

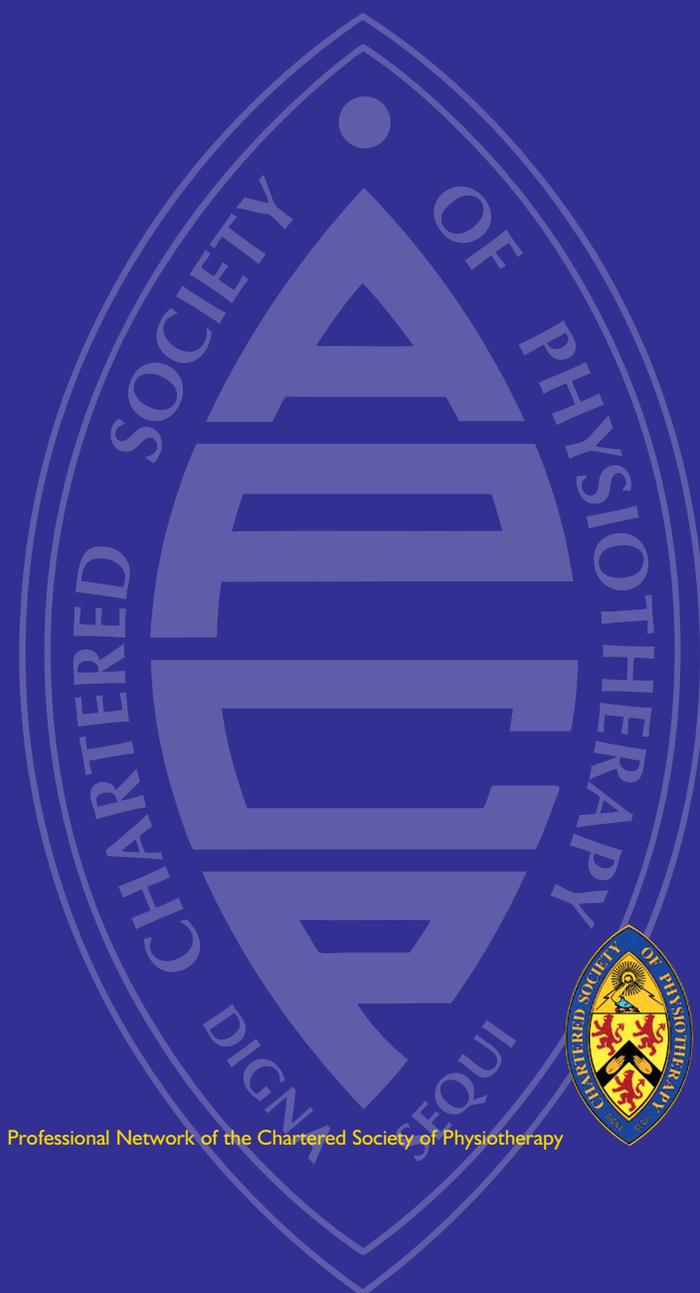


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Aims and Scope: the APCP Journal aims to publish original research and other scholarly work related to paediatric physiotherapy – its scientific basis and clinical application, education of practitioners, management of services and policy.

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Editorial

Welcome to the December 2022 edition of the APCP journal. It doesn't seem like a year ago that Barry Johnston handed over to Rachel Rapson (Assistant Editor) and I. I would like to take this opportunity to pay tribute to Barry's dedication and enthusiasm and thank him for his leadership of the journal over the last four years – hopefully we can continue to build on his work. My thanks too, to the wider team of reviewers and APCP administrators for their continued support with the journal, I have been made to feel most welcome.

In this edition I am delighted that we can include our first 'Masterclass' paper, an excellent overview of bronchiolitis that will be useful for APCP members to refer to over these winter months. I'd like to thank the authorship team (Laura Lowndes, Kieran Lock and Naomi Winfield) for their comprehensive paper and would encourage other teams to contact the journal if you would like to develop a masterclass in your area of expertise.

The second paper in this edition of the journal is a qualitative study that explores adherence to bracing in young people with adolescent idiopathic scoliosis (Chong and Simmonds). The paper draws out interesting points in relation to health literacy and supportive strategies to enhance adherence that may also be of relevance to other clinical populations.

This edition also includes a selection of abstracts from the APCP Conference held in November 2021. We hope that you enjoy perusing these abstracts that clearly demonstrate the breadth and depth of research, quality improvement, audit and scholarly activity that is ongoing in paediatric physiotherapy.

Unfortunately, we were unable to publish two editions of the journal this year due to a reduction in the number of papers submitted. This may be due in part to the major shift in staffing and priorities during the height of the Covid-19 pandemic, coupled with the impacts on research and educational opportunities. We hope that to see an increase in submissions to the journal in the coming weeks and months and will be linking with Specialist Committees and Universities in that regard.

Please do continue to send in papers for the journal. We have an open submission process across the year. All manuscripts are subjected to independent peer review. Accepted manuscripts will be published in the next available edition of the journal, either June or December. The APCP journal welcome submissions on; Original Research Papers, Scholarly Papers, Case Studies and Case Series, Audit Reports, Masterclass, Review Papers, Technical Evaluations, Service Development Reports, Abstracts of Theses and Dissertations and Letter to the Editor. If you are considering a submission and have further questions, please contact the journal via e-mail – journal@apcp.org.uk

**A qualitative study:
Exploring adherence to bracing in young people with adolescent idiopathic scoliosis**

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Abstract

Background

Adolescent idiopathic scoliosis (AIS) can cause back pain, decrease lung function and reduce quality of life. Bracing can prevent AIS from worsening. However, many young people do not wear their brace for the recommended hours and this is associated with worsening of scoliotic curve and higher chance of requiring surgery. To find ways for improving adherence to bracing, young people's views on what facilitates or hinders adherence were explored.

Methods

A qualitative study was conducted using semi-structured interviews. Young people who were prescribed bracing for AIS and their parents were invited to an online interview. Questions explored their perceived facilitators and barriers to brace adherence. Interview transcripts were analysed using thematic analysis.

Results

Six young people and five of their parents participated in the interviews. All young people were adherent to bracing. Three main themes of facilitators and barriers to brace adherence were generated. 'Knowledge about bracing' shows that adherence is influenced by knowledge about AIS and treatment effectiveness. 'Psychosocial factors' suggests how emotions and attitudes towards bracing affect adherence. 'Practicality' illustrates the physical factors which influence brace adherence.

Conclusions

For young people with good brace adherence, knowledge about bracing facilitates their adherence, suggesting the importance of patient education by healthcare professionals. Parents can play a major role in encouraging adherence by providing emotional and practical support. Young people can be reassured that some barriers to bracing can be overcome. Adherence may be further enhanced by user-friendly brace design. These facilitators can be promoted to maximise brace adherence.

Key points

Knowledge about scoliosis bracing facilitates brace adherence in young people who are adherent to bracing. Brace adherence may be enhanced by emotional and practical support from parents. Physical barriers to brace adherence may be overcome by getting used to bracing, or using different strategies and brace types.

Acknowledgements

The author would like to thank the project supervisor Dr Jane Simmonds and the participants for their contribution to this study; and the support groups and organisations for scoliosis (BackTalk Scoliosis Support Group, Curvy Girls, Higgy Bears, <https://www.scoliosis.gen.nz>, Scoliosis Association UK, Scoliosis Awareness & Support Ireland, Scoliosis and Setting Scoliosis Straight) for promoting the participant recruitment.

Funding

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Introduction

Scoliosis is defined as a 'three-dimensional torsional deformity of the spine' (Negrini et al., 2012). It is diagnosed when the lateral spinal curve exceeds a Cobb angle of 10° on a radiograph, accompanied by axial rotation (Scoliosis Research Society, n.d.). Idiopathic scoliosis specifies the deformity which is not caused by other diseases. Diagnoses made between the age of 10 and 17 are classified as adolescent idiopathic scoliosis (AIS) (James, 1975). The reported prevalence of AIS is between 0.93% and 12%, with more females presenting with larger scoliotic curves (Negrini et al., 2018).

Trunk deformity in AIS may change body appearance, cause pain and limit lung function, consequently reducing quality of life (Negrini et al., 2018). In less severe AIS, curve progression and the health consequences can be prevented by non-surgical management, including observation, physiotherapeutic scoliosis-specific exercise and bracing. Bracing is a rigid support or elastic bands which apply corrective force to the trunk, and a systematic review concluded that bracing is effective in preventing curve progression in patients with AIS (Negrini et al., 2015). This treatment is recommended for skeletally immature patients with Cobb angle above 20° to 25° (Negrini et al., 2018). Most brace types are designed to be worn full-time for at least 18 hours per day, whilst night-time braces should be worn for 8 to 12 hours per day.

Higher adherence to the recommended number of bracing hours is correlated with less curve progression and lower referral rate for surgery (Aulisa et al., 2014). However, when measured by sensors, only 17% of patients reached 70% of the recommended bracing time (Sanders et al., 2014). By exploring the facilitators and barriers to adherence to bracing, treatment adherence and effectiveness may be improved.

Brigham and Armstrong (2017) and Donnelly et al. (2004) identified some facilitators of brace adherence in young people with AIS, including effects of bracing in preventing surgery, curve progression and pain. Brigham and Armstrong (2017) also discovered a barrier to adherence, which was young people's fear of others' comments about their brace. Other possible barriers were physical difficulties such as discomfort, limitations in physical activity and limited choice of clothes; negative emotions due to bracing might hinder adherence too (Brigham and Armstrong, 2017; Donnelly et al., 2004; Law et al., 2017; MacLean et al., 1989). However, previous researchers did not evaluate their participants' actual brace adherence. If young people's perceived facilitators and barriers had been interpreted alongside their actual adherence, it might have enabled the exploration of whether promoting these facilitators or removing these barriers would improve adherence effectively or not. Furthermore, previous studies have only been conducted on girls with a Boston or Milwaukee brace. The experience of boys and young people on different brace types should also be acknowledged, to allow a comprehensive exploration of brace adherence.

This study aimed to explore facilitators and barriers to brace adherence in young people with AIS, including boys and different brace types. The findings may offer insights into how healthcare professionals (HCPs) and people who are close to a young person can motivate young people to adhere to bracing.

Method

A qualitative research design was selected to understand young people's experience of bracing (Green and Thorogood, 2009). This study was based on phenomenology, achieved by bracketing the researcher's prior assumptions, in order to understand 'lived experiences' of bracing from participants' point of view (Eberle, 2014). Interviews were chosen to collect rich data of how young people accounted for brace adherence, and to explore diverse factors of adherence individually (Heary and Hennessy, 2006). To explore participants' in-depth views, semi-structured interviews were employed. Parents/ guardians were also invited to the interviews, which could enrich data about young people's experience and strengthen credibility of the findings (Saldaña, 2011). Ethical approval was obtained from the University College London Research Ethics Committee (Project ID: 19575/001).

Recruitment

Young people and their parents were purposively recruited from eight support groups and scoliosis organisations via an online poster. The inclusion and exclusion criteria for participants are presented in Table 1. Informed consent from parents and assent from young people was obtained from all participants. Recruitment took place in May and June 2021, and was constrained to this period as this was a Masters' research project.

Table 1: Inclusion and exclusion criteria for participants with AIS

| Inclusion criteria | Exclusion criteria |
|---|---|
| On bracing for AIS at the time of interview | Other types of scoliosis |
| Age between 10 to 15 years | History of spinal operation |
| Could communicate in English | Could not understand or answer questions in English |

Data collection methods

Interviews were conducted and recorded using Microsoft Teams. Reflective notes were taken following the interviews to record the researcher's reflections.

Interview questions

Participants' demographic information and brace adherence were first collected. Then, questions were asked based on the topic guide (Box 1). The guide was developed by the primary researcher to explore how brace adherence was influenced by the facilitators and barriers recognised in the existing literature, including effects of bracing, psychosocial influence and physical difficulties. The influence of HCPs and parents was also asked to understand their role in adherence. The guide was iteratively amended with the project supervisor and other physiotherapists in the Masters' programme to improve its face validity. A pilot interview was conducted with a child on scoliosis bracing, to ensure the topic guide was appropriate for the research question (Roulston, 2014). Her data were not included in this study. Subsequently, a question to ask for participants' advice to other young people on bracing was added to the topic guide.

Box 1: Topic guide for the interview

- Can you tell me about your typical day? When do you wear or take off your brace on a school day, and at the weekend?

Knowledge and understanding about AIS

- What/ how did the healthcare professionals explain scoliosis and your brace to you?
- What do you feel about the effects of scoliosis on you?
 - The effects now, and the potential effects that anyone has told you

Attitudes towards bracing

- Have you not worn your brace on some days? Why?
- What do you feel about wearing your brace?
- Do you think your brace helps you or bothers you?

Physical barriers to adherence

- Do you feel pain in your brace?
- Does your brace stop you from doing something?
- How do you or your parents/ guardians help cope with these problems?
- What advice would you give to other young people on bracing?

Influence of other people

- Who has influenced you to wear your brace?
- Parents/ guardians: What have they done for your brace wear?
- Healthcare professionals: Are they helpful in your brace wear?
 - Have they talked about for how many hours you did wear your brace?
- Peers: Do you have a friend who also wears a brace? Have you told your friends about your brace?

Probing question

- In case of difference in opinions between the young person and the parent/ guardian: How do you usually resolve the difference in your opinions about bracing?

**The topic guide is mainly targeted on young people. Parents/ guardians who accompany the young person during the interview will be asked about the underlined topics.

Data analysis

The interviews were transcribed verbatim by the researcher. The transcripts were sent to parents for member checking to increase credibility (Saldaña, 2011). Four parents confirmed its accuracy while two parents made slight amendments to language use. Data were analysed using an inductive approach, based on the processes of thematic analysis described by Braun and Clarke (2012). Table 2 shows the processes and an example of how a subcategory was generated. During analysis, the primary researcher reflected on her bracketed presumptions about brace adherence (Box 2), which were documented before the interviews. It ensures that generated themes stayed close to participants' responses instead of the researcher's beliefs (Willig, 2014). To enhance credibility, themes were discussed with the supervisor (Green and Thorogood, 2009), and decisions made during the study were recorded in an audit trail (Cope, 2014).

