Submitted in partial fulfilment of the Lancaster University Doctorate in Clinical Psychology

March 2022

Doctoral Thesis

A Qualitative Exploration of Limb Loss

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Word Counts

	Main Text	Appendices (including tables, figures, and references)	Total
Thesis Abstract	300	-	300
Literature Review	7999	11099	19098
Research Paper	7999	10594	18593
Critical Appraisal	3867	765	4632
Ethics section	4102	7392	11494
Total	24267	29850	54117

Thesis Abstract

This thesis offers a qualitative exploration of the experience of living with limb loss and is comprised of a literature review, research paper and critical appraisal of the research process.

The literature review synthesised qualitative research exploring the experience of amputation and rehabilitation for members of the military. The results from 16 papers were synthesised using a meta-ethnographic approach and three themes were developed from the data: ‘Making the physical and psychological transition to life after amputation’, ‘The role of the military culture in rehabilitation’ and ‘The impact of relationships and the gaze of others during rehabilitation and beyond’. Findings highlighted the difficulties of transitioning to civilian life, the helpfulness of the military culture and identity during rehabilitation, and the importance of relationships and the perceived views of others. Clinical implications of these findings are discussed along with suggestions for further research.

The research paper explored the meaning and experience of sport participation and identity for people following limb loss. Nine participants were interviewed, and data analysed using interpretative phenomenological analysis. Four themes were developed from the data: ‘Enabling a feeling of normality and equality’, ‘Becoming a better person’, ‘Belonging and connection’, and ‘Experiencing and responding to the gaze of others’. The findings demonstrated the impact of taking part in sport on the sense of self and identity, and the personal benefits it brought. Findings are discussed in relation to existing literature and implications for clinical practice are highlighted.

Finally, the critical appraisal explored the strengths and limitations of the research paper, along with personal reflections on the process of carrying out the research. Salient points that presented along the course of the research, including the challenges of carrying out research amongst this population, language used, and the impact of the researcher during the process are also discussed.

Declaration

This thesis presents research undertaken between April 2021 and March 2022 as a requirement of the Doctorate in Clinical Psychology at Lancaster University. The work presented here is my own, except where due reference is made. This thesis has not been submitted for the award of any higher degree elsewhere.

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Date: 11/03/2022

Acknowledgements

Firstly, I would like to thank all the participants who took part for generously giving their time and sharing their stories with me. I would also like to thank my supervisor Dr Craig Murray for his support throughout the thesis process and helpful comments on drafts, and Dr Vicky Molyneaux for her time and clinical expertise.

Finally, thank you to my parents for looking after my dog, Homer, whilst I wrote this thesis.

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Section One: Literature Review

The experience of amputation and rehabilitation for military veterans: A systematic review and metasynthesis of qualitative research

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Prepared for submission to *Disability and Rehabilitation*

Abstract

Purpose: Research highlights the differences and unique experiences of military personnel experiencing amputation compared to civilians. This review aimed to synthesise qualitative research exploring the experience of amputation and rehabilitation among existing or previous members of the military.

Materials and methods: A systematic search of six databases for qualitative research was undertaken, resulting in 16 papers. A meta-synthesis was conducted using a meta-ethnographic approach to generate new interpretations reflecting the experiences of members of the military who have experienced limb loss.

Results: Three themes were developed from the data: (1) Making the physical and psychological transition to life after amputation; (2) The role of the military culture in rehabilitation; and (3) The impact of relationships and the gaze of others during rehabilitation and beyond.

Conclusions: Psychologists involved in the care of military personnel following amputation could offer targeted therapies to veterans experiencing problematic pain, psychological support during the transition to civilian life, and facilitate peer support programmes.

Implications for rehabilitation

- Target psychological therapies, such as Cognitive Behavioural Therapy and Acceptance and Commitment Therapy, to veterans who are experiencing problematic pain

- Offer psychological support prior to, and after, the transition to civilian life

- Encourage peer support programmes and provide support and training to mentors

Keywords: amputation, limb loss, military, qualitative

Introduction

The possible causes of amputation are varied, complex, and differ according to the socioeconomic climate of different global regions [1]. For example, in Western countries, limb loss typically occurs in the older population as the result of infections, peripheral arterial disease and diabetes [2]. This differs to amputation in developing countries where they tend to occur as a result of trauma such as landmines or combat [3]. Much of the existing research involving people who have undergone amputation has been conducted with general populations in the US and UK. In the UK, limb amputation has risen in recent years by 14% [4]. The majority of people with an amputation, approximately 80%, are over the age of 60, which is reported to be related to vascular causes [5].

Following limb amputation there is a period of adaptation to an altered body, and loss of a limb can lead to a number of additional losses such as physical health, self-esteem, independence, financial security and social relationships [6]. Loss of a limb also has an impact throughout the lifetime, bringing physical, mental health and social care challenges [7,8].

One subgroup of people with limb loss to receive increased attention in recent years are those who sustained an amputation during, or as a consequence of, military service [9]. This includes individuals who have lost a limb during combat, and those who have lost a limb during military exercise and road traffic accidents [10], as well as military veterans who undergo amputation after active service [11].

During the recent Iraq and Afghanistan conflicts, the numbers of amputations experienced by military personnel increased in frequency [12] with Improvised Explosive Devices (IEDs) or other explosives causing 81% of all injuries [13]. IED injuries can result in complex injuries, including amputation [7,14], and over half of veterans with major limb loss also have a traumatic brain injury [15]. These complex military injuries frequently result in higher levels of Post-Traumatic Stress Disorder (PTSD) and depression [7,16].

The number of US military personnel returning from Iraq and Afghanistan suffering from PTSD could be as high as 31% [17]. PTSD is associated with poor mental and physical health, a decrease in wellbeing, and a higher risk of suicide [18,19]. In the US, compared to civilians, male veterans are more than twice as likely to die by suicide [20], and veterans with PTSD have been found to be three times more likely to die by suicide than their civilian counterparts [21,22]. Despite these challenges, it has been found that veterans with an amputation are able to better adjust following their amputation if they are satisfied with their prosthesis [14], suggesting that the correct support is important.

Lower limb amputations are the most common type of amputation amongst veterans, with 29% of amputations acquired in combat being below knee, 27% being above knee, and between 21% and 30% experiencing amputation of multiple limbs [15]. Upper limb amputation occurs in 22% of military amputees [15]. Although some military members with an amputation return to duty, a high number are discharged from service [23], with research reporting that 89% of US military members with an amputation do not return to duty following amputation [24]. Individuals acquiring a physical injury during service may be immediately medically discharged, gradually experience a downgrading of their role leading to medical discharge, or may voluntarily leave service [25].

Following medical discharge, some veterans can experience poor psychosocial integration due to a variety of factors: the adjustment from being a person without a disability to a person with a disability [26], adjustment to career change [27], and mental health difficulties [28]. There is also a loss of personally important aspects of being in the military, such as camaraderie, belonging, and providing service [29]. In addition, recent research has found that the process of medical discharge itself, the way in which it was conducted, and follow up afterwards impacts on the challenges that veterans face [29].

Military members with a limb amputation differ from civilians with a limb amputation in numerous ways. Approximately 85% of veterans with a limb amputation are under the age of 35, and therefore much younger compared to civilians where over 81% are over the age of 44 [30]. The older age profile of the civilian limb loss community, coupled with co-morbidities related to their limb loss, means they are typically physically challenged with low exercise tolerance [31]. This is in contrast to military veterans with limb amputation who are younger, more physically able, with other challenges such as mental health difficulties due to trauma and PTSD [32].

These differences between veterans and civilians with limb loss may also result in different experiences post-amputation. Experiences of the military can have an impact on the behaviour of veterans, and influence how they respond to challenges in everyday, civilian life [33]. Therefore, it is important that health professionals working with this population have an understanding of the culture and experiences that come with being a member of the military to provide adequate care [34]. Hynes [29] points out that the culture of 'self-sufficiency' which is ingrained in members of the military further highlights the challenges in accessing support following medical discharge and adapting to civilian life. Military culture is described as authoritative, masculine, physically demanding, disciplined and tough [35,36], and members are expected to not accept defeat, be selfless and display self-discipline and toughness [37].

Literature in the field of military members with a limb amputation is limited, and the need for research in this area to help understand how to support these individuals either in civilian life or in the military has been highlighted [32]. In the West, government policy has also paid attention to the health and social care needs that limb loss veterans may have when compared to civilians. For example, in the UK, Murrison [32] made recommendations to support those who have undergone amputation during military service in the transition to civilian healthcare, and to improve their experience of care. Similarly, in the US, the Department of Veterans Affairs created the Amputation System of Care (ASoC) which aims to enhance the quality and consistency of care following amputation amongst military veterans [38].

To summarise, current research highlights the differences and unique experiences of military personnel experiencing amputation compared to civilians. Qualitative research, with its commitment to obtaining first-person accounts, is well suited to accessing and elaborating the meanings and experiences of lived phenomena and there is a growing body of such work in relation to limb loss for veterans. Qualitative approaches to researching limb loss have been argued to be well-suited to identifying the meanings of limb loss from the vantage point of those concerned [39]. A systematic review of qualitative research in this area would allow for an integrated account of research on the lived experience of amputation and rehabilitation amongst veterans, in turn assisting health and social care professionals in understanding military veterans' unique experiences and better improve the delivery of services [40]. One approach to this form of systematic review is that of qualitative metasynthesis [41,42], in which the findings of qualitative research are synthesised in an explanatory account of particular research concerns. Metasyntheses provide in-depth understanding of a phenomenon and so are useful in informing health care policy and practice [43-45]. In achieving this, the metasynthesis seeks to go beyond a descriptive summary of the original studies to produce novel insights.

To date, there is no published qualitative metasynthesis which has brought together the qualitative research findings in this area. Consequently, the present review aims to synthesise qualitative research exploring the experience of amputation and rehabilitation among existing or previous members of the military, with the research question: ‘What are the experiences of amputation and rehabilitation for military veterans?’.

Method

Where appropriate, methods comply with the PRISMA checklist for reporting systematic reviews [46].

Search strategy

To identify qualitative empirical studies on the experience of amputation and rehabilitation for military veterans the following procedures were adopted. Six databases covering literature in psychology, medicine and nursing were systematically searched to identify eligible articles: PsycINFO, AMED, MEDLINE, CINAHL, Web of Science and Scopus. Title and abstract searches were completed according to pre-defined search terms involving three areas: sample/population (veterans), phenomenon of interest (amputation), and study design (qualitative). Search strategy was reviewed by a specialist university librarian. Additional searches were conducted by searching for articles citing selected papers and searching the reference lists of selected papers. Searches were completed in September 2021, and January 2022 to identify any additional papers. Details of the search strategy and terms can be found in table 1.

Inclusion and exclusion criteria

Inclusion criteria for papers to be selected were: (1) the sample included adults who underwent a limb amputation during military service; (2) used a recognised qualitative research methodology for data collection and analysis; (3) results documented key themes; (4) published in a peer reviewed journal; and (5) written in English. Exclusion criteria were: (1) sample included other disabilities and results did not separate out the experiences of those who had experienced limb loss; (2) findings were not evidenced with data excerpts; and (3) included participants who experienced amputation after leaving military service and results did not separate this from participants who experienced amputation during military service. No date restrictions were applied.

Search results

Following the searches, and prior to the application of inclusion and exclusion criteria, 403 papers were exported into a reference manager (Endnote version x9). Duplicates (205) and non-English papers (three) were removed. The remaining 195 papers were assessed for relevance based on the title and abstract, resulting in excluding 168 papers. The remaining 27 papers were accessed in full. From these 27 papers, 12 were excluded as they either did not meet in the inclusion criteria or met the exclusion criteria. Reference sections of papers were assessed for additional papers, and the final set of papers were citation searched for any additional papers. This resulted in the identification of one additional paper, bringing the total number included in the review to 16. See figure 1 for full details of this search process.

Characteristics of selected papers

The selected papers were published between 2009 and 2021. Participants were from the USA (n=9), the UK (n=5), Denmark (n=1), and Ukraine (n=1). Sample sizes ranged from two to 33, and participants had undergone amputation whilst serving in the military. Eleven papers used interviews for data collection, four used an ethnographic methodology comprising interviews and observation, and one used written accounts. Further details of the selected papers, including nature of amputation, data collection and analysis are summarised in Table 2.

Critical appraisal of selected papers

The Critical Appraisal Skills Programme qualitative checklist (CASP) [47] was used as a tool to assess the quality, strengths, and weaknesses of selected papers. The CASP consists of 10 questions split into three sections which look to assess the validity and appropriateness of the methodology, design, recruitment, data collection, the relationship between researcher and participant, ethical considerations, analysis, results, and implications of the research. Following Duggleby et al [48] these items were assessed using a three-point scale, with three points being scored for strong evidence, two for moderate evidence and one for weak evidence. Most papers were assessed independently by the lead researcher, and a selection of papers were evaluated by a second rater to assess agreement of scores. Disagreements were discussed, leading to some alterations to the scoring. The scores for selected papers ranged from 9 to 21, showing variation in quality. CASP scores were not used to include or exclude papers for review, however the resulting themes were representative of a range of papers with differing CASP scores. Details of the CASP scores for the papers included in this review are displayed in table 3.

Data extraction and analysis

Firstly, the selected papers were read several times to become familiar with the data and key findings and to ensure that all relevant data were identified. Relevant second order constructs (the authors' interpretations of the participant data), were extracted, along with first order constructs (any supporting data excerpts from participants). A meta-synthesis of the papers was conducted using a meta-ethnographic approach described by Noblit and Hare [41] to address the aims of the research. This approach aims to generate new interpretations from various papers which focus on a similar topic using comparable methodologies [49]. Third order constructs were produced by synthesising the first and second order constructs across the set of reviewed papers to identify commonalties and variations and produce novel insights (see appendix 1-B for an example of the data extraction process). Finally, three final themes were identified to reflect the experiences of members of the military who have experienced limb loss.

It is important to note that the nature of the meta-ethnographic approach requires the author to make interpretations to generate themes across the papers, and the author will have an influence on this process [50]. To mitigate the potential for the primary researcher to introduce bias in this process, regular input was obtained from a member of the research team who questioned and audited the process of analysis [51], and an audit trail of analysis and interpretation is provided for transparency (appendix 1-C).

Results

The analysis generated three overarching themes: (1) Making the physical and psychological transition to life after amputation, (2) The role of the military culture in rehabilitation, and (3) The impact of relationships and the gaze of others during rehabilitation and beyond. Themes are discussed in detail below and quotes are provided to illustrate key points. Quotes were selected due to their appropriateness and care was taken to ensure that a range of papers were represented. The contribution that each paper made to the themes are provided in table 4.

Theme One: Making the physical and psychological transition to life after amputation

This theme encompasses how military personnel transition to life after amputation, and how this can be impacted by various factors. It is represented by all papers and comprised of two subthemes.

Adapting to life after limb loss

For a number of participants, limb loss resulted in withdrawing from military service. For some this was difficult as the military was seen as a big part of their life with no alternative ever considered: “I hadn’t really give a lot of thought to well what will I do if I leave the army? What will I do if I got injured? You didn’t think about that necessarily” [52,p.3318]. The loss of military life led to feelings of being in limbo and that life had been taken away:

> I just feel stuck, like I have no future or past. A lot of patients celebrate their alive day, you know the day they were hurt, to celebrate that they weren’t killed. But to me it’s like the worst kind of birthday because I feel a little like I was killed. No, not killed, I feel like on that day in October 2006 my life was taken away, everything in my life except for being alive. I’m like a baby again only I’m not sure that I’m going to grow up. [53,p.163]

For others, leaving the military was seen as a new opportunity, leading them to contemplate their future and place in the world, allowing them to explore different interests and careers: ‘‘If I have to sit at a desk, I may as well make a lot of money doing it.’’ [53,p.164]. However, for some, thoughts and plans for the future were in opposition to the goals of rehabilitation staff who focussed more on physical functioning than exploring alternative careers and interests: “I want to decide about law school or try to find a career job.

And, compared to the rest of my life, I got to tell you man, running [is] just not high on my list of priorities" [54,p.294].

Despite leaving the military, some still felt a strong link to the military and a sense of pride and comfort in sacrificing their limb for their country. This was reflected in Cater's paper [55], where military women compared themselves to civilian women with limb loss and spoke of the difference in camouflaging their prosthesis: "A lot of the women that I know who are military amputees, and the guys too, would be offended if you suggested that you hide [it]." [p.1450] and described finding meaning from their limb loss as it had "almost become a badge of honor". When this sense of pride was expressed by civilians, military personnel felt better cared for which impacted on their adjustment:

> She [a lady who worked at the amputee clinic] asked me if I was a veteran and I said, 'Yes, I am.' And she says, 'Well we cannot have our Veterans walking around like that.' And from that day on, it got better … it was just like I was born again, and that's the truth [56,p.603].

Adapting to life away from the military to civilian life, meant navigating new systems and it was felt there was a lack of guidance and information on this: "No one tells you about benefits and what you can get…but it would help you know. Because I didn't know about disability living allowance until six months after I could have claimed it." [57,p.5]. Some felt that help was available whilst in the military but wasn't available once they had left and described the contrast between help whilst in the military and after they had left: "While you're still in the military it's available, once you leave the military [switch noise] no Headley Court. Nothing" [52,p.3319].

Mental health difficulties impede the ability to move on

Through synthesis of the papers, it was found that mental health difficulties affected the ability to accept and move on following amputation. Post-traumatic stress was reported to be triggered by pain and could result in vivid memories of trauma. Here, pain is personified as a malevolent presence that cruelly reminds the participant of the ‘horror’ experienced:

> This pain is like an intruder for me. I feel it not only in my knee and in my right toes, but I also spontaneously returned to that tragic morning […]. On the one hand, the phantom pain reminds me that I can control my tank again, and, on the other hand, it brings back all the horror I have experienced. Phantom pain prevents me from forgetting it all [58,p.638].

The reminders are unrelenting. With the persistence of pain, the memories stay present and there is a constant reminder of the loss of limb: “I’m constantly in pain. It hurts to walk, even with prosthesis. It never lets you forget” [59,p.2859].

For some it was difficult to disentangle what could be a result of post-traumatic stress or simply part of military training and identity. For example, Messinger [60] described hypervigilance of environment and how some soldiers felt this was a result of army training and not their injuries from a bomb blast: “I’ve always been that way, you know, situationally aware. But being in the Army just makes it more…intense or more a part of how I am.” [p.200].

Lack of social contact due to reduced mobility could also affect mental health. One participant spoke of how spending time alone resulted in rumination and negative emotions: “I am bored being stuck at home and it allows me to ponder and think long and hard about this and it does make me angry and it does get me upset.” [57,p.8].

There was a lack of support reported for help with mental health difficulties: “there was no psychologists, no psychiatrists, nobody I could talk to in confidence. My mind wasn’t functioning correctly” [59,p.2858], and there was a reluctance to accept support that was available. For example, Messinger [61] described Ronald who felt that seeking help could have a negative impact on his military career. For some, avoiding seeking help led to further mental health problems:

> I guess the way I dealt with PTSD for so many years was to put it in the back of my mind…I had no one to talk to. I had no one to relate to. I was so alone that I contemplated suicide most of the time [59,p.2858].

The lack of mental health support was linked to military attitudes of stoicism in a paper involving older veterans, which led to unhelpful coping strategies such as alcohol: “The military coping at the time was don’t be a cry-baby, just go out, get [drunk] and get over with it…get over it, soldier on” [57,p.12].

Overall, this theme identifies the emotional difficulties in transitioning to life following limb loss, and how this can be impacted by discharge from the military and living within civilian systems.

Theme Two: The role of the military culture in rehabilitation

This theme encompasses the military culture and mind-set and how they impact on individuals’ experience of amputation, rehabilitation and sense of self. This theme is represented by all but three papers [59,62,63] and is comprised of two subthemes.

The military mind-set and culture

The military mind-set was reported to be useful during rehabilitation as it pushed military personnel, helped them to achieve physical goals and was helpful when experiencing setbacks. The military instilled the importance of physical fitness and putting in significant effort, and these attitudes were carried through post limb loss and through rehabilitation:

> The army set you in the mind set, don't they, of 'be the best' basically isn't it. You always try to be at the top of your fitness, you always do every challenge set in front of you and all that lot. Obviously when you're first wounded it's not going to happen but, also, that mentality helps you to recover as well [64,p.67].

This mind-set of pushing themselves tied in with the identity of being a soldier and was thought to be a permanent part of veterans. This continuation of the instilled desire to push themselves was described as helpful:

> So I think, you know, going back to being a wounded soldier, we like to push our boundaries. Even when we were fully abled, fighting fit we pushed our boundaries then and all we've done now is carry it on to help us [64,p.67].

The physical aspect of military culture was often valued during rehabilitation. Physical challenge, routine and the culture of exercise was something the veterans were used to. As exercise could provide structure to the day, which military personnel were accustomed to, it was a valued activity and therefore this structure helped encourage sports participation during rehabilitation [56]. Not all veterans experienced this sense of structure during their rehabilitation phases. Where this was the case they often "missed a sense of order, structure and regimes during my rehabilitation – basically, the military mind-set." [65,p.2557].

Some felt the rehabilitation environment had echoes of the military environment, especially being around other military personnel, which gave familiarity. Being around other veterans also provided friendly competition and encouragement which spurred them on during rehabilitation:

> It felt good to be back in that kind of environment. Even if [we] don’t make a big deal of competing, [the patients] keep an eye out on what others are doing or can do… Seeing how others were doing was a huge motivator [66,p.91].

Independence was a major aspect of the military culture. For some it was important to not be seen as reliant on others and to be seen as capable: “I don't ask anyone for help really. I've been a bit too independent really for that kind of thing [support]. I've always tried doing it for myself, yeah … I've always just got on myself and done it” [67,p.28]. The desire for independence clashed with views on the level of autonomy given to some over their healthcare, where some people reported a preference of being told what to do during rehabilitation. This may reflect the military culture of receiving orders from a higher rank: “The physiotherapist should know what is best for me and say: ‘do ten of these because this would benefit you’” [65,p.2557]. As the military mind-set favoured independence it could have prevented people asking for help, leading to a continuation of suffering: “I am so independent, it is difficult to actually go to them and actually say (umm) I need help” [52,p.3320]. However, it was not always possible to maintain independence and veterans often had to rely on others which contrasted with the military mind-set instilled in them:

> When I was first in the hospital I felt like I was helpless and that I’d always be helpless, forever. This feels just like that, you know, I was walking with canes, planning to get a new [adaptive] car and now I’m back in the hospital with my wife wiping my ass [53,p.160].

Sense of self

For some the military was a core part of their identity and this is something that had stayed with them since leaving the military: “I was a Marine and I still think like one. And they took two words out of my vocabulary: I can't.” [56,p.604] and will persist: “At the end of the day we still are soldiers and no one can take that away. And we will take that to our grave” [64,p.67]. However, for others there was a desire to disconnect their future self from the military. Messinger [54] described a veteran who, although appreciated that the military was an important facet of his life, did not want it to encompass his life and future: “I want my service to be part of my life, I don’t want it define my life.” [p.295].

Rehabilitation was described as a time where an identity crisis took place, being unable to identify who they were now: “discussion with myself about asking …is that a different me or is that the same me? Is that a different person than who I am now?” [53,p.160]. During this identity crisis they were able to learn about themselves, change, and develop, thus forming an altered identity and sense of self: “I feel like I’ve found out that my mind is as moldable as my body was.” [54,p.297].

There were also identity struggles in relating to that of the disabled identity whereby it was felt that identifying as disabled was undesirable: “I don’t want to declare myself as a technically (umm) a severely disabled person. Because in your head you don’t want to be that person, in your head you want to be normal” [52,p.3318]. In addition, there were also difficulties in finding their place in society, with a feeling of vast difference between veterans and civilians with limb loss:

> I found it difficult to relate to the others [non-veteran amputees] as they were at least 60 [years old], had diabetes, their arms were crossed, and they felt sorry for

> themselves… and you felt - come on!… It felt like we were from two different worlds with different ambitions for rehabilitation and for our subsequent lives. [65,p.2556]

Overall, this theme identifies how the military mind-set and culture impacts on rehabilitation and life after limb loss and discusses the complex relationship veterans have with the military following discharge.

Theme Three: The impact of relationships and the gaze of others during rehabilitation and beyond

This theme concerns how relationships with peers, staff and family can affect experiences of rehabilitation and beyond. It is comprised of two subthemes and represented by all but four papers [57,59-61].

Relationships with others

Being around injured peers who were also undergoing rehabilitation for limb loss was found to be useful. Veterans who were further along in their journey provided others with someone to model from and a future reference point of where they could get to. This provided a sense of optimism, hope and inspiration: “I could see him [an amputee] ambulating…and I didn't notice a limp with him. And I said to myself, ‘That's where I want to be doing. That's where I'm going to be.’” [56,p.603]. Peers also provided encouragement to one another and a sense of camaraderie. They could learn from each other, and those who were further along in their recovery would pass on knowledge and support to the newly injured: “As I got stronger and I could walk on my leg I’d go up to [Walter Reed Army Medical Center inpatient ward] 57 and talk to new guys and try to cheer them up or give them some idea of what to expect” [66,p.90]. They would tease each other as a way of encouragement, and this was in keeping with the military culture they were accustomed to: “if someone was just kind of leaning on the machine or not doing much we’d talk shit to them. It wasn’t planned; it’s just that guys would always rag on guys who were being lazy. I worked hard to avoid [having] that [directed at me].” [66,p.91].

