

# Clinical movement Analysis

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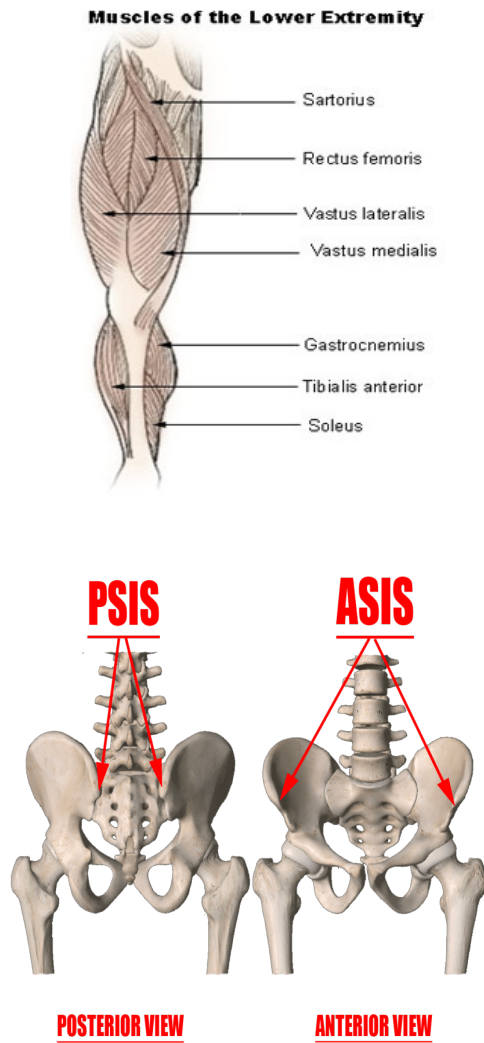
January 14, 2023

