



## Patient experiences and preferences during treatment and recovery of Lisfranc fractures: A qualitative interview study



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### ABSTRACT

**Aim:** To determine from a patient perspective what improves the quality of care and patient satisfaction during the treatment and recovery process of Lisfranc fractures and to reveal possible points for improvement in this process.

**Methods:** We performed a qualitative study based on semi-structured interviews with patients treated for a Lisfranc fracture-dislocation in the Netherlands with either open reduction and internal fixation or primary arthrodesis, until data saturation was reached, focusing on the quality of care during treatment and recovery, from a patient perspective.

**Results:** Data saturation was reached after interviewing 10 patients. The main themes emerging from the analysis were expectation management regarding the recovery period; communication with and between health care providers; information provided during consultations; and support during the recovery period. Participants expressed a need for improved provision of information about the different treatment options, the different kinds of pain that can arise, the expected duration of the recovery period, education on strong pain killers, likelihood of a second surgery, risks of osteoarthritis, risks of the surgery itself, allied health care and patient experiences. Participants mentioned the importance of good allied health care and a preference for starting allied health care as soon as possible. Insoles and compression socks were also appreciated by various participants. Finally, multiple patients saw a positive attitude on the part of the health care providers towards the recovery period as a key factor in recovery.

**Conclusion:** This study found that patients value more tailored approaches to the pre- and post-operative care program, more guidance regarding allied health care (physiotherapy), and a broader scope of available references and information for patients, both oral (during consultations and in informative videos) and written, such as brochures or evidence-based web pages and mobile platforms, which may be offered during consultations or when being discharged from the hospital.

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### Introduction

Seeing a treatment process from a patient perspective is a key factor in supporting improvements in the quality of health care, patient satisfaction, and patient experience [1,2]. By evaluating the whole treatment process, which consists of information provision during pre- and postoperative consultations, the operation itself,

and aftercare in the hospital as well as at home, adjustments can be made to improve the quality of care and to make this process more patient-centered, so as to improve quality of life of patients [3]. A more patient-centered care process could favorably affect patient satisfaction, improving treatment safety and recovery success [5]. Not much is known or published about patients' experiences and preferences concerning Lisfranc injury treatment, but qualitative studies focusing on diabetes, cardiac care, and COPD have shown that positive patient experiences during a treatment process have a favorable effect on clinical safety and effectiveness [6,7,8,9]. Hence why we deem it necessary to perform a qualitative study

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investigating patient experiences for Lisfranc fractures in order to improve clinical safety and effectiveness for these patients.

The Lisfranc joint, or tarsometatarsal (TMT) joint, is formed by the five metatarsals that articulate with the three cuneiform bones and the cuboid bone, it represents the junction between forefoot and mid-foot and encompasses tarsometatarsal articulations and ligaments [4]. Injuries at this joint are uncommon and account for about 0.2% of all fractures [4,10]. Current treatment choices for Lisfranc injuries range from conservative treatment to operative options such as open reduction and internal fixation (ORIF) and primary arthrodesis (PA). Surgery is only indicated in case of instability of the TMT joint complex, and its goal is to re-establish the functional anatomy of the mid-foot [10]. There is still some controversy about whether ORIF or PA should be favored as an operative treatment [1].

Regardless of the intervention used, the literature shows that patients' perspectives should be included more in the treatment process [5]. The American Orthopedic Foot and Ankle Score is commonly used to measure functional outcomes and quality of life after Lisfranc injuries [11–15]. However, functional outcomes are very different from patient experiences, as they only measure objective aspects and do not explore the quality of care perceived by the patient. Patient satisfaction is an important element of health care provision. It is influenced by many other factors than just functional outcomes and can be explored better by means of interviews [16,17].

Therefore, the aim of this study was to determine what, from a patient perspective, improves the quality of care and patient satisfaction before, during, and after the treatment and recovery process of Lisfranc fractures.