The sense of togetherness and teasing also had mental health benefits in preventing rumination: “so, you have banter and take your mind off it if you are worrying about it quite a lot” [64,p.67]. Commonality and feelings of togetherness were important, and some felt their rehabilitation would have been different if they had not been around other military personnel:

> I imagine the road to recovery would have felt very lonely if I’d not been with other military guys. Say I’d been in the NHS and the prosthetic care I received was with other people [patients] with injuries like mine but they weren’t military I wouldn’t be able to relate to them even if they were suffering the same thing [64,p.67]

Support was not only gained from peers, but also from rehabilitation staff. Staff offered encouragement and were important in helping personnel reach their full potential: “She didn't take any excuse from any of us as to why we couldn't push ourselves that day to perform what she expected to be done in our rehabilitation” [56,p.602]. Staff also provided an opportunity to step away from the expectations of ‘toughness’ and unemotional communication associated with a military identity, showing their more vulnerable side and gaining comfort that might otherwise be unobtainable from peers: “It’s hard to stop being the bad-ass Marine, so it’s nice to have someone that you can talk to quietly who isn’t going to call you a [wimp].” [66,p.89]

Family and close relationships were also impacted by limb loss as partners were often required to take on the role of carer. This could put a strain on relationships and instil a feeling of dependence: “After I got hit I couldn’t believe what she had to do for me, things I have no memory of my mom doing for me. We had terrible fights; I was terrified about whether she’d want to be with me after seeing me like this” [53,p.161]. Limb loss and difficulties with mobility affected the ability to take part in activities with family and fulfil family roles. Being provided with appropriate prosthetics could have a positive effect on this and allow expectations to be met such as being a father: “added benefit that I can play outdoors and swim with my children” [63,p.8]. Allowing family members to be a part of rehabilitation and join in with exercise could help strengthen relationships: “as I’ve been getting into mountain biking a lot more, we’ve gone out, got pretty much everybody in the family a bike. So we’ll go on family bike rides now” [62,p.63].

The perceived views of others

For some military personnel, it was important to be seen as capable and to show others they were coping well and succeeding, this meant not appearing disabled:

> I was determined that I was going to you know walk as normally. And in fact, most people up until quite recently, don't realise that I wear a prosthesis. And that's what I wanted. I wanted to be you know, accepted as normal [67,p.28].

Employment was described as a useful avenue in proving to others that they were just as capable as people without a disability: “You've got to prove to yourself that you can do a job and just as important prove to others” [67,p.28], and for some it was important to go above and beyond, and accomplish more than people without a disability in an effort to prove their abilities: “I want to prove, I am proving, that I can do more on one leg than most people can do with both.” [53,p.164]. To be seen as someone who is coping well, one participant spoke of taking part in a marathon where one of the main motivators was proving themselves to others: “And I did it because I wanted to anyway, to prove to myself like you've got to get on, but it was also I did it for my family to see I'm ok” [67,p.30]

Growing accustomed to reactions to their body in public was something veterans had to adapt to and accept; for example, a female who lost her leg during service felt she had to “adapt to everyday life, going out in public and dealing with the reactions of people on the street.” [55,p.1451]. These perceived negative views of others prevented accessing benefits they were entitled to and prevented disclosing their disability:

> I don’t want to be seen as a charity. I want to know that I can go out there, earn the money in my own right … That’s why I won’t apply for all the disability benefits because I don’t want them…I don’t want … for the country to label me as a scrounger and as a dole-dosser … I want a job [52,p.3318].

The desire to appear ‘normal’ often outweighed their own comfort and some would seek to appear ‘normal’ even if it was an inconvenience to them. A participant described by Messinger [54] spoke of not hanging a bag off the crook of the elbow of their amputated arm whilst in public: “it’s not a normal thing, it’s not an everyday thing to have a stump. But, then it’s one thing to have it, it’s another thing to throw it in people’s face in a way that you don’t really need to” [p.292].

There was a difference in how participants felt about the views of others. Some felt the identity of a disabled veteran was undesirable: “it’s not that I’m not thankful about how nice they were, or that they appreciate me for what I did, but I want to be a regular person and not always a disabled vet” [54,p.295]. However, being seen as an injured veteran could sometimes offer benefits and some were proud of the attention they received: “I am really proud of how I lost my leg, and I am proud I wore the uniform” [55,p.1450]. Here there is a contrast between being viewed as a disabled veteran and being viewed simply as a veteran, suggesting there is a difference between them, and perhaps more internalised stigma held amongst some veterans.

Overall, this theme identifies the importance of others following limb loss. Relationships can be helpful during rehabilitation; however some relationships can become strained. Internalised identity and stigma can have an impact on how veterans feel others view them.

Discussion

This review has synthesised qualitative findings from 16 papers focusing on military veterans who have experienced limb loss and illustrates key aspects in their life during and after rehabilitation. This process generated three key themes: ‘making the physical and psychological transition to life after amputation’, ‘the role of the military culture in rehabilitation’, and ‘the impact of relationships and the gaze of others during rehabilitation and beyond’. As this is the first meta-synthesis of its kind to bring together qualitative findings focusing on military veterans’ experiences of limb loss, this review provides novel insights which can be used to inform policy and practice.

The first theme focused on how military personnel transition to life following limb loss and the impact on this by various factors. The difficulties transitioning to civilian life were highlighted, which were compounded by a lack of guidance in navigating systems such as disability allowance and public healthcare systems. The current review also highlighted the difficulties in accepting limb loss and considering new roles and careers, this was represented well by a participant in Messinger’s paper [53] who stated they felt ‘stuck’ and had ‘no future or past’ [p.163]. Herman and Yarwood [68] note that while many veterans assimilate into civilian life, some became “stuck in a liminal space between civilian and military lives that perpetuated feelings of isolation" [p.41]. The Model of Transition in Veterans (MoTiVe) [69] offers a framework to explore the enduring attachment to the military amongst veterans. It is underpinned by Bourdieusian theory which explores the relationship between habitus (accepted behaviours within a cultural or social setting), field (the civilian and military environments with their own set of rules and levels of authority), and capital (the knowledge and acceptance of institutionalised behaviours) and how these can enhance or inhibit behaviour. It can be used to understand difficulties in assimilation to civilian life and renegotiation of identity by looking at socio-economic trajectories, life stories, and differences between military and civilian environments. The framework helps to understand the findings of the review, particularly the feeling of being in limbo after leaving the military, as the habitus, field and capital differ between civilian and military environments.

Physical and mental health was found to impact on the ability to move forwards following limb loss, and the role of pain and post-traumatic stress was highlighted. The current review found that experiencing pain, such as phantom limb pain or pain in the residual limb, triggered difficult memories. This builds on an existing review by Stevelink [70] which found mental health disorders have been frequently identified amongst ex-military personnel with a physical impairment, with up to 59% experiencing PTSD. A recent systematic review and meta-analysis focused on PTSD and pain in veterans found that veterans with PTSD and pain experienced high levels of pain, disability and depression and were also found to have a higher level of catastrophising beliefs, sleep disturbance and healthcare utilisation, and had lower pain self-efficacy and level of function compared to veterans without PTSD [71]. The current review adds an understanding of the meaning-making regarding these pain experiences and how they act to remind veterans of their lost lives and abilities, the traumatic circumstances in which they lost a limb, and the absence of the limb itself.

Findings from theme two highlight how the military culture can be helpful in pushing military personnel to achieve their goals during rehabilitation and can provide camaraderie and familiarity. This is supported by the social identity model of identity change (SIMIC) [72] which states that social groups provide security and a sense of identity to assist in coping with life transitions. Limb loss was found to impact on sense of self, and the review highlighted differences between veterans in the acceptance of the various identities, including the military or disabled identity, following limb loss. This has similarities with existing literature regarding limb loss for civilians, which describes individuals feeling as though they have become a different person following amputation [73] and go through a process of renegotiation or resistance in transitioning to a new disabled identity [74]. However, the particular identity and values forged through the military culture can result in distinct difficulties. For example, veterans' experiences, understandings of, and attitudes towards a disabled identity often contrast with their military identity of being strong and capable, leading to what one participant described as an 'identity crisis'. A term adopted by the US Army and used in various initiatives is the term 'warrior' [75]. The term 'wounded warrior' is used to describe injured military personnel and Messinger [60] documents the use of the term in a rehabilitation unit: "Wounded warriors dine in the Warrior Cafe… and they are assigned to Warrior Transition Units or to Warrior Transition Brigades" [p.197]. Although some participants in the current review were happy to receive attention from the public, others were keen to distance themselves from the military and the identity of an injured veteran, demonstrating a complex relationship with themselves, the military, and perceived public perception. This builds on existing research which suggests that stereotypical tropes such as 'wounded warrior' or 'war hero' can be damaging and unhelpful [76].

Finally, the third theme highlighted the importance of relationships with others and the impact of the perceived view of others. This links with the previous theme of the military culture, as support from peers was found to be helpful during rehabilitation, and many felt it was important to show to others that they were capable and strong. This theme also demonstrates the usefulness of relationships with people who are separate to the military identity, such as rehabilitation staff, allowing a vulnerable and emotional side to be accessed which would otherwise be difficult around peers. The desire to be seen as ‘normal’ was mentioned by various participants. Being able to pass as a person without a disability, or accomplish more than the average person, was important for some in feeling accepted. Some participants spoke of taking part in sport, such as a marathon, swimming or cycling, and one spoke of taking part so their family would see he was adapting well. This corresponds with literature in the field of sport and disability where sport has been found to enable people to show others they are able to achieve the same as people without a disability [77].

Clinical Implications

The findings of the review have several important clinical implications to assist military veterans adjusting to life following limb loss. The review suggests that pain can trigger PTSD symptoms and flashbacks, preventing moving on from trauma, and is supported by existing research. This finding suggests that targeted interventions delivered to those with problematic phantom or residual pain following amputation may be beneficial.

An important finding was the meaning that veterans ascribed to their pain, for example the reminder of lost abilities. An approach which focuses on changing these meanings and the relationship with pain could be beneficial, such as cognitive behavioural therapy (CBT) [78] or acceptance and commitment therapy (ACT) [79]. Pain management programmes are frequently underpinned by CBT principles and there is evidence which demonstrates its efficacy [80]. Existing research points out that veterans with PTSD and pain are likely to have catastrophising beliefs and low self-efficacy [71], so this could also be an important area to target CBT intervention. Alternatively, ACT may be useful as it helps people to identify and live according to their values, despite the presence of pain, and has been found to be as effective as CBT in managing chronic pain [81,82]. For individuals who experience traumatic memories when they experience pain, eye movement desensitisation and reprocessing (EMDR) [83], which was developed to treat psychological trauma, may be helpful and there is evidence that it is effective in reducing pain, depression and PTSD symptoms [84]. An integrated treatment approach for pain and PTSD may be beneficial, and research demonstrates the feasibility and clinical benefit of this amongst veterans [85].

The review also highlights the importance of not just providing physical rehabilitation following limb loss amongst the military population, but rehabilitation to civilian life. This transition to civilian life could be challenging if the military mind-set and values do not fit in with civilian life. Clinical psychologists could be helpful during rehabilitation and the transition to civilian life and could provide support to veterans in exploring their new identity and helping them continue to live according to their values in a way in which fits in with civilian life to ameliorate the feeling of not belonging. Therefore, access to psychological support should be available after leaving the rehabilitation centre to help with the transition.

The role of other veterans during rehabilitation was found to be beneficial. This was provided in an informal way, for example seeing others on the rehabilitation unit and teasing and encouraging others. Social comparison theory proposed by Festinger [86] highlights the process of comparing the self to others who may be better or worse off, known as upwards and downward social comparison. Upward comparisons can help provide a source of inspiration and useful information for self-improvement [87], and there is evidence amongst cardiac patients that upwards social comparison is associated with hopefulness and inspiration [88]. It may be beneficial to provide peer support in a more formal way if not already in place, such as being assigned a mentor or buddy, or in a group format like the VETPALS project [89]. The VETPALS project is a group-based self-management treatment intervention aimed at veterans with amputation. It aims to address self-management skills, managing emotions, communication and social support, health and activity, and maintaining goals and gains, and has been found to significantly improve psychosocial functioning and quality of life [89]. Peer support can improve outcomes for individuals following amputation [90] and can provide a sense of belonging, hope and resilience [91]. Clinical psychologists could be involved in setting up group-based interventions or provide support and training to mentors [91].

Limitations and future research

While the present review provides a comprehensive synthesis of the available research evidence concerning veterans and limb loss, it remains reliant on what research has been conducted. The experiences of female veterans (few papers included women’s views) and older veterans (most samples were comprised of middle-aged men) were largely absent. These remain important areas for future research to aid a better understanding of the experiences of female veterans and how to support an aging veteran population.

It is also noteworthy that the included papers were all conducted in Western countries, mostly the UK and US, biasing the findings to Western cultures, and the military and healthcare systems within them. Future research exploring the experiences of limb loss amongst non-Western military veterans would help in making recommendations for health and social care needs for populations from different social, cultural and geographical regions.

In addition, it was unclear whether the 16 papers in the review were representative of 16 studies. There may have been some overlap where participants were featured in multiple papers, for example it was noted that some quotes were used in multiple papers.

Conclusions

This meta-synthesis is the first to synthesise qualitative findings exploring the experiences of amputation and rehabilitation amongst military veterans. It synthesised 16 papers from four countries and highlighted three themes, which described post amputation life for members of the military who experienced limb loss. Results add to current understanding by emphasising the difficulties transitioning to civilian life and highlights the role of pain in post-traumatic stress, and the useful role of peers and the military culture during rehabilitation. The findings suggest several clinical implications for rehabilitation services including psychological support during the transition to civilian life, the use of peer support, and targeted treatment for those experiencing problematic pain.

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Table 1. Search terms applied to each database

PsychINFO	
Search terms combined with AND	
Amputation	(DE "Amputation" OR DE "Prostheses") OR TI ((Amput* OR ((Limb* OR leg* OR arm* OR foot OR feet OR hand*) N3 (loss OR artificial)) OR limb-loss or prosthe*)) OR AB ((Amput* OR ((Limb* OR leg* OR arm* OR foot OR feet OR hand*) N3 (loss OR artificial)) OR limb-loss or prosthe*))
Military	(DE "Military Personnel" OR DE "Air Force Personnel" OR DE "Army Personnel" OR DE "Enlisted Military Personnel" OR DE "Navy Personnel" OR DE "Volunteer Military Personnel") OR TI (("armed force*" OR veteran* OR military OR “ex-service" OR “service member*” OR army OR soldier* OR navy OR naval OR airforce OR air-force (military N5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR “national guard” OR “air force” OR RAF OR troop*)) OR AB (("armed force*" OR veteran* OR military OR “ex-service" OR “service member*” OR army OR soldier* OR navy OR naval OR airforce OR air-force (military N5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR “national guard” OR “air force” OR RAF OR troop*))
Qualitative	(DE "Qualitative Methods" OR DE "Focus Group" OR DE "Grounded Theory" OR DE "Interpretative Phenomenological Analysis" OR DE "Narrative Analysis" OR DE "Semi-Structured Interview" OR DE "Thematic Analysis") OR TI ((Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) N3 (of OR personal OR lived)))) OR AB ((Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) N3 (of OR personal OR lived))))

AMED

Search terms combined with AND	
Amputation	((ZU "amputation") or (ZU "amputees")) OR TI ((Amput* OR ((Limb* OR leg* OR arm* OR foot OR feet OR hand*) N3 (loss OR artificial)) OR limb-loss or prosthe*)) OR AB ((Amput* OR ((Limb* OR leg* OR arm* OR foot OR feet OR hand*) N3 (loss OR artificial)) OR limb-loss or prosthe*))
Military	(ZU "military personnel") OR TI (("armed force*" OR veteran* OR military OR “ex-service" OR “service member*” OR army OR soldier* OR navy OR naval OR airforce OR air-force (military N5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR “national guard” OR “air force” OR RAF OR troop*)) OR AB (("armed force*" OR veteran* OR military OR “ex-service" OR “service member*” OR army OR soldier* OR navy OR naval OR airforce OR air-force (military N5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR “national guard” OR “air force” OR RAF OR troop*))
Qualitative	(ZU "qualitative research") OR TI (TI (Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) N3 (of OR personal OR lived)))) OR AB (TI (Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) N3 (of OR personal OR lived))))

Medline

Search terms combined with AND	
Amputation	(MH "Amputees") OR TI (Amput* OR ((Limb* OR leg* OR arm* OR foot OR feet OR hand*) N3 (loss OR

	artificial)) OR limb-loss or prosthe*) OR AB (Amput* OR ((Limb* OR leg* OR arm* OR foot OR feet OR hand*) N3 (loss OR artificial)) OR limb-loss or prosthe*)
Military	((MH "Military Personnel") OR (MH "Warfare and Armed Conflicts") OR (MH "Iraq War, 2003-2011") OR (MH "Afghan Campaign 2001-") OR (MH "Vietnam Conflict")) OR TI ("armed force*" OR veteran* OR military OR “ex-service" OR “service member*” OR army OR soldier* OR navy OR naval OR airforce OR air-force (military N5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR “national guard” OR “air force” OR RAF OR troop*) OR AB ("armed force*" OR veteran* OR military OR “ex-service" OR “service member*” OR army OR soldier* OR navy OR naval OR airforce OR air-force (military N5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR “national guard” OR “air force” OR RAF OR troop*))
Qualitative	(MH "Qualitative Research+") OR TI (Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) N3 (of OR personal OR lived))) OR AB (Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) N3 (of OR personal OR lived)))

CINAHL

Search terms combined with AND	
Amputation	(MH "Amputation+") OR TI ((Amput* OR ((Limb* OR leg* OR arm* OR foot OR feet OR hand*) N3 (loss OR artificial)) OR limb-loss or prosthe*)) OR AB ((Amput* OR ((Limb* OR leg* OR arm* OR foot OR feet OR hand*) N3 (loss OR artificial)) OR limb-loss or prosthe*))

Military	((MH "Military Personnel+") OR (MH "Military Services+")) OR TI (("armed force*" OR veteran* OR military OR “ex-service" OR “service member*” OR army OR soldier* OR navy OR naval OR airforce OR air-force (military N5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR “national guard” OR “air force” OR RAF OR troop*)) OR AB (("armed force*" OR veteran* OR military OR “ex-service" OR “service member*” OR army OR soldier* OR navy OR naval OR airforce OR air-force (military N5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR “national guard” OR “air force” OR RAF OR troop*))
Qualitative	(MH "Qualitative Studies+") OR TI ((Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) N3 (of OR personal OR lived)))) OR AB ((Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) N3 (of OR personal OR lived)))

Web of Science

Search terms combined with AND	
Amputation	TI = ((Amput* "OR" ((Limb* "OR" leg* "OR" arm* "OR" foot "OR" feet "OR" hand*) NEAR3 (loss "OR" artificial)) "OR" limb-loss or prosthe*)) OR AB = ((Amput* "OR" ((Limb* "OR" leg* "OR" arm* "OR" foot "OR" feet "OR" hand*) NEAR3 (loss "OR" artificial)) "OR" limb-loss or prosthe*))
Military	TI = ("armed force*" OR veteran* OR military OR "ex-service" OR "service member*" OR army OR soldier* OR navy OR naval OR airforce OR air-force (military NEAR5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR

	combat OR war OR conflict OR combat OR "national guard" OR "air force" OR RAF OR troop*) OR AB = ("armed force*" OR veteran* OR military OR "ex-service" OR "service member*" OR army OR soldier* OR navy OR naval OR airforce OR air-force (military NEAR5 (sailor OR pilot OR marine* OR reserv* OR serving))OR combat OR war OR conflict OR combat OR "national guard" OR "air force" OR RAF OR troop*)
Qualitative	TI = (Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) NEAR3 (of OR personal OR lived))) OR AB = (Qualitative OR interview* OR “grounded theory” OR phenomenol* OR “thematic analysis” OR narrative OR semi-structured OR “focus group*” OR IPA OR “content analysis” OR ethnog* ((experience* OR perception*) NEAR3 (of OR personal OR lived)))

Scopus

Search terms combined with AND	
Amputation	((INDEXTERMS ("amputation")) OR (TITLE (amput* OR ((limb* OR leg* OR arm* OR foot OR feet OR hand*) W/3 (loss OR artificial)) OR limb-loss OR prosthe*)) OR (ABS (amput* OR ((limb* OR leg* OR arm* OR foot OR feet OR hand*) W/3 (loss OR artificial)) OR limb-loss OR prosthe*)))
Military	((INDEXTERMS (military)) OR (TITLE ("armed force*" OR veteran* OR military OR "ex-service" OR "service member*" OR army OR soldier* OR navy OR naval OR airforce OR air-force OR (military W/5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR "national guard" OR "air force" OR raf OR troop*)) OR (ABS ("armed force*" OR veteran* OR military OR "ex-service" OR "service member*"

	OR army OR soldier* OR navy OR naval OR airforce OR air-force OR (military W/5 (sailor OR pilot OR marine* OR reserv* OR serving)) OR combat OR war OR conflict OR combat OR "national guard" OR "air force" OR raf OR troop*)))
Qualitative	((INDEXTERMS (qualitative)) OR (TITLE (qualitative OR interview* OR "grounded theory" OR phenomenol* OR "thematic analysis" OR narrative OR semi-structured OR "focus group*" OR ipa OR "content analysis" OR ethnog* OR ((experience* OR perception*) W/3 (of OR personal OR lived)))) OR (ABS (qualitative OR interview* OR "grounded theory" OR phenomenol* OR "thematic analysis" OR narrative OR semi-structured OR "focus group*" OR ipa OR "content analysis" OR ethnog* OR ((experience* OR perception*) W/3 (of OR personal OR lived)))))

Figure 1. Diagrammatic Representation of Search Process

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources [85]

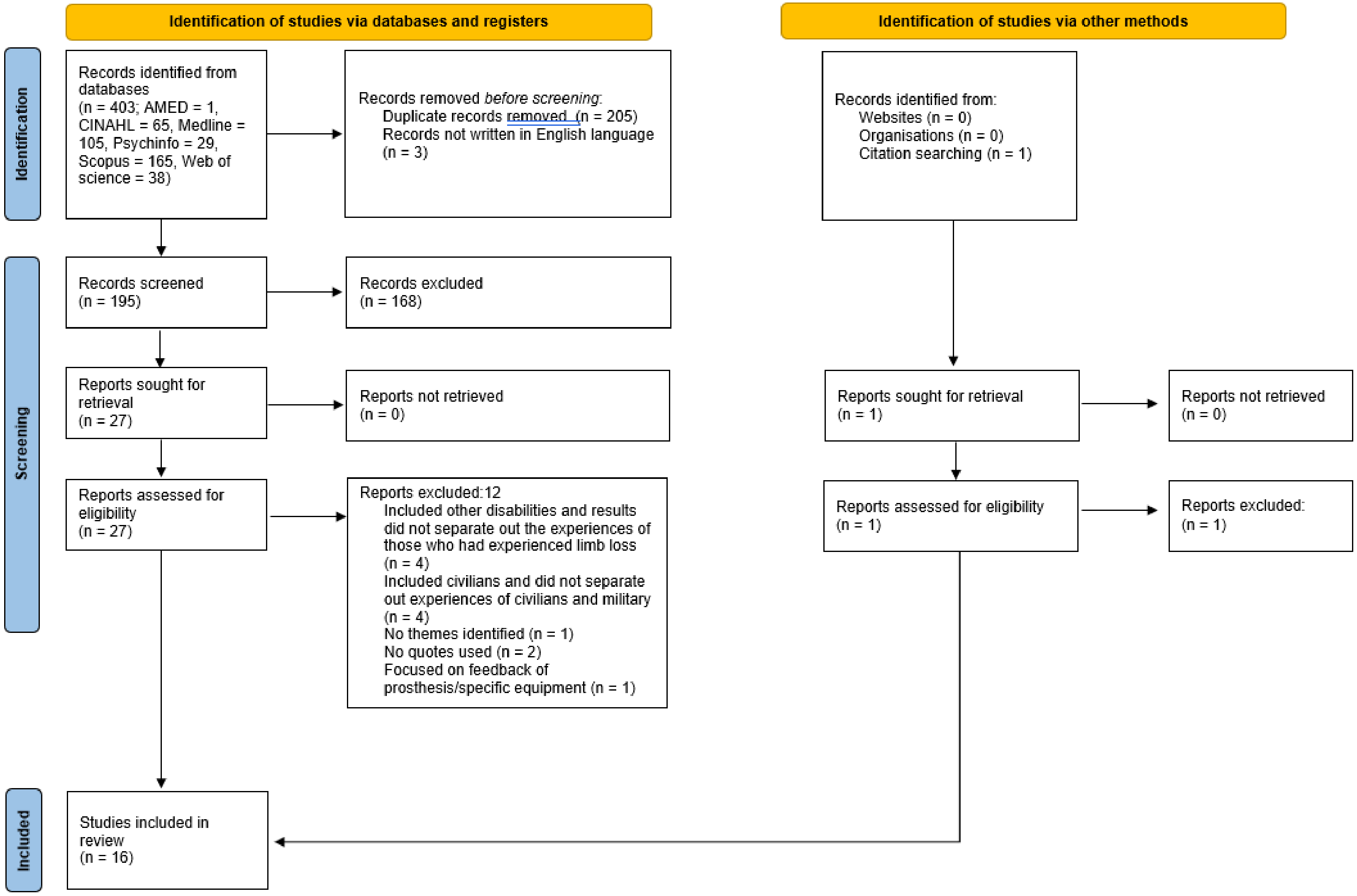

Table 2. Summary Information of the selected papers

Author(s)	Year	Location	Research Question / Aim	Participants	Design & Data Collection	Data Analysis
Caddick, McGill, Greaves & Kiernan	2018	UK	Explore how lives are experienced at the intersections of aging, disability and militarism. To consider a) the links to a military biography regarding how individuals might approach disability in later life, and b) veterans' approaches to dealing with mobility and impairment in later life.	Sample: n= 33 [1] Gender: All male Age: ‘Mid-life to old age’ Military background: UK Military, served in various conflicts from WWII to Gulf War 1, UN peacekeeping missions and those never deployed Amputation: Limb lost either during or post service	Detailed life history interviews	Interpreted using Frank's (2010) method of dialogical narrative analysis

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[1] Detail not provided in paper, provided via personal communication with author

