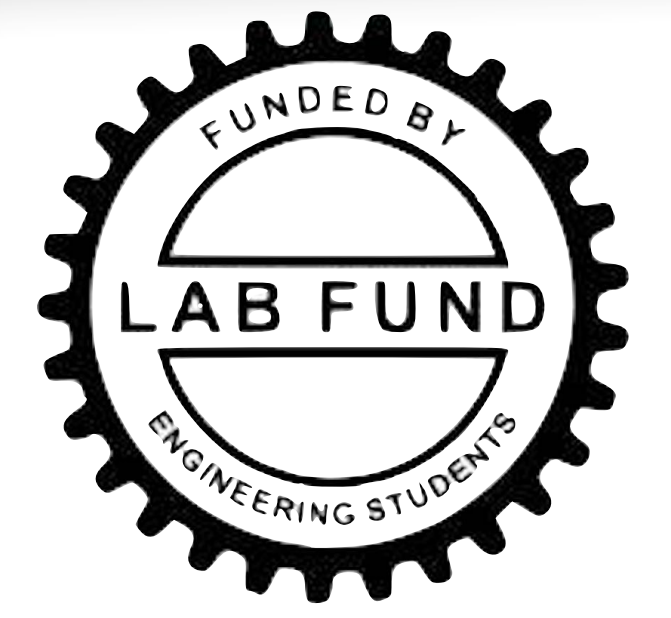




ADAPSIS

ANGULAR DISPLACEMENT & POSITION SMART IMPLANT SYSTEM

Claire Benwood • Courtney Koomen • Neha Sam • Alexander Vos

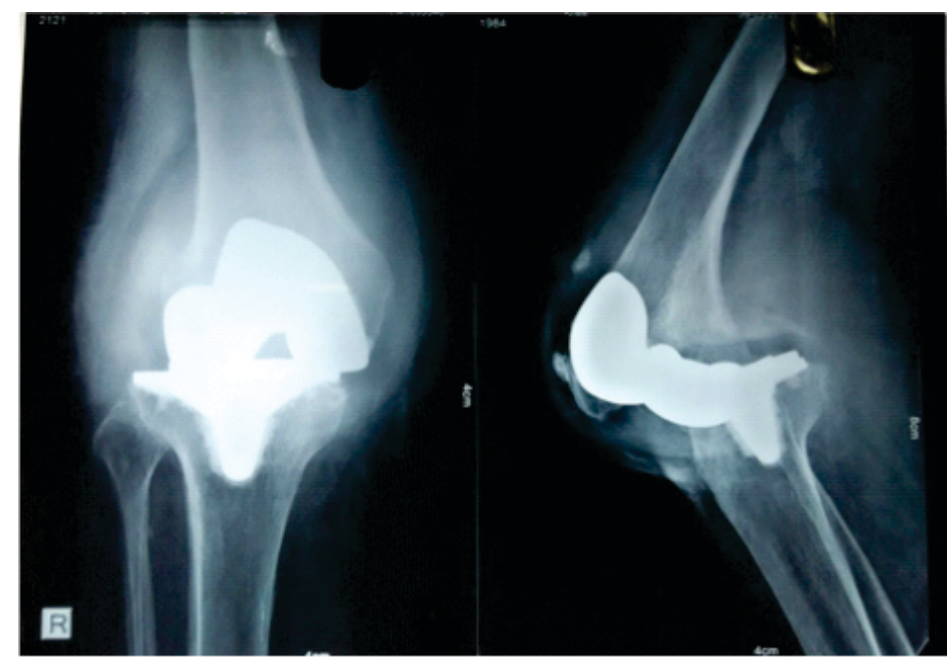


INTRODUCTION

- Polyethylene is translucent and difficult to image leading to inaccurate conclusions about its position within the knee^[1].



