

## PedsCases Podcast Scripts

This is a text version of a podcast from PedsCases.com on “**Pediatric Rehabilitation Part 2: History and Physical Examination.**” These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at [www.pedcases.com/podcasts](http://www.pedcases.com/podcasts).

### **Pediatric Rehabilitation Part 2: History and Physical Examination**

Developed by Andy Le and Dr. Matthew Prowse for PedsCases.com.  
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#### **Introduction**

Hello, and welcome to PedsCases podcasts. My name is Andy Le and I am a medical student at the University of Alberta. This podcast was developed in conjunction with Dr. Matthew Prowse, the Program Director of the Division of Physical Medicine and Rehabilitation at the University of Alberta. This podcast is second in a 3-part series on pediatric rehabilitation. In our first podcast, we provided an introduction to rehabilitation principles, including reviewing the International Classification of Functioning, Disability, and Health. Today, we will be discussing the pediatric rehabilitation history and physical examination. The third podcast will provide an approach to assessment of spasticity in a pediatric patient.

After listening to this podcast, the learner will be able to:

1. Understand the key components of a pediatric rehabilitation history including functional assessment.
2. Understand the rehabilitation physical exam including the neurologic and musculoskeletal exams.

#### **Rehabilitation History**

Let's start with the same case as our previous podcast. Jeremy is an 11 year old boy with cerebral palsy, specifically spastic diplegia. What do you need to include in your

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history and physical examination to assess Jeremy's function and begin to develop a rehabilitation plan? We will return to Jeremy's case at the end of the podcast.

We will begin by discussing the pediatric rehabilitation history. For information on the general pediatric history, please refer to the Pediatric History Taking podcast. Like any specialist referral, the patient and their family may be unaware of, or have a different understanding of, the reason for their appointment, and the role that a pediatric physiatrist can play in the management of their child. Therefore, as in any situation, it is important to explain your role in the care of the patient and what they can expect going forward. It is also crucial to determine any goals or expectations the patient and/or family have for the encounter.

In pediatrics, it is important to obtain as much of the medical history as is appropriate from the child, given their developmental level. This is critical because a parent's perception of a child's function may be inconsistent with the child's perception and their goals may be different as well.

As with any history, you should begin by identifying the patient's chief complaint. This could include pain, weakness, failure to achieve developmental milestones and/or loss of previously obtained skills. In physiatry the cause of the chief complaint could be due to a wide range of conditions. In some cases, the etiology is obvious such as after a traumatic brain injury or spinal cord injury. In others, the team may play a role in diagnosing the cause of the symptoms. Different neuromuscular complaints can be due to congenital problems, genetic syndromes, or cerebral palsy that are present from the perinatal period. Other complaints can be acquired including neuromuscular conditions like spinal muscular atrophy or muscular dystrophy.

The history of presenting illness should be directed by the patient's chief complaint. It is helpful to organize your history chronologically. It is important to know what the patient's level of functioning and health status was like prior to the development of their illness in order to compare it to their current level of functioning. If there was an acute injury, you should determine the mechanism of injury. You should review all of their symptoms, and the timecourse over which they have developed.

One of the most important aspects for the pediatric rehabilitation history is the developmental and functional history. The functional history in pediatric rehabilitation will also be different than adults, as it differs by age and developmental level of the child. Different conditions may affect developmental milestones in various ways, thus a comprehensive understanding of developmental milestones is imperative. It is important to know which milestones have been met, and at what age. The PedsCases Developmental Milestone table is a great resource for more information on developmental milestones. The developmental level of the child will also determine which rehabilitation approaches are most appropriate and guide goal-setting. We reviewed this component of history in part 1 of this series, but in summary you should walk through a patient's typical day, and identify their level of function with activities of

daily living (ADLs) and instrumental activities of daily living (iADLs), inquiring about any change in current functioning compared to previous functioning, and in particular determining if they have lost abilities that they previously had. This can be structured by using the domains from the Functional Independence Measure as a guide. Identifying developmental delay and/or regression is important to determine the patient's previous and current functional level. Ultimately, you want to determine what your patient is able to do, what they cannot currently do, and what they want to be able to do. If a history of regression is endorsed, then more acute investigations and management may be required to determine if there is a more serious underlying pathology. Identify some of their impairments, activity limitations, and participation restrictions. This will give you an idea of how the patient's symptoms are affecting their daily life.

