The Benefits of Rotationplasty in Children with Osteosarcoma and PFFD

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What is Rotationplasty

Surgical procedure performed when there is loss of limb length due to osteosarcoma of PFFD.

Involves removing part of the femur and tibia, rotating the foot 180 degrees about a vertical axis allowing the ankle to function as the knee joint.

Ankle dorsiflexion simulates knee flexion while ankle plantarflexion simulates knee extension.

Nerves must be intact and the principal vessels, must be able to be reconstructed for this procedure to be successful.

Benefits of Rotationplasty vs. Transfemoral amputation

- Gait pattern that is nearly normal
- Increased walking efficiency
- Increased walking speed
- Provides a functioning joint at the level of the knee
- Allows for continued growth of the modified segment of the limb and is more durable.

Disadvantages of Rotationplasty

- Unusual appearance of the limb
- Requires a particular design of prosthesis
- Psychological involvement

Clinical Relevance

- Provides great functional results in the following:
  - Decreased energy expenditure compared to other interventions.
  - Gait mechanics
  - Gait speed
  - Foot tolerates better socket load
  - Ability to return to playing vigorous sports at a reasonably high level

Evidence cont...

Hillmann et al studied gait analysis and findings suggested that rotationplasty allows for an individual to have a nearly normal gait pattern.¹

McClanaghan et al reported that based on oxygen consumption, walking efficiency after rotationplasty was higher than that after arthrodesis.¹

Van der Windt et al showed that after rotationplasty patients were able to walk faster than after transfemoral amputees.⁴

Using the MTS (Musculoskeletal Tumor Society Functional Score) Hillmann et al. discovered that patients had a better score for role functioning (hobbies, work, and other daily activities) and less restriction with ADLs compared to patients with endoprostheses.¹

References


Impairment addressed with Rotationplasty

- Range of motion
- Muscular Strength
- Walking Speed
- Energy Expenditure

Evidence

- Veenstra et al finding reported that long term survivors with a rotationplasty had a high functional and psychosocial outcome.
- Gebert et al concluded that the foot is able to adapt to the load change from rotationplasty and does not undergo arthritic changes in patients studied 10 years postoperatively.

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