

**J-MLIT Flex-GT Simplified Car Test Results**  
**Repeatability Check**

(Add Deformation Photos of Simplified Car )

# Materials and Methodologies

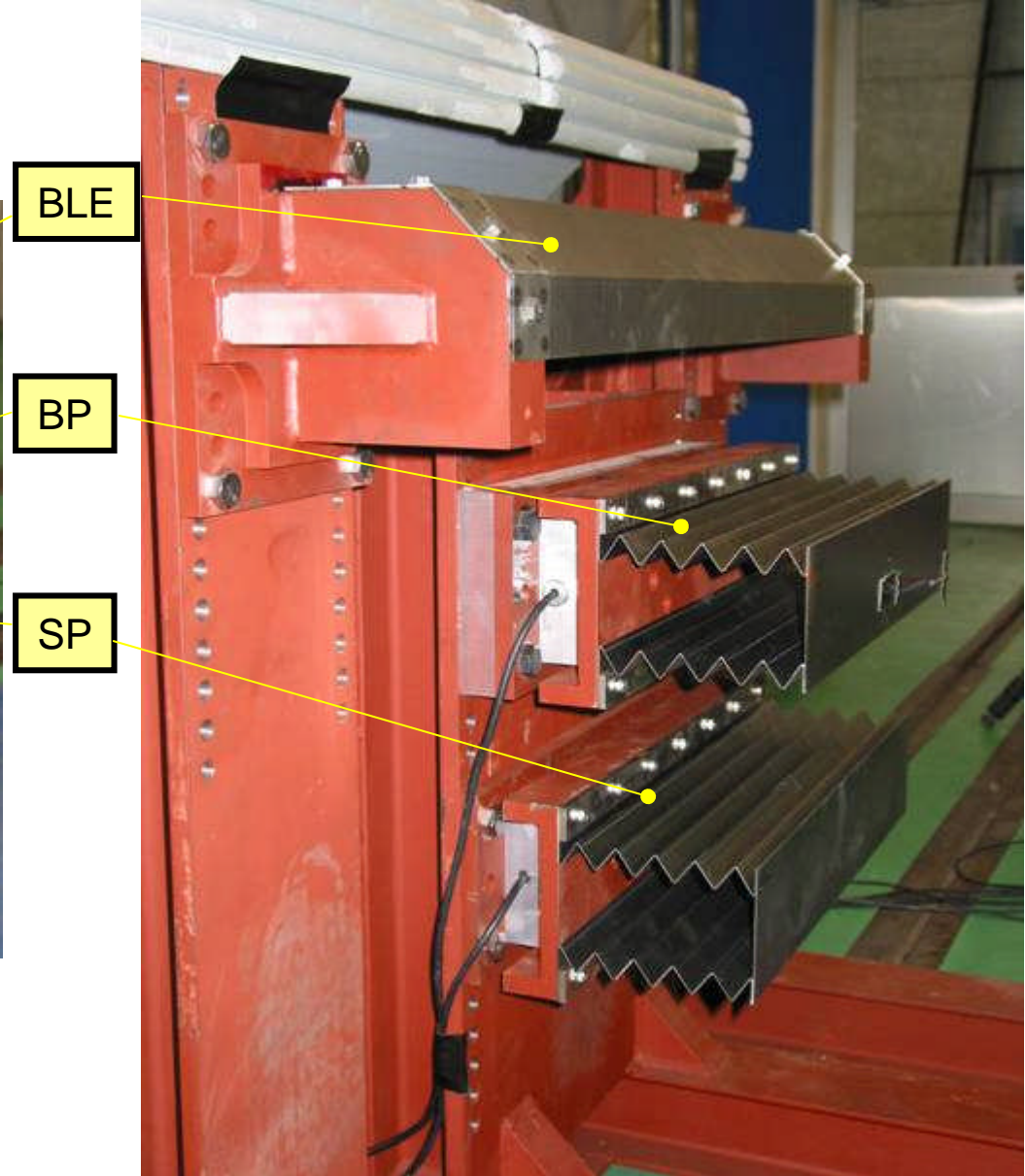
# Simplified Car (Photo)

Overview



BLE: Bonnet leading edge  
BP: Bumper  
SP: Spoiler

Close view



## Simplified Car (Photo)

After the test (deformation images)