Cater	2012	US	To increase understanding of the psychosocial adjustment issues American servicewomen experience after a traumatic amputation	Sample: n=6 Gender: All female Age: unknown, however age at amputation given: 20 – 36 (mean = 24) Military background: All Army/Army National Guard members Amputation: Traumatic amputation of one or more limbs	Phenomenology, In depth interviews	Phenomenological analysis
Christensen, Langberg, Doherty & Egerod	2017	Denmark	To increase understanding of the military identity influence on the organisation of rehabilitation and investigate factors of importance for successful rehabilitation services	Sample: n=6 Gender: All male Age: 25 – 36 (mean = 32) Military background: Danish veterans Amputation: unilateral transtibial or	Qualitative exploratory design triangulating semi-structured interviews and participant observations	Inductive latent thematic analysis

				transfemoral lower limb amputation		
Foote, Mac Kinnon, Robbins, Pessagno & Portner	2015	US	Understand and describe the long-term experiences of living with combat related limb loss from the veterans' perspective	Sample: n=20 Gender: All male Age: not stated Military background: Vietnam veterans Amputation: combat related limb loss	Mixed method, cross sectional study, including in-depth interviews	Descriptive analyses using inductive techniques
Jeppsen, Wood & Holyoak	2019	US	To explore the experiences of combat-related amputation among military Veterans and explore pathways to resilient behaviours	Sample: n=6 (+ 5 spouses) Gender: all male Age: not stated Military background: Veterans with combat related amputation from Operation Iraqi Freedom and/or Operation Enduring Freedom	Semi-structured interviews	Content analysis using Metatheory of Resilience and Resiliency (MRR) as a conceptual framework

				Amputation: Sustained military combat related traumatic limb amputation during deployment operations, either leg or arm amputation		
Khmiliar	2020	Ukraine	To clarify the psychological features of the perception of the world by the servicemen who have lost their limbs due to combat injury and are experiencing phantom pain, how they perceive their previous and present bodies, and how they decode pain in the context of their previous and present experiences	Sample: n=16 Gender: Male Age: 26-47 Military background: Servicemen of the Armed Forces of Ukraine Amputation: Combat injuries varying in severity which resulted in limb amputation	Observation, associative experiment, and narrative interview	Schutz's narrative approach
Littman, Bouldin & Haselkorn	2017	US	To better understand the barriers and facilitators to physical activity that persons with lower extremity amputation face	Sample: n=27 Gender: All male Age: 24 – 68 (SD = 13, mean = 54)	Semi-structured interviews	Qualitative descriptive analysis

				Military background: US military veterans receiving care from the Department of Veterans Affairs Amputation: All have lower extremity amputation (LEA). 6 participants had a bilateral amputation and/or an upper extremity amputation in addition to a LEA		
McGill, Wilson, Caddick, Forster & Kiernan	2020	UK	To explore the physical, psychological and social wellbeing of veterans who have experienced limb-loss and to ascertain the factors that contribute to the ability of veterans to maintain their independence at various stages in their lives	Sample: n=32 Gender: 30 Male, 2 Female Age: 43 - 95 Military background: Royal Navy and Royal Marines, British Army and Royal Air Force Amputation: limb loss sustained either during	Life story interviews	Framework Analysis Approach

				(14) or after (18) military service. Lost limbs due to conflict in military service, accidents or illness in military service (but not directly due to combat) and various post-service causes. Majority lower limb loss.		
Messinger	2009	US	To explore the role that context of injury plays in the rehabilitation of military patients who sustained a limb amputation	Sample: n=2 Gender: 2 Male Age: unknown Military background: US Military personnel Amputation: limb loss sustained on military duty in Afghanistan or Iraq. Both lost upper limbs below elbow.	Case studies	Ethnographic
Messinger	2010a	US	To contrast two models of rehabilitation	Sample: n=1 Gender: Male	Ethnographic	Ethnographic

				Age: unknown Military background: US Army Amputation: Sustained bilateral limb loss on the right side on duty in Iraq		
Messinger	2010b	US	To explore the different orientations to time experienced by clinicians and patients in the US Armed Forces Amputee Patient Care Program at Walter Reed Army Medical Center in Washington DC.	Sample: n=5 [2] Gender: not stated Age: not stated Military background: US military Amputation: not stated	Ethnographic observations and interviews	Ethnographic
Messinger	2013	US	To explore the two emotional experiences of hypervigilance and attention	Sample: not stated [3] Gender: not stated Age: not stated Military background: US military	Ethnographic observations and interviews	Ethnographic

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[2] Calculated by counting the number of pseudonyms used in the paper. Contacted author for clarification however response not received at time of submission

[3] Contacted author for clarification, however response not received at time of submission

				Amputation: not stated		
Messinger, Bozorghadad & Pasquina	2018	US	To explore how the social context of a rehabilitation programme influenced the way former patients with lower limb loss evaluated their outcomes.	Sample: n=20 (+ clinical care providers) Gender: 19 Male, 1 Female Age: Mid 20s – early 40s Military background: US Military Amputation: traumatic lower limb amputation sustained whilst on active duty in Afghanistan or Iraq	Cross-sectional phenomenological-based interviews and observations	Content analysis
Neal	2015	UK	To establish the effect that wounds had on the rehabilitation of traumatic amputees from the military patients' perspective	Sample: n=10 Gender: All male Age: 23 – 30 Military background: UK military Amputation: sustained the loss of one, two or	Ethnographic design using semi-structured interviews	Inductive coding

				three limbs between 2009 and 2011 due to traumatic amputation		
Taylor	2020	UK	To explore the reasons underpinning individual requests for specific types of prosthetic lower limb in a population of veterans with amputations	Sample: n=15 Gender: All male Age: 23-51 (mean 34.7) Military background: UK military veterans Amputation: 6 single amputees, 8 double amputees, 1 triple amputee. Primarily sustained in active duty during Iraq and Afghanistan conflicts.	Written personal statements	Thematic analysis
Wilson, McGill, Osborne & Kiernan	2020	UK	To examine the housing needs of veterans experiencing limb loss, and the impact of limb loss on housing needs and home adaptations of ageing military veterans	Sample: n=32 Gender: 30 Male, 2 Female Age: 43-95 (SD = 14.56, mean = 69.4) Military background: Veterans of Royal Navy	Semi-structured life story interviews	Thematic analysis

and Royal Marines, British Army and Royal Air Force Amputation: Mixture of in service and post service, upper/lower limb, and number of amputations

Table 3. Quality Appraisal of the selected papers using Critical Appraisal Skills Programme (CASP)

	Paper															
CASP (2019) Questions	Caddick et al (2018)	Cater (2012)	Christensen et al (2018)	Foote et al (2015)	Jeppsen et al (2019)	Khmiliar (2020)	Littman et al (2017)	McGill et al (2020)	Messinger (2009)	Messinger (2010a)	Messinger (2010b)	Messinger (2013)	Messinger et al (2018)	Neal (2015)	Taylor (2014)	Wilson et al (2014)
Was the research design appropriate to address the aims of the research?	3	3	3	3	2	2	3	3	3	2	1	1	3	3	2	3
Was the recruitment strategy appropriate to the aims of the research?	2	2	3	1	2	2	3	2	1	1	1	1	3	3	2	2
Was the data collected in a way that addressed the research issue?	3	3	3	3	2	2	3	3	1	1	1	1	2	3	3	3
Has the relationship between researcher and participants been adequately considered?	1	3	1	1	1	1	1	3	1	1	1	1	1	3	2	1
Have ethical issues been taken into consideration?	1	2	3	2	2	1	2	3	1	1	1	1	1	1	3	1
Was the data analysis sufficiently rigorous?	2	3	3	3	2	1	3	2	1	1	1	1	2	1	2	2
Is there a clear statement of findings?	2	3	3	2	3	2	3	3	2	1	2	2	3	3	3	3
How valuable is the research?	3	2	3	3	3	1	3	2	2	1	1	2	2	2	3	2
Total	17	21	22	18	17	12	21	21	12	9	9	10	17	19	20	17

1 = little to no justification or explanation

2 = moderate justification or explanation but not fully elaborated on

3 = extensive justification or explanation

Table 4. Contribution of each paper to Meta-Synthesis Themes

	Caddick et al (2018)	**Cater (2012)**	**Christensen et al (2018)**	**Foote et al (2015)**	**Jeppsen et al (2019)**	**Khmiliar (2020)**	**Littman et al (2017)**	**McGill et al (2020)**	**Messinger (2009)**	**Messinger (2010a)**	**Messinger (2010b)**	**Messinger (2013)**	**Messinger et al (2018)**	**Neal (2015)**	**Taylor (2014)**	**Wilson et al (2014)**
Theme 1: Making the physical and psychological transition to life after amputation	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
Adapting to life after limb loss	x	x	x	x	x		x	x		x	x			x	x	x
Mental health difficulties impede the ability to move on		x		x		x	x	x	x			x	x		x	x
Theme 2: The role of the military culture in rehabilitation	**x**	**x**	**x**			**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**		**x**
The military mindset and culture	x	x	x				x	x	x	x	x	x	x	x		x
Sense of self	x	x	x			x	x	x		x	x			x		
Theme 3: The impact of relationships and the gaze of others during rehabilitation and beyond	**x**	**x**	**x**		**x**	**x**	**x**	**x**		**x**	**x**		**x**	**x**	**x**	
Relationships with others		x			x		x	x			x		x	x	x	
The perceived view of others	x	x	x		x	x	x	x		x	x		x	x	x	

Appendix 1-A: Journal Instructions for authors

About the journal

Disability and Rehabilitation is an international, peer reviewed journal, publishing high-quality, original research. Please see the journal's Aims & Scope for information about its focus and peer-review policy.

From 2018, this journal will be online only, and will no longer provide print copies.

Please note that this journal only publishes manuscripts in English.

Disability and Rehabilitation accepts the following types of article: Reviews, Research Papers, Case Studies, Perspectives on Rehabilitation, Reports on Rehabilitation in Practice, Education and Training, and Correspondence. Systematic Reviews including meta-syntheses of qualitative research should be submitted as Reviews. All other types of Reviews will normally be considered as Perspectives in Rehabilitation.

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*Citations received up to 9th June 2021 for articles published in 2016-2020 in journals listed in Web of Science®. Data obtained on 9th June 2021, from Digital Science's Dimensions platform, available at https://app.dimensions.ai
**Usage in 2018-2020 for articles published in 2016-2020.

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- Authors who wish to be **identified** should include the name(s) and affiliation(s) of author(s) on the first page of the manuscript. The complete text should be uploaded as the "Main Document".

Once your paper has been assessed for suitability by the editor, it will be peer-reviewed by independent, anonymous expert referees. If you have shared an earlier version of your Author's Original Manuscript on a preprint server, please be aware that anonymity cannot be guaranteed. Further information on our preprints policy and citation requirements can be found on our Preprints Author Services page. Find out more about what to expect during peer review and read our guidance on publishing ethics.

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- Diagnostic accuracy - STARD
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- Randomized controlled trial - CONSORT
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3. You can opt to include a **video abstract** with your article. Find out how these can help your work reach a wider audience, and what to think about when filming.
4. 5-8 **keywords**. Read making your article more discoverable, including information on choosing a title and search engine optimization.

5. A feature of this journal is a boxed insert on **Implications for Rehabilitation**. This should include between two to four main bullet points drawing out the implications for rehabilitation for your paper. This should be uploaded as a separate document. Below are examples:
   Example 1: Leprosy
   - Leprosy is a disabling disease which not only impacts physically but restricts quality of life often through stigmatisation.
   - Reconstructive surgery is a technique available to this group.
   - In a relatively small sample this study shows participation and social functioning improved after surgery.

   Example 2: Multiple Sclerosis

   - Exercise is an effective means of improving health and well-being experienced by people with multiple sclerosis (MS).
   - People with MS have complex reasons for choosing to exercise or not.
   - Individual structured programmes are most likely to be successful in encouraging exercise in this cohort.
6. **Acknowledgement**. Please supply all details required by your funding and grant-awarding bodies as follows: *For single agency grants*: This work was supported by the under Grant . *For multiple agency grants*: This work was supported by the under Grant ; under Grant ; and under Grant .
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Updated 12-11-2021

Appendix 1-B: Data Extraction: An example from Caddick et al (2018)

Author theme titles	Author interpretations and/or key phrases	Relevant participant quotes	My initial comments and interpretations
Struggling against decline	• Struggling against decline whilst striving to maintain independence • Strong sense of agency • Despite problems like impaired mobility and debilitating pain • Desire to delay decline • Focus on what can do and activities which enabled them to place themselves in the categories of abled and 'not old' – tasks that show their bodies were still useful • Carrying out tasks in spite of debilitating pain • Independence as a moral virtue • Being independent helps to sustain independence • Having the right attitude - get on with it • After many years, body can't sustain the veteran's embodiment of a tough, 'get on with it' military identity	"It's going to come. I'm not looking forward to it. But I've tried a wheelchair one-handed and it's quite difficult. So I'll just have to adapt it in some way, and, God, I – in my mind I don't want it to come even though it's going to. I'm dreading it, absolutely dreading it" "Personally I'm the sort of bloke who says I don't care, it don't matter, I'll get over it. That's my attitude…You know you can't go softly-softly at all" ""The Army don't give you time to grieve, you just carry on and get on with it" "that's how I've always been" "I don't ask anyone for help really. I've been a bit too independent really for that kind of thing [support]. I've always tried doing it for myself, yeah … I've always just got on myself and done it"	• Military mindset of getting on with it despite experience pain and mobility difficulties • Importance of maintaining independence • Continuing attitudes throughout life • Struggle with being able to keep up with the 'get on with it' attitude

		““Last two or three years I've lost the ‘go’ in me... I get annoyed when I'm trying to do things and I can't do what I want to do. So frustration takes over.”	
Minimisation	• Sought to minimise the relevance of limb loss to life story and downplay its impact in their lives • Emphasis on normality • Limb loss as a fact of life and not impinging on sense of self • Desire to avoid a stigmatised disabled identity and be accepted as normal • Making an equal contribution to that of able bodied peers – work as a central role	“I was determined that I was going to you know walk as normally. And in fact most people up until quite recently, don't realise that I wear a prosthesis. And that's what I wanted. I wanted to be you know, accepted as normal” “So I can't honestly say that it stopped me doing things very much. I would like to have played a bit more cricket, but then I think if I tried I could perhaps have done. Nowadays there's more opportunities” “This [limb-loss] is fine. I mean, it's no problem” “You've got to prove to yourself that you can do a job and just as important prove to others”	• A need to appear ‘normal’ • Acceptance of limb loss • Work important in feeling equal to able bodied people
Victimhood	• Elicits sympathy from the public	“I don’t like sympathy”	• Differing views on being seen as a victim and receiving sympathy

	• Some explicit distance selves from it • Can potentially be both oppressive and strategically useful • Stigmatised and unwanted – antithesis of heroic soldier	“I honestly can say that what happened to me and the aftereffects, I felt abandoned, I felt alone. I felt so dejected and unwanted and uncared for. I wanted the military to help me. I wanted them to guide me, support me and to help me to try and rebuild a life”	
Life-as-normal	• Holding the trauma within • Emotional and psychological burden of keeping grief under wraps • A choice not to share illness or traumatic experience • Resisting victimhood	“the frustrations of life, you know not being able to move sideways, not being able to reach things on the shelves, not being able to carry the kids upstairs… It's not something that I have held 100% behind, but it might be something that I've held within for twenty years” “99% of the time you know it doesn't come across, it doesn't worry at all. It's nearly the norm. I feel normal in a way” “And I did it because I wanted to anyway, to prove to myself like you've got to get on, but it was also I did it for my family to see I'm ok. But I wasn't really… I think that what was devastating was that loss of limb obviously, but also loss of career and loss of direction. And that if anything was more disabling than actually the loss of limb, for me”	• Trying to carry on as normal comes at a cost

Appendix 1-C: Data Synthesis – An extract of an example of how original author and participant interpretations contributed towards final themes

Theme one: Making the physical and psychological transition to life after amputation

	Study	Author Theme Titles	My initial comments and Interpretations	Quotes
Subtheme: Adapting to life after limb loss				
[4]*Acceptance*	Caddick et al (2018)	Minimisation	Acceptance of limb loss	*“This [limb-loss] is fine. I mean, it's no problem”*
	Cater (2012)	Psychosocial adjustment and coping skills	Difficulty accepting limb loss	*“In my mind, I knew my life was changed, but I just didn’t want to accept that”*
	Christensen et al (2018)	Experiencing different identities	Difficulty in accepting disabled identity	*“I don’t see myself as disabled, but I have to relate to this some places.”*
	Littman et al (2017)	Acceptance	A drive to live is helpful in acceptance	*“Just because I've got one left leg and no toes, that's not going to stop me from keep living*

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[4] Titles in italics refer to codes assigned to authors initial comments and interpretations

				my life, you know. And I'm not going to check out because this little thing happened”
Finding meaning	Cater (2012)	Protective factors	A new-found appreciation for life and meaning	*“After I lost my leg, you learn you can do anything.” The experience “made me a stronger person”* *“a new outlook… life is short…do what you want to do with every day.”*
	Jeppsen et al (2019)	Universal resilience	Finding meaning and purpose	*“there’s a reason why you’re here. There’s a reason why you lived through it. And it might not come clear yet but it will reveal itself down the road”*
New life	Cater (2012)	Protective factors	A new-found appreciation for life and meaning	“a new outlook… life is short…do what you want to do with every day.”

Jeppsen et al (2019)	Universal resilience	Finding meaning and purpose	*"there's a reason why you're here. There's a reason why you lived through it. And it might not come clear yet but it will reveal itself down the road"*
Messinger (2010a)	Getting into and out of Iraq	Conflict between wanting to stay in rehab and plan for the future, and wanting to get back to active duty	*"It was so weird. On the one hand I'd totally forget how bad I was hurt, and I'd try to think up ways to leave the hospital and catch a MAC [military airlift command] flight back. On the other hand I would have these long conversations with my parents and fiancee about getting married so she could stay with me."*
McGill et al (2020)	Barriers to transition	Lack of direction	*"I hadn't really give a lot of thought to well what will I do if I leave the army? What will I do if I got injured? You didn't think about that necessarily"*

	Messinger (2010b)	Family and role concerns	Life being taken away from them	*"I just feel stuck, like I have no future or past. A lot of patients celebrate their alive day, you know the day they were hurt, to celebrate that they weren't killed. But to me it's like the worst kind of birthday because I feel a little like I was killed. No, not killed, I feel like on that day in October 2006 my life was taken away, everything in my life except for being alive. I'm like a baby again only I'm not sure that I'm going to grow up."*
The future	Jeppsen et al (2019)	Character resilience	Living towards values and continuing to do what is important to them	*"I'm not going to waste time by not going to school just because somebody is going to see me. The pro of going to school and progressing with my life far outweighed the con of having people look at me."*
	Littman et al (2017)	Routine/Purpose	Exercise helps to meet goals	*"I gotta learn how to walk, because I've got grandbabies, and I have to walk to the park."*

Messinger (2010a)	Getting into and out of Iraq	Conflict between wanting to stay in rehab and plan for the future, and wanting to get back to active duty	*“It was so weird. On the one hand I’d totally forget how bad I was hurt, and I’d try to think up ways to leave the hospital and catch a MAC [military airlift command] flight back. On the other hand I would have these long conversations with my parents and fiancée about getting married so she could stay with me.”*
Messinger (2010a)	The body	A desire to look ahead	*“You know, I don’t think so (learn to run). I’m not saying it will never happen, but this has been a really long experience and I’m finding I’m not that interested. I mean, I see much more of what’s going on in my life looking ahead you know. I want to decide about law school or try to find a career job. And, compared to the rest of my life, I got to tell you man, running [is] just not high on my list of priorities.”*

Messinger (2010a)	Future		Identity crisis when considering what to do in the future and difficulty working out what he is able to do	*It’s just the risk of failing, I guess…no, you know, I’m, I think I’m spending a lot of time with this identity crisis.”*
Messinger (2010a)	Future		Future as a priority over physical functioning – differs to the rehab program and this had an effect on the way staff saw him	*“I think it’s much more important for me to find stability in terms of my future than to spend months here refining how I walk.”*

Section Two: Research Paper

Identity and sport participation following limb loss: An interpretative phenomenological analysis

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Prepared for submission to *Disability and Rehabilitation*

Abstract

Purpose: Research indicates that sport is a useful avenue in redeveloping identity for people with a limb amputation, however there is little research in this area and the majority involves Paralympians or elite athletes with disabilities. This study aimed to explore the experience of sport participation and identity in people who had undergone limb amputation.

Materials and methods: Semi-structured interviews took place with nine people who had undergone amputation and participated in sport. Interviews were recorded, transcribed, and analysed using interpretative phenomenological analysis.

Results: Four themes were developed from the data: (1) Enabling a feeling of normality and equality; (2) Becoming a better person (3) Belonging and connection; and (4) Experiencing and responding to the gaze of others. Findings highlight the role of sport in facilitating personal growth through a desire to help and inspire others.

Conclusions: Psychologists involved in care following amputation could offer person centred therapies to those who may be reluctant to participate in sport in a way which makes use of a person's values and facilitates personal growth.

Implications for rehabilitation

- Acceptance and Commitment Therapy may be useful in helping to maintain physical activity in a way that people with limb loss can live towards their values

- Clinical psychologists could be involved in helping people with an amputation consider ways of supporting and mentoring others in their chosen sport or interest as a means of facilitating personal growth

Key words: amputation, limb loss, qualitative, interpretative phenomenological analysis, sport

Introduction

Regular sport participation or physical activity has been found to have a positive impact on quality of life, health, and psychological wellbeing [1,2]. For individuals with physical disabilities these benefits extend to helping reaffirm their ability [3], accept their disability [4], build a positive body image [3,5], increase self-esteem [6], and is an opportunity to enrich their social life [7,8]. People with disabilities can take part in adapted sport amongst others who also have a disability, which can provide a sense of belonging, commonality, and normality [9-12]. Alternatively, they can participate in sport alongside others without a disability. This has been reported to help people feel as though their disability is invisible and facilitates feelings of equality which can lead to acceptance of their disability and a feeling that they are more than their disability [13].

Sport or physical activity participation rates in individuals with a lower limb amputation vary in the literature and range from 11% to 60% [14]. Differences in rates have also been reported between countries, with 32% being reported in the Netherlands [15] and 60% in the United States [16]. Additionally, 83% of people with an amputation report that they would like to take part in more physical activity and sport in the future [17], suggesting there is a demand for supporting people with amputation in accessing sport.

For those who have good mobility, physical activity is important in maintaining use of their prosthesis [18]. Some people with limb loss restrict their levels of activity and participation in daily activities, and this has been found to correlate with pain, leading to psychological distress [19,20]. It has been reported that there are more barriers than motivators in taking up or maintaining an active lifestyle after amputation [21], and acceptance of limb loss, a daily routine incorporating activity, and self-confidence in trying new activities are important in facilitating activity [22].

After amputation, individuals may feel they have become a different person [3], and have been described to go through a process of renegotiation or resistance in transitioning to a new disabled identity [23]. For individuals with an amputation, sport enables them to create a new identity of athletic and capable, and reject the disabled identity [11]. Identity is described as ‘traits and characteristics, social relations, roles, and social group memberships that define who one is’ [24,p.69]. It provides a lens to assist in meaning making, and forms part of an individual’s self-concept, views on their personality, and beliefs about themselves. It is described as an important part of psychological wellbeing, assisting people in living a meaningful life [25]. It has been found that when people participate in adapted athletic activities they are less focused on their disability, giving them freedom to express themselves and thus focus more on the process of identity development [26]. Sport participation has been found to assist people with an amputation to feel ‘normal’ [12,27], however much of the research which exists concerns Paralympians or elite athletes with disabilities [28,29]. While illuminating, these studies provide detail regarding exceptional physical abilities rather than the abilities that characterise most people following limb loss. Research also shows that sport enables people with a disability to disprove negative beliefs, and show others and themselves they are able to achieve the same as people without a disability [30].

The development of an identity based on physical prowess can also help to provide a sense of accomplishment [9]. The increased visibility of adapted sport in the media, for example through the Paralympics, have been described as helpful in the building of positive identities in those with a disability [31]. However, it is important to note that for an individual who has undergone amputation, returning to something they were once good at can be disheartening and this could impact on their rehabilitation and view of themselves [27].

The above research indicates that sport participation is a useful avenue in redeveloping identity for people with a limb amputation. However, while research exists regarding sport participation and disability including some participants with limb loss [11,12], there is a lack of research focusing solely on the experience of identity development or reconstruction for people who have undergone amputation and participate in sport. Qualitative approaches can be particularly amenable to aiding an understanding of experiences which are ‘in flux, [and] negotiated within particular contexts or personal and social relationships’ and as a result ‘health and disability researchers have begun to use qualitative research methods to identify the meanings of ill health and disability from the point of view of those concerned’ [32,p.1134]. Given these considerations, the present study set out to explore the meaning and experience of sport participation and identity for people following limb loss.

Method

Design

The present study focussed on the lived experiences of people who had undergone amputation and engaged in sport; therefore, a qualitative methodology was most appropriate. Semi-structured interviews were used to elicit participants’ experiences, and data were analysed using interpretative phenomenological analysis (IPA) [33]. IPA is one of the most commonly used qualitative methodologies in physical and mental health research [34,35]. It was chosen as the most appropriate approach to address the research aims due to its fundamental principles of phenomenology, hermeneutics and idiography [33]. IPA allows for the collection of detailed accounts of individual experiences and aims to explore participants’ lived experiences (phenomenology) of a phenomenon and how they make sense of it [35]. As IPA involves a process of double hermeneutics, participants are attempting to make sense of their own experiences and this is then interpreted by the researcher, it is important that the researcher is aware of and able to bracket their assumptions and beliefs as this can impact on interpretations [33]. Through interpretation of data (hermeneutics), each individual's (idiography) experience of limb loss and sport participation, and what this means in terms of their identity, can be identified for commonalities and divergences with the sample as a whole.

Sampling and participants

Due to the idiographic focus of the approach and the time-intensive analysis of individual cases, IPA studies typically involve small, homogenous samples ranging between four and ten participants [33]. IPA uses a purposive sampling approach, meaning the individuals recruited possess certain characteristics making them the most appropriate group of people to explore the research aims [36]. Although the demographics of participants in this study differ, they are a homogenous group in that they all share the lived experience of limb amputation and have made the decision to engage in sport. This fits with the central focus of the study which is the experiences of people who have undergone a limb amputation in adulthood and participate in sport.

