MODULE 3-P1: Sensor-aided instrumented equipment to quantify function after stroke

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1   Introduction

- Accurate metrics to report functional recovery is vital and integral in tracking patient progress during rehabilitation.

- Sensor-based metrics has shown potential to precisely track clinical outcomes over time and assessment tasks. [1]

- However, development of sensor-based metrics quantifying functional sitting balance and pinch under dynamic conditions is scarce. [2-5]

2   Study design

Phrase	I	II
Objective	Equipment Validation	Capturing recovery patterns over time using validated instrumented equipment
Method	Cross-sectional	Longitudinal
Subject Profile	• Target Group: First-time stroke survivor (mild to moderate severity) vs • Controls: Healthy individuals	First-time stroke survivor (mild to moderate severity)

3   Expected outcomes

- Identify valid kinetic metrics best characterizing sitting balance and pinch function under dynamic conditions.

- Provide kinetic biomarker integrable to other technology and application in capturing functional recovery of patient.

4   Instrumented equipment

Sensors to capture truncal compensation and weightbearing distribution in sitting.

Key like sensor, designed with human factor, to harvest repeatable-thumb-positioned pinch profile.
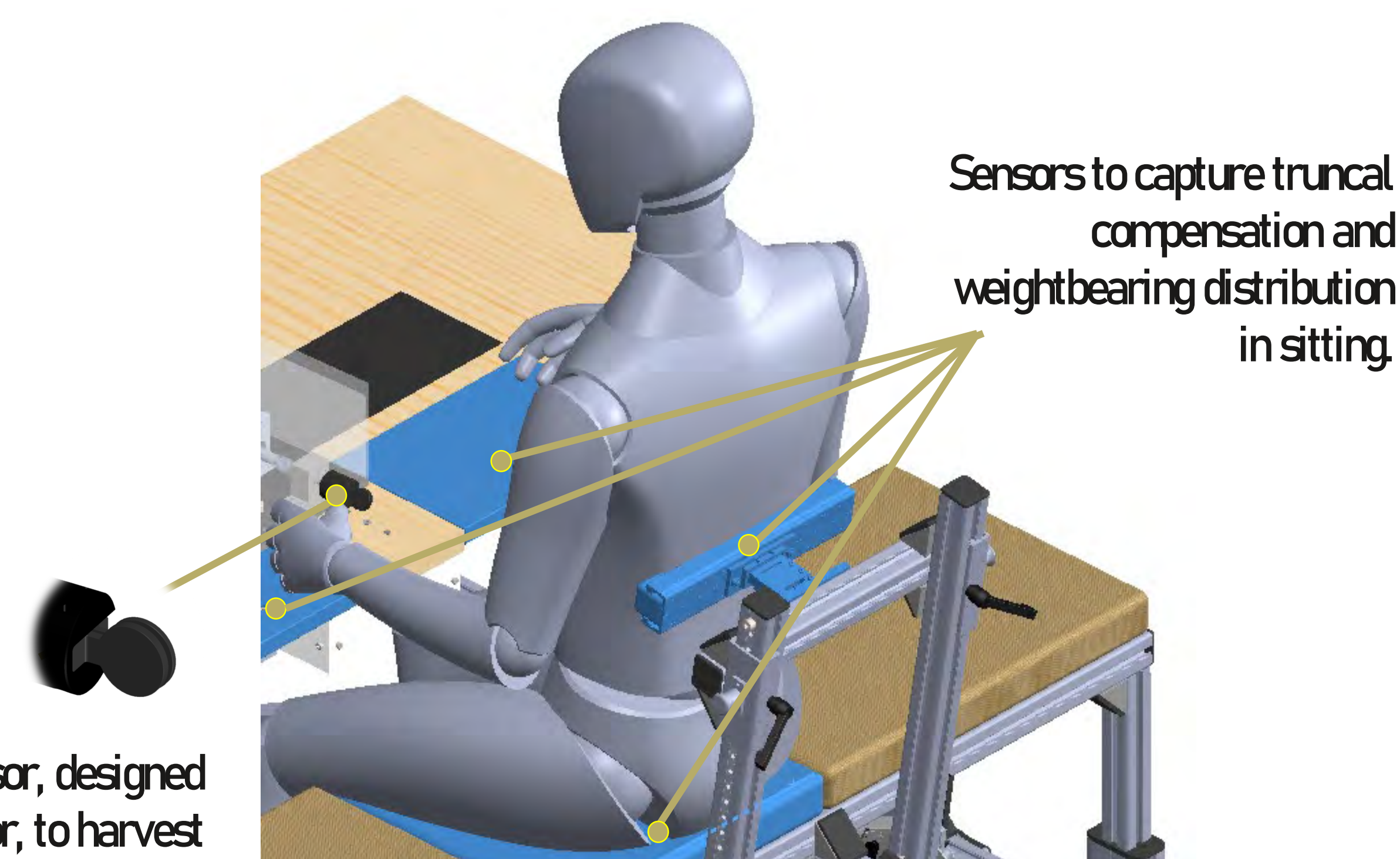
Figure 1: Conceptual design of instrumented equipment, consisting sensorised chair, table and key turning box.