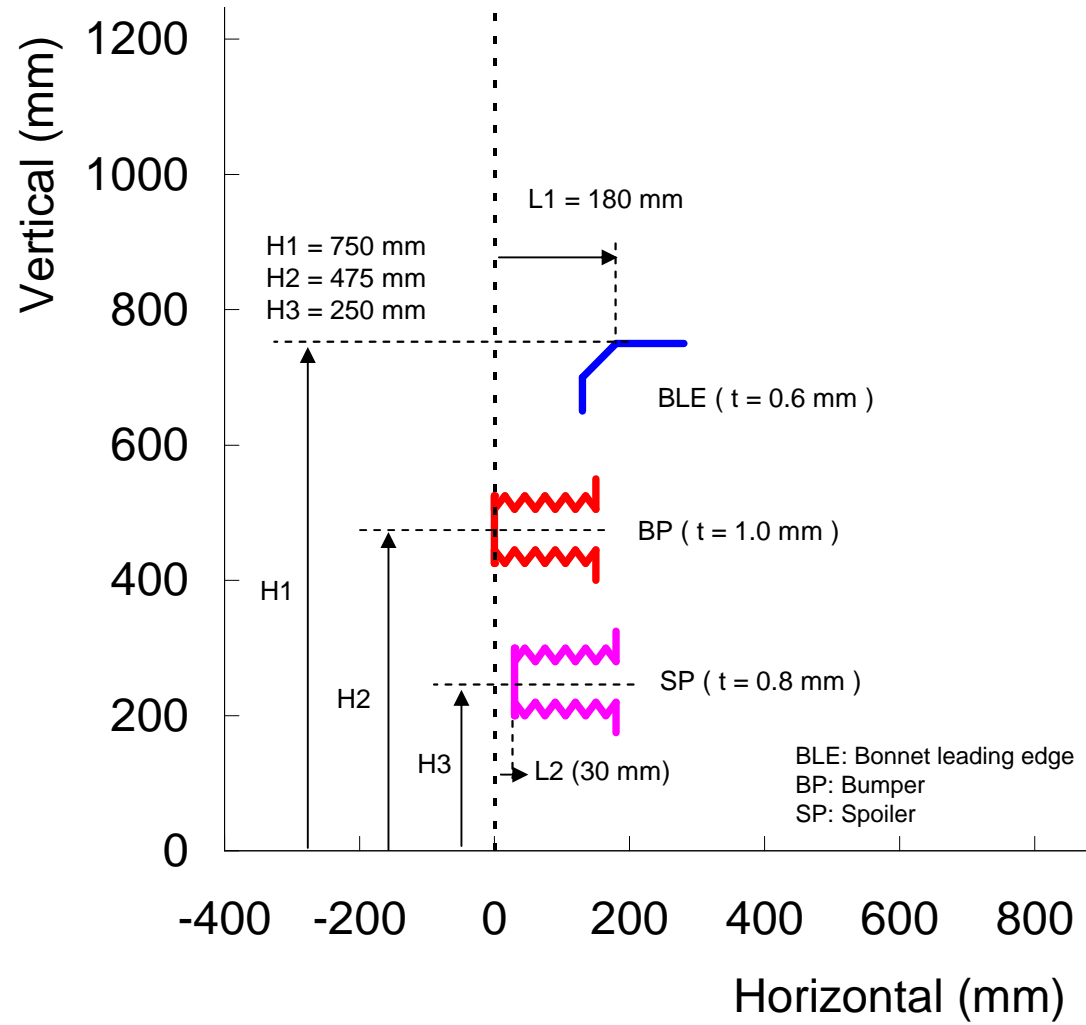
Overview



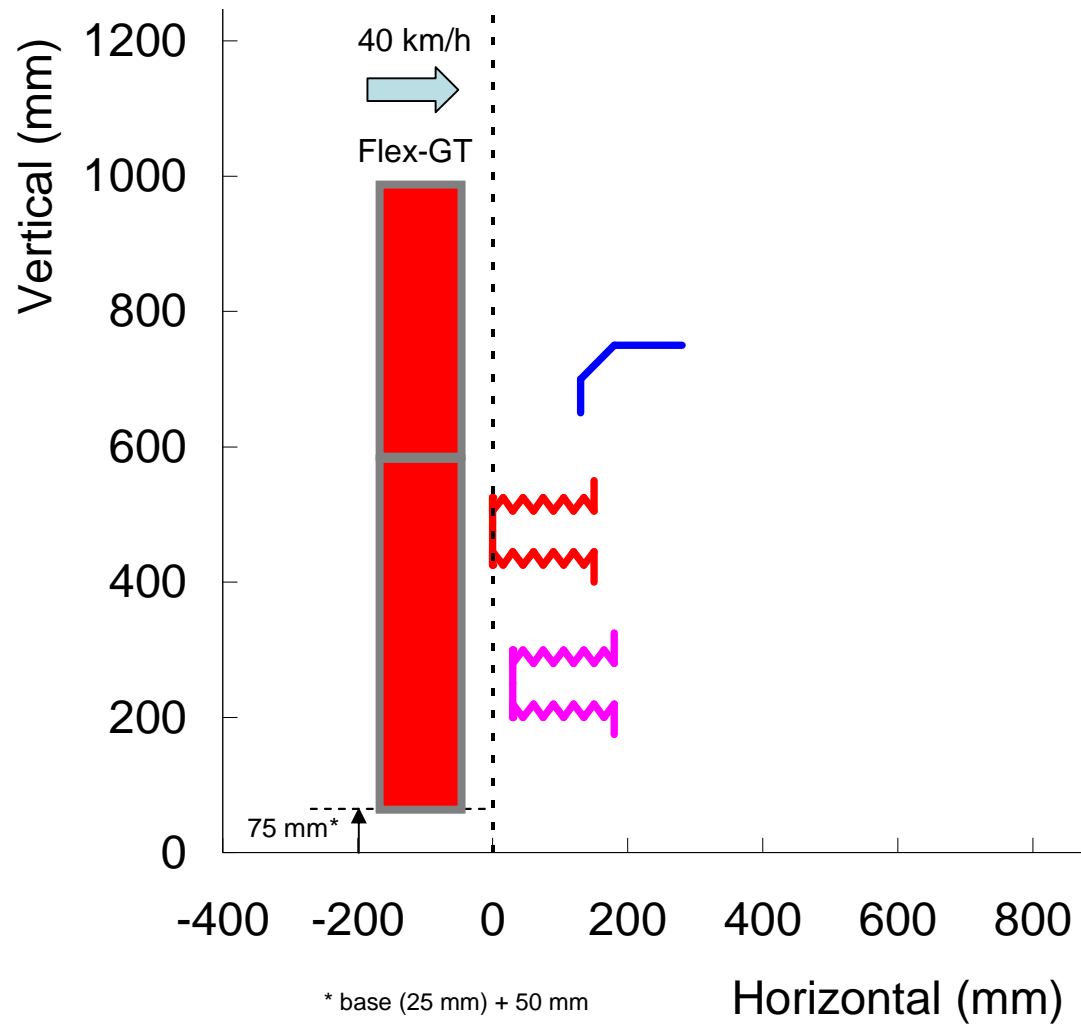
Top view



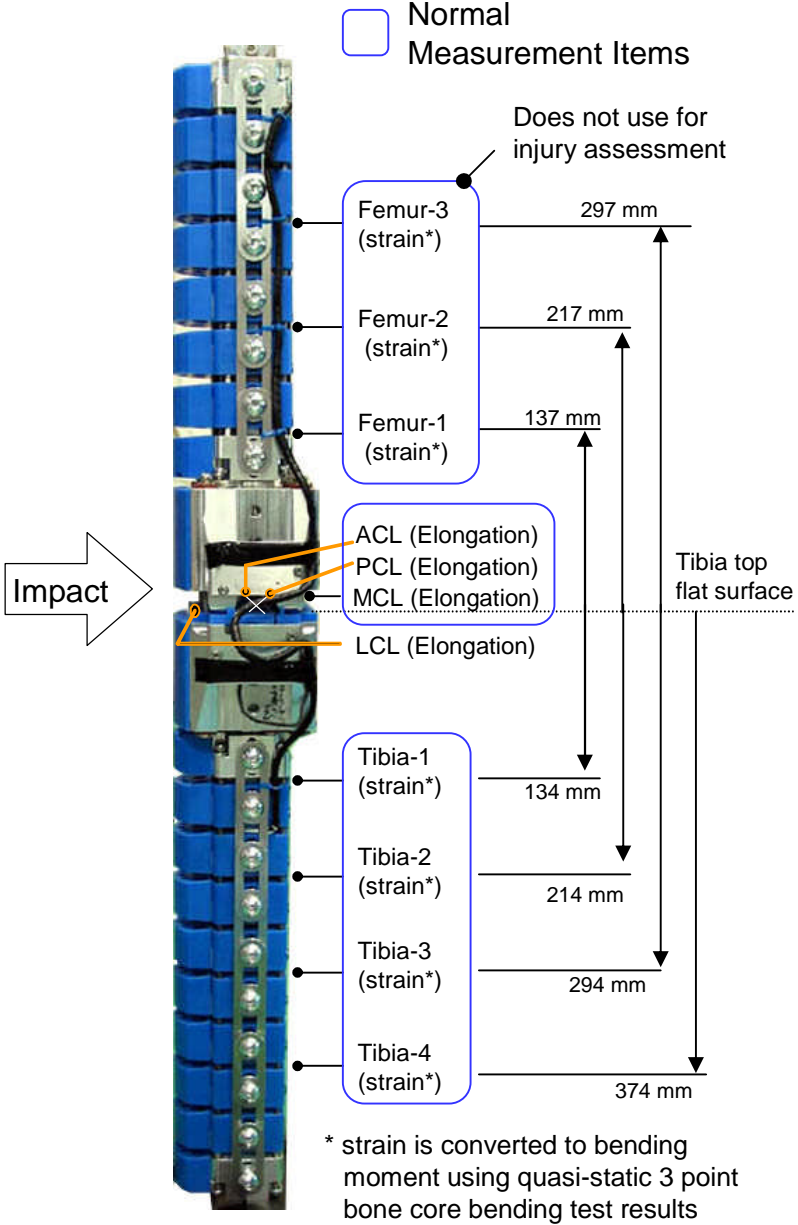
# Simplified Car (Dimensions)



# Impact Conditions Targets



# Flex-GT Measurement Items



## Test Results



# Impact Conditions Targets and Results (actual)

| Car            | Test ID | Impactor      | Impact Position (target) |                           | Impact Speed |        | Impact Position (actual) |          | Conducted Time<br>(hours:minutes) |
|----------------|---------|---------------|--------------------------|---------------------------|--------------|--------|--------------------------|----------|-----------------------------------|
|                |         |               | Horizontal Position      | Vertical Position         | target       | actual | Horizontal               | Vertical |                                   |
|                |         |               |                          |                           | (km/h)       | (km/h) | (mm)                     | (mm)     |                                   |
| Simplified Car | T01     | Flex-GT(SN01) | Center                   | + 75 mm<br>(base + 50 mm) | 40           | 40.7   | R5                       | 0        | 13:39                             |
| -              | T02     | -             | -                        | -                         | -            | 40.1   | L10                      | D3       | 14:30                             |
| -              | T03     | -             | -                        | -                         | -            | 40.0   | L10                      | D3       | 15:18                             |
| -              | T04     | -             | -                        | -                         | -            | 40.0   | R3                       | D4       | 16:06                             |
| -              | T05     | -             | -                        | -                         | -            | 39.9   | 0                        | D2       | 16:49                             |
| -              | T06     | -             | -                        | -                         | -            | 40.0   | R2                       | D2       | 17:55                             |

- Around 1 hour interval
- No change any parts

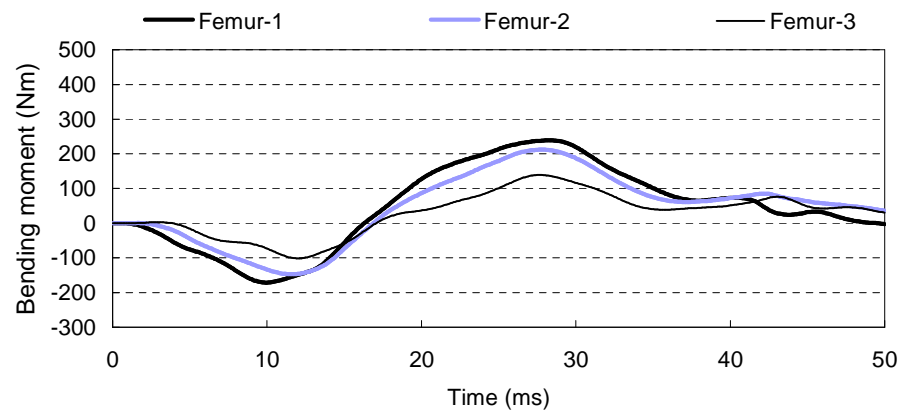
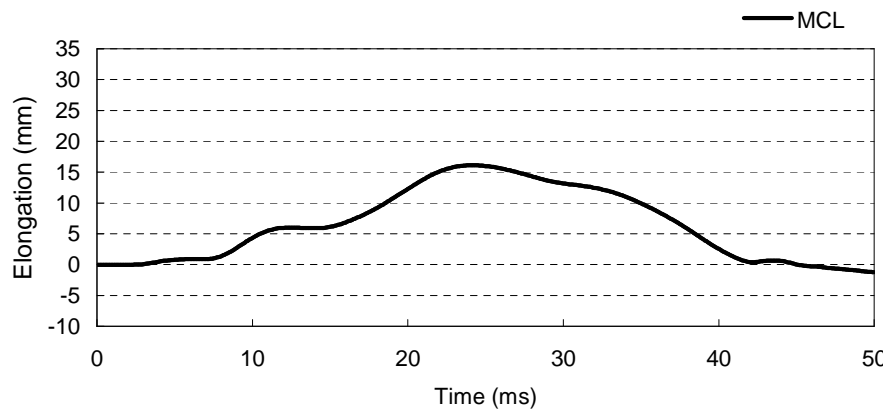
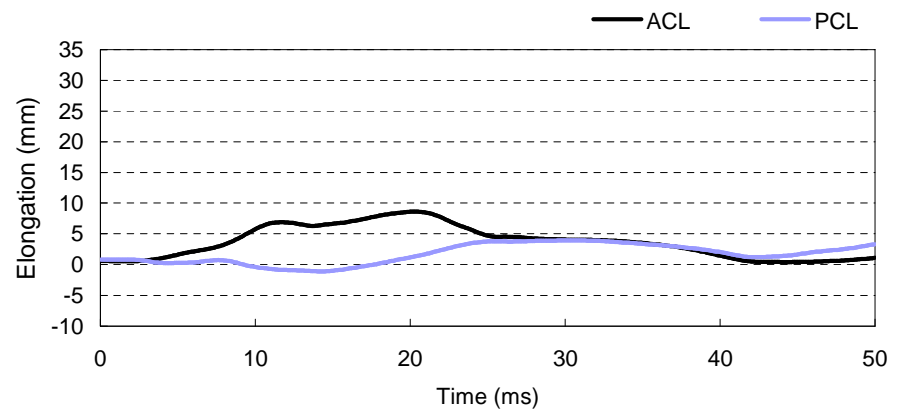
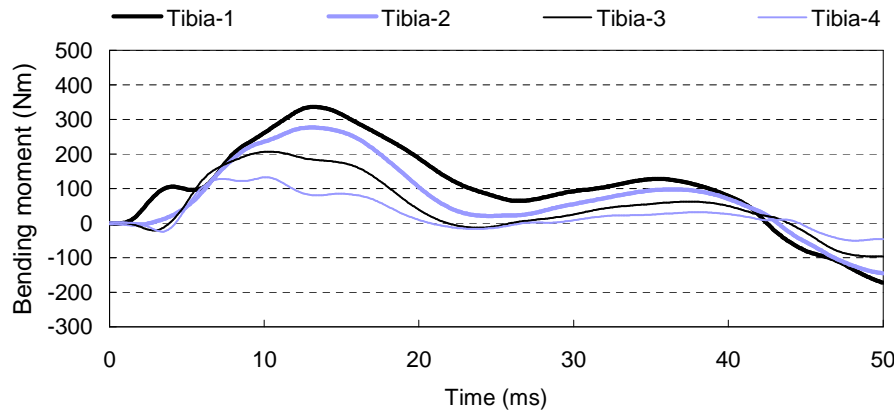
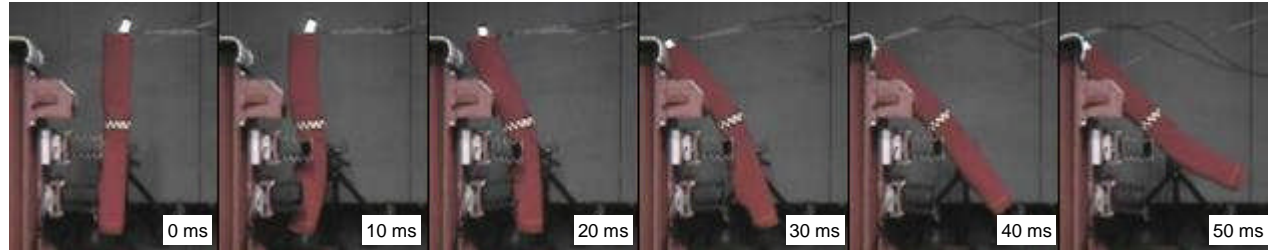
base: + 25 mm from ground level (+: Up)

