Three-point Bend MGP_PBT_001

Purpose

To assess the mechanical force that a femur can withstand.

Experimental Design

- **Minimum number of animals :** 1M or 1F
- **Age at test:** Week 16

Equipment

- Instron 5543 Materials testing frame
- Bluehill 2 software
- 3 point bend testing load cell (100N)
- Small petri dish
- 70% Ethanol
- Forceps

Procedure

1. Set up and calibrate the equipment.
2. Place femur with distal end to the left with the posterior side of the condyles facing downwards on top of two of the pins. The first pin should be positioned in the groove to the right of the condyles and the second pin should be at the groove of the femur just before the lesser trochanter. Ensure the femur is stable and at a 90-degree angle to the third pin above the femur.
3. Start the measurement. The third pin will press against the femur producing a graph trace until the femur breaks.
4. Remove the fractured parts and proceed to the next sample.

Notes

Data analysis
1. Plot load-displacement curves and determine yield, maximum and fracture loads.
2. Calculate stiffness from the linear part of the load displacement curve by the least squares method.
3. Calculate energy displaced prior to fracture by subtracting the elastic stored energy from the work energy at fracture load.

Parameters and Metadata

Yield Load MGP_PBT_001_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: N

Description: yield_load

Max Load MGP_PBT_002_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: N

Description: max_load

Stiffness MGP_PBT_003_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: N/mm

Description: stiffness

Fracture Load MGP_PBT_004_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: N

Description: fracture_load

Energy Dissipated Prior to Fracture MGP_PBT_005_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: %

Description: energy_dissipated_prior_to_fracture

Equipment manufacturer MGP_PBT_006_001 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** false **Is Annotated:** false

Description: equipment_manufacturer

Equipment model MGP_PBT_007_001 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** false **Is Annotated:** false

Description: equipment_model
