

# Quantifying Muscle Compressibility as a New Decision Support: When Pressure Readings & Clinical Signs Diverge

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## INTRODUCTION

Traditional criteria for diagnosing compartment syndrome have shown limited reliability. Pressure thresholds, single-point measurements, and the classic “P” signs have high variability and correlate poorly with tissue ischemia. These findings suggest the invasive gold standard may not accurately reflect tissue health [1,2], motivating the exploration of non-invasive, quantifiable methods for soft tissue assessment.

## CASE PRESENTATION

A 40-year-old female sustained a displaced tibial plateau fracture (fig.1) with marked soft-tissue swelling, tibia offset and joint depression, conferring ~50% ACS risk.

Temporary stabilization was achieved using an external fixator. Continuous Invasive Intracompartmental Pressure (ICP) monitoring was initiated.



Figure 1. Comparative radiographic views of the proximal tibia.

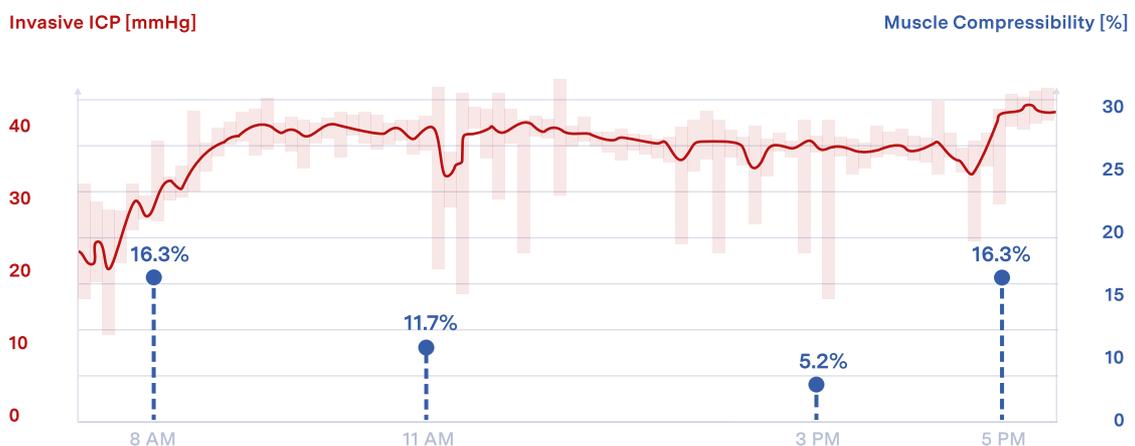


Figure 2. Intracompartmental pressure and muscle compressibility trends over time.

This figure presents simultaneous ICP measurements (Red line, left y-axis; mmHg) and intermittent muscle compressibility assessments (Blue markers, right y-axis; %) collected across the clinical observation period.

**ICP Trend:** When the catheter was inserted, the pressure was 30 mmHg and rose to 45 mmHg within 2 hours. It remained elevated for ~20 hours.

**Clinical Status:** The patient showed no progressive pain, neurological deficit, or tense compartment.

**Quantis ST Measurements:** Non-invasive soft tissue compressibility measurements were performed using the Compremium Quantis® ST device in the anterior compartment of the left lower leg. Compartment compressibility (CP Value) is the percentage change in compartment thickness between low and high applied pressures. Compressibility values dropped from 16.3% to 5.2% within 6 hours, followed by a recovery to the baseline of 16.3% after ~2 hours.

## OUTCOME & CONCLUSION

ICP remained high and stable, showing poor correlation with clinical findings, suggesting prophylactic fasciotomy. In contrast, compressibility measurements declined but rebounded to baseline, aligning with clinical and patient outcomes. No fasciotomy was therefore performed. The patient achieved full functional recovery without complications.

## REFERENCES

1. Bouklouch, Yasser et al. Rethinking the Paradigm of Using Ps for Diagnosing Compartment Syndrome. JBJS Open Access 10(2):e24.00065, April-June 2025. | DOI: 10.2106/JBJS.OA.24.00065
2. Yasser Bouklouch, Theodore Miclau, Edward Harvey, Diagnosis of acute compartment syndrome: current diagnostic parameters, Injury, Volume 56, Supplement 1, 2025, 112773, ISSN 0020-1383, <https://doi.org/10.1016/j.injury.2025.112773>

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### CE-approved intended use

The CPMX1 Software is intended for real-time and intermittent measurement and monitoring of relative compartment compressibility.

### FDA-cleared intended use

The Compartmental Compressibility Monitoring System (CPM#1) is intended for real-time and intermittent monitoring of relative compartment compressibility. The relative compartment compressibility (CP Value) is not meant for trend analysis. 510(k) Number: K223509.