Table 2: Processes of data analysis

| Five processes of data analysis | An example illustrating the processes |
|---|--|
| 1. The researcher read the interview transcripts and reflective notes for several times, and highlighted the data possibly relevant to the research question. | The following quote which demonstrated prevention of surgery as a facilitator of brace adherence was highlighted: 'Staying away from having an operation, because I obviously, I don't wanna like, have the operation.' |
| 2. Initial codes were given to label the feature of the participants' responses. | A code 'avoid surgery' was given to label the above quote. |
| 3. Similar codes were grouped together to generate broader themes and subcategories. | The codes including 'avoid surgery', 'reduce curve', 'reduce back pain' and 'unclear about brace effects' were grouped together into a subcategory called 'outcomes of bracing'. |
| 4. A thematic map was constructed to show the relationship between the themes. | |
| 5. Interview transcripts and reflective notes were reviewed to ensure that the themes could reflect the raw data. | |

Box 2: Researcher's bracketed presumptions about brace adherence

- Have mild scoliosis, not really affected by it. Parents and dance teacher perceived the 'imbalanced posture' as a bigger problem than I did. Saw a chiropractor for scoliosis during adolescence, but did not want to go to the sessions.
- Saw many young people not adherent to bracing. Had to educate them to adhere to bracing, but felt that the education was passive and ineffective in improving brace adherence-> Want to know how to improve adherence more effectively.
- Think different people may view the same barriers differently. What makes the difference in decision making between people?
- Possible barriers: not promising results of bracing, unwilling to sacrifice for future problems which may not happen, want to be independent, do not like being nagged, hotness.
- Possible facilitators: desire to avoid surgery.

Results

Six young people completed the interview. Table 3 displays the demographic information. There were four females and two males. All participants were adherent to bracing, including Participant 1 (P1), who had just started the treatment and was building up the hours according to his doctor. Five participants joined the interview with their mother.

Table 3: Demographics of participants

| Participant | Age | Sex | Country | Ethnicity | Age of diagnosis | Cobb angle before bracing | Latest Cobb angle | Duration on bracing | Type of brace | Number of wearing hours recommended per day | Actual number of wearing hours | Put on and off brace independently | Other conditions |
|-------------|-----|-----|---------|-----------|------------------|---------------------------|-------------------|---------------------|----------------|---|--------------------------------|------------------------------------|---------------------------------|
| P1 | 12 | M | UK | White | 11 | 60° | / | 2 weeks | Boston | 22 | 4(Still building up) | No | Autism spectrum disorder |
| P2 | 15 | F | US | White | 12 | 17° | 37° | 3 years | Charleston | 10 (night-time) | 9 to 10 | Yes | Nil |
| P3 | 12 | F | US | White | 10 | 30° | 6° | 1.5 years | Providence | 12 (night-time) | 9 | Yes | Nil |
| P4 | 15 | F | UK | White | 13 | 49° | 38° | 1.25 years | ScoliBrace | 23 | 22 to 23 | Yes | Nil |
| P5 | 14 | F | US | White | 11 | 43° | 14° | 3.5 years | Silicon Valley | 18 | 18 | Yes | Nil |
| P6 | 12 | M | UK | White | 10 | 45° | 44° | 2 years | Gensingen | 23 | 22 to 23 | Yes | Hypermobility, on investigation |

Key: F – female, M – male, UK – the United Kingdom, US – the United States.

Several new codes were identified in the final interview, implying that data saturation might not have been fully achieved due to the small sample size. Through thematic analysis, three main themes which facilitated or hindered the participants' brace adherence were identified:

1. *Knowledge about bracing*
2. *Psychosocial factors*
3. *Practicality*

Figure 1 presents the subcategories in each theme. Three themes and their subcategories are reported below.

Theme 1: Knowledge about bracing

Impacts of scoliosis

Some participants indicated that knowing scoliosis-associated symptoms facilitated their adherence to bracing:

"I had like lung problems and back pain, because it was so severe, but like that was another motivator." [P5, pre-bracing Cobb angle 43°]

Although other participants were not affected by symptoms of AIS, P2 was worried about pain in case of curve progression, which encouraged her to adhere to bracing.

Outcomes of bracing

Three participants were motivated to adhere to bracing mainly to avoid surgery:

"Staying away from having an operation, because I obviously, I don't wanna like, have the operation." [P2]

P3 and P6 stated that prevention of curve progression facilitated their adherence. Surprisingly, as illustrated by the quote below, P1 thought no outcomes would be achieved through bracing, hence appeared to be not encouraged to adhere to the treatment:

Researcher: "Do you think your brace will help you?"

P1 (diagnosed with autism spectrum disorder): "Like I said, no." ...

P1's mother: "It just takes some moment that he can understand."

Perceptions of surgery

Four participants worried about post-surgical complications, including limitations in activities, pain and nerve damage. Feeling negative towards surgical treatment encouraged them to adhere to bracing:

"It mainly just motivated me to wear my brace, because they (her support group) really like talk about stuff after surgery and ... I don't wanna do that." [P5]

Yet, positive perceptions of surgery can hinder brace adherence, as P2 found surgery faster than bracing:

"I don't want my brace for eight years. Why not just have the surgery?" [P2].

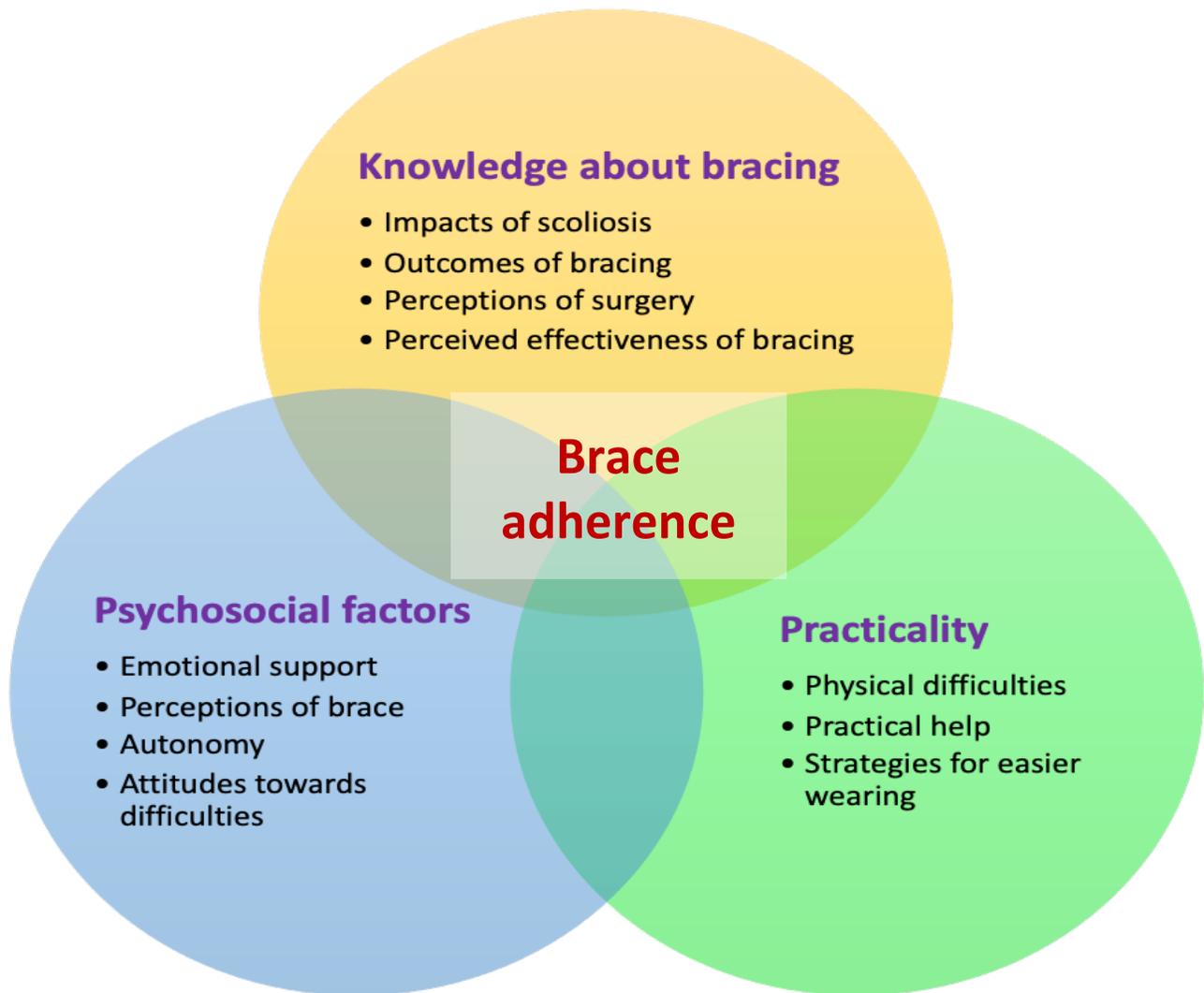


Figure 1: Themes and subcategories for facilitators and barriers to brace adherence in young people with AIS

Perceived effectiveness of bracing

P3 and P5 were confident in the effectiveness of their asymmetric braces, which enhanced their adherence. Their curve reduced during bracing:

"We know that their braces work, so that's also very helpful to know." [P5]

Other participants or their mothers highlighted the uncertainty about the effectiveness of bracing, which was affected by HCPs' explanation. The uncertain effectiveness might be a barrier to brace adherence:

"The size of P4's curves (49°), bracing was highly unlikely to work. ... The surgeon said it would never work." [P4's mother]

"I wouldn't be a supporter of the brace ... I don't see many other people would get significant results." [P1's mother]

The mother of three participants (P2, P4, P5) believed that the symmetrical Boston brace was less effective. When HCPs only offered Boston brace as treatment, they looked for asymmetric braces provided by other healthcare services. This raises speculation that if only Boston brace is available, its low perceived effectiveness may reduce adherence.

Theme 2: Psychosocial factors

Emotional support

Emotional support facilitated all participants' brace adherence. All participants described family support as a significant motivator, especially during the initial adaptation to bracing. Apart from verbal encouragement, some mothers mentioned 'being there' and staying alert to their child's feelings. **P3** and **P5** were encouraged to adhere to bracing by other patients from social media or support groups. **P3** highlighted 'not feeling alone' after owning specially designed animal dolls with braces.

"I also say, 'well done, P1. I'm so proud of you.' " [P1's mother]

"Just be there for you ... Try to understand how he's feeling and give him a break if he needs it." [P6's mother]

"The Curvy Girls meetings. It was helpful to talk to other people." [P5]

"When her sister got her that Higgy Bear ... she made her own little Insta (Instagram) page ... Then, she started talking to other kids ... An absolute game changer." [P3's mother]

Perceptions of brace

Despite good brace adherence, five participants experienced barriers, because they disliked their brace. They recalled emotions like 'upset' and 'annoyed'. Particularly, all four female participants expressed that they were not keen to talk about bracing with their friends. **P4** felt uncomfortable when being seen in her brace, so she hid it under specific clothes. A possible explanation is the worry about others' judgment:

"I wouldn't want to like be known as 'the girl with the brace' ... That's like my main worries like judgment from other teens." [P2]

Conversely, positive perceptions of brace can encourage adherence. **P6** had hypermobility and found his brace 'safe' and 'comfortable', which motivated him to adhere to bracing. Wearing his brace in school also felt 'normal' to him, likely after he explained bracing to schoolmates.

Autonomy

Autonomy in bracing was mentioned by three older participants (age 14 to 15). **P5** felt responsible for 'getting the treatment right' and self-decided what time to wear her brace. **P4** was motivated to wear her brace, partly because her mother supported her decision. The feeling of responsibility and autonomy might have facilitated their adherence.

Attitudes towards difficulties

Even though bracing seems challenging, persistence when facing difficulties enhanced some participants' adherence. Some participants coped with it actively by exploring ways to make brace adherence easier:

"I have to have a hook on the door to hang my brace ... finding ways to make it as easy as possible." [P5]

Theme 3: Practicality

Physical difficulties

Each participant described numerous physical barriers to brace adherence. All of them experienced pain or discomfort, which disrupted sleep for some participants. **P3** had a night-time brace, and stated she would not wear her brace outside her home because of discomfort. This suggests that full-time bracing can be a larger barrier to adherence, because discomfort may last longer.

Some participants mentioned that their brace limited physical activity and everyday activities like bending down. Other barriers included hotness, skin rash, and difficulty in finding chairs and bathrooms at school. Fortunately, five participants overcame the discomfort after getting used to bracing within weeks:

"I've gotten so used to the shape of the brace now, that I can barely feel it anymore." [P6]

Some participants regarded the design of Boston brace as a barrier to adherence, because the straps at the back stopped them from putting on the brace themselves.

Practical help

Brace adherence of all participants was facilitated by physical help, mostly at the beginning when their parents helped them put on the brace. Some parents reminded their child when to wear the brace or monitored their child's adherence. P6 once needed teachers' assistance to put on his brace. His parent also mentioned that HCPs gave suggestions for increasing adherence gradually.

Strategies for easier wearing

All participants used some strategies to make wearing brace easier, which enhanced their adherence. The most common strategy was taking breaks when wearing the brace, followed by doing sedentary activities. Having T-shirt or washcloth underneath the brace helped some participants. P5 loosened her brace for short periods of time, set timers to build up the wearing hours, and stayed indoor during summer. P4's mother bought new clothes for hiding the brace. P6's mother thought adherence would be facilitated by a better brace design, like being 'light-weight' and having straps at the front. It shows that some physical barriers may be overcome using specific strategies or brace design.

