



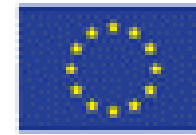
Second Course "Motion Analysis and clinics:
why to set up a Motion Analysis Lab ?"
- *Clinical cases presentation* -

TRAMA Project

January 14 - 17th 2008

LEURS Françoise,
LNMB - ULB





BILATERAL FEMORAL AMPUTATION:

GAIT REHABILITATION PROGRAM

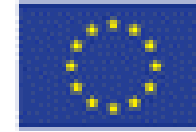
Françoise Leurs,
Leire Echeverria Idiarregaray,
Bernard Dan

Course “Motion Analysis and clinics: why to set up a Motion Analysis Lab ?”
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Clinical case presentation



- M.A. Is a 23 year old Algerian soldier, height: 1.72m, weight: 77kg
- Bilateral femoral amputation after a traumatic accident in 08/2003. First prosthesis 07/2005 in Brussels. (Before only wheelchair).
- Gait rehabilitation programm.
- Two types of prosthetic knees: locked knee (stability) & C-Leg (microprocessor- controlled knee prosthesis with hydraulic stance control)

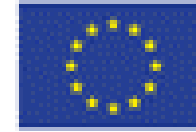


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Clinical case presentation



MATERIALS

- Equipment: BTS optoelectronic system with 6 cameras and video
- M. A. was asked to walk with two crutches as naturally as possible at his preferred speed on the walkway.
- The first acquisition is done after 1 month of gait rehabilitation with a locked knee joint, while the second acquisition is made after the second month of gait rehabilitation with the C-Leg.
- On each day, 6 trials were acquired, with bilateral kinematics and video. We chose one representative trial for each day.

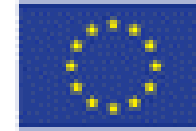


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Clinical case presentation



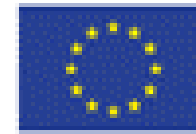
- Physical assessment: both stumps are in good trophic shape, approximately same length (42 and 43 cm from IC), not swollen. Correct hip mobility.
- Static equilibrium with eyes open and eyes closed (30s)
- Up and Go test: (Locked knee: 40sec, C-Leg: 22sec)
- Endurance test on treadmill (speed=1.5km/h) (Locked knee: 3.18min, C-Leg: 18.1min)
- Quality of life assessment: The C-Leg prosthesis can be used longer and more often and the sit-to-stand is easier. But there are more falls and low back pain after C-Leg use. Is this only due to the more intense use?

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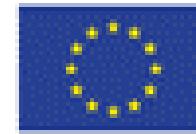


Clinical case presentation



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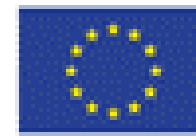
| Observed variables | Fixed | Knee | C-Leg | |
|---------------------|--------|--------|-------|------|
| | right | left | right | left |
| Speed (m/s) | 0.28 | | 0.69 | |
| Cycle duration (ms) | 2210 | 2050 | 1530 | 1510 |
| Step frequency/min | 56 | | 79 | |
| % stance phase | 74 | 82 | 65 | 64 |
| Step length (mm) | 352.4 | 277.79 | 504 | 562 |
| Step width (mm) | 275.26 | | 212 | |

