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## Improvement of Gait Disturbance in Piriformis Muscle Syndrome through Botulinum Toxin Injection

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**Introduction**

Piriformis muscle syndrome is a disease in which sciatic nerve is irritated around the piriformis muscle, causing direct muscle pain or sciatica. The main treatment is conservative therapy such as medication and exercise, botulinum toxin may also be injected for diagnostic and therapeutic purposes. In this case, sciatica and gait disturbance were caused by piriformis muscle hypertrophy, gait disturbance was improved through botulinum toxin injection into the piriformis muscle.

**Description**

The patient complained of radiating pain from right buttock to calf from September 2018 and showed gait disturbance at toe walking. In October 2018, the L4/5 level of lumbar stenosis was diagnosed at another hospital and subtotal laminectomy L4/5 level was performed. However, the symptoms persisted, so he was admitted to the department of rehabilitation medicine in April 2019. At the time of admission, weakness of the ankle plantar flexion was prominent during toe walking but there was no weakness at supine position (Video 1.). The FAIR test showed negative findings, and the area of right gluteus muscle and piriformis muscle showed tenderness. In the pelvis MRI, there were no structures that could compress the sciatic nerve like mass, but it showed asymmetry of piriformis muscle volume (larger on Rt.) (Fig. 1). On electromyography, the latency of H-reflex was more prolonged on the right side during the FAIR test (Table. 1). So, we could diagnose as the piriformis muscle syndrome, and performed trigger point injection into right piriformis muscle. Gait disturbance slightly improved, but the symptoms worsened again. The patient was discharged for personal reasons. On May 7th, 2019, the patient visited the department of rehabilitation medicine and was performed botulinum toxin injection into the right piriformis muscle. A total of 100 units of botulinum toxin were mixed in a 4cc normal saline and the injection was performed under ultrasound guided (Fig. 2). And, there was no specific complication after injection. The patient began to recognize the gait improvement after one month of the injection. On June 19th, 2019, during toe

walking, there was no difference in left and right, and weakness of ankle plantar flexion was not observed clearly (Video 2.).

**Discussion**

Recently, several reports have recommended that botulinum toxin injection was effective for the treatment of piriformis muscle syndrome. In this case, the sciatic nerve was compressed due to piriformis muscle hypertrophy and the gait disturbance appeared at toe walking. After botulinum toxin injection, gait disturbance was not seen at toe walking. In piriformis muscle syndrome, it has been reported that muscle and myofascial pain was improved through botulinum toxin injection, but there was no report of improvement in gait disturbance. In conclusion, we could suggest that botulinum toxin injection may be effective when gait disturbance is the main symptom in piriformis syndrome.