Once you have an understanding of what brought the patient in to see you, then collecting information on the patient's past medical history, medications, allergies and family history. By inquiring about the patient's past medical history, you want to identify co-morbidities that may have led to their disability or that may complicate their management going forward. Obtaining a good prenatal and perinatal history may help identify the etiology of certain conditions. For example, intrauterine infections and premature birth increases the likelihood of cerebral palsy. Please refer to the Pediatric History Taking podcast for more details regarding the prenatal and perinatal history. It is important to know if any medications or interventions have already been tried and how effective these therapies were. As always, you should determine if there are any potential drug interactions or side effects that may affect the management of the patient. The family history should attempt to identify the possibility of genetic disease which could lead to neuromuscular symptoms. Drawing a pedigree may be helpful if the family history is complex.

The psychosocial history should inquire about behaviour and education, in order to learn about how the patient interacts with different people in varying environments. This may include people such as parents, siblings, teachers, and peers, and various environments including at home, school, daycare, and so forth. In children, education is one of the main areas of functioning, so it is important to determine if there are deficits in this area and identify the potential causes. In cases of traumatic injury or major life change, inquiring about mental health is crucial in order to assess for depressive symptoms and suicide risk.

When obtaining a history, it is important to gauge the patient's understanding of their injury. This will become incredibly important when you begin goal-setting for their rehabilitation as having unrealistic expectations may prevent the establishment of realistic, achievable goals.

## **Physical Exam**

The pediatric rehabilitation exam is centered on identifying the patient's functional capabilities. In pediatrics, observation is critical since they may not be able to follow

directions and participate in a traditional physical examination. Identifying what the patient can and cannot do is often best by watching them in as natural an environment as possible. Like the history, this will vary based on developmental level. For example, in preschool-aged children, most of the focus will be on major developmental domains like gross motor, fine motor, speech/language, cognitive, and social/emotional skills; whereas in older school-aged kids and adolescents, you may incorporate more aspects of ADLs and iADLs that may be similar to the adult examination. When assessing their functional level, it is important to take into account all organ systems that may be involved; examples include vision, hearing, neurological, musculoskeletal, cardiac, pulmonary, dermatologic, and so forth. Like any pediatric exam, you will need to be opportunistic in order to assess all the appropriate systems.

As in any pediatric patient, it is important to check height, weight, and head circumference (if appropriate depending on their age) at each visit. Plotting their growth on standardized growth charts is essential. Growth charts for specific diagnoses are being developed increasingly and should be used whenever possible. The patient's functional problems may impair their nutritional intake and lead to failure to thrive in some cases.

Most of the pediatric rehabilitation exam will focus on the neurological and musculoskeletal assessment. This will be guided by the nature of their condition or injury. For example, in a spinal cord injury you may focus on assessing dermatomes and myotomes to identify the level of the injury; whereas in a brain injury, you may also want to assess for cranial nerve, cortical, cerebellar, and upper motor neuron findings. When conducting your neurologic examination, the goal is to localize any lesions, and identify impairments. Therefore it is helpful to think about the nature of your patient's condition and identify the neurologic anatomy that may be affected. Thinking about the neurologic tracts from distal to proximal or vice versa can help organize your thoughts (eg: cortical, subcortical, brain stem, cerebellum, spinal cord, motor neuron, nerve root, peripheral nerve, neuromuscular junction, muscle.) This approach will help guide your neurologic examination. The full neurologic exam includes visual assessment of muscle bulk and symmetry, assessment of muscle tone and strength, reflexes, sensation, and cerebellar findings. Further testing can be done to assess for cortical involvement, such as language and speech, extinction, stereognosis, graphesthesia, and two-point discrimination. For techniques specific to spinal cord injuries, check out the American Spinal Injury Association (ASIA) physical examination guide on their website. A link is included on the script at [PedsCases.com](http://PedsCases.com).

