

# Physical Agent Modalities

SLIDES CREATED BY:  
BRIANDA KARINA  
CORTEZ

BOOK REFERENCE:  
OCCUPATIONAL  
THERAPY FOR PHYSICAL  
DYSFUNCTION SEVENTH  
EDITION SEVENTH,  
NORTH AMERICAN  
EDITION

BY [MARY VINING  
RADOMSKI MA OTR  
FAOTA \(AUTHOR\)](#), [CATH  
ERINE A. TROMBLY SCD  
OTR FAOTA \(AUTHOR\)](#)

## Phases of Tissue Healing

	Description	Use
<b>Phase 1: Inflammation</b>	Initial response, controls blood loss, cleans wound	Cryotherapy Pulsed-wave ultrasound
<b>Phase 2: Proliferation</b>	Repair of damaged tissue → granulation, angiogenesis, wound contract, epithelization	Therapeutic ultrasound Electrical Stimulation
<b>Phase 3: Maturation/Remodeling</b>	Collagen fibers in wounded tissue are produced, broken down, changed, and reoriented to form <u>scar tissue</u>	Superficial heating agents Continuous wave ultrasound w/ deep heat

# Physical Agents in OT Treatment

---



Therapeutic ultrasound → OSTEOPOROSIS → alleviate hand pain



Iontophoresis → LATERAL EPICONDYLITIS → to deliver medication through skin and into body to reduce pain, improve grip strength & fxn



Electrical stimulation → SPASTICITY AFTER STROKE → to reduce spasticity before a fxn'al activity

# Thermotherapy

<b>Superficial:</b> depths up to 1 cm	Warm whirlpool baths Fluidotherapy Hot packs Paraffin
<b>Deep:</b> depths up to 5 cm	Ultrasound Phonophoresis Short-wave diathermy

<b>4 Primary Biophysiological Effects of Thermotherapy</b>	
Analgesic Effect	Reduce pain symptoms
Vascular Effect	Decrease muscle spasm, increase blood flow
Metabolic Effect	Tissue repair/pain relief through chemical reactions
Connective Tissue Response	Tissues more easily stretched after heating, can reduce joint stiffness and increase ROM

## Applications of Thermotherapy

---

**Mild**- relaxation & pain relief (4-5 degree tissue temperature increase)

---

**Moderate**- mod increase in blood flow (6 degree tissue temperature increase)

---

**Vigorous**- marked increase in blood flow (up to 14 degree temperature increase)

---

*\*Moderate & Vigorous* needed for vascular, metabolic, and connective tissue responses

---

*\*Positive therapeutic effect* when temp. increased between 102 – 113 degrees F.

# Superficial Thermal Agents

---

Heating Modalities		
Whirlpool	20 min.	Don't use w/ sig. edema
Fluidotherapy	20 min.	Therapist can provide active assistive and passive mobilization; can be used for desensitization
Hot packs	20 min.	Area being treated must be nonmobile & covered; need 6-8 layers of dry padding between hot pack and skin
Paraffin	20 min.	Used for hand dysfunction

# Superficial Thermal Agents → *Cryotherapy*

---

- Moves heat out of body; affects tissue temp. to depth of 2 cm.
- Biophysiological effects:
  - Analgesic → elevates pain threshold through counterirritation
  - Vascular → vasoconstriction when applied for less than 15 min. & vasodilation when applied longer than 15 min. Short-term application = reduce edema
  - Metabolic → slows down metabolic processes; useful to control excess inflammation/edema in early stages of healing
  - Neuromuscular → influence muscle tone; temporarily reduce spasticity

Cold packs: 20 min.

Ice massage: hold ice directly against skin and move in slow circles over target tissue; last no longer than 10 min.

**\*\*DO NOT use w/ pts. who have peripheral vascular disease, Raynaud's phenomenon, myeloma, leukemia, systemic lupus, cold urticaria\*\***

# Deep heating agent → *Therapeutic Ultrasound*

---

Ultrasound → deep heat modality → used in rehab to *restore and heal* soft tissues.

---

1 MHz: depth of 2.5 – 5 cm

---

3 MHz: depth of up to 2.5 → heats 3 times faster than 1 MHz

---

**Duty Cycle** (pulsed or continuous): % or ratio of time that ultrasound energy is actually being introduced into body

---

Neuromuscular E-Stim (NMES)	<ul style="list-style-type: none"> <li>Activates muscles for motor response</li> <li>Decrease muscle spasm</li> <li>Strengthen Muscle</li> <li>Muscle pumping to reduce edema</li> <li>Help reduce mod to high level spasticity</li> </ul>
Transcutaneous Electrical Nerve Stim (TENS)	<ul style="list-style-type: none"> <li>Stimulates specific afferent nerve fibers</li> <li>Sensory Analgesia</li> <li>Inferential: chronic large area pain</li> <li>Premodulated: chronic small area pain</li> </ul>
Functional E-Stim (FES)	<ul style="list-style-type: none"> <li>Facilitates performance during functional activities</li> <li>Acts as orthosis, helps facilitate muscle contraction</li> </ul>
Electrical Muscle Stim (EMS)	<ul style="list-style-type: none"> <li>Facilitates nerve regeneration/muscle reinnervation to prevent atrophy, degeneration, and fibrosis of fibers</li> </ul>
Interferential Current Therapy (IFC)	<ul style="list-style-type: none"> <li>Pain reduction, edema management</li> </ul>
Iontophoresis	<ul style="list-style-type: none"> <li>Ionizes topically applied meds into tissue</li> <li>Inflammation</li> <li>Scar formation/management</li> </ul>
E-Stim for Tissue Repair (ESTR)	<ul style="list-style-type: none"> <li>High-voltage galvanic stim</li> <li>Tissue healing</li> </ul>

# Electrotherapy

---

Increase muscle strength, decrease muscle spasm, decrease swelling, improve tissue healing, decrease pain, longer lasting analgesia