Discussion

The aim of this study was to explore the facilitators and barriers to brace adherence in young people with AIS. It has included the views of boys and young people on various brace types. The themes and subcategories generated accord with the existing literature, but reveal more reasons of why young people adhere to bracing. Each theme will be discussed below.

Theme 1: Knowledge about bracing

Impacts of scoliosis

The current study shows that knowing the impacts of AIS, such as back pain and lung problems, facilitates brace adherence in some young people. This finding supports that of Brigham and Armstrong (2017). According to the Health Belief Model, people are more likely to engage in behaviours for disease prevention, when they perceive the disease as severe (Dempster et al., 2018). Young people may perceive AIS as severe after understanding its impacts, and consequently adhere better to bracing.

Outcomes of bracing

Brace adherence can be enhanced by understanding that it helps avoid surgery and curve progression. This result is consistent with that reported by Brigham and Armstrong (2017) and Donnelly et al. (2004). However, education on the bracing outcomes should be tailored to individuals with AIS, as demonstrated by P1's experience. Possibly due to his diagnosis of autism spectrum disorder, P1 appeared to not understand his doctor's explanation of what useful outcomes bracing would bring. He was not motivated to adhere to the treatment. This reflects that some young people may need individualised education to increase their knowledge about the outcomes of bracing, in order to improve their adherence.

Perceptions of surgery

This study illustrates that post-surgery complications can discourage young people from considering surgery and improve brace adherence. On the other hand, P2 found 'one-off' surgery more favourable than bracing, which usually lasts several years. This positive perception of surgery can be a barrier to brace adherence. It is an interesting finding which has not been described previously, possibly because the in-depth interviews conducted here enabled participants to articulate their personal thoughts more easily than questionnaires or focus groups.

Perceived effectiveness of bracing

This is the first study to recognise that perceiving bracing as effective can motivate some young people to adhere to the treatment. It mirrors the Health Belief Model, which states that people are more likely to initiate a health behaviour if they consider the behaviour as beneficial (Dempster et al., 2018). Conversely, the uncertainty of brace effectiveness was a potential barrier to adherence for some participants.

Although the reported effectiveness of Boston brace and asymmetric braces is similar (Costa et al., 2021), some parents in this study believed symmetrical Boston brace was less effective, which may hinder adolescents' treatment adherence (Taddeo et al., 2008). This belief of ineffectiveness might be explained by the fact that all participants lived in the United Kingdom or the United States, where Boston brace is commonly used (Zaina et al., 2014). Among the young people whose curve progressed after bracing, there may have been more people on Boston brace, however this was not evaluated in this study.

Theme 2: Psychosocial factors

Emotional support

While previous studies have not intended to explore parental influence on brace adherence, the current study demonstrates that emotional support from parents can be a significant facilitator. Parental support for emotions remains important throughout adolescence and contributes to the psychological functioning of young people with chronic conditions (Oris et al., 2016), elucidating the role of parents in brace adherence.

Perceptions of brace

Negative perceptions of brace, expressed by most participants, can make brace adherence more difficult. This corroborates the negative emotions mentioned by Donnelly et al. (2004), Law et al. (2017) and MacLean et al. (1989). All the female participants in this study were reluctant to discuss bracing with peers. As the brain develops, adolescents may care more about others' opinions than adults do (Somerville, 2013). To avoid peers' opinions, young people might not wear their brace at school, causing lower adherence. The male participants did not report the same concern, but due to the small sample size, it is uncertain whether this phenomenon is unique to or more common in females.

In contrast to the literature, this study reveals that young people can also perceive their braces positively. P6 felt safe and comfortable with bracing, which promoted his adherence. His hypermobility might explain why he appreciated the support provided by bracing. Including participants with other conditions in this study might have enabled the exploration of diverse perceptions of braces in different people. Furthermore, wearing a brace at school was not a challenge to P6 after describing his brace to the whole school. This implies that raising awareness in schools may reduce patients' fear of peer opinions, possibly promoting brace adherence.

Autonomy

Brace adherence may be facilitated when young people have autonomy towards their brace wearing or choosing their own treatment, as suggested by three older participants' experiences. Although autonomy has not been explored in the literature about AIS, its benefit on adherence may be explained by Self-determination Theory, which suggests that autonomy can increase one's own motivation for a behaviour (Deci and Ryan, 2008).

Attitudes towards difficulties

Despite numerous psychosocial and physical barriers to bracing, most participants persisted to adhere to the treatment. Persistence despite obstacles can be important for high brace adherence. This finding has not been described before, likely because previous studies did not evaluate participants' actual brace adherence in relation to their perceived barriers. Persistence in adolescents is associated with authoritative parenting, which emphasises warmth, support for autonomy and reasoning of behaviours (Padilla-Walker et al., 2012). It appears to reinforce the importance of emotional support, autonomy and knowledge about AIS respectively on enhancing brace adherence.

Theme 3: Practicality

The current study confirms the physical barriers to brace adherence identified by Brigham and Armstrong (2017); Donnelly et al. (2004); Law et al. (2017) and MacLean et al. (1989), including pain and activity limitation. Through in-depth interviews, this study acknowledges that some physical barriers can be overcome using specific strategies or as young people get used to brace wearing. What this study also adds is that the back straps of Boston brace may hinder adherence because they make putting on braces difficult, whereas night-time brace seems to reduce physical barriers to adherence due to shorter wearing time. A meta-analysis has shown that the reported effectiveness of night-time bracing is comparable to that of full-time bracing (Costa et al., 2021), so if available, night-time bracing might be a better option to promote adherence.

Implications for practice

- According to a group of young people who adhere to bracing, adherence can be facilitated by knowledge about bracing. Therefore, patient education about the treatment is important. Since parents can influence young people's knowledge, education to parents may also improve adherence. Existing literature may be used to reassure parents about the effectiveness of bracing, including Boston brace.
- The study findings may assist parents and HCPs to better understand the negative emotions associated with bracing. Emotional support from parents may be helpful and supporting young people's autonomy may promote adherence as well. Raising awareness of bracing in schools may reduce patients' worry about peer opinion, possibly encouraging brace wearing at school.
- Although there are physical barriers to brace adherence, HCPs can reassure young people that they may overcome most physical difficulties after getting used to bracing, or manage the difficulties using the strategies identified in this study. Some brace designs may make adherence easier. Parents may also assist brace wearing physically.

Strengths and limitations

This is the first qualitative study to include young people who wore a wide range of braces. It sheds new light on how different types of braces lead to different perceived effectiveness and physical barriers. It is also the first study to include the views of boys. However, it should be noted that the recruitment materials only reached families who joined support groups or particular scoliosis organisations. These families might be more engaged in managing AIS. Furthermore, data saturation was not achieved due to small sample size, and only participants with good adherence were recruited.

There are probably facilitators and barriers to brace adherence left unexplored, especially in young people with low adherence. The results may only be applicable to the population who join support groups and adhere well to bracing. Another limitation is that only participants from the United Kingdom and the United States were recruited, which may be attributed to the greater number of scoliosis organisations in these countries and the interviews being conducted in English. The findings are less transferable to people from other countries which may have different brace types available or different healthcare systems.

Recommendations for future research

The study could be repeated with a wider sample frame, i.e. spinal clinics as well as patient charities and social media groups. Purposive sampling could help ensure that young people who are adherent and non-adherent to bracing are included. A randomised controlled trial is required to establish the effects of combining education by HCPs and parental support on brace adherence. There is also a need for randomised controlled trials or prospective studies to compare the effects of different types of braces. If night-time braces are as effective as full-time braces, night-time braces may be a better option to promote adherence.

Conclusion

This study has explored the facilitators and barriers to brace adherence in a group of young people with AIS with good adherence. Knowledge about bracing, and emotional and practical support from parents have emerged as significant facilitators for adherence. This study has also found that some barriers can be overcome using specific strategies or a more user-friendly brace design.

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Bronchiolitis: A Physiotherapists Perspective

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Introduction

Bronchiolitis is an acute lower respiratory tract infection mainly affecting young children. It is caused by different viruses with cough, increased work of breathing and difficulty feeding being the predominant symptoms (Øymar et al, 2014). Bronchiolitis is the most common reason for children up to 2 years old to be hospitalised and admitted to paediatric intensive care (PICU).

This article presents current knowledge of bronchiolitis and the clinical considerations for a physiotherapist who might be asked to assess and treat these children.

Clinical definition

The NHS definition of bronchiolitis is 'a common lower respiratory tract infection that affects babies and young children under 2-year-old' (NICE, 2021). Internationally definitions vary with the American Academy of Pediatrics (AAP) definition being: 'a constellation of clinical symptoms and signs including a viral upper respiratory prodrome followed by increased respiratory effort and wheezing in children less than 2 year of age' (Øymar et al, 2014).

Epidemiology

Bronchiolitis occurs most frequently during the winter months (Øymar et al, 2014). Approximately 1 in 5 children develop bronchiolitis in the first year of life (Øymar et al, 2014). Most mechanically ventilated patients with bronchiolitis spend less than 7 days on paediatric intensive care (Tasker, 2014). For most it is a mild illness not requiring any medical intervention; only 24.2 per 1000 children with bronchiolitis will be admitted to hospital (Murray et al, 2014). During 2020, the first year of the Covid-19 pandemic, the bronchiolitis infection rates were significantly lower than average due to infection control measures in place such as lockdowns, mask wearing and encouragement for more hand washing (Hussain et al, 2021). In 2021 case rates of Respiratory syncytial virus (RSV) bronchiolitis increased up to 50% in Australia out of season once infection control measures eased (Hussain et al, 2021). This pattern was then mirrored in the UK once Covid restrictions eased (www.gov.co.uk).

Pathophysiology

Bronchiolitis can be caused by many different viruses with RSV accounting for 60-80% of bronchiolitis cases (Øymar et al, 2014). Other viruses that can cause bronchiolitis include adenovirus, influenza virus, human metapneumovirus, rhinovirus and parainfluenza virus. Virology is obtained via a nasal pharyngeal aspirate (NPA), often performed on admission to the emergency department. It has been shown that in approximately 20% of bronchiolitis cases children will have dual infections, however this does not seem to be linked with increased severity (Thorburn et al., 2006). Improvements in detection may be the reason that multiple viruses are now found acutely.

The virus begins by replicating in the upper airways, causing typical coryzal symptoms of nasal discharge, sneezing, sore throat and fever before tracking further down into the lower airways and bronchioles 1-3 days later. This leads to an inflammatory response where immune cells infiltrate the area causing oedema and increased mucus production from the goblet cells. This leads to a cycle of cell necrosis and cell regeneration within the epithelial cells (Nagakumar et al, 2012). This oedema, mucus production and necrosis can lead to distal airflow obstruction, increased airway resistance, gas trapping, ventilation perfusion mismatch and atelectasis, producing the common symptoms seen in children with bronchiolitis such as increased work of breathing and hypoxemia (Nagakumar et al, 2012).

Clinical characteristics

Infants with bronchiolitis will generally present with a persistent cough (Bush and Thomson, 2007), increased work of breathing and poor feeding (NICE, 2021). Commonly a NPA is sent for virology, however treatment should commence based upon clinical signs.

Most infants can be treated at home; however, the NICE guidelines recommend that those with apnoeas, persistent low oxygen levels (below 90% for 6 weeks old and over and below 92% for under 6 weeks old), poor oral intake (under 50% of usual volume) or persistent severe respiratory distress should be admitted to hospital for observation, oxygen and nasogastric feeding if indicated (NICE, 2021).

The majority of infants hospitalised with bronchiolitis are previously healthy. Infants with a past medical history of premature birth, chronic lung disease, congenital heart disease, immunodeficiency or neuromuscular disease are particularly vulnerable to more severe bronchiolitis infection (NICE, 2021).

Table 1: Typical features of bronchiolitis infection

| Assessment | Bronchiolitis presentation |
|-------------------|--|
| Feeding | Reduced in moderate to severe cases |
| Temperature | Elevated, RSV infection associated with higher temperature than other viruses |
| X-Ray | Not routinely performed. Typical presentations include lobar consolidation, segmental or lobar atelectasis, cardiomegaly. Other potential findings: prominent bronchial opacities, peri bronchial infiltrates, hyperinflation. |
| Work of breathing | Increased, characterised by recession, nasal flaring, head bobbing |
| Auscultation | Coarse crackles and wheeze; decreased breath sounds if areas of atelectasis (Image 1) |
| Respiratory rate | Increased but in severe cases or neonates apnoeas can be seen |
| Oxygen Saturation | Decreased in severe cases |
| Heart Rate | Increased but can have bradycardia in severe respiratory failure |
| Urinary output | Decreased associated with reduced feeding |
| Nasal symptoms | Increased nasal secretions |
| Cough | Often develops within 1-3 days; wet sounding |



Image 1: During auscultation course crackles and wheeze may be heard. Decreased breath sounds may be evident if areas of atelectasis exist

Applied anatomy and physiology

Infant airways have a higher proportion of mucus producing goblet cells, poorly developed cilia, and non-functional collateral ventilation channels, making the airways more susceptible to mucus obstruction (Gompelmann, Eberhardt and Herth, 2013). Infant airways are of course small; a thin layer of mucus leads to a very significant increase in airways resistance. Increased airways resistance will require increased effort to achieve airflow.

The cross-sectional shape of the infant thorax is cylindrical, and the ribs are horizontal in relation to the sternum; infants are therefore unable to access the ‘bucket handle’ motion by which older children and adults increase lung volumes. They are therefore reliant upon increased respiratory rate to increase minute volume. In adults, more than 50% of muscle fibres in the diaphragm and intercostal muscles are Type 1, slow twitch fatigue resistant fibres. In infants this is as little as 25%, leaving them highly vulnerable to fatigue and rapid onset of respiratory failure.

