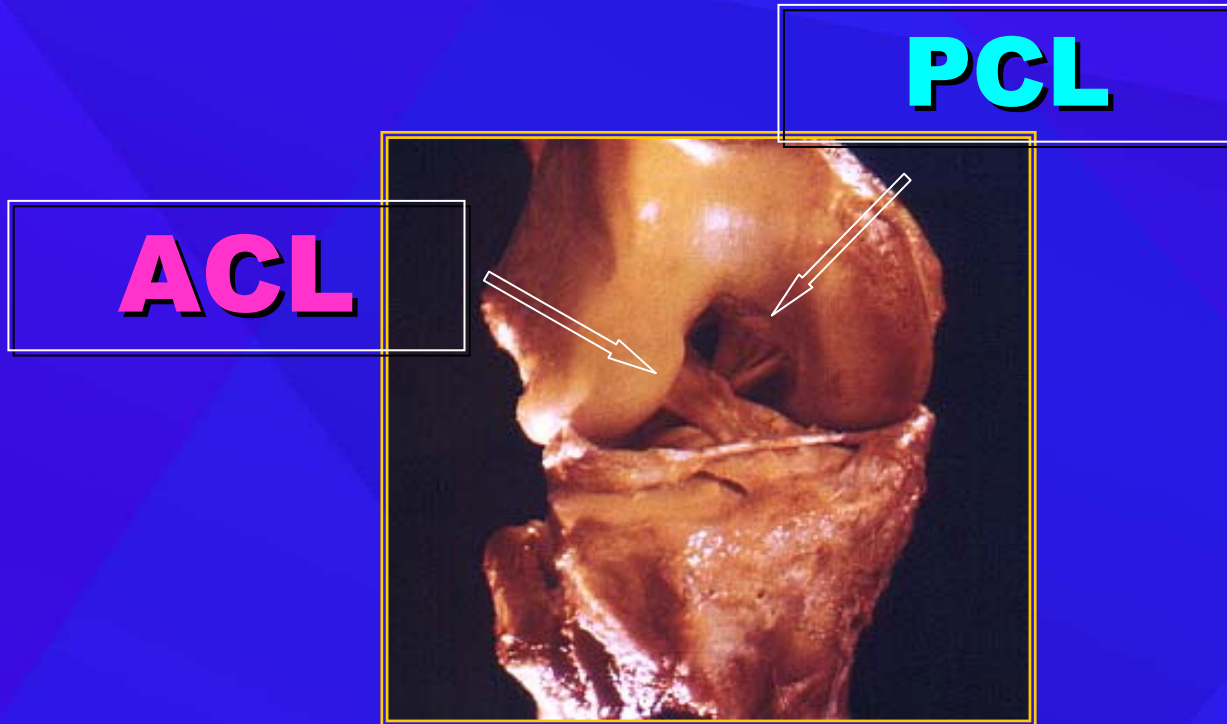


INTRODUCTION

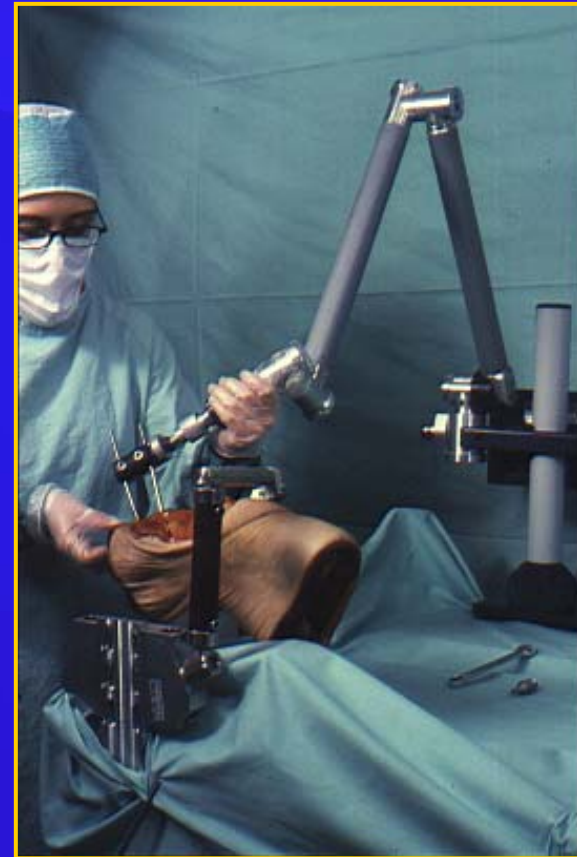


WIDELY INVESTIGATED

**COMPLETE THE
NUMERICAL DESCRIPTION
OF ACL and PCL FIBERS
DURING RANGE OF MOTION**

8 FRESH CADAVERIC KNEES; COMPUTER DISSECTION WITH FARO ARM

(0.3 mm/0.3° accuracy)



