## Intermediate Duration Outcomes of Surgical Management for Chronic Exertional Compartment Syndrome (CECS) in Adolescents: The Mubarak Fasciotome

Katherine D Wilson<sup>1</sup>, James David Bomar<sup>2</sup>, Eric William Edmonds

<sup>1</sup>University of California, San Diego, <sup>2</sup>Rady Children's Hospital

**Introduction:** Chronic exertional compartment syndrome (CECS) presents significant challenges in both diagnosis and treatment, particularly among adolescents participating in sports. The Mubarak fasciotome was designed in 1976 by Scott Mubarak to facilitate less invasive surgical management of CECS. The tool is a thin metal rod with a protected blade at the head, which can be extended "blindly" through fascial compartments. This tool takes the place of the Metzenbaum scissors which often require larger, or multiple incisions to achieve complete facial decompression. While other iterations of fasciotome tools have been studied, only one other study to date has examined the safety and efficacy of the Mubarak fasciotome for managing CECS. Our case-series study evaluated the intermediate-term outcomes (more than 2 years) of CECS surgical treatment in adolescents using the Mubarak fasciotome.

**Methods:** Fasciotomy using the Mubarak fasciotome is demonstrated using cadaveric models. We conducted a retrospective analysis of patients who underwent lower extremity fasciotomy for intra-compartmental pressure (ICP) confirmed CECS over a 13-year period. The fasciotomy procedure was performed with the Mubarak fasciotome on the affected compartments under general anesthesia. A single-incision method was used for anterior/lateral compartments, and a medial incision for posterior compartments. Postoperative therapy was administered, and PROs were evaluated using MARX and SANE scores, as well as pain assessments at various intervals and final follow-up. Data analysis was performed using SPSS.

**Results:** The study identified 6 patients (10 limbs) who underwent fasciotomy for CECS, with an average follow-up of 7.2 years (range 2 to 12.5 years). Post-surgery, patients reported significant reductions in pain, with average scores dropping from 7.7 to 1.5. MARX scores reflected a high return to physical activity, with an average score of 8.7. SANE scores for daily and athletic activities were also high, indicating good functional recovery. However, only 66% of patients resumed their original or a similarly intense sport. No major complications were observed.

**Conclusions:** The Mubarak fasciotome for CECS surgery in adolescents resulted in positive intermediate-term outcomes, including pain relief, functional improvement, and high patient satisfaction, which persisted throughout their athletic careers. This minimally invasive technique presents a viable alternative to traditional open fasciotomy, provided that care is taken to properly place the fasciotome to avoid nerve injury.