Individuals were eligible to participate if they (a) experienced amputation of one or more limb(s) in adulthood (eighteen years or older), (b) after amputation engaged in sport and were engaged in this at time of interview, (c) were English speaking, and (d) able to take part in a video or telephone interview. Recruitment took part during Covid-19 when government restrictions and health and safety considerations meant that interviews could not be conducted face to face.

Participants were recruited online via disability sport groups and charities (e.g. Limbs4life) (one participant was recruited in this way), via social media (twitter, amputation or adapted sport groups/forums on facebook) (eight participants were recruited in this way) and via snowball sampling (were asked to inform other people they knew who might be eligible; one participant was recruited via this method). A total of nine participants (four female, five male), aged 22 to 62 (mean 46), took part. Time since amputation ranged from six months to forty years (mean 13.6 years). Five participants were from the UK, three from the US, and one from Australia. They took part in a range of different sport: swimming, sit skiing, cycling and football. Demographic details, and further details on the nature of their amputation and sport are presented in table 1.

Data collection

Potential participants contacted the researcher via email and were emailed the Participant Information Sheet (thesis Ethics section in part 4, appendix 4-E). Once eligibility was confirmed, an interview via video or telephone call was arranged. Six participants chose a video call, and three a phone call. Verbal consent was recorded.

A semi-structured interview schedule (see thesis Ethics section in part 4, appendix 4-I) was developed using existing research in the area of sport, disabilities and identity [11,12] and in collaboration with the research team, who together had expertise in amputation and prosthesis use, health psychology, clinical psychology and qualitative research. Questions aimed to elicit various salient aspects of their experience of limb loss and sport, ranging from their initial experiences of amputation and the challenges in adapting to life after limb loss, to the decision process in taking up sport and if the way they saw themselves has altered since participating in sport.

The schedule contained questions which fell into four broad areas: demographic information, limb loss, sport participation, and identity. The interview schedule was used to guide conversation to allow exploration of the research question. The researcher also facilitated the participant to discuss what was important to them, and at the end of the interview asked them if they had any thoughts relating to amputation, sport and identity that had not already been covered in case they had important reflections which were missed.

Following the interview, participants were given the opportunity to ask the researcher any questions. After the interview the participants were sent a copy of the Participant Debrief Sheet (see thesis Ethics section in part 4, appendix 4-K) containing contact information of charities and organisations which offer emotional or practical support in the event the interview had stirred up difficult emotions.

Interview length ranged from 40 to 83 minutes (mean 57 minutes). Interviews were transcribed verbatim with identifying information removed and pseudonyms used to maintain confidentiality.

Data analysis

IPA was used to analyse the data. Although IPA has a number of defining characteristics, there is no one prescriptive method of conducting IPA [37]. For the present study, the guide to conducting IPA by Murray and Wilde was followed because of the thorough audit trail it provides [38]. To retain the idiographic focus of the research, transcripts were analysed consecutively and, in accordance with this approach, analysis was ‘bracketed’ or ‘held in abeyance’ between each transcript. Firstly, a participant’s transcript was read several times to aid familiarisation with the content. Next, initial codes were generated line-by-line describing the participant’s experiences and sense making. Once complete for the transcript, codes that shared common elements were grouped together into distinct themes. A short interpretive narrative was written for each theme that encompassed the participant's experiences, meaning making and researcher interpretations that had been grouped together, and a title was assigned summarising the narrative. Once this had been completed for each participant, the final stage took place whereby all themes across the sample were synthesised, noting converges and divergences. This resulted in a final set of themes which reflected an understanding of sport participation, identity and amputation and sense making people assigned to this, and a narrative summary was produced for each theme. Table 2 displays the contribution that each participant made to each theme. The final themes are supported by an appropriate amount of data as per Smith's [35] guidelines which state that for an IPA study with a sample containing more than eight participants, each theme must contain extracts from at least three participants and state the prevalence of participants. Throughout the process of analysis, the research supervisor audited each step of the analysis to ensure the IPA method was followed correctly. Recommendations, such as combining elements of some themes into others, were incorporated.

Reflexivity

IPA recognises our own experiences and understanding are both a potential resource and problem in IPA work. It is important that the researcher is aware of and able to bracket their personal beliefs and assumptions as this can impact on interpretations and meaning making [33]. The researcher did not have lived experience of limb amputation nor did they know anyone who had experienced it, so their knowledge and beliefs were shaped by society and the media. With this is mind, the researcher completed a reflective journal to aid reflexivity, making notes during data collection of assumptions, and reflections before and after interviews. For example, the researcher bracketed their assumptions that limb loss would impact on participants' quality of life, and that limb loss would lead to a new appreciation of movement and activity leading to sport participation. The researcher also participated in regular supervision with their research supervisor, discussing any reactions or thoughts around interviews, for example discussions around how comfortable someone with limb loss may feel speaking about their experiences with someone without a physical disability.

Ethical considerations

The research was given ethical approval by Lancaster University Faculty of Health and Medicine's Research Ethics Committee (FHMREC reference: FHMREC20176). Procedures for gaining consent and data storage were followed. For the full ethics application see thesis Ethics section in part 4.

Due to the nature of remote interviews, careful consideration was given on how to manage distress during the interview. A plan was developed, and it was agreed to discuss with each participant prior to the interview how distress would be managed, for example whether there was someone they could speak to.

During the interviews no participants appeared distressed, however sources of country specific organisations and charities which could provide emotional support (including the Samaritans, Mental Health America, and Limbless Association) were provided on a debrief sheet following the research interview. No participants requested to remove their data or withdrew from the study. All data excerpts involve the use of pseudonyms to protect each participant's identity.

Results

Theme One: Enabling a feeling of normality and equality

All participants described how taking part in sport enabled them to feel ‘normal’, equal to others, or helped them regain aspects of their life they had prior to amputation. However, this process differed between participants: some took part in sport with people without a disability (Mary, Carol, Chris and Jessica), one took part with other people with an amputation (Harry), and some did a combination of taking part alongside people with and without a disability (Bob, Mike, Gary and Frances).

Mary, who cycled with people without a disability, did not feel disabled when she took part: “I think competing with able bodied people…makes me think that I’m not disabled”. This feeling was shared by other participants who felt that sport was a useful tool in facilitating a feeling of equality and normality, especially as they were able to keep up with others. Mike described his feelings of normality when cycling versus walking:

> …It's just something I can do that I seem totally normal at, you know. I don't have any special equipment.…I can pedal with two legs just like a normal guy…I can walk normal but you know, I don't know it's hard to explain, walking around, I'm still an amputee, but when I get on the bicycle I’m a bicyclist. I don’t consider myself an amputee bicyclist, I’m just a cyclist.

Taking part with people without a disability could also help people with an amputation feel equal and no different to others if they are treated the same and do not receive special treatment. Bob and Carol both experienced this in their cycling and swimming groups, and Bob reflected that it made him feel good. However, competing against people without a disability could result in conflicting emotions; for example, Gary expressed pride at being able to beat people who did not have a disability, but also a sense of frustration that it was not a fair competition:

> I'm not as motivated sometimes because they are abled-bodied competition, so you know you're starting off and you're already kind of on the back foot before you've even started, but I also really like for example the [race], I think I finished 7th…and every single person was able-bodied so there's you know there's a real sense of pride there.

Some participants described sport as enabling them to be themselves, confirm and strengthen their identity, and be something other someone with an amputation: "it made me feel good I was part of a group not just the amputee guy who comes along for work you know sits behind while the others have a good time" (Bob). Taking part in sport also assisted with this feeling as it provided participants with a sense of their past self; for example, Chris had found a sport to replace basketball which he was no longer able to play:

> with sit skiing you can't keep me off the mountain unless there's like some serious problem, otherwise I'm going to find a way I'm going to get up there, and I haven't had something like that since losing basketball.

The ability to take part in sport also reflected that life was continuing as normal and was no different despite having had an amputation. Harry, a member of a football team for people with limb loss, explained this as he reflected on how his feelings had changed over time: "at first I was feeling sorry for myself…what's going on, what's gonna happen with my life. I see now I'm just continuing as normal, and now I've got just got a positive outlook on everything". This view was also echoed and expanded by Jessica who saw being able to take part in horse riding again, and achieve what she could prior to amputation, as reassurance that life was heading in the right direction:

> like the first horse I rode other than my own and I was able to ask for certain movements and the horse responded appropriately maybe a little expressively, because I wasn't quite sure what my leg was doing, it was like confirmation that I was on the right track and things were gonna be OK

In summary, taking part in sport can provide people with an amputation with a sense of normality and equality. This can be achieved via taking part with people without a disability, or with people who also have a physical disability. Taking part in sport can help people feel ‘normal’ as they are achieving something they were able to do before amputation or that people without a disability can do, are treated the same as others, can maintain part of their pre-amputation identity, and it can represent their life continuing after amputation.

Theme Two: Becoming a better person

Participants recounted how their amputation and sport participation had facilitated personal growth. This included the development of new personal qualities and a desire to help others. Eight of the nine participants are represented in this theme.

Some felt that through their experiences of amputation and sport they had developed positive qualities and become a better person: “I think I see myself as a better man than I was…I’m the same person, but enhanced, if that makes sense. I'm a lot more compassionate than I was before. More understanding” (Mike). Through playing football, Harry’s confidence increased, and he became more extraverted: “I’d say I’m outgoing. That's probably. Yeah, erm I’d say I’m loud now, I'm loud because of it”. He felt that being affiliated with a well-known football club, and the opportunities to play at stadiums around the country, was fundamental in building his confidence: “[F]or me to say, obviously I play for [team], which is, it's not your average team, is it? It's a big club, and you say you play under there under that foundation it's a confidence boost in itself". Dealing with the challenges of life after amputation, such as pain and exhaustion, also helped participants develop compassion and empathy for others: "I would say I'm definitely a lot more aware of what other people are experiencing, potentially more compassionate" (Jessica).

Some participants discussed their early experiences after amputation and reflected on the mental challenges they faced: "Main challenges apart from the obvious physical ones was mentally and emotionally. I just could not come to terms with what they've done" (Frances). Despite initial struggles, Frances found that swimming didn't just help her physically but also emotionally as it boosted her mood: "it helps you mentally… you actually feel so good that you've actually done it and it really, mentally, I think it really boosts you", and this positive effect was also noticed by family.

Although amputation led to losses amongst some of the participants, such as job role and independence, amputation also led to personal gains: "for me the amputation has, for everything it's taken away from me, it's giving me something else. Whether, you know, empathy, humility, kind of forcing me out of my comfort zone" (Chris), suggesting loss of a limb as a sacrifice for gaining positive, personal qualities. This increased empathy for others then lead to a desire to help people in a similar situation. Some participants wanted to share their experiences and knowledge with the aim of improving the experience of sport for people with an amputation. Following his amputation, Chris spent time figuring out the most appropriate prosthetic to use for his type of amputation and sport. He was keen to combine his knowledge and experience of amputation and sport to help others: "by me figuring this out I can then go share this so that other people can figure it out and that kind of stuff". These personal gains were also reflected by Mike where he received feedback from others after he helped them cycle "I've had a couple people send me videos of them being able to get back and ride on their bikes and they're like 'you helped me get, you helped me get back into life', I think that's cool”. One participant even decided to train as a prosthetist after her experiences of pain and amputation and is keen to undergo further training: “I wanna make sure that I'm able to actually help people” (Jessica).

Another way that some participants helped others was by becoming an inspiration; inspiring others to take up sport: “I think I actually thrive on that, on the fact that I make people look at themselves and think ‘well if she can do it I can do it as well, why am I complaining’” (Mary). This inspiration was reciprocal, and Mary not only enjoyed inspiring others but also sought inspiration from other athletes with a disability: “I do get a lot of inspiration from other people that have had traumas in their life”. However, the feeling of being an inspiration was not appreciated by all:

> I don't want to be an inspiration, but I kind of see I’ve inspired a lot of people via some facebook pages with videos on how to get started on cycling and riding stuff, I think it's, it's kind of cool that I can help people learn to ride. (Mike)

To summarise, this theme shows that participants developed positive personal qualities such as compassion and empathy through their amputation and felt it resulted in them becoming better people. This led to a desire to help others which gave them satisfaction, motivation and a new purpose in life.

Theme Three: Belonging and connection

Alongside the sense of normality that participation in sport instilled, where this involved being part of a team or a group, participants felt a sense of belonging and connection to others. Seven of the nine participants contributed to this theme.

Being part of a group facilitated the development of friendships and broadened participants' social networks, resulting in positive emotions, exemplified by Mary: "it gives me a beautiful social network…I just feel very loved and wanted and yeah appreciated". Bob expanded his social network through taking part in sport, and for him it was the primary reason to get involved. The social element provided an incentive to exercise and is something to look forward to: "I thought I'd do something where there's a social activity where you're meeting other people, doing something where you can also have a chin wag afterwards".

Being part of a group can be encouraging and help in overcoming fears related to sport. Mary described herself as a "naturally fearful person", however she was encouraged and helped by the people in her cycling group, and she also returned the support and encouragement to others: "they cheer you on for your goal, so you cheer them on for their goal, so it's very reciprocal". This helped to enhance the experience and encouraged her to continue cycling.

Being amongst others with a disability or amputation who understand the struggles of living with an amputation is valuable. It gives opportunities for learning and support and provides space to share experiences that cannot be gained from spending time with people without a disability:

> They understand your struggle, how you adapt to things, and they'll obviously give you advice. For example, there was one guy, plays for [team name], he taught me how to do shoelaces, just little bits like that, you can just bounce off each other I suppose (Harry)

This ability to connect with others helped participants to not feel alone and had a positive impact on their mental health. Being part of group offered a feeling of belonging and reassurance that they were not alone: "you know there are other people out there that have their own struggles and you feel a part of something when you’re in a group I guess” (Frances). Despite the differences in type or level of amputation, Frances felt connecting with others who had undergone an amputation was important and likened it to therapy:

> I've always thought there's no better therapy than one amputee talking to another because you just get it, you know what it's like. And even if it's not the same leg, same height, you know if it’s a bilateral, above knee, you still, you’re still missing a limb

For some, simply being around other people with an amputation or disability served as a source of inspiration and reassurance which had a knock-on effect on daily life: “you can get on with daily activities because a lot of other lads do it so there's no reason why you can't do it” (Harry).

Some participants acknowledged how support from others, either within sporting groups or from friends and family, was instrumental in building confidence. Amongst the swimmers, support from others was key in building confidence in the water, for example Carol’s friends helped her with the practical side of accessing the pool, family provided encouragement, and swimming instructors provided her with tips and direction. This all helped in the building of her confidence and eventually she felt able to go swimming without assistance: “I felt confident enough to go in the pool on my own and turn up on my own, get dressed on my own, do everything on my own”.

Being able to take part in sport and activities with friends and family was also important to some participants. Sit skiing was a sport in which Chris was able to keep up with his friends and children and meant he was no longer “holding everybody back” which made it a much more enjoyable experience. Similarly, Mike introduced his wife to cycling and it is now something they do to spend quality time together. Mary also met her partner through cycling, and they continue to take part in events together. Cycling is a way they can have fun and show affection to one another:

> he cycles in his event so he'll pass me and then we wave kisses to each other and it's always 'aw there goes my man' and he goes 'there you go my precious girl' so yeah it's really just good fun

To summarise, being part of a sporting group following amputation can provide a feeling of belonging. The social side of being part of a group can give opportunities to learn from others, for example daily living tips, and gain support and encouragement. For some participants, sharing their sport with family and friends was a useful way to spend quality time together and fostered feelings of connection.

Theme Four: Experiencing and responding to the gaze of others

The visibility of limb loss when engaging in sport was an important aspect of participants' experiences. While some enjoyed being seen by others because they thrived on the positive feedback and inspiring people, others were uncomfortable and did not like labels assigned to them by others. Some also found that the way they felt about being viewed had changed over time. This theme is made up of experiences from seven participants.

For most participants, taking part in sport resulted in their amputation being on show, and some found this difficult initially: "when I started I was a little bit embarrassed and I didn't want people really looking at my leg… but now I've become like you know what this is me, almost flaunt it" (Mary).

Frances had similar feelings: "The first time I went there I was just mortified that I was going down in a hoist, and I thought all eyes were on me, but now I don't bat an eyelid". Despite the fear of negative evaluation from others, Frances recognised the benefits and enjoyment she got from swimming and saw these as outweighing negative appraisals from others. She placed a high value on the activity of swimming and saw the negative judgements as a reasonable price to pay; she temporarily gave up her feelings of comfort to gain the positive effects of swimming:

> …I can't spend the rest of my life just sitting around not doing anything, I have to do something, and even if it means just for that short hour that somebody else notices that I have got an amputation, so if I was in a public pool, I just think that the gain is worth it. (Frances)

Harry described how he would initially avoid going out and wearing t-shirts which made his arm amputation more visible, however becoming involved in football instilled confidence in him:

> …when I first had the amputation, I didn’t want to go out. But now I'm not afraid to go out and play sport with my say, just having a kick around with my friends in the park, I wouldn't have done that. But now I've got the confidence to do that”.

The level of exposure can also be helpful in reducing the stigma associated with people with a disability. Due to his multiple amputations and reliance on others, Bob often felt like he was “a burden on society”, however by being welcomed into a club with accessible facilities, he felt he was shown a different side to how he was viewed by others: “it reduced that stigma of being disabled that you’re a hindrance that you’re a pain in the backside”.

Conversely, some participants enjoyed the exposure and visibility to others and the opportunity this brought to inspire others. Mary described a change in how she felt about others viewing her amputation and prosthetic, and over time she enjoyed the attention and admiration it brought:

> I actually enjoy the, it sounds vain, but the attention because even though I'm last everybody cheers me as I come in because they all can see I've got a prosthetic so like 'wow you can do it so what's my excuse', and I think I actually thrive on that. (Mary)

Others did not enjoy the increased amount of attention and status of an inspiration. Gary described his conflicting feelings around this: "I think people now see me as this inspirational person, who's just an inspiration because they do a lot of sport, which in some respect is quite a nice feeling but it does get a bit tiresome sometimes".

Some participants felt that they were predominantly viewed as a person with an amputation rather than an athlete: "I'm getting viewed as like an amputee as opposed to like, hey, there's that girl and she can totally ride those difficult horses, which I can still do just there's a little bit of leg missing" (Jessica). This differs to Carol's experiences where she is viewed for her abilities and given nicknames such as "the mermaid". This had a positive impact on her confidence as she felt she was being recognised for something she could do well.

Participating in sport was a useful way to influence others' opinions of people with an amputation. This was especially important for Jessica who felt she was looked at "with distain" as limb loss can be associated with diabetes and an unhealthy lifestyle: "sport is extremely empowering, and it gives us the ability to demonstrate our strength without having to say anything".

To conclude, the gains obtained from taking part in sport can outweigh the possible uncomfortable feelings of being viewed by others, and participants' feelings around this can change over time as they become more confident. In addition, some participants use sport to display their capabilities to show others what they can achieve.

Discussion

The aim of this study was to explore the meaning and experience of sport participation and identity for people following limb loss. Using interpretative phenomenological analysis (IPA) four main themes were identified: enabling a feeling of normality and equality, becoming a better person, belonging and connection, and experiencing and responding to the gaze of others.

The feeling of normality and equality when participating in sport was described by all participants. Taking part in sport provided participants with continuity between past and current identities as it helped them to feel equal to others, affirmed abilities, and allowed them to be seen as something other than a person with an amputation. Identity can often be fractured through illness [39] and experiencing bodily losses can lead to 'feelings of estrangement' from the past body [40,p.662]. However, results from the current study suggest how sport can ameliorate this disruption by providing an environment where an individual can connect with their body. Building on the feeling of normality and equality, in the current study participants recounted how sport participation minimised a disabled identity. Sport participation enabled participants to make positive comparisons with the past self. This finding shares aspects of the social identity approach that are of particular relevance to people with disabilities, particularly in regards to disability self-categorisation [41]. By participating in sport, participants' self-categorisation shifted away from that of a disabled identity. These findings extend insights from previous research, such as studies where a participant described forgetting they had an amputation when participating in sport [27], and where the majority of interviewees reported that taking part in sport provided them with the feeling of normality and equality to peers [12].

Almost all participants mentioned how amputation and sport participation facilitated personal growth, such as becoming a better person and having a new desire to help and inspire others. They felt they had become more empathic, compassionate, and understanding. Some used these qualities to help others in a similar situation by encouraging them to take part in sport, helping people locate the most appropriate prosthesis, and taking part in sport in a way that they would be visible to others and inspire them. This has similarities to the theory of ‘post-traumatic growth’, which is described as a positive psychological change resulting from challenging life events [42,43] which challenge the way an individual understands the world and their place in it [44]. Therefore, growth does not occur directly via trauma, it is through the difficulties an individual experiences with making sense of their new reality. In relation to limb loss, it has been found that providing space to cognitively process the trauma, and social, emotional and practical support can facilitate post-traumatic growth [45], and in turn this has been found to facilitate psychological adjustment amongst individuals with limb loss [46]. This links to the current findings as physical activity has been found to aid individuals in post-traumatic growth following illness and disability [47,48] as it helps in the understanding and processing of trauma, and allows individuals to take risks, and test boundaries and their psychical capabilities.

Connecting with others and a sense of belonging from being part of a team or group provided participants with a social network to seek support and friendship. This finding links to social identity theory which posits a person’s sense of self and belonging in the world is based on their group membership [49]. The development of social identity is said to be a three-stage process consisting of social categorisation, social identification and social comparison [49] and the theory recognises that people tend to strive to reach or maintain a positive social identity, which is derived from making favourable comparisons between the ingroup and relevant outgroups [50]. For some, being part of a group helped build confidence in their sport, and for others this extended to everyday situations that people with limb loss must learn to navigate. Experiences with others who have had similar experiences can assist in identification with others, and taking part in group sport with other people with disabilities is reported to provide a sense of belonging, which can help to develop the athletic identity and sense of self, in addition to providing a sense of belonging, commonality and normality [9-12]. The finding of belonging and connection is complemented by existing research: being part of a team or group allows individuals to meet people with similar experiences, and also helps them to feel part of the wider community as people watch them play and support them [51].

The gaze of others when participating in sport was important to most participants. Some respondents enjoyed being viewed and felt sport participation was a useful way of displaying their capabilities, whilst others felt uncomfortable being viewed and felt they were judged negatively. Taking part in sport enables people with an amputation to disprove beliefs and show others, and themselves, they are able to do something people without a disability can do [30] and shows their strength and abilities [10,52]. The discomfort and negative evaluations that some participants felt in regards to being looked at by others can be related to Goffman’s seminal work on stigma. Succinctly, Goffman’s theory on stigma states that stigma is socially generated and affects individuals who are unable to conform to society’s conventional norms. He suggests that people are stigmatised due to discrediting attributes, for example bodily appearance [53]. Goffman describes a number of responses stigmatised individuals can take, including making a conscious effort to compensate for their stigma by displaying their skills and abilities, or altering or concealing themselves. Results of the current study has similarities to Goffman’s work on stigma, in particular the responses that people take in showing their abilities. In the current study, participant reports of internalised stigma changed after becoming involved in sport. This had similarities to existing research which found that taking part in football for people with an amputation allowed individuals to be seen positively [51] and with research that indicates engaging in physical activity can help individuals to manage the stigma associated with physical disability [54].

Clinical implications

The findings of this study highlight the positive effects taking part in sport can have on identity for people living with limb loss and have important implications for the rehabilitation process following amputation. As physical activity is a core part of rehabilitation following amputation for the maintenance of prosthesis use and to enhance physical functioning [18,55,56], individuals with an amputation could be encouraged to participate in sport, not only for the physical gains but also for the positive impact on identity and sense of self. Increased understanding of the role that sport plays in instilling a feeling of normality, equality, and reduced stigma may be used to target sport and rehabilitation interventions to vulnerable groups, for example individuals with a poor view of disability or individuals with low self-worth. It is important that barriers and facilitators, such as technical, social and personal [18] are considered when encouraging people with limb loss to participate in sport, and attempts are made to minimise the barriers. This is particularly important considering the large number of people with an amputation who would like to take part in more physical activity and sport in the future [17].

Psychological input as part of a multi-disciplinary team (MDT) is recommended in professional guidelines regarding rehabilitation following amputation [57,58]. Clinical psychologists could provide individual support to those who are ambivalent or reluctant to take part in sport and could provide consultation and training to members of the MDT on communication techniques or motivational interviewing skills [59] to also help working with people who are ambivalent about sport. It is important that the MDT work together in providing joined up advice and personalise plans to match with individuals' needs and abilities.

The theme 'Becoming a better person' shows how taking part in sport can help people connect with their values and indicates the potential utility of particular psychological therapies. Acceptance and Commitment Therapy (ACT) [60] adopts a person-centred approach and assists people to identify and live according to their values, and existing research has reported the successful use of ACT in assisting with difficulties following burn injury [61] and stroke [62]. ACT may be helpful for some people with an amputation as it could be used to help people identify sports and activities that also allow them to live in line with their values, for example if connecting with family is important, they may choose to take part in an activity that the whole family is able to take part in, or if being social is important they may focus on team sports. ACT may be useful in helping people who are unsure or not keen on taking up sport by focusing on physically active pursuits which fit with their values, for example if being in nature is important, they may focus on gardening, or if meeting others is important, they may consider joining a walking group. Therefore, this approach could assist in helping people identify valued activity which also has physical benefits. ACT could also be particularly helpful for people who have experienced a sense of loss following their amputation.

Given the findings that connecting with others who have also undergone amputation and helping people access sport was important to a number of participants, clinical psychologists working with people with an amputation should consider the importance of sport in facilitating personal growth, and how helping others with an amputation with their chosen sport can help to facilitate this growth. Peer support has been reported to improve outcomes for individuals following amputation [63] and can provide the supporter with a sense of belonging, connection, hope and resilience [64]. Clinical psychologists could be involved in helping people with an amputation consider ways of supporting and mentoring others in their chosen sport or interest.