Martelli, Comp Meth&Progr in Med (2003)

E.P. 00128769.7 (2000)

US. 0147415-A1 (2002)

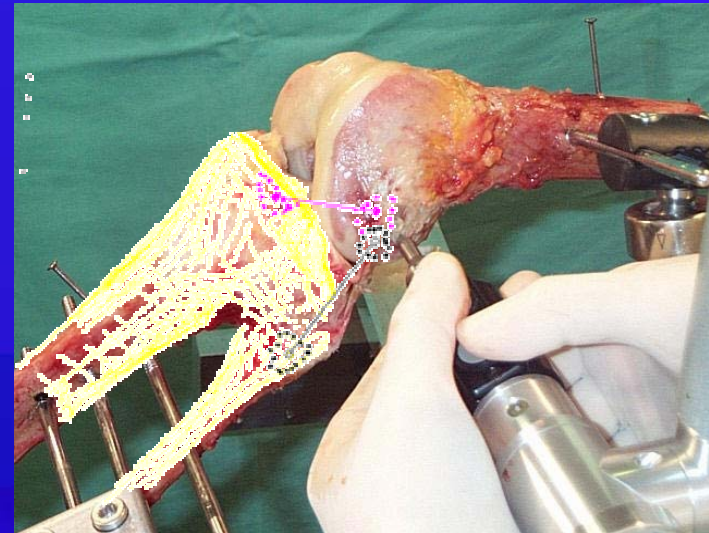
PERFORMED TESTS

- **PROM**
- **DRAWER TEST**
- **I-E ROTATION AT 90° OF FLEXION**

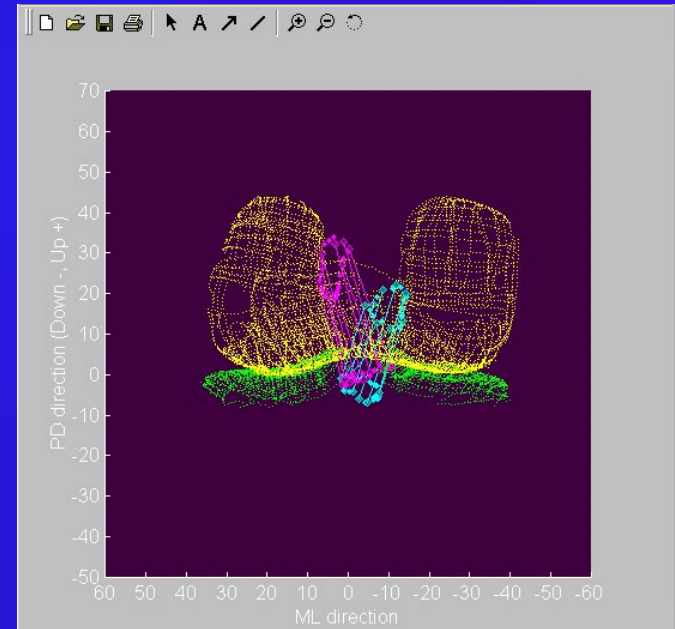
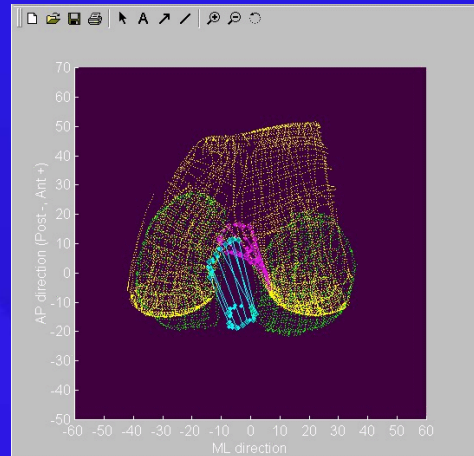
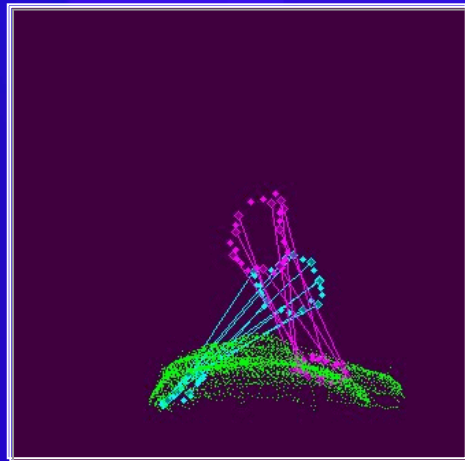


