

Effects of hippotherapy on people with cerebral palsy from the users' perspective: A qualitative study

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Although there is now some evidence for specific effects of hippotherapy on people with cerebral palsy, these studies fail to provide a comprehensive picture of the effects of hippotherapy. This was the first qualitative study to explore the hippotherapy experience of people with cerebral palsy from a user perspective. The effects of hippotherapy and their context were of particular interest. Seventeen users aged from 4 to 63, with or without their parents, participated in focus groups or individual interviews in six centres in Britain and in Germany. The main effects of hippotherapy, as identified by users and parents, are normalisation of muscle tone, improved trunk control, improved walking ability, carryover effects of hippotherapy to activities of daily living, and increased self-efficacy, confidence, and self-esteem. This study provided unique and new insights into the context in which hippotherapy happens, as well as its effects on impairment, activity, participation, and quality of life in people with cerebral palsy. The study's findings are integrated with the existing literature on motor learning and pedagogy to try to explain the complex effects of hippotherapy as reported by users and parents. A conceptual framework that illustrates these effects and their interactions is introduced.

Introduction

There is no unanimously accepted definition of the term “Hippotherapy” across the globe. It was first coined in Germany in the late 1960s but has since come to mean different things in different countries. While we acknowledge these differences in practice, this study explored the effects of hippotherapy on people with cerebral palsy in Germany and in the United Kingdom. For this reason, this article is based on hippotherapy as practised in those two countries, where it is defined as a specialist physiotherapy treatment

for people with neuro-motor disorders “with and on the horse” (Strauß, 2007). Hippotherapy makes use of the movement impulses of a walking horse to facilitate movement responses in the user astride the horse. The user does nothing to actively influence the movement of the horse; on the contrary, the user is moved by the horse and responds to the horse's movement. The physiotherapist directs a trained horse handler to vary the horse's movement in terms of stride, cadence, acceleration/deceleration, and direction to facilitate motor learning specific to the user's needs. Hippotherapy is distinct from other forms of

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therapeutic riding; it is a specialist physiotherapy and rehabilitative treatment, not a recreational activity. People with cerebral palsy constitute one of the main user groups of hippotherapy (Debuse, Gibb, and Chandler, 2005; Strauß, 2007).

The proposed physical effects of hippotherapy on people with neuro-motor disorders are the regulation of muscle tone (Künzle, Steinlin-Egli, and Yasikoff, 1994; Lechner et al, 2003; Rommel, Peterson, and Rommel, 1996; Strauß, 2007; Watakabe et al, 2003), improved trunk control (Casady and Nichols-Larsen, 2004; Haehl, Giuliani, and Lewis, 1999; Rommel, Peterson, and Rommel, 1996; Strauß, 2007; Tauffkirchen, 1996), improved gait (McGibbon, Andrade, Widener, and Cintas, 1998; Strauß, 2007; Would, 1998), improved motor function (Casady and Nichols-Larsen, 2004; Haehl, Giuliani, and Lewis, 1999; McGibbon, Andrade, Widener, and Cintas, 1998), the stretching of contractures (Watakabe et al, 2003), and improved balance, coordination, and sensory integration (Strauß, 2007; Tauffkirchen, 1996; von Arbin, 1994; Weber, 1996). However, a considerable proportion of the literature on hippotherapy is based on observation rather than rigorous and systematic evaluation of outcome. More recently, systematic studies have provided evidence for the effects of hippotherapy on children with cerebral palsy (Casady and Nichols-Larsen, 2004; Haehl, Giuliani, and Lewis, 1999; McGibbon, Andrade, Widener, and Cintas, 1998; Would, 1998). While this is to be welcomed, the (quasi-) experimental investigations to date of specific effects of hippotherapy have failed to provide a comprehensive picture of the effects of hippotherapy on people with cerebral palsy.

This article reports part of a larger study (Debuse, 2006a), the aim of which was to explore in depth the effects of hippotherapy on people with cerebral palsy. Sim and Wright (2002) asserts that “an understanding of... professional interventions in health care is incomplete unless an attempt is made to capture the subjective reality of health and ill-health as they affect the individual.” For this reason, we believed that only by exploring the effects of hippotherapy on people with cerebral palsy from a user perspective would it be possible to truly validate what researchers and clinicians have identified as the effects of hippotherapy on this user group.

The effects of hippotherapy were explored in more than one country, because it was unwise to assume that hippotherapy practised in one country would have the same effects as hippotherapy practised in another. The United Kingdom and Germany were chosen as study locations due to their differences in hippotherapy practice and history (Debuse, Gibb, and Chandler, 2005). In Germany hippotherapy has been practised by specialist physiotherapists and taught to a high standard for more than 30 years. In December 2005 more than 1,400 physiotherapists held a nationally recognised qualification to practise hippotherapy (Deutsches Kuratorium für Therapeutisches Reiten, 2005). As a result, hippotherapy is a widely available treatment modality for people with cerebral palsy and other neuro-motor disorders. In Britain, on the other hand, hippotherapy has only been practised for 10 years. At the time of data collection in autumn 2003, only 12 physiotherapists held a recognised qualification to practise hippotherapy; of these, only 8 practised. It is not surprising, therefore, that hippotherapy is still little known in Britain and available to very few individuals.

Methods

Research paradigm and methodology

This study was based on the Critical Realism paradigm, which Robson (2002) argues, “can provide a model of scientific explanation which avoids both positivism and relativism.” The natural sciences branch of Critical Realism (in the remainder of the text referred to as Critical Realism) holds that there is one reality that exists independent of our perception of it (Bhaskar, 1989; Kitchell, Clark, and Gombos, 1986; Proctor, 1998; Wainwright, 1997). It is important, however, that Critical Realism also recognises that different experiences of reality can and do exist (Bhaskar, 1989; Collier, 1994; Robson, 2002). This recognition was central to this study, as it sought to explore the effects of hippotherapy on people with cerebral palsy from the perspectives of the users, of physiotherapists (Debuse, Gibb, and Chandler, 2005), and of existing literature. The overriding aim of this study was to explore what the reality of hippotherapy is for people with cerebral palsy, in

Table 1. Assumptions shared by Critical Realism and Naturalistic Inquiry (Bhaskar, 1989; Lincoln and Guba, 1985; Robson, 2002).