Impact Position: R: Right, L: Left, U: Up, D: Down (Driver's point of view)

# Test Results

## Simplified Car Model (T01) $\Leftarrow$ Flex-GT, $H_1 = \text{base} + 50 \text{ mm}$

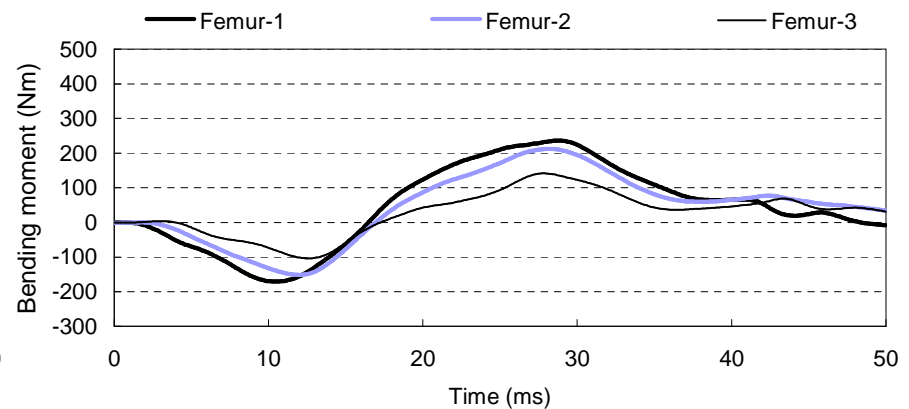
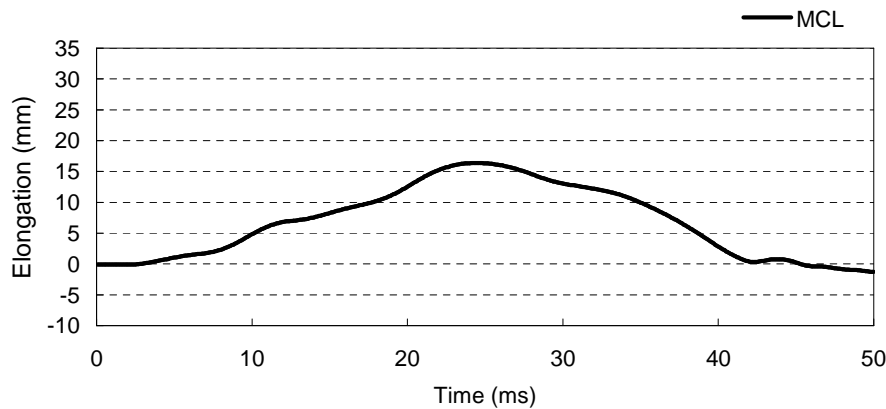
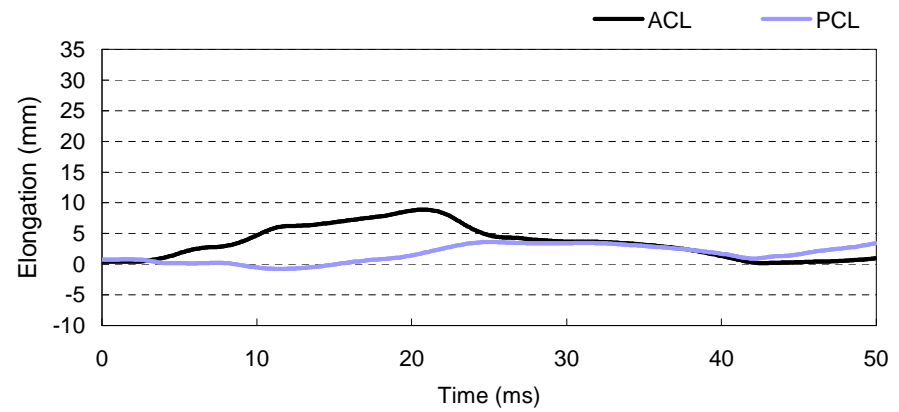
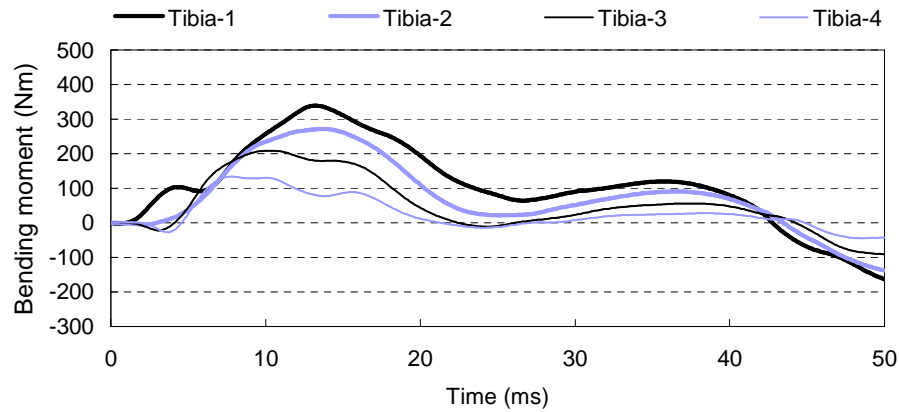
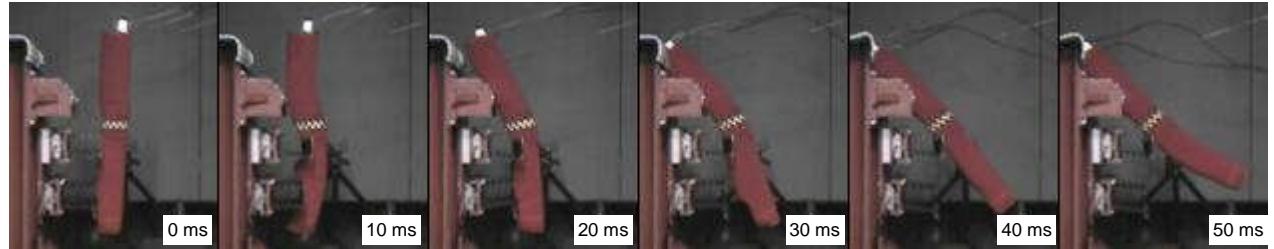
|          | unit | Max.  |
|----------|------|-------|
| Femur-3  | (Nm) | 139.1 |
| Femur-2  | (Nm) | 212.0 |
| Femur-1  | (Nm) | 238.8 |
| Tibia-1  | (Nm) | 336.4 |
| Tibia-2  | (Nm) | 277.2 |
| Tibia-3  | (Nm) | 206.4 |
| Tibia-4  | (Nm) | 132.8 |
| Knee-ACL | (mm) | 8.6   |
| Knee-PCL | (mm) | 4.0   |
| Knee-MCL | (mm) | 16.1  |