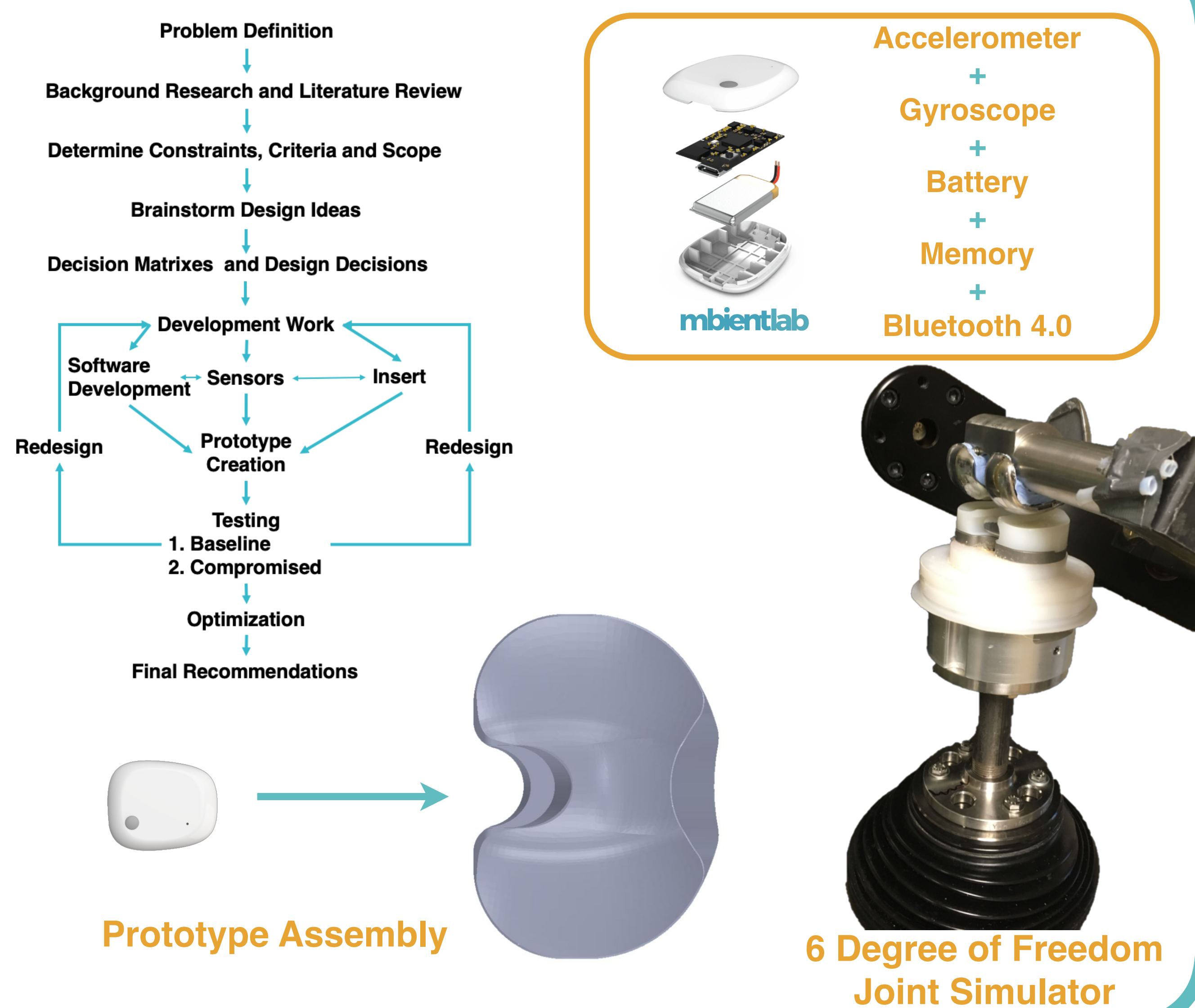
Femoral Component →
Polyethylene Insert →
Tibial Component →