For a musculoskeletal assessment, it may also be helpful to think about it anatomically. Are there joints that are affected? Muscle? Ligaments? Having a structured approach to the MSK exam will keep you organized; for example "Look, Move, Feel" is often used. On inspection, the mnemonic SEADS can be used: swelling, erythema, atrophy, deformities, skin changes. The pGALS screen can be used to identify MSK deficits and may be useful in guiding your exam. pGALS stands for the pediatric gait, arms, legs, and spine screen. This is a quick 3-4 minute physical exam screen that can identify

MSK deficits in the aforementioned areas. For more information on the pGALS screen, refer to the references at the end of this podcast script. When examining joints, a good rule of thumb is to assess the joints both above and below the affected joint to thoroughly evaluate the kinetic chain. In children, you should always assess gait and gross motor movements when possible. Often times, if a patient is able to run, this will bring out deficiencies that may not be noted during their normal walking gait (for example, varus/valgus deformities, decreased or absent arm swing, etc.)

The ultimate goal of your assessment is to use your information to guide goal-setting so as to therapeutically address impairments in a way that may improve function and quality of life through decreasing activity limitations and participation restrictions. The components of your history and physical exam that you emphasize will depend on the nature of the patient's illness and disability.

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## Case

Let's return to our case. When delving into Jeremy's history, you determine that he was delivered at 33 weeks gestational age by emergency C-section for fetal distress. His mom described a brief period of hypoxia and a short stay in the NICU for breathing difficulties. He has always had significant weakness in his legs and took longer to learn how to walk compared to his brother; however, he has good use of his upper extremities and met most gross motor milestones on time. Regardless, Jeremy has always required assistance with certain ADLs and IADLs, as mentioned in the previous podcast. He finds his main impairments have come from the spasticity in his hip adductors, which has made it difficult to sit comfortably and toilet independently. As Jeremy has grown up, modifications have been made to meet his ever-changing needs, such as forearm crutches to help him mobilize.

Jeremy is healthy otherwise and enjoys socializing with his friends at school. He is a good student, though he requires additional time to write tests and complete assignments compared to his peers. He gets along well with his family, teachers, and peers,

On exam, Jeremy is able to respond to your questions and follow your commands. His language comprehension and fluency are in keeping with his age.

You start your MSK examination with inspection. You assess for areas of skin breakdown, which don't appear to be present, and muscle bulk, which seems to be reduced at the dorsal aspect of his feet and his gluteal region. He has full active and passive range of motion in his upper extremities. He has limited active range of motion in his lower extremities due to weakness, and reduced passive range of motion due to spasticity.

On examination of gait, he walks without any gait aids at a slow pace with a scissoring pattern. He has difficulty clearing his feet.

On neurological examination, you determine his cranial nerves are all grossly intact. He has 5/5 strength in both his upper limbs and variably impaired strength gradings of his lower limbs with scores ranging from 0 to 3, consistent with spastic paresis. On assessment of muscle tone, you notice his arm flexors have a mild degree of spasticity, while his plantarflexors, knee extensors, and hip adductors have a moderate to significant degree of spasticity. There is sustained clonus at his ankles. You identify 2+ deep tendon reflexes in biceps, brachioradialis, and triceps reflexes bilaterally, and 3+ deep tendon reflexes in his knee jerk, hamstring, and Achilles reflexes bilaterally. His Babinski reflexes are upgoing bilaterally.

On sensory testing, no deficits are identified. Cerebellar testing is normal in the upper extremities, but is not-testable in the lower extremities due to muscle weakness.

You discuss your findings with your preceptor, and begin making plans for a multidisciplinary rehabilitation program based on Jeremy's goals.

## **Conclusion**

This brings us to the end of this PedsCases podcast on the pediatric rehabilitation history and physical examination. Before we leave, let's review some take-home points:

1. A thorough developmental and functional history are essential for the pediatric rehabilitation history. Ultimately, you want to determine what your patient is able to do, what they cannot currently do, and what they want to be able to do. Differentiating between developmental delay and regression is also important, as a history of regression may warrant further investigations.
2. The main aspects of the physical exam are musculoskeletal and neurological assessments, with the underlying goal of assessing a patient's functional capabilities. It is helpful to organize these exams anatomically in order to localize neurologic lesions and identify musculoskeletal deficits.
3. The goal of your history and physical examination is to identify the interplay of impairments, activity limitations, and participation restrictions in order to guide goal-setting for treatment to improve functional outcomes and quality of life.

Thanks for listening!

## **References**

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