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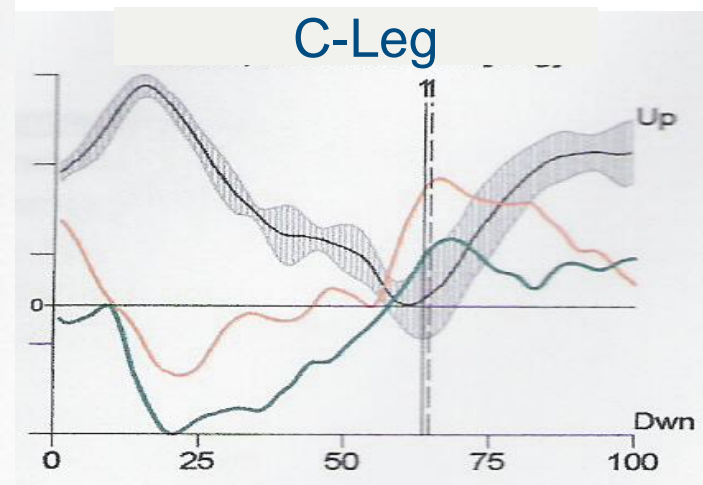
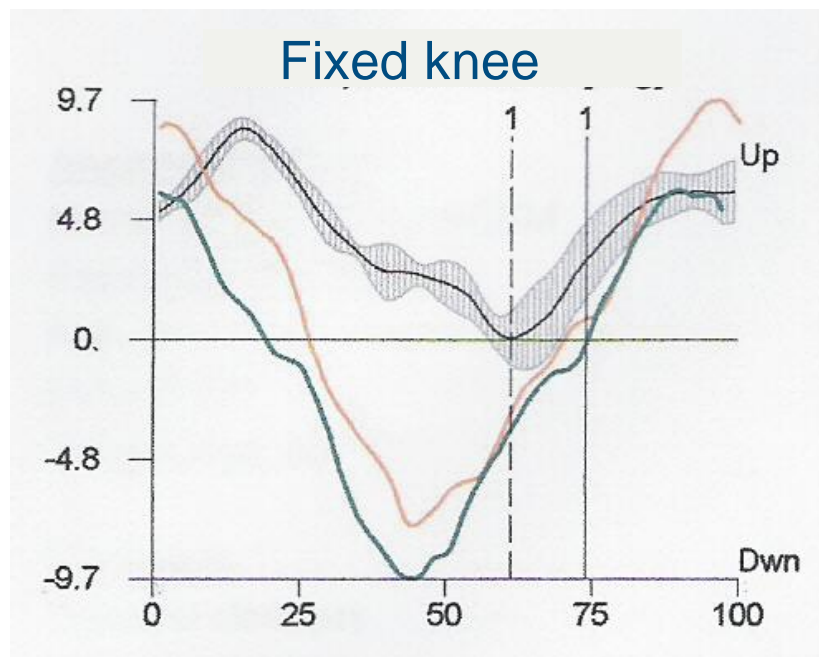




Clinical case presentation



Pelvic obliquity



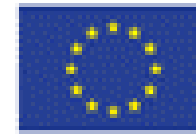
— right — Right TO
— left - - - - Left TO

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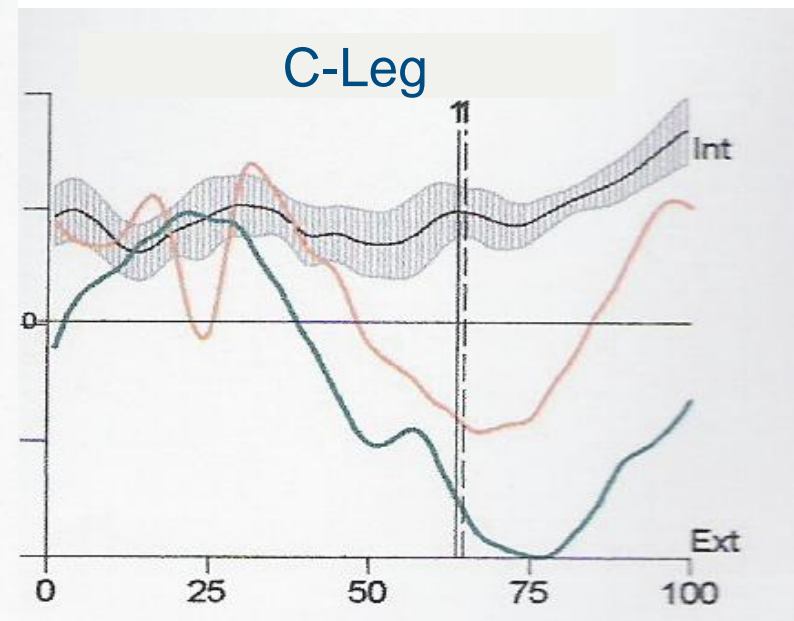
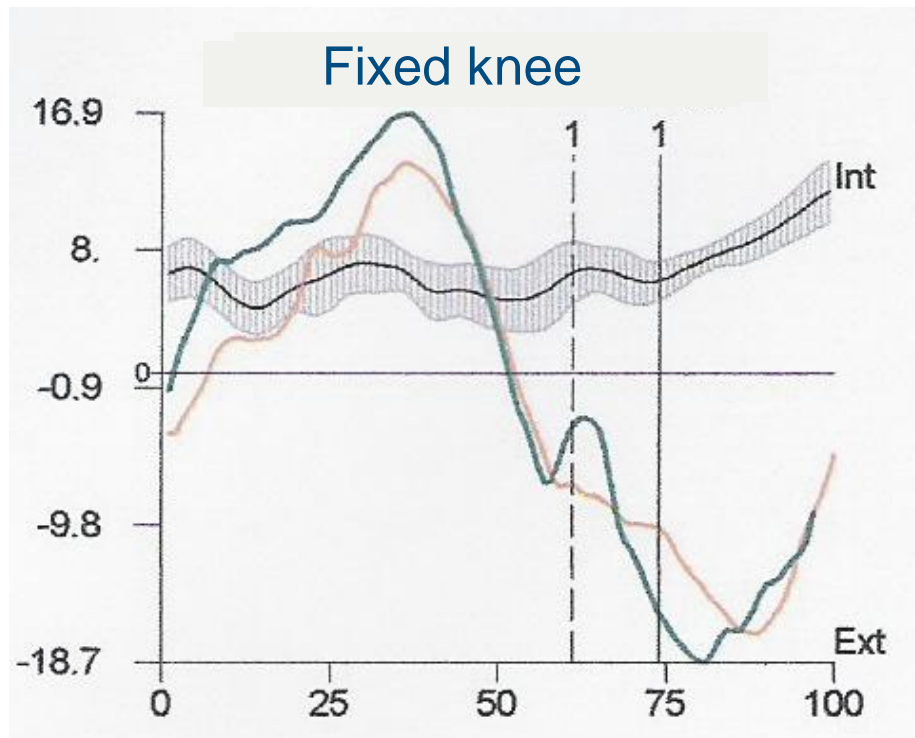




