'It's a part of me': an ethnographic exploration of becoming a disabled sporting cyborg following spinal cord injury

Andrew C. Sparkes, James Brighton & Kay Inckle

Published online: 23 Oct 2017.

Submit your article to this journal

Article views: 260

View related articles

View Crossmark data

Routledge
Taylor & Francis Group

Check for updates

'It's a part of me': an ethnographic exploration of becoming a disabled sporting cyborg following spinal cord injury

Andrew C. Sparkes[a], James Brighton[b] and Kay Inckle[c]

[a]Institute for Sport, Physical Activity & Leisure, Carnegie School of Sport, Leeds Beckett University, Leeds, UK; [b]School of Human and Life Science, Canterbury Christ Church University, Canterbury, UK; [c]Department of Sociology, Criminology and Social Policy, Liverpool University, Liverpool, UK

ABSTRACT

In much research dealing with sport technologies and the process of cyborgification there is a significant lack of attention given to the experiences of athletes themselves. This is particularly so for disabled athletes. Against this backdrop of neglect, we draw on data generated from a 4-year ethnographic study that explored the experiences and meanings of disability sport for those who became involved in it following a spinal cord injury, and here we focus specifically on the process of becoming a disabled sporting cyborg. Our analysis reveals the following phases in this process: from taken-for-granted to techno-survival cyborgs; rehabilitation centres and becoming a technically competent cyborg; everyday life as an embodied cyborg; becoming a disabled sporting cyborg. The dynamics of each phase, how they relate to each other, and how they shape body-self-technology relationships over time are considered in detail. In closing we offer some reflections on the consequences of cyborgification and the implications of this process for constructions of ability and disability. We also raise questions regarding the structural and ethical implications of cyborgification, particularly in terms of the validation of certain kinds of bodies at the expense of others and the role of technology in reproducing social inequalities.

Introduction

In proposing her *Cyborg Manifesto*, Haraway (1991) introduces the cyborg as a 'cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction.' (p. 149). For her, given our enmeshed relationships with multiple forms of technology, we are all cyborgs. According to Richardson and Locks (2014), the ubiquitous couplings of flesh and machine via cyber-technologies, and the rapid rise of the cyborg culture in the twenty-first century, has led to the emergence of a 'vast literature on cyborgs in the media and cultural studies, film studies, gaming theory, medicine, anthropology, science, art and a range of other discourses' (p. 95). To these other discourses we would add that of sports studies.

The addition of sports studies should be of little surprise. Haraway (1991) viewed modern sport as a 'cyborg orgy'. Furthermore, as Butryn (2003), Butryn and Masucci (2003, 2009) and Shogan (1999) remind us, high-performance athletes have always been cyborgified competitors, whose various hybrid identities and notions of corporeality have been irreversibly infiltrated through various degrees and methods of technologisation from their childhood onwards. In this regard, Butryn (2003) speaks of modes of cyborgification in sport informed by five types of technology: self (e.g. performance enhancing drugs,

prosthetic limbs), landscape (e.g. artificial grass and synthetic surfaces), implement (e.g. lightweight running shoes and wheelchairs), rehabilitative (e.g. ultrasound) and movement or evaluative technologies (video and biomechanical analysis). He notes that sport studies scholars have offered differing views of the impact of these modes of cyborgification on sport and those who take part in it. These range from dehumanising and dangerous to liberating and enabling new ways of being.

Beyond the theoretical debates about athletes as cyborgs, Butryn (2003) makes the important point that there has been little attempt to investigate athletes' interactions with and perceptions of technology. For him, what is 'absent from much of the research dealing with sport technologies are the voices of the athletes themselves' (p. 19). To rectify this situation he interviewed seven elite track and field athletes to examine their technological life histories and their cyborg identities. His analysis revealed that, even though the athletes in his study should rightfully be viewed as sporting cyborgs, 'they varied greatly in their methods, degrees, and experiences of cyborgification' (p. 35). Likewise, Butryn and Masucci (2009) in their qualitative study that examined the lived cyborgian experiences of 12 athletes who participated in indoor sport endeavours in technologised spaces, as well as those who participated in outdoor spaces, found that 'the multiple intersections between the technospaces/ natural worlds, cyborg identity, and the environment, are complex, contested, and negotiated' (p. 303). Given the situation described above Butryn recommends the following:

> Future research should examine the process of cyborgification in other sports, with the aim of helping individuals to critically assess their relationship with technology, where their bodies fall on the 'natural/unnatural continuum,' and how other lines of social identity (e.g., racial, gender, age, [dis]ability) intersect with their technological identities. (Butryn 2003, p. 34)

The inclusion of disabled sporting bodies in the future research agenda on cyborgification proposed by Butryn (2003) is significant. According to Moser (2006) and Reeve (2012), the role of technology is largely unexplored in disability studies. The latter believes this reluctance lies in the concerns that disability scholars have voiced about Haraway's (1991) cyborg manifesto, and the criticisms they have made about viewing the impaired body as a contemporary cyborg.

An obvious criticism of cyborg theory and disability noted by Reeve (2012) is that it actually risks reinforcing the historically dominant individual or medical model of disability that defines disability in solely biomedical terms as a 'lacking' or 'failed' body capacity or function, which render someone unable to perform activities which are considered 'normal' (Thomas 2007). Disability in this model is 'caused' by a part of the body that is not working properly and is in need of fixing to return the person to normal functioning. Within this medical model of disability, as Peers and Eales (2017) point out, tools (e.g. wheelchairs) are designed to compensate for, or are a necessary solution, to this bodily 'lack' that disabled people necessarily *depend* upon in order to function 'normally'.

In view of the above, the ways in which cyborg theories often celebrate technological interventions and human/machine couplings may act to perpetuate the ableist assumption that disabled bodies are broken and require 'fixing'. This, in turn, when coupled with a perceived person-tool divide, as Peers and Eales (2017) illustrate, can act to reify an able-bodied/disability divide in which those appropriately performing able-bodiedness '*comfortably use* technology, and those who fail to perform able-bodiedness (the disabled) *are uncomfortably dependent* upon technology. They are dependent upon technology in order to approximate, or to be read as attempting to approximate, able-bodied ideals' (p. 112). Alongside this, it has been argued that even if it was possible to fix the impaired body, this particular cyborg body would continue to be stigmatised and seen as what Barnes and Mercer (2003) call 'half a human being' (p. 83). Indeed, much of the early 'cyborification' of disabled bodies – such as those who were born with the effects of Thalidamide – was focused on normalising the appearance of those bodies at the expense of their actual mobility.[1]

Nonetheless, Reeve (2012) argues that there are benefits from disability studies engaging with cyborg theory in terms of, for example, exploring the potential of technology to allow disabled people to redesign their bodies and become the architects of their own identities involved in new ways of being that destabilise the categories of normal/abnormal and able-bodied[2]/disabled. As she states, 'Cyborg

theorists may have neglected disability; but disability studies can use cyborg theory to look at embodiment and subjectivity in new and productive ways' (p. 108).

