

# [Chapter 24-motor control and motor learning](https://assignbuster.com/chapter-24-motor-control-and-motor-learning/)

Principles of Motor Learning\*Motor learning: learning and refinement of motor skills over time
-Takes place in a complex interaction between child and environment
-Refers to the intrinsic process that accompanies a child experiencing and participating in meaningful activities and the long-lasting changes in motor performance
-Based on principles of neuroplasticityNeuroplasticity\*The ways the brain can change by laying down new circuitry and making new neural connections
-Occur when the brain receives new information/stimuli
-In response, permanent
changes happen in
the brain.
-Learning requires feedback, feedforward, practice, modeling and transfer of learning. ONCHAPTER 24-MOTOR CONTROL AND MOTOR LEARNING SPECIFICALLY FOR YOUFOR ONLY$13. 90/PAGEOrder NowPrinciples of Motor Control\*Motor control: the ability to regulate or direct the mechanisms essential to movement
-Role of CNS, techniques to quantify movement, nature and quality of the movement
-Addresses posture, mobility, and fine motor and gross motor skills; explores motor development throughout the lifespan
-Supports a dynamic systems approachPrinciples of Motor Control (cont'd)\*Dynamic systems theory: interplay between the neuromuscular system, the environment, cognition, and the intended task
\*Change in one system affects the others.
\*One task involves the dynamic interaction of many systems (e. g., visual, proprioceptive, tactile).
\*To engage, one must have an intent to move (guided by a cognitive process).
\*Change leads to neuroplasticity. Pillars of Motor Control\*Interventions are meaningful.
-Children engage more and for longer when things
are meaningful.
\*Interventions closely mimic occupations of childhood.
\*Intervention occurs in the
\*setting similar to the natural
\*context where the
\*occupation takes place. Applying Motor Learning to Practice\*Motor learning concepts can inform occupational therapy intervention.
-Use the concepts in a meaningful, occupation-based activity within the natural context. Feedback\*Informs the learning about progress in acquiring new motor skills
\*Before (feedforward) and after (feedback) performance
\*Intrinsic (within the child)
\*Extrinsic (provided by an external source)
\*Verbal and nonverbal
\*Consider type, timing, motor outcomes. Feedback (cont'd)\*Feedforward: adjustments in anticipation of the movement required
-OT may help by discussing the movement required before doing it
\*Feedback: adjustments based on performance
-OT may help by asking the child to reflect on the movement
\*Intrinsic feedback: information a child received following a practice attempt (nervous system processes)
\*Extrinsic feedback: provided by OT, others. Helpful in identifying errors in movementTiming of Feedback\*May be provided in various ways:
-Concurrent: during the movement
-Immediate: just following
-Terminal: right at the completion
-Delayed: after the movement has been completed and a time interval has transpired
\*Sporadic (following some but not every trial) feedback was found to be more beneficial.
\*Children respond to consistent extrinsic feedback at the beginning of a new skill, and then internalize it after practice. Modeling or Demonstration\*Providing visual information about how to perform a skill or task
-Most effective when presented in natural context
\*Demonstrations are best if provided:
-Before practicing skill and in early stages of learning
-Slowly, without verbal feedback
-After emphasizing critical cues
-Throughout practice as frequently as is helpfulVerbal Instruction\*Can be used to teach children and youth motor skill
-Practice is typically preceded or accompanied by verbal instruction or cues.
~Brief, 1-3 words
-Once the child completes key components, the OT may provide additional verbal instruction to refine movement.
-Providing repetitive practice
with the same verbal instruction
reinforces learningKnowledge of Results and Knowledge of Performance\*Knowledge of results (KR)
-Information provided from external source about the outcome or end result
-Helps children retain newly learned motor skills
\*Knowledge of performance
-Providing information about the nature or characteristic of the movement
-Helps children understand how they could adjust or change movementsPractice and Repetition\*Repetition of motor tasks enhances brain development.
\*Blocked practice: repeating the similar movements with short rest breaks
\*Distributed: repetition of different skills spread over the course of the intervention with rest breaks
\*Variable/random: practice of many different skills with periods of restTransfer of Learning/Generalization\*Applying past learning to new situations
-Works best when client has opportunity for mastery of foundational skills first
-Then you incorporate different skills. Motor Control Principles in Practice\*Motor memory includes registration of the influence and the internal feedback from the motor output back into the sensory system.
-After this link is when learning occurs.
-Motor control is best addressed by engaging the child in meaningful activities that closely mimic occupations of childhood and occur in natural context. Degrees of Freedom\*Joints vary in the amount of movement allowed, may be difficult for a child to control the movements
-For fine motor tasks, a child must control the shoulder, wrist, elbow, and hand joints.
~To increase control, the degrees of freedom can be limited by holding or stabilizing the jointCoordination and Timing\*Coordination: activation of specific muscles together
-May be addressed by beginning with gross movements and progressing to more precise movements during intervention
-Also by encouraging postural stability during tasks
\*Timing may be promoted by including music, rhythmic songs, or counting. Strength and Muscle Tone\*Strength: ability to contact a muscle or muscle group against gravity and resistance
-Children with motor deficits may have decreased strength and endurance, impacting occupational participation.
\*Muscle tone: amount of tension in resting muscle or muscle group
-Discrepancies interfere with occupations.
-OT may focus on helping the child engage, allow him or her to refine motor skills