Strengths and limitations

This study is unique in providing an in-depth understanding of the experiences of lay people, or non-professional sport competitors, with an amputation who take part in sport. An international sample was obtained with a relatively even split of males and females, thereby including a diverse set of experiences in the research. The use of video calls allowed the inclusion of participants based anywhere in the world providing they met the inclusion criteria, increasing the chances of recruiting from a relatively small population.

Although there are strengths to the study, there are several limitations to be considered. Although the sample was considered homogenous, there were some differences between participants such as the time since amputation and reason for amputation. Although this allowed for a broad range of experiences to be discussed in interviews, those who experienced amputation more recently may have been better able to remember and recall their experiences than those who had experienced amputation many years prior.

Despite attempts to include them, experts by experience were not involved in the design and development of the research. This may have resulted in missed opportunities in identifying issues with the research design, for example the recruitment methods and interview schedule used.

Most participants who took part were recruited through social media from amputation support groups or sport groups for people with an amputation. It is possible that people who do not like to identify as being ‘an amputee’ avoid such groups and so the study may be missing the experiences of these individuals. Some participants preferred to participate in sport amongst people without disabilities, therefore there may be other individuals like this who were not exposed to the recruitment advert and so could not have taken part. Those recruited through limb loss support groups may have had a greater need for social support and experienced difficulties following their amputation and so the study may not represent those who did not seek support. However, a benefit of the recruitment method is that it was advertised in various places and one participant was recruited through word of mouth from another participant, allowing people with different experiences and members of different groups and social media preferences to take part.

Future research

Future research adopting a longitudinal approach would be valuable in aiding an understanding of the role of sport in the rehabilitation of people following limb loss over time. Similarly, given the Western centric focus of much of the research on limb loss, and the use of largely white samples, research with participants from more diverse cultural backgrounds, ethnicities or countries would be helpful in extending the evidence base concerning identity development and sport following amputation. Finally, the present research has focussed on adults and so people who had lost a limb during childhood were excluded. Children and adolescents who are born with limb difference or lose a limb early in life would offer a valuable, under-researched group where sport participation and identity could be explored further; particularly as childhood and adolescence are important life periods for identity formation.

Conclusions

This study used IPA to explore the lived experiences of people who had undergone limb amputation and participate in sport, and the impact on their identity. The findings demonstrate the various ways sport can facilitate identity reconstruction following amputation and have important implications for the exploration of sport during rehabilitation and beyond. Clinical psychologists can assist by helping individuals to live according to their values, allowing them to regain and strengthen their identity. Taking part in sport can be beneficial in this as it can allow individuals to connect with others, help people, and feel a sense of normality. Clinical psychologists can also assist individuals in navigating feelings associated with the gaze of others and internalised stigma. The study also highlights areas for further research.

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Table 1. Participant Demographics

Pseudonym	Age	Gender	Sport	Years participated in sport	Limb amputated	Years since amputation	Country	Interview method
Mary	59	F	Mountain biking	13	Left leg, below knee	40	Australia	Video
Chris	42	M	Sit skiing Mountain biking	2 5	Left leg, below knee	5	US	Video
Gary	27	M	Judo, obstacle courses	4	Right Leg, below knee	5	UK	Telephone
Bob	62	M	Swimming Cycling	20-25 10-15	Right leg, below knee Right arm, above elbow	35	UK	Telephone
Frances	55	F	Swimming	2	Right leg, above knee	2	UK	Video
Mike	51	M	Cycling	5	Left leg above knee	15	US	Telephone
Harry	22	M	Football	4	Right arm, above elbow	4	UK	Video
Carol	58	F	Swimming	15.5	Left leg, hind quarter	16	UK	Video
Jessica	40	F	Horse riding	36	Left leg, below knee	0.5	US	Video

Table 2. Final Themes and Individual Participant Themes

Final theme	Participant theme
Theme 1: Enabling a feeling of normality and equality	Bob: Feeling part of a group and no different to people without a disability Carol: Regaining and maintaining independence via swimming Carol: Swimming as a means to build confidence in and out of the pool Chris: “I'm really not a basketball player anymore” – accepting losing identity as a basketball player and finding a replacement in sit skiing Frances: Being bold, building emotional strength, and overcoming the mental challenge of amputation Frances: Swimming provides a feeling of normality and belonging Gary: Feeling proud of achievements, but frustration that these achievements aren’t always fair Gary: From sitting on the side-lines to taking part: amputation as a means of freedom and ability Harry: Cancer as motivation: taking part in football shows that he is continuing as normal getting on with life Jessica: Being in control - getting back into sport was confirmation that everything was going to be ok Mary: “Competing against able-bodied people makes me think I’m not disabled”: Cycling offering a feeling of normality Mike: “Walking around, I'm still an amputee, but when I get on the bicycle, I’m a bicyclist” – cycling offering a feeling of normality

Theme 2: Becoming a better person	Bob: Finding ability through disability: through the restriction of amputation came the desire and urge to be active Chris: A new purpose- helping others navigate a complex situation Frances: Being bold, building emotional strength, and overcoming the mental challenge of amputation Gary: Getting satisfaction and motivation from sharing the sport and helping others Harry: “I've just found my voice” – the role of sport in increasing confidence Jessica: Becoming more compassionate and a desire to help others – how injury and elective amputation has led to positive gains Mary: Being the only amputee - standing out, receiving admiration, and being an inspiration Mike: “I see myself as a better man than I was” – amputation resulting in self-improvement. Becoming more compassionate and understanding, and helping and inspiring others
Theme 3: Belonging and connection	Bob: Feeling part of a group and no different to people without a disability Carol: Swimming as a means to build confidence in and out of the pool Chris: Not holding anybody back: how sit skiing enables keeping up with friends Frances: Swimming provides a feeling of normality and belonging Harry: Being part of an amputee community helps with adjustment to life with one arm Mary: The social element is instrumental in conquering fears and facilitating enjoyment of cycling

	Mike: Connection to others and God to overcome amputation
Theme 4: Experiencing and responding to the gaze of others	Bob: Accepting and adapting – how inclusion reduces the stigma Carol: The role of a positive, problem-solving attitude in navigating life after amputation Frances: The gains from swimming are worth the stares and judgements – the role of a high value activity in overcoming the difficulties in accepting a new body Gary: Openness and visibility of being an amputee differs to that of being seen as disabled Harry: “I've just found my voice” – the role of sport in increasing confidence Jessica: “sport is extremely empowering” – proving ability and strength to others Mary: Being the only amputee - standing out, receiving admiration, and being an inspiration

Appendix 2-A: Journal instructions for authors

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   - Reconstructive surgery is a technique available to this group.
   - In a relatively small sample this study shows participation and social functioning improved after surgery.

   Example 2: Multiple Sclerosis

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   - People with MS have complex reasons for choosing to exercise or not.
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Updated 12-11-2021

Appendix 2-B: Initial Coding excerpt – Mary

Initial Codes	Transcript
	So I suppose to start with, before we kind of get into the interview properly, I wondered if you could like briefly tell me about the nature of your limb amputation, I know you told me a little bit in the email you were 19 and it was a car accident, is there anything else that you want to tell me about that?
Before amputation she did not consider herself an athlete and would usually come last She has learnt to enjoy sport Can’t go running but can go cycling Enjoys the freedom of cycling Likes the admiration from people without a disability when cycling	That naturally I’m not, I was never an athlete, so naturally I would participate but always come last and it’s still like it now I participate but I come last but I’ve actually learnt to enjoy it and I think mountain biking is probably one of the sports that have made it so I can do it easier, I can’t go running for example, but I can participate in mountain biking and I enjoy the freedom of the cycling and probably the psychological thing about the admiration I do get from other people, from normal, from you know, two legged people, I don’t know what to call it, yeah.
	So can you tell me a little bit about your participation in it, I was wondering do you use like a special bike or do you use a prosthetic, how do you, how do you do it?
Not allowed to cycle after recent surgery but does anyway	So I use, so my prosthetics I have I just use it so I but recently I had osseointegration and so I haven’t been able to I wasn’t allowed to cycle now but I do but the doctor doesn’t know I’m doing it but what I’ve got now because of the osseointegration there’s a , there’s, do you know what that is?
	I don’t, I was going to ask you if you could tell me a little bit about what that is
	So osseointegration is where they put a titatium rod into your bone so that the bone now has to grow on the titatium rod, so they don’t want me to twist or something to twist the rod because it has to grow fast onto it
	Right

Some difficulties cycling with a prosthetic Would fall a lot during races, but many other people fall too	So what I've done is in the past I used to have cleated shoes which, cyclists have cleats which they lock in, but inevitably I would, when we do difficult things in races I would fall, lots of people fall, I would fall as well, but the foot would stay cleated in and I would come out the socket so my bike and my leg would lay one side of the track and I would lay on the other side of the track, but now I can't do that because I can't allow it to twist so what I've got now is magnetic pedals so the foot just clicks onto the pedal that's got a magnet on it and it's easier to lift up so but that is not

Appendix 2-C: Summary Table of Individual Participant Themes

Participant	Themes
Bob	Theme 1. Finding ability through disability: through the restriction of amputation came the desire and urge to be active Theme 2. Accepting and adapting – how inclusion reduces the stigma Theme 3. Feeling part of a group and no different to people without a disability
Carol	Theme 1. Regaining and maintaining independence via swimming Theme 2. Swimming as a means to build confidence in and out of the pool Theme 3. The role of a positive, problem solving attitude in navigating life after amputation
Chris	Theme 1. Not holding anybody back: how sit skiing enables keeping up with friends sit skiing Theme 2. A new purpose- helping others navigate a complex situation Theme 3. “I'm really not a basketball player anymore” – accepting losing identity as a basketball player and finding a replacement in sit skiing
Frances	Theme 1. Swimming provides a feeling of normality and belonging Theme 2. The gains from swimming are worth the stares and judgements – the role of a high value activity in overcoming the difficulties in accepting a new body Theme 3. Being bold, building emotional strength, and overcoming the mental challenge of amputation
Gary	Theme 1. From sitting on the side-lines to taking part: amputation as a means of freedom and ability Theme 2. Openness and visibility of being an amputee differs to that of being seen as disabled Theme 3. Getting satisfaction and motivation from sharing the sport and helping others Theme 4. Feeling proud of achievements, but frustration that these achievements aren’t always fair
Harry	Theme 1. Being part of an amputee community helps with adjustment to life with one arm Theme 2. Cancer as motivation: taking part in football shows that he is continuing as normal getting on with life Theme 3. “I've just found my voice” – the role of sport in increasing confidence

Jessica	Theme 1. Being in control - getting back into sport was confirmation that everything was going to be ok Theme 2. "sport is extremely empowering" – proving ability and strength to others Theme 3. Becoming more compassionate and a desire to help others – how injury and elective amputation has led to positive gains
Mary	Theme 1. "Competing against able-bodied people makes me think I'm not disabled": Cycling offering a feeling of normality Theme 2. The social element is instrumental in conquering fears and facilitating enjoyment of cycling Theme 3. Being the only amputee - standing out, receiving admiration, and being an inspiration
Mike	Theme 1. "I see myself as a better man than I was" – amputation resulting in self-improvement. Becoming more compassionate and understanding, and helping and inspiring others Theme 2. "Walking around, I'm still an amputee, but when I get on the bicycle, I'm a bicyclist" – cycling offering a feeling of normality Theme 3. Connection to others and God to overcome amputation

Appendix 2-D: Audit trail example for one participant - Mary

Theme 1 – Being the only amputee - standing out, receiving admiration, and being an inspiration

Initial Codes	Narrative Summary	Participant Quotes
•Didn’t feel bothered about losing her leg as she wasn’t particularly active anyway •So used to life as an amputee now that it is difficult to remember what it was like in the early days, osseointegration has brought back memories of it. •She would often forget she didn’t have a leg in the morning •Adapted to life with one leg and now it is very natural for her •Lack of control over the amputation has made it easier to accept and move on •Has taken a long time to accept the appearance of an artificial leg and will now use prosthetic legs with designs on them and doesn’t need them to look normal •Cycling has helped acceptance of prosthetic •Prosthetic being visible results in respect from others •Some difficulties cycling with a prosthetic •Fallen in love with the outdoors •Making choices to make her life easier •Can’t go running but can go cycling •Her body has adapted to the level of exercise, it is difficult after a period of no exercise •Worries about being intimate with another man •Sexual aspect of being an amputee is daunting •Certain things she can’t do in the bedroom •Embarrassment	This theme encompasses Mary’s adaptation to life as an amputee and the battles with her body image. Mary described adapting fairly easily to life after amputation and was more upset about her weight than losing her leg. She felt relieved that the focus would now be on her leg and not on her weight, especially as her amputation was an accident and not something she had control over, in contrast to her weight. A large motivator in taking up cycling was a means to manage her weight, and despite feeling comfortable being an amputee Mary initially found cycling difficult as her prosthetic leg would be on show so she would try to hide it. Over time, she has accepted her prosthetic, and it’s unnatural appearance, and will ‘almost flaunt’ it. In contrast to her early experiences where she would hide her leg, she now enjoys her prosthetic being noticed. She takes part in able bodied events and stands out due to being the only amputee. Her amputation and prosthesis being exposed and on display ‘forces’ respect from others. This allows her to receive recognition and admiration from others and be seen as an	“I don’t do sport any way so the fact that I’d lost my leg did not bother me because I wasn’t like ‘oh what am I going to do now I can’t do what other people are doing’ because I wasn’t doing anything” “I think I’ve got so used to it now that I wouldn’t have been able to tell you until now I’ve had the osseointegration done now” “your brain forgets that you haven’t got a leg so like when you wake up in the morning to go to the toilet you go oh hang on I haven’t got a leg” “getting in and out of bath, it’s so natural now for me to do it but if I think back it’s something you have to adapt to” “The amputation has never, ever, bothered me. It was sort of like yeah it happened, it was an accident…I haven’t got control of the amputation, it happened, accept it, lets move on” “honestly it’s only recent that I’ve actually made prosthetic legs that have got animals on them and now I’ve actually got to the stage where I’m making a statement, I’m actually putting it out there and going ‘this is me’, it’s not meant to look like the other leg, it’s not a leg, it’s artificial, it’s yeah, that took a long time” “think the exposure was there all the time because you’re riding with shorts so it’s exposed

•Awareness of hurting partner •Added mental load, has to think about thinks that were previously automatic •More self-conscious of her weight than her amputation, and was glad the focus would be on her leg instead of weight •Started cycling to manage her weight •Tries really hard to not be fat •Was more upset about weight than amputation •Amputation was an accident and something she cannot be blamed for or control, whereas weight is •Sport helps to manage weight and allows her to eat chocolate •Initially didn’t want people looking at her leg and was embarrassed and would hide her leg with tracksuits, contrast to how she is now and will ‘almost flaunt’ it. •An acceptance of her leg •Thrives on the respect of taking part in able bodied events •Seen as an inspiration •Children are proud and impressed •Gets inspiration from other disabled/injured athletes •Social media increases visibility of amputees who do sport but also amputees who do normal things •Likes the admiration from able bodied people when cycling •Enjoys receiving recognition and cheers from others when cycling, believes this is due to her prosthetic. Thrives on inspiring others and making people think ‘you can do it so what’s my excuse’ •Further opportunities – giving talks which she loves	inspiration. She enjoys this and it has led to further opportunities such as public speaking about her experiences. Inspiration is reciprocal and Mary also appreciates other amputees or athletes with a disability being publicly visible as she also gains inspiration from them. In addition to challenges around her self-image, Mary discussed her feelings around being intimate with her partner and felt daunted and worried about this.	all the time so it’s sort of like I think the sports sort of made me aware that I can’t cover it” “everybody sees it and you’re almost forcing the respect out of the people which is a bit vein, but yeah it is” “when we do difficult things in races I would fall, lots of people fall, I would fall as well, but the foot would stay cleated in and I would come out the socket so my bike and my leg would lay one side of the track and I would lay on the other side of the track” “that I’ve really fallen in love with the outdoors” “So I choose to drive automatic but I can drive manual” “I can’t go running for example, but I can participate in mountain biking” “Your body adapts” “when we got divorced it was like woah ok now I wonder if another man would look at me, my leg, and how would I go sexually with another person” “that whole sexual aspect of being an amputee is daunting” “just you go oh hang on there’s certain things I actually can’t do” “I’ve got to take my leg off before we can get into bed it’s like uhh this is embarrassing” “there’s this piece of metal that sticks out your stump now so it’s sort of like ooh now I’ve got to be careful I don’t scratch, scratch my partner with it or hurt him”

•Is the only amputee	“so now I’ve got to think when I press the clutch in so it’s something oh wow and you’ve got to think, when you’re able bodied you just do it” “I think I’ve always been a little bit on the plump side so for me weight was more of an issue than amputation so for me having an amputation was sort of like *gasps* at least people are going to look at my leg now and there’s nothing I can do that was an accident but if they’re looking at my big fat backside that I felt more aware of” “I was more aware of was being overweight than I was of my leg.” “everybody says ‘oh you’re not fat’, I say I know I’m not fat because I actually try really hard not to be fat” “I’ve always got this whole weight thing, that’s probably why I started cycling like ‘oh I’m gaining weight I’ve turned 40 I should start doing something’” “definitely helps with the weight, I can eat, I can have chocolate” “I think when I started I was a little bit embarrassed and I didn’t want people really looking at my leg… as I finished something put a tracksuit on or something… but now I’ve become like you know what this is me almost flaunt it” “I’ve never participated in a disabled event, I don’t know what it’s like to be part of that environment because I’m always with able bodied people so there’s a lot of respect that

comes my way from them and I think I thrive on that”

“I have been asked to do a couple of talks you know public speaking talks about it so that’s so that’s also like yep that’s an inspiration so I think I get I definitely get the thing about being an inspiration, (inaudible) the sport has given me the leverage of inspiring people”

“, they always go ‘oh wow’ and they tell their friends you know what my mum did my mum’s doing this so it’s sort of like they always ask ‘mum so when’s the next thing?’”

“I do get a lot of inspiration from other people that have had traumas in their life”

“social media’s actually really good because now you get involved with people, other people and you see them so all these amputees, you now see people that actually do a lot of sport but then you also get to see people that go I’m just a normal person that is just thankful that I can walk to the post box and back again”

“the admiration I do get from other people, from normal, from you know, two legged people”

“because I think I actually enjoy the, it sounds vein, but the attention because even though I’m last everybody cheers me as I come in because they all can see I’ve got a prosthetic so like ‘wow you can do it so what’s my excuse’, and I think I actually thrive on that, on the fact that I make people look at themselves and think ‘well if she can do it I can do it as well, why am I complaining’”

		“I have been asked to do a couple of talks you know public speaking talks about it so that’s so that’s also like yep that’s an inspiration so I think I get I definitely get the thing about being an inspiration, (inaudible) the sport has given me the leverage of inspiring people” “none of the things I’ve participated in have there been any other amputees”

Theme 2 – The social element is instrumental in conquering fears and facilitating enjoyment of cycling

Initial Codes	Narrative Summary	Participant Quotes
•Riding with 70 other people •Feeling loved and appreciated •Met partner through cycling, they do events together but don’t train together •Trains alone but takes part in large events •Events are long in duration and she has people around her all of the time •Early experiences of rides, not races, with a social element showed her that sport can be fun •Getting to know people well through sport •Being part of a group and not being by herself •A common interest with her partner where they can have fun and show affection •Meeting others and being inspired by them to do more sport •Meeting others broadens horizons •Sport gives you something to talk about •Making jokes •Enjoys being part of a group of enthusiastic athletes	This theme describes the importance of the social aspect of the sport for Mary and how it has been fundamental in her enjoyment of it Taking part in biking events where there was not an element of competition allowed Mary to get to know others and feel part of a group. She was able to create a social network where she felt loved and appreciated, and through the sport she met her current partner, and they continue to take part in events together. This can be a way of them having fun and showing affection to one another. Mary enjoys being part of a group of athletes as they are enthusiastic and give support to one another. Through socialising with others, she has discovered other activities and broadened her horizons. It has exposed her to new ideas and has spurred her on to do more physical activity, such as hiking.	“so there were 70 other riders so I just rode with 70 other people” “it gives me a beautiful social network that it, yeah I just feel very loved and wanted and yeah appreciated” “later I got involved with one of the people I’d met there and so (partner’s name)’s my partner and so we together do mountain biking events but we don’t necessarily train together because I’m not good” “I train by myself, I cycle by myself, and then we go to events in a big group” “you’ve always got people around you all the time for 7 hours” “so it was really a fun event, I think the whole fun aspect set in my brain that this was actually fun, the people are great, everybody they weren’t maniacal people that were fast because it wasn’t a race, so I think that sort of

•Receives and gives support to members of group •Events being cancelled due to covid has taken away the goal and purpose of training which has been hard •Cycling without an event to focus on is boring •Took advantage of events being cancelled and got osseointegration •Races/events provide motivation to exercise •Emotional benefits of taking part in sport •Would fall a lot during races, but many other people fall too •Naturally a fearful person and was scared doing her first bike ride •Falling off her bike was made easier by rewards for those that fell •Felt satisfaction after overcoming fears •Overcoming fear and self-doubt was a challenge at first •Enjoys the freedom of cycling	Unfortunately, covid-19 restrictions resulted in biking events and races being cancelled, when Mary has the prospect of being involved in a race or event this would provide motivation to train, and so this has made cycling boring for her. Despite this, she used this to her advantage and used the time to get surgery. Getting involved in cycling as part of a group helped Mary over come her fears. She described herself as a naturally fearful person, however knowing and seeing others fall too helped, and falling off her bike was made easier by all the riders in the group being rewarded with chocolate and falling being made into a social element of the event. Although overcoming her fears was a challenge to begin, it left her with feelings of self-satisfaction and freedom.	sealed the fun aspect for me of the sport, this can be fun” “inevitably now it’s the same group of people generally that go to the same places so we all know each other” “so many different categories so it doesn’t feel like ‘oh my goodness I’m out there all by myself’ because I’m not, I’m in the middle of this whole group” “he cycles in his event so he’ll pass me and then we wave kisses to each other and it’s always ‘aw there goes my man’ and he goes ‘there you go my precious girl’” “ on one our …I met mountaineers there…I wouldn’t mind just doing hiking just going for nice mountain climbs and so they’ve inspired me” “try’ so suddenly your horizons are broadened because you’re mixing with other people that have got other ideas and do canoeing or all these things you suddenly are exposed” “it gives you something else to talk about” “so it’s always a joke so I think it does impact yeah if you can make a joke of something” “so but when you’re with a group of people that are athletes they’re vibrant, they’re full of enthusiasm” “they cheer you on for your goal so you cheer them on for their goal so it’s very reciprocal” “That’s been hard because it takes away the goal so that boring hour cycle that you do down the road like oh this is boring there’s

	nothing I'm towards it there's no reason to go down the boring road everyday" "but while covid was on that's when I had the osseointegration done so I was thinking well you know what all my events are cancelled so I might as well do this and it's a win win" "it's that whole motivation to get up and do it (inaudible) but if you know there's a race coming up you don't think about 'oh I don't feel like it' it's just too bad you better get your butt on the bike" ", yeah definitely good for the brain like the emotional side" ", when we do difficult things in races I would fall, lots of people fall, I would fall as well" "I was very, very scared. I was scared of falling. I'm naturally a fearful person" "no I don't want to come off, I don't want to get hurt, I don't like this idea of getting hurt, but it was such a fun ride that if you had a fall somewhere along the line, they would buy you a chocolate…, so they made it fun, and and and so I think that sort of overcame it" "and I had all this fear and then once I was over it was like 'oh ok yeah I did it'" "I enjoy the freedom of the cycling"

Theme 3 – "Competing against able-bodied people makes me think I'm not disabled": Cycling offering a feeling of normality		
Initial Codes	Narrative Summary	Participant Quotes
•Before amputation she did not consider herself an athlete and would usually come last •She has learnt to enjoy sport •Grew to love mountain biking •Prior to amputation felt useless when it came to sport as wasn't naturally athletic •In her 40s she realised she was able •Will try to beat people on the same level as her •Accepting of people beating her •Has got stronger over time so doesn't always come last •Considers self an athlete •Recent surgery reminded her she is disabled •Doesn't consider self as disabled •Others forget she is disabled •Competing against able-bodied people makes me think I'm not disabled •Some prosthetics remind her what it is like to be able bodied •Spurred along by negative comments •Doesn't compete against many in her age category so usually places on the podium •Pride and amusement at being the only one in her age category so coming first in the country. Enjoys the irony of it. •Is the only amputee •Not allowed to cycle after recent surgery but does anyway	This theme describes Mary's view of herself and how this has changed over time. Prior to her amputation, Mary did not consider herself athletic and felt useless with regards to sport. In her 40s, approximately 20 years after her amputation, she began to participate in mountain biking and grew to love it. Over time she got stronger and does not always come last like she did in the past. She began to realise that she does have athletic ability and now considers herself an athlete, just like the people she rides with. It is clear how much cycling is important to her now as she is willing to ignore her doctors advice to avoid cycling after surgery. Another key part of how Mary views herself is not being disabled. This is enhanced by the fact that she takes part in events, and competes with, able bodied people where she is the only amputee, and due to there being a small number of competitors in her age category she often wins and places on the podium. Other people also tend to 'forget' that she is disabled and has an amputation. Although she does not see herself as disabled, she does recognise that she is more limited in her abilities than other people, and so when racing will aim to beat people who she perceives as being on the same level as her, for example older or with joint problems.	"I was never an athlete, so naturally I would participate but always come last and it's still like it now I participate but I come last but I've actually learnt to enjoy it" "once I started doing that I just grew to love it and then actually started entering into mountain biking events." "It was like 'do I have to? Nah I'm useless'…I wasn't naturally athletic" "I was in my 40s I was like 'oh I can do this'" "people there would be people that are actually slower than me that are older or fatter that have knee problems but they're all doing it for the fun so then I go 'ooh yep I could pass them I can do this'" "the girls that ride with me are really strong so I know if there's someone else they're going to beat me that's just the way it is" "now I'm much stronger and I don't necessarily come last anymore, which is a great feeling" "and when I had done it I think oh now I remember that I'm disabled" "I never consider myself as being disabled it's it's like I forget and because I am like I am, generally people forget that as well" "I think competing with able bodied people makes, probably makes, reminds me that I, makes me think that I'm not disabled"

	“with this prosthetic I’ve got a water leg a water attachment so I put it on and I can just walk in like ‘oh this is what it feels like to be able bodied’” “I cycled my butt off but I passed them and I just said bye and they were so upset, a one legged granny can beat you yeah” “there’s only generally 3 or 4 of us in the age category so inevitably if there’s 3 of us I’ll be on the podium I’ll be third so it’s always I’m always on the podium because I’m third” “it’s the irony of it I think that I enjoy, the laughter that well if I’m the only one” “to I wasn’t allowed to cycle now but I do but the doctor doesn’t know I’m doing it”

Section Three: Critical Appraisal

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This critical appraisal allows for further, more in depth, reflections on the research process and broader issues. In this critical appraisal I will firstly provide a summary of each paper along with implications for clinical practice. Following this, I will explore the strengths and limitations of the empirical paper, along with my personal reflections on the process of carrying out the research. I will also discuss issues and salient points that presented along the course of the research process, including the challenges of carrying out research amongst this population, language used, and the impact of the researcher during the process.