Clinical case presentation



Pelvic Rotation

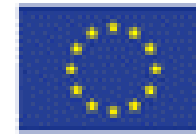


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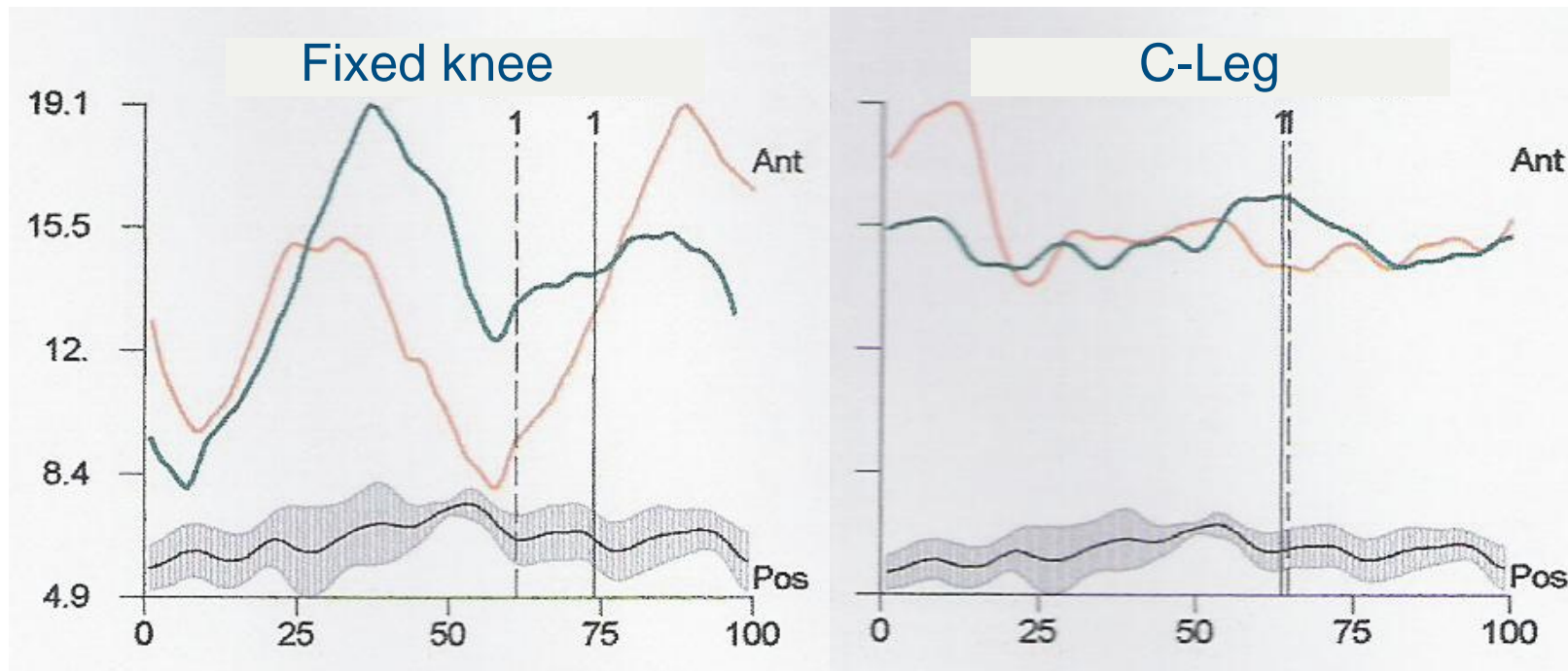




