

# Nerve Decompression Alone Can Restore Motor Function in Patients with Acute Flaccid Myelitis

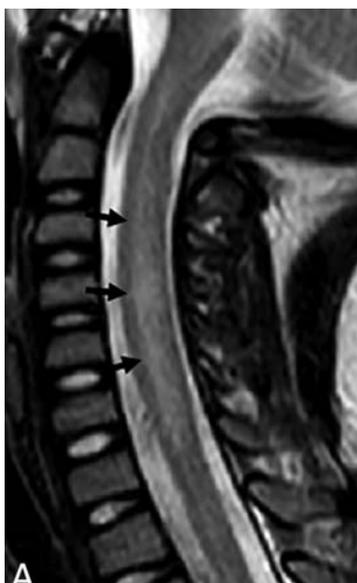
Dengler J<sup>1,2</sup>, Hill EJR<sup>1,2</sup>, Moore AM<sup>1</sup>

1 Division of Plastic and Reconstructive Surgery, Washington University School of Medicine, St Louis MO; 2 Sunnybrook Health Sciences Centre, University of Toronto, Toronto ON

## Introduction

**Acute Flaccid Myelitis (AFM)** is a rare but devastating disorder resulting in **mixed-pattern motor weakness** in previously healthy children, with **proximal muscles more severely affected** than distal muscles.

While much remains to be understood, the condition is known to attack the anterior horn cell **causing lower motor neuron injury**, with **highly variable patterns of recovery**.



Maloney J et al. AJNR Am J Neuroradiol. 2015 Feb;36(2):245-50.

Early results from our group have shown the successful restoration of function using a **combination of nerve decompression, intra-operative stimulation and motor nerve transfers**.

Here, we present the striking recovery of motor function in a select group of patients following **nerve decompression alone**.

## Methods

We present **3 distinct cases** of AFM who underwent **decompression neurolysis** by a single surgeon with **immediate post-operative recovery of motor function**.

All patients were consented for end to side or end to end nerve transfer to improve motor weakness/atrophy.

**Intra-operative nerve stimulation (2mA, 100us, 10min per nerve)** following decompression showed significant improvement of motor function.

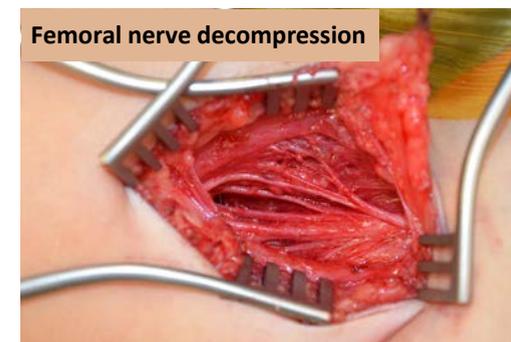
Parents contacted intra-operatively to discuss findings and potential to abort plan for nerve transfer.



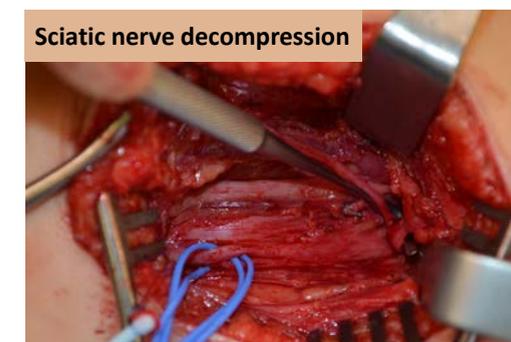
## Results

**Case 1:** 15yo M with AFM and persistent left leg weakness. At **8 months**, underwent combined transfer-decompression procedures. Preoperative Medical Research Council (MRC) **quadriceps strength of 1/5 improved to 4/5** post-operatively **immediately following decompression of femoral nerve**.

## Results (cont'd)



**Case 2:** 9yo F with AFM and persistent right leg weakness. At **8 months**, underwent combined transfer-decompression procedures. Pre-operative **toe flexion strength of 1/5 improved to 3/5** post-operatively **immediately following decompression of sciatic nerve**.



**Case 3:** 2yo F with severe AFM requiring tracheostomy and mechanical ventilation, with persistent left leg weakness, right arm flaccidity, left arm proximal weakness and preservation of some hand function. At **8 months**, underwent nerve decompressions alone. Left **deltoid strength improved from MRC 2/5 to 3/5 immediately following decompression of the axillary nerve**.

## Results (cont'd)

In all cases, post-operative findings correlated to intra-operative stimulation following decompression.

**Signs and symptoms** that decompression could help:

- **Weakness**
- **Point tenderness** over compression point
- Complaints of **pain**

**When to decompress:**

- Within time window and intra-op nerve stimulation following decompressive shows improvement in motor function
- If no nerve donors available and pain / point tenderness on exam
- If outside of time window for nerve transfers and pain / point tenderness on exam

## Conclusion

Though much is still not understood about AFM, these cases demonstrate **a role for surgical decompression neurolysis in the treatment of AFM**.

The immediate improvement in motor function from decompression alone suggests a **component of compressive-ischemic conduction block** underlying motor deficits in this condition, which can be reversed with removal of the thick perineural scar, and provide immediate improved function for these children.

**Further work is needed** to identify the exact etiology, disease process, and best management for children with this debilitating condition. **Early referral to a nerve surgeon for these children is warranted**.