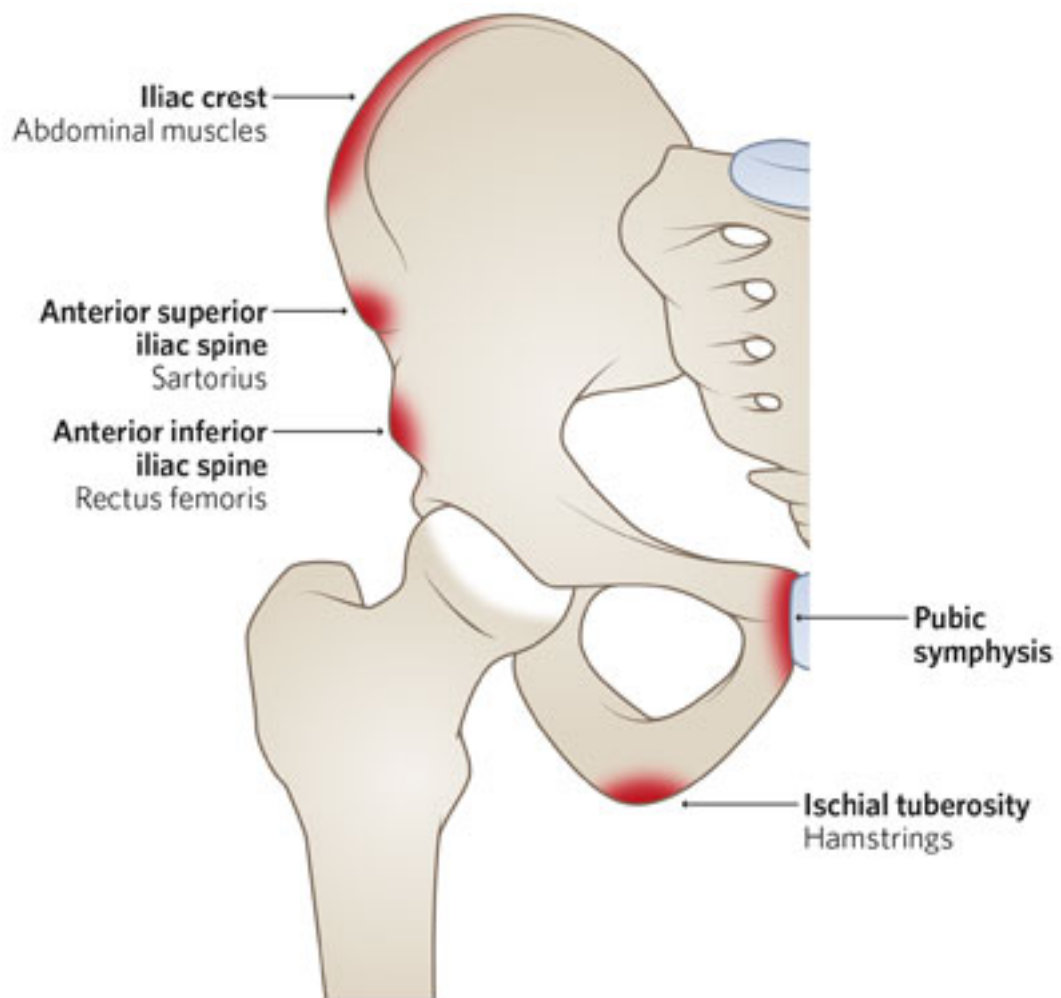
# 1 Abbreviations

Term	Definition
IC	Initial Contact (p. 18)
LR	Loading Response
MSt	Mid Stance
TSt	Terminal Stance
FC	Final Contact
ISw	Initial Swing
MSw	Mid Swing
TSw	Terminal Swing
ROM	Range of Joint Motion
IMU	Inertial Measurement Unit (p. 45)
DLT	Direct Linear transformation (p. 56)
RTM	Rotation Matrix
TCS	Technical axis system
ACS	Anatomical axis system
ASIS	Anterior Superior Iliac Spine (p. 17)
PSIS	Posterior Superior Iliac Spine (p. 18)
pelvic LCS	Pelvic Lower Cross Syndrome (tightened muscles pull the pelvis out of its normal alignment)
ISB	International Society for Biomechanics
COM	Center Of Mass
GRV	Ground Reaction Vector
CoP	Center of Pressure (origin of GRV)
AMP	Arithmetic Mean Point
MUAP	Motor Unit Action Potential
CMMR	Common Mode Rejection Ratio-
MVC	Maximum Voluntary Contraction
AFO	Ankle Foot Orthosis
LTHI	Left Thigh
LKNE	Left Knee
LHEE	Left Heel
LTOE	Left Toe
RHEE	Right Heel
LANK	Left Ankel
LHJC	Left Hip Joint Center
LKJC	Left Knee Joint Center
LAJC	Left Ankle Joint Center
REM	Rapid Eye Movement