In terms of unsettling the 'normal' Apelmo (2017) notes that the cyborg is a conscious actor who actively disturbs order and crosses boundaries. Reeve (2012) calls on the example of Oscar Pistorious, the athlete who runs with lower limb prosthetics made from carbon fibre, and who in beating able-bodied athletes in elite competition directly challenges the notion that success in mainstream athletics is only for those with perfect 'normal' bodies. Indeed, the achievements of Pistorious, according to Swartz and Watermeyer (2008), have instigated a form of cyborg anxiety that has stimulated others (e.g. Jones and Wilson 2009, Burkett *et al*. 2011, Moola and Norman 2012; Smith and Thomas 2012), to raise critical questions about the ethics and fairness of his use of technology when racing against able-bodied athletes, what it means to be human, what distinguishes people from machines and what differentiates able-bodied and disabled bodies in postmodern and/or posthuman times.

Cyborg anxieties and other themes are illuminated by Howe (2011) in his analysis of the Paralympic Games and how, with the rapid advances in mobility technology (e.g. feather light racing wheelchairs as well as biomechanically and ergonomically responsive prostheses), this has led to the creation of a legion of cyborg bodies that is manifest in the image of the sporting supercrip. For him, this manifestation is problematic in terms of how it disempowers those impaired athletes who do not rely so heavily on, or do not need, special technologies of mobility (e.g. ambulant athletes with cerebral palsy) in ways that disempower them (also see Silva and Howe 2012). Furthermore, the economic and cultural capital required to become an elite sporting cyborg make it an impossible dream for the vast majority of people with disabilities. In this context, disabled cyborg athletes, such as Oscar Pistorious, can be seen to reinforce social norms and structures as much as they disturb order. For example, in the context of a profoundly racially structured society, permeated by violence against women and overlaid by excruciating material inequalities, Pistorious, as a white, upper middle-class, male, responsible for the death of his fiancé is much less disturbing of the social order than his cyborg legs might suggest. This said, as Howe (2011) notes, it remains that 'Paralympian wheelchair racers and prosthetic-wearing athletes are the most explicit examples of cyborgification in sport today' (p. 869), and with their explicit ties to technology they most obviously blur the lines between the 'natural' and the 'artificial'.

Given the situation described by Howe (2011) regarding the intimate relationships that some disabled athletes have developed over time with special technologies of mobility as part of a process of cyborgification, we are left wondering, as Butryn (2003) did in relation to able-bodied athletes, just where the voices of the disabled athletes themselves are in the discussion. It would appear that, with rare exceptions, they are mostly absent. One such exception is the work of Purdue and Howe (2013) who used semi-structured interviews with a range of Paralympic stakeholders to explore issues surrounding the inclusion of impaired bodies within the Paralympic Games. Another exception is the work of Apelmo (2012, 2017) who used participant observation, semi-structured interviews and video diaries with ten young female athletes with physical impairments across three disability sports (sledge hockey, wheelchair basketball, table tennis) to explore how they made use of technology in their identity construction.

The findings of Apelmo (2012, 2017) illustrate the importance of technology to disabled people, both as a sign of difference, and as part of their resistance to being stereotyped by other people. Those she interviewed made use of their wheelchairs when constructing their identities as young women and active subjects. Furthermore, in talking about risk, joy, pleasure, excitement and strength they opposed themselves to the discourse that sees disabled people as passive, needy and pitiful. They also challenged the gender discourse within sports by displaying toughness, strength and risk-taking, while constructing a more traditional femininity against the view of disabled women as non-gendered and asexual. Like heterogeneous cyborgs, Apelmo (2012) suggests, 'they question the dichotomies between organism and machine, natural and artificial, able-bodied and disabled, active and passive, normal and deviant, female and male, as well as the idea of the essentialist wholeness of the human body' (p. 406).

Against this backdrop, and given the relative absence of disabled athletes' voices in debates regarding their experiences of the processes of cyborgification, in this article we seek to provide a space for such voices to be heard. We do so by drawing on data generated from a 4-year ethnographic study that

explored the experiences and meanings of disability sport for those involved and, in particular, how sport was used to reconstruct body-self relationships by those who have become disabled through a spinal cord injury.

Methodology

Having gained university ethical approval, James Brighton contacted a number of governing bodies in England to facilitate access to disability sport clubs and individual disabled athletes. Following this, he conducted ethnographic fieldwork in a wheelchair basketball club and a wheelchair rugby club who competed in their respective national leagues. Here, James, an able-bodied researcher (see Brighton 2016), adopted a number of field roles ranging from observer to participant observer. He also conducted interviews in the field and formal life history interviews with selected participants from these clubs and others who he was introduced to via these associations. The participants whose comments are included in this article are as follows:

- Steve *(male, age 36, wheelchair basketball)*
- Matthew *(male, age 25, wheelchair basketball)*
- Kacey *(male, age 28, wheelchair basketball)*
- Jenny *(female, age 23, wheelchair rugby)*
- Alex *(male, age 27, wheelchair rugby)*
- Daniel *(male, age 24, wheelchair rugby)*
- Brett *(male, age 30, wheelchair rugby)*

During interviews one of the topics explored was the relationship that the disabled athletes had with technology post-SCI and how this shaped their body-self relationships. A thematic analysis of the interview data as described by Braun *et al*. (2016), and Sparkes and Smith (2014) was chosen as a method of identifying patterns, or themes, and as a way of describing and interpreting the meaning and importance of these. This form of analysis led to the identification of the following phases in the development of the disabled sporting cyborg: From taken-for-granted to techno-survival cyborgs; Rehabilitation centres and becoming a technically competent cyborg; Everyday life as an embodied cyborg; Disabled sporting cyborgs.

In terms of judging the quality of the current study and the analysis offered, it is important to note that these themes were both confirmed and fleshed out by drawing on the field notes made by James based on his observations of the disabled athletes in action and by his direct engagement with them in various settings over a four-year period as he moved from passive observer (e.g. watching practices from the balcony), to active helper (e.g. setting up and putting away equipment) and on to more central roles (e.g. taking part in practices as an able-bodied player in a wheelchair, coaching younger players, socialising with players after training and games, and becoming a registered playing squad member).

Adopting such roles, enabled James to integrate himself into the settings, legitimise his usefulness to participants in a tangible way, and increased his physical and cultural capital within the clubs. These roles also presented opportunities for additional data collection that included the chance to share embodied experiences and to get up close and personal to conversations and actions on court. This also provided the opportunity for member-checking preliminary interpretations and analysis of emerging data (see Tracy 2010, Brighton 2015). Importantly, as suggested by Sparkes and Smith (2009, 2014), participant feedback was not taken as a direct validation or refutation of the researcher's inferences. Rather, as they recommend, member checking in this study was treated as yet another source of data and insight, as an opportunity for reflexive elaboration and an enhanced understanding of how research findings are co-constructed as part of the creative process of the research by those involved.