## Patients and methods

### Setting and participants

This study was embedded in the 'Better to Fix or to Fuse' (BFF) study [18], an ongoing multicenter prospective randomized controlled clinical trial comparing PA and ORIF for the treatment of individuals with a Lisfranc fracture-dislocation in the Netherlands, assessing quality of life, complications, functional outcomes, and cost-effectiveness. Trial inclusion criteria were age  $\geq 18$  years, acute Lisfranc fracture injury ( $< 6$  weeks after trauma), displaced or unstable during weight-bearing radiographs, and independence regarding activities of daily living. Trial exclusion criteria were: open Lisfranc injury, purely ligamentous Lisfranc injury, non-displaced and stable during weight-bearing radiographs, contraindications for general or locoregional anesthetic techniques, other fractures of the ipsilateral leg, pre-existent abnormalities at the Lisfranc complex, pre-existent immobility, dependence regarding activities of daily living (due to dementia, Alzheimer, NYHA class IV angina and heart failure, or oxygen-dependent COPD), rheumatoid arthritis, pathologic fractures (metastasis, secondary osteoporosis), peripheral neuropathy and/or diabetes, alcohol or drug abuse preventing adequate follow-up. Process evaluation is an integral element in this study.

Patients were recruited from both patient groups (PA and ORIF) from the BFF study, making sure to include a range of patient characteristics, representative of the total study population of the BFF study [18], to increase generalizability. Homologous sampling and the Lincoln and Cuba criteria were used to increase the transferability from our study population. [19,21,22] Patients were categorized by several variables deemed important by the research team, such as sex, treatment by either ORIF or PA, time since surgery, and age. Potential participants already included in the BFF study [18] were contacted and informed by email. If willing to participate, they received more detailed information, and an appointment

was made for an interview. A total of 14 participants were contacted, one of whom refused to participate due to personal circumstances, while three participants failed to respond to the emails they were sent, leaving 10 patients to be interviewed.

### Interviews

Semi-structured, individual interviews guided by an interview guide were performed by two of the authors, one female medical doctor (N.A.C. van den Boom), and one female medical student working for a master's degree, who was not involved in the BFF trial (Isa Douwes). The interview guide was created based on the topics of interest, being the quality of care as perceived by the patient and patient satisfaction in the treatment process. This interview guide was composed in cooperation with a third author (S.M.A.A. Evers), a professor with great expertise in health technology assessment and quality of life, who is also the scientific director of the Care And Public Health Research Institute. The complete interview guide for the study is presented in Table 1 in the appendix. This guide was designed to allow interviewees to express both positive and negative opinions about the treatment process. The interview guide was divided into 4 categories: pre-operative, hospitalization period, recovery period, and the future, focusing on the way they experienced the treatment process and whether they had suggestions for improvement. We used the principles as stated by Masjon J et al. and Angela Cuoco et al for qualitative research, and the Lincoln and Cuba criteria and COREQ checklist to ensure quality of the interview guide [19–21].

First, all interviewees were given a short introduction about who the interviewers were, what the reasons for doing this research were, and what the interview would consist of. All questions were open-ended, and participants were asked to be elaborate in answering the questions and to give examples where possible. Follow-up questions were asked additionally to the interview guide, to explore the answers in more detail. During the interviews, field notes were made by the interviewers to record important answers and describe body language and tone where appropriate. All interviews were conducted online by the research team between October 7<sup>th</sup>, 2021, and January 20<sup>th</sup>, 2022, using ZOOM or Microsoft Teams. All interviews lasted between 20 and 30 minutes. ZOOM or Microsoft Teams were used rather than face-to-face interviews because of their efficiency in covering a large geographical area and to limit health risks, as these interviews were all conducted during the COVID-19 pandemic.

Reporting was done in accordance with the COREQ list, a 32-item checklist for interviews and focus groups, and the Lincoln and Cuba trustworthiness criteria have been used as a guide to assess and ensure quality [20,30]. Not all criteria could be ticked off, but we tried to increase our credibility by testing the interview protocol, ensuring the investigators had the required knowledge and research skills to perform their roles, peer debriefing and adequate collection of referential materials such as field notes made during the interviews. Transferability was ensured by providing a clear and detailed description of methods of data collection and analysis. Dependability was ensured by providing a detailed track record of the data collection process throughout the interviewing and analysis process. Confirmability was established by applying several triangulation techniques (methodological, data source, investigators and theoretical) [30]. Video and audio recording was used in case any ambiguities were discovered while reading the transcripts, so the authors could re-watch these videos to make notes of the participant's tone of voice, emotional state, or body language since the way that something is said is often just as important as what is said. Another reason for video and audio-recording the interviews was to ensure that the other authors could trace the audit trail while analyzing.

