

# 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

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## Max Load MGP\_PBT\_002\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Unit Measured: N

Description: max\_load

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## Stiffness MGP\_PBT\_003\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Unit Measured: N/mm

Description: stiffness

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## Fracture Load MGP\_PBT\_004\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Unit Measured: N

Description: fracture\_load

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## 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

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## Equipment manufacturer MGP\_PBT\_006\_001 | v1.0

procedureMetadata

Req. Analysis: true

Req. Upload: false

Is Annotated: false

Description: equipment\_manufacturer

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# Equipment model MGP\_PBT\_007\_001 | v1.0

procedureMetadata

**Req. Analysis:** true

**Req. Upload:** false

**Is Annotated:** false

**Description:** equipment\_model

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