James' deep and prolonged corporeal immersion in the physical cultural settings of the wheelchair basketball and rugby clubs enabled him to engage with the multi-sensorial and inter-sensorial experiences of the participants and how this shaped their body-self-object relationships in various settings and

to develop what Wacquant (2015) describes as carnal know-how. This kind of engagement, according to Sparkes (2017a), illuminates the subtle relationships over time between the 'biological and the cultural as the physical body moves in, out of and through specific spaces and geographical locations. As part of this process, the structural, political, historically specific and socially situated nature of human embodiment and experience are revealed in rich and raw detail' (p. 16).

Another significant quality marker of this ethnographic study relates to the issue of the prolonged immersion in the field undertaken by James. Rather than just simply 'being there', for him this involved an active presence with specific intent, coupled with a sensory intelligence and an ability to immerse oneself physically, socially, cognitively and emotionally in the cultures of others. This is rightly signalled by many ethnographers to be a marker of 'goodness' in this kind of inquiry (e.g. see Atkinson 2012, Sparkes and Smith 2014, Molnar and Purdy 2016, Sparkes 2017b). Likewise, speaking of qualitative research in general, and the criterion of *rich rigor*, one of the questions asked by Tracy (2010) is: Did the researcher spend enough time to gather interesting and significant data? Guba and Lincoln (1989) also include prolonged engagement and persistent observation as necessary for achieving the criterion of *credibility*.

An additional way to achieve this criterion according to Tracy (2010) is via 'thick description'. For Schwandt (2015), to thickly describe social action is actually 'to begin to interpret it by recording the circumstances, meanings, intentions, strategies, motivations, and so on that characterize a particular episode. It is this interpretive characteristic of description rather than detail per se that makes it thick' (p. 306). Such thick description, as we have provided below, enables readers to reflect on the case under study, make connections where appropriate, and assess if it is 'recognizable' in Delmar's (2010) terms to their own situations prior to forming what Stake (2005) calls 'naturalistic generalizations'.

With the above methodological issues in mind, we now move to present the findings of the ethnographic study regarding the phases identified in the development of the disabled sporting cyborg, the dynamics involved in each phase, and how they relate to each other over time.

From taken-for-granted to techno-survival cyborgs

As is common with most people in Western societies that are infused with technology in a multitude of forms, the participants in our study did not raise issues directly about how or why their bodies connected to or experienced such technology in their lives pre-SCI. That is, they simply took it for granted. This ranged from their use of mobile phones, computers and motorised vehicles to the various types of sports technology noted by Butryn (2003) such as, their use of high-tech running and/or training shoes, playing on synthetic surfaces and indoor courts using specialist equipment, and the use of rehabilitative technologies like ultrasound to assist recover following injury. Such body-self-technology interfaces and interactions were deemed as non-problematic and so, in the phenomenological perspective described by Leder (1990), they simply disappeared from conscious awareness and reflection.

Following Leder (1990), just as the body *dys*-appears (i.e. comes to awareness) only when it 'goes wrong', especially when pain is involved, so SCI propels a person into a highly visible and dependent relationship with medical technologies – although pain is not often a significant feature. Here, as Apelmo (2017) notes, the body becomes public property with a loss of control and integrity as it becomes assessed through the medical gaze. Dramatic lifesaving procedures are instigated following SCI as the paralysed person is immobilised in an acute spinal unit to allow stabilisation of the fracture. For example, a 'halo' may be required. This involves holes being drilled into the skull and tongs inserted to immobilise the body in order to stabilise a fracture in the cervical spine. Such engagements and experiences led to the telling by our participants of techno-survival cyborg stories. For example, in the following comment, Jenny acknowledges how advances in medical technologies have enabled more people than before to survive SCI.

> Yeah, god … I mean somebody with my injury 50 years ago would not have survived. And you know, even if they had they would have probably had constant health problems with kidney function and stuff like that. I suppose we are very lucky. Technology has allowed me to survive in many respects.

As part of enabling their survival, many of the participants noted how their bodies had been implanted with inorganic materials, what they called 'metalwork', in such procedures as pinning and plating to protect and stabilise vertebrae. Reflecting on how advances in medical technologies have changed the treatment of SCI, Matthew comments in a matter-of-fact way about what this has meant for his own body.

> Well I think that ages ago they lay you on your back for 5 months at least before they get you up, but now they can do metalwork and you can get up after 2 or 3 weeks. I have got two metal rods in my back; that was the first job. I am T6 (Thoracic vertebra, level 6) … so mine are about half way … you can see it actually (Matthew leans forward and pulls up his shirt so I can see two 8 inch scars either side of his spine at thoracic level). It's quite a good scar! It wasn't painful. So they chiselled two bits out of my spine and stuck in the metal rods, one either side then screwed the metal rods in to keep them straight … if you didn't have the metal plates, instead of bending at the waist you would bend at the ribs, so that is pretty good.

Matthew's comment illustrates the intensity and speed with which people who have received a serious SCI have their embodied relationship with technology dramatically changed. It also illustrates his acceptance of himself as a differently constructed cyborg body with metalwork inside of him that allows him to survive and function on a daily basis. This metalwork inside the body remains a constant reminder to some of their cyborg status post-rehabilitation. As Daniel explains:

> There is definitely a consciousness of it [metalwork]. I can't physically feel it [metalwork] but just every time I rub the scar on the back of my neck or rub the scar on the front of my neck it's just a reminder of, 'Hey, you've got a good amount of titanium in your neck'. It's a reminder that I am a cyborg in that sense.

Through internal fusions with lifesaving and stabilising technologies, our participants reconstructed harmonious body-self relationships as described by Leder (1990). In doing so, they became *techno survival cyborgs* with repaired bodies and relationships between body and self, providing the foundations for new forms of corporality and subjectivity. As is now discussed, these new ways of being provided opportunities to reimagine possibilities and further transgress boundaries between the human/machine.

Rehabilitation centres and becoming a technically competent cyborg

Following surgical interventions into their bodies to stabilise their SCI, our participants then moved to specialist rehabilitation centres where via various re-embodiment practises the process of cyborgification continued as they learned to function competently using assistive technologies, such as wheelchairs. According to Papadimitriou (2008), in such rehabilitation centres, people post-SCI not only learn to use a wheelchair to it maximal functional utility (as determined by rehabilitation staff primarily), but they also learn to live through it, making it part of their way of living. That is, they become 'en-wheeled' as part of a process of negotiating a new bodily style, 'one that includes the chair as part of the functional body post-injury and which makes them newly abled' (p. 691). For Papadimitriou, this incorporation process, which we see as a key aspect of cyborgification for people post-SCI, points to embodied ways of being in the world that are malleable when it comes *to incorporating material objects into its body schema* in ways that 'extend beyond the oppositional distinction able-bodied/ disabled' (p. 691). In describing the significance of learning to do a 'wheelie' in one's wheelchair, she notes the following.