## Analysis

With permission from the participants, each interview was audio- and video-recorded, then transcribed verbatim and de-identified prior to analysis. After transcribing all interviews, each transcription was read while listening to the recording, and any spelling mistakes or other errors were corrected.

Then, all transcripts were read by both authors to get an overview and a general idea of what themes appeared in the interviews. Each transcript was then read and analyzed individually to identify emerging themes and subthemes. A descriptive code was attached to text parts related to a specific theme or subtheme using Atlas.ti. All descriptive codes were evaluated by two authors (N.A.C. van den boom and I. Douwes) separately, and coding decisions were discussed until an agreement was reached. In case of disagreement, another author was contacted (S.M.A.A. Evers). Next, all data from each interview were grouped into clusters based on the main themes and subthemes emerging in the interviews, and quotes from different interviewees were compared and translated.

## Results

Written, informed consent was given by participants prior to the interview. Participants were aged 24 to 67 years and were treated in various hospitals across the country. A total of five male and five female participants were interviewed, three male participants in the ORIF group and two in the PA group, while two of the female participants were in the ORIF group and three in the PA group. All patients had been operated upon at least 6 months prior to the interviews. The socio-demographic information of these patients is summarized in Table 2 and described per participant in Table 3, both can be found in the appendix.

We retrospectively calculated data saturation using a calculation described by Guest et al. [31]. In this calculation, we chose a base size of 4 interviews, a run length of 2 interviews, and a new information threshold of  $\leq 5\%$  to indicate that we have reached adequate saturation. At  $8^{+2}$  interviews we reached the  $\leq 5\%$  new information threshold. Therefore, data saturation was considered to have been achieved after 10 interviews, and no new participants were contacted.

The main themes emerging from the analysis were expectation management regarding the recovery period, communication with and between health care providers, the information provided during consultations, and support during the recovery period. Each theme included various subthemes, as presented in Table 4 in the appendix.

All results found during the analysis of the interviews are described in detail below for each theme. For each theme and subtheme, several quotes were selected to illustrate patients' answers in more detail.

### Expectation management regarding the recovery period

#### Various types of pain presenting during stages of the recovery period

Three patients mentioned being inadequately prepared for the different kinds of pain that can arise during the recovery period. They mentioned going through different stages of pain in the recovery period and finding it difficult to differentiate between these kinds of pain; they would have preferred to have known beforehand that these could occur and where they originated from. One patient described thinking one of the implants was causing their skin to tear through friction, while the foot was still in a cast, causing major anxiety since they could not see the foot at that moment. Better information on where the pain originates from and that this pain can occur during the recovery period could have prevented this anxiety according to the patient.

*'I would have preferred more information on the different types of pain you go through. What this fracture and the operation do to the foot and where the pain comes from. And about the prognosis, how long it will take'* – F, age 56, 6-12 months post-ORIF

#### How long the different types of pain can persist

Some patients described not being aware of how long the pain during the recovery period could persist. Some patients were under the impression that the pain would disappear or at least be reduced after the cast was removed but were then surprised that the pain level actually increased, and a lot of progress remained to be made from there. However, some other patients mentioned being well informed on the possible duration of the pain in the recovery period, but still being surprised and disappointed.

*'When you get a walking cast, you think it's over. At first, it went well, but then my foot started to swell. When the walking cast came off, I thought I could just walk home in a supportive shoe, but I was very disappointed. It was very painful, and I made progress very slowly'* – F, age 67, > 12 months post-PA

#### Attitude towards recovery

Some patients stressed the importance of an optimistic attitude from the health care provider but also from the patient. One of them explained that having a positive attitude and focusing on the things that are possible instead of the things that are not helped them to get through the recovery period. The second patient emphasized the importance of a positive attitude on the part of the health care provider during the consultations and that focusing solely on what is not possible might adversely affect recovery. They explained there should be a balance between being optimistic and motivating whilst still being honest to the patient and giving them a realistic view of the situation.