Infants under 6 months of age are preferential nose breathers. It is therefore important to ensure that the nasal passages of infants with bronchiolitis are kept clear. Usual treatment includes saline drops to reduce airways resistance and reduced work of breathing. Suction may cause oedema in the upper airways, with insufficient evidence of its overall efficacy (Florin, Plint and Zorc, 2017).

Babies have poor postural stability and very compliant chest walls which is why chest recession and head bobbing is observed with increased work of breathing. Positioning to reduce work of breathing is thus vitally important. The prone position stabilises the chest wall and optimises ventilation perfusion matching. Because of the increased risk of sudden unexpected death in infancy (SUDI) the prone position should only be used where the child is constantly monitored (Carpenter et al., 2004).

Treatment of Bronchiolitis

The mainstay of hospital treatment for infants with bronchiolitis is supportive therapy to reduce work of breathing and support adequate nutrition, as detailed in table 2.

Table 2: Treatment aims and interventions

| Aim | Intervention |
|--|--|
| Supplemental oxygenation, often high flow nasal oxygen | Maintain oxygenation, reduce respiratory effort |
| Positioning | Stabilise chest wall to reduce work of breathing |
| Adequate nutrition and hydration | Nasogastric feeding, intravenous fluids |
| Reduce airways resistance | Saline drops and suction to nasal passages |
| Reduce fatigue | Minimal handling |

Children with moderate bronchiolitis, not requiring intubation do not generally benefit from chest physiotherapy. A Cochrane review by Roqué i Figuls et al (2016) reported no significant benefit of chest physiotherapy techniques on disease severity, respiratory parameters, length of hospital stay or oxygen requirements in this population.

Non-invasive ventilatory support

Non-invasive ventilatory support is often provided to children with bronchiolitis, including Continuous Positive Airway Pressure (CPAP) and High Flow Nasal Oxygen (HFNO). CPAP should be considered in children with bronchiolitis who have impending respiratory failure (NICE, 2021), though evidence for this is of low quality according to a 2019 Cochrane review (Jat and Mathew, 2019). However, participants in the papers included in the latter review were all children without co-morbidities, thus more research is needed to establish the effectiveness of CPAP in children with co-morbidities (Roqué i Figuls et al., 2016; NICE 2021). There is limited evidence to demonstrate the effectiveness of CPAP in children with bronchiolitis, however early research suggests that there is a decreased respiratory rate in children with bronchiolitis who receive CPAP (Jat and Mathew, 2019). In some cases, CPAP can be used to avoid mechanical ventilation. The function of CPAP is to provide low levels of positive end-expiratory pressure to decrease airway resistance, thus improving gas exchange (Pryor and Prasad, 2008). HFNO provides humidified oxygen at high volumes and is used increasingly on paediatric wards; its use has been proved to be safe in a general paediatric ward setting (Oñoro et al., 2011) (Daffyd et al., 2021). HFNO reduces both the duration of oxygen therapy and ICU treatment in children with bronchiolitis (Ergul et al., 2018).

When not to treat

In severe bronchiolitis, where a child is self-ventilating on high levels of oxygen and showing signs of respiratory distress, conventional physiotherapy techniques have failed to show benefit in the primary outcome of change in severity status of bronchiolitis. Indeed, there is evidence that physiotherapy interventions can lead to severe adverse clinical effects for hospitalised patients with severe bronchiolitis including bradycardias, desaturations, transient respiratory destabilisation and vomiting during procedure. Physiotherapy is therefore not indicated in severe cases of bronchiolitis in the non-intubated population (NICE, 2021), (Roqué i Figuls et al., 2016).

When to treat

Ventilated children with an increased sputum load often benefit from chest physiotherapy intervention. Indications for treatment include high peak inspiratory pressures, high oxygen requirements, large volume of or thick secretions reported on suctioning and low partial pressure of oxygen or saturations.

Where a child has a sputum yielding co-morbidity (such as Cystic Fibrosis, Primary Ciliary Dyskinesia) or neurological co-morbidity chest physiotherapy should be considered in the non-ventilated population (NICE 2021).

Treatment options

Removal of secretions is the primary aim in the physiotherapy treatment of children with bronchiolitis, in order to optimise ventilation-perfusion ratios and reduce strain put on the cardiovascular system (Morrow, 2015). There are a number of treatment methods available to a physiotherapist treating children with bronchiolitis (NICE, 2021). If treatment is indicated, start with positioning and manual techniques and then increase and change these (if indicated) in a stepwise approach. Generally shorter treatment sessions are tolerated better with regular breaks for rest and to reassess the child.

Positioning



Positioning is vital in infants with bronchiolitis. It can improve chest wall stability and oxygenation and promote comfort and sleep. The prone position (Image 2) has been shown to be beneficial, increasing oxygen saturations and reducing episodes of hypoxaemia (Gillies et al, 2012) however it should only be used in those infants that are continuously monitored due to the risk of SUDI. It is also worth considering the ventilation/perfusion ratio (V/Q ratio), used to assess the efficiency and adequacy of the matching of two variables: V; ventilation which refers to the air that reaches the alveoli and Q; perfusion which refers to the blood that reaches the alveoli via the capillaries. Positioning is used to optimise V/Q ratios, also known as V/Q matching. V/Q matching is necessary for efficient gas exchange. In infants, ventilation is greater in the non-dependent lung (top lung) and perfusion is greater in the dependent lung (bottom lung). Therefore, if an infant is in respiratory distress then positioning them in the 'good lung up' position is more beneficial for gaseous exchange.

Image 2: The prone position has been shown to be beneficial, increasing oxygen saturations and reducing episodes of hypoxaemia

When treating a child for secretion clearance, postural drainage can be used alongside manual techniques in children with bronchiolitis. It functions by changing the patient's position to facilitate airway clearance using gravity to enhance mobilisation of bronchial secretion from the peripheral airways towards central airways (Balachandran et al., 2005; Paz et al., 2019). Whilst postural drainage can facilitate airway clearance, head-down positioning is not recommended in neonates and infants. Head-down tilt has many potential issues including gastro-oesophageal reflux, raising intracranial and systemic blood pressures, the potential for intraventricular haemorrhage in neonates, and placing the diaphragm at mechanical disadvantage (Morrow, 2015).

Percussions

Chest percussion is commonly used in ventilated infants to facilitate airway clearance. It functions by rhythmical cupping of the chest wall producing an energy wave, which is transmitted through the chest wall to the airways, loosening secretions from the bronchial walls (Hussey and Prasad, 1995). Percussion is often the first option when treating a ventilated patient with bronchiolitis. Chest percussion in the infant population generally uses a facemask or tented fingers. Where a facemask is used, tissue should be used to block the opening to prevent loss of energy waves. Percussions should be hard enough to produce a slight head bob in the infant. It is important to stabilise the head, especially in neonate, while doing percussions. Chest percussions are generally well tolerated in infants, though vigorous and rapid percussion may induce bronchospasm, particularly relevant in bronchiolitis, hence should not be used in the self-ventilating population with bronchiolitis (Pryor and Prasad, 2008).

Manual Hyperinflation

Manual hyperinflation (MHI) is commonly used in the critical care setting with both adults and children. The hypothesised effect of manual hyperinflation is that it may improve lung function, enhance secretion clearance and reopen areas of atelectasis (Rhodes, 1987), (Ntoumenopoulos, 2005), (van der Lee et al., 2017). Providing additional positive pressure can facilitate recruitment of collapsed lung tissue and promotes air flow behind areas of secretion load. When used for airway clearance, MHI should have three or four tidal volume breaths followed by one large breath (at approximately 20% higher than ventilated tidal volume peak pressures); this allows for monitoring of cardiovascular status and prevents hyperventilation (Hussey and Prasad, 1995). This cycle should then be followed by suction and re-auscultation. Where secretions remain and there are no adverse events, i.e. desaturation or bradycardias, then this cycle should be repeated. Manometers can be attached to the water circuit to allow therapists to monitor the pressures being reached throughout this technique; these can also be useful in monitoring the PEEP provided throughout MHI. During MHI, clinicians will often use expiratory vibrations to facilitate airway clearance. There is limited research suggesting there are benefits to MHI in paediatric critical care settings. One study suggests that fast release techniques during MHI can promote secretion clearance, with others suggesting MHI can cause retrograde movement of secretions (Pryor and Prasad, 2008). The hypothesised mechanics of MHI are disputed and evidence of its use in ventilated children remains inconclusive (Mackenzie and Shin, 1985), (Shkurka et al., 2021), yet clinically this remains a consistently used treatment option (Godoy, Zanetti and Johnston, 2013).

Vibrations

Vibrations are a useful adjunct particularly in children due to the increased compliance of the chest wall (Pryor and Prasad, 2008). Vibrations are particularly useful during MHI and should be applied at the start of expiration when releasing the bag. Where vibrations are applied early, potentially dangerous peak inspiratory pressures are generated and, although not harmful, where late, vibrations are not effective at increasing peak expiratory flow (Shannon et al., 2010). The vibration creates a high expiratory flow which can assist in mobilising secretions towards central airways. Vibrations with a frequency of more than 60Hz, can also improve mucociliary transport and alters the thixotropic property of mucous (reducing its viscosity) (McIlwaine, 2006). Vibrations are effective at clearing peripheral airways due to the above physiology (Hussey and Prasad, 1995).

Saline lavage

Saline lavage is a regularly utilised adjunct on paediatric intensive care units and aims to loosen thick or sticky secretions to facilitate easy removal with suction (Pryor and Prasad, 2008), (Mercer et al., 2018). Saline should not be used routinely, but where secretions are thick use of 0.9% saline instils alongside endotracheal suctioning may be beneficial (McKinley et al., 2018). Saline is drawn up into a syringe at varying volumes between 0.5-10mls; in infants 0.5-1ml is the most appropriate volume (Hussey and Prasad, 1995). The syringe of saline is then inserted in to the endotracheal tube. Saline is generally provided alongside manual techniques or MHI by respiratory specialist physiotherapists (Shannon et al., 2015).

Suction

Suction should not be routinely performed in spontaneously ventilating infants with bronchiolitis, but nasal suction should be considered in those with respiratory distress or apnoea (NICE, 2021). In intubated and ventilated patients, however, airway suctioning is the most important secretion removal technique and should

be used where there is a significant build-up of secretions (Branson, 2007). Infants with viral bronchiolitis appear to tolerate suctioning techniques without adverse short-term physiological effects (Ringer et al., 2020). The following link is a recorded simulation scenario for an infant with bronchiolitis and the physiotherapy airway clearance techniques that should or should not be considered:

<https://portal.e-lfh.org.uk/Component/Details/737794>

Conclusion

Bronchiolitis is a common condition in infants. It is important to consider the pathophysiology of the condition as well as the differences in physiology between children and adults when treating these patients. There is very little evidence to suggest routine physiotherapy has positive effects in this population and in some cases can hinder recovery. Therefore, for self-ventilating patients without co-morbidities causing secretion retention, chest physiotherapy is not indicated. Where these co-morbidities are present, airways clearance adjuncts and the use of nebulisers should be considered, ensuring monitoring for potential bronchospasm and desaturations.

Whilst patients with bronchiolitis can become extremely unwell, those who require critical care on average spend less than seven days on PICU before stepping down to the ward (Tasker, 2014). Ensuring adequate oxygenation during this week in PICU is the key role for a physiotherapist treating a patient with bronchiolitis. Percussions and positioning should be the first option for someone treating an intubated infant with bronchiolitis, ensuring the patient does not have a head down tilt. MHI and saline instillation can be particularly useful when a patient has thick secretions, though should not be routinely used for intubated infants with bronchiolitis due to a lack of supporting clinical evidence. Suction should not be routinely performed, but where ventilated or in respiratory distress, airway suctioning becomes one of the key parts of bronchiolitis management.

For more information go to: [Respiratory Surge in Children - elearning for healthcare \(e-lfh.org.uk\)](https://e-learning-for-healthcare.org.uk)



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APCP Annual Conference

12 / 20 / 25 November 2021

The following abstracts were presented at the APCP Annual Conference in 2021

A literature review to identify the optimal conservative treatment pathway for paediatric first-time patella dislocations

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Background

At Birmingham Children’s Hospital (UK) there was a lack of standardisation in the management of first-time patella dislocation patients. The typical pathway of this patient group involved a referral from the Emergency Department (ED) to a consultant-led fracture clinic, followed by a referral to physiotherapy; however, patients rarely required intervention in fracture clinic and were predominantly managed by physiotherapy. As a service development initiative, we explored the feasibility of first-time paediatric patella dislocation patients by-passing fracture clinic and being referred directly to physiotherapy from ED.

Aims

A systematic review to identify whether conservative treatment is suitable for paediatric first-time patella dislocations, and to identify an optimal conservative pathway.

Methodology

Search terms were specified in the “PICO” format. Embase, Ovid and AMED were the included databases, and the searches were completed between April-May 2020. Exclusion criteria comprised: adult patients only, surgical reduction, educational papers, only surgical intervention included, congenital dislocation and subluxation only. All included articles were appraised using the Critical Appraisal Skills Programme (CASP). Extracted data included population demographics, intervention, and results, to enable narrative synthesis in four categories: conservative versus operative treatment, orthotic provision, weight bearing status and physiotherapy treatment.

Results

15 studies were included in the review. Analysis identified 60% of the included studies investigating surgical versus conservative management found no significant difference, and 10% favoured conservative management. Regarding orthotic support, a patella stabilising orthosis was the only included orthotic to have a beneficial outcome. With reference to weight bearing, 6 of the included studies specified a weight bearing status, all of which were fully weight bearing as tolerated, and there were no harmful resultant effects. None of the included studies compared different physiotherapy treatments, therefore the optimal pathway is unclear; the most commonly occurring themes identified were inclusion of: quadriceps isometric strengthening, open chain exercise and general quadriceps exercise.