DIGITIZATION

- **TIBIAL SURFACE**
- **FEMORAL SURFACE**
- **INSERTIONS AREA OF PCL**
- **9 LINEAR FIBERS ON PCL (AL/PM B)**



COMPUTER ELABORATION AND 3D INTERACTIVE JOINT DISPLAY



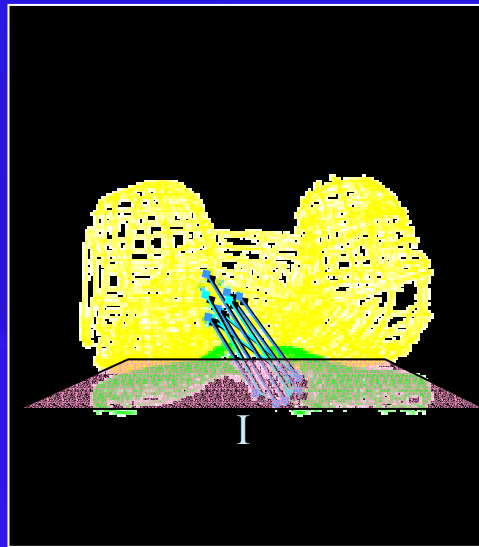
LIGAMENTS ANALYSIS

- **Elongation during PROM + IE**
- **Orientation during PROM + IE**
- **Rotation during PROM + IE**

Zaffagnini S., J. Med.Eng. & Tech 2000
Martelli S., Annals of Biomed Eng., 2001
Martelli S., Comp. Meth & Prog in Med. 2003
Martelli S., J Bone & Joint Surg [Br] 2002

