# Pathophysiology of Muscle Contractures in Cerebral Palsy

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**KEYWORDS**

• Cerebral palsy • Skeletal muscle • Extracellular matrix • Sarcomere • Fiber
• Gene expression • Pathophysiology

**KEY POINTS**

- Muscle from patients with cerebral palsy shows functional deficits such as decreased force production and range of motion.
- Muscle is altered at a structural level, with decreased muscle body size, smaller-diameter fibers, and highly stretched sarcomeres (the force-producing unit of muscle).
- Muscle from patients with cerebral palsy has altered extracellular matrix and connective tissue.
- Decreased muscle stem cell numbers and altered gene expression have been reported in cerebral palsy.

## INTRODUCTION

### *Nature of the Problem*

Cerebral palsy (CP) is a motor disorder caused by a nonprogressive injury to the developing brain.[1] The injury occurs perinatally and, though causes are rarely known,[2,3] CP is common in infants born preterm with small birth weights.[4] CP occurs in 2 to 3 of every 1000 live births[5] and has heterogeneous symptoms, anatomic involvement, and functional impairment, including lifelong changes in motor function.[1,2] These

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