# Test Results

## Simplified Car Model (T02) $\Leftarrow$ Flex-GT, $H_1 = \text{base} + 50 \text{ mm}$

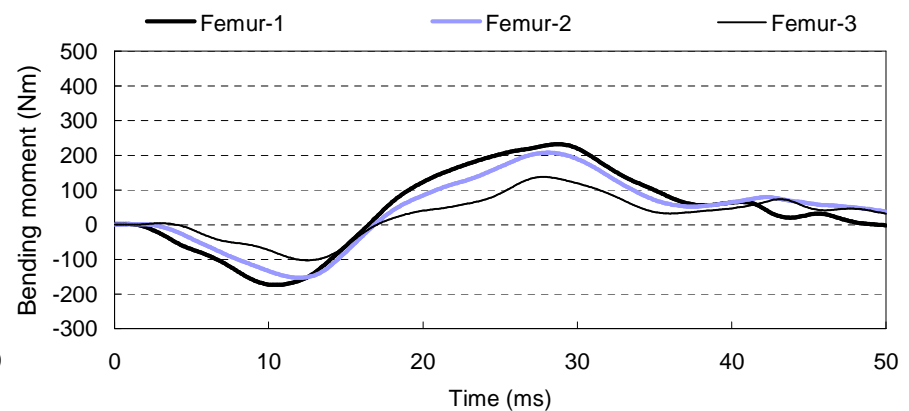
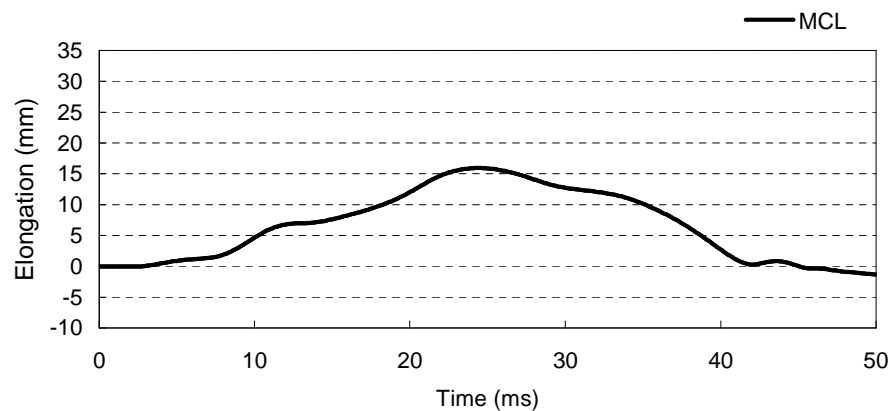
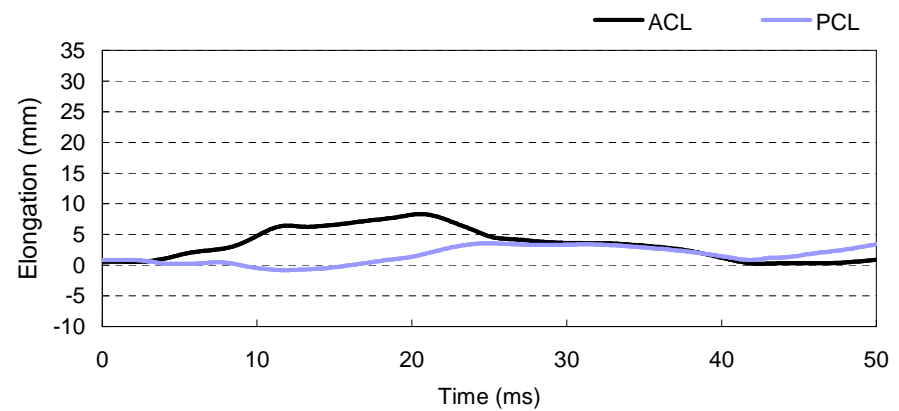
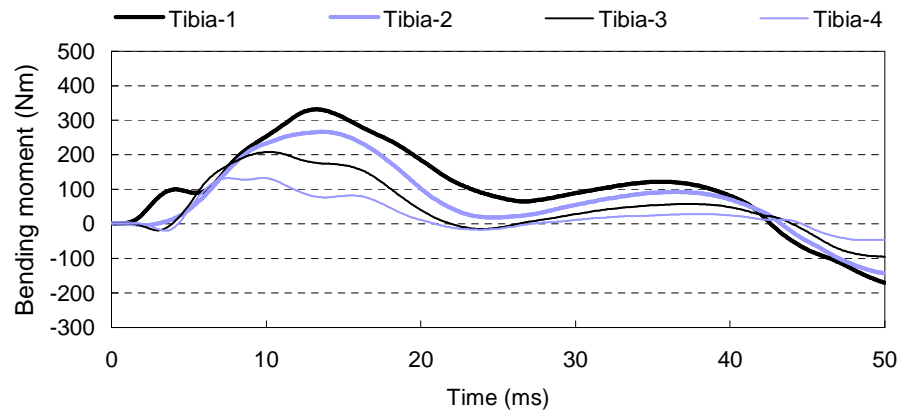
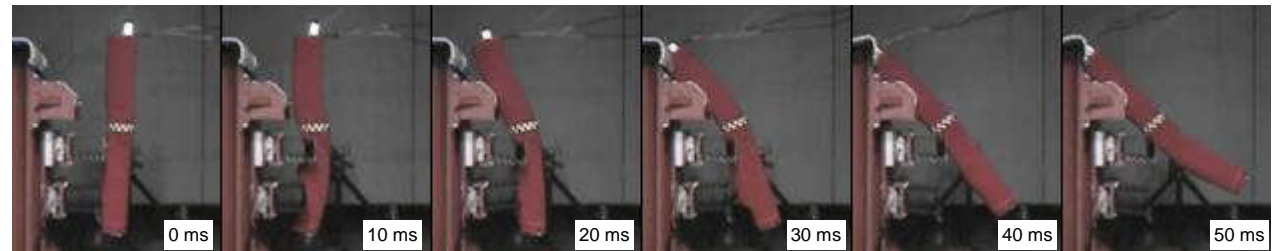
|          | unit | Max.  |
|----------|------|-------|
| Femur-3  | (Nm) | 141.4 |
| Femur-2  | (Nm) | 211.8 |
| Femur-1  | (Nm) | 235.8 |
| Tibia-1  | (Nm) | 339.3 |
| Tibia-2  | (Nm) | 272.0 |
| Tibia-3  | (Nm) | 209.1 |
| Tibia-4  | (Nm) | 133.5 |
| Knee-ACL | (mm) | 8.9   |
| Knee-PCL | (mm) | 3.6   |
| Knee-MCL | (mm) | 16.4  |



# Test Results

## Simplified Car Model (T03) $\Leftarrow$ Flex-GT, $H_1 = \text{base} + 50 \text{ mm}$

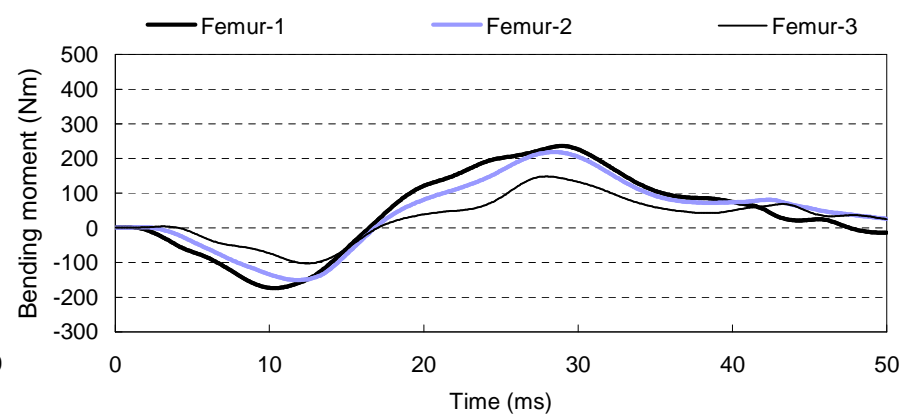
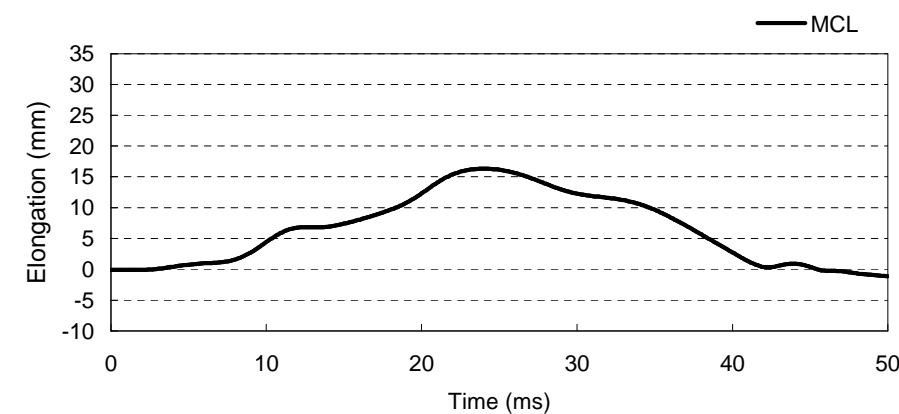
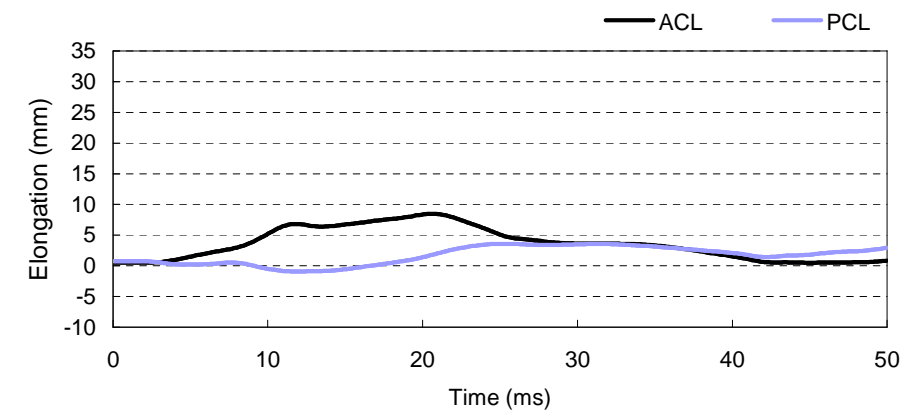
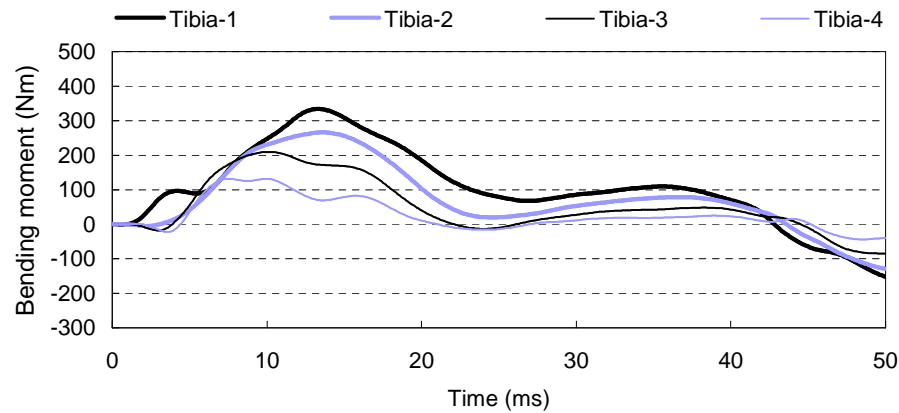
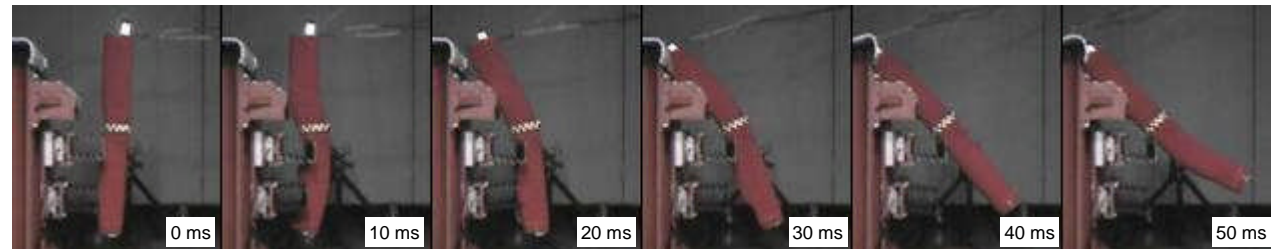
|          | unit | Max.  |
|----------|------|-------|
| Femur-3  | (Nm) | 137.9 |
| Femur-2  | (Nm) | 207.1 |
| Femur-1  | (Nm) | 231.8 |
| Tibia-1  | (Nm) | 331.2 |
| Tibia-2  | (Nm) | 266.5 |
| Tibia-3  | (Nm) | 208.1 |
| Tibia-4  | (Nm) | 132.5 |
| Knee-ACL | (mm) | 8.3   |
| Knee-PCL | (mm) | 3.6   |
| Knee-MCL | (mm) | 15.9  |