*'I think a lot of attention goes to what isn't possible, and only a little to what is possible. I understand that from a medical perspective, but I look at it differently now, it is important to focus on what you can still do and what possibilities you still have. After surgery, they told me I was very optimistic and I told them I was aware of that but that the chance of recovery is still there and that I want to achieve that, and if I let go of that optimism too soon, it won't happen. The only things that predict your recovery are your physical well-being and your attitude. I know I might not fully recover but if you keep stressing not recovering, you won't recover.'* – M, age 44, 6-12 months post-ORIF

#### Communication with and between health care providers

Some patients were pleased to always see the same doctors during the hospital stay, since this built a relationship between doctor and patient and made conversations easier, as the doctor was aware of all patient information. However, they understood that this is not always a possibility. One patient would have preferred being able to contact a doctor or being able to ask questions when they needed it, without a consultation appointment. They explained it would not be a necessity, but it would take away some worries and insecurities that can arise during the recovery period.

*'I'm a person that likes to know everything and I understand you can't have a consultation every week, but it would be nice to have some accessible way to ask questions, like through an app. It would be nice, not a necessity'* – F, age 49, 6 months post-PA

#### Receiving information before, during, and after the intervention

Some patients complained about the communication between health care providers, receiving different information from different doctors, and being confused about how to proceed. One of these patients mentioned that the possible cause of this is receiving information at so many different moments. From the nurses at

the ER, from the staff in the OR, from the surgeon during the pre-operative consultations, from the surgeon doing the procedure, and so on. While all this information should match, it is understandable that not all staff present the exact same information, which causes discrepancies and confusion.

*'I was told I would get a normal cast for 4 weeks and a walking cast for 4 weeks. When I was admitted to the hospital, I was told it would be 8 weeks of a normal cast. A lot of inconsistency and confusion.'* – M, age 24, 6 months post-ORIF

#### Information provided during consultations

##### Pain medication

Three patients indicated a need for more education about the use of strong painkillers such as morphine, which are prescribed for the first phase of the recovery period. In particular, they wanted to know how to start phasing out the different medications, what side effects to look out for, and the risk of addiction. One patient suggested a brochure dedicated to this topic being handed out to them when they were discharged from the hospital.

*'The painkillers were quite strong. I was discharged and wasn't told how to use and dose these medications, so I had to look this up myself. The anesthesiologist explained the side effects of morphine to me in the recovery room, but I had just woken up from surgery, so I couldn't remember this information very well. It's good to know the risks of these strong painkillers.'* – F, age 49, 6 months post-PA

##### References from other patients

One patient mentioned it would have helped to read other patients' stories and experiences so he could compare this with his own experiences. Reading about how other patients went through phases of pain during recovery and if this is a normal amount and duration of pain can help patients to either accept this or can encourage them to increase their use of allied health care or see a doctor. When asked if patients felt the need for patient forums, none of the participants expressed a need for this, since they felt that patients would only share negative information on these forums. They did express the need for information in a patient brochure, which is discussed in more detail below.

*'You don't have any references, no idea what is normal and what isn't. I was under the impression I was recovering slowly, but the doctor told me it was going well. It's worse than an ankle fracture and this can tempt you to start doing things sooner than you should. I thought I would be able to walk with the walking cast, but I truly had no idea.'* – M, age 44, 6–12 months post-ORIF

##### Information provision suggested by patients

Patients expressed the need for a folder, brochure, or another option to read about Lisfranc fractures. The information patients deemed most important was about the different treatment options, possible scenarios during the recovery period, duration of the recovery period, pain management, the likelihood of a second surgery, risks of osteoarthritis, risks of the surgery itself, the need for allied health care, and patient references. Some patients expressed feeling overwhelmed in the Emergency Room and not being able to process all information they were told. The same happened during the consultations when it was not possible to remember all information provided. They wished they could have read all information in their own time, especially since some information comes from the ER, some from nurses, and some from the surgeon, as mentioned above.

*'A big folder is not necessary, especially not in an acute setting, but a way to get this information would be useful. I used the internet now, which I hate'* – M, age 44, 6–12 months post-ORIF

#### Support during the recovery period

##### Insoles

Some patients were advised to get insoles by their physiotherapist and both patients benefitted greatly from the support these insoles provided, enabling them to make better progress during recovery; it reduced the pain, which made walking and exercising easier, which in turn contributed favorably to their recovery progress.