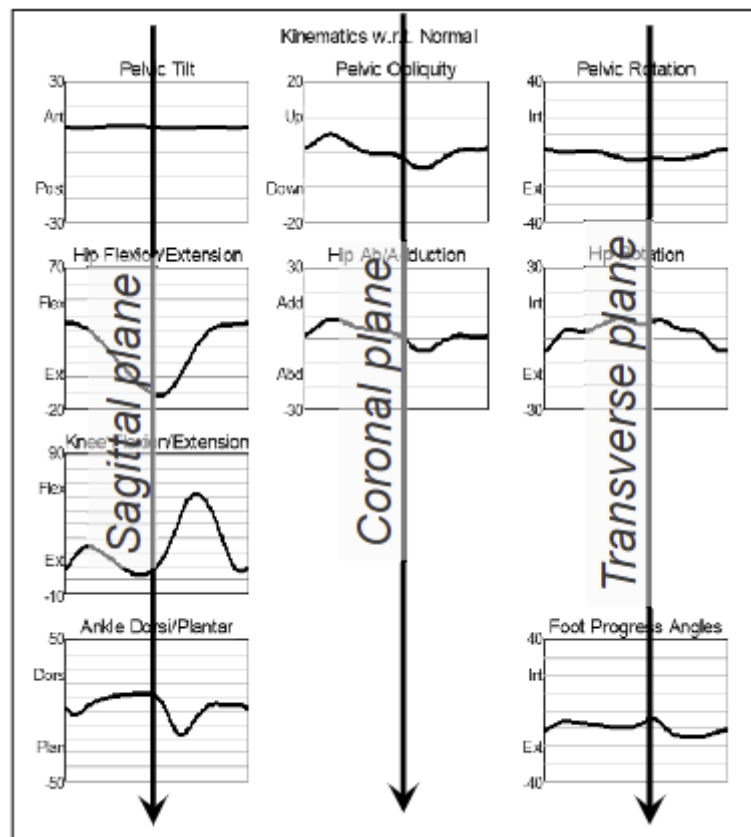
## 2 Lower Limb Muscle groups

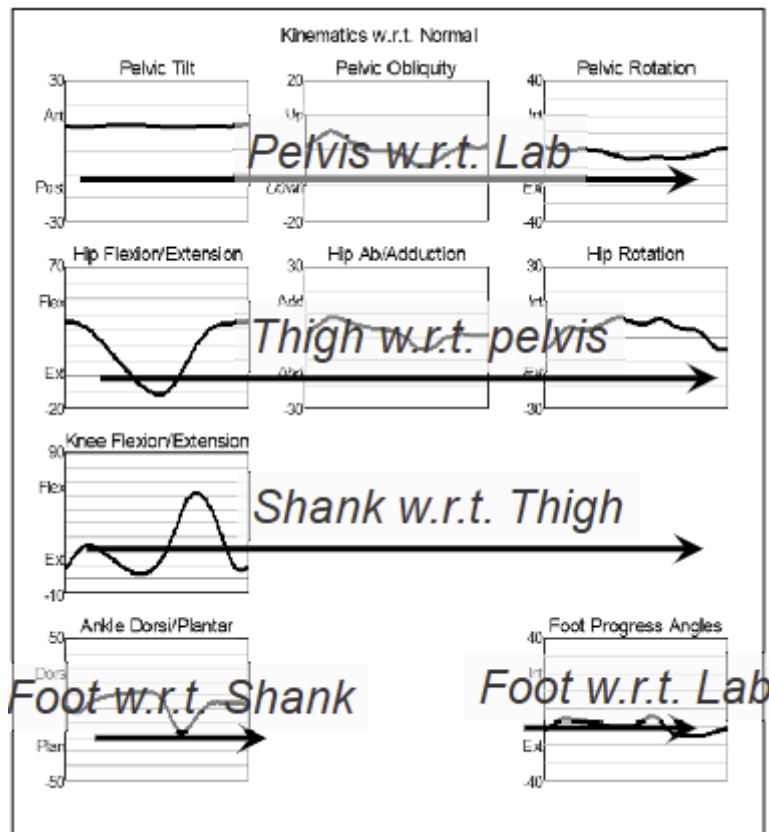
### 2.1 Some useful images

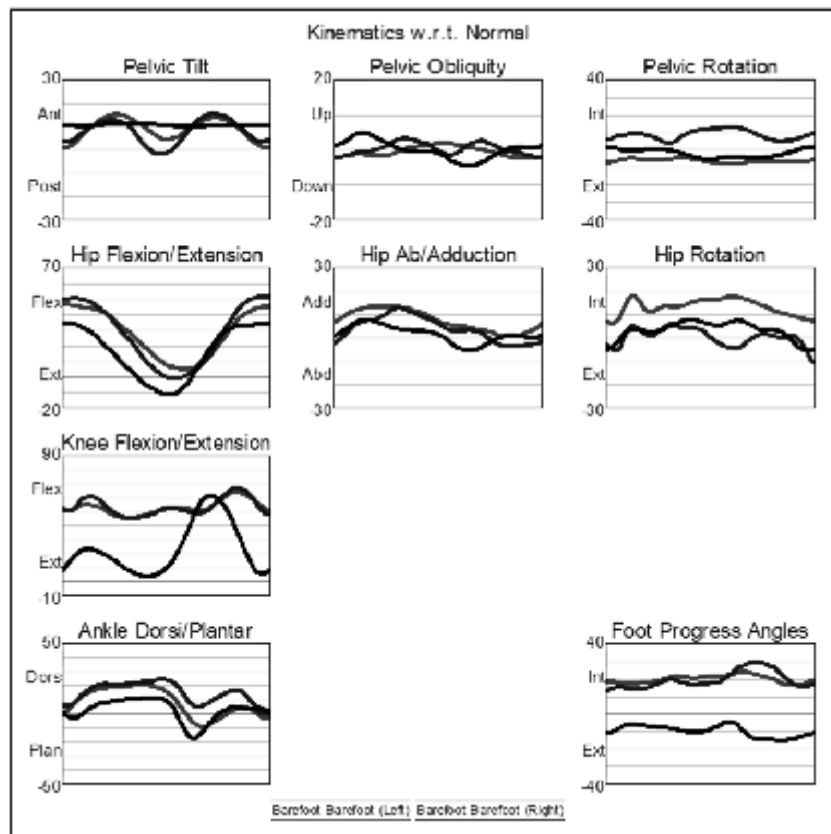