# Test Results

## Simplified Car Model (T04) $\Leftarrow$ Flex-GT, $H_1 = \text{base} + 50 \text{ mm}$

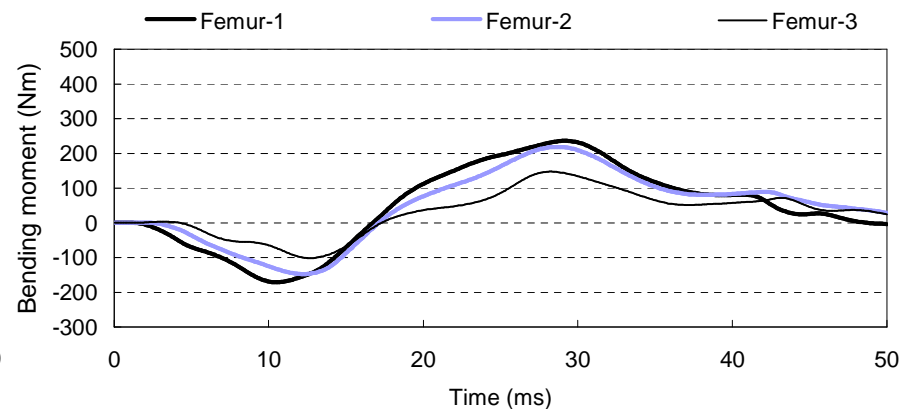
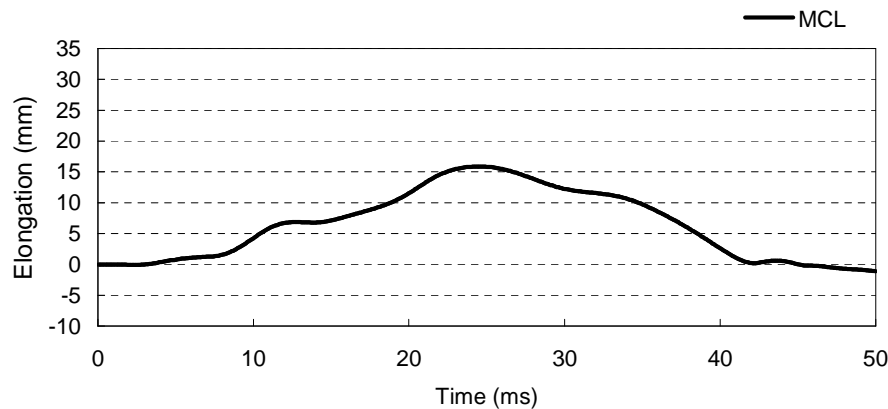
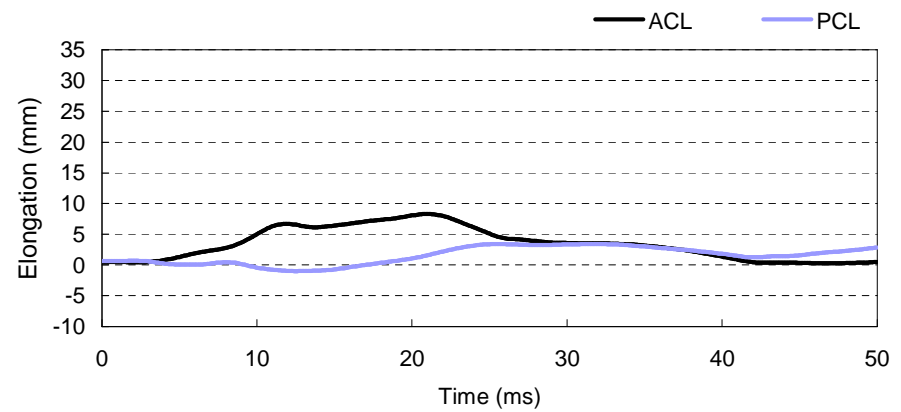
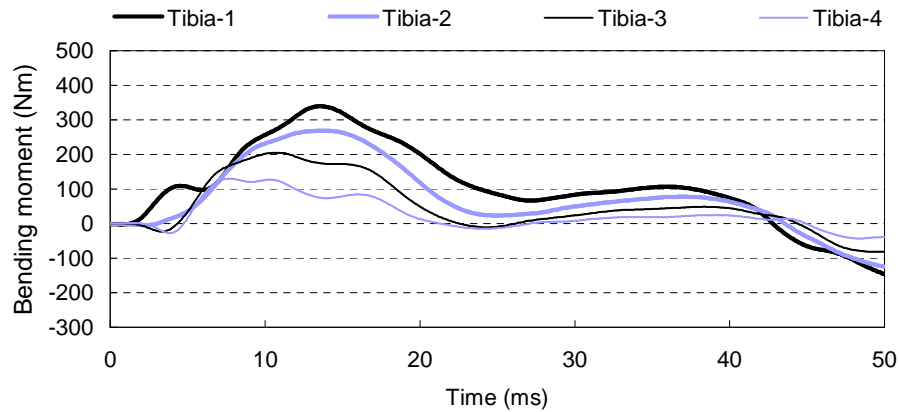
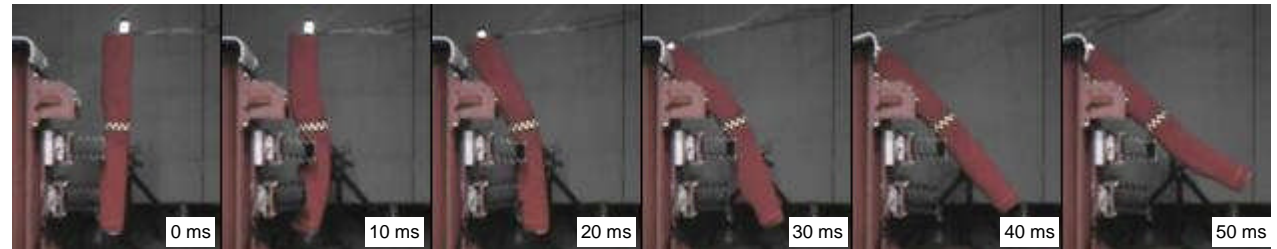
|          | unit | Max.  |
|----------|------|-------|
| Femur-3  | (Nm) | 148.4 |
| Femur-2  | (Nm) | 218.6 |
| Femur-1  | (Nm) | 235.7 |
| Tibia-1  | (Nm) | 333.7 |
| Tibia-2  | (Nm) | 266.2 |
| Tibia-3  | (Nm) | 209.2 |
| Tibia-4  | (Nm) | 131.3 |
| Knee-ACL | (mm) | 8.4   |
| Knee-PCL | (mm) | 3.5   |
| Knee-MCL | (mm) | 16.3  |



