Lower Extremity Orthoses: A Primer

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Outline

- Define orthosis
- Common reasons to use an orthosis
- Different types of orthosis
  - Design
  - Rationale and indications
- Review additional considerations
What is an orthosis?

- Externally applied device that is designed and fitted to the body to achieve one or more of the following goals:
  - Control biomechanical alignment
  - Correct or accommodate deformity
  - Protect and support an injury
  - Assist rehabilitation
  - Reduce pain
  - Increase mobility
  - Increase independence
Why do YOU care?

- Your kids may have orthoses!
  - Familiarity of language
  - General understanding of rationale
  - Be able to help take them off/on
Get ready for acronyms!!

- UCBL
  - University of California Biomechanics Laboratory
- SMO
  - Supramalleolar orthosis
- AFO
  - Ankle foot orthosis
- KAFO
  - Knee ankle foot orthosis
- FRAFO
  - Floor reaction ankle foot orthosis
Types of orthoses

- Foot orthosis
- UCBL
- SMO
- Posterior Leaf Spring AFO
- Hinged AFO
- Solid AFO
- Floor Reaction
- KAFO
Reasons to use an orthosis²

- Improves stability during walking by blocking problematic joint motions
- Improve foot clearance (not catching feet on the floor) by assisting joint motions
- Improves efficiency of gait pattern to minimize energy expenditure
- Preventing deformity and secondary orthopedic issues by providing optimal skeletal alignment
- Preventing contracture (muscle shortening) by holding a joint in position where the muscle is lengthened
Foot Orthosis (FO)^3

- **Indication:**

- Arch support in patients who are pronated (flat feet)
UCBL³

- **Indications:**
  - Arch and heel support
  - Higher level of support than foot orthoses
SMO³

- Can help control pronation (flat feet) AND supination (arches too high)
- Relatively rigid control, but ankle and knee motion still allowed
Posterior Leaf Spring AFO\textsuperscript{2,3}

- Controls foot drop (toe pointing down)
- Allows the ankle to come forward when the foot is on the ground during walking
- Helps push foot off the floor before it swings through
Hinged AFO$^{2,3}$

- Very versatile design; can add stops or springs to block or assist many different motions at ankle or knee.
- Commonly used to prevent walking up on toes, while still allowing the ankle to come forward.
Solid AFO\textsuperscript{2,3}

- Locks ankle in a fixed position
- Prevents walking on toes
- Prevents “crouch gait” (hips and knees bent, ankle forward)
- Prevents drop foot
- Prevents hyperextension at knees
- Can be used at rest to prevent calf muscle shortening
Floor Reaction AFO\textsuperscript{2,3}

- Designed to prevent crouch gait (knee buckling)
KAFO\textsuperscript{2,3}

- Commonly used in paralysis or profound weakness
- Locks at knee joint keep it straight when upright, but unlock to allow sitting
- Typically used alongside an assistive device (crutches or walker)
- Can be used at rest to prevent calf and hamstring muscle shortening
Additional considerations³

- Possible issues
  - Overbracing
  - Underbracing
  - How long do they wear the brace for?
    - Lifespan of brace
    - Fit issues
    - Day vs. night use
Movie time!

https://www.youtube.com/watch?v=sPctE4DFpdU
THANKS!

Questions?
References