> Doing a wheelie, therefore, means much more than being able to bump a curb – it means that newly injured patients are learning to maneuver their bodies through the chair. Their bodily awareness is now extending to include the frame of the wheelchair. During this process of learning to balance on the two back wheels wheelchair users in fact learn to act *from* the wheelchair and thus doing a wheelie is not merely a skill, but an instance of 'doing with' one's body. (p. 697)

A number of the participants in our own study echoed the experiences of those in Papadimitriou's (2008) in relation to the wheelchair becoming part of their body in the rehabilitation setting. Matthew recalls himself doing wheelies and how this sense of oneness and mastery in his chair led him to think of ways to enhance this experience by developing a new design for his wheelchair:

> I remember I got used to it really quickly at [spinal rehabilitation unit] and I would always do wheelies and show off to my friends … I want to make a chair that's just like a seat, and you can strap your legs underneath the seat,

and be on two wheels so you are automatically doing a wheelie! So you are going around on two wheels and not four, like a Unichair, that would be fun.

Prior to this sense of oneness with the wheelchair becoming possible, the participants described how they had to go through a drastic sensory reorientation process. For example, Steve recalls how, having been in a prone position for 6 months, he experienced violent sickness as he was gradually moved into a sitting position prior to being introduced to a wheelchair.

But because you were more upright, you were just sick more. So they would just tip the chair slightly to get your head used to being in different positions … In between that they took you up to the gym where they taught you to sit up by yourself and transfer and literally just all the basic things you need in life – transfer from chair to chair, transferring out of the bed, transferring onto and off the toilet, in and out of the shower, in and out of the car depending on what your injury level was. As I built it up I became less sick and more competent, until I became more independent and the chair became more and more part of me.

The comments provided above suggest that the rehabilitation centre functions as a transitional phase where mobility technology becomes integrated into a new embodied selfhood. However, to an extent, this selfhood depends on how people engage with and experience these resources, matters of identification and the meanings given to the contexts in which rehabilitation takes place. But, more importantly, and much like access to the survival technology, rehabilitation into cyborg embodiment is dependent on the availability of material and technological resources which are unequally distributed in national and global terms.

Everyday life as an embodied cyborg

Having become en-wheeled and newly abled in a specialist rehabilitation setting among peers in accessible environments with supportive staff, our participants faced different challenges when returning to the local community, such as the ableist environments of the workplace, inaccessible housing and public places. Here, according to Papadimitriou (2008), as newly abled adults reconstructing their sense of self in an able-bodied world wheelchair users are caught in a curious position in which 'the wheelchair becomes a vehicle of freedom of mobility and independence, but the (obstinate) dominant cultural and social symbolism and assumptions regarding wheelchair use degrade, demote and devalue them in public settings' (p. 701). A number of our participants recognised this curious positioning as evidenced in the following statement by Daniel who can walk with crutches but opted to use his wheelchair for pragmatic reasons.

Initially … I didn't want people to see me in the chair … but what I sort of didn't realise was that it's not … I can't be independent without it. I can't rush home, I can't get a drink when I am standing because I'm on crutches and things like that, so it took me a while to get used to that, and people seeing me in a chair but you get used to it. What would have taken 5–10 minutes maybe on crutches I could do in 5–10 seconds, it's so much quicker … this is how I am now, I don't walk that much. I only walk for sort of standing up really in the kitchen, just to grab something off the top. I will always keep walking and keep standing because it is good for you but I don't have any long term plans to be walking around more, I am happy in this … I can do anything in this – whereas on my feet I can't I am quite limited as to what I can do. I mean, it took me a while to get used to that but I am happier now I have accepted it.

In stating that he can 'do anything' in his wheelchair, Daniel acknowledges the benefits that accrued with his cybogification in relation to the enabling effects his assistive technology. Others in our study also noted this feature of their cyborg en-wheelment in everyday life and also commented how, as part of this process of reconstructing their lives post-SCI, their wheelchairs over time became a 'natural' part of them:

No, you don't think about it (the chair). You just move. It is part of me … you don't really think about it because you take it with you everywhere. I have to. It is part of my body now. It is my legs and I have to use it. (Matthew)

I don't really register that I am in a chair, not anymore because it's sort of … because I have been doing it a while now it has become sort of natural … naturally I do things. To start with I had to think how am I going to do something but now it's a bit easier, it comes a little bit more naturally than it did before. So your chair, it becomes more and more a part of you. I am in one every day of my life now, so yeah, I think it's more an extension of my body really. (Kacey)

The comments above by Matthew and Kacey are echoed by the participants in Apelmo's (2017) study. Here, once again, the newly impaired young women described their wheelchairs as 'a part of me' that they liked but did not think about. Apelmo draws on the work of Merleau-Ponty (1945) to point out that in such instances, the wheelchair has ceased to be a thing, and that over time its use had become a habit, of form of bodily knowledge that was incorporated as part of the self of the young women in her study. Clearly, the participants in our study experienced the same process in action.

Becoming and being a disabled sporting cyborg

When asked about their relationship with technology in their sporting lives, many found it difficult to articulate any views about what might be considered low-level and less obvious cyborg technology. For example, Jenny expressed surprise when she realised how central Velcro was to her ability to perform as a disabled basketball player:

> I suppose Velcro is technology, isn't it? I had not really thought of it like that. I just haven't thought about it like that, as technology. God yeah, that's a big thing isn't it. I hadn't thought of that. What a contribution Velcro makes! Yeah, I suppose you take it for granted don't you … I don't have to think about it.

Set against this, the following ethnographic observation of a wheelchair basketball training session indicates the high level technology associated with sports wheelchairs and the centrality of this to the process of cyborgification.

> During a break in play I notice that both the 'everyday' and 'sports' wheelchairs left at the side of the court are custom modified to suit the individual and the specific impairments they have. Some have high back support. Others are lower. The cushions where the players sit vary in height, texture and malleability and appear carefully selected to minimise the interface between human/machine. The camber of the wheels sticks out at different angles and the centres of gravity have been variably adjusted to maximise responsiveness. The lightweight frames are sleek, their curves mixing carbon-graphite with shiny aluminium (see Figure 1). Stylistically, ownership has been made over the chair, with some covered in stickers and flashing lights, others having additional Velcro attachments for support. I ask Steve about the uniqueness of these chairs who explains, 'The sports chairs are the most important equipment for us as basketball players, they are an extension of our bodies, they have to fit us, have to support us and we have to be comfortable in them, we view them as another extremity, you feel like you are part of the chair and the chair is part of you, in that way we are like a cyborg. I have a new everyday chair as well, I love it, its sleek and sexy man – great curves, very futuristic.'