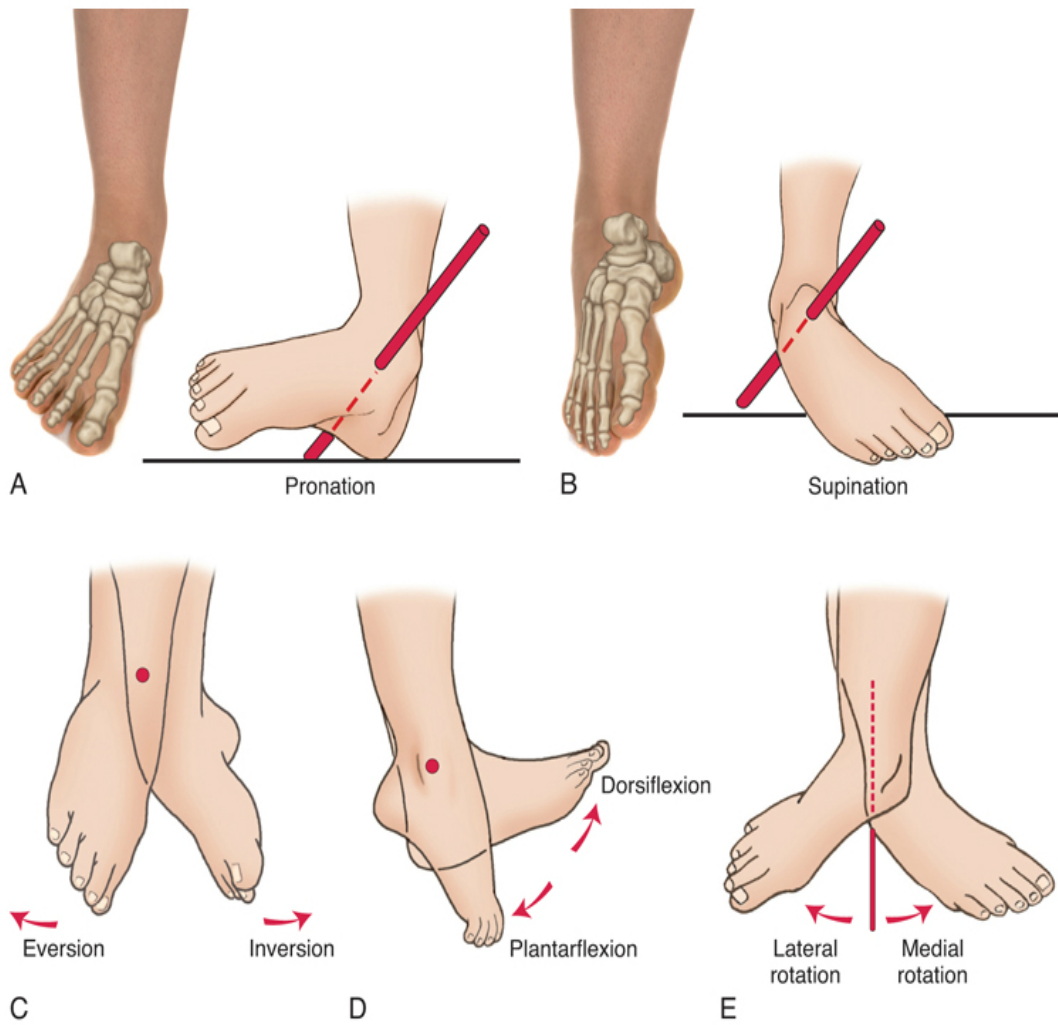


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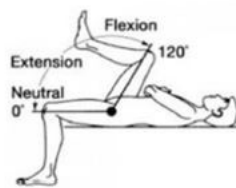