FIBERS COMPUTATION

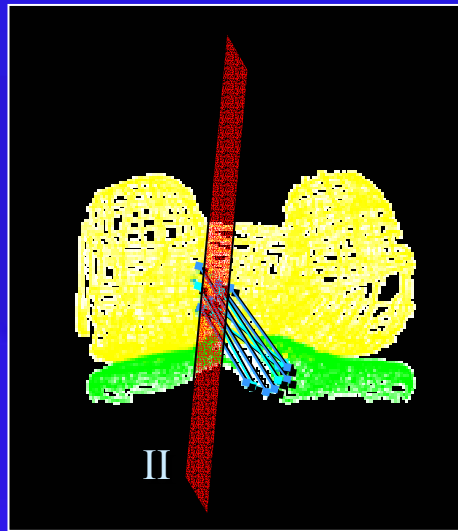
3D ORIENTATION WITH RESPECT TO ANATOMICAL PLANES



➤ **I TIBIAL PLATEAU**

FIBERS COMPUTATION

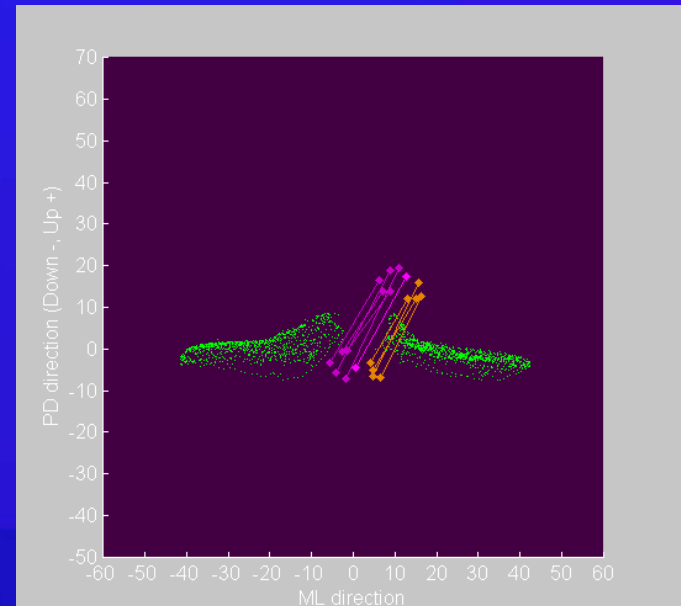
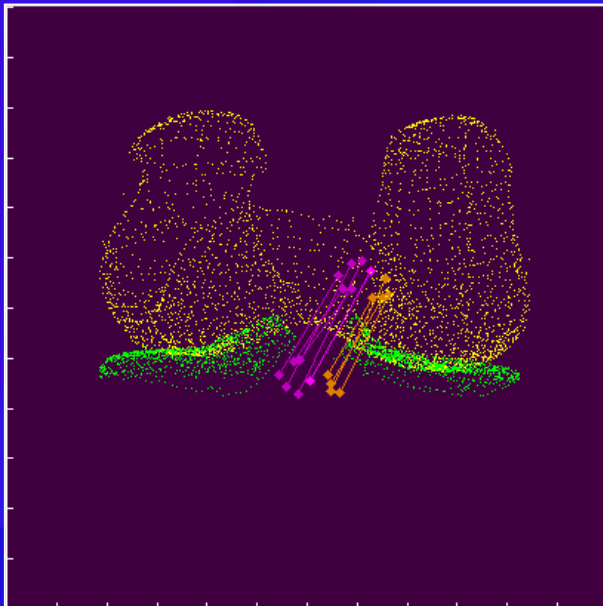
3D ORIENTATION WITH RESPECT TO ANATOMICAL PLANES



➤ **II FEMORAL NOTCH**

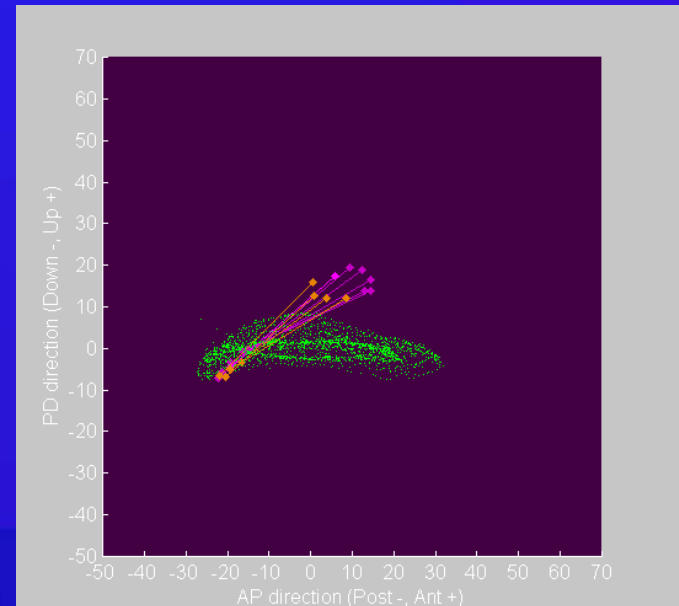
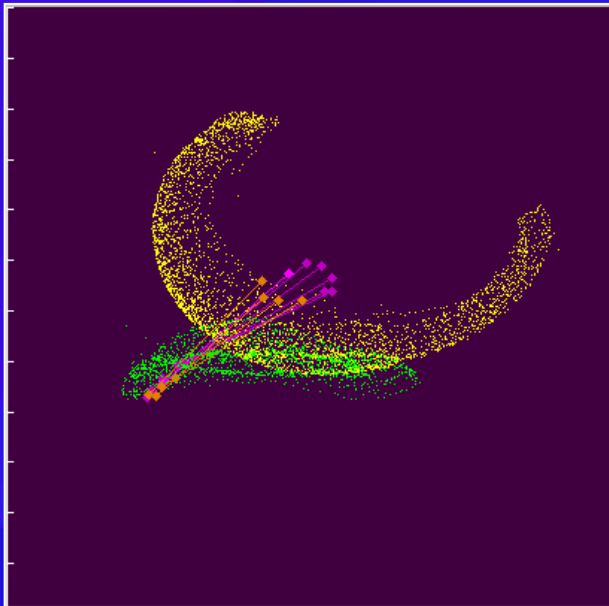
FIBERS COMPUTATION

