

Identifying Research Priorities in Limb Reconstruction Surgery in the United Kingdom

British Limb Reconstruction Society Research Collaborative

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ABSTRACT

Introduction: Limb reconstruction surgery (LRS) has a wide range of clinical applications within orthopaedic and trauma surgery. We sought a consensus view from limb reconstruction healthcare practitioners across the United Kingdom to help guide research priorities within LRS. Our aim is to guide future clinical research in LRS, and assist healthcare practitioners, clinical academics, and funding bodies in identifying key research priorities to improve patient care.

Materials and methods: A modified Delphi approach was used; it involved an initial scoping survey and a 2-round Delphi process to identify the consensus research priorities in both adult and paediatric LRS. Participants were asked to rank approved submitted questions according to perceived importance on a 5-point Likert scale, where 1 represented lowest importance and 5 indicated highest importance. Mean scores were calculated to identify a consensus of the top ten research priorities for adult and paediatric LRS.

Results: One hundred and fifteen participants primarily from across the United Kingdom working in LRS contributed to the modified Delphi process. Participants ranked and then re-ranked the presented research topics in terms of perceived importance. This led to the identification of a top ten research priorities in both adult and paediatric LRS, respectively, based on the collective responses of LRS practitioners. The highest-ranked questions in both adult and paediatric practice related to how to best assess and record patient-reported outcome measures (PROMs) in LRS patients. Other priorities included the effectiveness of specialist physiotherapy, the use of patient-focused psychological support, and the use of various operative management strategies for infection and limb length discrepancies.

Conclusion: We present a consensus-driven research priority study that outlines the key research topics and themes determined by healthcare professionals within LRS in the United Kingdom.

Clinical significance: These questions will assist funding bodies in prioritising where research funding may be best utilised and help drive future improvement in patient care.

Keywords: Deformity, Delphi, Limb reconstruction, Musculoskeletal infection, Non-union research priorities, Trauma.

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INTRODUCTION

The sub-speciality of limb reconstruction surgery (LRS) has a wide range of clinical applications within Orthopaedic and Trauma surgery. In complex skeletal trauma, various LRS surgical methods and techniques can be used to achieve a good functional outcome for patients where conventional techniques have either failed or are deemed inadequate.¹ In addition to managing musculoskeletal trauma, limb reconstruction principles can also be applied to treat conditions such as musculoskeletal infection, fracture non-union, and both congenital and acquired limb deformities.²

Limb reconstruction surgery is an emerging sub-speciality within orthopaedic and trauma surgery. Therefore, currently, there is a deficit of high-quality research aimed at guiding and advancing treatment principles and patient outcomes. To drive innovation and knowledge within the field there is not only a need to identify what the consensus view of key research priorities are among leading limb reconstruction practitioners but also how best to demonstrate the clinical need to acquire targeted funding to support high-quality research in the future, such as randomised controlled trials.³

Potential funding bodies that would be prepared to fund research endeavours within the field of LRS may not be aware of some crucial issues relating to the delivery of LRS patient care, therefore, objectively demonstrating the collective research priorities of surgeons and that of the extended surgical care