# Test Results

## Simplified Car Model (T05) $\Leftarrow$ Flex-GT, $H_1 = \text{base} + 50 \text{ mm}$

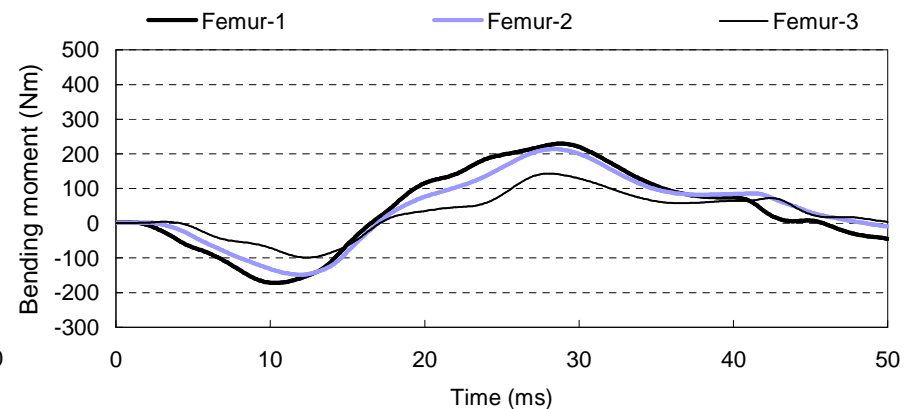
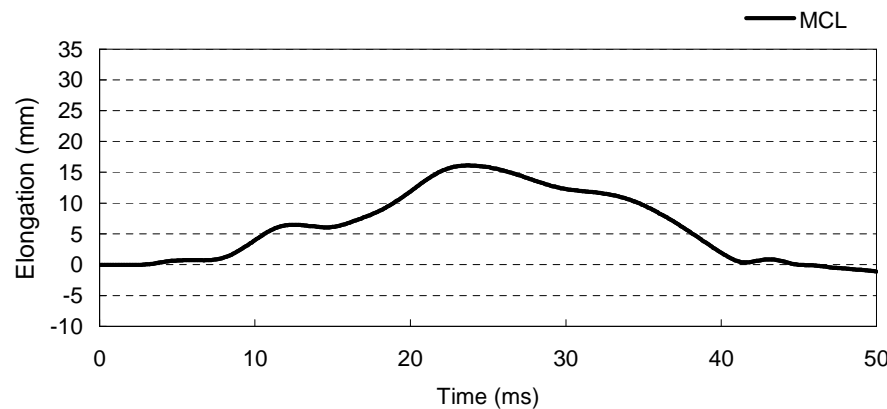
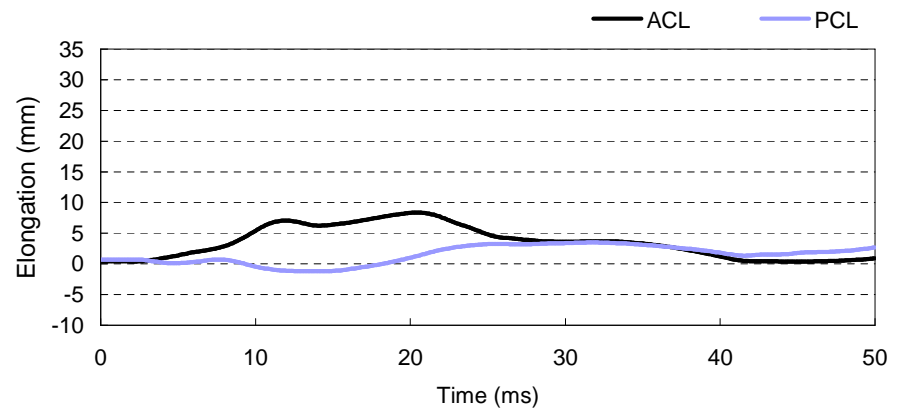
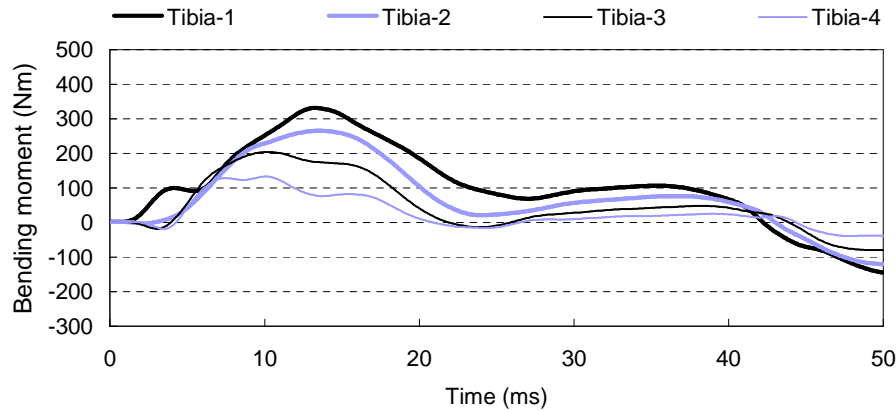
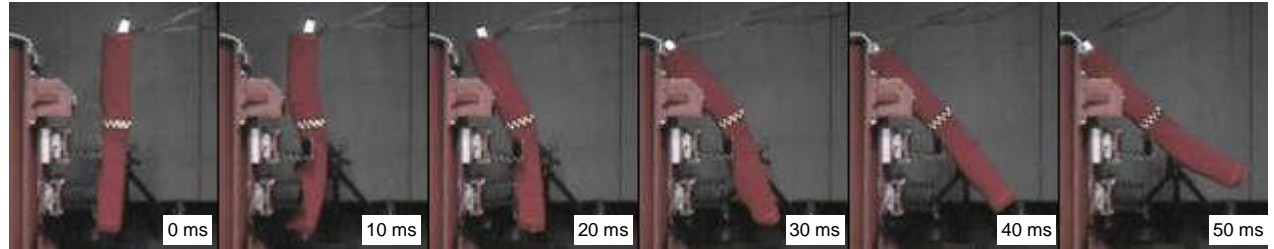
|          | unit | Max.  |
|----------|------|-------|
| Femur-3  | (Nm) | 147.5 |
| Femur-2  | (Nm) | 218.7 |
| Femur-1  | (Nm) | 236.3 |
| Tibia-1  | (Nm) | 339.2 |
| Tibia-2  | (Nm) | 268.9 |
| Tibia-3  | (Nm) | 204.9 |
| Tibia-4  | (Nm) | 129.5 |
| Knee-ACL | (mm) | 8.3   |
| Knee-PCL | (mm) | 3.4   |
| Knee-MCL | (mm) | 15.9  |



# Test Results

## Simplified Car Model (T06) $\Leftarrow$ Flex-GT, $H_1 = \text{base} + 50 \text{ mm}$

|          | unit | Max.  |
|----------|------|-------|
| Femur-3  | (Nm) | 143.1 |
| Femur-2  | (Nm) | 213.7 |
| Femur-1  | (Nm) | 229.5 |
| Tibia-1  | (Nm) | 331.5 |
| Tibia-2  | (Nm) | 266.1 |
| Tibia-3  | (Nm) | 204.3 |
| Tibia-4  | (Nm) | 133.0 |
| Knee-ACL | (mm) | 8.4   |
| Knee-PCL | (mm) | 3.5   |
| Knee-MCL | (mm) | 16.1  |