3D ELONGATION



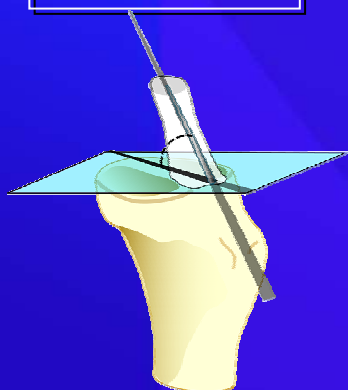
FIBERS COMPUTATION

TWISTING

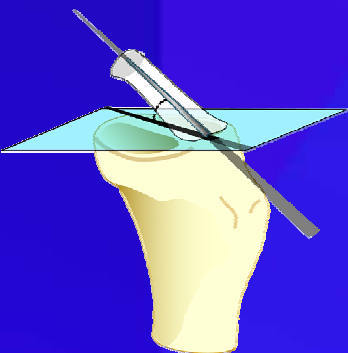


LONGATION AND ORIENTATION WITH TIBIAL PLATEAU

ACL

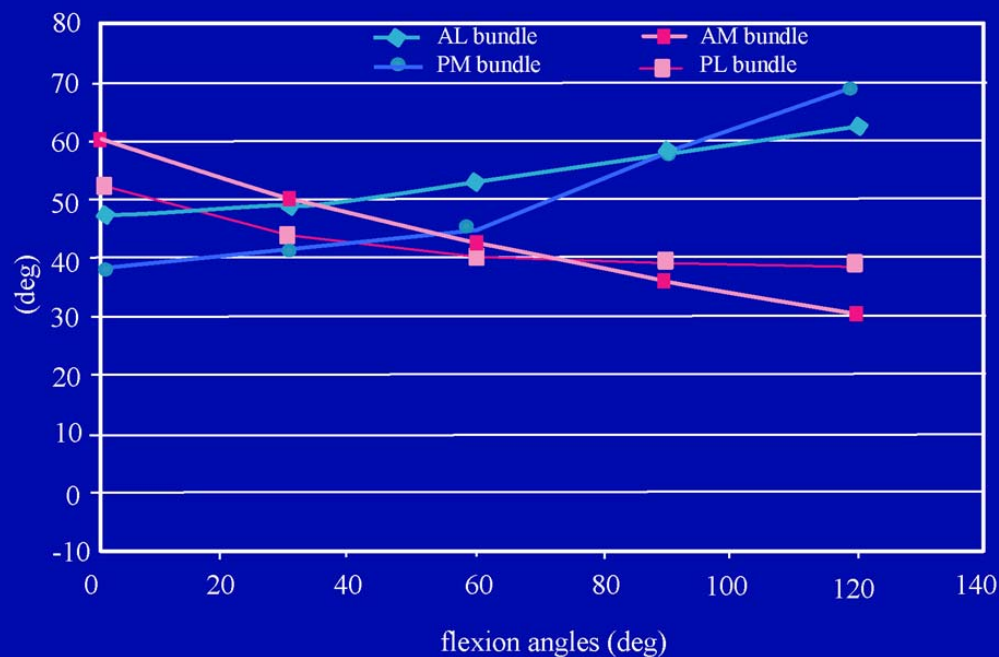


EXT 56.5°

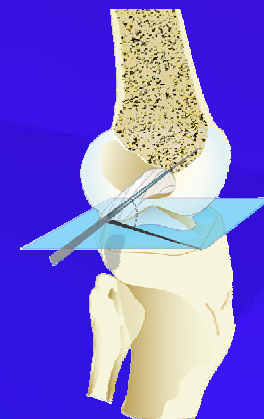


FLEX 33.5°

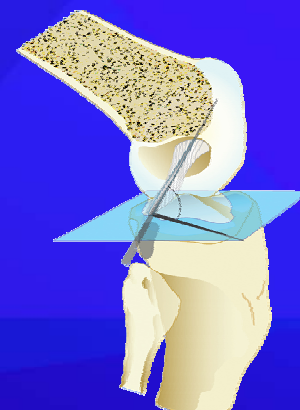
PROM



PCL