Philosophical assumption	Critical realist and naturalistic inquiry interpretation
Ontology	
The nature of reality	“Reality” is context-dependent; it cannot be explained or predicted by experiments. Absolute causality is rejected.
Epistemology	
Ways of investigating reality	Different experiences of reality can and do exist. While it is impossible to fully understand reality, it can be investigated from different aspects, to obtain a picture as comprehensive as possible. Human knowledge and understanding is fallible and transient. Research results may be generalisable only to the extent that they are context specific.
Axiology	
The influence of the researcher on the researched	The researcher and the researched are interactive and interdependent. Acknowledgement of the value-ladenness of theory and the theory-ladenness of facts. The researcher accounts for this in order to make plain the context in which research takes place.
Methodology	
The exact methods of investigating reality	Critical Realism may use both qualitative and quantitative methods of inquiry. Naturalistic Inquiry prefers the use of qualitative methods, although it does not use them exclusively. Both advocate a naturalistic/real-world approach, as this is considered essential for the study of reality in its particular context.

terms of cause and effect. This meant uncovering the complex interrelationships between horse, patient, and physiotherapist, as well as the environment in which hippotherapy takes place.

The uncovering of reality in a particular and defined context as outlined above, is a key aim of the Critical Realist approach. To achieve this, Critical Realism uses an inductive as well as a deductive approach to science. Note that Critical Realism views both professional and lay perspectives as valid and equal representations of phenomena (Clark, 2003). This aspect of Critical Realism is particularly relevant to this study, because it provides the basis for the use of information from different sources, as well as for triangulation both between these sources and within them.

Critical Realism accepts that research is value-laden and that the researcher is not objective. For this reason, critical realists account for influences of the researcher, to clarify the context in which research takes place and knowledge is generated. No matter whether qualitative or quantitative methods of inquiry are used, Critical Realism

advocates research in a natural setting to make knowledge context-specific (Robson, 2002). These assumptions are shared by the Naturalistic Inquiry approach as discussed by Lincoln and Guba (1985). Naturalistic Inquiry, too, is based on the existence of multiple realities and the individuality of experience and emphasises the relevance of data collection in a natural setting (Erlandson, Harris, Skipper, and Allen, 1993; Lincoln and Guba, 1985). Table 1 provides an overview of how Critical Realism and Naturalistic Inquiry complement each other.

Study design, recruitment, and sample

A qualitative design was chosen to allow in-depth exploration of users’ experience of the effects of hippotherapy. Other than in (quasi-) experimental study designs, in qualitative research it is not desirable to use a random sample. Instead, sampling is designed to ensure that the voices of people with relevant knowledge/experience are being heard (Erlandson, Harris,

Skipper, and Allen, 1993; Lincoln and Guba, 1985; Robson, 2002; Sim and Wright, 2002). Inclusion criteria were a diagnosis of cerebral palsy, having received hippotherapy for at least six sessions, the ability to express themselves verbally, or being a parent/carer of somebody who fitted the above criteria. People who did not have a diagnosis of cerebral palsy were excluded for obvious reasons, as were people who were unable to express themselves verbally.

In Britain, of all physiotherapists practising hippotherapy at the time of data collection in autumn 2003, only two who worked at the same centre identified that they had patients who satisfied the inclusion criteria and an environment that was conducive to data collection. In Germany a stratified purposive sample was used. To account for possible differences in user experience in different parts of the country, it was decided to collect data at centres in different federal countries within Germany. Potential sites for data collection were identified from the German Therapeutic Riding Association's

(DKThR) catalogue of approved centres and physiotherapists. Because hippotherapy tends to be practised in German centres only once or twice a week, the final choice of centres was based on how "hippotherapy days" at individual centres fitted into the first author's 2-week schedule for data collection and on whether they had patients who fitted the inclusion criteria at the time.

In all, 17 users aged from 4 to 63, with or without their parents, took part. Table 2 provides a brief overview of numbers and composition of groups, as well as of users' ages. Users' experience of hippotherapy ranged in duration from 6 weeks (only one participant) to several years; their level of ability from Gross Motor Function Classification System (GMFCS) level I ($n=4$; age 4 to 36) to GMFCS levels IV and V ($n=4$; age 13 to 40). Users' CP "classification" included spastic diplegia, hemiplegia, and quadriplegia. All users would normally attend for hippotherapy once weekly; their "objective progress" was not ascertained because this was

Table 2. Number of participants in focus groups/interviews.

Location of data collection*	Overall number of participants	Number of groups	Number within groups	Composition of group, age of children
Germany				
Centre 1	5	1	5	2 children, age 7 and 13, their mothers and one adult user
Centre 2	1	1	1	One adult user
Centre 3	4	1	4	2 children, age 4 and 15, the mother of one and carer of the other
Centre 4	7	2	2	One adult user and his mother (to aid communication)
			5	2 children, age 13 and 10, their mothers and one adult user
Centre 5	6	2	2	One girl, age 9 and her mother
			4	One boy, age 14, his mother, and one adult user and her mother
UK				
Centre 6	8	3	4	2 children, age 5 and 14 and their mothers
			2	One boy, age 5, and his mother
			2	One boy, age 5, and his mother

*In Germany all these centres were accredited by the German Therapeutic Riding Association (DKThR). In Britain, where no such accreditation exists, data was collected at a centre where two physiotherapists, who are qualified in hippotherapy, practise.

not relevant for the study. This sampling strategy recruited participants who were representative of children with cerebral palsy who receive hippo-therapy in both countries and their parents. At no time was there any effort or intention to recruit participants who might express a particularly favourable view of hippotherapy.

