

> **THE PATIENT**
31-year-old baseball coach

> **SIGNS & SYMPTOMS**
– Muscle spasms in right arm when throwing a baseball
– Twitches and involuntary muscle contractions in upper arm

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> **THE CASE**

A 31-year-old right-handed college baseball coach presented to his family physician (FP) with concerns about the “yips” in his right arm. His ability to throw a baseball had been gradually deteriorating. Involuntary upper right arm muscle contractions and spasms, which began intermittently when he was a teenager, were now a real problem for him as an adult. (See the video at: <http://bit.ly/2nt10k9>.) The patient was having difficulty rolling a baseball underhand to players as part of infield practice and he was experiencing muscle spasms when lifting his right arm over his head. “Twitches” in the patient’s upper arm were making drinking difficult, but he had no problems feeding himself, writing, or performing other basic activities of daily living.

The patient experienced the same symptoms whether it was baseball season or not. He hadn’t noticed a change in symptoms with caffeine and denied use of any other stimulants in the last 4 years. His symptoms didn’t improve or worsen with greater or lesser quantity or quality of sleep or when he concentrated on stifling the involuntary movements. He had attempted to learn to throw left-handed to overcome the impairment, but was concerned that the same problem would occur in his left arm.

The patient had previously worked with a sports psychologist and hypnotherapist to overcome any potential subconscious performance anxiety, but this hadn’t helped. Stretching and strengthening with a physical therapist and numerous sessions with an acupuncturist hadn’t helped either. Despite this, he believed the problem to be primarily psychological.

■ **The patient’s history included** mild attention deficit disorder and exercise-induced asthma; his family history was negative for any movement or psychiatric disorders. He had 2 dislocation repairs on his left, non-throwing shoulder in his early twenties. His medications included fluticasone-salmeterol twice daily and albuterol, as needed.

The patient denied myalgia or arthralgia, decreased passive range of motion, shoulder or arm weakness, swelling, or muscle atrophy. He also didn’t have paresthesias in his right arm or hand, a resting tremor, difficulty moving (other than drinking from a cup), difficulty moving other extremities, dizziness, imbalance, or seizures.

The patient’s vital signs were normal. He had full range of motion and 5 out of 5 strength without pain during right shoulder abduction, external and internal rotation, an empty can test, a lower back lift off (Gerber’s) test, and a test of bicep and tricep strength, along with negative Neer and Hawkins tests.

There was no evidence of muscle wasting or asymmetry in the bilateral upper extremities. The patient’s deep tendon reflex grade was 2+ out of 4 in both of his arms. He didn’t have a sensory deficit to light touch in areas of C5 to T1 and he had normal cranial nerves II to XII. He had normal rapid alternating movements, heel-to-shin testing, and finger-to-nose testing, as well as a normal gait and Romberg test.

■ **The patient provided a video** showing the abnormal involuntary flexion of his shoulder when attempting to throw a baseball. (To see the video, go to <http://bit.ly/2nt10k9>.)

THE DIAGNOSIS

The patient's FP was aware of the "yips," a condition that is commonly viewed as psychological or related to performance anxiety. (The "yips" are colloquially known as "Steve Blass Disease"—named after a Pittsburgh Pirates pitcher who suddenly lost the ability to control his pitches.¹) But based on the patient's clinical presentation and history of seeing a number of mental health care providers—in addition to his worsening symptoms—the FP ordered magnetic resonance imaging (MRI) of the brain. The MRI turned out to be unremarkable, so the patient was referred to Neurology.

In the general neurology clinic, a diagnosis of Wilson's disease (a condition that leads to excess copper deposition in multiple organ systems, including the nervous system) was considered, as it can cause symptoms similar to those our patient was experiencing. However, a complete blood count, complete metabolic panel, antinuclear antibody test, ceruloplasmin test, and copper level were all normal, effectively ruling it out. An MRI of the cervical spine showed mild to moderate right foraminal stenosis at C3-4 and C5-6, but this did not explain the patient's symptoms.