Overview of findings

The literature review was conducted to investigate the experiences of military personnel who had experienced limb loss. Three themes were identified through a meta-synthesis of 16 papers: (1) Making the physical and psychological transition to life after amputation, (2) The role of the military culture in rehabilitation, and (3) The impact of relationships and the gaze of others during rehabilitation and beyond. The findings emphasise the difficulty in transitioning to civilian life and the role of pain in post-traumatic stress. The relevance of clinical psychology was considered in relation to these findings and potential implications for support were suggested such as targeted interventions to those with problematic pain following limb loss, providing support and training around becoming a peer mentor, and providing support to veterans in exploring their identity and values following discharge from the military and transition to civilian life.

The second section of this thesis presented qualitative research exploring the experiences of people who had undergone limb amputation and participate in sport, and the impact of this on their identity. Nine participants took part in semi-structured interviews containing questions about their experience of amputation, challenges, and sport participation. Interpretative phenomenological analysis (IPA) [1] was used to analyse interview transcripts and four themes were identified: (1) Enabling a feeling of normality and equality, (2) Becoming a better person, (3) Belonging and connection, and (4) Experiencing and responding to the gaze of others. The findings highlighted the various ways sport can facilitate identity reconstruction following amputation and were discussed in terms of the existing literature along with potential implications for the involvement of clinical psychologists during rehabilitation.

Although the two papers differed in terms of the population of interest, the literature review focused on military veterans whereas the empirical paper included only civilians, there were some commonalities between the findings such as struggles with identity and the usefulness of connecting with others who had experienced amputation.

Strengths and limitations

Recruitment

Participants for the study were recruited primarily via social media. Recruitment via social media can be beneficial as it is a cost-effective recruitment method and has been reported to be the best recruitment method for hard-to-reach populations [2]. The advert was posted on twitter with the use of relevant hashtags and posted on Facebook groups relating to amputation and adapted sport. Some groups had over a thousand members across various countries which ensured that a large number of people were exposed to the research advert, giving a large number of potential participants and the potential for an international sample and breadth of experiences. However, it is possible in the larger groups that had many posts per day that my post could have been missed by some members. I was aware that I did not want to appear like I was ‘spamming’ pages or taking away from the intended nature of the group, to provide peer support and advice, so I limited my posting to two times per Facebook group. A downside of advertising online is that the advert will have only reached people who had access to the internet and actively use social media. This could have led to a group of people being excluded from the research. Efforts were made to advertise the research in a printed magazine; however, this was met with barriers such as the high cost and periodical nature of the magazine.

Participants

A sample size of nine was achieved in the empirical research. This was an appropriate size for IPA [1] and I was pleased I managed to reach my target of between six and nine interviews. This relatively large sample size gave richness to the dataset, however it resulted in a large volume of data for analysis. All participants lived in western countries; this may have played a role in their identity development and how they view themselves, for example western society tends to have an individualistic culture as opposed to more collective cultures seen in eastern societies [3]. Although the sample was geographically diverse, the sample consisted of mostly white participants, with only one participant of a different ethnicity.

The sample had a fairly even gender split (five male, four female). However, it is possible that there are differences between the genders in terms of ability or willingness to talk about emotive events, and it was noted that on average the interviews with male participants were shorter in length than interviews with the female participants. It has been documented that researcher characteristics, for example gender and ethnicity, can impact on data collection [4] therefore it is possible that the female participants were more open with me because I am also female.

It is possible that the sample was biased in terms of socioeconomic background, giving the participants a particular lens in which they view the world and themselves. The study may have favoured those from a high socioeconomic background and with more disposable income. It is important to note that people with disabilities are more likely to live in poverty [5]. Taking part in adapted sport often requires the use of adaptive equipment or assistive technology, and it has been reported that cost is the main reason why people struggle to access assistive technology [6]. In addition, it has been reported that a barrier to taking part in exercise amongst people with limb loss is the standard of local facilities and the ability to travel to local sport centres [7] which could be affected by the socioeconomic status of an individual and the area in which they live. Access to, and the quality of, facilities could also impact on confidence in taking up sport and maintaining activity and as a result perpetuate stigma amongst this group. The socioeconomic status of participants of the study was not collected and therefore unknown.

Some participants experienced amputation following trauma such as a road traffic accident, others experienced amputation due to osteosarcoma, and others chose to have an amputation following failed surgery after injury or chronic pain in their limb. Although the participants were homogenous in the fact they had all experienced amputation, their differing experiences may have had an impact on the way they saw themselves before and after amputation as those who underwent elective amputation may have had more time to prepare and come to terms with the loss of a limb. It is important to note that the most common cause of amputation in Western countries is due to vascular causes [8] which differs from the participants in this sample. This may be due to the age of those with a vascular amputation typically being older and more physically impaired therefore taking part in sport may be more challenging and so less common. As such, the findings of this study may not be able to be extended to all individuals with limb loss.

It is also important to consider potential biases in collecting data retrospectively. Some participants experienced amputation decades prior to the interview so their memories may have been less reliable than those who experienced amputation more recently, and they may have found it difficult to recall their thoughts and feelings from this time.

Data Collection

Covid-19 impacted on the research as all interviews were required to be carried out remotely. This worked in my favour as it meant participants could be recruited from anywhere in the world. The participants in the UK were not local and a face-to-face interview would have been difficult even without covid restrictions. Online interviews have been reported to be a viable method of data collection due to technological advancements and can replace face to face interviews [9]. A benefit of online interviews amongst people with limb loss is it may have looked more attractive to take part in for people with mobility difficulties who may struggle to travel somewhere to take part. Despite the benefits of online interviews, there are a number of disadvantages: participants were required to have access to suitable technology, which may have excluded older participants [10] or those from a lower socioeconomic background. To ameliorate this, telephone interviews were also offered to participants as an alternative.

Although the use of video and telephone calls had benefits, it may have resulted in some barriers in communication. For example, the ability to pick up on body language was hindered particularly for interviews which took place via telephone. This may have impacted on the building of rapport, possibly resulting in less detail [11,12]. Alternatively, as the telephone offers more anonymity, participants may have been more comfortable taking part this way and thus divulged more information. I gave participants the choice of telephone or video interview; most opted for video however two opted for telephone and one participant experienced technical issues during the interview, so we switched to telephone for the remainder. I found the telephone interviews more difficult as I could not see participants to assess their body language or facial expressions to gauge how the interview was going.

Research interviews were a new experience for me, so it was a steep learning curve. In my first interview I struggled with managing a talkative participant who had a tendency to veer off topic. In the initial interviews I felt I stuck more rigidly to the interview guide, possibly due to my lack of confidence and familiarity with interviews, and so I may have missed opportunities to explore particular areas in sufficient detail. Throughout the process I became more comfortable in interviewing and more familiar with the interview guide thus was more focused on the interview and the participant. Pilot interviews may have been useful during this process, allowing me to become accustomed to delivering interviews [13]. Due to time constraints a pilot study was not conducted, however this may have highlighted issues prior to the research taking place.

Throughout interviewing I found that using the word ‘identity’, for example ‘How has your identity changed?’, in my questions was quite abstract and people often struggled to answer. However, over time I found that if I replaced it with ‘How has the way you see yourself changed?’ then this seemed to resonate with people more and they were able to answer more easily. I think this highlights the important of language used in interview questions and how a slight altering of questions can gain much more information [14], and the important of conducting pilot interviews to identify these problems [15].

Involvement of experts by experience

The research lacked the input of experts by experience (EBE). I attempted to gain the input of experts by experience on the content and design of the research materials via a limb loss charity, however I did not receive a response. In hindsight, due to successful recruitment via Facebook groups, it would have been relatively easy to seek advice and consultation from the moderators or members of these groups. An EBE recruited in this way could have provided feedback on the advert, information sheet, interview schedule, and debrief sheet. They could have also taken part in pilot interviews, providing feedback on my interview style. EBEs have reported feeling that they can assist with research in identifying potential issues that were not previously considered and can improve research design [16].

Challenges

Initially the intended focus of the research was on people who had taken up sport after amputation and did not take part in sport before amputation or did not consider themselves athletic. It proved difficult recruiting these specific participants, so after some difficulty recruiting it was decided to alter the specific focus of the research and to include people who did take part in sport prior to amputation. This amendment was submitted and approved by the Research Ethics Committee. Ultimately, there was a mixture of participants who did and did not take part in sport prior to amputation, including some who did take part in sport but following amputation had to find a different sport to take part in. An example of this is provided by Chris who could not return to playing basketball, and others who returned to sport but at a higher level, such as Harry. I considered the differences between the participants and the impact of this on the homogeneity of the sample, however it was felt that the sample met homogeneity due to experiencing limb loss and taking part in sport following this. In addition, during the analysis, commonalities were found between a variety of participants, contributing to super-ordinate themes showing that despite their different experiences prior to limb loss they shared similarities in their identity and sense of self.

Personally, delivering interviews was a challenge for me. It wasn't something I had done before and I was nervous before each interview, particularly as they were online or on the telephone. I tried to focus on my clinical experience in delivering therapy sessions over the telephone or online which helped to ease my nerves. Although I would have preferred face to face interviews, conducting them online or on the telephone did offer some benefits as mentioned earlier and some participants may have preferred this method as they could take part from the comfort of their own homes. Traditionally, qualitative interviews are conducted face to face [17,18] which is reported to help build a rapport necessary to help gather rich data [11,12,19], and online interviews have been reported to be a suitable alternative [20]. During the telephone interviews I found myself needing to use more verbal cues as the participants could not see my reactions, such as nodding along, and this may have impacted on the ability to build rapport.

Reflexivity and the use of the self in the research

IPA research requires the researcher to acknowledge their own views and assumptions [1]. With this in mind, I kept a reflective diary (illustrative excerpts are included below) throughout the research process to ensure I kept a reflective stance, and I considered my own identity and how this might be viewed by participants and impact on the interview process:

> I wonder how it might feel for the participants to be interviewed by someone who does not have a disability, or who hasn't an amputation, and if this has an impact on the interview (diary extract 05/2021)

I was aware of my position as a person without a physical disability during the process of conducting the interviews, and although participants could only see part of me so could not tell whether I had a physical disability or not, I wondered how comfortable and easy the participants may have found talking to me about their experience of limb loss. In addition, I do not know anyone who has experienced limb loss, nor do I consider myself as athletic or even particularly active. I chose this particular topic as I have an interest in physical health and the emotional impact of it. I wondered how my lack of personal experience would impact on the research. Having a lack of knowledge and experience of limb loss and sport may have been beneficial as I did not have preconceived ideas about them, but at the same time perhaps there are important elements that I may have missed out on.

In this research I took on the role of an outsider, as opposed to an insider. Merton [21] describes an insider as being the member of a specific group and having intimate knowledge of the members of the group in question. For example, an insider may share the same disability or impairment, or be of the same race or cultural background. The position of being an insider vs outsider has been debated in the literature [22-25]. Insiders may have increased access to knowledge and can gather information from participants more quickly [26], however they may be biased towards a particular view [27], and outsiders may be valuable in research as they may “ask naïve questions to the vulnerable group and thereby push the envelope of understanding” [28,p.307]. It is possible that I was seen as sitting in between the insider and outsider role, with my interest in the psychological aspect of limb loss.

Several participants asked me why I was doing this research, my experiences on the doctorate and what was next for me. I felt the need to justify my interest in the research topic being a person without a physical disability with no experience of amputation. I spoke of my interest in the psychological side of physical health and felt somewhat uncomfortable revealing I did not know exactly which area I wish to work in upon qualifying. As a result of this discomfort, and not wanting to appear disinterested in the topic and therefore disingenuous, I skirted around this question:

> I was asked about my career and where I would work when I finish the course, I felt as though I had to say I want to work in physical health so as to not invalidate doing the research, when honestly, I'm not sure where I'd like to work yet (diary extract 05/2021)

I wasn't used to being asked personal questions and was caught off-guard, as I was used to focusing fully on the client and not bringing too much of myself to therapy sessions. This made me reflect on my clinical work and when it may be appropriate to bring elements of myself into the therapy room.

Some participants were very enthusiastic about the research and grateful to have their views and experiences heard, and the opportunity to contribute to an area of importance to them. I felt a strong sense of responsibility to 'get it right' during the analysis and write up of the research, especially as it has been reported that people with disabilities often feel misrepresented by research [29]. I didn't want to let them down and felt a degree of responsibility and pressure. It could have been helpful for me ask participants for their feedback on the results section, to check I had understood them correctly, although this was not possible due to the tight timescale of the thesis. This process is known as member checking; however its utility is debatable and Thomas [30] states that it although it is useful in approving material where anonymity cannot be assured it does not tend to improve research findings.

The power of language

During the course of the research, I noticed that some participants used the word ‘normal’ when speaking about how they feel doing sport, or how they wanted to be viewed by others, and wanting a feeling of ‘normality’. I chose to use the word ‘normality’ in one of the themes as I felt this best reflected the experiences and views of the participants and when I used the word ‘normal’ I placed it in inverted commas in an attempt to demonstrate that these were not my words. Some participants referred to people who had not lost a limb as ‘normal people’, whereas others used the term ‘able-bodied’. Feeling ‘normal’ has been documented by Mary Jo Deegan [31] where she discussed that ‘feeling normal’ and ‘feeling disabled’ are “part of everyday life of a person with a disability” [p.26]. She describes ‘feeling normal’ as a social process, and not being a denial of disability or a judgement of the disability, but when the disability becomes neutral and simply exists.

Although I reflected on the language of the participants used, it is important to acknowledge my position as a person without a physical disability and the language used in my report. Initially, I used the word ‘able-bodied’ throughout the write up, however after familiarising myself with guidelines around writing about disability I altered this [32,33].

Another aspect of language that came up in interviews with some participants was the way they were spoken about by others, especially the use of the term ‘disabled’ and being seen as ‘an inspiration’. This made me think about how we view athletes with a disability and how they are spoken about in the media. One participant in particular spoke quite passionately about her dislike of being viewed as an inspiration: she wanted to be viewed as a regular person taking part in a regular activity, not doing something out of the ordinary. However, she was happy to be seen as an inspiration to other people with a disability, for example someone who has also lost a limb. A term that was mentioned by her was ‘inspiration porn’, also known as ‘inspiration objectification’ [34].

The term ‘inspiration porn’ has become increasingly widespread after Stella Young, an Australian comedian and activist, spoke up on the topic [35]. Grue [36] debated the definition of the term and offers the following definition: “the representation of disability as a desirable but undesired characteristic, usually by showing impairment as a visually or symbolically distinct biophysical deficit in one person, a deficit that can and must be overcome through the display of physical prowess” [p.847]. As a result, the person with a disability is objectified and they are provided as a source of inspiration for people without a disability. Research analysing the media’s portrayal of elite athletes with a disability demonstrated that although their athleticism was focused on, this was underpinned by a narrative of being a ‘superhuman’ or a ‘supercrip’, a term used to describe someone with a disability who takes on “super human feats” and achieves despite their disability [37], showing that the media has the potential to influence the public’s views around athletes with a disability and could also create division within the disability community. This demonstrates the importance of how we speak about athletes with a disability.

Future Research & Conclusions

Future research could return to the original focus of the research, especially in light of the discovery of the usefulness of Facebook groups in recruitment. To further encourage participation, an incentive in the form of a voucher could be offered. Although care would need to be taken as this could encourage people to take part who are not genuine. Alternatively, it could be interesting to focus on people who were unable to continue with their sport following amputation and the impact of this on their sense of self.

To conclude, this thesis has added novel findings to the evidence base in the area of limb loss and identity. In the critical appraisal I discussed key elements of the research process, including strengths and limitations of the research, key challenges I encountered, potential improvements and areas for further research. It is hoped that these insights may inform future work in the area of limb loss and sport participation. Specifically, the issues of taking an insider-outsider perspective in research and the power of language when describing people with a disability have been discussed.

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Section Four: Ethics

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Faculty of Health and Medicine Research Ethics Committee (FHMREC)
Lancaster University

Application for Ethical Approval for Research

Title of Project: Understanding the experience of sports participation and identity in individuals who have undergone limb amputation

Name of applicant/researcher: Heather Havlin

ACP ID number (if applicable)*: **Funding source (if applicable)**

Grant code (if applicable):

***If your project has *not* been costed on ACP, you will also need to complete the Governance Checklist [link].**

Type of study

☐ Involves existing documents/data only, or the evaluation of an existing project with no direct contact with human participants. **Complete sections one, *two* and four of this form**

☒ Includes *direct* involvement by human subjects. **Complete sections one, *three* and four of this form**

SECTION ONE

1. Appointment/position held by applicant and Division within FHM Trainee Clinical Psychologist

2. Contact information for applicant:
E-mail: h.havlin@lancaster.ac.uk **Telephone**: 07756000720 (please give a number on which you can be contacted at short notice)

Address: Furness College, Lancaster University, Lancaster, UK, LA1 4YG

3. **Names and appointments of all members of the research team (including degree where applicable)**

Heather Havlin (Principal Researcher)
Dr Craig Murray (Research Supervisor)
Vicky Molyneaux (Field Supervisor)

3. If this is a student project, please indicate what type of project by marking the relevant box/deleting as appropriate: (please note that UG and taught masters projects should complete **FHMREC form UG-tPG**, following the procedures set out on the FHMREC website

PG Diploma ☐ Masters by research ☐ PhD Thesis ☐ PhD Pall. Care ☐

PhD Pub. Health ☐ PhD Org. Health & Well Being ☐ PhD Mental Health ☐ MD ☐

DClinPsy SRP ☐ [if SRP Service Evaluation, please also indicate here: ☐] DClinPsy Thesis ☒

4. Project supervisor(s), if different from applicant: Dr Craig Murray (Research Supervisor), Dr Vicky Molyneaux (Field Supervisor)

5. **Appointment held by supervisor(s) and institution(s) where based (if applicable)**: Dr Craig Murray (Senior Lecturer, Lancaster University), Dr Vicky Molyneaux (Clinical Psychologist)

SECTION TWO

Complete this section if your project involves existing documents/data only, or the evaluation of an existing project with no direct contact with human participants

1. Anticipated project dates (month and year)

Start date: End date:

2. Please state the aims and objectives of the project (no more than 150 words, in lay-person's language):

Data Management

For additional guidance on data management, please go to Research Data Management *webpage, or email the RDM support email:* rdm@lancaster.ac.uk

3. Please describe briefly the data or records to be studied, or the evaluation to be undertaken.

4a. How will any data or records be obtained?

4b. Will you be gathering data from websites, discussion forums and on-line 'chat-rooms'

4c. If yes, where relevant has permission / agreement been secured from the website moderator?

4d. If you are only using those sites that are open access and do not require registration, have you made your intentions clear to other site users?

4e. If no, please give your reasons

5. What plans are in place for the storage, back-up, security and documentation of data (electronic, digital, paper, etc)? Note who will be responsible for deleting the data at the end of the storage period. Please ensure that your plans comply with General Data Protection Regulation (GDPR) and the (UK) Data Protection Act 2018.

6a. Is the secondary data you will be using in the public domain?
6b. If NO, please indicate the original purpose for which the data was collected, and comment on whether consent was gathered for additional later use of the data.

Please answer the following question *only* if you have not completed a Data Management Plan for an external funder
7a. How will you share and preserve the data underpinning your publications for at least 10 years e.g. PURE?

7b. Are there any restrictions on sharing your data?

8. Confidentiality and Anonymity
a. Will you take the necessary steps to assure the anonymity of subjects, including in subsequent publications?
b. How will the confidentiality and anonymity of participants who provided the original data be maintained?

9. What are the plans for dissemination of findings from the research?

10. What other ethical considerations (if any), not previously noted on this application, do you think there are in the proposed study? How will these issues be addressed?

SECTION THREE
Complete this section if your project includes *direct* involvement by human subjects

1. Summary of research protocol in lay terms (indicative maximum length 150 words):

Amputation can often alter they way people see themselves and their sense of identity. After amputation of a limb, physical activity is often used as part of the recovery process. Physiotherapy is used to increase strength, provide better use of prosthetics and therefore increase mobility. As it is important for people with an amputation to keep up their physical strength, they may end up taking part in more physical activity than they did prior to amputation, for example taking up sports or athletics.
This increased participation in sports can have an impact on people’s identity and the way they see themselves. However, not all people with amputations who take part in sport were athletes prior to amputation, so it may be interesting to explore the experiences and identity development amongst this group.
Participants of this study will be invited to take part if they did not have previous involvement in sports prior to amputation. Information about their experiences will be collected via interview. Transcriptions will be analysed to help understand participants’ lived experience, how they make sense of this, and any meaning they assign to this. Achieving this understanding may help professionals, including psychologists, to help people in the adjustment of limb loss.

2. **Anticipated project dates (month and year only**)

Start date: 04/2021 End date: 03/2022

Data Collection and Management

For additional guidance on data management, please go to Research Data Management *webpage, or email the RDM support email:* rdm@lancaster.ac.uk

3. Please describe the sample of participants to be studied (including maximum & minimum number, age, gender):

The study is aiming for approximately 6 – 12 participants. Participants will be people who have undergone a limb amputation, and since amputation have engaged in any sports or athletics. The sample will be international and not limited to a particular geographical area.
A roughly 50/50 male/female split amongst the sample will be aimed for, and participants must be aged 18 or over, with a limb lost in adulthood (i.e. aged 18 or over).

Inclusion criteria:
- Experienced amputation of a limb in adulthood (i.e. aged 18 or over) (both upper and lower limb accepted, and multiple amputation accepted)
- After amputation engaged in sport/athletics, and currently engaged in this
- English speaking
- Did not consider themselves active in sports prior to amputation
- Aged 18 or over

Exclusion criteria:
- Considered themselves active in sports prior to amputation

4. How will participants be recruited and from where? Be as specific as possible. Ensure that you provide the *full versions* of all recruitment materials you intend to use with this application (eg adverts, flyers, posters).

Participants will be recruited in a number of ways:

- Approaching disability sports groups, and relevant charities

Disability sports groups and relevant charities will be approached via email (see appendix A for draft email correspondence) and sent an advert and poster for the study (appendix B and C), participant information sheet (appendix D), and social media advertisements with an electronic links to the poster (appendix E).
They will be asked to either:
- Contact their members via email, sharing the advert (appendix B) or poster (appendix C) and information sheet (appendix D).
- Advertise the study via their social media channels using the social media advertisement (appendix E) or sharing the poster (appendix C).
- Publish the advert (appendix B) in their publication.

The poster and advert will contain the email address of the lead researcher so interested individuals will then be able to contact the researcher to obtain more information and arrange to take part.

- Snowballing

Once a participant has taken part in the study, they will be asked to inform other people that they know who may be eligible for the study e.g. friends, team mates etc. They will be sent a copy of the advert to pass on to potential participants.

- Social media

The lead researcher proposes to set up a research twitter account that can advertise the study. The twitter account would be solely used to advertise the proposed study and to share the social media adverts (appendix E) and poster (appendix C). The research will also be advertised on facebook, using the poster (appendix C) and social media advert (appendix E).

Once potential participants have made contact to express interest in participating, they will be screened to ensure they meet the inclusion criteria. This will be done via email by asking if they were 18 or over when they lost a limb, they did not consider themselves active in sports/athletics prior to amputation, and they are currently active in sports/athletics.

5. Briefly describe your data collection and analysis methods, and the rationale for their use.

When participants arrange to take part in the study, they will be asked to complete the Athletic Identity Measurement Scale (AIMS) (Brewer, Van Raalte, & Linder, 1993) (appendix F). This measures the extent to which an individual identifies with the athletic role, and will form part of a demographics table (appendix G) detailing basic information about participants.
If the lead researcher is inundated with interest, beyond that of the target sample size of 6-12, the AIMS scores will be used to select participants with a stronger athletic identity. The reason for this is that the research is not looking in general at sports and limb loss, it is looking at the experience of identity and sports in groups of people with limb loss. It is therefore important that the people who take part have a strong sporting identity and it is an important aspect of their lives.

The study will adopt a qualitative approach, specifically Interpretative Phenomenological Analysis (IPA), to understand and investigate individuals' experience of sports participation and identity after limb amputation.
IPA allows for the collection of rich data of individual experiences. It is one of the most commonly used qualitative methodologies in physical and mental health (Smith, 1996, 2011), and aims to explore participants' lived experience of a phenomenon and how they make sense of it (Smith, 2011). IPA is suitable as this research aims to understand a persons' experience of limb loss and sports participation, and what this means in terms of their identity.
IPA typically involves a small, homogenous sample. Although demographics of people involved may be different e.g. age, ethnicity, economic background, and amputations may differ e.g. upper or lower limb, number of amputations, size of amputation, they all share the same lived experience of a limb amputation, and have made the decision to take up and engage in sport after amputation, therefore IPA is a suitable method of data collection and analysis.