Support for the comment made by Steve above comes from other disabled athletes, who when asked if they classified themselves as cyborgs, answered in the affirmative. As Brett stated:

> We often, very often say, 'your chair is an extension of yourself,' and that's the way that it has to be, you have to be solid in the chair, it has to be fitted exactly to you, you have to be strapped into it, you have to feel comfortable with it, so in that aspect I would say yes, in a way we do look at it that way because it's part of you, and it should be, to play at a certain level you have to feel like it's just another extremity, so yes.

In coming to see themselves as cyborgs, the participants acknowledged experiential differences when inhabiting their everyday 'normal' wheelchairs and their more high-tech sporting wheelchairs. For example, reflecting on how he feels when he makes the transition between the two chairs, Matthew states, 'It changes how I *feel*; it is … you know … it's like going from a Mini to a Ferrari. Your adrenaline rush starts pumping … you know you are going out to play, you're ready to play'. This difference in feeling is associated with the customisation of the sports wheelchair to the body of the disabled athlete in relation to the sport being played so as to blend the organic and the inorganic in the pursuit of an embodied one-ness that enables successful performance. As Alex stated:

> They [sports wheelchairs] are so well built and so custom fit it's really just a part of you moving. So it's not like I'm adding something to myself, it's just kind of like an extension of myself. Once you get your chair dialled in and you get used to it, it's such a smooth action and such a smooth feeling, almost like companionship you have with it that it's really just like one piece moving.

The harmonious relationship between athlete and chair was encouraged in training sessions where, in addition to 'bodywork' focusing on improving cardio-vascular fitness, speed, strength, and endurance,

Figure 1. Wheelchair designed for a disabled basketball player.

'chairwork' was also undertaken that aimed to improve agility, co-ordination, balance and reaction time. This involved manoeuvring in and out of slaloms and completing drills involving short, sharp executions of movement. All of which nurtured the one-ness between human body and the high-tech, mechanical sports chair.

In relation to sports wheelchairs it is interesting to note how their design for certain uses shaped not just the feelings of those who used it in a game but also their identities during it. This is evident in the differences between the design of the defensive and offensive chairs in wheelchair rugby (see Figures 2 and 3).

The differences between these two types of wheelchair are described by Jenny as follows:

> There are two different types of chair. In a defensive chair you're sat a lot deeper than I am now, it's really bucketed and you're strapped in. Then on the front of mine I have got like a pick bar that is like a bit of metal that sticks out and that is so that you can tie up the offensive players and tip them out sometimes. The offensive chairs are a lot more rounded off, they have metal plates along the front of the chair to like to try and prevent the defensive players from getting them. I am defensive player, so I give out a beating!

In her statement above, Jenny's relationship with the specific design of her chair not only leads her to define herself as a defensive player but also as one that will 'give out a beating'. That is, deploy physical

Figure 2. Defensive rugby wheelchair with hooked front.

Figure 3. Offensive wheelchair with rounded front for manoeuvrability.

violence against an opponent. In this regard, it is interesting to note that rugby wheelchairs are often referred to as 'Mad Max wheelchairs'. Reflecting on this term, Brett notes the following:

> They certainly make it more brutal, because our chairs are not like basketball chairs, our chairs are not like tennis chairs, they were built for the brute force, the high impact, the contact that we have. I would say the sport itself encourages that contact and then the chairs were designed in order to keep up.

Echoing Brett's views, Matthew described himself as a 'tank' in his sports wheelchair, while Alex stated, 'You could say that, with the metal inside my body I am like a cyborg, like the *Terminator* or something! The chair too adds to this feeling'. Alex's reference to the 1984 science fiction film *The Terminator* is interesting. In this film, a hyper-muscular/masculine Arnold Schwarzenegger plays the role of a seemingly indestructible humanoid cyborg assassin.

The Terminator is emotionally and physically detached, he feels no pain (physical or emotional) and his body is defined by its capacity to withstand violence and, in the first film, by its continual

self-regeneration or repairability. However, in the second movie, when Schwarzenegger's character has transitioned from the bad to the 'good' terminator, he also takes on disabilities, including losing an eye and one arm from below the elbow. The second film finishes as the now visibly disabled Terminator self-immolates in a vat of molten lead in order to save humanity from the potentially devastating impacts of the computer chip inside his head. As such, the Terminator also gives rise to more troubling readings of disability and technology: firstly, the requirement of self-sacrifice of the disabled body in order to save humanity; secondly, the positioning of technology and cyborg bodies as ethically problematic, destructive rather than productive forces – a theme returned to below.

Nonetheless, the functionality and repairability embodied by the Terminator was referenced by several of the participants in our study in relation to the metalwork they had inside their bodies and the externality of their wheelchairs. This combination led to an increased sense of resilience whereby the internal metalwork made them feel stronger and more able to absorb punishment when being hit by other wheelchair rugby players and hitting them in return. In addition, the fact that certain parts of their body could not feel pain, coupled with a conviction of repairability, led to a willingness to engage in risky and reckless behaviours. This is evident in the following comment by Brett in which he reflects on the possibility of serious injury due to high impact collisions in wheelchair rugby.

> Mark Zupan (a high profile and famous wheelchair rugby player) says, 'What's the worst that can happen? I can break my neck again?' Yeah, It's almost like he's kind of been through it and he's been repaired through technology. I think we all kind of have that mentality … Like he says, I say it to my parents or to my mum and my fiancée all the time, 'What's the worst that can happen?' … I don't want to say it's a security blanket but it definitely creates an additional confidence in you and you know that if you do it again, well then you did something right.

This repairability of the cyborg is also reinforced by the practical dynamics of engagement in certain disability sports as indicated by James in his field observation of a wheelchair rugby game:

> I'm sat in a chair at the side of court talking to Steve who is grabbing a drink when BANNNGGGG! I physically jump in shock assuming someone has shot a gun. Steve laughs and tells me to look over at the dispersing melee of chairs where I notice that Kacey is unable to push away having sustained a puncture. One of the assistant coaches swiftly runs onto court with a spare wheel and efficiently replaces Kacey's wheel using the quick release mechanism. The coach then relays the wheel to the team engineer who takes the wheel, peels off the tyre and replaces the inner tube. In the next break in play, Kacey's original wheel is restored. 'Probably pumped up too much' the engineer tells me, 'I have pumped this up to 40 PSI (pounds per square inch) to avoid another puncture'. Looking on, Steve says 'It's almost like we are not disabled until something goes wrong with our chairs'.

