An Approach to Foot Drop for Primary Care Physicians

What is foot drop?

Foot drop refers to weakness of the ankle dorsiflexors leading to an inability to lift the forefoot. This can lead to functional limitations with gait, mobility, and can be associated with chronic pain.

What are the causes of foot drop?

Most of the time, foot drop is the result of a neurological process, but a ruptured tendon involved in dorsiflexion can also be a cause. Neurological causes include the following:

- Compression of:
    - the peroneal nerve near the fibular head (and less commonly in other locations)
    - the L5 nerve root near the spine
- Direct trauma of the peroneal nerve or its branches, especially those injuries that lead to fractures, dislocations, or deep lacerations.
- Compartment syndrome in the leg leading to nerve ischemia
- Neurological disorders such as Charcot-Marie-Tooth, amyotrophic lateral sclerosis, or multiple sclerosis
- A systemic condition leading to nerve damage, such as diabetes or vasculitis

How do you evaluate a patient with foot drop?

History:

- The patient may complain of dragging their toes, problem walking or climbing stairs, or frequent tripping and falling.
- There may be numbness in the anterolateral leg, dorsum of the foot, and/or 1st toe webspace.
- Look for clues to the etiology:
    - Presence of trauma
    - Presence of back pain and/or sciatic symptoms
    - Factors that can lead peroneal nerve compression such as rapid weight loss, habitual leg crossing, and prolonged squatting.
    - Signs and symptoms of systemic conditions such as vasculitis or diabetes
    - Presence of other neurological symptoms not limited to the distribution of L5 or peroneal nerve

Physical exam:

- A thorough neurological exam of the lower extremity is required including an assessment of all dermatomes, myotomes, reflexes, and upper motor neuron signs.
- Pay particular attention to peroneal nerve function:
    - **Motor**: assess for weakness in ankle dorsiflexion (deep branch), eversion, and plantarflexion (superficial branch)
    - **Sensory**: assess for decreased sensation of anterolateral leg, and dorsum of foot (superficial branch), as well as 1st webspace (deep branch)

- The following chart of motor functions helps to differentiate between peroneal dysfunction and L5 radiculopathy:
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Weak	Peroneal	L5
Dorsiflexion (Deep peroneal)	Yes	Yes
Eversion (Superficial peroneal)	Yes	Yes
Inversion (Tibial)	No	Yes
Hip abduction (Gluteal)	No	Yes
Knee flexion (Sciatic)	No	Yes (medial hamstrings)

Investigations:

- Electromyography/Nerve Conduction Studies (EMG/NCS) should be ordered approximately **3-4 weeks after the onset of injury**. If done too early, significant pathologies may be missed.
- Imaging studies may be ordered to rule out a compressive lesion:
    - If an L5 lesion is suspected, a spine MRI should be ordered.
    - If a peroneal lesion is suspected, an MRI of the leg (or an ultrasound if the suspected mass is superficial) should be obtained.
- Serological lab tests should be ordered based on clinical suspicion of a systemic metabolic or autoimmune process.

How should you manage a patient with food drop?

- Conservative therapy may be attempted in most patients as many cases will improve over time. These include:
    - Protect the peroneal nerve from further injury – padding around the fibular head, avoid leg crossing or prolonged squatting.
    - Physical therapy to maintain ankle and foot mobility and to prevent contractures
    - Electrostimulation of the affected muscles may help with recovery of function
    - Use of ankle foot orthosis to help with foot clearance during ambulation
- Surgical referrals are indicated in the following situations:
    - If the foot drop developed acutely following a significant injury where a nerve transection is suspected, the patient should be referred urgently to a surgical center specializing in peripheral nerve injuries.
    - If there is evidence of severe nerve damage on EMG/NCS and/or lack of any functional recovery at 3 months, these patients should be referred to a surgical center specializing in peripheral nerve injuries within 3-4 months. They may be candidates for nerve transfer surgery if referred early.
    - If an obvious compressive mass is identified, it may be amenable to surgical excision
    - If patient continues to have functional deficits after conservative therapy, they may be referred for consideration of tendon transfer surgery (posterior tibial to lateral cuneiform or cuboid) to restore dorsiflexion

Summary: Foot drop refers to a weakness of the ankle dorsiflexors leading to an inability to lift the forefoot. The most common causes are injuries to the peroneal nerve or an L5 radiculopathy. The

evaluation should focus on identifying which nerve structure is injured, the etiology of nerve injury, and to determine the extent of dysfunction. Most patients will improve with conservative therapy, but certain scenarios require timely surgical referral such as when a severe injury to the nerve is suspected.

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