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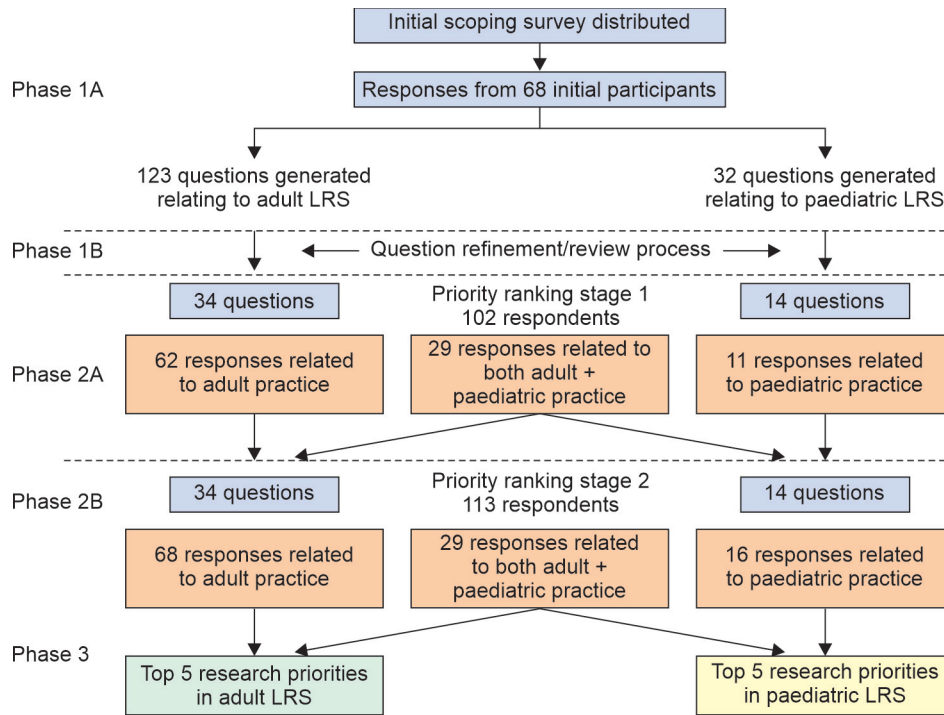
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team working with LRS patients is particularly important.⁴ Additionally, identifying and communicating the consensus of what is viewed as important research priorities amongst consultant surgeons and healthcare practitioners has been historically difficult.⁵

This consensus-driven research priority study aims to guide both research clinicians and funding bodies on what key issues are deemed of most importance in a bid to improve the body of evidence, guide future research activities and improve patient outcomes. This study describes the methodology that was used in our research and reports the priorities that were identified.

Flowchart 1: Flowchart summary of Delphi process



MATERIALS AND METHODS

A modified Delphi approach was used; it involved an initial scoping survey and a 2-round Delphi process to identify the consensus research priorities in both adult and paediatric LRS.

Submitted questions from participants underwent initial review by an expert panel (6 consultant surgeons and one physiotherapist), with any repeated questions or questions deemed ‘out of scope’ being omitted—for the purposes of our study, basic science questions were categorised as ‘out of scope’. Following this initial review process, respondents were then asked to rank approved submitted questions according to perceived importance on a 5-point Likert scale, where 1 = lowest importance and 5 = highest importance. This process was then repeated with respondents being asked to re-rank priorities with prior knowledge of how each question scored on importance amongst their colleagues in the first stage (Flowchart 1).

Phase 1A: Identifying Research Questions

The initial scoping ‘Google Forms’ survey was emailed to healthcare practitioners using the British Limb Reconstruction Society (BLRS) membership network. Delegates were also asked to contribute during the British Orthopaedic Association (BOA) Annual Congress in September 2021.

Via Google Forms, delegates were asked “Considering your clinical practice in the field of LRS, what are the most important clinical questions that need addressing?”

Responses were received as free-text comments and participants were advised to present ideas based on a population, intervention, comparison, and outcome (PICO) format. An unlimited number of ideas and questions was accepted, and participants could complete this phase of the study more than once.

The survey aimed to gain opinion primarily from LRS practitioners based in the United Kingdom, however, there were a

small number of responses from international conference delegates. Due to the small sample size of this demographic, this paper does not seek to draw conclusions related to international opinion or consensus. Regional or national demographics of those who submitted a response as well as the roles they provide as an LRS practitioner were recorded (Table 1).

Phase 1B: Determining the Research Questions

All submitted survey questions were then reviewed by the expert panel and were compiled into question categories. These included ‘trauma’, ‘infection’, ‘fracture healing and non-union’, ‘deformity and limb length discrepancy’ and ‘miscellaneous’.

Any repeated or duplicated questions were removed as were any questions that were deemed ‘out of scope’ by the expert panel. All questions were searched for in evidence published by the Cochrane Library, the National Institute for Health and Care Excellence, systematic reviews, meta-analysis, and randomised controlled trials (levels I and II). Any question that was deemed to already have been answered in the recent literature (within the past 10 years) was also excluded.

