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LETTER TO THE EDITOR

A Case of Ascending and Descending Stair-Specific Dystonia

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Task-specific dystonia is a form of focal dystonia occurring only during specific motor tasks.[1] Dystonia is a movement disorder distinguished by sustained or intermittent muscle contractions causing repetitive, abnormal movements or positions. The dystonic movements can be initiated or worsened by voluntary action and are often associated with overflow activation. The movements are typically patterned, tremulous, or twisting.[2,3] While more commonly confined to a cranial or brachial distribution, task specific dystonia has been described in the legs.[4] Reports of isolated task-specific dystonia with stair descent are also available.[3] These reports described dystonia specific to stair descent, which was notably absent with stair ascent. Unlike previously reported cases, the patient described here exhibited dystonic leg movements during stair ascent in addition to stair descent.

CASE REPORT

A 59-year-old right-handed woman presented with a one year history of involuntary abnormal right leg movements associated with ascending and descending stairs. The onset of the movements was rapid, but there had been no progression over the one year of her symptoms. She described the movements as a "hitch" or a feeling of getting stuck mid-stride. She felt unsteady but denied any falls or need for assistance. She denied pain or sensation of stiffness during these movements. She felt no urge or relief with movement. The movements occurred with every step on a staircase, regardless of step height. The movements occurred with no other activity. She is not aware of any alleviating maneuvers such as a sensory trick. Physical therapy has not been helpful. She has never tried medications for the movements. She has no history of leg trauma, weakness, or other neurologic symptoms. She has no family history of neurologic disease, including dystonia. MRI of the brain showed mild microvascular white matter changes that were not felt to be contributory to her symptoms. Serum studies of B12, thyroid stimulating hormone, ceruloplasmin, and copper levels were unremarkable prior to presentation to our office.

On exam, during performance of rapid movements of the hand, she had subtle mirrored movements seen in the inactive hand. She had no rigidity. Gait on a level surface was normal. The rest of her neurological exam was normal, including no cerebellar nor bradykinetic abnormalities. During stair descent, there was exaggeration of right hip flexion with external hip rotation and ankle dorsiflexion, consistent with previous reports of task-specific stair dystonia.[3] However, with ascending stairs, there was also exaggeration of right hip and knee flexion compared to the left leg, with a slight delay in the placement of the right foot on the next step (Supplementary Video 1 in the online-only Data Supplement). These movements were not seen when she ascended and descended stairs backwards. The patient provided informed consent regarding publication of the case and the associated video.

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DISCUSSION

While the genesis of focal dystonia is unknown, it is felt to stem from highly learned and highly stereotyped activities. Menon et al.[3] propose that descending stairs is more complex and difficult, possibly making it more susceptible to task specific dystonia resulting from a sensorimotor defect. This complexity may be a function of the need for tighter control of angular momentum with stair descent.[5] Ascending stairs is also stereotyped and repetitive, thus making it susceptible to developing a task specific dystonia. Kinesiology studies have demonstrated that, in a frontal plane, there is a greater degree of angular momentum in stair ascent.[5]

In both phases of stair ambulation, the dystonic movement occurs in the non-weight-bearing leg. The importance of sensory input in dystonia physiology is well described. We propose that the non-weight-bearing leg is more susceptible to dystonic posturing in the absence of sensory input from the stair itself or from muscle spindles activated during weight-bearing, similar to the removal of a sensory trick.[6]

Additionally, during performance of rapid hand movements, subtle mirrored movements were seen in the inactive hand. These arm movements were not entirely consistent with overt dystonic posturing, but mirror movements have been identified in a number of movement disorders, including focal dystonia. We suspect that while there was no obvious dystonia of the hands/arms, the presence of these movements is consistent with her greater dystonic phenomenology.[7]

The weight-bearing muscles active in ascending versus descending stairs are similar, but the motor activity in the non-weight-bearing legs is different. Unlike in descent, while ascending, one must actively flex the hip and knee while dorsiflexing the ankle to avoid tripping on the step in front of it. In our case and in the previously described cases of dystonia with stair descent, dystonic activity resulting in hip flexion is consistent.[3] During ascent in our case, this manifests as increased hip flexion and difficulty placing the leg down on the next step. The dystonic pattern in our patient's knee was variable, with dystonic knee flexion seen on ascending and knee extension seen on descending. These different patterns of dystonic activation suggest that the dystonia is task-specific, as the pattern of activity seems to be different to each individual phase of stair ambulation. The unilateral nature of this dystonia is unexplained. While task-specific dystonia of the arm typically affects the dominant arm responsible for the task, stair climbing is a bilateral activity. While the unilateral nature of this phenomenon still begs more research and explanation, the unilateral nature of this stair-specific dystonia is consistent with previously published reports of leg dystonia observed on stair descent.[3]

In conclusion, we report a case of task specific dystonia manifested on both stair ascent and descent. While dystonia with descending stairs is better described, we urge clinicians to watch closely for patterns of dystonia on stair ascent in these cases. This coincidence on both phases of climbing stairs suggests that the activity may be a trigger for task-specific dystonia; however, different patterns of dystonic muscle activity may suggest that the two tasks are sufficiently different that one dystonic posture may occur in the absence of the other. However, dystonia isolated to stair ascent remains to be described.

Supplementary Video Legends

Video 1. The patient is shown ascending and descending stairs, demonstrating dystonic right leg posturing on both ascent and descent. In the second part of the video, she demonstrates no dystonia during ambulation on level ground.

Supplementary Materials

The online-only Data Supplement is available with this article at https://doi.org/10.14802/jmd.18057.

Conflicts of Interest

Dr. Ratliff has served as a consultant for UCB Pharmaceuticals and Retrophin, Inc. He has received speaker honoraria from Teva and US World Meds, LLC.

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