

# Hyaluronidase Injection and GRAFO in Patient with Diabetic Amyotrophy: A Case Report

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## Introduction

Diabetic amyotrophy is a rare form of diabetic neuropathy whose mechanism is not yet fully understood. However, there is increasing evidence that immune-mediated microvasculitis results in nerve injury. This disease is characterized by severe unilateral pain in the proximal part of the lower extremity, followed by motor weakness, which can lead to muscle contracture. Intramuscular injection of hyaluronidase has been found to be an effective treatment for improving joint movement safely without muscle weakness. In this report, we present the case of a patient with diabetic amyotrophy who underwent gait training using hyaluronidase injection and orthosis after a long period of being bedridden, which resulted in knee contracture.

## Case report

A 13-year-old girl visited the emergency room for mental change and was diagnosed with hyperosmolar hyperglycemic syndrome and diabetic ketoacidosis. After a week of intensive care unit care, the patient suffered from lasting left thigh pain and extremity weakness. Computed tomography images showed a decrease in the left quadriceps muscle (Fig. 1). In nerve conduction studies, sensory nerve action potentials of bilateral superficial peroneal and left sural nerves were absent and compound muscle action potentials of bilateral peroneal, left tibial, and femoral nerves were absent. This result was highly suggestive of superimposed left femoral motor neuropathy as diabetic amyotrophy. The pain and muscle weakness led to progressive hamstring tightness and a limitation of popliteal angle to 70 degrees, hip flexion to 40 degrees, and ankle dorsiflexion to 10 degrees, making gait more challenging. After medical care of diabetes mellitus complications, the patient was hospitalized for about a month for rehabilitation. A total of 150 units of hyaluronidase was diluted in 0.9 ml of normal saline and injected five times into the left calf and hamstring. After three weeks, 300 units of hyaluronidase were injected in the same manner, and rehabilitation, including continuous passive motion machine, four times a day, left hamstring stretching, and strengthening exercise, was performed. After a month, the range of motion had improved as follows: hip flexion to 100 degrees, popliteal angle to 15 degrees, and ankle dorsiflexion to 20 degrees (Table 1). A Ground Reaction Ankle Foot Orthosis (GRAFO) provided effective support of the knee and balance in a standing position, enabling gait training. At the time of discharge, the patient was able to walk with GRAFO with manual assistance from behind.

Table 1. Change in range of motion on the left lower extremity

	Lt. hip	Lt. knee	Lt. ankle
	Flexion	Pop angle	Dorsiflexion
Initial	40	70	+10
2 weeks	90	45	+10
3 weeks	90	40	+15
4 weeks	100	20	+20
5 weeks	100	15	+20

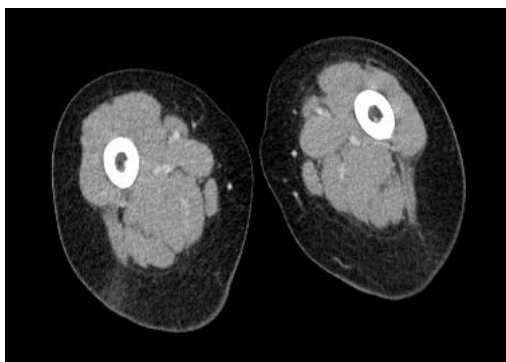


Figure 1. Muscles of the left rectus femoris and hamstring were decreased in the computed tomography venography

## Conclusion

Hyaluronidase injection combined with rehabilitation treatment and the use of GRAFO, can improve joint mobility and functional outcomes in patients with diabetic amyotrophy. However, further studies are needed to determine the optimal dosage and frequency of hyaluronidase injection, as well as the long-term effectiveness of this treatment.

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