Data will be collected via the use of semi structured interviews, which will be take place over video (via Microsoft teams) or telephone (if in the UK). As some participants may feel uncomfortable being video recorded, the recording feature in teams will not be used and the interviews will be audio recorded via Dictaphone. Transcripts will be anonymised, removing any identifiable information such as names and places, and a pseudonym will be used to identify participants.
For interviews which take place via telephone, the researcher will withhold their phone number.

The interviews will be semi-structured in nature, and a list of possible questions or topic areas to be explored in the interview will be used (appendix H). This will allow a level of flexibility and deeper exploration of topics or issues that the participant discloses.

6. What plan is in place for the storage, back-up, security and documentation of data (electronic, digital, paper, etc.)? Note who will be responsible for deleting the data at the end of the storage period. Please ensure that your plans comply with General Data Protection Regulation (GDPR) and the (UK) Data Protection Act 2018.

Immediately after the interviews have taken place, audio recordings will be removed from the Dictaphone, and transferred and stored electronically on the university's secure encrypted server or in university-approved cloud-based storage, where they will be kept for the duration of the research. Interviews will be transcribed and also kept in the same place.

As the interviews will take place via video or phone call, and the researcher will not meet the participants in person, participants will be asked to provide verbal consent. This will be gained by the researcher reading out each item on the consent form (appendix I) and having the participants verbally consent to each item. Verbal consent recordings will be transferred and stored on the university's secure encrypted server or in university-approved cloud-based storage, where they will be kept for the duration of the research.

Data (including typed transcripts of interviews) will be retained by the Doctorate in Clinical Psychology programme's research administration team for a period of ten years. Data will be transferred to the administration team using a secure university-approved procedure. Following the retention period, the data will be deleted by the administration team under the supervision of the research supervisors.

7. Will audio or video recording take place? ☐ no ☒ audio ☐ video

a. Please confirm that portable devices (laptop, USB drive etc) will be encrypted where they are used for identifiable data. If it is not possible to encrypt your portable devices, please comment on the steps you will take to protect the data.

Audio will be recorded using a digital Dictaphone. This device cannot be encrypted, and so data will therefore be transferred and removed from the Dictaphone on completion of each interview to the university's secure encrypted server or University-approved secure cloud storage. It is anticipated that this should be possible immediately following completion of each interview, however should there be any delay the audio recorder will be kept with the researcher at all times between completion of interview and upload of data.

b What arrangements have been made for audio/video data storage? At what point in the research will tapes/digital recordings/files be destroyed?

Audio recordings of interviews will be stored on the university's secure encrypted server or university-approved secure cloud storage until the research has been examined; at this point, the audio files will be deleted.

Please answer the following questions *only* if you have not completed a Data Management Plan for an external funder

8a. How will you share and preserve the data underpinning your publications for at least 10 years e.g. PURE?

Data (including transcripts of interviews) will be stored in electronic format by the Doctorate in Clinical Psychology programme's administration team. Data will be transferred electronically using a secure method that is supported by the university. It will then be stored on the university's secure encrypted server, or in university-approved secure cloud storage, as per usual course procedures. Audio recordings will be deleted when the thesis has been examined and transcripts and consent recordings will be kept for 10 years.

8b. Are there any restrictions on sharing your data ?
Due to the small sample size, even after full anonymisation there is a risk that participants may be identified from their interviews. Therefore, full transcripts will only be shared on a case by case basis by the research team, where the purpose is for secondary analysis or verification of data collection and analysis.

9. Consent
a. Will you take all necessary steps to obtain the voluntary and informed consent of the prospective participant(s) or, in the case of individual(s) not capable of giving informed consent, the permission of a legally authorised representative in accordance with applicable law? yes

b. Detail the procedure you will use for obtaining consent?
Informed consent will be ensured by participants accessing and reading the participant information sheet electronically.
All participants will receive the information sheet prior to booking in a suitable day/time to take part in the interview. This will ensure participants are fully aware of the purpose, methods, and use of the research, and also aware of issues related to confidentiality and their right to withdraw.
Participants will be asked to provide verbal consent. This will be gained by the researcher reading out each item on the consent form and having the participants verbally consent to each item. Verbal consent recordings will be transferred and stored on the university's secure encrypted server or in university-approved cloud-based storage, where they will be kept for the duration of the research.

10. What discomfort (including psychological eg distressing or sensitive topics), inconvenience or danger could be caused by participation in the project? Please indicate plans to address these potential risks. State the timescales within which participants may withdraw from the study, noting your reasons.

It is not anticipated that any risk will occur during completion of this study. However, it is possible that participants may become distressed whilst discussing particularly emotive or traumatic events related to their limb amputation. A plan to deal with distress, discomfort and risk is discussed below.

Prior to the interview, I will discuss the possibility of speaking about particularly emotive events and the interviewee will be encouraged to make a plan for this e.g. who they will speak to after the interview if they need some support, or how they will look after themselves.
In the event a participant becomes distressed or uncomfortable during the interview, the interview will be stopped, and the participant will be given time to recover and make an informed decision as to whether they would like to continue with the interview. It will be made clear that they can withdraw from the study, continue at a later date, or take a short break if they wish. I will also use my clinical skills to contain the participant's distress using active listening skills and validate their feelings. I would remind them of the plan we agreed on prior to the interview and encourage them to follow the plan and seek support.

In the event of any risk or safeguarding concerns, professional guidelines will be followed (BPS, 2009 & HPCP, 2012). If there is a risk issue, then I would explore this risk, looking at any thoughts around harming themselves or others, plans and intent. If after this exploration I was concerned regarding the safety of the participant, I would agree a safety plan, including the participant speaking to a

friend, family member, their GP, or if necessary, presenting at a local hospital. I would agree to contact them again the following day to make sure they have accessed the support they need.
I would also provide contacts of any relevant charities that can also provide support around adjusting to limb loss, or organisations that can provide mental health support specific to their country. This will be provided in the debrief document and emailed to participants following the interview (appendix J).

Following the interview, I would contact both of my research supervisors, one of which is a qualified clinical psychologist, to ensure there was no further support I could have provided. For safeguarding concerns, I would again follow professional policy and contact both of my research supervisors for further advice. For urgent risk or safeguarding concerns, I would act on this by sharing the participants contact details to relevant agencies for immediate support.

Participants are free to withdraw from the study at any point prior to commencing the interview, and during the interview, without giving any reason. Once the interview has been completed, participants can withdraw their data for up to 2 weeks after the interview. After this time, the data may be analysed and incorporated into themes. Therefore it may not be possible for it to be withdrawn, though every attempt will be made to extract participants' data from the study, up until the point of publication.

11. What potential risks may exist for the researcher(s)? Please indicate plans to address such risks (for example, noting the support available to you; counselling considerations arising from the sensitive or distressing nature of the research/topic; details of the lone worker plan you will follow, and the steps you will take).

Regular meetings will occur between the researcher and research supervisor could be used to discuss any issues or particularly distressing interviews.

As interviews will be taking place via video call, and not in participant's homes, the lone worker policy will not be needed.

12. Whilst we do not generally expect direct benefits to participants as a result of this research, please state here any that result from completion of the study.

There are no direct gains to participants taking part in the study. However, we hope that participants will enjoy taking part and that the study will lead to a better understanding of the development of identity following amputation, via the use of sports participation.

13. Details of any incentives/payments (including out-of-pocket expenses) made to participants:
The study will not be offering any financial incentives to participants.

14. Confidentiality and Anonymity
a. Will you take the necessary steps to assure the anonymity of subjects, including in subsequent publications? yes
b. Please include details of how the confidentiality and anonymity of participants will be ensured, and the limits to confidentiality.
Basic demographic information will be collected (gender, age, limb amputated, sport participated in) and this will be attached to a pseudonym. This pseudonym will also be used in the write up of the research. A file containing demographic and other identifying information e.g. contact details will be kept in a file on the university's secure encrypted server or in university-approved cloud-based storage

If during the interview, the participant says something that indicates they or someone else is at risk of harm, confidentiality will need to be broken. The lead researcher has a duty of care to pass on this information on to relevant agencies to ensure safety. If possible, the participant will be informed about this.

Identifying information will be redacted in the transcripts, for example names and places, to keep the data as anonymous as possible. Careful consideration will be made when including quotes in the write up of the research, so as to not include any identifiable information. Interviews will be transcribed by the lead researcher, and external transcription services will not be used.

15. If relevant, describe the involvement of your target participant group in the *design and conduct* of your research.

As part of the development of the participant information sheet, consent form, interview guide, and research protocol, a relevant charity was approached for feedback. No feedback was received.

16. What are the plans for dissemination of findings from the research? If you are a student, include here your thesis.

The study will be written as a doctoral thesis and submitted to Lancaster University.

A short report of the findings will be written and offered to organisations involved in recruitment of participants, and all participants of the study.

The study will be submitted for publication in a relevant peer reviewed journal.

The research will also be presented to students and staff of the DClinPsy programme in Summer 2022.

If it is of interest, the findings of the study may be presented at conferences or to healthcare teams and support groups involved with amputation or sport

17. What particular ethical considerations, not previously noted on this application, do you think there are in the proposed study? Are there any matters about which you wish to seek guidance from the FHMREC?

As interviews will take place via video call (on Microsoft teams) it is important to note that the researcher will carry these out in their own home. In order to preserve confidentiality, the interviewer will wear headphones to hear the participant to ensure that other members of the household cannot hear the participant. Members of the household will also be informed when interviews will take place and told to not enter the room. Participants will also be asked to consider taking part in the interview in a place where they will not be disturbed and can speak freely, and to consider the use of headphones too.

References

Brewer, B. W., Van Raalte, J. L., & Linder, D. E. (1993). Athletic identity: Hercules' muscles or Achilles heel? *International journal of sport psychology*

SECTION FOUR: signature

Applicant electronic signature: H.Havlin Date 20/10/2020

Student applicants: please tick to confirm that your supervisor has reviewed your application, and that they are happy for the application to proceed to ethical review ☒

Project Supervisor name (if applicable): Craig Murray Date application discussed 13/10/2020

Appendix 4-A - Research Protocol

Understanding the experience of sports participation and identity in individuals who have undergone limb amputation

Lead researcher: Heather Havlin, Lancaster University, email h.havlin@lancaster.ac.uk

Research supervisor: Craig Murray, Lancaster University, email c.murray@lancaster.ac.uk

Field supervisor: Vicky Molyneaux, Liverpool NHS Foundation Trust, email victoria.molyneaux@liverpoolft.nhs.uk

Introduction

Following limb amputation, depression and anxiety have been found to be relatively high for two years; and anxiety around body image and social discomfort is associated with increased depression and anxiety (Horgan & MacLachlan, 2004). Rates of Post-Traumatic Stress Disorder have also been found to range from 3.3% to 56.3% after amputation (Sahu, Sagar, Sarkar, & Sagar, 2016).

According to the NHS, after an amputation individuals will typically work with occupational therapists, prosthetists, and physiotherapists (NHS, 2019). Psychologists are not named as having an active role in the rehabilitation phase, however it is recommended that rehabilitation centres should have access to a counselling service, and counselling should be offered prior to amputation if possible, and to those at increased risk of emotional distress e.g. amputation due to trauma (British Society of Rehabilitation Medicine, 2003). Although it is recognised that there is a need for psychological care in those who have experienced a critical illness, the guidelines are vague and do not state what the psychological input should be and who it should be delivered by. (National Institute for Health and Care Excellence (NICE). Clinical guideline [CG83], 2009). Clinical psychologists often have a role in service development and provision (The British Psychological Society (BPS), 2011), so an increase in psychological understanding of rehabilitation from amputation could help inform the treatments offered by the different professions involved in rehabilitation teams.

Physical activity is often used as part of rehabilitation following a limb amputation, and aims to enhance physical, psychological and social functioning (Burger & Marincek, 1997; Geertzen, Martina, & Rietman, 2001).

Regular sport participation or physical activity has been found to have a positive impact on quality of life, health (Bijnen et al., 1998; Powell, Thompson, Caspersen, & Kendrick, 1987) and psychological wellbeing (Folkins & Sime, 1981) in able-bodied people. For individuals with physical disabilities these benefits extend to helping reaffirm their ability and feel less disabled (Sousa, Corredeira, & Pereira, 2009), helping to accept their disability (Sporner et al., 2009), build a positive body image (Sousa et al., 2009; Tatar, 2010), increase self-esteem and mastery (Pasek & Schkade, 1996), and is an opportunity to enrich their social life (Auricchio, Bernardes, & Moreno, 2017; Yazicioglu, Yavuz, Goktepe, & Tan, 2012). 83% of people with an amputation report that they would like to take part in more physical activity and sport in the future (LimbPower, 2016), which suggests there is a demand for supporting people with amputation in accessing sport and physical activity.

In addition to these benefits, sport participation has been found to provide an opportunity to facilitate and build identity (Lundberg, Taniguchi, McCormick, & Tibbs, 2011). Research has found that people who participate in adapted athletic activities concentrate less on their disability and more on the process of identity development (Groff & Kleiber, 2001).

For individuals with limb loss, participating in sport enables them to create a new identity of athletic and capable, and reject the disabled identity (Galli, Reel, Henderson, & Detling, 2016). Taking part in sport enables people with an amputation to disprove negative beliefs and show others, and themselves, that they are able to do something able-bodied people can do (Allan, Smith, Côté, Ginis, & Latimer-Cheung, 2018). Sport has also been reported to assist people with an amputation to feel ‘normal’ (Lundberg et al., 2011; Wadey & Day, 2018). Being part of a sports team can help provide a sense of belonging, which can help to develop the athletic identity and sense of self, in addition to providing a sense of belonging, commonality and normality (Anderson, 2009; Day & Wadey, 2016; Galli et al., 2016; Lundberg et al., 2011). The development of an athletic identity can also help to provide a sense of accomplishment, which has been described as assisting in the growth of stronger identity (Day & Wadey, 2016). Some individuals feel that being active is a fundamental part of their identity, and continuing to be active after amputation reinforces the fact that they had been active throughout life (Jayakaran et al., 2019).

This research aims to explore individuals’ identity development following amputation and sports participation, and the meaning the people ascribe to this.

Method

Design

The study will adopt a qualitative approach, specifically Interpretative Phenomenological Analysis (IPA), to understand and investigate individuals' experience of sports participation and identity after limb amputation.

IPA allows for the collection of rich data of individual experiences. It is one of the most commonly used qualitative methodologies in physical and mental health (Smith, 1996, 2011), and aims to explore participants' lived experience of a phenomenon and how they make sense of it (Smith, 2011). IPA is suitable as this research aims to understand a persons' experience of limb loss and sports participation, and what this means in terms of their identity.

IPA typically involves a small, homogenous sample. Although demographics of people involved may be different e.g. age, ethnicity, economic background, and amputations may differ e.g. upper or lower limb, number of amputations, size of amputation, they all share the same lived experience of a limb amputation, and have made the decision to take up and engage in sport after amputation, therefore IPA is a suitable method of data collection and analysis.

Participants

Participants will be individuals who have undergone a limb amputation, and since amputation have engaged in sports/athletics. Specific inclusion and exclusion criteria are as follows:

Inclusion Criteria

- Experienced amputation of a limb in adulthood (i.e. aged 18 or above) (upper and/or lower limb accepted, and multiple amputation accepted)
- After amputation engaged in sport/athletics, and currently engaged in this
- English speaking
- ~~Did not consider themselves active in sports prior to amputation~~
- Aged 18 or over

Exclusion Criteria

~~•Considered themselves active in sports prior to amputation~~

Sample

A sample size of between 6 and 12 participants, with a roughly 50/50 male/female split, will be aimed for. IPA typically involves a small sample, so it is thought that a sample of this size will be sufficient. The sample will be international and not limited to a particular geographical area.

Recruitment

Participants will be recruited in a number of ways:

- Approaching disability sports groups, and relevant charities

Disability sports groups and relevant charities will be approached via email (see appendix A for draft email correspondence) and sent an advert and poster for the study (appendix B and C), participant information sheet (appendix D), and social media advertisements with an electronic links to the poster (appendix E).

They will be asked to either:

- Contact their members via email, sharing the advert (appendix B) or poster (appendix C) and information sheet (appendix D).
- Advertise the study via their social media channels using the social media advertisement (appendix E) or sharing the poster (appendix C).
- Publish the advert (appendix B) in their publication.

The poster and advert will contain the email address of the lead researcher so interested individuals will then be able to contact the researcher to obtain more information and arrange to take part.

- Snowballing

Once a participant has taken part in the study, they will be asked to inform other people that they know who may be eligible for the study e.g. friends, team mates etc. They will be sent a copy of the advert to pass on to potential participants.

- Social media

The lead researcher proposes to set up a research twitter account that can have a link to the participant information sheet. The twitter account would be solely used to advertise the proposed study and to share the social media adverts (appendix E) and poster (appendix C). The research will also be advertised on facebook, using the poster (appendix C) and social media advert (appendix E).

Once potential participants have made contact to express interest in participating, they will be screened to ensure they meet the inclusion criteria. This will be done via email by asking if they were 18 or over when they lost a limb, they did not consider themselves active in sports/athletics prior to amputation, and they are currently active in sports/athletics.

Materials

Local groups will be contacted (appendix A) and adverts (appendix B and C) will be used to advertise the study, and potential participants will be sent a copy of the information sheet (appendix D).

Prior to interview, potential participants will be asked to complete the Athletic Identity Measurement Scale (AIMS) (Brewer, Van Raalte, & Linder, 1993) (appendix F). This is a 10-item questionnaire which measures how strongly an individual identifies with an athletic role. The items require response on a seven-point likert scale whereby seven represents strongly agree and one strongly disagree.

If the lead researcher is inundated with interest, beyond that of the target sample size of 6-12, the AIMS scores will be used to select participants with a stronger athletic identity. The reason for this is that the research is not looking in general at sports and limb loss, it is looking at the experience of identity and sports in groups of people with limb loss. It is therefore important that the people who take part have a strong sporting identity and it is an important aspect of their lives.

Items on the consent form (appendix I) will be read out to participants and verbal consent will be gained.

A question guide (appendix H) will be used during the interview, and following the interview a debrief sheet will be sent to participants (appendix J).

Procedure

Participants will be recruited in a number of ways (see recruitment section). The advert sent to charities and sports groups, and advertised online will contain the lead researchers contact details.

When the lead researcher has been contacted by a potential participant, they will send an information sheet with containing further information. Once potential participants have made contact to express interest in participating, they will be screened to ensure they meet the inclusion criteria. This will be done via email by asking if they were 18 or over when they lost a limb, they did not consider themselves active in sports/athletics prior to amputation, and they are currently active in sports/athletics. They will also be asked to complete the Athletic Identity Measurement Scale (AIMS) and this information will be added to a demographics table (appendix G) capturing basic information about participants. Finally, a date and time will be arranged for their interview.

Participants will be asked to provide verbal consent. This will be gained by the researcher reading out each item on the consent form and having the participants verbally consent to each item. Verbal consent recordings will be transferred and stored on the university’s secure encrypted server or in university-approved cloud-based storage, where they will be kept for the duration of the research.

The interview will take place via Microsoft Teams, or if the participant is not comfortable with a video call then the interview will take place via telephone (if in the UK). For interviews which take place via telephone, the researcher will phone the participant and withhold their phone number.

The interview audio will be recorded using a digital Dictaphone. As some participants may feel uncomfortable being video recorded, the recording feature in teams will not be used . The dictaphone device cannot be encrypted, and so data will therefore be transferred (and removed from the dictaphone) on completion of each interview to the university’s secure encrypted server or University-approved secure cloud storage. It is anticipated that this should be possible immediately following completion of each interview, however should there be any delay the audio recorder will be kept with the researcher at all times between completion of interview and upload of data.

Basic demographic information will be collected (gender, age, limb amputated, sport participated in) and this will be attached to a pseudonym. A file containing demographic and other identifying information e.g. contact details will be kept in a file on the university's secure encrypted server or in university-approved cloud-based storage

Proposed analysis

The interview data will be analysed using interpretative phenomenological analysis (IPA) which involves close analysis of the interview transcripts.

Interviews will be transcribed and analysed by the lead researcher as soon as possible after completion of the interview. This analysis will be added to each time a new interview is completed. Transcriptions will be coded and put into themes. The research supervisor will also be involved in the analysis, which will ensure validity and quality assurance to the analysis.

Stake holder liaison

As part of the development of the participant information sheet, consent form, interview guide, and research protocol, a relevant charity was approached for feedback. No feedback was received.

Practical issues (e.g. costs, logistics)

As interviews will take place via video call (on Microsoft teams) it is important to note that the researcher will carry these out in their own home. In order to preserve confidentiality, the interviewer will wear headphones to hear the participant to ensure that other members of the household cannot hear the participant. Members of the household will also be informed when interviews will take place and told to not enter the room. Participants will also be asked to consider taking part in the interview in a place where they will not be disturbed and can speak freely, and to consider the use of headphones too.

Ethical considerations

Informed consent

Informed consent will be ensured by participants accessing and reading the participant information sheet electronically.

All participants will receive the information sheet prior to booking in a suitable day/time to take part in the interview. This will ensure participants are fully aware of the purpose, methods, and use of the research, and also aware of issues related to confidentiality and their right to withdraw.

Participants will be asked to provide verbal consent. This will be gained by the researcher reading out each item on the consent form and having the participants verbally consent to each item. Verbal consent recordings will be transferred and stored on the university's secure encrypted server or in university-approved cloud-based storage, where they will be kept for the duration of the research.

Confidentiality

Basic demographic information will be collected (gender, age, limb amputated, sport participated in) and this will be attached to a pseudonym. This pseudonym will also be used in the write up of the research. A file containing demographic and other identifying information e.g. contact details will be kept in a file on the university's secure encrypted server or in university-approved cloud-based storage

Identifying information will be redacted in the transcripts, for example names and places, to keep the data as anonymous as possible. Careful consideration will be made when including quotes in the write up of the research, so as to not include any identifiable information.

Potential distress

It is not anticipated that any risk will occur during completion of this study. However, it is possible that participants may become distressed whilst discussing particularly emotive or traumatic events related to their limb amputation. A plan to deal with distress, discomfort and risk is discussed below.

Prior to the interview, I will discuss the possibility of speaking about particularly emotive events and the interviewee will be encouraged to make a plan for this e.g. who they will speak to after the interview if they need some support, or how they will look after themselves.

In the event a participant becomes distressed or uncomfortable during the interview, the interview will be stopped, and the participant will be given time to recover and make an informed decision as to whether they would like to continue with the interview. It will be made clear that they can withdraw from the study, continue at a later date, or take a short break if they wish. I will also use my clinical skills to contain the participant's distress using active listening skills and validate their feelings. I would remind them of the plan we agreed on prior to the interview and encourage them to follow the plan and seek support.

In the event of any risk or safeguarding concerns, professional guidelines will be followed (BPS, 2009 & HPCP, 2012). If there is a risk issue, then I would explore this risk, looking at any thoughts around harming themselves or others, plans and intent. If after this exploration I was concerned regarding the safety of the participant, I would agree a safety plan, including the participant speaking to a friend, family member, their GP, or if necessary, presenting at a local hospital. I would agree to contact them again the following day to make sure they have accessed the support they need.

I would also provide contacts of any relevant charities that can also provide support around adjusting to limb loss, or organisations that can provide mental health support specific to their country. This will be provided in the debrief document which will be emailed to the participant following the interview (appendix J).

Following the interview, I would contact both of my research supervisors, one of which is a qualified clinical psychologist, to ensure there was no further support I could have provided. For safeguarding concerns, I would again follow professional policy and contact both of my research supervisors for further advice. For urgent risk or safeguarding concerns, I would act on this by sharing the participants contact details to relevant agencies for immediate support.

Withdrawal

Participants are free to withdraw from the study at any point prior to commencing the interview, and during the interview, without giving any reason. Once the interview has been completed, participants can withdraw their data for up to 2 weeks after the interview. After this time, the data may be analysed and incorporated into themes. Therefore it may not be possible for it to be withdrawn, though every attempt will be made to extract participants' data from the study, up until the point of publication.

Timescale

The proposed research is part of the DClinPsy thesis and is required to be submitted to Lancaster University in March 2022.

The principal researcher will submit an application to the Faculty of Health and Medicine Research Ethics Committee for ethical review in October 2020, with a view to begin data collection and analysis by April 2021. It is anticipated that data collection will run from April to September 2021, and data analysis will be complete by December 2021.

The study will be suitably amended and submitted for publication by the researcher by August 2022.

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Appendix 4-B - Covering email to charities/sport clubs

Dear [name of charity/sports club]

My name is Heather Havlin and I am currently completing a Doctorate in Clinical Psychology at Lancaster University, UK. As part of the programme, we conduct research into a topic area of our choice. In collaboration with Dr Craig Murray (Research Supervisor), we are hoping to look at the following topic area:

Understanding the experience of sports participation and identity in individuals who have undergone limb amputation

As part of this research, I will be looking to interview individuals who have undergone a limb amputation and take part in sports/athletics. I am particularly interested in hearing from people who did not consider themselves as active in sports before their amputation. We hope the research will help inform healthcare and rehabilitation services to best support individuals with limb loss, by understanding their experiences of amputation, sports participation and the impact on their identity.

The research will involve taking part in an online interview via Microsoft Teams or telephone with myself. These interviews will be audio recorded and later transcribed with all identifying information anonymised to maintain participant's confidentiality. I have attached a participant information sheet and a social media advertisement for Twitter or Facebook.

It would be really helpful if you could advertise the study via your webpage, Twitter or Facebook accounts, where potential participants will be able to click on the electronic link to access the study information and to get in contact should they wish to take part.

Alternatively, if you think it may be possible for you to send the participant information sheet to anyone on your mailing list who you think may be interested, that would be very much appreciated.

I look forward to your reply and if you have any further questions or queries please do not hesitate to contact me at h.havlin@lancaster.ac.uk or alternatively I can ring at a convenient time to suit you.

