<https://www.frontiersin.org/journals/publichealth/articles/10.3389/fpubh.2021.528388/full>

**Qualitative research methodology**

**Objective:** The purpose of this study was to get insight in the needs, wishes, and preferences regarding the practical operationalization of persuasive strategies in a mobile application aimed at promoting PA in healthy inactive adults.

* So that they keep using it in a long-term fashion

**Methods:** 5 focus groups leading into discussion of design and operationalization of six predefined theory-based persuasive strategies (e.g., self-monitoring, feedback, goal setting, reminders, rewards, and social support)

Exercise apps can be utilized as cost-effective interventions that can reach large populations, especially if they are embedded with theoretically supported persuasive strategies that align with the needs and wishes of the user.

In eHealth interventions, user engagement usually declines after the first few weeks as people often lack commitment to use the app

Recently, a scoping literature review by Sporrel et al. identified the following six strategies as most promising to increase PA in mobile exercise interventions: **feedback, self-monitoring of behavior, goal setting, reminders, rewards, and social influence** ([19](https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2021.528388/full#B19)).

* Participants from Amsterdam
  + Native dutch speaking

PAUL Project

* 3 pillars: data-driven research (to identify which situations are associated with running behavior (frequency and duration) of infrequent app users), behaviour change techniques/persuasive strategies (6 strategies above), using feedback to help build app (the purpose of this study

Pilot study to collect surveillance data to understand & start looking at correlation studies

**Case-control or cross-sectional**

* I think cross-sectional would be better in terms of simply pilot-study getting information
* Adding in strength training as well might make things more complicated in terms of doing a case-control

**Strength training & resistance training**

<https://doi.org/10.1542/peds.2020-1011>

* Resistance training and strength training or synonymous
  + E.g., bodybuilding, powerlifting, core strengthening
  + Have a component of sport and exercise training meant to enhance muscular strength, muscular power, and local muscular endurance for general exercise or competitive sport
  + This includes using free-weights (barbells/dumbbells), weight machines, medicine balls, kettlebells, elastics, or your own body weight
    - Just need to increase strength
* Benefits to resistance training
  + Improvements in motor skill performance
  + Gains in speed and power
  + Developing physical literacy
  + Reducing the risk of injury
  + Injury rehabilitation
  + Improvements in cardiovascular fitness
  + Body composition
  + Bone mineral density
  + Blood lipid profiles
  + Insulin sensitivity in youth who are overweight
  + Increased resistance to injury
  + Improves mental health
* There has been in increase in resistance training in younger children as they are entering more competitive sports at younger ages
* Training exercises involving the core (abdominals, low back, and gluteal muscles) are foundationally important for sports participation and can provide benefit for sport-specific skill acquisition and postural control

<https://doi.org/10.1542/peds.2013-1343>

* Evidence does show that participation in a resistance-training program helps increase daily levels of spontaneous activity in school-aged boys, which suggests that resistance training may be a good place to start when trying to get inactive kids to be more active.

*DOI:*10.1519/JSC.0b013e31819df407

* Worries of injury is only based on information due to lack of proper technique and supervision

<https://bjsm.bmj.com/content/52/24/1557.abstract>

* the available research supports resistance training in youth with a new perspective of acquiring and maintaining high strength reserves to enhance performance across a wide range of general and specific skills while reducing injury risk.

<https://journals.lww.com/nsca-jscr/abstract/2003/02000/maximal_strength_testing_in_healthy_children.25.aspx>

* The one-repetition maximum (1 RM) (see Table 1 for definition) test can be administered by qualified professionals to assess maximal strength, determine an appropriate resistance-training intensity, and evaluate the effectiveness of a resistance-training program.

[10.1016/j.jpeds.2005.01.055](https://doi.org/10.1016/j.jpeds.2005.01.055)

* School-age youth should participate daily in 60 minutes or more of moderate to vigorous physical activity that is developmentally appropriate, enjoyable, and involves a variety of activities
* Forces associated with muscle contractions during weight-bearing activities and exercises like strength training have a been noted to have a positive impact on skeletal tissue.
  + Various types of studies suggest that physical activity benefits skeletal health, showing positive effects from childhood activity through adulthood, and highlighting the differences between more active and less active individuals.

**Assessing strength training (surveillance)**

* Survey or diary (talk about what they did that day specifically)

[10.1016/j.jpeds.2005.01.055](https://doi.org/10.1016/j.jpeds.2005.01.055)

**Recruitment strategies (sample sizes)**

* 20 participants total?? – pilot study

**Changes to collecting data (surveys)**

* Recent research continues to validate its use across different populations and cultures. The questionnaire has been extensively studied in various English-speaking populations, including Canadian, British, Euro-American, and African-American children, with positive results regarding its psychometric properties.
* The tool is particularly effective because it uses memory cues to help children recall their physical activities over a seven-day period, making it especially suitable for young participants. Recent validation studies, such as the one conducted in Saudi Arabia, continue to demonstrate the questionnaire's reliability and validity in new cultural contexts, showing adequate reliability through Cronbach's alpha and favorable item analysis.
* While some limitations exist, such as the need for concurrent validation with objective measurement tools like accelerometers, the PAQ-C remains a practical and valid instrument for assessing children's physical activity levels.