Clinical case presentation



Pelvic Tilt

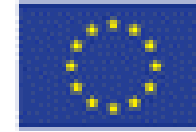


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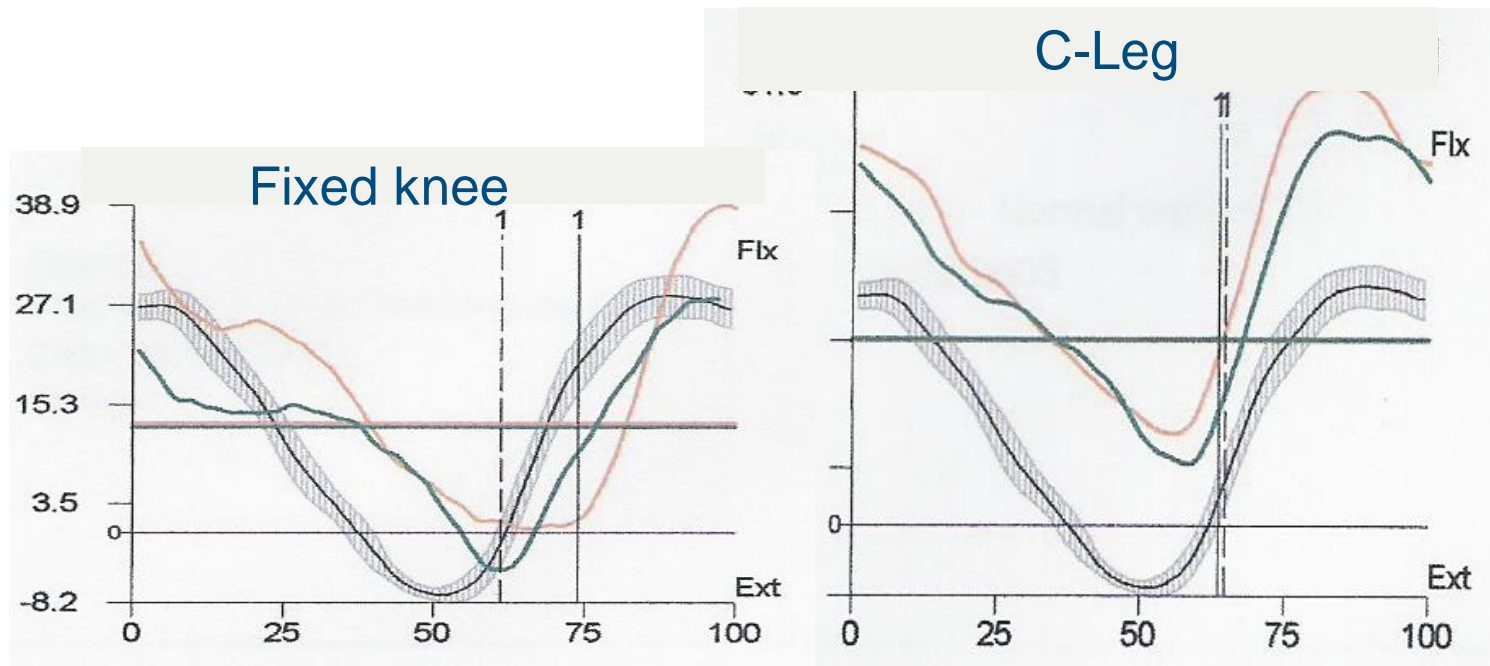