*'I have insoles now, fitted to my foot. And they also advised me to buy shoes with a sturdy sole. This provides a lot of support, and my feet can rest a lot more'* – M, age 58, >12 months post-ORIF

##### Physiotherapy

Six of the 10 patients were supported by a physiotherapist during the recovery period. Points for improvement included starting sooner than when the cast comes off, since the rest of the body also needs support during these weeks. One patient mentioned losing a lot of muscle mass during bed rest and would have preferred to be guided and supported by a physiotherapist during this period.

*'I would have started physiotherapy sooner, I started after the cast came off. Due to the bedrest your posture changes, I also worked while lying in bed. A physiotherapist could also help with loosening up the rest of the body and the other leg, since this leg is forced to move more and differently.'* – F, age 56, 6–12 months post-PA

Patients also expressed the need for more guidance and advice on what exercises to do and what movements they were allowed to make and what limits to observe while exercising. All these patients experienced physiotherapy as very helpful and a necessity during the recovery period. Some patients did not seek help from a physiotherapist due to miscommunication during one of the consultations with the surgeon and were disappointed since they could tell that they were not able to make good progress. One of these patients contacted a physiotherapist themselves and reported feeling glad they had done that, since they were still able to make good progress because of this.

*'When the cast came off, I was very disappointed, I thought the real recovery would start there. In the cast, everything is stuck, and it hurts, but you are not aware of what kind of pain it is and what you are allowed to do, and I was searching for this. I just went to a physiotherapist, and this helped a lot. What can you move and when, and what signals should you look out for? It was very useful to work with them and since then I made progress faster.'* – M, age 44, 6–12 months post-ORIF

##### Compression socks

One patient mentioned swelling of the lower extremities during the recovery period, and explained how compression socks were helpful in the recovery since they gave a lot of support so she could practice walking more easily.

*'I called the doctor because my leg was swelling and she gave me a compression sock. This helped a lot, it also provided support.'* – F, age 67, >12 months post-PA

##### Validity of the method

For this qualitative study, we used pre-defined methods and the COREQ list on reporting qualitative studies [20]. As regards the validity of our methods, the verbatim transcription of the interviews did not lead to any substantial problems. In the member check, none of the respondents did have any additional remarks. The results of double-checking the interviews by two independent reviewers (N.A.C. van den Boom and I. Douwes) did not lead to any substantial differences and consensus was quickly reached. Homogenous sampling was used to increase generalizability as stated by the Lincoln and Cuba Checklist. [19,21,22]

## Discussion

The aim of this study was to determine what, from a patient perspective, would improve the quality of care and patient satisfaction before, during, and after the treatment and recovery process of Lisfranc fractures.

Current treatment choices for Lisfranc injuries range from conservative treatment to operative options such as open reduction and internal fixation (ORIF) and primary arthrodesis (PA). [10] ORIF consists of a dorsal longitudinal incision over the interval at the base of the first and second TMT joints. This approach allows visualization and reduction of the first, second, and medial half of the third TMT joints. Kirschner wires temporarily secure the joint and the TMT joints are reduced. In this procedure, the mobility of the joints will be spared. For primary arthrodesis, the same incisions are made as in ORIF, but instead of only fixating the fracture, the TMT joints will be fixed as a whole. First, the articular surfaces are removed from the TMT joints, then the joints will be fixed using either autograft cancellous bone and/or plates or screws at the fusion sites of the joints, thereby immobilizing the TMT joints but gaining a lot of stability. [10,29] Both ORIF and PA have advantages and disadvantages. After an ORIF procedure, the mobility of the midfoot will be preserved since only the fracture but not the joint itself will be fixed, which is one of the main reasons to choose this procedure [29]. However, it has been shown that strictly ligamentous injuries of the tarsometatarsal joint do not always heal after ORIF, leading to an increased risk of joint degeneration [4,15]. Secondly, drilling and placement of screws and/or plates across the articular surface can increase the risk of posttraumatic arthritis [10]. On the other hand, primary arthrodesis of the TMT joint means the joint will be fixed, thereby immobilizing this part of the foot and eliminating the risk of posttraumatic arthritis, the associated pain, and the need for a secondary intervention. Even though primary arthrodesis of the TMT joint takes away the risk of symptomatic secondary arthritis in the TMT joint, fixing the joint can cause limited function of the foot, especially if multiple TMT joints are involved in the injury [29].