Phase 2A: Delphi Round 1 – Ranking of Research Questions

Once a finalised list of approved questions was compiled, a further ‘Google Form’ survey was sent to all BLRS network members regardless of whether they submitted a research question in phase 1. This was again distributed via the BLRS membership network and to delegates at the British Limb Reconstruction Congress in March 2022.

In phase 2, members were asked to rank each of the questions on a 5-point Likert scale regarding the level of importance they placed upon the question in relation to their current practice (1 = lowest importance, 5 = highest importance). Reminders were sent by email after 2, 4, and 6 weeks and 24 hours before the survey

Table 1: Respondent demographics – phase 1A

<i>Region</i>	<i>Grade/job role</i>
North West England = 18	T&O Consultant = 43
Yorkshire and Humber = 5	Registrar/Resident = 3
London = 16	Fellow = 3
Kent, Surrey and Sussex = 1	Allied health = 7
West Midlands = 3	Specialist nurse = 4
South West England = 2	Student = 1
Thames Valley = 2	
North East England = 1	
Wessex = 2	
Scotland = 1	
Northern Ireland = 2	
South Africa = 3	
Brazil = 1	
Australia = 1	
Italy = 2	
Bangladesh = 1	
Total = 61	

Table 2: Respondent demographics – phase 2A

<i>Region</i>	<i>Grade/job role</i>
North West England = 25	T&O Consultant = 72
Yorkshire and Humber = 14	Registrar/Resident = 5
London = 22	Fellow = 6
West Midlands = 9	Allied health = 13
South West England = 2	Specialist nurse = 6
Thames Valley = 4	
North East England = 5	
East of England = 3	
Kent, Surrey and Sussex = 3	
Wessex = 4	
Scotland = 4	
Wales = 1	
Northern Ireland = 1	
Ireland = 1	
South Africa = 2	
Russia = 1	
Denmark = 1	
Total = 102	

closed to prompt a response from participants. Participants were also given the opportunity to suggest further relevant questions to the survey or make changes to the current questions in this phase of the study or both.

Phase 2B: Delphi Round 2 – Re-ranking of Research Questions

A final survey was circulated by the BLRS membership and to delegates who had attended the BOA Annual Congress in September 2022. Along with each question delegates were asked to give their perceived priority ranking; participants were presented with a visual graphic display (bar chart) showing the mean responses of all the participants from the first survey in phase 2.

In phase 3, participants were given the following instruction prior to them being asked to re-rank the questions based on their perceived research priorities with knowledge of the collective consensus amongst their colleagues: ‘We will now present the research questions from the previous round and ask you to re-score the questions. We will also show you the scores from participants in phase 2 which will demonstrate the current state of collective opinion which may help to inform your choices’.

Participants then rescored the questions with the knowledge of the prior group responses.

Phase 3: Final Research Questions

Research questions scored in the previous phase were ranked by overall mean score per question. The top-ranked questions for both adults and paediatrics were published.

RESULTS

Phase 1A: Identifying Research Questions

In the initial phase (1A), a total of 123 questions relating to adult LRS and 32 questions related to paediatric LRS research were submitted

from 68 participants. The demographics of the respondents can be seen in [Table 1](#).

Phase 1B: Determining the Research Questions

In total, 51 questions relating to adult limb reconstruction, and eight questions relating to paediatric limb reconstruction were removed since the expert panel considered them to be “out of scope”. Further duplicated questions, or questions that focused on similar topics were merged into single questions leaving a final total of 34 questions relating to adult LRS and 14 relating to paediatric LRS.

Phase 2A: Delphi Round 1 – Ranking of Research Questions

One hundred and two participants responded to this phase (demographics shown in [Table 2](#)). Sixty-two participants responded to the adult-only questions, 29 to both adult and paediatric questions and 11 solely to the paediatric questions. The mean total scores for perceived ‘clinical importance’ for all adult and paediatric questions were 3.64/5, and 3.96/5, respectively.

No additional questions or refinements were suggested by participants.

Phase 2B: Delphi Round 2 – Re-ranking of Research Questions

A final list of approved questions was then distributed for respondents to rank (phase 2A), and then re-rank (phase 2B) research priorities in terms of perceived importance, with knowledge of the responses to the previous phase.