Kind regards,

Heather Havlin
Trainee Clinical Psychologist
Lancaster University

Appendix 4-C - Advert to be placed in relevant charity publications

Have you experienced the loss of a limb and currently participate in sport? Opportunity to be involved in research…

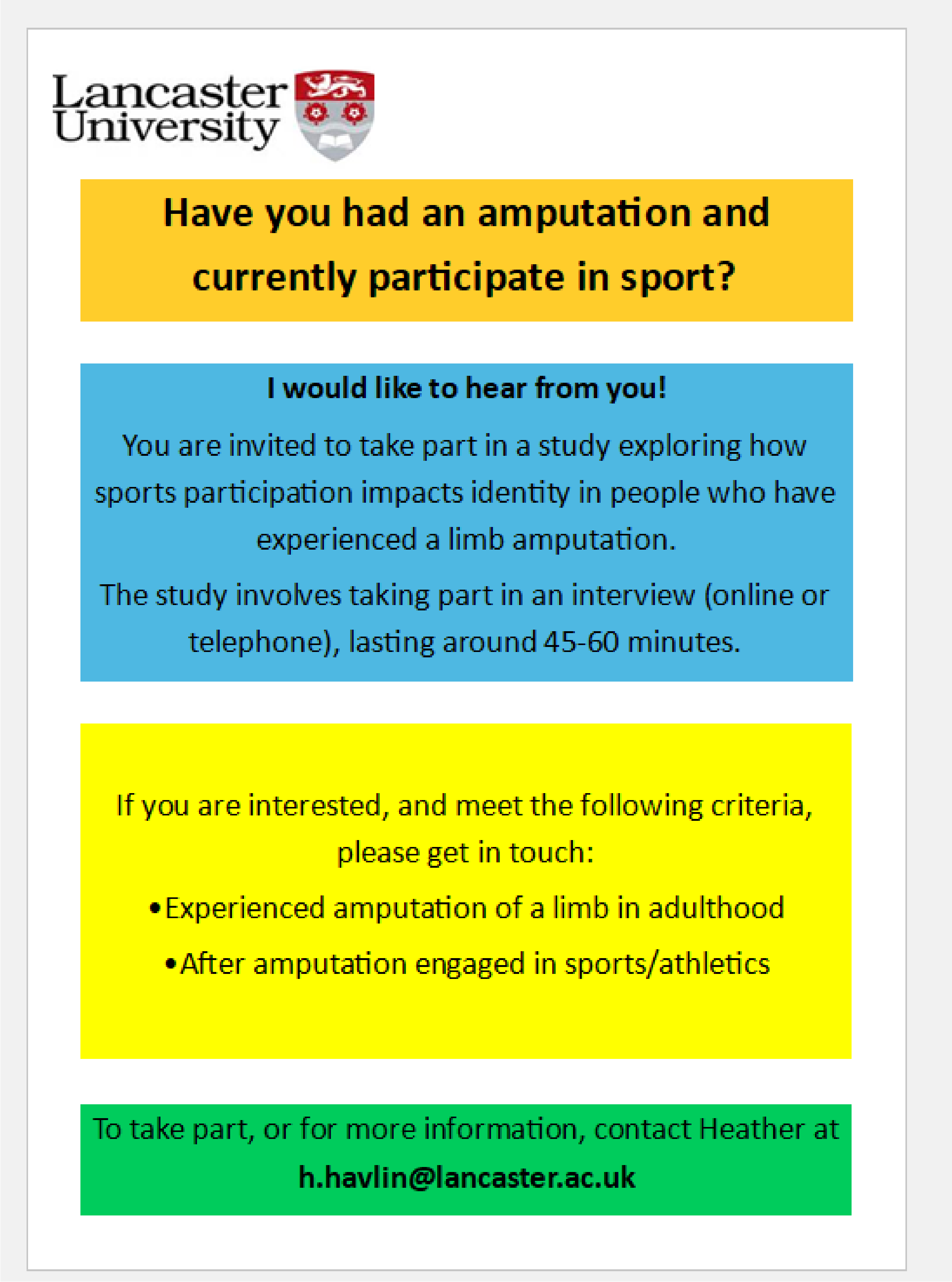
I am researching the experience of sports participation and identity in individuals who have undergone limb amputation.

The study will involve taking part in an interview with me (Heather Havlin, Trainee Clinical Psychologist), which will last around 45-60 minutes. It will involve talking about your experiences of amputation, and your participation in sports after amputation. I am inviting participants around the world to take part so the interviews will take place online, on Microsoft Teams, or via telephone. Access to Microsoft Teams is free, and details of how to use it will be provided.

Data collected from the interview will be anonymised, and a pseudonym (false name) will be used in the write up of the study.

To take part, or for further information, please contact me on h.havlin@lancaster.ac.uk or tweet at (twitter address).

Appendix 4-D – Poster



Lancaster University

Have you had an amputation and currently participate in sport?

I would like to hear from you!

You are invited to take part in a study exploring how sports participation impacts identity in people who have experienced a limb amputation.

The study involves taking part in an interview (online or telephone), lasting around 45-60 minutes.

If you are interested, and meet the following criteria, please get in touch:

- Experienced amputation of a limb in adulthood
- After amputation engaged in sports/athletics

To take part, or for more information, contact Heather at **h.havlin@lancaster.ac.uk**

Appendix 4-E - Participant Information Sheet

Understanding the experience of sports participation and identity in individuals who have undergone limb amputation

My name is Heather Havlin and I am a trainee clinical psychologist. I am conducting this research as part of my studies for a Doctorate in Clinical Psychology at Lancaster University, Lancaster, United Kingdom.

What is the study about?

The purpose of this study is to explore how participation in sports and athletics impacts identity in individuals who have undergone a limb amputation.

Why have I been invited to take part?

You have been invited to take part because the study requires hearing from people who have experienced a limb amputation and participate in sports.

Do I have to take part?

No, you are under no obligation to take part.

What will I be asked to do if I take part?

If you decide you would like to take part, you would be asked to take part in an interview lasting approximately 45 minutes to an hour with the lead researcher, Heather Havlin. This interview will be audio recorded and you will be asked about your experiences, which may involve questions exploring your amputation, the rehabilitation process, your involvement in sports, any challenges you encountered, your sense of identity, and how you have managed and made sense of these experiences.

This interview will be arranged with you at a convenient time, and will take place online via Microsoft Teams, or via telephone.

Will my data be Identifiable?

All reasonable steps will be taken to protect the anonymity of the participants involved in this project.

The information you provide is confidential and all data collected will be anonymised. The typed version of your interview will be made anonymous by removing any identifying information including your name, location, sports club etc. A pseudonym (false name) will then be used for any direct quotations used in the write-up of the study. Anonymised direct quotations from your interview may be used in the reports or publications from the study, so your name will not be attached to them.

The data collected for this study will be encrypted and stored securely on a university approved secure cloud storage system. Only the lead researcher, Heather Havlin, will have access to participant interviews, which will be stored electronically on a secure drive. The research supervisor, Dr Craig Murray, will have access to anonymised interview transcripts. At the end of the study, electronic copies of anonymised transcripts will be kept securely for

10 years at Lancaster University in line with university policy. At the end of this period, they will be deleted. Audio recordings will be deleted once the project has been submitted for publication/examined.

There are some limits to confidentiality; specifically, if something said in the interview indicates that you or someone else may be at risk of harm. In which case, the lead researcher has a duty of care to pass on that information to relevant agencies to ensure your or the person's safety. If possible, you will be informed about this.

What will happen to the results?
The results will be summarised and reported in a thesis, which will be assessed as part of the lead researcher's Doctorate in Clinical Psychology. The results may also be written up for publication in an academic or professional journal. A summary of the results from this study will be made available to participants after the study has been completed. It is expected that summaries will be available from August 2022.

Are there any risks?
There are no risks anticipated with participating in this study. However, some of the questions may bring up difficult memories or feelings, so we will spend some time prior to the interview considering how to best support you in the event of distress. If you experience any distress following participation you are encouraged to inform the researcher. The debrief sheet also contains resources which can provide further support.

Are there any benefits to taking part?
Although you may find participating interesting, there are no direct benefits in taking part. It is hoped that by sharing your experiences, it will lead to a better understanding of sports participation, identity, and amputation. This could help professionals working with individuals undergoing amputation or rehabilitation to understand them and their experiences.

Who has reviewed the project?
This study has been reviewed and approved by the Faculty of Health and Medicine Research Ethics Committee at Lancaster University.

Where can I obtain further information about the study if I need it?
If you have any questions about the study, please contact the principal researcher, Heather Havlin via email on h.havlin@lancaster.ac.uk

Alternatively you can contact the research supervisor, Dr Craig Murray, via email on c.murray@lancaster.ac.uk

Complaints
If you wish to make a complaint or raise concerns about any aspect of this study and do not want to speak to the researcher, you can contact:

Dr Ian Smith, Research Director
I.Smith@Lancaster.ac.uk

Health Research
Lancaster University
Lancaster
LA1 4YW

If you wish to speak to someone outside of the Clinical Psychology Doctorate Programme, you may also contact:

Dr Laura Machin, Chair of Faculty of Health and Medicine Research Ethics Committee
l.machin@lancaster.ac.uk

Faculty of Health and Medicine
(Lancaster Medical School)
Lancaster University
Lancaster
LA1 4YG

Thank you for taking the time to read this information sheet.

Resources in the event of distress
Should you feel distressed either as a result of taking part, or in the future, please see the debrief sheet for resources which may be of assistance.

Appendix 4-F - Social Media Advertisements

Twitter & Facebook

Option A

Have you had an amputation and participate in sport? Opportunity to be involved in research *(electronic link to poster)*

Option B

Have you experienced the loss of a limb and currently participate in sport? Opportunity to be involved in research *(electronic link to poster)*

Option C

Have you experienced a limb amputation and since joined a sports club/team? Opportunity to be involved in research *(electronic link to poster)*

Appendix 4-G - Athletic Identity Measurement Scale (AIMS)

Please mark an “x” in the space that best reflects the extent to which you agree or disagree with each statement in relation to your own sports participation.

1. I consider myself an athlete.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

2. I have many goals related to sport.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

3. Most of my friends are athletes.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

4. Sport is the most important part of my life.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

5. I spend more time thinking about sport than anything else.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

6. I need to participate in sport to feel good about myself.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

7. Other people see me mainly as an athlete.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

8. I feel bad about myself when I do poorly in sport.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

9. Sport is the only important thing in my life.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

10. I would be very depressed if I were injured and could not compete in sport.

Strongly Disagree :_____:_____:_____:_____:_____:_____:_____: Strongly Agree

Appendix 4-H – Demographics Table

Participant number	Age	Gender	Sport participated in	Years participated in sport	Limb amputated	Years since amputation

Appendix 4-I - Semi-Structured Interview Guide

Demographic Information

Before we start the interview could you briefly tell me the nature of your limb amputation, and how old you were when it happened?

Could you also tell me what sport(s) you participate in now, and how long you have been participating in it/them?

Limb loss

Could you please describe your experience of amputation?

What were the main challenges in adapting to life after limb loss?

How would you describe your identity before and after limb loss?

Sports participation

What was your relationship with sport like prior to limb loss?

How long after limb loss did you begin to participate in sport?

How and why did you get involved in sport?

What was the process of deciding to take up sport after limb loss? Was sport part of rehabilitation? Is it something you did alone, with a friend, or did you join a club?

What were your initial experiences of sport like?

What were the key challenges when you started to participate in sport?

How do you feel you have benefitted from participating in sport?

Identity & How you see yourself

How would you describe your identity after starting to participate in sports, and your identity today?

How did sports impact on the development of your identity?

Did participating in sports impact on how you saw yourself? And your relationship with your amputation?

Did it impact on your social relationships (e.g. within sports such as team members, and outside of sport such as family? How?

Did it impact on how your saw yourself in other areas of your life (e.g. at work, at home, as a parent, friend)? How?

Thank you for taking part today, do you have any final thoughts or reflections on your experiences of amputation, sports participation an identity?

Appendix 4-J - Consent Form

Study Title: Understanding the experience of sports participation and identity in individuals who have undergone limb amputation

You have been invited to take part in this research exploring the experiences of sports participation and identity in individuals who have undergone a limb amputation.
To gain your verbal consent to take part in this study, I will read a list of questions and you will need to respond 'yes' to each one if you agree.
If you have any questions or queries at any point, please let me know

1. Have you read the information sheet and fully understand what is expected of you within this study?
2. Have you had the opportunity to ask any questions and to have them answered?
3. Do you understand that you interview will be audio recorded and then made into an anonymised written transcript?
4. Do you understand that audio recordings will be kept securely until the research project has been examined, and then deleted?
5. Do you understand that your participation is voluntary and that you are free to withdraw at any time without giving any reason?
6. Do you understand that you can withdraw you interview data up to 2 weeks after the interview?
7. Do you understand that once your data has been anonymised and incorporated into themes it might not be possible for it to be withdrawn, though every attempt will be made to extract your data, up to the point of publication?
8. Do you understand that the information from your interview will be pooled with other participants' responses, anonymised and may be published; and all reasonable steps will be taken to protect the anonymity of the participants involved in this project?
9. Do you consent to information and quotations from your interview being used in reports, conferences and training events?
10. Do you understand that the researcher will discuss data with their supervisor as needed, and your anonymised interview transcript will be shared with the researcher's supervisor, Dr Craig Murray?
11. Do you understand that any information you give will remain confidential and anonymous unless it is thought that there is a risk of harm to yourself or others, in which case the principal researcher may need to share this information with their research supervisor?
12. Do you consent to Lancaster University keeping anonymised transcriptions of the interview for 10 years after the study has finished?
13. Do understand all of the points discussed, and fully consent to take part in the study

Appendix 4-K - Debrief sheet

Understanding the experience of sports participation and identity in individuals who have undergone limb amputation

Thank you for taking part in this study. The study was looking to explore the experiences of individuals who had undergone a limb amputation and then gone on to participate in sport, and the effect of this on their identity and sense of self.

If you have any questions or concerns relating to the study please contact the principal researcher, Heather Havlin, in the first instance at h.havlin@lancaster.ac.uk

If you have any concern or complaints regarding the study please contact Ian Smith, Research Director of Doctorate in Clinical Psychology Programme, at I.Smith@lancaster.ac.uk or Dr Laura Machin, Chair of Faculty of Health and Medicine Research Ethics Committee, at l.machin@lancaster.ac.uk

The interview may have touched on sensitive or distressing topics and if you would like further emotional support you may find the below organisations useful:

UK

- NHS - www.nhs.uk/using-the-nhs/nhs-services/mental-health-services/how-to-access-mental-health-services/
- Mind - www.mind.org.uk
- The Samaritans - www.samaritans.org

Ireland

- The Samaritans www.samaritans.org/samaritans-ireland/
- HSE https://www2.hse.ie/mental-health/

Canada

- Mental Health Support www.canada.ca/en/public-health/services/mental-health-services/mental-health-get-help.html
- Canadian Mental Health Association cmha.ca/

USA

- Mental Health America www.mhanational.org/finding-help
- NAMI www.nami.org/Home

New Zealand

- Lifeline www.lifeline.org.nz/
- Mental Health Foundation www.mentalhealth.org.nz/get-help

Australia

- Beyond Blue www.beyondblue.org.uk
- Lifeline www.lifeline.org.au

Worldwide

- Befrienders www.befrienders.org

You may also wish to access further support around limb loss, and as you may be aware, there are a number of international charities that can be contacted for further support and information:

- Amputee Coalition www.amputee-coalition.org
- Limbless Association www.limbless-association.org

Finally, I would like to thank you once more for taking part and I wish you all the very best for the future.

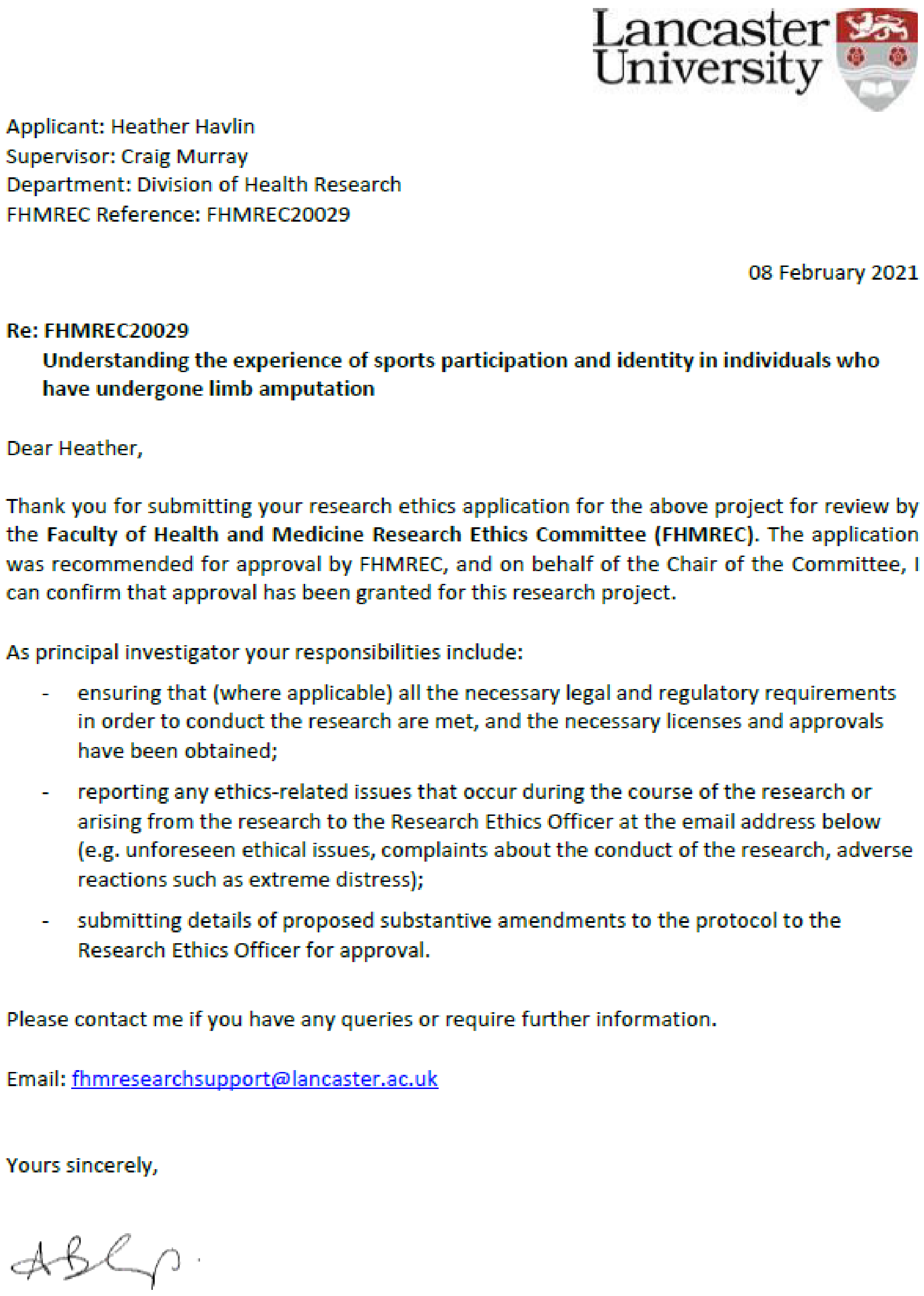
Kind regards,

Heather Havlin

Trainee Clinical Psychologist

Lancaster University

Appendix 4-L – Approval Letter



Applicant: Heather Havlin
Supervisor: Craig Murray
Department: Division of Health Research
FHMREC Reference: FHMREC20029

08 February 2021

Re: FHMREC20029
Understanding the experience of sports participation and identity in individuals who have undergone limb amputation

Dear Heather,

Thank you for submitting your research ethics application for the above project for review by the **Faculty of Health and Medicine Research Ethics Committee (FHMREC)**. The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for this research project.

As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);
- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information.

Email: fhmresearchsupport@lancaster.ac.uk

Yours sincerely,

Appendix 4-M – Amendment Application

Faculty of Health and Medicine Research Ethics Committee (FHMREC) Lancaster University Application for Amendment to Previously Approved Research

1. Name of applicant:

   Heather Havlin

2. E-mail address and phone number of applicant:

   h.havlin@lancaster.ac.uk
   07756000720

3. Title of project:

   Understanding the experience of sports participation and identity in individuals who have undergone limb amputation

4. FHMREC project reference number:

   FHMREC20029

5. Date of original project approval as indicated on the official approval letter (month/year):

   08/02/2021

6. Please outline the requested amendment(s)
   Note that where the amendment relates to a change of researcher, and the new researcher is a student, a full application must be made to FHMREC

   Amendment to the inclusion/exclusion criteria.
   Currently the criteria states that participants must not have considered themselves as active in sports prior to their amputation. I would like to remove this constraint, to open up the study to those who were active prior to amputation.

7. Please explain your reason(s) for requesting the above amendment(s):

   Difficulty in recruiting this specific population. Also, those who participated in sports prior to amputation may have had to change the sport participated in or participate in a different way. This could impact on their sense of self and identity and so may be relevant to hear about their experiences too.

Guidance:

a) Resubmit your research ethics documents (**the entire version which received final approval, including all participant materials, your application form and research protocol**), with all additions highlighted in yellow, and any deletions simply 'struck through', so that it is possible to see what was there previously.
b) This should be submitted as **a single PDF** to Becky Case There is no need to resubmit the Governance Checklist

Applicant electronic signature: H.Havlin

Date: 09/07/2021

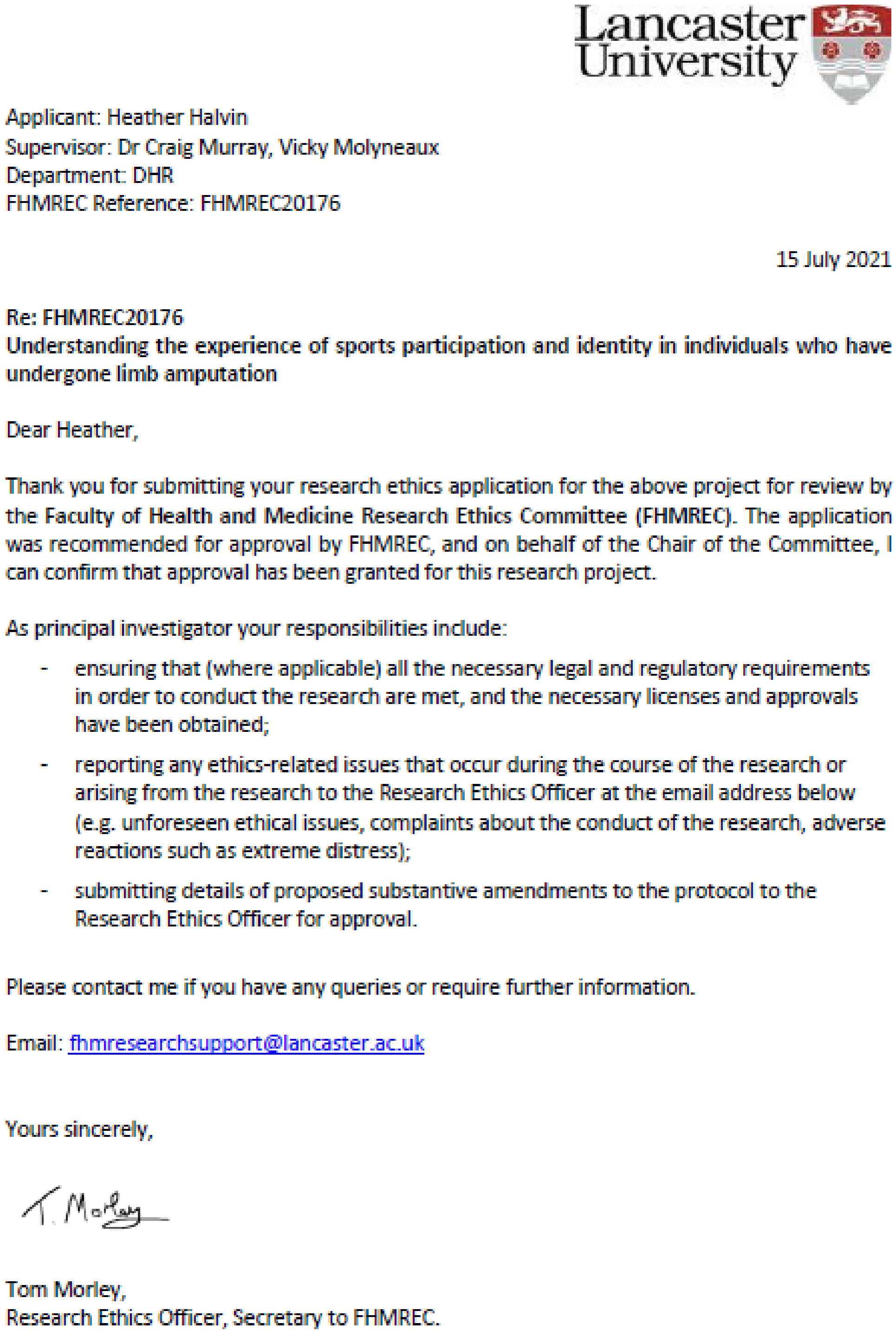
Student applicants: please tick to confirm that you have discussed this amendment application with your supervisor, and that they are happy for the application to proceed to ethical review ☒

Project Supervisor name (if applicable): Dr Craig Murray

Date application discussed: 06/07/2021

<u>You must submit this application from your Lancaster University email address, and copy your supervisor in to the email in which you submit this application</u>

Appendix 4-N – Amendment Approval Letter



Applicant: Heather Halvin
Supervisor: Dr Craig Murray, Vicky Molyneaux
Department: DHR
FHMREC Reference: FHMREC20176

15 July 2021

Re: FHMREC20176
Understanding the experience of sports participation and identity in individuals who have undergone limb amputation

Dear Heather,

Thank you for submitting your research ethics application for the above project for review by the **Faculty of Health and Medicine Research Ethics Committee (FHMREC)**. The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for this research project.

As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);
- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information.

Email: fhmresearchsupport@lancaster.ac.uk

Yours sincerely,

T. Morley

Tom Morley,
Research Ethics Officer, Secretary to FHMREC.