OBJECTIVES

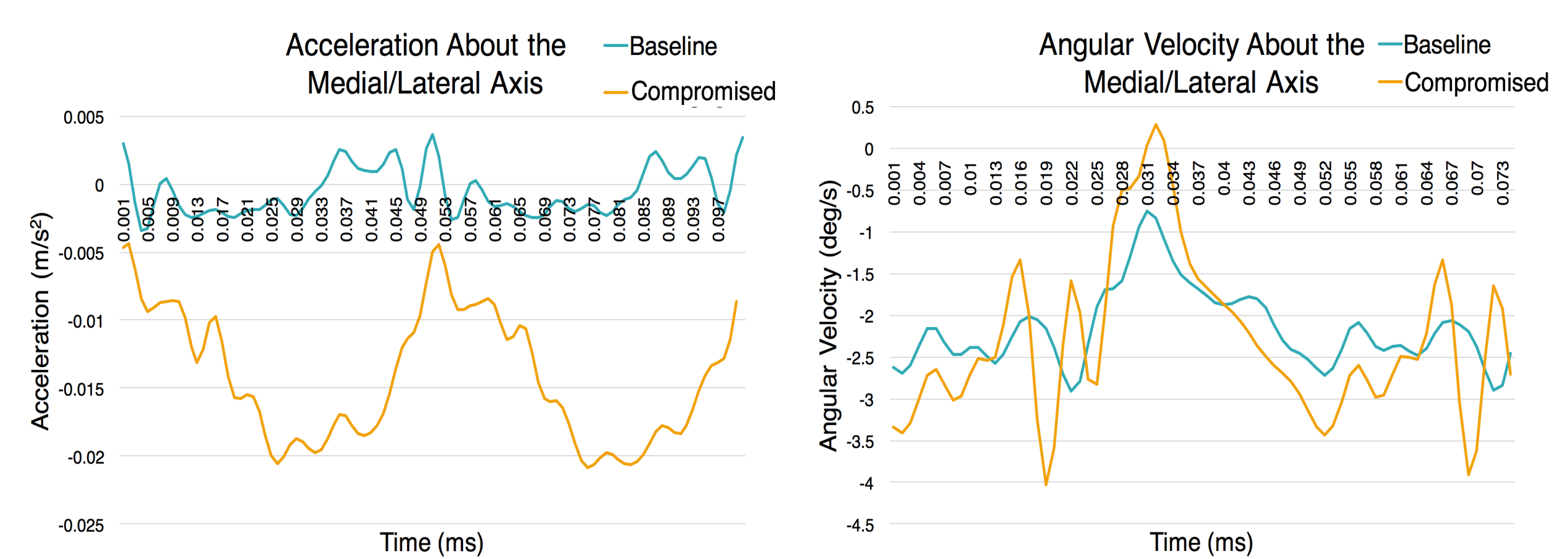
- Measure the absolute motion of the Polyethylene Insert (PI)
- Design and develop a preliminary experiment in order to:
 - Quantify baseline conditions for calibration
 - Collect data during simulation of compromised insert
- Read, process and transmit the data to a smartphone
- Compare structural integrity of original and new PI using mechanical simulations in SolidWorks

DESIGN

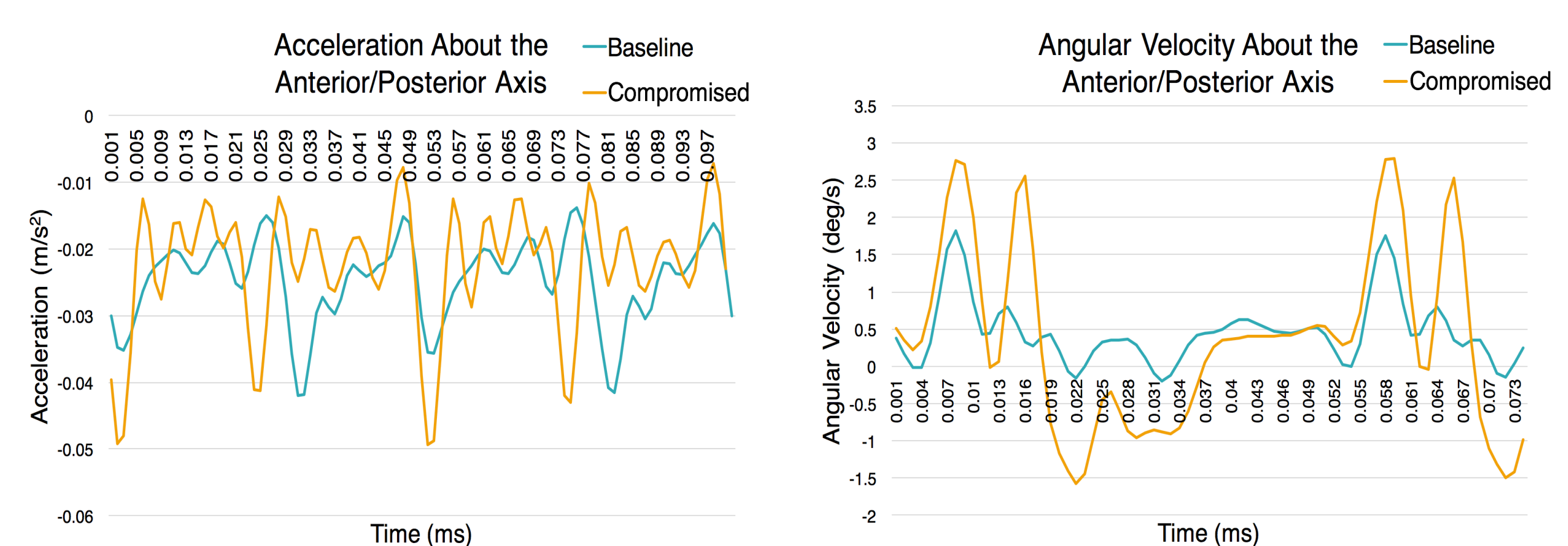


RESULTS

When insert was compromised, more rocking motion at posterior end of insert was detected