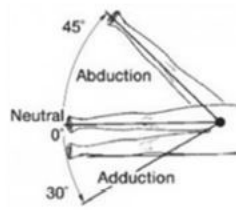
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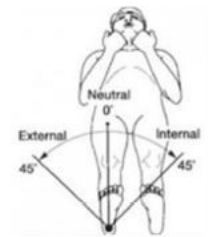
## Hip joint



Flexion & Extension

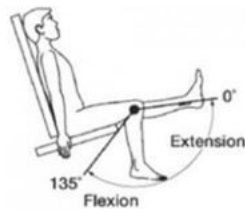


Abduction & Adduction



External & Internal rotation

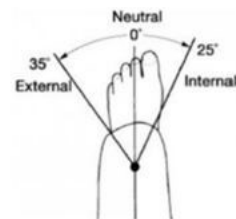
## Knee joint



Flexion & Extension

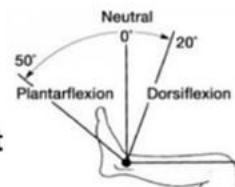


Varus & Valgus



External & Internal rotation

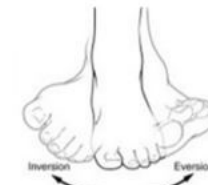
## Ankle joint



Plantar & Dorsi flexion



Pronation & Supination



Inversion & Eversion

## 2.2 Muscles + Important movements descriptions

### Anatomical planes:

- Frontal/Coronal
- Saggital
- Transverse

### Motion

- Abduction/Adduction (happens in the Frontal plane) (away from the midline /to the midline)
- Flexion/Extension (happens in the Saggital plane)
- External/Internal rotation (happens in the Transverse plane)

### Special cases

- Ankle Dorsiflexion/Plantarflexion
- Foot Inversion/Eversion (foot to inside/ to outside == adduction/abduction of foot)
- Varus/Valgus heels/knees (O benen / X benen)
- Forefoot Pronation/Supination = leaning inward, heel away from center/ leaning outward
- Circumduction (little circular movement in gait)
- foot progression angle(rotation) (relative tot the lab)
- Pelvic: tilt (relative to the lab)
- Pelvic: rotation (relative to the lab)

### Key muscle groups of the lower limb

- **Soleus:** Plantarflexor in kuit lateraal
- **Gastrocnemius:** Plantarflexor/ Knee-flexion
- **Peroneus Brevis:** Eversion/Plantarflexion
- **Tibialis anterior:** Inversion/Dorsiflexion
- **Peroneus Longus:** Eversion/Plantarflexion
- **Rectus Femoris:** Hip flexion/Knee extension
- **Vastus Medialis:** Knee extension
- **Vastus Intermedius:** Knee extension
- **Vastus Lateralis:** Knee extension
- **Biceps Femoris:** Knee flexion/Hip extension
- **Semitendinosus:** Knee flexion/Hip extension
- **Semimembranosus:** Knee flexion/Internal rotation of knee/Hip extension
- **Psoas:** Hip flexion
- **Tibialis Posterior:** Inversion foot/Plantarflexion
- **Iliacus:** Hip flexion
- **Sartorius:** Hip flexion
- **Pectineus:** Hip flexion
- **Gracilis:** Hip flexion
- **Gluteus Maximus:** Hip extension
- **Adductor Magnus:** hip extension

## 3 General explications

Kinetics vs Kinematics

Dynamics is divided into kinematics and kinetics. Kinematics describes the motion of objects, while kinetics studies forces that cause changes of motion.

Gimbal lock: axis align in a joint

Concentric movement = muscle shortens

Eccentric = muscle elongates

Isometric = no movement

Passive movement = performed by someone else

Active movement = performed by yourself