I. Overview

II. Functional Motor Levels
   a. Thoracic-High Lumbar
   b. Low Lumbar
   c. Sacral
      i. High Sacral
      ii. Low Sacral

III. Expected Longterm Walking Ability
   a. Walking ability depends on the functional motor level
      i. Thoracic-high Lumbar level
         1-5% Community ambulators
         10-15% Household ambulators
         80% Non ambulators
      ii. Low Lumbar Level
         80% Community ambulators
         20% Household/nonambulators
      iii. Sacral Level
         94% Community ambulators
         6% Household/ nonambulators
   b. Walking ability is also affected by comorbidities
      i. Mental retardation
      ii. Obesity
      iii. Balance
      iv. Spasticity
      v. Contractures

IV. Use Of Gait Analysis
   a. Augments clinical assessment
   b. Provides an objective evaluation of gait patterns
   c. Brace selection
   d. Surgical planning
   e. Useful
      i. Low Lumbar Level Lesion
      ii. Sacral Level Lesions
V. Typical Gait Patterns
   a. Muscle weakness associated with the lesion determines the compensatory gait pattern.
      i. Pelvis and Hip
      ii. Knee and Ankle
      iii. Trunk
      iv. Crutch Walking
      v. Energy expenditure

VI. Deformities affecting Gait
   a. Increased Hip Flexion/Contracture
      i. Treatment recommended >20 degrees
         Hip Flexor Lengthening
         Release of Tensor Fascia
         Transfer the Sartorius from ASIS to AlIS
         +/- proximal release rectus origin
         +/- intrapelvic lengthening of iliopsoas
   b. Hip Dislocation and Subluxation
      i. Low Lumbar Level
         Do not relocate the hip due to high recurrence
         Address contractures with lengthening
         Adductor lengthening
         Intrapelvic iliopsoas lengthening
         Valgus Osteotomy if necessary
         Femoral derotation if indicated
      ii. Sacral Level
         Walk without support dislocation leads to major asymmetry
         Relocate hip
         Femoral and acetabular surgery
         Soft tissue rebalancing
   c. Increased Knee Flexion/Contracture
      i. Ground Reaction Force AFO
      ii. Judicious Hamstring Lengthening (if tight)
      iii. Capsulotomy posterior Knee capsule
      iv. Guided growth
   d. Rotational malalignments
      Lead to Valgus Knee Stress
      i. Pelvic obliquity/rotation
         Crutches
      ii. Excessive Hip internal rotation during stance
         Derotational osteotomy femur
      iii. External tibial torsion > 20 degrees
         Derotational osteotomy tibia
      Internal tibial torsion
      i. Does not lead to abnormal knee stress
ii. Leads to intoeing
Derotational osteotomy tibia


References


