Pediatric Limp

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Introduction

- Limping is a disruption of normal locomotion
- Accounts for 4 per 1000 visits to pediatric emergency department
- Can be caused by both benign and life-threatening conditions

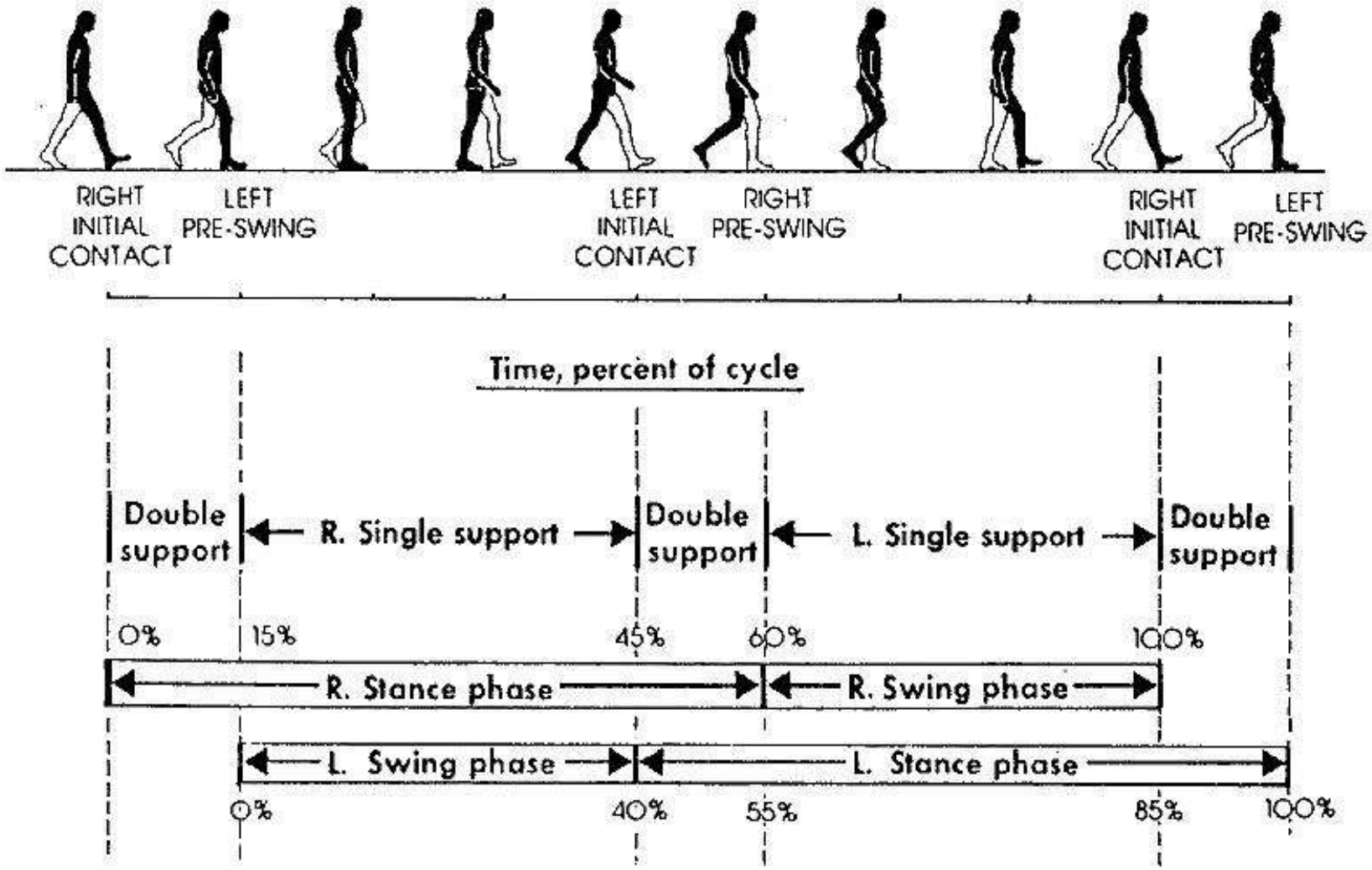
Introduction

- Management can range from sterile neglect to major surgery
- Most are caused by trauma or benign self-limiting conditions
- Detailed history, focused physical exam, simple panel of testing can accurately categorize limp

Overview

- Brief gait overview
- Types of gait impairment
- Describing limp
- Categories of etiology
- The chart
- Basic workup panel
- Case studies
- Conclusion

Brief gait overview


RIGHT INITIAL CONTACT
LEFT PRE-SWING
LEFT INITIAL CONTACT
RIGHT PRE-SWING
RIGHT INITIAL CONTACT
LEFT PRE-SWING
Time, percent of cycle
Double support
R. Single support
Double support
L. Single support
Double support
0%
15%
45%
60%
100%
R. Stance phase
R. Swing phase
L. Swing phase
L. Stance phase
0%
40%
55%
85%
100%