The main point that became obvious from the results is that many patients feel they are inadequately prepared for the surgery and the recovery of their Lisfranc fractures, and our respondents expressed a need for more information. The interviews showed that this resulted from several factors, mainly the combination of patients underestimating the consequences of this fracture due to lack of references from other patients, and insufficient information provision by care providers. Possible solutions could be to make alterations to the pre- and post-operative care plan.

None of our patients expressed the need for a patient forum, which leads us to believe these would not be helpful for the broader population. In contrast, brochures or folders were greatly appreciated by patients across our study sample. They were suggested by multiple participants to be a solution for anxiety and uncertainty during the recovery period and could be a valuable addition to pre- and postoperative care. Several patients expressed the value of a brochure containing information about the different treatment options, the different kinds of pain that can arise during the recovery period, the expected duration of the recovery period, education on strong painkillers (how to phase them out, possible side effects to be aware of and risks of addiction), likelihood of a possible second surgery, risks of osteoarthritis, risks of the surgery itself, the need for allied health care, and patient references. This brochure could be offered to all patients during preoperative consultations as an addition to all the verbal information provided by the care providers, or when being discharged from the hospital. We think this is a rather good idea and could lead to better care, not only in Lisfranc injury. Information brochures have been reported to support and improve patients' understanding of their injury and

management plan, and to facilitate communication between patients and health care professionals [23]. Instead of just brochures, we believe resources consisting of webpages and mobile platforms including educational videos, patient experience blogs, or interactive recovery timelines next to the information mentioned before could be of great additional value for these patients.

Comments were also made about being able to contact a doctor without an appointment, but we recognize the logistic challenges this involves. A solution to this could be to plan extra visits, not with a doctor but, for example, with a physician assistant or nurse practitioner, to make support more accessible.

Next to this, a few patients expressed the need to have a positive attitude toward recovery. Therefore, the focus in the postoperative visits could be shifted more towards the remaining functional status or the possibilities to maintain a positive attitude.

As regards allied health care, postoperative physiotherapy was appreciated and deemed a necessity by the patients who received this. Some patients did not receive any allied health care and were disappointed, since they could tell that they were not able to make good progress. Patients explained that the reason physiotherapy is a must is that it provides guidance and advice on what exercises to do and what movements they were allowed to make, as well as what limits to observe while exercising. Jensen et al. [24] described uncertainty amongst patients about how much weight their ankle was allowed to bear after ankle fractures, and a wish for written and individually targeted information. In addition to the above-mentioned brochure, patients could be offered a brochure or suggestions for evidence-based web pages or mobile platforms dedicated to allied health care, containing detailed information on exercises and movements patients are allowed to perform, what signals to look out for, weight-bearing restrictions, and other supportive measures such as compression socks and insoles. Wiertsema et al. [25] describe another possible solution to improving allied health care. They investigated the use of transmural trauma care consisting of four elements: (1) a multidisciplinary team at the outpatient clinic, (2) coordination and individual goal setting for each patient by this team, (3) a network of primary care physical therapists, (4) E-health support for transmural communication with outcome measures of generic and disease-specific health-related quality of life (HR-QOL), pain, functional status, patient satisfaction, and perceived recovery. They found statistically significant differences in patient satisfaction, disease-specific HR-QOL, pain, functional status, and perceived recovery, which is why we think this would have considerable added value in the rehabilitation of patients with Lisfranc fractures as well.