Clinical case presentation



Hip flexion/extension

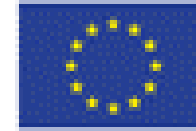


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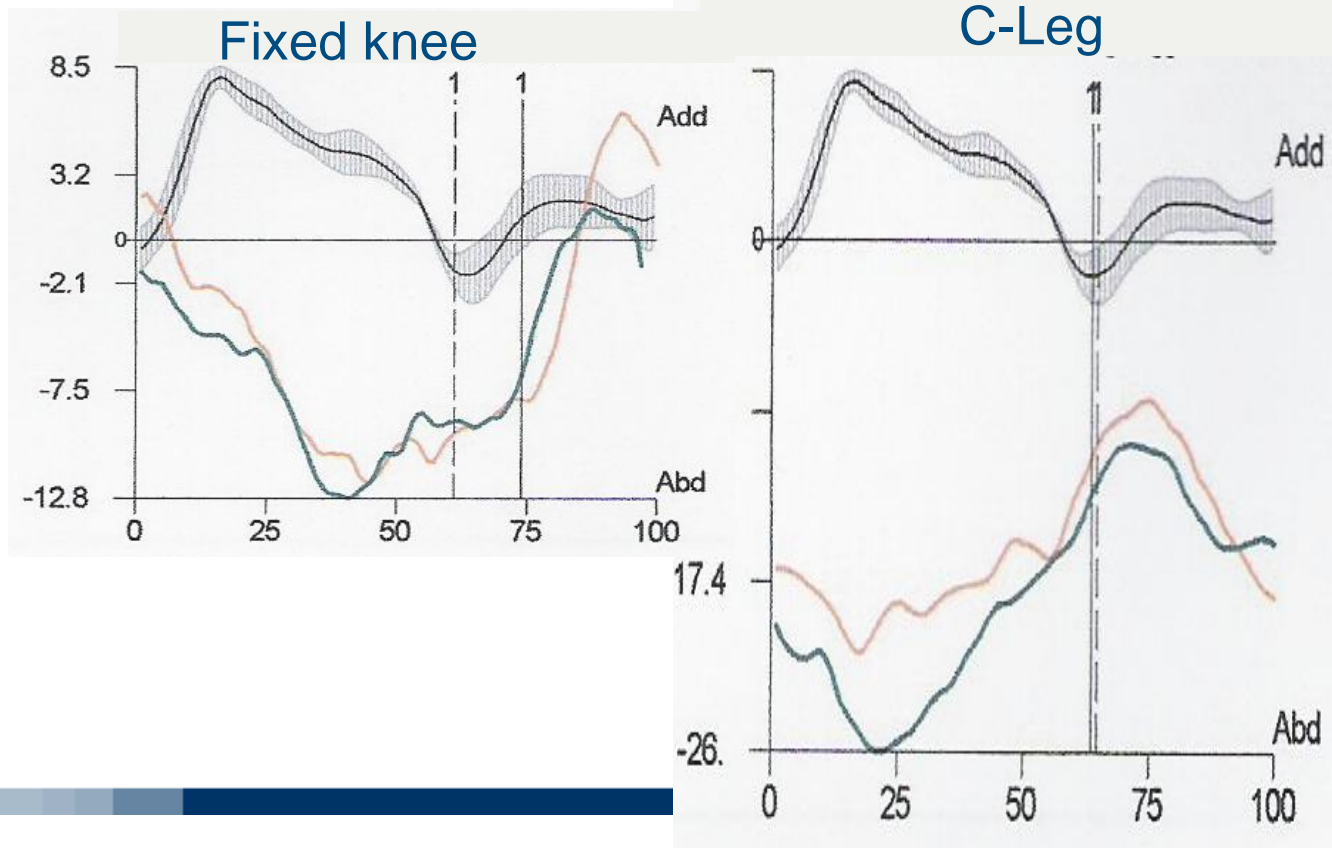