When insert was compromised, more rocking motion at both the medial and lateral sides of the insert was detected

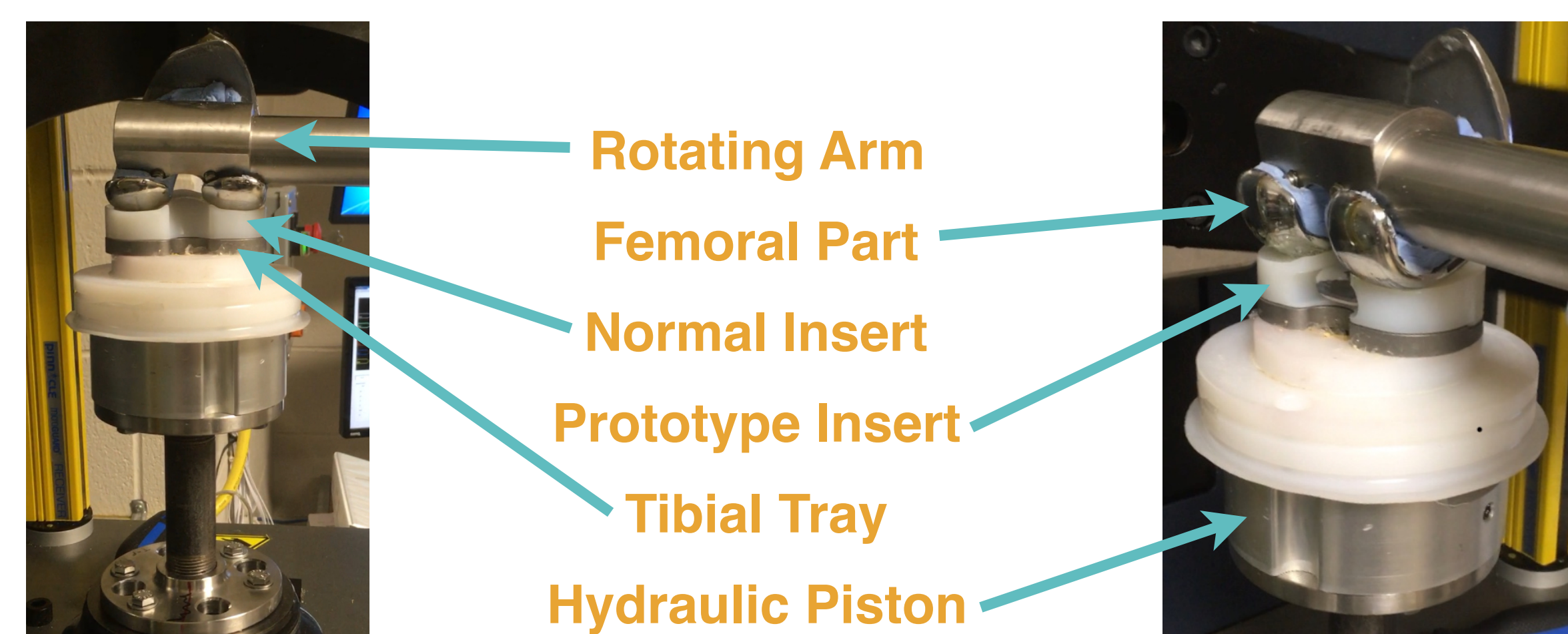


FUTURE WORK

- Continue to refine experimental methodology
- Develop smaller, biocompatible sensors
- Collect more extensive simulated baseline data
- Collect simulated life cycle data
- Conduct in vivo trials



Simulated Gait Testing Conditions



References:

[1] K. Lam-Tin-Cheung, "Marker based technique for visualizing radiolucent implant components in radiographic imaging," Journal of Orthopaedic Research, 2016.

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