The study was ethically approved by the relevant bodies in the United Kingdom and in Germany. Adult users and parents/carers gave written informed consent; verbal consent was gained from the children.

Data collection and analysis

It has been argued that a friendly, informal environment facilitates discussion and disclosure, because participants are more likely to express their views freely than in a formal interview situation (Bloore, Frankland, Thomas, and Robson, 2001; Kidd and Parshall, 2000; Stewart and Shamdasani, 1990). Possible participants in this study already knew each other from previous contacts at the equestrian centres and were likely to be comfortable in each others' company, as well as in the physical surroundings. Participants' familiarity with the surroundings and with each other was considered particularly important to minimise any unease in the children. For these reasons, focus groups (Bloore, Frankland, Thomas, and Robson, 2001; Kidd and Parshall, 2000; Krueger, 1998; Krueger and Casey, 2000) were considered an ideal vehicle for data collection with users and parents. However, due to participant preferences and time and space constraints, it was impossible to conduct focus groups with all participants. Where focus groups were not possible, semistructured interviews either of individuals or a user/parent team were conducted.

The interviews and focus groups were semi-structured and based on the same key questions that centred on the effects of hippotherapy (Appendix 1). They were facilitated in such a way that all participants felt included in terms of language use and environment and could contribute freely. This allowed friendly discussions, which gave all participants a voice. Unlike in other focus group investigations (Kidd and Parshall, 2000; Morgan, Gibbs, Maxwell, and Britten, 2002; Reed and Roskell-Payton, 1997), there was no evidence in any of the groups of

overt or covert pressure by members of the group affecting other participants' responses in this study. While focus group participants frequently agreed with what other members of the group had said, they often expanded on what had been reported and shared their own experience of the same effect or observation. This can be taken as genuine consensus, as opposed to less vocal or assertive members conforming to majority or dominant opinion.

Depending on the location, the bilingual first author facilitated the focus groups/interviews in English or German. The focus groups/interviews were audio- and video-recorded and transcribed verbatim.

Data analysis was informed by the Naturalistic Inquiry approach (Lincoln and Guba, 1985). The data were searched for "the smallest pieces of information [codes or units] that may stand alone as independent thoughts in the absence of additional information other than a broad understanding of the context" (Erlandson, Harris, Skipper, and Allen, 1993). As part of the data analysis process, each interview/focus group was coded descriptively. Codes were numbered in the "order of appearance," given a verbal label, and suffixed with "pg" to indicate participants' own words (participant-generated), or "og" to indicate observer-generated codes. All pg codes strictly used the participants' own words; they constituted the great majority of codes allocated. From the second transcript (the order was random), reference was made to codes used in the first, and those codes were used whenever exactly the same meaning was expressed.

Though observer-generated, the "og" codes were still descriptive. An example of og codes used is 7og "other than hippotherapy normal physiotherapy is experienced as something not very pleasant" to describe "[hippotherapy] simply isn't the normal physio where somebody prods about on you." All transcripts were coded as outlined above and a list compiled alongside of all the codes and what they stood for. In an effort to stay true to participants' intended meaning, no a priori frameworks were used, and care was taken to let themes emerge from the data. Toward the end of the coding process five main themes were apparent:

- Factors that influence the experience and the effect of hippotherapy (context and perception)
- The movement experience

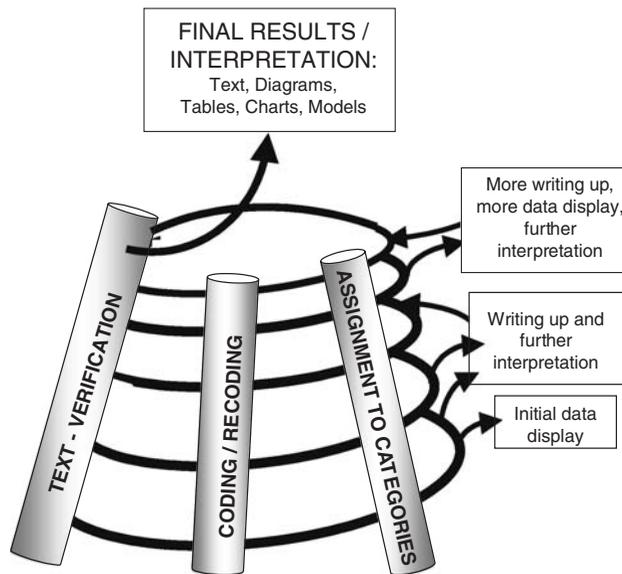


Figure 1. Diagrammatic representation of data analysis in this study, as informed by Lincoln and Guba's (1985) Naturalistic Inquiry approach.

- The physical effects
- The psychological effects
- Users'/parents' responses to these effects

The codes were assigned to these emerging themes and categories within these. Figure 1 illustrates the data analysis process.

Rigour

The authors acknowledge that due to their interactive nature, absence of dissent in focus groups cannot usually be taken for consensus (Sim and Wright, 2002). To address this problem associated with focus groups in terms of consensus and transferability (Kidd and Parshall, 2000; Reed and Roskell-Payton, 1997; Sim and Wright, 2002), data from both methods of data collection were used for triangulation (Sim and Wright, 2002). This demonstrated that participants described the same experiences in different centres and in interviews as well as focus groups, often using the same words, independently of each other. This is evidence of genuine consensus. Saturation was reached very early on: From the second data collection encounter participants repeated, and thus confirmed independently, what had already been

said. From the fifth focus group/interview no more new topics were raised. The subsequent focus groups and interviews were still valuable, however, as they served for triangulation and independent confirmation of topics raised earlier (Lincoln and Guba, 1985; Robson, 2002).