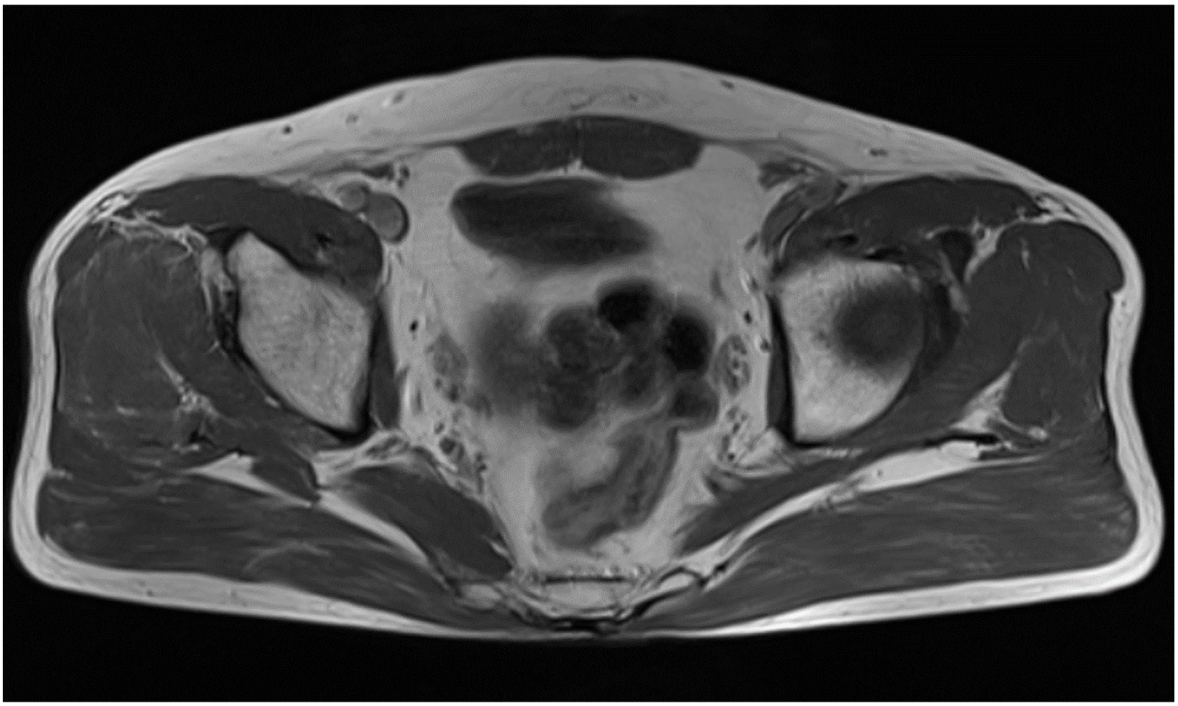

Figure 1. Axial T2-weight magnetic resonance imaging showed the asymmetry of piriformis muscle volume (larger on the right).

Table 1. The results of electromyography including H-reflex and H-reflex during FAIR test

| **H-reflex** | | | |
|---|---|---|---|
| Stim. site | Recording | H-reflex(msec) | signif |
| Rt. tibial n | GCM | 32.26 | Prolonged |
| Lt. tibial n | GCM | 31.76 | Acceptable |
| **H-reflex (FAIR test)** | | | |
| Stim. site | Recording | H-reflex(msec) | Difference |
| Rt. tibial n | GCM | 34.91 | 2.65 |
| Lt. tibial n | GCM | 31.90 | 0.14 |

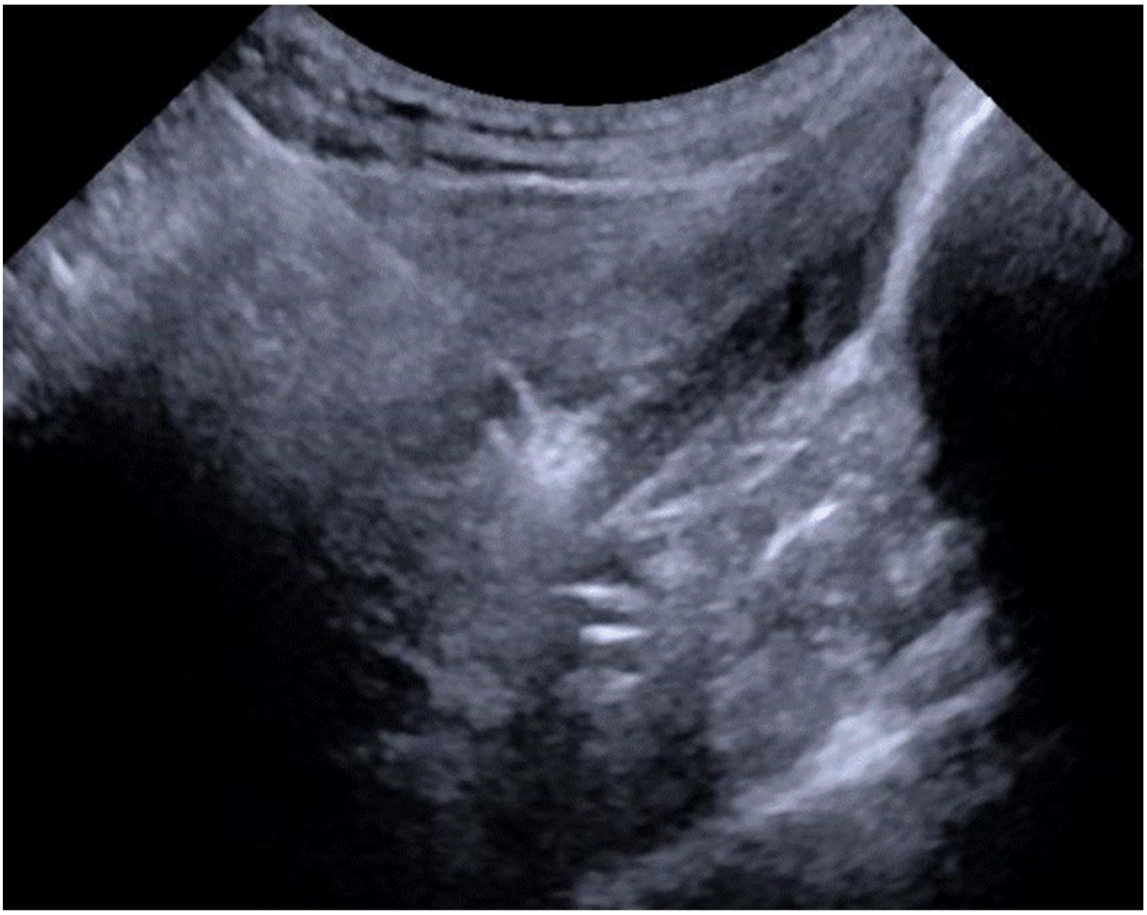

Figure 2. Ultrasound-guided botulinum toxin injection into the right piriformis muscle.