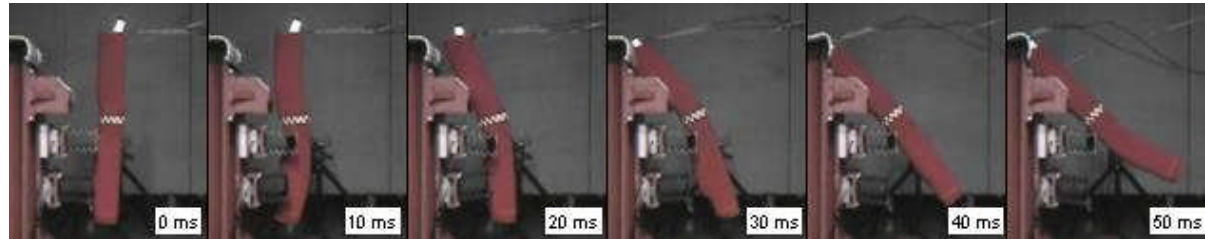


## Comparison of Test Results



# Comparisons Kinematics

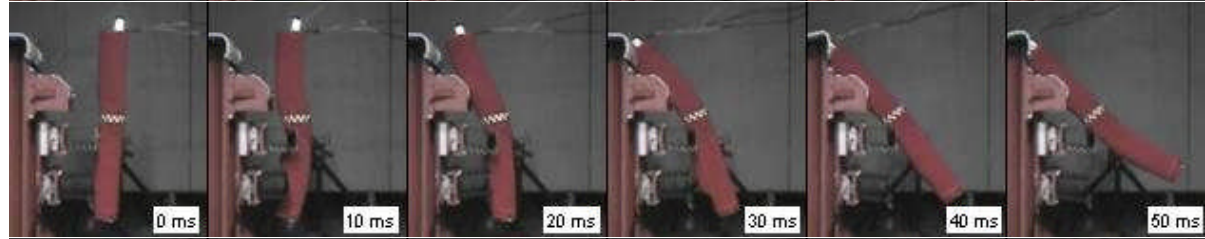
T01



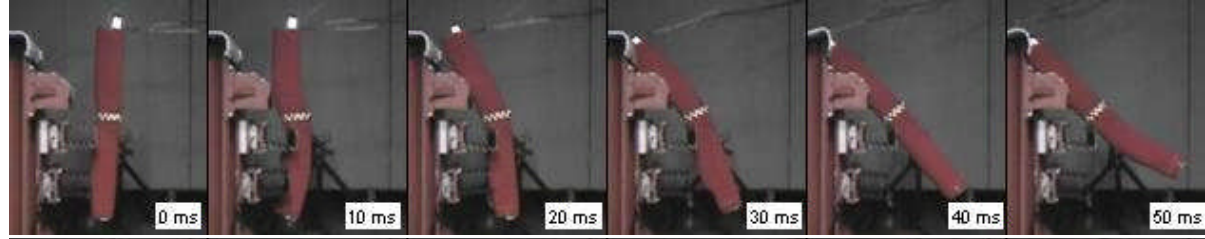
T02



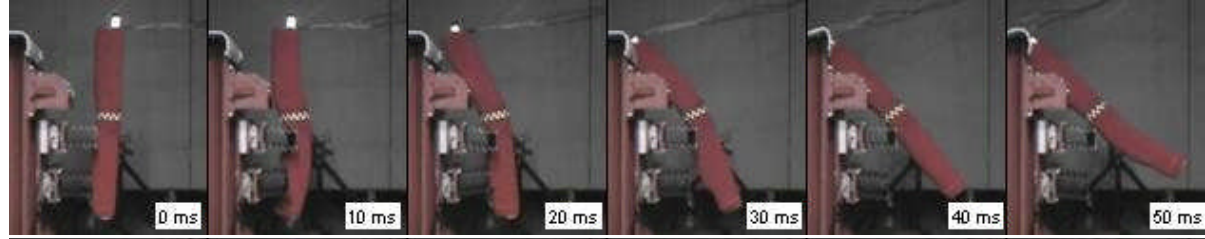
T03



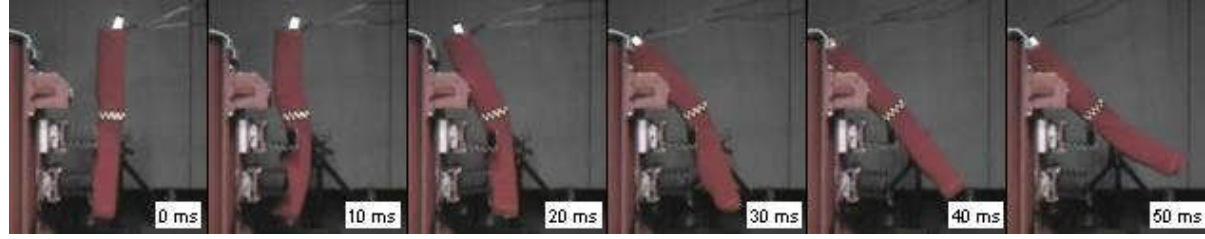
T04



T05

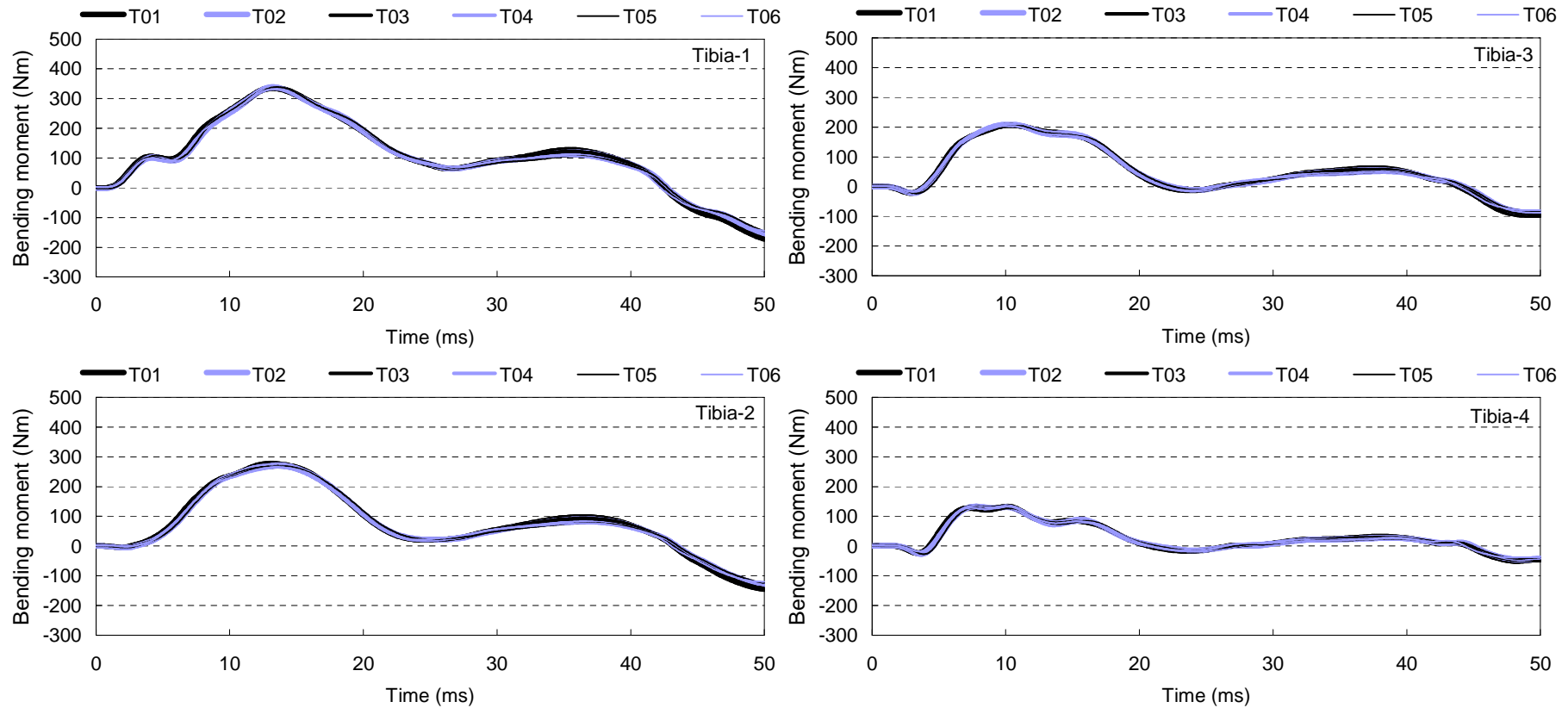


T06



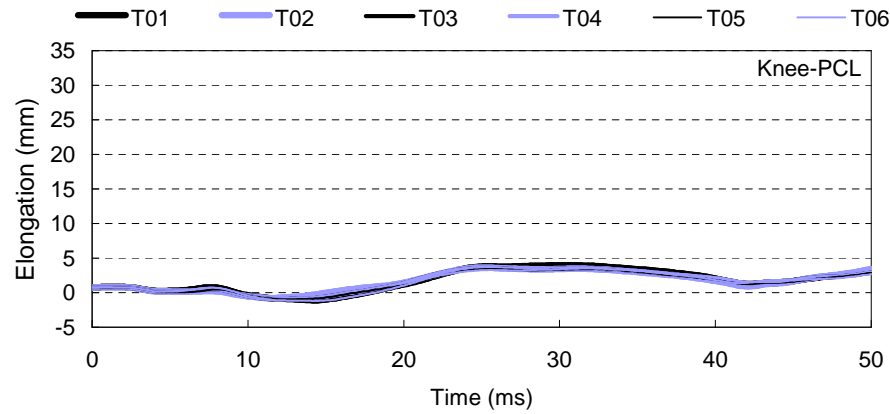
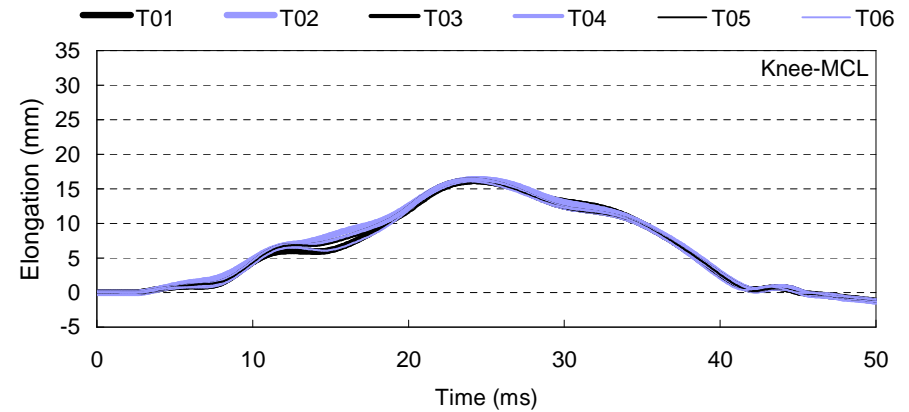
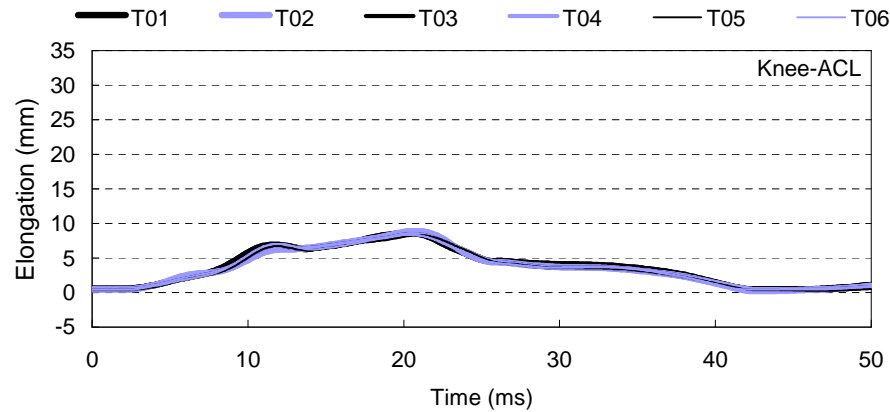
# Comparisons

## Wave form: Tibia-1, Tibia-2, Tibia-3, Tibia-4



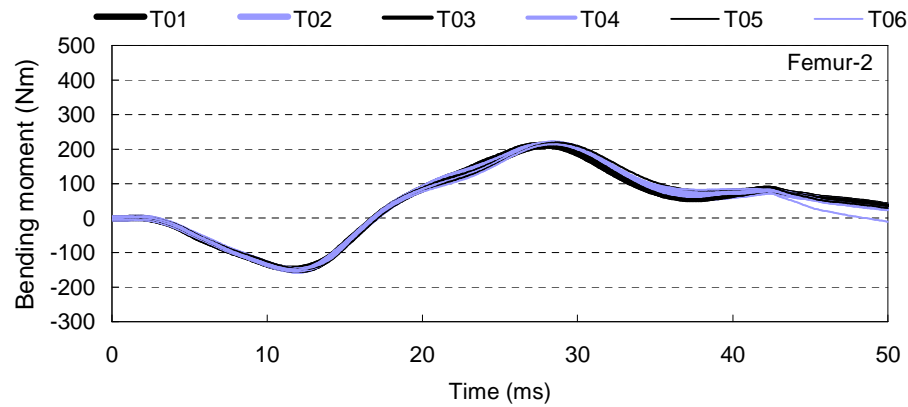
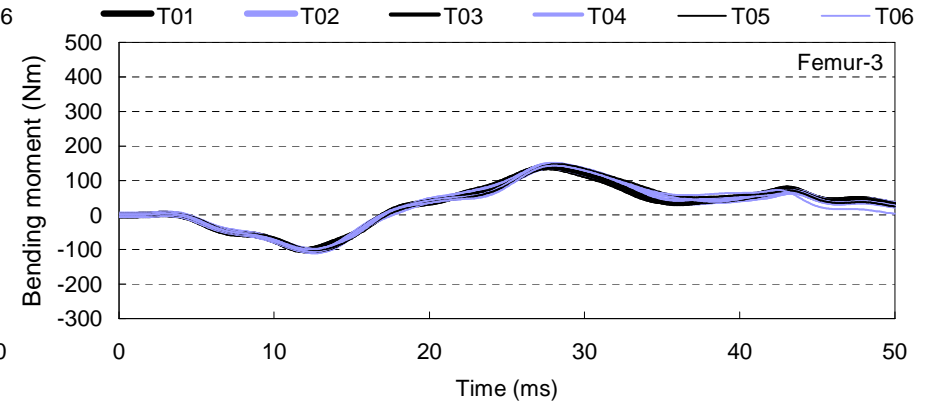
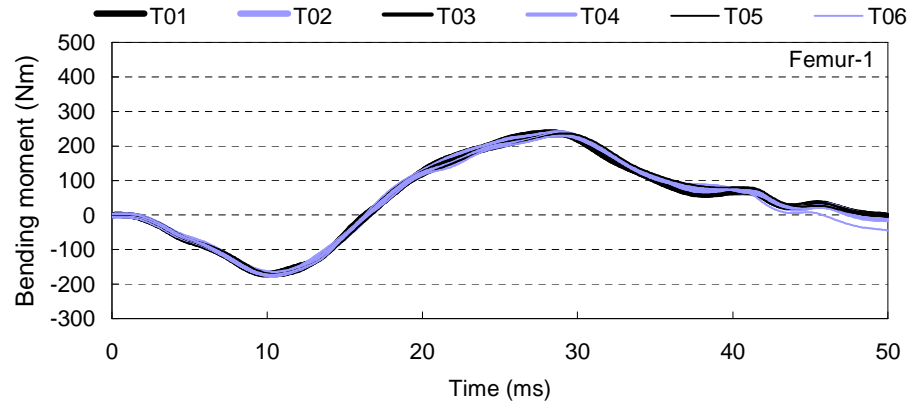
# Comparisons