As advocated by several authors (Erlandson, Harris, Skipper, and Allen, 1993; Kidd and Parshall, 2000; Lincoln and Guba, 1985), it had initially been planned to schedule another focus group to discuss the truthfulness of the author's final interpretation. In preparation for this, an abbreviated version of the results was submitted to a subsample of participants for their scrutiny and critical comments. The participants were recruited from one focus group and one individual interview and consisted of two adult users and two children and their mothers. However, these participants stated independently of each other that they fully agreed with the findings as presented and that their experiences were reflected accurately and comprehensively. On this basis, no further focus group was facilitated, and the first author's interpretation was accepted. For a summary of the measures taken to ensure academic rigour, please see Table 3.

In combination with a rigorous sampling strategy and data analysis, the evidence of genuine

Table 3. Overview of study in terms of academic rigour and consistency.

Research goals	To explore in depth the effects of hippotherapy on people with cerebral palsy from a user's perspectives
Methodology	Qualitative, informed by Naturalistic Inquiry
Research methods	
Sampling	Germany: Striated purposive sample; Britain: convenience/whole population sample
Data collection	Naturalistic Inquiry: Focus groups and Semi-structured interviews
Data analysis	Naturalistic Inquiry: No a priori frameworks Multiple coding Emergence of themes from the data User-generated rather than observer-generated codes Spiral process Constant comparative method (analysis)
Quality control	Reflexivity (author being very open about her own background and her potential effects on the participants and vice versa) Audit trail Triangulation of data sources and methods Multiple coding Participant verification

consensus and early saturation indicate that the findings are likely to be representative of a larger population of people with cerebral palsy who receive hippotherapy than those who took part in this study. All this would point to the credibility, completeness, and transferability of the findings (Sim and Wright, 2002).

Results

While the questions centred on the effects of hippotherapy, many participants expressed themselves on issues that went far beyond the key questions. This made a user-generated model of hippotherapy emerge, which is presented in Figure 2.

The themes presented in Figure 2 and the categories that contributed to them will now be reported. Within the constraints of this article it is only possible to consider key categories. Figures in the text summarise categories and indicate important interrelationships between different effects of hippotherapy. Underlining indicates where participants placed particular emphasis within their contributions.

Factors that influence the experience and the effect of hippotherapy

All users and/or their parents reported that hippotherapy was fun and that it was experienced as riding and not as therapy. A 14-year-old boy shared: "*firstly, riding does me good, and secondly, it's fun*". In a different group, a 10-year-old girl offered: "*I like coming and I feel fine when I'm here with the horses*". Her mother confirmed: "*she absolutely beams when she sits on the horse, that is very apparent!*"

Many participants also commented that they welcomed that hippotherapy takes place in a "normal" rather than a health care environment. Participants spoke with enthusiasm about how they liked the interaction with the horses and how much they appreciated the horses' efforts. When a 13-year-old participant was asked what riding meant to her she said: "*the horses, really, well I love horses, interacting with them*".

Many commented that they felt that their own/their child's positive attitude toward hippotherapy was likely to enhance the effects of this intervention. The mother of a 13-year-old put it like this: "*it is much easier to motivate oneself for*

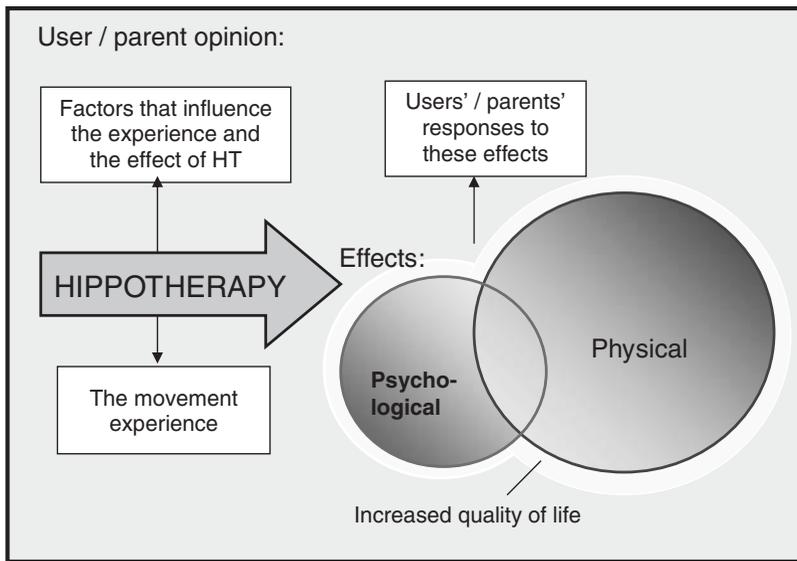


Figure 2. User-generated model of hippotherapy (HT).

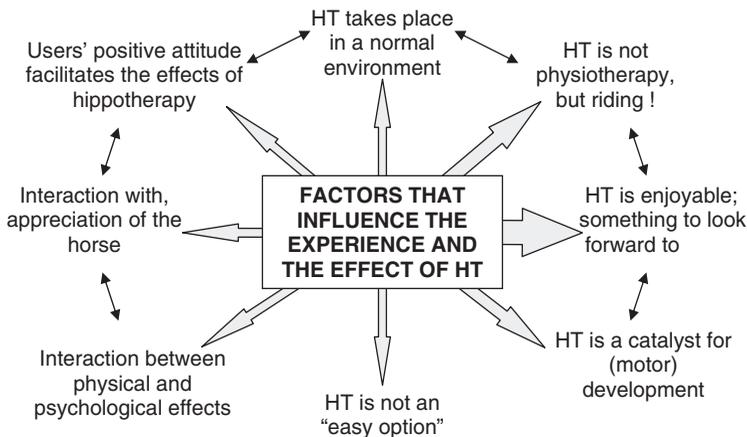


Figure 3. Diagrammatic representation of the factors that influence the experience and the effect of hippotherapy (HT). In this figure, as in the subsequent figures, the black arrows indicate important interrelationships between different effects of hippotherapy.

such a therapy than for [conventional] physio; that, I think, is really a very, very big advantage”.