Clinical case presentation



Hip Adduction-Abduction

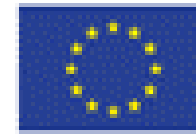


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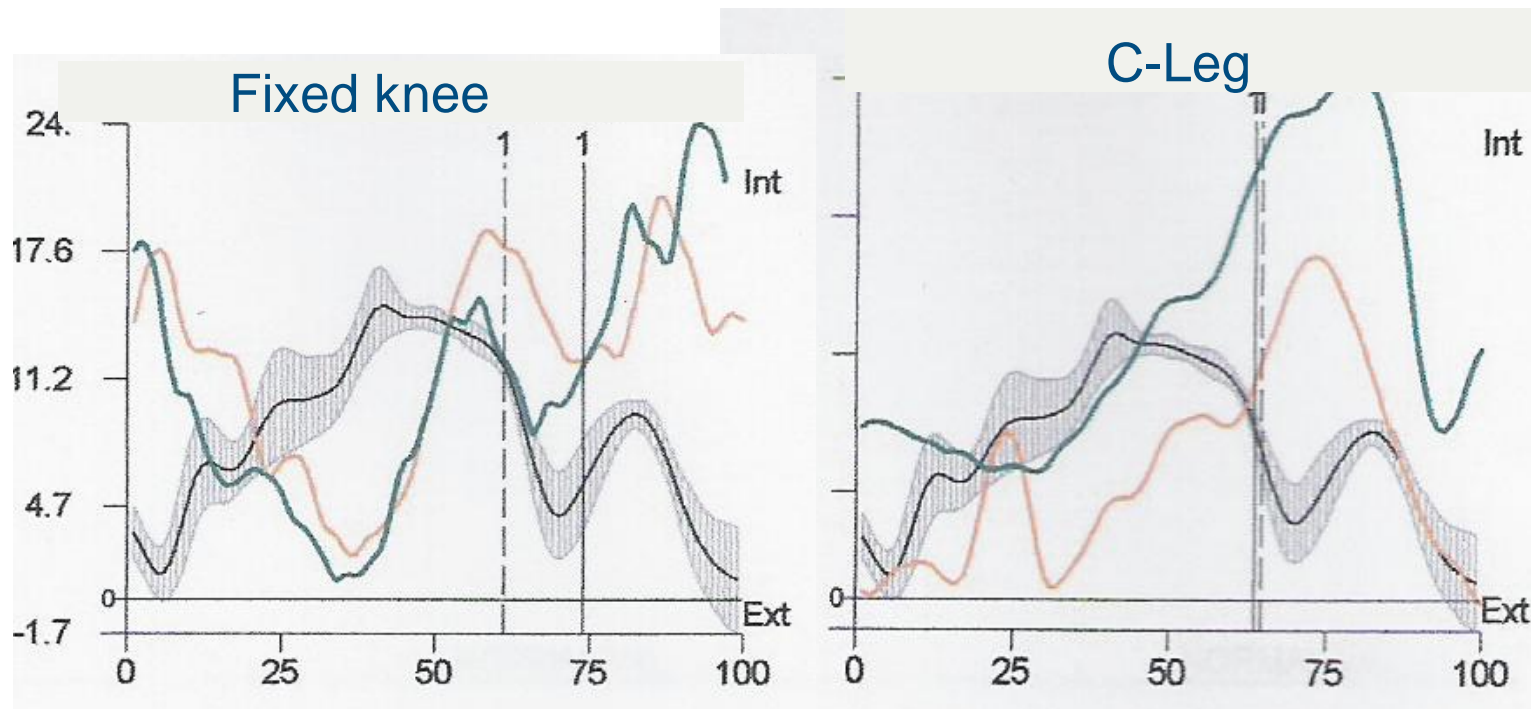