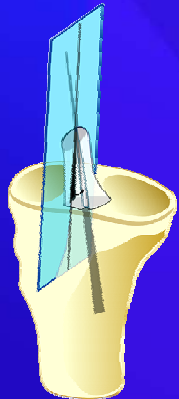
EXT 42.4°



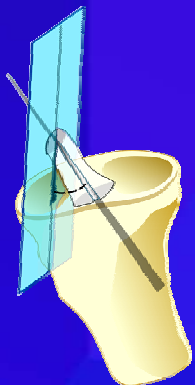
FLEX 62.8°

Elongation and ORIENTATION WITH FEMORAL NOTCH

ACL

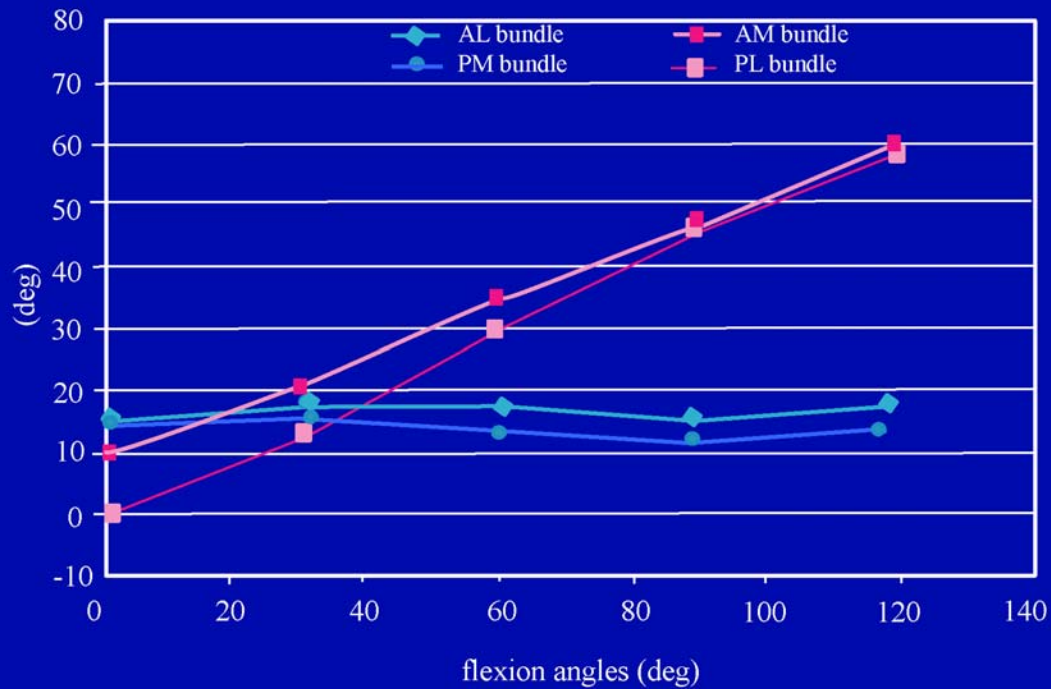


EXT 4.6°



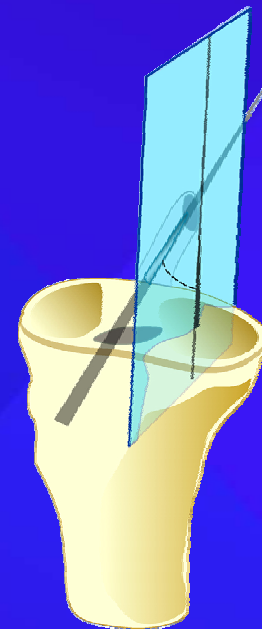
FLEX 58.4°

PROM



PCL

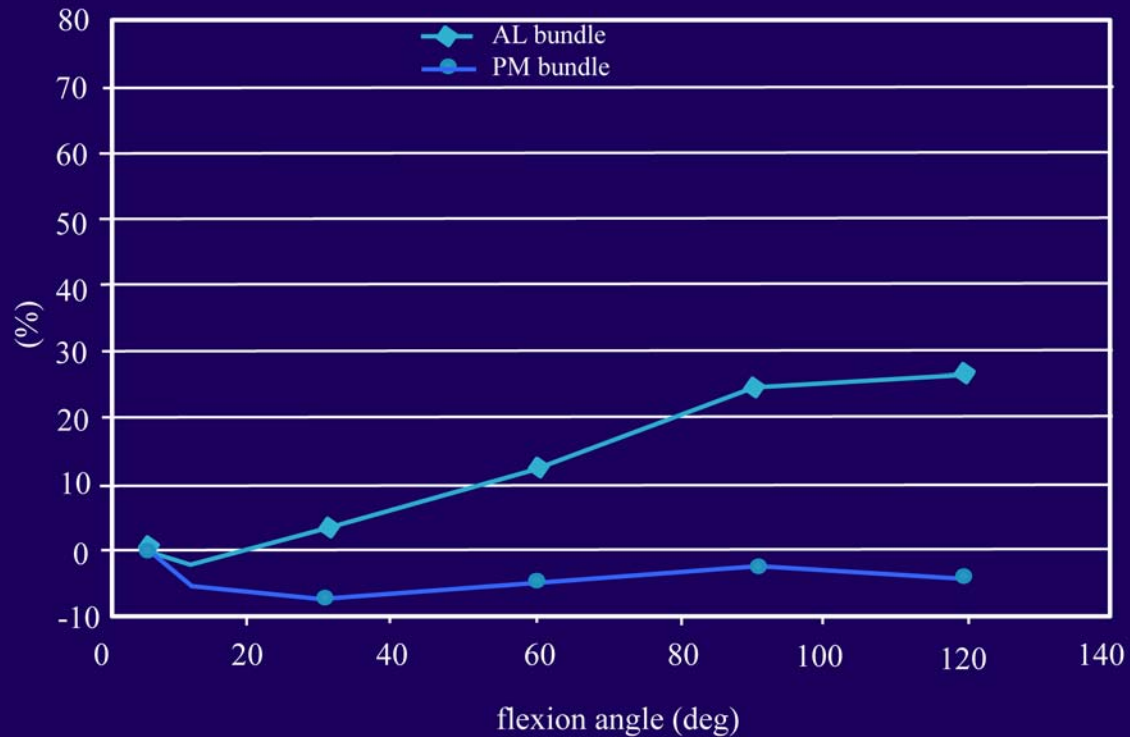
EXT 14.1°



FLEX 16.4°

