

## E-Pediatric Neurorehabilitation: Boon to parents and children with cerebral palsy in COVID-19 era

## Neurorreabilitação com E-Pediatric: alívio para pais e filhos com paralisia cerebral na era do COVID-19

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Pediatric neurorehabilitation has been retarded in the COVID-19 lockdown period, especially for children with cerebral palsy (CP) due to social distancing, fear of spread, lack of transport, as well as the availability of therapists. The new method of rehabilitation, such as Home-based, can improve the facility of treatment service on a large scale by a single therapist, especially through telerehabilitation. The child with cerebral palsy has decreased limits of stability when compared to their peers<sup>1</sup>. Lack of therapeutic exercises could worsen the child's health and decrease the physical function, especially for children with CP<sup>2</sup>. Therefore, it is very important to find an alternative solution with user friendly and effective for rehabilitation services. E-Rehabilitation strategies can help the parents to overcome the current scenario<sup>3</sup>.

There are certain negative aspects of this type of rehabilitation that need to be clearly explained, gain the confidence of parents or caregivers and eventually proceed with the process<sup>4</sup>. Advanced rehabilitation techniques could not be feasible for every people, which may lead to

improper frequency among the therapist and parents for effective rehabilitation. The use of E-rehabilitation also has a positive frequency to enhance the outcomes and improve the quality of life of many children<sup>5</sup>.

E-Pediatric Neurorehabilitation builds the communication between the therapist and the children in planning and providing services to prevent future complications of life<sup>6</sup>. There are many types of E-rehabilitation that provide required education and accessibility for research. There are three major e-rehabilitation methods commonly used, such as virtual rehabilitation (VR), video-based, and telerehabilitation.

The major advantages of VR platform-based exercises are to provide the VR environment according to a child's interest and carrying out activities based on motor skills, cognitive learning, goal target, and a safe environment<sup>3</sup>. By improving these form of rehabilitation engages the children for a particular time as well as provide adequate physical activity for the day<sup>7</sup>.

This brings out the adherence between parent and child suffering from cerebral palsy. Cerebral palsy children are known to have fewer physical movements, improper interaction. This type of gaming helps the child with innovative experience by providing proper guidance and involving parents in the therapeutic program. Today android phones are available at low cost, where it can also be used for E-rehabilitation as mobile-based therapy, many applications are available in play store for children games regarding improving skills<sup>8</sup>. The list of mobile health applications for cerebral palsy children with age-appropriate are available to indulge in rehabilitation exercises and boost their self-confidence (Chart 1).

**Chart 1.** List of mobile health applications and game plan for cerebral palsy children

<b>E- treatment/E-rehabilitation mobile based Application</b>	<b>Brief description</b>
<a href="https://play.google.com/store/apps/developer?id=Cerebral+Palsy+Foundation">https://play.google.com/store/apps/developer?id=Cerebral+Palsy+Foundation</a>	Awareness for parents
Brain Games <a href="https://play.google.com/store/apps/details?id=com.iz.kids.brain.trainer.games.memory.logic.puzzles">https://play.google.com/store/apps/details?id=com.iz.kids.brain.trainer.games.memory.logic.puzzles</a>	Improves memory, cognition
3-12 years Educational games <a href="https://play.google.com/store/apps/details?id=game.hard.education_games.games">https://play.google.com/store/apps/details?id=game.hard.education_games.games</a>	Flash cards, matching
Speech for kids and babies <a href="https://play.google.com/store/apps/details?id=com.dar_slova.hs">https://play.google.com/store/apps/details?id=com.dar_slova.hs</a>	Different
<a href="https://play.google.com/store/apps/developer?id=ImagiRation+LLC">https://play.google.com/store/apps/developer?id=ImagiRation+LLC</a>	Language and cognitive therapy
<a href="https://play.google.com/store/apps/developer?id=NB+Fit">https://play.google.com/store/apps/developer?id=NB+Fit</a>	Exercise for Kids at home
<a href="https://play.google.com/store/apps/dev?id=7716127734668680988">https://play.google.com/store/apps/dev?id=7716127734668680988</a>	Sensory baby toddlers
<a href="https://play.google.com/store/apps/dev?id=5704336914526446295">https://play.google.com/store/apps/dev?id=5704336914526446295</a>	Baby touch sound

Exergaming with parental help improves the interaction, cognitive skills as it also provides auditory, visual inputs to monitor the performance and helps in motivation in reaching higher levels during and after the game. Mobile-based or E-rehabilitation helps to set daily, weekly goals with therapist advice by improving overall mobility, balance, bilateral coordination, fine motor skills, and non-motor components such as speech and voice, quality of life, and satisfaction of therapy.

The limitations of using E-rehabilitation is accessibility with good quality of the source (mobile phones, tabs, computers) especially in rural areas due to high cost, poor network issues and even lack of confidentiality, inappropriate education, coping, reduced awareness of gadgets and its usage, some children may be with impaired vision and hearing, improper parental involvement, therapist and parents timings, lack of face-to-face interaction services<sup>3,9</sup>.

Furthermore, using E-rehabilitation for cerebral palsy children enhances the level of physical activity and creates awareness among parents and caregivers about the treatment process with promising outcomes and improving quality of life. Hence, E-rehabilitation is the best solution in rehabilitation cerebral palsy children with their parents /caregivers in COVID-19.

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