Clinical case presentation



Hip Rotation

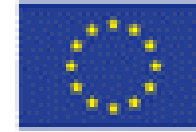


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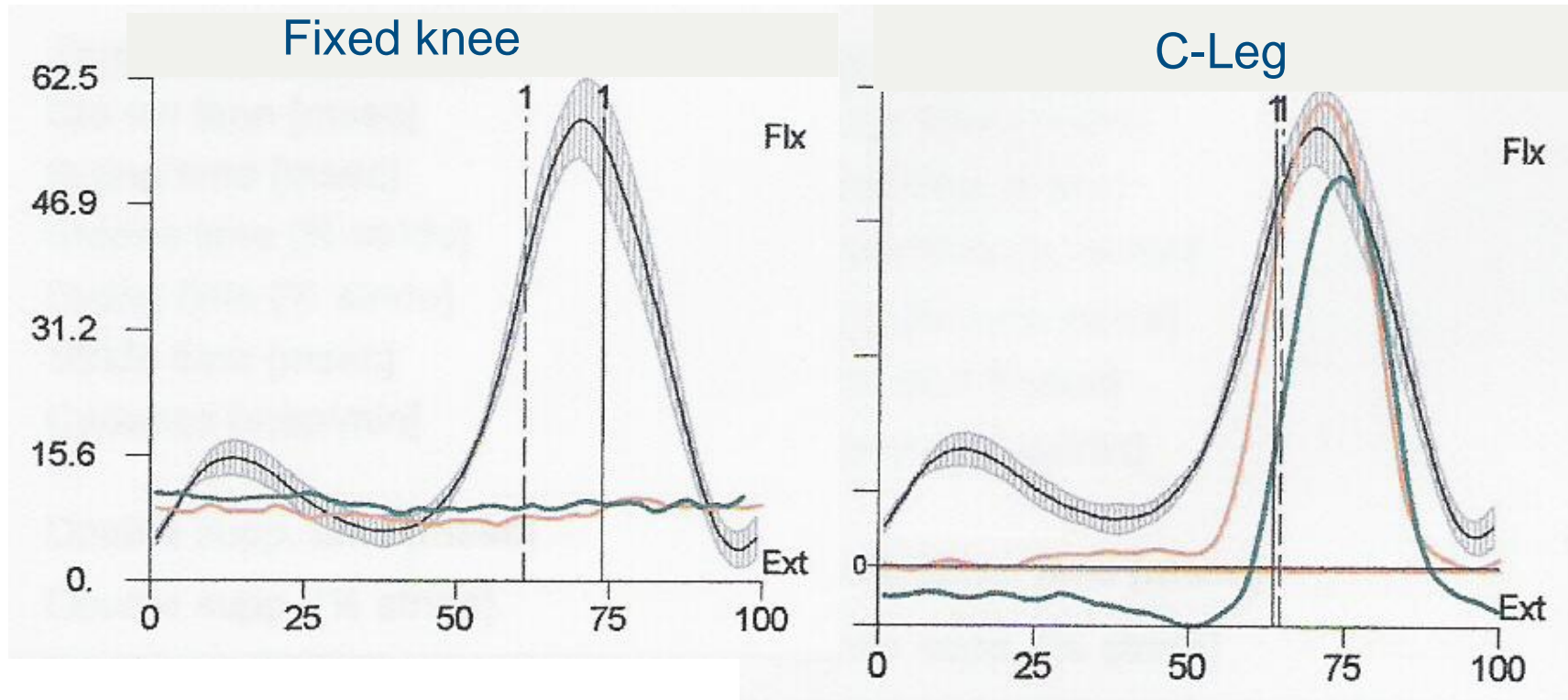




Clinical case presentation



Knee flexion-extension

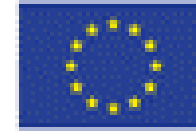


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Clinical case presentation



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- Spatio-temporal parameters are more symmetric, gait speed is higher and step width is lower with C-Leg.
- Low back pain and falls are due to the increase in use of the prosthesis' and the reduction of attention spent on gait.

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TRAMA TRAssing in Motion Analysis


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Clinical case presentation




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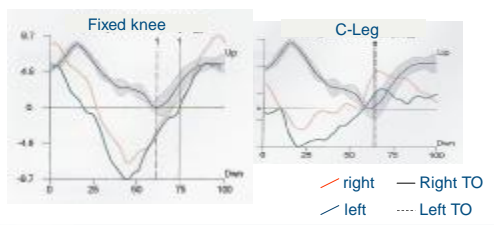