Limitations

A single reviewer was utilised, thus increasing the risk of bias. Moreover, the included articles did not solely include a paediatric population, thus decreasing the validity of the results, however, paediatric patients featured in all of the included studies.

Implications for practice

Paediatric first-time patella dislocation patients could be referred directly to physiotherapy from ED. They should be advised to fully weight bear as tolerated and if a splint is provided, this should be a patella stabilising orthosis. Physiotherapy treatment should focus on quadriceps strengthening, but a definitive consensus is yet to be established.

The influence of bracing on health-related quality of life in adolescent idiopathic scoliosis: a systematic review.

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Background and Objectives

Adolescent idiopathic scoliosis is the most commonly occurring spinal deformity in children (Altaf et al. 2013, Cheng et al. 2015) which left untreated can have severe health consequences. The most successful conservative treatment is application of a spinal brace but its success relies on wear for a substantial period of the day, often for many years (Weinstein et al. 2008, Negrini et al. 2018) however, chronic illness and associated treatment burdens are reported to influence well-being, particularly during the adolescent period (Clarke and Eiser 2004, Weinstein et al. 2008) and links have been made between those who are not compliant with bracing and lower health related quality of life (HRQoL).

Gaining knowledge of quality of life throughout patient's healthcare interventions can provide a more comprehensive picture of wellbeing to enable health care professionals to support patient-centred care (CSP 2012, WHO 2014). This review aimed to identify and synthesise best available evidence to explore if bracing influences health related quality of life in adolescents with idiopathic scoliosis.

Methodology

A systematic search of AMED, CINAHL, EMCARE, MEDLINE, PsychINFO, Scopus and Cochrane electronic databases were carried out. Explicit inclusion criteria were set to identify studies that evaluated the HRQoL of adolescents with a diagnosis of idiopathic scoliosis who were conservatively treated with spinal bracing. Studies were required to utilise a validated HRQoL outcome measure and although no date range was set, included studies were limited to English language. PRISMA guidelines (Liberati et al. 2009) for the reporting of systematic reviews were followed. From 1115 papers identified by searches, 17 full text articles were reviewed for eligibility with 8 meeting review criteria and being taken to critical appraisal. Due to risk of significant methodological bias 3 studies were excluded and the remaining five studies underwent data extraction and due to significant study heterogeneity making meta-analysis inappropriate, a narrative synthesis was carried out.

Results

Five studies, two experimental and three observational, involving 1092 participants were included in the synthesis. Results suggest that bracing does not influence health related quality of life to a point of statistical or clinical significance however evidence suggests exercise may be better tolerated and should be considered if clinically appropriate.

No statistically significant reduction in HRQoL was shown over the duration of bracing treatment but indicators suggest the initial six months may be a point of increased risk with suggestions of a trend of reduced HRQoL although this appeared transient in nature.

Conclusion and implications for practice

Limited very low and low-level evidence was located in this review suggesting bracing as a treatment for adolescent idiopathic scoliosis does not impact HRQoL.

This review has several limitations including the omission of unpublished studies and those not of English language, risking publication and language bias. No retrieved or included studies were from the UK population, limiting generalisability to UK practice where protocols for bracing and cultural influences on HRQoL may affect outcomes. Observational research of greater methodological quality should be undertaken to investigate findings of this review and further explore the influence of bracing on HRQoL in adolescent idiopathic scoliosis.

Patient choice and involvement in treatment planning should be at the forefront of clinicians' decision making with consideration of possible stressors involved with bracing, particularly at the initiation of treatment, to optimise quality of life and clinical outcomes.

Keywords: Scoliosis, adolescent idiopathic scoliosis, quality of life, bracing

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Development of Best Practice Guidelines in the Physiotherapy Management of Children and Young People with Cerebral Palsy who are at Fracture due to Low Bone Mineral Density

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Background

Children and young people with cerebral palsy are at risk of decreased bone mineral density (BMD) and low impact fracture (LIF) during normal handling (Houlihan, 2014; Mergler et al. 2009). There is no research available to physiotherapists on how to minimise the risk of fractures during physiotherapy treatment or handling. Discovering the common mechanisms of fracture injury and providing best practice guidelines for physiotherapists may decrease the risk of LIF's and support improved patient care.

Methodology

This study collected primary data via a survey distributed to paediatric physiotherapists across the United Kingdom through the APCP. The survey asked for details on participant demographics, whether they discussed the risk of low BMD and LIF's with their patients/families, details of fracture incidents in the past five years and requested a free text description of the mechanism of injury.

Results

There was n=123 respondents to the study of which n=65 had experience of a fracture in the past five years. The n=65 cohort reported a total of n=87 fractures.

61.5% of physiotherapists reported that they discussed the risk of low BMD and 43.4% discussed LIF's with the patient and their families. The presence of a policy/guideline on bone health management increased the likelihood of these discussions taking place.

79.3% of fracture incidences were at GMFCS level V and 74.7% occurred in the femur. 48.3% of fractures had no known mechanism of injury and 14.9% had a delayed diagnosis. Of the remainder of fractures, 31% were linked to everyday handling (including manual handling and personal care) and 23% were linked to physiotherapy related activities. A number of common mechanisms of injury were highlighted in the study, in particular the risk of fracture when a child is not unfastened from their equipment correctly before hoisting, during personal care and during physiotherapy stretches.

The results produced key learning points that would aid development of best practice guidelines for physiotherapists. These included the increased understanding, awareness and discussion of the risk of LIF's for both physiotherapists and families/carers during physiotherapy interventions and everyday handling.

Conclusion and implications for practice

There is a lack of discussion of the risks of low BMD and LIF's with patients and their families. The high number of LIF's that occurred without any known mechanism of injury and subsequently having a delayed diagnosis of fracture highlighted the need for physiotherapists to routinely discuss this risk with patients and their families.

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Paediatric MSK Waiting List Initiative Post Covid 19

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Background

As part of the Covid Recovery Plan, NHS Lanarkshire employed four Physiotherapy Assistant Practitioners (AP's) from a cohort of final year Glasgow Caledonian University Physiotherapy students within Paediatric Physiotherapy for a total of eight weeks. As part of their employment, an MSK waiting list initiative was piloted. The aim of this project was to identify patients from the MSK Paediatric Waiting List who potentially no longer required physiotherapy intervention or where intervention could be offered by the AP's through 'targeted universal information' to reduce waiting list numbers/times impacted by the C19 pandemic.

Objective

- Reduce the waiting list numbers increased by C19 pandemic by contacting patients and identifying if specialist input was still required.
- Reduce patient waiting times by identifying patients who would benefit from targeted universal information to reduce symptoms.
- Utilize AP staff to provide universal advice and reassurance prior to/in place of initial assessment with a qualified physiotherapist.

Methodology

- A waiting list initiative was piloted in NHS Lanarkshire Paediatric MSK service following C19 pandemic.
- Patients were identified by Senior Physiotherapists from the Paediatric MSK Waiting List and if deemed appropriate placed on an excel database.
- AP staff had training opportunities, access to resources and Senior Physiotherapists for advice at all times throughout the process.
- AP staff would then contact families and complete a triage proforma to ensure no red flags were identified and based on the telephone call had 4 outcome options.
- Descriptive data analysis was performed.

Results

In total 53 patients were identified as appropriate for inclusion. The total number of patients who were able to be contacted by telephone was 33 (62%). Incorrect contact details or no answer by telephone equated to 38% of patients identified.

Of the 33 patients successfully contacted 5 (15%) patients were discharged immediately following phone consultation, a further 15 (45%) were discharged following an 'on hold' period having received universal targeted information. This equates to a total of 20 (60%) patients were successfully managed by AP staff via telephone consultation alone.

Conclusions / Implications for practice

There were a high number of patients who were unable to be contacted by telephone. Of those that were, using a targeted universal information approach was effective in managing their symptoms following an increased waiting time due to the C19 pandemic thus reducing waiting list numbers.

This approach could be successfully undertaken by Physiotherapy Assistant Practitioner staff, increasing productivity and efficiency of the service.

pGalSplus: A tool to facilitate the identification and assessment of children with serious musculoskeletal disease

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Background

Musculoskeletal (MSK) problems are common, often benign and self-limiting and present to healthcare professionals (HCPs) in the community who may not be MSK specialists; it can be challenging to identify those with serious disease. pGALS (paediatric Gait, Arms, Legs and Spine) is a simple, quick MSK assessment and has been shown to detect joint and functional problems in various conditions including inflammatory arthritis. We aimed to develop an extended pGALS assessment, called pGALSplus, to facilitate identification of children with MSK disease who require onward referral to specialist services.

Objective

To pilot the pGALSplus assessment in CYP with Juvenile Idiopathic Arthritis (JIA), Mucopolysaccharidoses (MPS), Muscular Dystrophy (MD) or Developmental Coordination Disorder (DCD) as exemplar MSK conditions and compare feasibility and acceptability with healthy controls (HC)

Methodology

Mixed methods approach; Phase 1 included a scoping review of the literature and qualitative interviews with expert HCPs within paediatric practice to identify key clinical assessments that inform diagnosis and progress. These results informed the initial 'pGALSplus' assessment which underwent iterative development in Phase 2 with an expert working group (including paediatric rheumatologists, expert paediatric physiotherapists and neuromuscular specialists). Phase 3 focused on testing pGALSplus in the exemplar disease groups with feedback from HCPs, patients and carers. Patients; n=37 (JIA;n=10, DCD;n=10, MD;n=9, HC;n=8), age range 2-10 years).

Results

Phase 1 data identified key components of pGALSplus to include: pGALS assessment, a questionnaire to identify further indicators of DCD, components of the North Star Ambulatory Assessment(NSAA) to identify early stages of neuromuscular disease (MD), and an assessment of static balance (found to be significantly worse in children with DCD).

In Phase 2 pGALSplus was further expanded to include clinical assessment aiming to identify pain or restriction of range of movement (JIA or MPS), underlying weakness (MD) or issues with motor planning and coordination (DCD). The additional tests included; testing reflexes (to assess underlying neurology); leg lengths (which may indicate lower limb joint pathology); activity-based skills including standing from the floor (MD), and catching a ball (DCD). Phase 3 demonstrated pGALSplus to be quick to complete (mean 12.6 minutes (9 - 20), with high satisfaction from patients and carers (100% 'about right' time taken). The assessment was deemed 'very easy or easy' for HCPs (35/37, 95%) and patients (32/37, 86%). Parents and children reported high acceptability (32/37, 86% reported it to be 'very comfortable or with minimal discomfort').

Conclusions / Implications for practice

pGALSplus is an evidence and consensus-based tool to discriminate between MSK conditions with high acceptability and feasibility. pGALSplus includes resources to aid HCPs to undertake the assessment. Our aim is that pGALSplus is implemented amongst HCPs (including physiotherapists) in the community who are likely to encounter children early in the clinical pathway.

The impact of sleep disturbances for children with cerebral palsy and their families.

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Background

Although sleep disturbances are common in children with cerebral palsy (CP) little is known about their nature or extent. Further, the individual and family consequences of sleep disturbances have not been reported.

Objective

To explore the impact of sleep disturbances on children with CP aged 3-18 years resident in Northern Ireland (NI) and their families.

Methodology

In this qualitative study online semi-structured interviews were conducted with families of children with CP. Families were recruited via social media and were eligible to participate if the child with CP was 1) aged 3-18 years, 2) resident in NI and 3) experienced clinical sleep disturbance (as indicated by a score of 70+ on the Sleep Disturbance Scale for Children). Each family interview involved a parent, a child with CP, and a sibling and the interview type was either verbal, written or proxy depending on a participant's preference, age, communication style and cognitive ability. Interviews were video-recorded and transcribed verbatim. Inductive thematic analysis was undertaken to identify key themes. Rigour was established using member checking, confirmatory co-coding with the research team, triangulation of multiple participant perspectives and the incorporation of rich and thick descriptions.

Results

Ten families participated. Most data were collected by verbal interview with the respondent (parents n=10, children with CP n=2, siblings n=6), however a small number of responses from children were either written (children with CP n=2, siblings n=3) or proxy with their parents (children with CP n=6, siblings n=1). Six themes were identified: 1) Identification and acknowledgement of sleep disturbances; 2) Personal and environmental factors contribute to sleep disturbances; 3) Mood and interpersonal relationships are both strengthened and challenged for all family members; 4) Home and school routine are negatively impacted for all family members; 5) Physical health is negatively impacted for children with CP and their parents; 6) Parents seek support and solutions to manage sleep disturbances for their child with CP.

Conclusions / Implications for practice

Despite the wide-ranging consequences of sleep disturbances on the whole family unit, these issues are often not recognised nor addressed. Healthcare professionals should routinely ask children with CP and their families about sleep. Multi-disciplinary, family-centred support for families that experience sleep disturbances are required.

Assessing and addressing the motor difficulties of disadvantaged children with poor fundamental motor skills – FUNMOVES, an evidence-based assessment and physiotherapy programme for children with Developmental Coordination Disorder

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Background

Fundamental movement skills (FMS) are critical to childhood development. They facilitate participation in physical activity and are associated with wider health, educational and socioemotional outcomes. Alarming, a large proportion of children (60+%) are not able to perform age-appropriate FMS. Despite the profound negative consequences of this, children with poor FMS are being overlooked and the most disadvantaged children are being neglected due to low levels of parental awareness, over-stretched healthcare services, and healthcare inequalities.

Aims

To expedite access to assessment and support, this research aimed to develop an intervention which (i) screens all children for FMS difficulties in schools and (ii) empowers teachers to address FMS difficulties within a school environment.