As Steve here acknowledges, impairment may once again in Leder's (1990) terms *dys*-appear into consciousness when technology fails. For Campbell (2009), this raises questions about disabled people being at the mercy to technology, as well as the cost of and access to the technology itself, particularly in the context of the globally inequitable distribution of technology and the privileged status of some disabled athletes. This said, it is important to recognise that sports wheelchair technology has developed *in response* to the evolving demands of disability sport itself. As Peers and Eales (2017) note, over time 'the wheelchair basketball community, the logics of competitive sport, the discourses of disability, and the particular movement patterns and qualities of the athletes shifted the sport, its strategic and aesthetic patterns and vectors, and the materiality of the sporting equipment' (p. 118). When sports equipment is designed by tetraplegics with tetraplegics, it provides a direct challenge to medico-tragedy conceptualisations of disabled people as weak, fragile, vulnerable and dependent on others. Indeed, wheelchair rugby was originally termed 'Murderball' reflecting its hard-hitting, aggressive and brutal nature (Goodwin *et al*. 2009). As Jenny emphasises: 'Yeah, I mean that is the *best* bit about it, really hitting people … it's *barbaric!* Knocking someone out of their chair feels GOOODD'.

It is unsurprising then that rugby wheelchairs, and to a lesser extent basketball wheelchairs, have developed in order to further enable this barbarity and support the hyper-masculine militaristic metaphors of being a 'tank', the Terminator, or Mad Max as all this sits well amongst the aggressive and instrumental ideologies prevalent in contemporary sport. This evolving chair technology has, in turn, impacted on the subjectivities of participants in and though their bodies. For example, when asked how he feels about knocking an opponent Kacey stated: 'Well, because of their impairment, a lot of the

players can't really feel the pain anyway'. Thus, the immobilisation and 'termination' of an opponent via aggressive acts involving high speed collisions is legitimised by a process of defining the other as more machine (no pain) than human (feels pain).

Reflections

In this article, we have responded to the call by Butryn (2003) to investigate athletes' interactions with and perceptions of technology and to provide an arena for their voices to be heard. In so doing, we have illuminated how the relationships between technology, impairment, and the body are central in disabled athletes 'very notions of their selves' (Butryn and Masucci 2009, p. 288). At one level various modes of cyborgification as identified by Butryn (2003) were found in the range of technologies that our participants engaged with which were generic as well as disability-specific. For example, land-scape (adaptive strength and conditioning equipment); implement (Velcro, handball wax to assist grip); rehabilitative (hydrotherapy and weightless treadmills); and movement or evaluative technologies (recording performances on an iPad). Beyond this, by examining a range of self (internal metalwork) and implement (specialist sporting wheelchairs specifically designed for the athlete) technologies we have revealed how the process of cyborgification can operate for people who become disabled through SCI and who have the opportunity to become disabled athletes.

In the gradual transformation from techno-survival cyborgs to a technically competent embodied cyborg in everyday life, and then onto a disabled sporting cyborg, our findings show how our partic-ipants were able to redesign their bodies and become the architects of their own identities involved in new ways of being. For example, in becoming en-wheeled, both everyday wheelchairs and sports wheelchairs became 'part of them', and the interface between the natural (human) and the artificial (machine) dissolved through repetition of daily and athletic routines and regimes.

In particular, the one-ness that our participants felt with their sports wheelchair technology resulted in efficient and powerful athletic movements that destabilised the categories of normal/abnormal and able/disabled by creating new cybernetic forms of subjectivity. In becoming disabled sporting cyborgs, they were released from and directly challenged the normative myth of the disabled body as weak, passive, undesirable and tragic to become agentic, strong, desirable and celebrated as corporeal beings who took pride and pleasure in their bodies and their achievements. In this regard Hargreaves (2000) notes how the wheelchair, normally a symbol of weakness, dependency and of neediness, becomes transformed in disability sport into a symbol of power, speed and muscularity. Likewise, Apelmo (2012, 2017) recognises how the wheelchair, once seen as othering is re-articulated in disability sport as enabling, enhancing, individual, and stylistic and embodied as an important part of a positive and pro-ductive cyborg identity. However, before getting uncritically swept away in a 'cyborg orgy' of applause, it is important to highlight some concerns around these processes, and in particular the impacts of gendered and economic social structures, as well as the ethical dimensions of technology itself.

For example, despite the positive aspects of becoming a disabled sporting cyborg noted above, it also needs to be recognised that this process can be dangerous and restrictive by perpetuating the aggressive, violent and instrumental rationalities that saturate certain sports. As Reeve (2012) reminds us, cyborgs are vulnerable to discursive regulation, surveillance and oppression by those who control the interpretation of bodily boundaries, and care must be taken in proclaiming the empowering potential of cyborgification for disabled athletes. Our findings suggest that the use of technology in selected disability sports, as in many able-bodied sports, continues to be policed and informed by militaristic and hyper-masculine ideologies that shape both the practices and the experiences of engagement for those involved. In this context, it is notable that the majority of our research participants are male. While this is partly due to the aetiology of SCI between men and women, it also reflects the wider economic and gendered structures which privilege males over females and devise, promote, and develop sports for disabled people.

Our research suggests that violent, hegemonic masculinity is prized in the two disability sports rep-resented in our study, and this may emerge from, and reinforce, the wider social perceptions of disability

as failed masculinity. Linked to this, as we have indicated, the notions of repairability coupled with an awareness of the absence of pain, both in parts of their own bodies and in their opponents, encourage dangerous imaginations of the disabled sporting cyborg to be constructed. These imaginations risk dehumanising others and legitimating aggressive acts against them in ways that may, once again, reinforce wider social perceptions of people with disabilities as abnormal and dispensable human beings.

It also needs to be recognised that economic structures also play a huge role in determining who can become a disabled sporting cyborg. For example, many disabled people simply cannot afford to purchase a specialised sports wheelchair that cost several thousands of pounds. This is particularly relevant given that disabled people are among the poorest groups in our society and access to even basic assistive technology, as well as public transport and leisure facilities is often problematic (Goodley 2011, Hughes and Avoke 2010, Reeve 2012, Equality & Human Rights Commission 2017). Becoming a sporting cyborg for many, therefore, lies beyond their realm of financial possibility.

Disability sport, disabled athletes and their embodied relationships with technology as cyborgs will continue to evolve. We hope that the findings of our study will encourage others to further explore this phenomenon in the coming years with a view to better understanding the possibilities and the limitations of the process for those involved. However, our study is dependent on those with SCI, a very specific – and often privileged – group of disabled people for whom sports and technology has been developed. A such, future explorations would need to consider a wider range of impairments than our study to include, for example, those that are 'hidden' and less visible such as cerebral palsy, a learning disability or a non-normative cognitive style that tend not to satisfy the desire for normatively valued sporting performances (see Howe 2011, Purdue and Howe 2013). Similarly, marginalised are those with congenital disabilities who often do not have access to specialist rehabilitation and the range of sports facilities and equipment available to the participants in our study.

