### Alignment Recommendations for TT Modular Lower Limb Prostheses

#### Sagittal plane

1. **Bench alignment of the prosthesis with Laser line/plumb/crosshair laser**
   - Align the prosthesis with a laser line/plumb/crosshair laser.

2. **Set the heel height** (effective heel height of the shoe + 5 mm) (743S12 Heel Height Measuring Device)

3. **Position the alignment reference line 30 mm behind the center of the prosthetic foot**

4. **Connect the prosthetic socket and prosthetic foot using the proper adapters**

5. **Position the prosthetic socket so that the 50/50 point is on the alignment reference line, with the socket set at the appropriate flexion angle [α = flexion contracture + 5°] (50-50 743A80 Gauge)**

6. **Position the prosthetic foot in the frontal plane so that the alignment reference line runs between the big toe and second toe; position the prosthetic socket so that the alignment reference line runs along the lateral edge of the patella**

7. **Set the proper abduction/adduction angle**

#### Frontal plane

1. **Set the external rotation of the foot [approx. 5°]**

2. **Position the alignment reference line 30 mm behind the center of the prosthetic foot**

3. **Connect the prosthetic socket and prosthetic foot using the proper adapters**

4. **Position the prosthetic socket so that the 50/50 point is on the alignment reference line, with the socket set at the appropriate flexion angle [α = flexion contracture + 5°] (50-50 743A80 Gauge)**

5. **Position the prosthetic foot in the frontal plane so that the alignment reference line runs between the big toe and second toe; position the prosthetic socket so that the alignment reference line runs along the lateral edge of the patella**

6. **Set the proper abduction/adduction angle**

#### Dynamic Alignment Optimisation

1. **Verify the length of the prosthesis. Determine the effective knee center of rotation according to Nietert and mark it on the outside of the prosthetic socket (743A8 Heel Pivot Gauge)**

2. **Mark the prosthetic socket 15 mm in front of the effective knee center.**

3. **Through plantar flexion of the prosthetic foot, the load line is moved to the “15 mm mark” on the socket (laser line).**

#### Static alignment with L.A.S.A.R. Posture

1. **Through mediolateral shifting and pronation/supination of the prosthetic foot, the laser line should pass through the center of the prosthetic foot in front of the foot adapter.**

2. **On the socket, the load line should run along the lateral patella edge.**

#### Outdoor trial walking

- **Varus motion**
  - If there is excessive varus motion at the end of the mid-stance phase, move the prosthetic foot further in the **medial direction**
  - Adjust the varus motion to achieve physiological knee movement.

- **Valgus motion**
  - If there is excessive valgus motion during mid-stance, move the prosthetic foot further in the **medial direction**
  - Adjust the varus motion to achieve physiological knee movement.

- **Foot not shifted**
  - If there is excessive varus motion during load transfer: move the prosthetic foot further **forward**
  - If there is excessive valgus motion at the end of the mid-stance phase: move the prosthetic foot further in the **medial direction**

- **Mediolateral shifting**
  - If an adjustment of the a-p position is necessary, the static alignment has to be readjusted on the L.A.S.A.R. Posture.

- **Foot shifted**
  - If the m-l position needs to be adjusted, the static alignment has to be readjusted in the frontal plane on the L.A.S.A.R. Posture.

- **Make sure that physiological knee movement is achieved upon weight bearing after heel strike. This physiological knee movement comprises stance phase flexion upon weight transfer and subsequent stance phase extension.**

- **Sagittal plane:**
  - Prosthetic wearers often step down with the knee joint extended and therefore have to be instructed to flex the knee. The prosthetic wearer can achieve physiological knee movement most readily when the a-p position of the prosthetic foot has been optimised.

- **Frontal plane:**
  - During the stance phase, the knee joint may exhibit a varus motion. This varus motion is minimised through mediolateral shifting and the external rotation of the prosthetic foot. The external rotation should be adjusted so that the foot/inside edge of the shoe is parallel to the movement direction.

- **If the m-l position needs to be adjusted, the static alignment has to be readjusted in the frontal plane on the L.A.S.A.R. Posture.**