One hundred and thirteen participants responded to this phase of the study (see [Table 3](#) for demographics). Sixty-eight participants responded to adult questions, 29 to both adult and paediatric, and 16 to the paediatrics questions. The mean total for the perceived ‘clinical importance’ for all adult and paediatric questions was 3.88/5 and 4.16/5, respectively.

Table 3: Respondent demographics – phase 2B

<i>Region</i>	<i>Grade/job role</i>
North West England = 30	T&O Consultant = 61
Yorkshire and Humber = 15	Registrar/Resident = 9
London = 25	Fellow = 8
West Midlands = 6	Allied health = 24
South West England = 4	Specialist nurse = 10
Thames Valley = 8	Foundation doctor = 1
North East England = 3	
East of England = 5	
Kent, Surrey and Sussex = 1	
Wessex = 2	
Scotland = 3	
Wales = 1	
Northern Ireland = 2	
Ireland = 1	
South Africa = 1	
Russia = 1	
Denmark = 1	
Brazil = 1	
Australia = 2	
Nigeria = 1	
UAE = 1	
Unknown ('NHS') = 1	
Total = 115	

Phase 2C: Final Research Questions

The final scored questions were reviewed by the expert panel, identifying ten research priority questions in both adult and paediatric LRS based on the collective responses of LRS practitioners (see [Tables 4](#) and [5](#) for final research questions).

DISCUSSION

To our knowledge, this consensus-driven research priority study is the first to identify the major research priorities in both adult and paediatric LRS in the United Kingdom. These views are likely to be broadly representative of the speciality due to the scope and reach of our survey as outlined by the demographics data in each phase of the process.

The highest scoring key priority in both adult and paediatric LRS related to, as identified by our study, assessing and recording patient-reported outcome measures (PROMs) in both trauma and elective limb reconstruction. There are few PROMS dedicated solely to assessing a patient’s outcome following LRS and complex trauma.⁶ The patient-reported outcomes measurement information system (PROMIS) is a set of person-centred measures that evaluates and monitors physical, mental, and social health in adults and children. It is used as a primary outcome measure in many new and current National Institute for Health and Care Research (NIHR) funded orthopaedic research studies and clinical trials.⁷⁻⁹ However, like many other PROMS, it is not known if it provides an accurate

assessment of the short-, medium- and long-term outcomes for patients following LRS. Tools that can be used to measure the outcomes that are important to patients following LRS will enable management strategies to be more accurately assessed through research and ultimately improve patient care.¹⁰

Other key priorities identified in adult LRS centred on topics including the clinical effectiveness of specialist physiotherapist input in patients with circular external fixators, whether psychological support after complex trauma improves functional outcomes, and if single vs 2-stage revision surgery is more clinically and cost-effective in the treatment of bone infection or osteomyelitis cases.

Key priorities identified for paediatric LRS included whether internal lengthening techniques in cases of deformity are preferential to external fixation, if limb length discrepancy requires surgical intervention it is more clinically and cost-effective to intervene early or wait until skeletal maturity, and whether the use of adjunctive therapies such as bone morphogenic proteins (BMPs) in treatment of tibial pseudoarthrosis.

The Delphi approach used in this study has been shown to be an effective and efficient approach for gathering informed judgments and ideas to achieve consensus from a large group of participants.^{11,12} Increasingly, this approach has been used to identify and communicate key research priorities in healthcare. Combining the Delphi process to generate a ranked list with the addition of an expert panel to guide the production of the questions and subsequent consensus means that our approach can be considered as a ‘modified Delphi’ method. This approach has a proven track record of successfully developing research priorities in orthopaedic research that have been successfully funded to produce high-level research that focuses on improving and changing practice.^{13,14}

A potential limitation of the study is that upon review of the demographics, our response rates are heavily skewed towards the views of consultant orthopaedic surgeons with a relatively small proportion of allied health respondents such as specialist physiotherapists and advanced nurse practitioners. Furthermore, any future research and clinical trials based on this consensus study should include the views of patients and relatives affected by LRS pathology.