Types of gait impairment

Types of gait impairment

All gait impairments fall into 5 main categories:

1. Anatomical deformity
2. Antalgia
3. Stiff joint
4. Neuromuscular weakness
5. Limb-length discrepancy

Anatomical deformity

- Generally easily visible to the observer
- Most commonly involve bowing of shins
- Depending on abnormality can alter normal gait in many ways

Antalgia

- Characteristically causes shortened stance on affected side
- Patient quick to unload weight off affected site

Stiff joint

- Loss of fluidity of swing phase
- May look normal in stance
- Circumduction or hip-hiking common

Neuromuscular weakness

- Most complex source of limp
- Requires close observation of muscular activation and knowledge of compensation strategies
- Common types include Trendelenberg (gluteus medius), scissoring (adductors), steppage (tibialis anterior)

Limb-length discrepancy

- In pediatrics causes teeter-tottering (trunk sway)
- Common cause is hemihypertrophy
- Discrepancy may static or dynamic

Describing limp

Describing limp

- More important to use clear language than correct terminology
- Knowing basic musculoskeletal terms will be helpful

Describing limp

- Have child walk back and forth down hallway
- Try to distract child to bring out true nature of limp
- Unhurried observation is key to success
- Unwillingness or inability to walk is significant

Describing limp

- Observe each part (foot, ankle, leg, knee, thigh, hip) in turn, comparing side to side

- Be mindful of range of motion, weight acceptance, cadence, fluidity, coordination, postural alignment

Categories of etiology

Categories of etiology

Six major categories:

1. Infectious
2. Developmental
3. Inflammatory
4. Neuromuscular
5. Traumatic
6. Neoplastic

Categories of etiology

Categories can further be broken down based on age of child:

Toddler (age 1-3)

Child (age 4-10)

Adolescent (age 11-15)

Categories of etiology

- History should be geared towards placing limp into one of these categories

- Sometimes overlooked questions include:
  - Recent illness
  - Recent antibiotics
  - Family history of connective tissue disorders, IBD, neuromuscular disorder
  - Associated symptoms (fevers, rash, voiding or stool problems, etc.)

The Chart

Toddler (1-3 years)

Bugs	Deformity	Inflamed	NMSK	Trauma	Tumors
Septic arthiritis Osteo-myelitis	Hip dysplasia Club foot	Transient synovitis of hip JRA	Cerebral palsy Muscular dystrophy	Toddler's fracture Child abuse	Leukemia

Child (4-10 years)

Bugs	Deformity	Inflamed	NMSK	Trauma	Tumors
Septic arthiritis Osteo-myelitis	Hip dysplasia Club foot Discoid meniscus Leg length discrepancy	Transient synovitis of hip JRA	Cerebral palsy Muscular dystrophy Charcot-Marie-Tooth disease	Fracture Legg-Calves-Perthes disease	Osteoid osteoma Ewing's sarcoma Leukemia Eosinophilic granuloma

Adolescent (11-15 years)

Bugs	Deformity	Inflamed	NMSK	Trauma	Tumors
Septic or gono-coccal arthiritis Osteo-myelitis	Hip dysplasia Tarsal coalition Osteo-chondritis dessicans	JRA	Herniated lumbar disc Spondylo-listhesis Charcot-Marie-Tooth disease	SCFE Overuse syndrome	Osteogenic sarcoma Ewing's sarcoma Osteoid osteoma

Basic workup panel

Basic workup panel

Plain films of joint or areas in question

CBC

ESR

Basic workup panel

- Proper x-rays should include AP and lateral views
- Long bones should visualize entire shaft and joints at both ends
- Comparison views of unaffected side are also helpful

Basic workup panel

- If specific etiology is suspected, may add to basic panel (i.e. RF and ANA in juvenile rheumatoid arthritis)
- May also perform arthrocentesis if specific joint is in question

Case studies

Case 1

13-year old boy limping for 6 months

Case 1

Case 2

8-year old girl limping for 3 days

Case 2

Case 3

22-month old boy limping for 1 week

Case 3

Case 4

7-year old boy limping for 4 months

Case 4

Case 5

11-year old boy who “walks funny”

Case 5

Conclusion

Conclusion

- Pediatric limp is difficult and complex entity
- Proper analysis of gait and detailed history can help categorize condition
- Basic panel of x-ray, CBC, ESR will oftentimes support category or make diagnosis

References

- Images courtesy of Google Image Search
- Clark, Mark C. *Approach to the child with a limp.* Up-to-date. Sept 2005.
- Godley, David R. *A practical approach to the child who limps.* Contemporary Pediatrics. Feb 2002.