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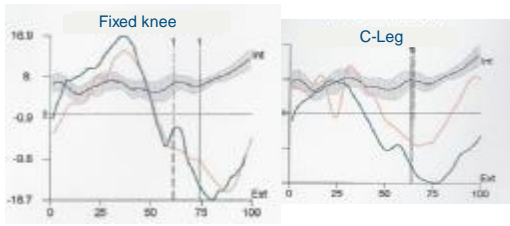
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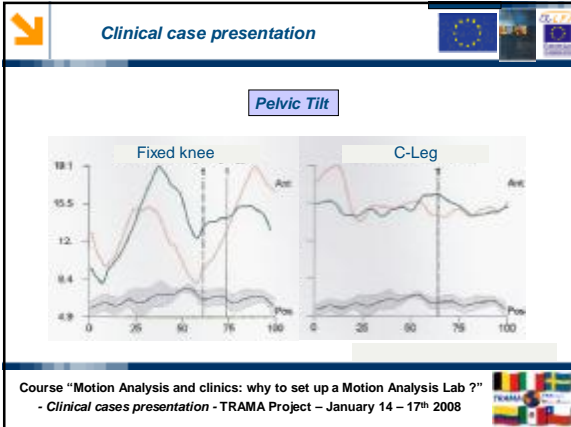
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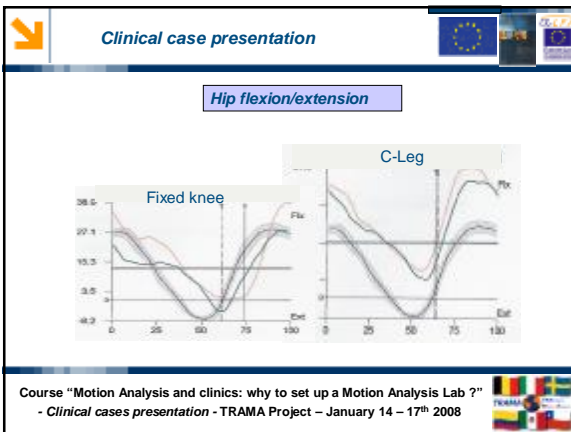

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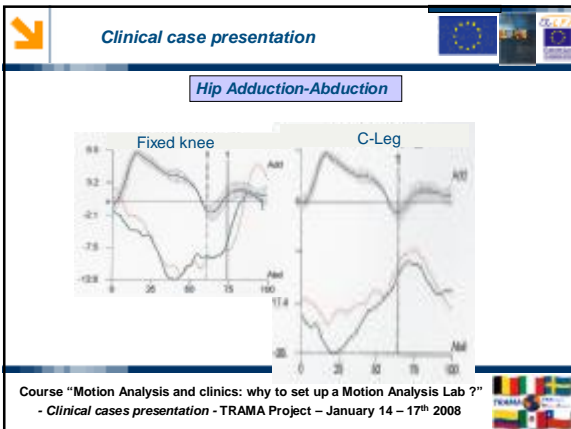
Pelvic Rotation

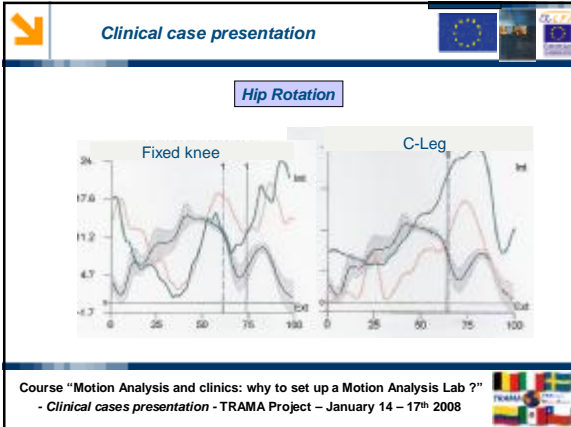


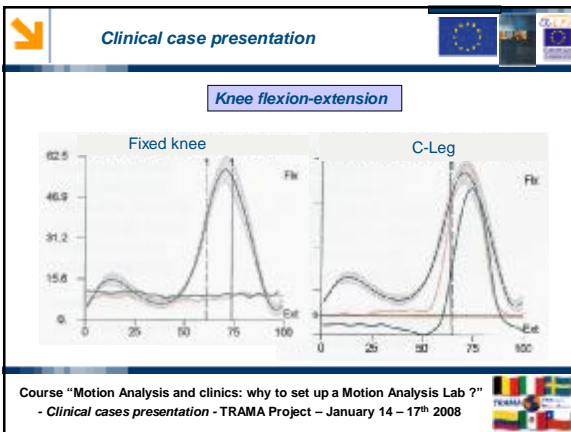
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