surgery. Participants felt this period is ideal to build a therapeutic alliance, streamline reassuring communication, discuss expectations and goals and educate patients to take informed shared decisions.<sup>32–34</sup> Prehabilitation of lumbar fusion is still in its infancy, certainly compared with prehabilitation in other orthopaedic interventions such as knee and hip replacement.<sup>35</sup> Nevertheless, preoperative physiotherapy and psychological therapy improved pain after LFS, in the study of Nielsen *et al*<sup>36</sup> and Reichart *et al*<sup>34</sup>.

There was no doubt among interviewees that *rehabilitation for LFS should include a biopsychosocial approach to assessment and treatment*, which is consistent with current guidelines on LBP management.<sup>5 37</sup> Abbott *et al*<sup>38</sup> linked the content of interviews with patients to the well-known International Classification of Functioning, Disability and Health framework. This confirmed the broad impact of LFS seen on the levels of body structures and functions (35.5%), activities and participations of daily life (53.6%) and personal and environmental domains (10.9%). Several qualitative studies in LFS demonstrated longstanding and unacceptable preoperative pain and disability trajectories in patients, with a surgical decision bringing hope for relief that may bring unrealistic expectations about the outcome of LFS.<sup>13 14 39</sup> Also, reports on the heterogenous postoperative outcome after LFS and the struggle to handle surgery-related pain as well as to regain a societal role illustrated ongoing stress.<sup>13 40</sup> Jakobsson *et al*<sup>41</sup> and Abbott *et al*<sup>42</sup> found that pain catastrophising, preoperative control over pain and self-efficacy for exercise predict (although to a small extent) postoperative disability in patients with LFS. Not surprisingly, *participants in our study felt that a referral to a psychologist*

*should be facilitated, when necessary*, because physiotherapists and other HCPs may lack competence in addressing specific or complex psychological barriers. Physiotherapists indeed formulated this need for psychological guidance to handle contextual factors in the broader literature on LBP management.<sup>43</sup> However, evidence to show that trained HCPs can effectively deliver psychologically informed treatments (eg, based on acceptance and commitment therapy or exposure principles) is accumulating, but research on the value of such transdisciplinary HCP roles in the field of LFS is needed.<sup>44–47</sup>

All participants in this study acknowledged the importance of *early mobilisation* after LFS. This is in accordance with recent literature on surgery for degenerative spinal conditions for which benefits of this approach were seen.<sup>48</sup> This early postoperative mobilisation contrasts with a still common practice of postoperative bracing following spinal surgery. A recent study showed that Belgian spinal surgeons prescribed postoperative lumbar bracing in more than half of LFS procedures.<sup>49</sup> Interestingly, this decision to brace was mainly guided by the surgeons' beliefs about pain relief and improved fusion rate. Similarly, in the qualitative work from Greenwood *et al*,<sup>14</sup> patients reported to restrict their movement due to fear of surgical implant failure due to the absence of received information here or clear instructions not to move the first 3 months after surgery by the treating surgeon. This was confirmed by *patient participants in this study who insisted on reassuring education on tissue integrity* and recent qualitative work by Rushton *et al*<sup>8</sup> who stated that sufficient and coherent education in comprehensive management is needed to avoid and reduce threat associated with surgical procedure. Apart from this psychological point of view, sufficient movement is essential to promote bone healing in the vicinity of the LFS implants. Unfortunately, our study also *revealed contradicting perspectives from different HCP disciplines* that may hamper early mobilisation. Surgeons were much more stringent in postoperative restrictions than physiotherapists, who even felt that no restrictions on activities should be given. Also, adequate analgesia by a PC(I)A-pump was deemed necessary by some surgeons, whereas physiotherapists and occupational therapists perceived this as an important barrier to early mobilisation.

It was remarkable that some participant subgroups (physiotherapists, psychologists and patients) focused on return to work (RTW), while other stakeholders in this study did not discuss this topic. Rolving *et al*<sup>50</sup> found that only 42% of the patients returned to work, 1 year postoperatively. Oestergaard *et al*<sup>28</sup> indicated a stagnation of RTW rates after LFS from 6 months to 1 year postop. Further research on RTW is needed, because there are no clear guidelines on RTW for patients undergoing LFS and successful interventions are currently lacking.<sup>28</sup>

On the one hand, HCPs and patients in this study expressed views on LFS care pathways that broadly corroborated with the needs of patients found in the LFS literature and broader LBP treatment guidelines.<sup>5 8 14</sup> While



several of the HCPs also had a managing role in their hospital, it was nevertheless remarkable that opinions on cost-effectiveness of interventions, impact of legislation, staffing cost or hospital culture were largely absent. To gain insight into managerial aspects of lumbar fusion care, future studies should consider including more managers as participants.

On the other hand, discrepancies between team members on the exact rehabilitation contents exist. Gaining consensus on the rehabilitation content is an important challenge to be addressed by future research. This qualitative study lays the foundation for further developing an optimal rehabilitation pathway for LFS that encounters the needs of both patients and HCPs.<sup>7 35 49</sup>

This study has some limitations. First, the results of this qualitative study may be specific to the studied population and setting, that is, tertiary (non)-academic hospital care. However, transferability of findings was promoted by the recruitment of a large number and variety of participants and a thick description of their diverse backgrounds and opinions. In addition, each relevant discipline was represented by one or more participants, and four experts from non-university hospitals were purposefully included. Furthermore, the inclusion of five patients strengthens this study's trustworthiness, since the insights of patients are essential to provide the best possible care.<sup>51</sup> Second, it is possible that the reported perspectives may have been influenced by social desirability or power imbalances, particularly as the participants were aware of the role of the investigators.<sup>52</sup> To limit this, we reassured confidentiality, allowed off-the-record statements and avoided the use of focus groups. Also, to increase reflexivity in our research team, interview coders from two disciplines (physiotherapy and physical medicine and rehabilitation medicine) were deliberately paired and supported by a methodological expert and independent researcher to promote self-criticism and credibility of findings.

## CONCLUSION

This qualitative study provided insight into the perceptions, beliefs and expectations of both HCPs and patients regarding the current and preferred rehabilitation care pathway for patients undergoing LFS. It highlights a clear division of roles between HCPs and the importance of early mobilisation for patients. A clear and consistent communication between all caregivers involved seems to be essential. Participants have recognised the importance of addressing the biopsychosocial aspects in the rehabilitation of these patients and the importance of a central point of contact. This embedded qualitative study was an initial step in the development and implementation of a clinical rehabilitation pathway for LFS.

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