## Wave form: Knee-ACL, Knee-PCL, Knee-MCL



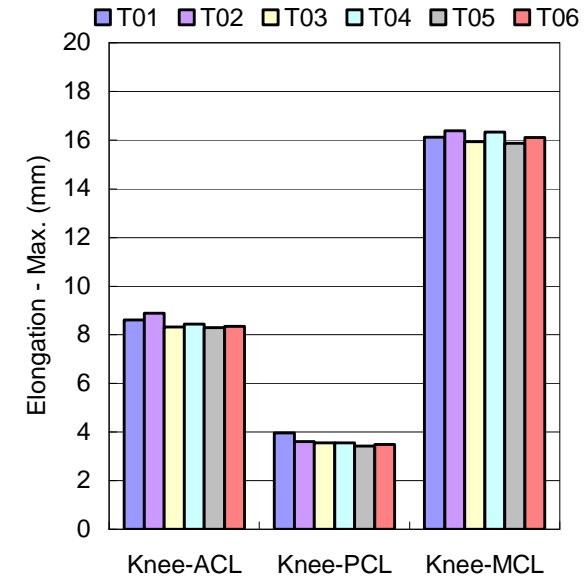
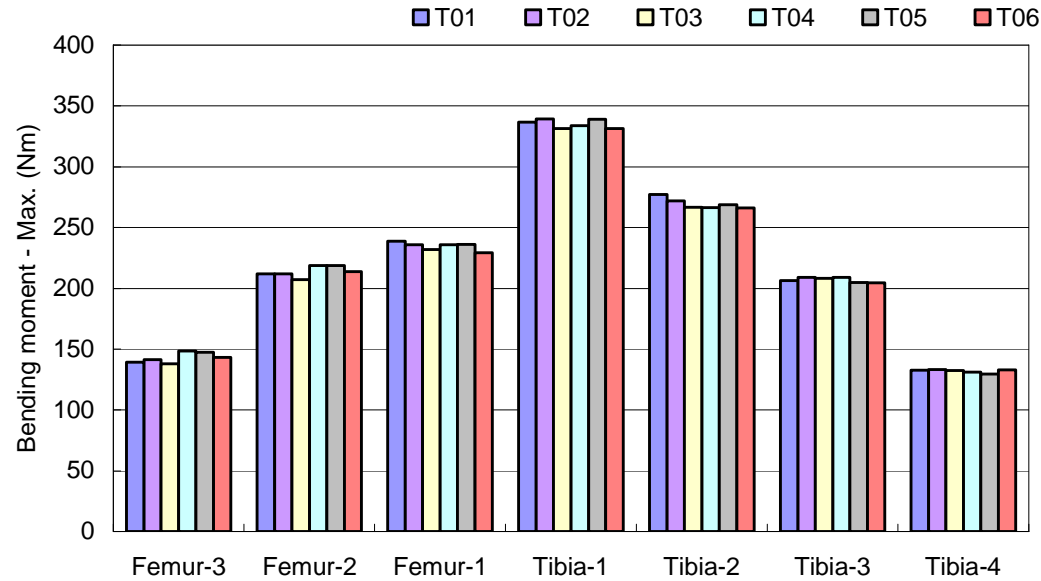
# Comparisons

## Wave form: Femur-1, Femur-2, Femur-3



# Comparisons

## Maximum Values



|            | Femur-3 | Femur-2 | Femur-1 | Tibia-1 | Tibia-2 | Tibia-3 | Tibia-4 |
|------------|---------|---------|---------|---------|---------|---------|---------|
| Avg. (Nm)  | 143     | 214     | 235     | 335     | 269     | 207     | 132     |
| SD (Nm)    | 4.32    | 4.43    | 3.39    | 3.65    | 4.41    | 2.10    | 1.47    |
| CV         | 3.0%    | 2.1%    | 1.4%    | 1.1%    | 1.6%    | 1.0%    | 1.1%    |
| Assessment | Good    | Good    | Good    | Good    | Good    | Good    | Good    |

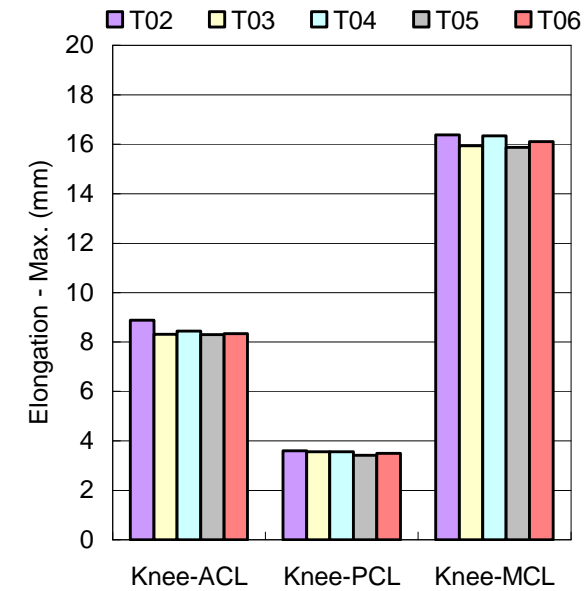
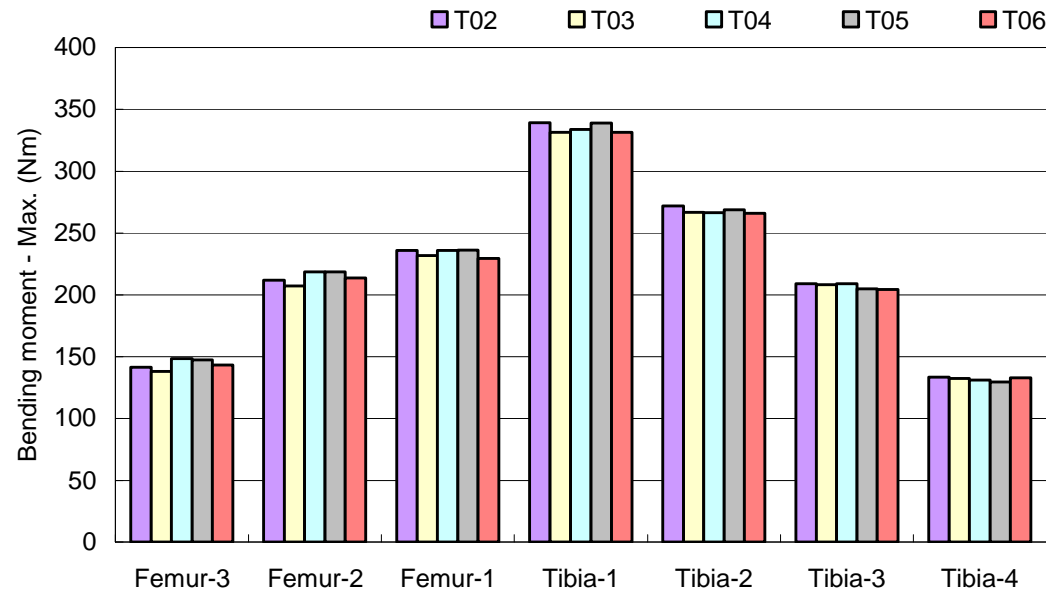
|            | Knee-ACL | Knee-PCL   | Knee-MCL |
|------------|----------|------------|----------|
| Avg. (mm)  | 8.5      | 3.6        | 16.1     |
| SD (mm)    | 0.22     | 0.18       | 0.21     |
| CV         | 2.6%     | 5.1%       | 1.3%     |
| Assessment | Good     | Acceptable | Good     |

SD: Standard deviation, CV: SD/Avg.

Good: less than 5%, Acceptable: from 5% to less than 7 %, Marginal: from 7% to less than 10 %, Not Acceptable: over 10 %

# Comparisons

## Maximum Values (excludes T01 (40.7km/h) test result)



|            | Femur-3 | Femur-2 | Femur-1 | Tibia-1 | Tibia-2 | Tibia-3 | Tibia-4 | Knee-ACL | Knee-PCL | Knee-MCL |
|------------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|
| Avg. (Nm)  | 144     | 214     | 234     | 335     | 268     | 207     | 132     | 8.5      | 3.5      | 16.1     |
| SD (Nm)    | 4.36    | 4.87    | 3.04    | 4.02    | 2.52    | 2.33    | 1.60    | 0.24     | 0.07     | 0.23     |
| CV         | 3.0%    | 2.3%    | 1.3%    | 1.2%    | 0.9%    | 1.1%    | 1.2%    | 2.9%     | 1.9%     | 1.5%     |
| Assessment | Good    | Good    | Good    | Good    | Good    | Good    | Good    | Good     | Good     | Good     |

SD: Standard deviation, CV: SD/Avg.

Good: less than 5%, Acceptable: from 5% to less than 7 %, Marginal: from 7% to less than 10 %, Not Acceptable: over 10 %