Principles of prosthetics &orthotics

(UOMU013031)

Lab.1
“Basic Steps for Optimal Prosthetic Socket”

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The basic tools used in traditional casting prosthetics

1. Preparation Tools

- Measuring tape

To take limb circumference and length measurements.

- Marker/Pencil (indelible)

To mark anatomical landmarks on the residual limb or liner.

- Plastic wrap or stockinette

Placed over the limb before casting to create a smooth surface and prevent sticking.

- Vaseline

Applied to prevent the cast from adhering to the skin or liner

2. Casting Equipment and Materials

- Plaster bandages

Used to create a mold of the residual limb

- Plaster bowl and spatula

For mixing plaster with water

- Water container

For dipping plaster bandages.

- Gloves

To protect hands from plaster residue

3. Support and Positioning Tools

•Casting stand or stool

Helps position the patient correctly during casting.

•Elastic bandages or straps

•To maintain limb positioning while the plaster hardens.

4. Post-Casting Tools

•Casting knife or scissors

To cut and remove the hardened plaster mold.

•Surform file or rasp

Used for minor adjustments and smoothing rough edges.

• dishwashing liquid

used to prevent the adherence of plaster with a negative mode

Basic Steps for Optimal Prosthetic Socket Assessment

Patient assessment for a prosthetic socket involves several critical **steps to ensure optimal fit**, **comfort**, and **function**. The key steps are:

1. **Patient History and Evaluation**
2. **Residual Limb Examination**
3. **Socket Design Selection**
4. **Casting, Scanning, and Measurement**
5. **Diagnostic (Test) Socket Fitting**
6. **Definitive Socket Fabrication**
7. **Final Fitting and Alignment**
8. **Patient Education and Follow-up**

The difference between evaluation and assessment

Evaluation and assessment are often used interchangeably, but they have distinct meanings, especially in medical and clinical contexts.

Assessment

- Definition: A systematic process of **collecting data** to understand a patient's condition.
- Purpose: To gather information about the patient's physical, functional, and psychological status.
- Process: Includes **history taking, physical examination, and diagnostic tests.**
- Example: Checking the residual limb for shape, skin integrity, and muscle strength before fitting a prosthetic socket.

while,

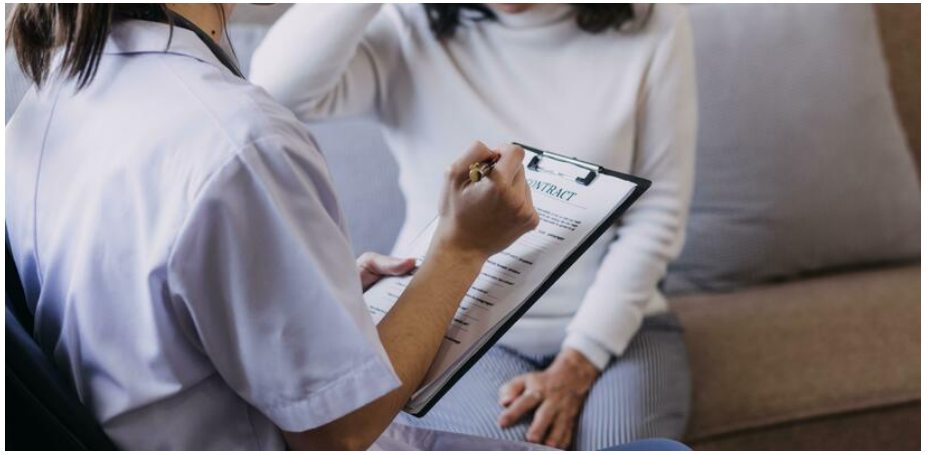
Evaluation

- Definition: A judgment or **analysis** based on the collected assessment data.
- Purpose: To interpret the findings and determine the next steps (such as treatment or prosthetic adjustments).
- Process: Involves **analyzing assessment results to make clinical decisions**.
- Example: Deciding if the prosthetic socket needs modification based on the patient’s gait analysis and comfort level

Basic Steps for Optimal Prosthetic Socket Assessment

1. Patient History and Evaluation

- Medical history (amputation causes, comorbidities, previous prosthetic experience)
- Physical condition (residual limb status, skin integrity, muscle strength)
- Activity level and lifestyle goals
- Psychological and emotional readiness



2. Residual Limb Examination

- Shape and volume (cylindrical, conical, bulbous, etc.)
- Skin condition (scars, ulcers, pressure points)
- Bony prominences and soft tissue distribution
- Sensitivity and pain assessment
- Joint range of motion and muscle function

3. Socket Design Selection

- Type of socket (e.g., total surface bearing, patellar-tendon bearing)
- Suspension method (suction, pin-lock, vacuum, belts)
- Material choice (carbon fiber, thermoplastic, etc.)
- Interface (liner type, socks, gel pads)

4. Casting, Scanning, and Measurement

- Manual casting (plaster wrap or fiberglass)
- Digital scanning (3D imaging for precise fit)
- Measurements of

➢ the residual limb

➢ contralateral limb (sound leg) for symmetry

5. Diagnostic (Test) Socket Fitting

- Initial fitting using a clear plastic or check socket (IPOPF)
- Static and dynamic alignment check
- Pressure and contact assessment using pressure mapping or patient feedback
- Adjustments based on comfort and function

6. Definitive Socket Fabrication

- Modifications based on test socket findings
- Final material selection and reinforcement
- Integration of components (pylon, foot, knee units, etc.)

7. Final Fitting and Alignment

- Ensure proper suspension and weight distribution
- Gait training and mobility assessment
- Fine-tuning adjustments for comfort and function

8. Patient Education and Follow-up

- Proper donning and doffing techniques
- Skin care and hygiene instructions
- Maintenance
- Regular follow-up for adjustments and monitoring of residual limb changes