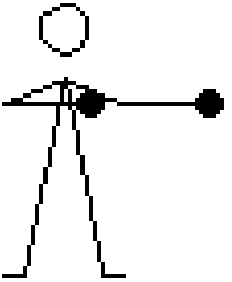
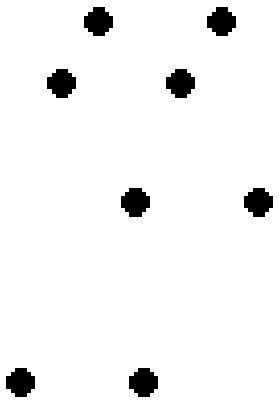


Coordination Exercises



Definition of coordination Exercises:

- It is the ability to execute smooth, accurate, controlled motor responses (optimal interaction of muscle function).
- Coordination is the ability to select the right muscle at the right time with proper intensity to achieve proper action.
- Coordinated movement is characterized by appropriate speed, distance, direction, timing and muscular tension.

- It is the process that results in activation of motor units of multiple muscles with simultaneous inhibition of all other muscles in order to carry out a desired activity.

The ability to execute smooth accurate motor response depends on:

- Deep sensations.
- Vision.
- Vestibular system and cerebellum.
- Motor system.
- Flexibility and ROM.

Importance of the cerebellum in coordination:

- The cerebellum is the primary center in the brain for coordination of movement.



Components of coordinated movement:

- **Volition**: is the ability to initiate, maintain or stop an activity or motion.
- **Perception**: in tact proprioception and subcortical centres to integrate motor impulses and the sensory feedback. When proprioception is affected it is compensated with visual feedback.
- **Engramformation**: is the neurological muscular activity developed in the extrapyramidal system. Research proved that high repetitions of precise performance must be performed in order to develop an engram.

Types of coordination:

1) Fine motor skills:

- Require coordinated movement of small muscles (hands, face).
- Examples: include writing, drawing, buttoning a shirt, blowing bubbles

2) Gross motor skills:

- Require coordinated movement of large muscles or groups of muscles (trunk, extremities).
- Examples: include walking, running, lifting activities.

3) Hand-eye skills:

- The ability of the visual system to coordinate visual information. Received and then control or direct the hands in the accomplishment of a task .
- Examples : include catching a ball, sewing, computer mouse use.



Causes of coordination impairments :

- Uncoordinated movement or coordination impairment is known medically known as ataxia. There are a number of known causes for ataxia. They range from chronic conditions to sudden onset. However, most conditions will relate to damage or degeneration of the cerebellum.
- Injury, disease, lesion of cerebellum and basal ganglia (ataxia, parkinsonism)
- Alcohol/drug intoxication
- Poisoning
- Infectious diseases

General principles of coordination exercises involve:

1. Constant repetition of a few motor activities
2. Use of sensory cues (tactile, visual, proprioceptive) to enhance motor performance
3. Increase of speed of the activity over time
4. Activities are broken down into components that are simple enough to be performed correctly.

5. Assistance is provided when ever necessary.
6. The patient there fore should have a short rest after two or three repetitions, to avoid fatigue.
7. High repetition of precise performance must be performed for the engram to form.

8. When ever a new movement is trained, various inputs are given, like instruction(auditory), sensory stimulation(touch) ,or positions in which the patient can view the movement (visual stimulation) to enhance motor performance.

Therapeutic exercises used to improve coordination:

- Frenkel's exercises
- Proprioceptive Neuromuscular Facilitation
- Neurophysiological Basis of Developmental techniques
- Sensory Integrative Therapy

FRENKEL'S EXERCISES

- Frenkel aimed at establishing voluntary control of movement by the use of any part of the sensory mechanism which remained intact, notably sight, sound and touch, to compensate for the loss of kinaesthetic sensation.
- The process of learning this alternative method of control is similar to that required to learn any new exercise, the essentials being: Concentration of the attention, Precision and Repetition

- The ultimate aim is to establish control of movement so that the patient is able and confident in his ability to carry out these activities which are essential for independence in everyday life.

Frenkel's Exercises principles :

- Start unilateral then bilateral.
- Start fast then slow movement.
- Start by proximal then by distal joints.
- Start by symmetrical then asymmetrical movement.
- The patient must see the movements and verbal feedback is very important.