A diagnosis of paroxysmal exercise-induced dystonia was also considered at the time of the initial work-up, as our patient's symptoms were most pronounced during physical activity. But this condition usually responds to antiepileptics, and carbamazepine and phenytoin were each tried for multiple months early in his evaluation without benefit.

■ 3 factors led to a diagnosis of focal limb dystonia: Only our patient's right arm was affected, his laboratory and imaging work-ups were negative, and he didn't respond to antiepileptic treatment. Characterization of a movement disorder is based upon phenomenology. In this case, the patient had sustained abnormal posturing at the shoulder during right upper limb activation, which was only triggered with specific voluntary actions. This was consistent with dystonia, a movement disorder characterized by sustained or intermittent muscle contractions causing abnormal movements and/or postures—often initiated or worsened by voluntary action.²

VIDEO

Involuntary muscle spasms occurred whenever this patient threw a baseball



IMAGE COURTESY OF: KYLE BRADFORD JONES, MD, UNIVERSITY OF UTAH, SALT LAKE CITY

To see the video of the patient's movement disorder, go to <http://bit.ly/2nt10k9>.

DISCUSSION

The "yips," or intermittent, transient tremors, jerks, or spasms³ that are seen in athletes, are well-documented in the lay press, but haven't been significantly addressed in the medical literature.⁴ Stigma surrounding the condition among athletes likely leads to under-reporting. Athletes typically experience yips with fine motor movements, such as short putts in golf and pitching in baseball. In fact, while the majority of the medical literature on yips revolves around golfers, many talented baseball players have had their careers altered by the condition. The yips may also affect movements in sports like darts, cricket, table tennis, and billiards.

In 1984, dystonia was defined as a disorder of sensorimotor integration that results in co-contraction of agonist/antagonist muscles, and may be characterized by state dependence (exacerbation with specific activities) or sensory tricks (amelioration with specific types of sensory input).⁵ In 2013, the definition was revised to remove "co-contraction" from the definition because phenomenology alone is sufficient to make the diagnosis.¹

Many athletes and sports fans believe the yips are caused by performance anxiety or related phobias, but evidence suggests that

➤ Athletes typically experience the "yips" with fine motor movements, such as short putts in golf or pitching in baseball.

many athletes with the movement disorder may actually have focal limb dystonia.^{6,7} The yips can, however, lead to performance anxiety,³ but there has been no difference noted between the anxiety level of golfers with or without the yips.⁷ Psychological treatment approaches are commonly employed, but surface electromyograms have shown abnormal co-contraction of wrist flexor and extensor muscles in 5 out of 10 golfers with the yips (but 0 of those without) while putting—which is consistent with focal limb dystonia.⁸

Botulinum toxin injections are Tx of choice, but can cause weakness

Muscle relaxers, such as baclofen and benzodiazepines, as well as dopamine antagonists, can ameliorate dystonia.⁹ Focal limb dystonia may also respond to the antispasmodic trihexyphenidyl, but the dose must often be limited due to adverse effects such as nausea, dizziness, and anxiety.¹⁰

Botulinum toxin injections have proven effective for focal limb dystonia¹¹ and are considered the treatment of choice. However, there are few reports on their use in athletes, where the adverse effect of weakness could affect performance. One case report also showed improvement of yips with acupuncture, although this has not been extensively studied.¹²

■ **Our patient** didn't respond to low-dose (2 mg twice a day) trihexyphenidyl. Tetrabenazine, a dopamine depletor frequently used for hyperkinetic disorders, was not effective at 25 mg taken prior to coaching sessions. Higher doses of an anticholinergic could have been effective, but the patient declined our recommendation to pursue this (or botulinum toxin

injections). He decided instead to train himself to use his left arm while coaching.

THE TAKEAWAY

Athletes who play sports that require precision movements commonly develop the yips. While the prevailing theory among athletes is that this is a psychological phenomenon, evidence shows that this may in fact be a neurologic focal dystonia caused by repetitive use. Greater awareness of yips as a possible organic, treatable neurologic condition is needed in order to stimulate more research on this topic.

JFP

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➤ There are few reports of the use of botulinum toxin injections in athletes, where the adverse effect of weakness could affect performance.



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