RESULTS : ELONGATION

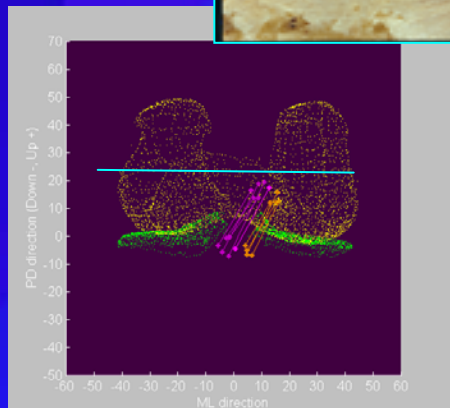
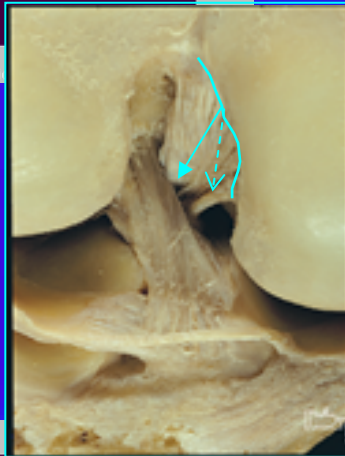
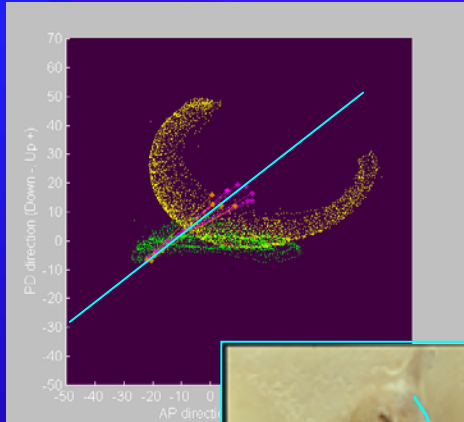
PROM



**AL B. INCREASES
LENGTH 25%**

**PM B. DECREASES
LENGTH 4.5%**

RESULTS : TWISTING



**TWISTING AMOUNT
DEPENDS ON THE
CHOSEN AXIS OF
ROTATION, e.g. EITHER
THE LIGAMENT OR
THE FEMORAL AXIS**