So far, limited information has been published on patient experiences and preferences during the treatment and recovery of Lisfranc fractures. No qualitative interview studies have been performed regarding these patient experiences and preferences. However, some qualitative interview studies have been published on patient experiences concerning foot or ankle fractures. Jensen et al. [24] described patients receiving substantial information on their treatment plans and future implications during consultations for their ankle fractures, but not on what to expect in terms of pain, mobility, and early rehabilitation. All of them said they had no knowledge or recollection of being given this information, and they said it would have been valuable to have it. Patients in this study expressed a need for more written and individually targeted information on how they were supposed to rehabilitate and on what would be a normal recovery path. McKeown et al. [26] reported that patients receiving physiotherapy for their ankle fractures generally described this as a useful experience, solution-focused and helpful in terms of education and reassurance about their injury. Renna et al. [27] investigated if patients were satisfied with the information, they received about their lower limb operations and concluded that more than twenty percent of the study popula-

tion requested more information on post-operative pain and recovery timelines. The main resources suggested by these patients' included webpages and mobile platforms. [27].

### Strengths and limitations

A strength of this study is that patients came from different regions, and their baseline characteristics, such as age, sex, surgery performed, and time since surgery, were all under control and well-matched.

One thing that can be considered a limitation of this study is the use of online platforms such as ZOOM and Microsoft Teams to conduct all interviews. Reasons for using online interviews were the ability to cover a large geographical area, in order to include a diversity of demographics, as well as to limit health risks, as these interviews were all conducted during the COVID-19 pandemic. However, Shapka et al. compared the data quality of interviews conducted with adolescents in a face-to-face setting versus online and concluded that data quality is unaffected by the method of data collection and that there is no need for researchers to avoid conducting interviews online [28]. Next to this, all interviewers ensured patients' privacy was a priority and therefore all video- and audio recordings are saved on private hard drives, each participant was given a pseudonym (R01 [Respondent 1], R02, R03, etc.), and names and personal information were removed from each video and transcript that was saved.

Another strength of this study is the flexibility of the interviewers with regard to the interview guide as well as the fact that the interviewers are from the same culture as the interviewees [19,22]. After each interview had been performed, the full transcriptions were shared between the authors so they could read how each interview had been conducted, what follow-up questions had been asked, where additional questions had been valuable, and so they could provide each other with feedback. This made it possible for both interviewers to adjust their interview guides so as to obtain as much valuable information as possible and to ensure both interviewers had the same focus. Other strengths were the use of member checking, transcripts, video recording of the interviews, homogenous sampling, the use and description of an interview guide, thorough description of personal characteristics of the interviewers and interviewees, participant selection, setting, data collection, data analysis, reporting by using pre-defined methods and the COREQ and Lincoln and Guba criteria list for reporting of qualitative studies [20,21,22]. Also, we have respected the 4 P's corresponding to partnership, participation, protection, and power. The principle of partnership requires that between researcher and research object, there is a relationship based on mutual trust and respect for each other diversity. The principle of participation entails the continuous involvement of the researched groups in the planning and decision-making processes within a research project in order to achieve a more conscious respect for their cultural rituals and behavioral protocols. The principle of protection requires not only respect for the participants' values and beliefs but also active safeguarding of them. The essence of the principle of power can be summed up in this famous quote from the Marvel comics: 'With great power comes great responsibility'. Indeed, the researcher must reflect upon their own privileged position within the relationship with the research subject, who may feel potentially denigrated especially if the researcher belongs to the dominant culture of that context [19,32].

This study explored various aspects of patients' experiences during treatment of and recovery from Lisfranc fractures, using semi-structured interviews, because we used pre-defined questions that the researcher follows in a flexible way. We found that patients valued more tailored approaches to the pre- and post-operative care program, better guidance regarding allied health care (phys-

iotherapy), and a wider scope of available references and information for patients. Suggested solutions were planning postoperative visits with physician assistants or nurse practitioners to make support more accessible, improving rehabilitation by using transmural trauma care, and improving information provision on treatment, expectations during recovery, and allied health care by brochures or evidence-based web pages and mobile platforms.

### Conclusion

In terms of the aim, this study found that patients would value more tailored approaches to the pre- and post-operative care program, more guidance regarding allied health care (physiotherapy), and a broader scope of available references and information for patients, both oral (during the consultations and in informative videos) and written, such as brochures or evidence-based webpages and mobile platforms, which may be offered during consultations or when being discharged from the hospital.

Table 1–Table 4

### Declaration of Competing Interest

None

### Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.injury.2022.10.013.

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