However, despite users’ and parents’ positive experiences with hippotherapy, several participants pointed out that hippotherapy was not an “easy option.” Several users experienced hippotherapy as very tiring. One reported: “after hippotherapy I’m shattered; I have to lie down and rest... hippotherapy definitely is strenuous.” Another boy in a different group expressed a similar experience: “...it was very strenuous,

but one gets used to that after a while, now it’s not so strenuous any more.”

Other participants emphasised that they/their children had had to overcome their initial fear of horses. As one mother put it, “at first, we couldn’t get him near a horse, he was screaming such a lot”; an adult user said “when I started I was afraid of the big horse and now I find it fantastic!”

Figure 3 illustrates all the themes that were raised within this category. As in all of the

following figures, thickness of arrows indicates weight of opinion.

The movement experience

It was very clear that users are very aware, indeed, of the effects of the horse's movement on them. Two wheelchair users described, independently of each other, an experience on horse back of something that must be close to normal movement. One said:

“yes, on the horse I feel as if I was walking, because... I can give myself completely up to it [movement], and the horse transmits it onto me”.

In a different group another wheelchair user explained:

“Also from a holding point of view, the stability, when the horse is moving, to keep your balance yourself and to be more stable, you don't tip so easily, so you're sitting more upright, not hanging skewwhiff any more! The horse moves you in a way, which you would never be able to achieve like that yourself. Because in the wheelchair you're stable. The movement on the horse is a completely new sensation, really, which you don't get, at other times... simply the to-and-fro, and the balancing; that you can go along with the movement, with your body, that is really a completely new feeling, which you're never really exposed to, otherwise.”

The physical effects

All participants expressed themselves on the beneficial physical effects of hippotherapy. This is the contribution a 7-year-old girl made to her group:

“...when I come off the horse [dismount] then sometimes I feel very small, because the horse was so big, ...erm, yes, and then I always feel really very good, when I've dismounted.” She put a lot of emphasis on that.

Many participants reported that a break in hippotherapy causes a deterioration in their function and ability. Many participants also expressed that they experienced hippotherapy to be more effective than conventional physiotherapy. One wheelchair user in her thirties shared with her group:

“With other therapies you notice how things deteriorate slightly over time if you don't do them, but to notice that something actually develops, particularly as an adult; I don't think you get that any more with other therapies.”

Several also commented that hippotherapy facilitates conventional physiotherapy. One adult user said: *“there definitely wasn't even the slightest chance that I could have done anything on the roll in physio – it was absolutely unthinkable.”* Since she started hippotherapy she can exercise on the roll.

Several users also reported improved standing and walking ability. This is how a 5-year-old introduced the topic of falling (unprompted):

M: *“And do you know something else?”*

DD: *“No”*

M: *“Once I fell.”*

DD: *“Off the horse?”*

M: *“No! On that stuff out there (points to the concrete path outside). I was walking in and I tripped.”*

M's mother: *“once he's been on the horse and we go back to the car, he can actually run to the car, which he can't before.”*

DD: *“that's interesting.”*

M (emphatically): *“and I don't fall over.”*

M's mother: *“no, you don't fall.”*

Participants also commented on improved trunk control and posture, stabilisation of hip subluxation to the extent that surgery was prevented, and improvement in upper limb function.

A 13-year-old with good sitting balance and an upright posture told me: *“At school I kept falling off the chair.”*

Her Mother: *“Yes, you kept falling off the chair; she still had to be strapped*

into a specially moulded chair then. Well, when she started riding she wasn't able to hold her head up properly by herself, and... her trunk hung far forwards like this, and it happened really quickly that she sat on the horse by herself."

A similar experience was shared by a 14-year-old wheelchair user in the UK:

A: *"I had trouble keeping myself up."*

A's mother: *"She had trouble keeping straight."*

DD: *"That's good! Does this mean that now you're able to sit better than before?"*

A nods.

The regulation of muscle tone was another area most participants raised. While the scope of this article does not allow an in-depth report of participants' experiences of muscle tone, it is worth mentioning that both individually and in combination, participants' comments provide evidence that parents and users have a good working knowledge of muscle tone. A 7-year-old girl volunteered: *"I also feel looser than when I'm not on a horse."* Her mother confirmed: *"yes, also with the abduction, normally her knees are together and that becomes stretched with hippo-therapy and also the muscle tone is always quite loose after the riding."*

Participants in all groups reported that hippo-therapy had been a catalyst for motor development and that there was carry-over to function and activities off the horse. A 14-year-old told his group:

"I have learned to ride a bike since I started riding!"

DD: *"really? Since you've been coming here you've learned to ride a bike! And the two were directly related?"*

His mother: *"I can confirm this about the bike. Well, he was hell bent on learning to ride a bike, and through keeping his balance on the horse, he learnt to ride a bike without stabilisers, and he really wanted to do that. And I think that without the riding learning to ride a bike would have been much more difficult."*

A 26-year-old who is now able to stand for transfers and a 10-year-old girl who can now join her family skiing are further indications of a carryover of motor learning from hippotherapy to skills off the horse. A 63-year-old participant reported:

"And even then, before my retirement, when I had just started here, the colleagues that I had known for 10, 20 years were all surprised at what I got away with at work—and I mean now the locomotion, fetching something and sitting back down again. I find that so wonderful! I could never have dreamt that, when I started [hippo-therapy] at the age of 55, I could still get a little something out of it. The family, too, made comments like: 'man, you're sitting so straight, or you're walking so straight', and so forth."