CONCLUSION

It is essential to develop a strategic agenda to enable researchers to focus their efforts on priorities that are important to healthcare practitioners managing LRS patients. For the first time, we have outlined key topic areas, themes and research questions from a range of LRS healthcare practitioners. These questions will assist funding bodies in prioritising where research funding may be best used to expand the current body of evidence to help us advance LRS care for both adult and child patients.

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Table 4: Top 10 research priorities identified in adult LRS

<i>Research priority</i>	<i>Mean score</i>	<i>Question</i>
1	4.85	Q33: What are the most appropriate functional- and PROMs in both trauma and elective limb reconstruction surgery and how is this information best collated?
2	4.75	Q28: Is the use of specialist LRS physiotherapists more clinically and cost-effective than non-specialist therapy in the management of patients with a circular frame?
3	4.65	Q31: Does the incorporation of psychological support pre- and post-operatively improve patient and functional outcomes in the management of complex trauma and limb reconstruction surgery?
4	4.56	Q3: What are the long-term implications (risk of osteoarthritis) of lower limb joint (ankle and knee) mal-alignment and/or shortening following a fracture?
5	4.49	Q12: What is the clinical and cost-effectiveness of single vs two-stage surgery in the management of bone infection/osteomyelitis?
6	4.43	Q5: Is the use of circular frame fixation more clinically and cost-effective than internal fixation in the management of open tibial fractures?
7	4.41	Q30: When removing an external fixator, is the use of local sedation methods (entonox/penthrox) of anaesthetic in a non-theatre setting (clinic) more clinically and cost-effective than removal under general anaesthetic?
8	4.41	Q29: What is the clinical and cost-effectiveness of high-dose vitamin D vs no supplementation for the management of non-unions and lengthening?
9	4.29	Q14: What is the risk of infection in the treatment of a fracture with internal fixation following the application of a temporary external fixation?
10	4.28	Q6: What is the clinical and cost-effectiveness of circular frame vs internal fixation methods for the treatment of complex tibial plateau fractures?
11	4.28	Q19: What is the clinical and cost effectiveness of single vs two stage surgery in the management of infected fracture non-unions?

Table 5: Top 10 research priorities identified in paediatric LRS

<i>Research priority</i>	<i>Mean score</i>	<i>Question</i>
1	4.69	Q46: What are the most appropriate functional- and PROMs in both paediatric trauma and elective limb?
2	4.56	Q45: Does the incorporation of psychological support pre- and post-operatively improve patient and functional outcomes in the management of complex paediatric trauma and limb reconstruction surgery?
3	4.50	Q43: In children aged 10 years or over with limb length discrepancy of the tibia and/or femur, are internal lengthening techniques (IM nails and/or plates) more clinically and cost-effective than external fixators methods (circular frame or rail)?
4	4.38	Q44: In children with congenital pseudarthrosis of the tibia, is adjunctive use of bone morphogenic proteins and/or bisphosphonate more clinically and cost-effective when compared with standard care (no adjunctive treatment)?
5	4.31	Q36: In children, younger than 10 years old, with limb lengthening discrepancy of the femur, are internal lengthening techniques (IM nails and/or plates) more clinically and cost-effective than external fixators methods (circular frame or rail)?
6	4.31	Q40: In children with limb length discrepancies, is early surgical equalisation more clinically and cost-effective than allowing children to reach skeletal maturity with untreated/residual limb length discrepancy prior to considering lengthening?
7	4.31	Q47: What is the best pain management regimen in the management of children undergoing limb reconstruction surgery?
8	4.19	Q41: In children with significant longitudinal deficiency, is reconstructive amputation and prosthetic fitting more clinically and cost-effective than management with no surgery and prosthetic fitting?
9	4.19	Q39: What are the effects on the articular cartilage and/or growth plate following limb lengthening surgery to the femur/tibia for congenital limb deficiency?
10	4.13	Q42: In the population of children with asymptomatic genu valgum, is treatment of deformity with 8-plate hemiepiphysiodesis more clinically and cost-effective than non-operative management?