Methods

Supported by the Department for Education, FUNMOVES was co-developed with Bradford Primary schools. FUNMOVES universally screens FMS ability using activities designed for pre-existing assessments (identified by a systematic review) and feasibility guidelines (formed by teacher opinions). Based on the difficulties identified in the assessment, children are then given paired physiotherapy exercises, identified by a systematic review as having the strongest evidence for large improvements in FMS ability in a clinical setting but now delivered by teaching assistants using a co-developed manual that has already been piloted by teaching assistants. Over three studies 814 children (4-11 years) were assessed, and after each study Rasch analysis was used to evaluate construct validity; modifications of FUNMOVES were made, based on Rasch and implementation fidelity results. Ethical approval was granted by the University of Leeds School of Psychology Research Ethics Committee (reference numbers: PSC-591 and PSC-773).

Results

After three rounds of modifications, FUNMOVES is unidimensional, with good fit to the Rasch model, it meets standards for accurate measurement, and can differentiate between ages and abilities. FUNMOVES also meets feasibility criteria as it enables two members of teaching staff to assess the FMS of a whole class in under an hour, in a small space, using items available in schools. Teachers found the physiotherapy exercises easy to implement with minimal training and support.

Implications and future directions

Timely assessment and intervention is critical to ensure disadvantaged children are identified, and all children have the opportunity to thrive. This could be vital in response to development delays and reduced physical activity attributed to the Covid-19 pandemic. FUNMOVES has shown promise for use within this context, however, an RCT is planned to evaluate efficacy of the full programme further.

A stakeholder engagement process to co-design a study protocol for children with complex neurodisabilities and their families

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As part of the submission, I would like to emphasise the theme Optimising Health: R. Lozano.

There are multiple challenges to designing and implementing research for children with severe learning and physical disability. Engagement of stakeholders can support researchers in overcoming these challenges, enabling the co-design of meaningful, appropriate research that can inform optimal care and practice in this population.

Background

Respiratory illness is the most common reason for children with neurodisability to attend hospital, affecting their quality of life and accruing significant healthcare costs. It remains the primary cause of death in this population¹. Exercise plays an important role in the prevention and management of respiratory illness in children with neurodisability². However, limited studies have focused on individuals with severe disabilities³, who are at higher risk of respiratory illness. Population heterogeneity, accessible exercise-based interventions and limited measurements of respiratory health pose a challenge to both researchers and clinicians working within this group of children. Stakeholders can offer their own insights and expertise to assist researchers in understanding these challenges, leading to the co-design of a meaningful and accessible study for families and children with complex neurodisability.

Objective

Stakeholder engagement aimed to co-design and refine:

- Study design and procedures
- Accessible and safe exercise-based intervention
- Appropriate methods of measurement
- Transparent and sensitive public facing study information

Methodology

Stakeholder engagement was sought from two groups. Firstly, expert clinicians were identified locally through the South West (UK) Respiratory Physiotherapy Network and nationally, from the Association of Paediatric Chartered Physiotherapists' Respiratory Committee. Secondly, caregivers with experience looking after a child or young person with a neurodisability and respiratory issues, volunteered via the PenCRU Family Faculty, UK.

Results

Clinician stakeholder engagement successfully informed the co-development of a single case study design to explore the use of rebound therapy for respiratory health. Rebound therapy was selected as a popular, highly accessible form of exercise for children with moderate to severe disabilities. Following in-depth exploration of available objective respiratory measures, stakeholders recommended a composite of outcome measures for quality of life, physical function and chest health. This initiated further collaboration with the technology industry to explore a novel medical device, OptiBreathe.

Caregiver stakeholder engagement informed substantial amendments to the eligibility criteria to clarify the descriptions of respiratory issues experienced by a child with complex neurodisability. They also amended study contact methods from a digital app to text, to promote inclusivity and reduce perceived burden for parents and families. The group helped to select quality of life measures that addressed relevant questions for a child with complex neurodisability and co-developed the necessary information sheets and supporting documentation.

Conclusions / Implications for practice

Stakeholder engagement successfully informed the development of a meaningful, accessible single case study entitled: rebound for respiratory in children and young people with neurodisabilities.

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Improving the Pathway for Children with Musculoskeletal (MSK) conditions referred from Primary Care - A Service Development

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Background

Musculoskeletal (MSK) concerns are a common reason for children and young people (CYP) to attend their GP¹. Many of these patients are subsequently referred to specialist paediatric services for ongoing review and management. Anecdotally, within the author's health board, variability to which health profession a CYP is referred to (orthopaedic service or physiotherapy) was identified. This variation appeared to be dependent on GP preference rather than the condition with which the patient was presenting. This inconsistent approach resulted in differing waiting times, with CYP referred to orthopaedics waiting up to 24 weeks and CYP referred directly to physiotherapy being assessed and managed within 4 weeks.

Objective

Our aim was to develop and evaluate a pathway that appropriately identifies CYP referred by their GP with a MSK concern for physiotherapy management, thus bypassing the need for orthopaedic review.

Methodology

A pathway was developed in collaboration with physiotherapy and orthopaedic services at the Royal Hospital for Children, Glasgow to triage suitable CYP to physiotherapy services. With additional funding the pathway was piloted for 3 months initially and further reviewed at 12 months. Primary outcome measures were, number of patients redirected to physiotherapy and number referred to orthopaedics following physiotherapy review. A secondary outcome measure was orthopaedic waiting list times.

Ethics / R & D approval needed – not required – service development

Results

Over the 12 month evaluation period, 591 patients were redirected to physiotherapy and only 37 (6%) referred for on for a consultant review. In addition, orthopaedic waiting times were reduced from 24 weeks to 6 weeks. It is thought the implementation of this pathway supported the reduction of this waiting time.

Conclusions / Implications for practice

This service development demonstrates that many CYP presenting to GP with MSK concerns can be effectively managed by physiotherapy without the need for orthopaedic review, thus better utilising healthcare resources. It is estimated the pathway saves ~£125 per CYP by reducing consultant and radiology costs². Furthermore, this initiative provides a more efficient, patient centred service with fast access which supports both health board³ and national⁴ quality strategies.

Permanent funding has now been allocated within the physiotherapy service to sustain the pathway long-term. Potentially, models of care looking at paediatric physiotherapy first contact practitioners could be explored.

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Provision of effective 24-hour postural care through utilisation of a sustainable sleep system resource.

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Background

Sleep systems are a key component of delivering effective 24hour postural care to protect children and young people from the life limiting consequences of body shape changes. Within NHS Greater Glasgow and Clyde the provision and use of sleep systems was inconsistent across the specialist children's service due to staff knowledge, funding and access to assessment equipment. A service wide equipment resource was established to aid appropriate assessment and ensure sound clinical reasoning prior to selection and purchasing of sleep systems.

Aims/ Objective

Improved consistency and effectiveness of equipment provision across the physiotherapy service and increased access to sleep systems through assessment and re-cycled stock.

Increased knowledge and skills base of physiotherapists across the service in relation to sleep system availability, assessment and provision.

Physiotherapist's will have evidence of a successful trial period with a child using a sleep system, within their own home, prior to ordering and NHS funding of sleep system provision.

Overall cost savings attached to sleep system provision due to a reduction of inappropriate prescription and purchasing of sleep systems and related wasted expenditure.

Increased access to sleep systems, maximised postural care opportunities and improved health and well-being outcomes for children and young people across GG&C.

Methodology

An equipment inventory of available stock across multiple sites was completed.

Staff survey completed to establish sleep system knowledge and audit practice.

In collaboration with 4 company representatives, 8 sleep system assessment kits were created without any expenditure as no budget was attached to project.

Specific sleep system training delivered in partnership with company representatives to paediatric physiotherapists.

Partnership working with Equipu Stores Team to establish a robust system for storing, cleaning and transporting sleep system assessment kits timely across GGC.

Results

Established assessment sleep system resource available via Equipu Stores. Access to 8 sleep system assessment kits with cot and single bed sized options available for use in the community to trial prior to purchasing.

Increased staff knowledge and confidence in assessment and prescription of sleep systems with 100% of participants who completed training rating their confidence in sleep system assessment as confident or very confident post training.

Raised awareness of sleep systems and knowledge base of physiotherapists across the service ensuring best outcomes for our children and young people.

Conclusions / Implications for practice

Children and families in NHSGGC now have access to a consistent and clinically reasoned approach to sleep system provision as part of their personal 24hour postural plan.

References

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Improving the Health and Wellbeing of People with Learning Disabilities: An Evidence-Based Commissioning Guide for Clinical Commissioning Groups (CCGs) 2012

Biomechanics and prevention of body shape distortion Hill (Clayton), S. and Goldsmith, J. Biomechanics and prevention of body shape distortion. The Tizard Learning Disability Review. 2010. Vol. 15, Issue 2, pgs. 15 – 29

Don't Burst the Bubbles: The New Normal The Outreach Physiotherapy Service at the Scottish Centre for Children with Motor Impairments 2020

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Background

The Scottish Centre for Children with Motor Impairments (SCCMI) provides outreach programmes in the form of small groups for preschool and school age children with neurodevelopmental problems through-out the school year. In 2020, due to COVID 19 "lockdowns" and restrictions, all these groups were cancelled, and, at this time, NHS physiotherapy services ceased to operate or were reduced.

The Scottish Government and the Chartered Society of Physiotherapy (CSP) both recognised the importance for continuing support and Rehabilitation for children with complex additional support needs. (Ref 1 and 2)

Aim

To evaluate family engagement in an alternative COVID secure outreach programme for children with complex needs during the UK pandemic April – December 2020.

Methodology

Between April – June 2020, families were contacted via telephone or email and offered a COVID secure outreach programme in the form of either 6 weekly:

Remote physiotherapy sessions

Face to face sessions within the centre

Family wellbeing swims

Each child saw the same physiotherapist and support worker to maintain bubbles. Where possible treatment sessions were held outside.

In the new Autumn term, the above outreach service continued from September to December 2020. We had a few parental requests for a longer time between appointments (fortnightly), so parents had time to focus on home treatment programmes.

Results

We received "excellent" in the Talking Mats 5 questions PCM (Ref 1,2). Parents and children indicated that they preferred group working and missed meeting other children and families in similar circumstances.

The face-to-face sessions proved the most popular choice of parents with 70% (17/24 children) attending SCCMI. Most of these children 16/17 children also had family "wellbeing swims". Just 29% (7/24 children) chose to have remote sessions. Most of these children lived more than an hour's travel time from SCCMI.

Conclusions

During the COVID 19 pandemic, SCCMI continued to support families of children with complex needs, in line with The Scottish Government and the Chartered Society of Physiotherapy (CSP).

The service successfully engaged two thirds of families, offering a variety of COVID secure novel programmes. Parent barriers to engaging were reported later in the pandemic, attributed to returning to work, and family commitments. Parents feedback highlighted the loss of group interaction during COVID 19 and suggested engaging nursery staff in the programme as well as parents. The GAS demonstrated programme success but was felt to be time consuming, promoting the need to explore the shortened 3 Milestones GAS Goal (Ref 5)

Ethics

SCCMI is an independent grant-maintained school and Education and Therapy Centre. Ethics approval was granted by the SCCMI Board.

References

- 1) www.gov.scot/publications/coronavirus-guide-schools-early-learning-closures accessed 20/06/2020
- 2) csp.org.uk/news/coronavirus/clinical-guidance/rehabilitation-cornavirus/rehab-duringpandemic-FAQs accessed 20/06/2020
- 3) caremeasure.stir.ac.uk accessed September 2020 and 30/08/2021
- 4) www.csp.org.uk/professional-clinical/research-evaluation/outcome-experience-measures accessed September 2020 and 30/08/2021
- 5) A.Krasny-Pacini et al, Feasibility of a shorter Goal Attainment Scaling method for a Paediatric Spasticity clinic – The 3 Milestones GAS, *Ann Phys Rehabil Med* 2017 July; 60 (4) :249-2

The Impact of a new Rapid Response Children’s Respiratory Physiotherapy Service for Children with Long Term Complex Physical Disabilities: Results of 12-month pilot

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Background

Severely disabled children are at increased risk of hospitalisation as a result of chest infections. Providing specialist respiratory care to these children may help to reduce morbidity, mortality and rates of hospitalisation.

Objective

The Children’s Rapid Response Respiratory Service conducted a 12-month pilot to assess the impact of providing such care.

The Children’s Rapid Response Respiratory Service provides early specialist assessment and rapid treatment within 24 hours of onset of respiratory concern in the community as well as provision of a preventative chest care plan, regular review and parent/carer training throughout the year.

Methodology

127 children in Lincolnshire were identified as eligible for the service. Data was gathered regarding pre-service hospital admissions and admissions during the pilot; rapid response interventions were graded based on their impact (avoidance of hospital admission/A+E or urgent G.P./routine G.P. appointments); potential impact of preventative intervention was calculated; parent/carer satisfaction questionnaires were distributed and school attendance rates were compared pre and post pilot.

Results

Hospital admissions were reduced during the pilot from 123 to 25 (80% reduction). Total cost of admissions, Out of Hour and A+E appointments reduced by 56.08%. As a direct result of service provision 64 hospital admissions, 64 ambulance callouts, 158 A+E/urgent G.P. appointments and 165 routine G.P. appointments were avoided resulting in a total cost saving of £239,688.32. Preventative intervention was calculated to have saved £636,801.30. Of the 127 children, 96 feedback questionnaires were returned and indicated that 100% of parents felt the service had been critical to keeping their child out of hospital, had a positive impact on their child's and family's life and helped them to be more equipped to manage their child at home. Parents/carers highlighted that their child's respiratory management had improved from 5.1/10 to 9.1/10 with 10 meaning they are 100% confident.

Conclusions / Implications for practice

The pilot's results have evidenced that a home-based rapid response service, that is both proactive and reactive at a time when the child is unwell, has significantly improved the respiratory management of this cohort of children living in Lincolnshire. Evidence from this first year proves that this service is financially viable as results of the first year indicate an 80% reduction in hospital admissions with financial savings across the health system in Lincolnshire in the region of £600,000. Therefore, when you consider the cost of this new service being £190,000, future investments should clearly be made into high quality proactive home first services like rapid response.