Questions need to be asked about the role of technology in the lives of disabled people in general and the part it plays in enabling their movement into, and experiences of, the world of disability sport. In this regard, qualitative researchers could heed the call by Chamberlain and Lyons (2016), as we have done in part, to focus on material objects (e.g. different types of wheelchair) and their contribution to the process of cyborgification as part of their studies.

> They may be objects of investigation in their own right, or they may have more indirect involvements, through their potential to invoke memories and to memorialize. They may be investigated for richer meanings, for their symbolic and metonymic functions, their entanglement in subjectivities and social relationships, or more broadly as part of material culture. (Chamberlain and Lyons 2016, p. 164).

According to Humphries and Smith (2014), these explorations could include *object biography* in which objects such as everyday wheelchairs and specialist sporting wheelchairs, like people, are considered to have multiple biographies with their use and function changing over time and context and also changing in their relationships to people. Another focus could be on what they call *object materiality*. Here, researchers let objects speak for themselves by closely examining them to 'access the hidden stories, and significant assemblages of forces and people that interact with and change the object over time' (p. 483). For example, the offensive and defensive rugby wheelchairs of individual players (see Figures 2 and 3) could be examined to reveal their hidden stories. Finally, what Humphries and Smith call *object research* might be used to reflect on the materiality of the disability basketball and rugby wheelchairs shown in Figures 1–3, and how, as their design, construction and composition have changed over time it has altered both the ways in which disabled athletes can perform and how they experience their performances in these sports.

Alongside issues of materiality and varying formulations of human-technology relationships, further questions need to be asked that explore the ethics of technology itself. Dower and Williams (2002) point out that technology is usually positioned as ethically neutral since it emerges from the purportedly objective practices of science. However, rather than being ethically neutral, technology exists in what might be described as an 'ethical vacuum' from which all kinds of inequalities and injustices emerge or are recreated. Therefore, a critical exploration of the ethics of technology and how it structures disability in terms of for whom it is destructive and for whom it is productive is essential. For example,

who (globally) has access to the life-saving technology which enabled the techno-survival cyborgs in our study? Whose lives does technology 'terminate' through, for example, the screening and aborting of foetuses whose characteristics will never constitute a supercrip cyborg? What norms, values and structures, such as, techno-capitalism and hyper-masculinity are reproduced by elite sporting cyborgs? Similar questions also need to be raised in relation to the technological enablement of some disabilities at the expense of others. For example, given that people with SCI are at the forefront of developments in sports technology, they are well positioned to become a new cyborg elite against which other disabilities *dys*-appear as the material and social abject.

Such questions are unlikely to be answered by one approach in isolation and nor is this desirable. Moola and Norman (2012) pointed to the lack of contact between disability studies, the sociology of embodiment and sport sociology and how this had inadvertently reproduced the invisibility of disabled athletes and a dearth of empirical evidence regarding their sporting lives. Since then, there has been more contact between these domains and an increased recognition of the potential of *critical* disability studies to inform sport-related research into disability and disablement as evidenced in, for example, the work of Apelmo (2017), Brighton (2015), and Smith *et al*. (2016a, 2016b). Despite such progress, we suggest that future research into the processes and products of cyborgification for disabled athletes would benefit from further engagement with work in the following areas. The work in critical disability studies that takes the body to be simultaneously biological, material and social in character; the work of those who advocate embodied and carnal forms of sociology that address the active role of the body in social life and shift from theorising *about* bodies to theorising *from* lived bodies; and those sport sociologists that have focused on disabled athletes. This work must also account for the impact of material and social structures and the complex ways with which technology interacts with and reproduces them. Adopting such a multi-disciplinary approach will not be easy. The importance of the questions asked, however, makes it a necessary requirement.

Notes

1. These implements can be viewed at British Science Museum website: http://www.sciencemuseum.org.uk/broughttolife/themes/controversies/thalidomide).
2. We use the term able-bodied rather than non-disabled because for us the latter is politically problematic as it makes disability a 'thing' that people either are or aren't in a very binary way rather than a complexly structured social identity.

Disclosure statement

Notes on contributors

Andrew C. Sparkes is with the Carnegie School of Sport at Leeds Beckett University, England. His research interests revolve around the ways in which people experience different forms of embodiment over time in a variety of contexts – often not of their own making. Recent work has focused on interrupted body projects and the narrative reconstruction of self; ageing bodies in sport and physical activity; sporting auto/biographies as narrative maps; and sensuous ways of knowing and being in physical cultures.

James Brighton, PhD, is Senior Lecturer in the Sociology of Sport and Exercise at Canterbury Christ Church University, United Kingdom. As part of the Sport and Body Cultures (SBC) research group, James' research interests lie in the sociology of the body and how people experience alternative forms of embodiment in sport and physical activity. He is interested in interpretive and innovative methods of qualitative inquiry including life history, sensual and visual ethnography, and narrative analysis.

Kay Inckle, PhD, is a lecturer in sociology at Liverpool University. Her work (and life) is based on critical and embodied approaches to disability, self-injury, body politics and practices, gender and sexuality. She is also interested in user-led and creative approaches to research methods and ethics and she has published widely across all of these areas including her latest book *Safe with Self-Injury: A Practical Guide to Understanding, Responding and Harm-Reduction* with PCCS Books.

References

Apelmo, E., 2012. Falling in love with a wheelchair: enabling, disabling technologies. *Sport in society*, 15 (3), 399–408.

Apelmo, E., 2017. *Sport and the female disabled body*. London: Routledge.

Atkinson, M., 2012. The empire strikes back: doing realist ethnography. *In*: K. Young and M. Atkinson, eds. *Qualitative research in sport and physical culture*. Bingley: Emerald Group Publishing Ltd, 23–49.

Barnes, C. and Mercer, G., 2003. *Disability*. Cambridge: Polity Press.

Braun, V., Clarke, V. and Weate, P., 2016. Using thematic analysis in sport and exercise research. *In*: B. Smith and A. Sparkes, eds. *Routledge handbook of qualitative research in sport and exercise*. London: Routledge, 191–205.

Brighton, J., 2015. *Narratives of spinal cord injury and the sporting body: an ethnographic study*. Unpublished PhD Thesis. Leeds Beckett University, England.

Brighton, J., 2016. Researching disabled sporting bodies: reflections from an 'able'-bodied ethnographer. *In*: I. Wellard, ed. *Researching embodied sport: exploring movement cultures*. London: Routledge, 163–177.

Burkett, B., McNamee, M. and Potthast, W., 2011. Shifting boundaries in sports technology and disability: equal rights or unfair advantage in the case of Oscar Pistorius? *Disability and society*, 26 (5), 643–654.