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REFERENCES

1. Mehta N, Graham S, Lal N, et al. Fine wire vs locking plate fixation of type C pilon fractures. *Eur J Orthop Surg Traumatol* 2022;32(5): 875–882. DOI: [10.1007/s00590-021-03048-3](https://doi.org/10.1007/s00590-021-03048-3).
2. Hohmann E, Birkholtz F, Glatt V, et al. The 'Road to Union' protocol for the reconstruction of isolated complex high-energy tibial trauma. *Injury* 2017;48(6):1211–1216. DOI: [10.1016/j.injury.2017.03.018](https://doi.org/10.1016/j.injury.2017.03.018).
3. Chalmers I, Bracken MB, Djulbegovic B, et al. How to increase value and reduce waste when research priorities are set. *Lancet* 2014;383(9912):156–165. DOI: [10.1016/S0140-6736\(13\)62229-1](https://doi.org/10.1016/S0140-6736(13)62229-1).
4. Turner S, Ollerhead E, Cook A. Identifying research priorities for public health research to address health inequalities: Use of Delphi-like survey methods. *Health Res Policy Syst* 2017;15(1):87. DOI: [10.1186/s12961-017-0252-2](https://doi.org/10.1186/s12961-017-0252-2).
5. Tallon D, Chard J, Dieppe P. Relation between agendas of the research community and the research consumer. *Lancet* 2000;355(9220): 2037–2040. DOI: [10.1016/S0140-6736\(00\)02351-5](https://doi.org/10.1016/S0140-6736(00)02351-5).

6. Wright J, Timms A, Fugazzotto S, et al. Development of a patient-reported outcome measure in limb reconstruction: A pilot study assessing face validity. *Bone Jt Open* 2021;2(9):705–709. DOI: 10.1302/2633-1462.29.BJO-2021-0105.R1.
7. Perry D, Achten J, Knight R, et al. Immobilisation of torus fractures of the wrist in children (FORCE): A randomised controlled equivalence trial in the UK. *Lancet* 2022;400(10345):39–47. DOI: 10.1016/S0140-6736(22)01015-7.
8. Perry D, Costa M, Appelbe D, et al. Children's Radius Acute Fracture Fixation Trial (CRAFFT): A multicentre prospective randomised non-inferiority trial of surgical reduction vs non-surgical casting for displaced distal radius fractures in children. University of Oxford Study Protocol [online] V1.0 28 January 2020. Available at: <https://njladmin.nihr.ac.uk/document/download/2032483>. Accessed on: 24 June 2023.
9. Perry D, Achten J, Dutton S, et al. Surgery or Cast for injuries of the Epicondyle in Children's Elbows (SCIENCE): A multicentre prospective randomised superiority trial of operative fixation vs non-operative treatment for medial epicondyle fractures of the humerus. University of Oxford Study Protocol [online] V1.0 20 February 2019. Available at: <https://njl-admin.nihr.ac.uk/document/download/2028846>. Accessed on: 24 June 2023.
10. Churrua K, Pomare C, Ellis LA, et al. Patient-reported outcome measures (PROMs): A review of generic and condition-specific measures and a discussion of trends and issues. *Health Expect* 2021;24(4):1015–1024. DOI: 10.1111/hex.13254.
11. Leggett H, Scantlebury A, Sharma H, et al. Quality of life following a lower limb reconstructive procedure: A protocol for the development of a conceptual framework. *BMJ Open* 2020;10(12):e040378. DOI: 10.1136/bmjopen-2020-040378.
12. Hsu CC, Sandford BA. The Delphi technique: Making sense of consensus. *Pract Assess Res Evaluation* 2007;12(10):1–8. DOI: 10.7275/pdz9-th90.
13. Boddy K, Cowan K, Gibson A, et al. Does funded research reflect the priorities of people living with type 1 diabetes? A secondary analysis of research questions. *BMJ Open* 2017;7(9):e016540. DOI: 10.1136/bmjopen-2017-016540.
14. Crowe S, Fenton M, Hall M, et al. Patients', clinicians' and the research communities' priorities for treatment research: There is an important mismatch. *Res Involv Engagem* 2015;14(1):1. DOI: 10.1186/s40900-015-0014-7.