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Examining the construct validity of the fatigue and pain domains of a new hypermobility symptom tool - The Spider

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Background

Pain and joint instability are common symptoms of hypermobility related disorders. However, the Hypermobility Spectrum Disorder/hypermobility Ehlers-Danlos Syndrome (HSD/hEDS) phenotype extends to non-musculoskeletal symptoms including fatigue, dysautonomia, urinary incontinence and mental health (Castori et al., 2017). These symptoms develop in childhood and can significantly impact quality of life. To improve patient care, 'The Spider' assessment tool has been developed to evaluate the impact of these symptoms to help direct and monitor care. The Spider comprises 25 questions within 8 domains. Initial face and content validity has been established and now further psychometric evaluation is required to ensure the tool is robust (de Wandele et al., 2020).

Aim/s and/or Objective/s

This study evaluated the construct validity of the pain and fatigue domains of The Spider in adolescents.

Methodology

Ethical approval was obtained by UCL REC (17331/001)

An online questionnaire was distributed to adolescents aged 12-18 years with and without a diagnosis of HSD/hEDS. Convergent validity was investigated by correlating The Spider pain and fatigue domain questions with the Paediatric Quality of Life Inventory Multidimensional Fatigue Scale (MFS) and Child Activity Limitations Interview-9 (CALI-9) and Numeric Pain Rating Scale (NPRS). Known-group validity was examined by comparing The Spider's pain and fatigue domain scores between adolescents with HSD/hEDS and healthy participants.

Results

A total of 272 participants completed the questionnaire. 232 diagnosed with HSD/hEDS and 40 non hypermobile healthy participants. Convergent validity was demonstrated by strong negative correlations between The Spider's fatigue domain and MFS ($r=-0.72$, $p<0.0001$), strong positive correlations between The Spider's pain domain and CALI-9 ($r=0.71$, $p<0.0001$), and moderate positive correlations with the NPRS ($r=0.51$, $p<0.0001$). Known-group validity was established by significant differences ($p<0.001$) of The Spider's scores between those with HSD/hEDS and healthy adolescents.

Conclusions / Implications for practice

These results reflect strong convergent and known-group validity for the fatigue and pain domains of The Spider in adolescents with HSD/hEDS. The Spider guides multidisciplinary treatment strategies that are tailored to the patient's symptom profile. This is an important step in validating this tool. Further psychometric testing on the other 6 domains is in process.

References (as appropriate/not essential)

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Parent experience of a physiotherapy-led Ponseti service

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Background

Clubfoot or congenital talipes equinovarus (CTEV) is one of the most common paediatric deformities (Pavone et al., 2018). The Ponseti technique is considered the gold standard method for treatment (Zhao et al., 2014). Patient experience is identified as a key measure of quality of care (NICE 2012). It allows for the views of parents to drive improvements (Kingsley and Patel 2017).

Objective

To undertake a service evaluation of the physiotherapy led Ponseti service at Somerset NHS Foundation Trust in the form of a parent experience measure. This data will provide a benchmark for the service and provide recommendations for service improvement, to improve the patient experience and optimise care.

Methodology

A parent experience measure was designed and completed using Plan-Do-Study-Act methodology (ACT Academy 2017). Approval was gained for a service evaluation from the Trauma and Orthopaedics Directorate and Information Governance Team. The measure was derived from a literature review, including both quantitative and qualitative questions over 3 themes:

1. Facilities and service experience
2. Communication
3. Treatment and support

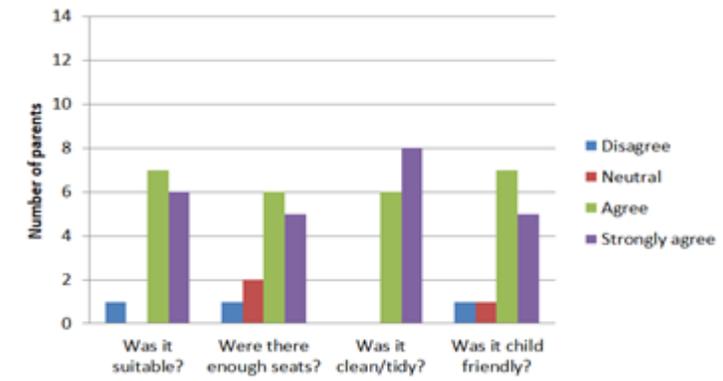
23 parents who currently attended the Ponseti clinic were asked to complete the questionnaire via email or post.

Results

The questionnaire response rate was 61% (14/23 parents).

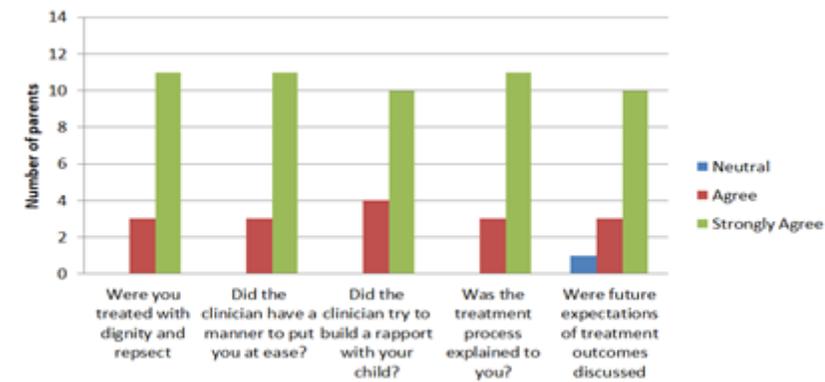
1. Facilities and service experience:

Parents found the overall experience excellent or good (93%) with 7% rating it as average. 29% were reviewed antenatally and rated that experience as excellent or good. Experience of the clinic room facilities can be seen in figure below:



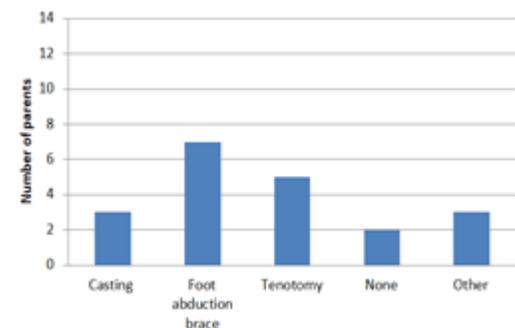
2. Communication:

Communication during the appointment can be seen in the figure below:

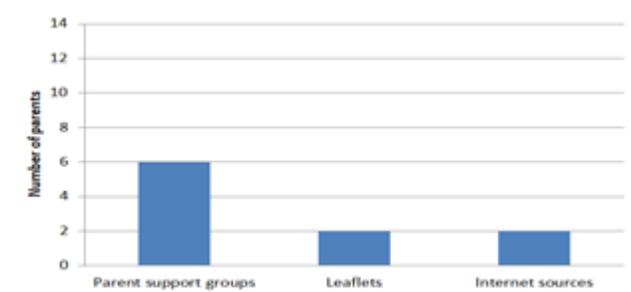


3. Treatment:

50% (n=7) would prefer face-to-face appointments, 43% (n=6) mixture of appointments (virtual and face-to-face). Most challenging aspects of treatment can be seen below:



93% (n=13) stated good or excellent support from the clinician. Parents felt support could have been enhanced by:



Qualitative comments included the need for a more consistent clinic room, improving other professionals' knowledge of clubfoot, parental anxiety and suggestions for further support in a group or leaflet. The positive support from clinic staff was acknowledged.

Conclusions / Implications for practice

The findings showed a positive experience with communication, support from the clinician and overall experience. Areas identified for improvement included the clinic room, additional sources and enhancing other professionals' knowledge to provide support. Limitations of the study include small cohort and questionnaire non-response bias. Results can be used at a local level to improve the patient experience and quality of care. The parent experience measure could be used for audit purposes in the future.

References

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Assessing the validity of the anxiety and depression domains of the Spider, a new screening tool for adolescents with hypermobile spectrum disorder (HSD) and hypermobile Ehlers Danlos Syndrome (hEDS).

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Background

Symptoms of hypermobile Ehlers Danlos Syndrome (hEDS) and Hypermobility Spectrum Disorders (HSD) often present childhood and persist into adult life (Tinkle et al., 2017). Although collectively characterised by increased joint flexibility, hEDS/HSD symptoms often extend beyond the musculoskeletal system. Further insight into the profile of symptoms of hEDS/HSD during clinical assessment is required to offer holistic and targeted care. A new screening tool - The Spider - has been created to assess impact of symptoms in individuals with hEDS/HSD and guide referral (de Wandele et al 2020). This questionnaire assesses the impact of neuromusculoskeletal, pain, fatigue, cardiac dysautonomia, urogenital, gastrointestinal, anxiety and depression symptoms on an individual with hEDS/HSD. To ensure the Spider is robust, all domains of this outcome measure require validation. Validation of the pain and fatigue domains has shown promising results in the adolescent population, demonstrating acceptable convergent and known group validity (Tang et al., 2020).

Objective

To examine the convergent validity and known group validity of The Spider anxiety and depression domains compared with RCADS-25 in adolescents with and without HSD/ hEDS.

Methodology

Ethical approval was gained from the UCL Ethics Committee (project ID: 19629/001). Participants were recruited through three patient charity groups (Ehlers Danlos Support UK, Ehlers Danlos society, HMSA) and through the Central Health Physiotherapy Hypermobility Unit. Participants between 12-18 years old with and without hEDS/HSD or symptomatic generalised joint hypermobility (GJH) were asked to participate. Participants answered the Spider anxiety and depression domain questions and the RCADS-25, a previously validated outcome measure. The questionnaires were completed anonymously via an online survey hosted by REDcap.

Results

104 participants completed the questionnaires, 180 with HSD/hEDS, and 20 healthy controls. Convergent validity was demonstrated through strong positive correlations between the depression domain scores of the Spider and the RCADS-25 ($r=0.853$, $p<0.001$) and moderate positive correlations between the anxiety domains of the Spider and RCADS-25 ($r=0.676$, $p<0.001$). The known group validity assessment was significant ($p<0.001$), demonstrating the Spider's ability to differentiate between those with and without HSD/hEDS.

Conclusion / Implications for practice

This validation study demonstrates that there is acceptable convergent and known group validity of the Spider anxiety and depression domains. These Spider domains demonstrate robustness for use in clinical practise to identify the presence and impact of anxiety and depression in those with HSD/hEDS, which would facilitate onward referral and management. Future research will validate the four remaining domains before publishing for international use.

References

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An Investigation of Physiotherapists' Experiences of The Barriers and Facilitators of Implementation of a Virtual Model of Practice-Based Learning Placement for Physiotherapy Students

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Background

Coronavirus Disease 2019 (COVID-19) resulted in temporary redeployment of Allied Health Professionals (AHPs) into acute sectors with strict directives to minimise patient contact. Cancellation of student placements resulted, leaving a deficit of placement hours. To address this, NHSGGC Specialist Children's Services Physiotherapy Department organised a 4-week virtual model of practice-based learning placement for 4 pre-registration MSc Physiotherapy students from Glasgow Caledonian University. This approach combined a variety of opportunities delivered virtually including e-learning, peer-assisted learning (PAL), role play, virtual consultations with patients and project based opportunities. This placement, undertaken within the context of paediatric neuro-rehabilitation, was designed in response to restrictions placed upon many Physiotherapy services during the COVID-19 pandemic. Whilst many studies advocate the benefits of virtual learning for students, there is no evidence regards the experiences of physiotherapists delivering virtual PrBL.

Aim

The aim of this study was to explore physiotherapists' experiences of the barriers and facilitators of implementation of a virtual model of practice-based learning (PrBL) placement for physiotherapy students.

Methodology

All physiotherapists involved in design, delivery and/or direct supervision of students on this placement, were invited to take part (n=9). Eight physiotherapists consented to participate through individual semi-structured interviews. Research questions were designed to explore participants' experiences of barriers and facilitators of this novel approach. Data was recorded, transcribed and thematically coded using the Theoretical Domains Framework (TDF).

Results

Participants reported significantly detailed barriers and facilitators related to 5 of the 14 TDF domains (Emotion, Beliefs about Capabilities, Skills, Environmental Context and Resources, and Behaviour Regulation). Emerging sub-themes, reflecting the most widely reported barriers and facilitators, were explored included peer assisted learning (e.g. participants reported many benefits despite little knowledge and skill of PAL models), virtual tutorials (e.g. peer support and experience of attending webinars helped alleviate anxieties relating to issues

with technology) and peer support for clinicians (e.g. weekly meetings throughout the placement helped reduce ambiguity around tutorial content and facilitated shared scoring of the student placement).

Conclusion

Although Physiotherapists undertaking this novel approach acknowledged some barriers to delivery of a fully virtual PrBL placement, they also proposed many behavioural strategies to counteract those challenges, facilitate successful outcomes and highlighted beneficial elements of virtual PrBL. It is recognised that the impact of COVID-19 will require AHPs to explore and embrace less traditional approaches to PrBL in order to provide effective sustainable means of placement provision recovery, with increased capacity to support HEIs and workforce demands.

APCP Research Submissions Guidance

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Introduction

One of the key objectives of the APCP is to encourage research and development (R&D) in paediatric physiotherapy and related fields to enhance the evidence base of physiotherapy. The APCP Journal is the first journal in the UK to focus on paediatric physiotherapy - it aims to disseminate original research, facilitate continuing medical education and to provide an opportunity to debate controversial issues in paediatric physiotherapy. All submissions to the APCP are subject to anonymous peer review by 2 reviewers.

The APCP Journal will review the following papers on research, Experimental Study, Qualitative Study, Literature Review, Service Evaluation/Audit and Case Study/Series. Other forms of research **will** be considered but should be discussed with the journal editor prior to submission (journal@apcp.org.uk). The following guidance is for submission to the journal with regards to the highlighted research types.