**Accelerometer**

Stretching

- group in UK which collects data on hip stuff looking at surgical outcomes BOSS (British orthopaedic - Perry)

- getting sense of prevalence, etc.

Research ethics board (women and childrens)

- application questions

- consent forms (some drafted from other studies)

Physical activity (PA)—any bodily movement produced by skeletal muscles resulting in energy expenditure (Caspersen et al., 1985)—plays a critical role in bone health, body composition, cardiovascular fitness, and mental well-being (Janz et al., 2010; Specker et al., 2015; Janssen & LeBlanc, 2010). Importantly, PA during childhood can reduce the risk of chronic diseases in adulthood (Raitakari et al., 1994; Twisk et al., 1997), and these habits are often carried into adulthood (Telama et al., 2005). On the other hand, physical inactivity is associated with numerous chronic diseases, including obesity, diabetes, cardiovascular disease, and mental health disorders such as anxiety and depression (Booth, Roberts, & Laye, 2012).

Resistance training, a cornerstone of modern fitness and rehabilitation, has gained recognition in recent years for its positive impact on children's and adolescents' physical health. Initially associated with bodybuilding and powerlifting, resistance training now encompasses a variety of exercises designed to improve strength, endurance, and power. This can include free weights, resistance bands, weight machines, and body-weight exercises.

Emerging research underscores the benefits of resistance training for youth, including improved motor skills, increased strength and speed, reduced injury risk, and enhanced cardiovascular health, bone mineral density, and body composition. Additionally, resistance training can positively impact mental health by reducing anxiety and boosting mood. It also plays a crucial role in rehabilitation, particularly for musculoskeletal conditions like Perthes, SCFE, and DDH. Strengthening the muscles around the affected joints helps stabilize the hip, reduces the risk of re-injury, and improves mobility. Evidence suggests that resistance training can also increase overall physical activity levels, even in otherwise inactive children, making it a promising intervention to promote movement during recovery.

The incorporation of resistance training into youth sports has become increasingly common, with growing evidence supporting its safety and effectiveness when performed under proper supervision. Research indicates that the benefits of strength training for youth are comparable to those seen in adults, highlighting the importance of building strength reserves early to improve performance and reduce the likelihood of future injuries.

In addition to promoting physical activity, it is crucial to address sedentary behavior, which is also associated with negative health outcomes. Sedentary behavior, such as prolonged screen time, is linked to metabolic syndrome, hypertension, and mental health issues like depression and anxiety (Tremblay et al., 2010). Studies have found that even with regular exercise, excessive sedentary time can counteract the health benefits of physical activity (Engberg et al., 2019; Owen et al., 2010). Therefore, it is essential to promote both increased physical activity and reduced sedentary behavior.

The **CSEP Canadian 24-Hour Movement Guidelines** for Children and Youth emphasize the importance of accumulating at least 60 minutes of moderate-to-vigorous physical activity (MVPA) daily and limiting recreational screen time to less than 2 hours per day (CSEP, 2016). Despite the well-documented benefits of physical activity and the established guidelines, adherence remains low, with only 39% of Canadian children meeting the recommended 60 minutes of daily MVPA, and only 53% meeting the screen-time guideline (Statistics Canada).

In pediatric hip patients, the benefits of physical activity extend beyond general health, as exercise can improve hip function, alleviate pain, and reduce the risk of future disability (Ayers, Franklin, & Ring, 2013; Fransen et al., 2014). However, inactivity in this population can have more severe consequences, such as weight gain, which adds stress to the affected hip joint, worsening symptoms and functional limitations (Cooper et al., 1998). This cycle of inactivity and worsening symptoms is particularly concerning for hip patients, as it may exacerbate the progression of osteoarthritis (Issa & Griffin, 2012).

Evidence from studies of other pediatric conditions, such as juvenile arthritis and asthma, shows that these patients tend to engage in less physical activity compared to their healthy peers (Henderson et al., 1995; Bourdier et al., 2019; Glazebrook et al., 2006). While no study has yet focused on the physical activity levels of pediatric hip patients, the challenges observed in other pediatric conditions suggest that hip patients may experience similar barriers to physical activity, including both real and perceived limitations related to their condition (Riner & Sellhorst, 2013; Walker et al., 2015).

This study aims to address the gaps in the current literature by examining physical activity and sedentary behavior in children and adolescents with Perthes, SCFE, and DDH. Given that orthopedic care generally concludes at the end of adolescence, our target population will focus on pediatric patients. We will assess the proportion of these patients who meet Canadian physical activity and sedentary behavior guidelines and explore the factors influencing their activity levels. This research will provide valuable insights to help guide pediatric hip patients in achieving optimal recovery and long-term health outcomes.