Butryn, T., 2003. Posthuman podiums: cyborg narratives of elite track and field athletes. *Sociology of sport journal*, 20 (1), 17–39.

Butryn, T. and Masucci, M., 2003. It's not about the book: a cyborg counternarrative of Lance Armstrong. *Journal of sport and social issues*, 27 (2), 124–144.

Butryn, T. and Masucci, M., 2009. Traversing the matrix: cyborg athletes, technology and the environment. *Journal of sport and social issues*, 33 (3), 285–307.

Campbell, F., 2009. *Contours of ableism: the production of disability and ableness*. Baskingstoke: Palgrave Macmillan.

Chamberlain, K. and Lyons, A., 2016. Using material objects and artifacts in research. *In*: B. Smith and A. Sparkes, eds. *Routledge handbook of qualitative research in sport and exercise*. London: Routledge, 164–176.

Delmar, C., 2010. 'Generalizability' as recognition: reflections on a foundational problem in qualitative research. *Qualitative studies*, 1, 115–128.

Dower, N. and Williams, J., 2002. *Global citizenship: a critical reader*. Edinburgh: Edinburgh University Press.

Equality & Human Rights Commission (EHRC), 2017. *Being disabled in Britain: a journey less equal*. London: EHRC.

Goodley, D., 2011. *Disability studies: an interdisciplinary introduction*. London: Sage.

Goodwin, D., Johnston, K., Gustafson, P., Thurmeier, R. and Kuttai, H., 2009. It's okay to be a quad: wheelchair rugby players' sense of community. *Adapted physical activity quarterly*, 26, 102–117.

Guba, E. and Lincoln, Y., 1989. *Fourth generation evaluation*. London: Sage.

Haraway, D., 1991. *Simians, cyborgs and women: the reinvention of nature*. New York: Routledge.

Hargreaves, J., 2000. *Sporting females: critical issues in the history and sociology of women's sports*. London: Routledge.

Howe, P.D., 2011. Cyborg and supercrip: the paralympics technology and the (dis)empowerment of disabled athletes. *Sociology*, 45 (5), 868–882.

Hughes, C. and Avoke, S., 2010. The elephant in the room: poverty, disability, and employment. *Research & practice for persons with severe disabilities*, 35, 5–14.

Humphries, C. and Smith, A., 2014. Talking objects: towards a post-social research framework for exploring object narratives. *Organization*, 21 (4), 477–494.

Jones, C. and Wilson, C., 2009. Defining advantage and athletic performance: the case of Oscar Pistorius. *European journal of sport science*, 9, 125–131.

Leder, D., 1990. *The absent body*. Chicago, IL: University of Chicago Press.

Merleau-Ponty, M., 1945. *Phenomenology of perception*. London: Routledge.

Molnar, G. and Purdy, L., eds., 2016. *Ethnographies in sport and exercise research*. London: Routledge.

Moola, F. and Norman, M., 2012. Transcending 'Hoop Dreams': toward a consideration of corporeality, crossroads and intersections, and discursive possibilities in disability and theory. *Qualitative research in sport, exercise and health*, 4 (2), 284–295.

Moser, I., 2006. Disability and the promises of technology: technology, subjectivity and embodiment within an order of the normal. *Information, communication & society*, 9 (3), 373–395.

Norman, M. and Moola, F., 2011. 'Bladerunner or boundary runner'?: Oscar Pistorius, cyborg transgressions and strategies of containment. *Sport in society*, 14 (9), 1265–1279.

Papadimitriou, C., 2008. Becoming en-wheeled: the situated accomplishment of re-embodiment as a wheelchair user after spinal cord injury. *Disability and society*, 23 (7), 691–704.

Peers, D. and Eales, L., 2017. Moving materiality: people, tools, and this thing called disability. *Art/research international: a transdisciplinary journal*, 2 (2), 101–125.

Purdue, D. and Howe, P.D., 2013. Who's in and who is out? Legitimate bodies within the Paralympic Games. *Sociology of sport journal*, 30, 24–40.

Reeve, D., 2012. Cyborgs, cripples and iCrip: reflections on the contribution of Haraway to disability studies. In: D. Goodley, Bi. Hughes and L Davis, eds. *Disability and social theory: new developments and directions*. London: Palgrave, 91–111.

Richardson, N. and Locks, A., 2014. *Body studies: the basics*. London: Routledge.

Schwandt, T., 2015. *The Sage dictionary of qualitative research*. London: Sage.

Shogan, D., 1999. *The making of high-performance athletes: discipline, diversity, and ethics*. Toronto: University of Toronto Press.

Silva, C. and Howe, P.D., 2012. The (in)validity of *supercrip* representation of paralympian athletes. *Journal of sport and social issues*, 36 (2), 174–194.

Smith, B., Bundon, A. and Best, M., 2016a. Disability sport and activist identities: a qualitative study of narratives of activism among elite athletes' with impairment. *Psychology of sport and exercise*, 26, 139–148.

Smith, B., Perrier, M. and Martin, J., 2016b. Disability sport: a partial overview and some thoughts about the future. *In*: R. Schinke, K.R. McGannon and B. Smith, eds. *Routledge international handbook of sport psychology*. London: Routledge, 296–303.

Smith, A. and Thomas, N., 2012. The politics and policy of inclusion and technology in Paralympic sport: beyond Pistorius. *International journal of sport, policy and politics*, 4 (3), 397–410.

Sparkes, A., 2017a. Researching the senses in physical culture: charting the territory and locating an emerging field. *In*: A. Sparkes, ed. *Seeking the senses in physical culture: sensuous scholarship in action*. London: Routledge, 1–24.

Sparkes, A., ed., 2017b. *Seeking the senses in physical culture: sensuous scholarship in action*. London: Routledge.

Sparkes, A. and Smith, B., 2009. Judging the quality of qualitative inquiry: criteriology and relativism in action. *Psychology of sport and exercise*, 10, 491–497.

Sparkes, A. and Smith, B., 2014. *Qualitative research methods in sport, exercise and health: from process to product*. London: Routledge.

Stake, R., 2005. Qualitative case studies. *In*: N. Denzin and Y. Lincoln, eds. *Handbook of qualitative research*. 3rd ed. London: Sage, 443–466.

Swartz, L. and Watermeyer, B., 2008. Cyborg anxiety: Oscar Pistorius and the boundaries of what it means to be human. *Disability & society*, 23 (2), 187–190.

Thomas, C., 2007. *Sociologies of disability and illness*. Hampshire: Palgrave Macmillan.

Tracy, S., 2010. Qualitative quality: eight 'big tent' criteria for excellent qualitative research. *Qualitative inquiry*, 16, 837–851.

Wacquant, L., 2015. For a sociology of flesh and blood. *Qualitative sociology*, 38, 1–11.