Experimental study

Experimental study: any study that involves exploration of a factor or intervention and the collection of quantitative data will fall into this category whether it is a randomized controlled trial, cross-over study, longitudinal study and so on. As a rule ethical approval is required for these studies and many are prospective in nature. Experimental studies are designed to answer a specific research question usually expressed as a hypothesis and, unlike case studies, inferences or generalizations can be made to the wider population. Experimental studies form the backbone of evidence-based practice. Articles should normally be no longer than 2,500 words.

The following information provides detail to be included in each section of the paper.

Title

The title should tell the reader in as few words as possible what they are going to read. For example; *Exploring muscle stimulation versus exercise on quads strength in CP: a pilot study.*

Abstract

The abstract should provide: Your main objective in a single sentence; a brief description of the research design; the setting of the study e.g. home, primary/secondary care; brief inclusion/exclusion criteria for participants; a description of the intervention/comparison and the main/primary outcome measure/s used; key results with number of participants and data such as mean and standard deviation for each group/condition, difference between groups/conditions, confidence intervals and significance level. Overall conclusions/implications of the study findings.

Introduction

This should include a background to the topic being studied including any previous relevant research with gaps /weaknesses identified. This section **does not require** a long narrative review. The main aims and objectives should be stated, along with any hypotheses.

Methods

This section should provide a clear description to the reader about what you actually did. Like a recipe the reader should be able to bake the same cake as you have done. Ethical and/or R&D approval details (see section on ethical approval below for details). Participants:

- from where were they recruited and how you intended to recruit including justification for that number (power or pragmatic approach if pilot or feasibility work), along with inclusion and exclusion criteria.
- Randomisation details where used.

A detailed description of the intervention and any control group treatment. A description of outcome measures used with references for reliability and validity if available. Details of blinding if used. Methods of data analyses, for example descriptive presentation, parametric or non-parametric approach and inferential test used.

Results

This section should provide a clear description of the findings of the study. A flow chart may be used to account for the flow of participants through the study including drop outs. **Descriptive analysis findings** e.g. demographic and main data set including mean and standard deviation/ median inter-quartile range. **Inferential analysis findings** e.g. main data set including confidence intervals and significance level if appropriate. Group analysis of comparisons between groups, mean difference, confidence intervals etc as relevant.

Discussion and conclusion

The first paragraph should summarise the main findings of the study. The findings should then be discussed in relations to previous research and clinical relevance outlined in your introduction. Areas of weakness e.g. bias, outcome measures and sample should be discussed. Strengths of the study should be discussed and finally the article should close with your recommendations and clinical implications if any. NOTE this section must be supported by your findings.

Qualitative study

Qualitative studies use rigorous methodologies to collect usually textual data; this could also include images, observations as well as interview or focus group data. These studies are usually more concerned with the 'why' rather than the 'what' or 'how' type research questions and are chosen when exploring experiences and/or perceptions of a phenomenon. The data that is collected is rich in depth and can help develop evidence in a novel area. Qualitative findings may in form future quantitative research work.

Articles should normally be no longer than 3,000 words.

Title

The title should identify the research design, the topic being studied and the type of Participants The title should tell the reader in as few words as possible what they are going to read e.g. *Children with chronic respiratory disease experiences of physical activity: a qualitative study.*

Abstract

The abstract should provide:

- a brief overview of the objective;
- a brief description of the research design used;
- the setting of the study e.g. home, primary/secondary care;
- brief selection criteria for participants;
- a description of the main results
- The overall conclusions of the study

Introduction

The introduction should include a background to the topic being studied including any previous relevant research with gaps /weaknesses identified. A justification should be provided of the qualitative approach chosen.

Methods

This section should provide a clear description to the reader about what you actually did.

- Participants: where were they recruited and how were they selected.
- A detailed description of the method used e.g. interview/focus group
- A detailed description of how the data was handled e.g. transcription, verification.
- A detailed description of how the data was analysed
- A description of how rigour of data collection was achieved for example steps to ensure trustworthiness should be clearly stated.
- Ethical and/or R&D approval details (see section on ethical approval below for details).

Results

This section should provide both the results of the data analysis and example data items that characterise the main themes or ideas.

Quotations should be written in italics with double quotation marks. No individual participant should be identified.

“ well... I used to enjoy walking to the shops. I met people there” [Female 3]

Discussion and conclusion

The first paragraph should summarise the main findings of the study. The findings should then be discussed in relations to previous research and clinical relevance. Areas of weakness and limitations e.g. bias, method, sample should be discussed. Strengths of the study should be discussed and recommendations for further study made.

Literature review

Literature reviews are often conducted as a precursor to experimental studies to highlight where the ‘gap’ is, that can then be filled with the experimental study. Alternatively, you may wish to conduct a literature review in order to identify and summarize a large amount of studies about a particular topic in a systematic way. A literature review is particularly important when studies show conflicting results and direct comparisons can highlight the potential reasons for this.

A systematic review should be reported using the PRISMA checklist
<http://www.prismastatement.org/2.1.2%20-%20PRISMA%202009%20Checklist.pdf>

A narrative review should be written using the following guide. The introduction to both types of review should include a justification of the chosen method. Articles should be no longer than 3,000.

Title

Identify the topic and scope of the review. The title should tell the reader in as few words as possible what they are going to read.

e.g. Inspiratory muscle training and exercise capacity in neurodegenerative conditions: a narrative review

Abstract

This section should include a brief overview including:

- Background and justification for review
- Specific objectives of the review
- Search criteria
- Study appraisal and synthesis method
- Results
- Limitations
- Conclusions

Introduction

This section should include a rationale for the review in the context of what is already known. A rationale for the review method used (systematic, meta-analysis or narrative). The specific question being addressed should be stated in terms of Participant, Interventions, Comparisons, Outcome measures and Study designs (PICOS).

A clear search strategy must be provided which includes:

- Sources of information e.g. databases used and dates covered by search
- Key search terms in relation to PICOS
- Inclusion/exclusion criteria for studies
- Method of study appraisal e.g. Critical Appraisal Skills Programme (CASP <http://www.casp-uk.net/>) and number of appraisers and their role for example is one only for adjudication.

Review

The narrative review should be presented as an analysis and synthesis of the data found based on the search strategy. The review may be divided into sub sections which clearly link to the original review question and provide synthesised findings laid out with clarity for the reader.

Conclusion

This section should provide a conclusion based on the search strategy and the analysis and synthesis of the studies found. Recommendations for further study should be included.

Service evaluation/Audit

Service evaluation may be used for a number of reasons. Firstly, it is useful to estimate the value of the service being delivered (this may not be in monetary terms, but could be). Secondly, it may be used to compare a new method of service delivery with a more established one – particularly if a Trust/Health board is moving from one mode to another. Thirdly it may be used to justify staffing levels or add weight to a funding bid for more staff. The outcome of a service evaluation may be patient-centred, for example length of hospital stay, number of re-admissions or number of adverse events; or it may be service or therapist centred, for example cost of treatment regime, quality of life of physiotherapist etc. It is important to consider the question that you wish to answer and choose an outcome that is relevant to that question.

Service evaluation should not be used if there are National or Regional Guidelines which relate to the service provided. In these cases the research method which is applicable is audit.

Articles should normally be no longer than 2,500 words.

The following information provides detail to be included in each section of the article.

Title

The title should identify the service that has been evaluated and the context of that Evaluation. E.g. An evaluation of a pulmonary rehabilitation service within a rural setting.

Abstract

The abstract should provide:

- a brief overview of the purpose of the evaluation
- the setting of the evaluation e.g. home, primary/secondary care;
- a brief description of the service
- a brief description of the method of evaluation
- a description of the main findings
- Conclusion and recommendations

Introduction

This should include a brief background to the purpose and context of the evaluation. The context may include socio-economic, political, environmental, historical issues. It should also include reference to literature as a rationale for undertaking the evaluation.

Methods

This section should provide a clear description of the service evaluation including:

- rationale and objectives of the service
- the population/people for whom the service was designed
- activities/processes included within the service
- involvement of other organisations within the service
- cost of the service
- Ethical and/or R&D approval details (see section on ethical approval below for details).

A clear description of the method/s of evaluation should be provided:

- clear description of method e.g. self completion questionnaire, focus group/s, observation
- participants in the evaluation – numbers and characteristics
- method/s of data analysis

Results

A clear description of the findings of the study should be provided and may include quantitative and qualitative data.

If key performance indicators were identified, these may provide a structure for this section.

Results may be divided into sections such as process e.g. attendance, satisfaction and impact e.g. change in participants' knowledge/behaviour

Quantitative data should be described using tables and graphs; qualitative data should be presented as descriptive themes.

Discussion and conclusion

The first paragraph should summarise the main findings of the study. The findings should then be discussed in relations to previous research, potential changes to policy and/or practice in the context of professional practice and/or service organisation.

Areas of weakness and strength of the evaluation should be discussed and recommendations made.

Case study/series

You might want to write a case study/series if you come across a condition or technique that is unusual, rare or a response to treatment that is unexpected. Although case studies lack the scientific rigor of large randomized controlled trials, they are important for highlighting instances where a patient or treatment has deviated from the 'typical' protocol or response. They are often used for patients who have very rare presentations, where insufficient patient numbers would preclude a randomized controlled trial. Or for novel treatment approaches that have shown to be surprisingly successful! The following provides information of the detail to be included in each section of the case study.

Word count: you should aim for 1500 words for a case study and 2000 words for a case series.

Title

The title should identify the research design and topic of the study e.g. C6 spinal injury in a 1 year old: case study report

Abstract

The abstract should provide:

- The background to the case study/series
- A brief description of the case(s)
- A brief evaluation of the case(s) in the context of previous literature
- Main conclusion/s and recommendation/s.

Introduction

The introduction should include a background to the topic including:

- the purpose of the case study/series – i.e. what is novel about this case study?
 - Background information e.g. pertinent information relating to the condition
 - A brief review of pertinent literature related to the case study
 - Clear justification for the case study research approach
-

The case presentation

This section should provide a clear description to the reader about the case and may include detail related to:

- Participant demographic data
- Participant's underlying condition
- Participants' previous medical, medication, family and social history (as much detail as is relevant to the case)
- Data related to other systems e.g. digestive, musculoskeletal (as relevant)
- A chronological description of the participant's problems.

Discussion and conclusion

The first paragraph should summarise the main findings of the case study. The case should be evaluated in terms of accuracy, validity and uniqueness. Information from the case study should be integrated with information from previous literature. New knowledge should be highlighted and recommendations made

All Submissions

In addition to the considerations for the specific research-type submission, each paper should include the below sub-headings.

Key points

Three key points should provide the reader with the value of the study.

Acknowledgements

Acknowledgements should be provided for anyone who was not an author but helped in the preparation of the article.

Funding

Funding of the study needs to be acknowledged preferably worded as follows. Either: 'This work was supported by [name of funder] grant number [xxx]' or 'This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors'. You must ensure that the full, correct details of your funder(s) and any relevant grant numbers are included.

Ethical and R&D approval

Approval for use of an individual's data must be gained from relevant sources. If your manuscript contains any individual person's data in any form (including individual details, images or videos), consent for publication must be obtained from that person, or in the case of children, their parent or legal guardian.

Trust/Health Board R&D approval and if necessary NHS research ethics approval must be documented. If the study was part of an academic award, confirmation of University ethical approval is also required.

If your manuscript does not contain data from any individual person (ie literature review), please state "Not applicable" in this section.

Masterclass paper

The purpose of a Masterclass paper is to describe in detail clinical aspects specific to paediatric physiotherapy. This may relate to specific treatment techniques, a particular management approach or management of a specific clinical entity. Masterclasses are showcase articles and authors can be invited to write a masterclass paper because of their significant expertise in a relevant area. Additionally, if an author feels that they have a topic that would be appropriate for a masterclass and have recognised expertise in the field, the author should contact Jane Simmonds (research officer - research@apcp.org.uk) before submitting a paper to ascertain that the proposed topic and content will be suitable and meets requirements.

Articles should be no longer 4000 words (excluding references)

Title

Brief description of what the paper will present

Abstract

The abstract should provide

- Introduction (setting the scene and introducing the topic)
- Purpose (what is the purpose/aim of the masterclass, what is going to be discussed)
- Implications (for practice)

Introduction

This should review the relevant literature and put the subject matter into context.

Main Body

The main body of the text will describe the technique/ approach / presentation in detail. The topic should have clear application to clinical or professional practice. This sets a masterclass apart from a narrative review paper. Sub-headings can be tailored to the subject matter.

Case studies are often very valuable in order to illustrate the theoretical principles discussed within the masterclass. If the word limit precludes the inclusion of a case study within the body of the masterclass then a case study can be submitted as a separate paper alongside the masterclass.

Summary/Conclusions

This section should provide a brief conclusion/summary based on the information presented in the paper.

General Submission Guidance

Email your submission in the first place in Word format to journal@apcp.org.uk - clearly indicating the nature of the submission, e.g. case series, research project.

Ensure that your copy includes information about the author (full name, qualifications, email address). Once your submission has been received you will receive feedback from the reviewers indicating whether the copy has been accepted for publication.

Formatting the document for submission

All text is Arial and fully justified.

Title: bold 16pt, 1.5 spacing Authors, keywords and correspondence: 12pt, all headings bold Abstract:

- Sub-headings: 14pt, bold, italic
- Text: 12pt, single spaced, italic

Main body of article:

- Headings: bold 14pt,
- Text: 12pt, double spacing
- Any further subheadings within sections: italic

Fig and table titles: 12pt

Word count

Articles may be submitted from pieces of work originally for higher education. Generally writing for educational purposes meet different objectives than writing for a journal article. Therefore unless your program of education requires you to write specifically for publication you will need to revise any thesis/ literature review to reflect journal dissemination requirements – this reflects the word count for each type of research.

Copyright

Any included tabulation or images from other publications should include permission from the original copyright owner.

Notes:

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Masterclass- Bronchiolitis: A Physiotherapists Perspective

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