The latter would seem to indicate that hippo-therapy can facilitate motor learning in users of all ages.

Two further important effects of hippo-therapy on people with cerebral palsy were its facilitation of personal care and pain relief. Two adult users in different groups mentioned that after hippo-therapy they have considerably less low back pain and spasticity-related pain.

Another adult user who needs help with her personal care told her group:

G: *"I can also say that...I had bloody awful problems taking my legs apart, and that's become better and better with time [as a result of hippo-therapy]."*

DD: *"and now that you're able to take your legs apart a bit better, do you find it's easier to get dressed, or such like?"*

G: *"yes, it's generally easier; also when I'm hanging in the hoist, I've got to move my legs apart a bit then, and that's just not as painful any more."*

Although the effects of hippo-therapy on personal care falls within the physical effects category, there is no doubt that particularly these effects also influence how a person feels, their dignity, and their self-respect.

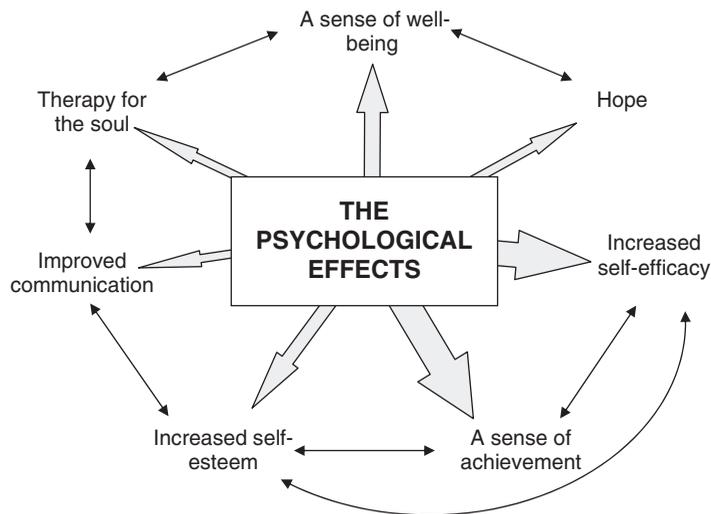


Figure 5. The psychological effects of hippotherapy. The black arrows indicate important interrelationships between different effects of hippotherapy.

he would go and walk away from us, whereas before he wouldn't do that."

Child and adult study participants expressed clearly that, due to their improved motor function following hippotherapy, users believe that they can achieve certain motor tasks; therefore, they feel confident to attempt them and are successful. In other words, participants described improved self-efficacy (Bandura, 1982; Linton, 2005) as a result of hippotherapy. Figure 5 provides a summary of all the psychological effects of hippotherapy as reported by users.

Users'/parents' response to the effects of hippotherapy

From participants' comments it was clear that hippotherapy was experienced as very positive and effective. A German mother said:

"I am convinced [of the effectiveness of hippotherapy]. Otherwise I wouldn't come every Friday – we come from (town some 35 miles away on one of Germany's busiest motorways) and coming here is often quite an undertaking. Well, if I wasn't convinced of it, I wouldn't come."

Many parents also commented that seeing their children's function improve gave them hope for their future. One mother shared with her group:

"I do know of a few parents who, eh, are deeply depressed after they're diagnosed... but in saying that, six weeks into after being here, there was a vast difference in me, as well... gran and granddad, you know, everybody is just... they're overwhelmed with the progress that has helped him come to this. And these are all things that he would never have got to without the horse-riding."

Figure 6 illustrates the themes participants raised in this context.

We are aware that most of the quotes cited above are from adult users and parents. This is, because quite often with the children it was necessary to probe what they meant, which resulted in long dialogues. While it was easy to report these long passages of text in the first author's doctoral thesis, this was considered beyond the scope of this article.

The great majority of the quotes illustrates that there was no ambivalence about what people wanted to say. Many participants also used

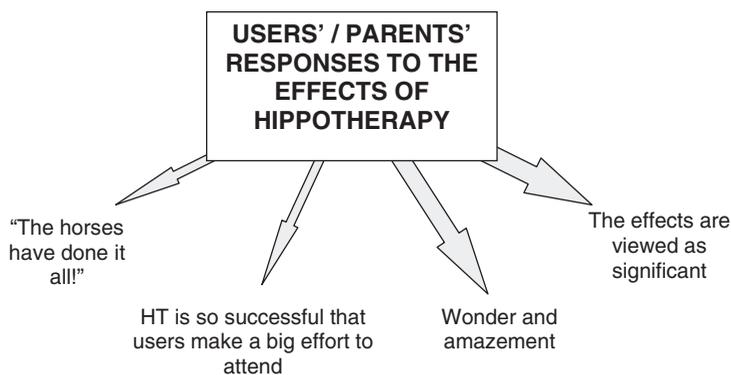


Figure 6. Users'/parents' response to the effects of hippotherapy (HT). The black arrows indicate important interrelationships between different effects of hippotherapy.

expressions like “wonderful,” “amazing,” “crazy,” “enormous,” and “incredible.” Some German participants’ use of language was such that, although they did not actually swear, there are no words in the English language other than a swear word to convey the strength and passion of their expression. It is interesting that different participants also used the same words to express their experiences. This was not prompted by the facilitator, but it is an indication that users genuinely share the same experiences. Two adult users in different centres, for example, likened their feeling of walking following hippotherapy to “floating on a cloud.”