5   Current status and timeline

2022 (Key Milestones)
- Concept realization and continuous design improvement (Figure 2)
- Developed preliminary tests and protocol with normative subjects.
- Submitted NTU IRB application for equipment validation.

2023 (Next Milestones)
- To validate equipment with stroke subjects.
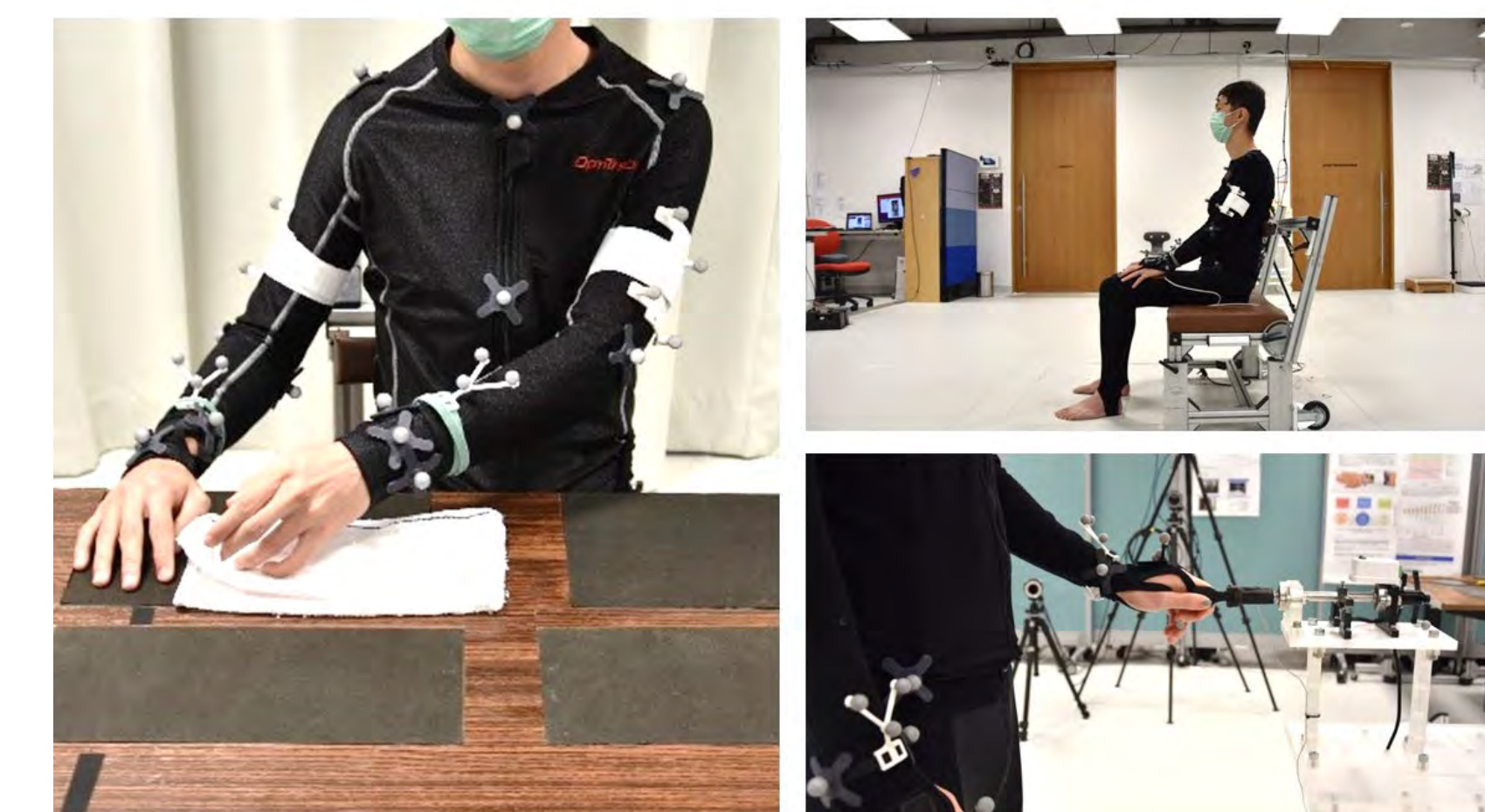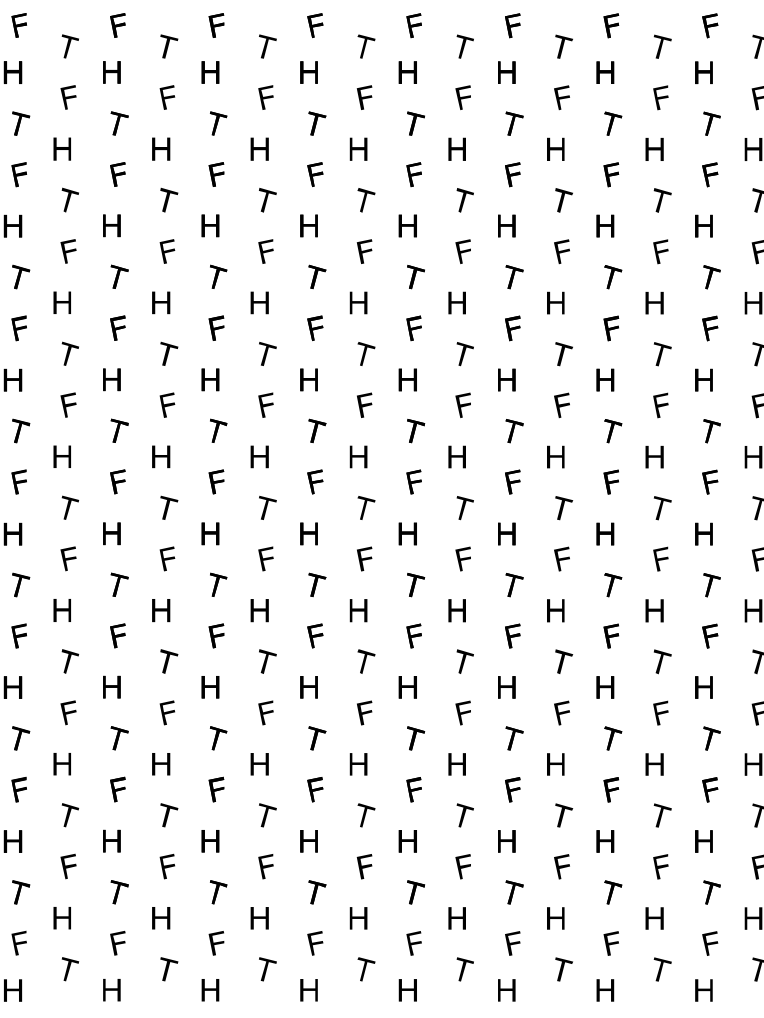- To discover pattern differences between stroke survivors and healthy subjects.

Figure 2: Normative subject performing dynamic task on instrumented equipment designed to capture sitting compensation and pinch profile.

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