

Learning the Dynamics of Human Walking

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What are we learning when we learn to walk? What is a mature gait pattern? How do we walk when the dynamic resources we use have been changed? How can the answers guide rehabilitation? The answers to these questions and more will be addressed in this presentation. I will present evidence that in learning to walk children discover a state dependent forcing that allows for passive energy conservation in the spring and pendular resources available through soft and hard tissues. The emergent motor patterns are largely determined by effective and efficient use of these dynamic resources, by the functional anatomy, and the task at hand. When resources are changed as a result of insult or injury to neurological or anatomical systems, walking patterns emerge that are predictably based on the changed resources. Results of interventions that are designed to address changed resources will be presented. Recent innovations in the delivery of those interventions will be discussed.