Differences in the reported effects of hippotherapy in Germany and in the UK

While there was general consensus between U.K. and German participants on the main effects of hippotherapy, there is evidence that hippotherapy has greater physical effects in Germany than in the United Kingdom. This was apparent both from the physical effects reported and from the relative depth in which physical and psychological effects were discussed in both countries. This difference in the relative weighting of physical vis-à-vis psychological effects mirrors physiotherapists’ views in both countries was reported in a previous paper (Debuse, Gibb, and Chandler, 2005) and may be explained by differences in the history, practice, and training in hippotherapy in the two countries (Debuse, 2006a; Debuse, Gibb, and Chandler, 2006). The

scope of this article does not allow a detailed analysis of factors that have contributed to these differences. For an in-depth discussion of these differences and what is likely to have contributed to these the reader is referred to Debuse (2006b).

Discussion

The effects of hippotherapy users/parents reported in this study were striking in their magnitude and complexity. While many of this study’s findings on the physical effects of hippotherapy have confirmed what other authors have written about (e.g., Casady and Nichols-Larsen, 2004; Debuse, Gibb, and Chandler, 2005; Haehl, Giuliani, and Lewis, 1999; Lechner et al, 2003; Macauley and Gutierrez, 2004; MacKinnon et al, 1995; Sterba, Rogers, France, and Vokes, 2002; Strauß, 2007; von Arbin, 1994; Would, 1998, 2003), this study has also provided many new insights into the effects of hippotherapy and the context in which they occur. It is striking that a large number of participants mentioned without prompting that they experienced hippotherapy to be more effective than conventional physiotherapy. In an attempt to explain this finding and the reported effects, hippotherapy will now be discussed in relation to motor learning.

The walking horse imparts 90–120 movement impulses per minute onto a person on its back, which cause the following movements in that person: up-down, forwards-backwards, side-to-side,

trunk rotation, and alternate lateral flexion in the lumbar spine (Strauß, 2007). Riede (1986) and Schirm and Riede (1998) have provided evidence that the resultant pelvic movement of the person on horseback is very nearly identical to the pelvic movement during normal human gait. In other words, hippotherapy facilitates the development of trunk control in a pattern typical of human gait via the horse's walk (Riede, 1986; Schirm and Riede, 1998). This is a key aspect and the basis for hippotherapy practice in Germany.

There is now a recognition that neuromotor deficit is not only the result of people's abnormal motor output but also due to a lack of sensory input and, therefore, the opportunity to experience and practise normal movement responses, such as balance and righting reactions. Thus, the lack of exposure to motor learning opportunities adds significantly to people's disability (Leonard, 1994; Shumway-Cook and Woollacott, 2001; You et al, 2005).

Strauß (2007) points to the vicious cycle in which the development of walking depends on trunk control, yet the fine-tuning of trunk control can only be developed via walking (i.e., the need to balance the trunk over a base of support which moves in a physiological pattern). Equally, motor disorders that primarily affect the lower limbs have secondary adverse effects on people's trunk movement. Poor trunk control, in turn, can either interfere with a person's walking ability or even prevent the development of gait, a feature particularly apparent in people with cerebral palsy.

Hippotherapy can break through this vicious cycle via the unique motor learning opportunities the horse's walk provides (Riede, 1986; Strauß, 2007).

The movement the walking horse imparts on the person on its back, indeed, comes very close to normal movement for many individuals with cerebral palsy and other neuro-motor deficits. This is very important not only from physiotherapists' point of view. A study participant who depends on a wheelchair for her mobility expressed explicitly (and unpromptedly) that most people with neuro-motor deficits are not usually exposed to the same physical challenges as their non-disabled peers. Hippotherapy requires her to balance her trunk over a complex moving base of support, an experience that she does not normally have, and thus provides her with a unique opportunity for motor learning.

Several users also reported improved standing and walking ability. This is consistent with effects of hippotherapy documented in existing literature on the topic (Casady and Nichols-Larsen, 2004; Haehl, Giuliani, and Lewis, 1999; McGibbon, Andrade, Widener, and Cintas, 1998; Strauß, 2007; Would, 2000).

Trunk control is arguably a pivotal motor skill on which the development, practice, and perfection of many other motor behaviours depends. Its relationship with walking has already been discussed. As far as upper limb function is concerned, Green, Mulcahy, and Pountney (1995), for example, point out that if children with cerebral palsy are unable to keep their sitting or standing balance, they need to use their upper limbs in a supportive function. As a result, they have great difficulty engaging in reaching or grasping activities and are therefore excluded from exploring their environment as their peers would. The development of a wide range of motor skills which the participants in this study reported may well be closely related to the facilitation of trunk control in hippotherapy.

Alongside the unique facilitation of trunk control in a gait-typical pattern, hippotherapy would also appear to cause a regulation of muscle tone, an effect reported by all study participants, and, as a result, an inhibition of abnormal movement patterns (Strauß, 2007). In combination, these effects allow the development of new, corrected motor patterns. This receives support from a number of published studies on the effects of hippotherapy (Casady and Nichols-Larsen, 2004; Haehl, Giuliani, and Lewis, 1999; McGibbon, Andrade, Widener, and Cintas, 1998; Would, 2003). It is also evident from the participants in this study, all of whom reported a carryover of the effects of hippotherapy to motor activities off the horse, including improved walking and standing ability, the ability to ride a bike, and developing the upper limb motor ability that allowed drinking from a glass. This clearly indicates true motor learning and not just a training effect (Shumway-Cook and Woollacott, 2001) and illustrates how effective hippotherapy can be in enriching the opportunity for motor learning of people with cerebral palsy.

However, it is important, Strauß (2007) argues, that its movement is only one part of the horse; its therapeutic effects are, therefore, more

comprehensive. She suggests that the horse's movement constitutes neuro-motor stimulation, its body provides sensori-motor, and its character psychomotor stimulation. While this distinction is perhaps somewhat rigid, there is no doubt that the horse provides all these motor learning inputs. Important aspects of neuro-motor learning have already been discussed. The horse also provides a plethora of sensual stimuli: The senses of touch, proprioception, vision, hearing, smell, and the vestibular system are all involved. This intense sensory experience in conjunction with the rhythmical and symmetrical movement the horse transmits improves the sensory integration, and therefore, body awareness of the person on the horse's back (Schulz, 1998; Strauß, 2007). At the same time, users of hippotherapy experience dynamic movement in space, an aspect both child and adult participants in this study commented on. This not only increases their spatial awareness it challenges them to anticipate and respond to changes in speed and direction (Schulz, 1998; Strauß, 2007).

Being able to meet this challenge not only improves their body awareness and motor control, it gives them a sense of achievement. Many adult users of hippotherapy expressed explicitly, some adults and children implicitly, that hippotherapy gives them a sense of achievement. Being able to achieve physically is of immense significance for people who often find themselves defined by what they can't do; it increases their confidence and self-esteem. It also increases their self-efficacy (Hellström, Nilsson, and Fugl-Meyer, 2001; Linton, 2005; Mondloch, Cole, and Frank, 2001); this means that based on their hippotherapy achievements they are more likely to successfully try motor behaviours in situations off the horse. This, in turn, facilitates increased participation in "normal" activities which, arguably, should be the ultimate aim of physiotherapy. The mother of a 5-year-old boy told her group:

"He used to trip and he couldn't go out with the others in the garden with his toys... but now it's definitely that he can do more as well, and the more he can do, the more [his brother and sister] get involved with him as well."

The results of this study indicate clearly that, both in Britain and in Germany, hippotherapy is

effective at impairment, activity, and participation level (WHO, 2001). The boy who now confidently walks away from his parents to explore his environment and the other 5-year-old who has been able to join his siblings in play since he started hippotherapy are examples of the latter. It is important that hippotherapy does not only enable participation through its effects but also through what it provides. As far as users are concerned, they are not receiving hippotherapy, they are riding. This "normal" and deeply enjoyable and affirming physical activity in the "normal" environment of an equestrian centre constitutes participation and integration. Thus, the neuro-motor, sensori-motor, and psycho-motor stimulation hippotherapy provides and its effects on users' impairment, activity, and participation make it an affirming and very motivating experience. Motivation, in turn, is key to motor learning (Shumway-Cook and Woollacott, 2001).

Based on the results of this study, existing literature on hippotherapy, neuroscience/motor learning (Chen, Cohen, and Hallett, 2002; Dobkin, 2004; Elbert et al, 1994; Flor, Braun, Elbert, and Birnbaumer, 1997; Grillner et al, 1995; Shumway-Cook and Woollacott, 2001; Steven and Blakemore, 2004), and pedagogy (Aunola, Nurmi, Lerkkanen, and Rasku-Puttonen, 2003; Bandura, 1982; Chen, Darst, and Pangrazi, 2001; Hellström, Nilsson, and Fugl-Meyer, 2001; Rubie, Townsend, and Moore, 2004; Stine, 1997), we developed a conceptual framework to help explain why hippotherapy would appear to provide such an effective motor learning opportunity for people with cerebral palsy. While this framework cannot claim to be complete, we hope it will serve to summarise this discussion and contribute to the understanding of the complex effects of hippotherapy on people with cerebral palsy. It is presented in diagrammatical form in Figure 7.

Conclusion

This study's methods and quality control were rigorous and the findings so unambiguous and consensual that the results are both credible and transferable. They constitute important evidence of the actual—as experienced by the users—and comprehensive effects of hippotherapy on people with cerebral palsy. The qualitative study design

was not only successful in exploring the effects of hippotherapy from a user perspective, it provided a fascinating insight into the complex interactions of different aspects of hippotherapy.

Our key findings are that:

- Hippotherapy constitutes a unique opportunity for motor learning: Users' reports clearly indicate that hippotherapy facilitates true motor learning/carryover of motor ability to motor activities off the horse, not just a training effect.
- Users and parents experience hippotherapy to be more effective than conventional physiotherapy.
- The psychological effects of hippotherapy are integral to its overall effects; they enhance its physical effects.
- Hippotherapy benefits people with cerebral palsy at impairment, activity, and participation level, irrespective of their age.
- Improved function following hippotherapy clearly boosts users' self-esteem and self-efficacy.
- Both physical and psychological effects of hippotherapy enhance the quality of life of people with cerebral palsy.

These words of the 63-year-old participant clearly illustrate all the above points:

Well, the tripping has gone completely since I started hippotherapy... I find that so wonderful! I could never even have dreamt that I might still improve at this age. Before, somebody only had to touch me slightly -well, I fell. That's completely gone! I don't have the feeling any more when I'm walking with my illness that I'll fall. That's completely gone! I walk towards things as if I was healthy."

Users have a deep understanding of the effects of treatment on them. We can learn enormously from their expertise. The first author is extremely grateful to the participants in this study for sharing their (often very personal) experiences with her so generously. This qualitative study's findings can now provide the basis for other studies to examine complex intervention strategies as outlined by the Medical Research Council (2000).

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Appendix 1. Sample questions to children

How do you like coming to ride?
If yes, what do you like about it?
What effects does the riding have on you?

Sample questions to adult users and parents:

What do you observe the effects of hippotherapy to be on yourself/on your child?
What, in your experience, are the main effects of hippotherapy?
Does having hippotherapy have an effect on any of your/your child's activities off the horse?
Would you like to share anything else about your/your child's experience of hippotherapy?

*Please note that due to the semi-structured nature of the interviews/focus groups, the exact wording and order of these questions varied. However, in each of the interviews and focus groups all the above topics were covered.

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