



Al-Mustaqbal University
Collage of Engineering
Prosthetics and Orthotics Engineering
Third Stage

ORTHOTICS II

Prof. Dr. Mohammed Hamzah Daham

1st term – Lecture 6

2025-2026

mohammed.hamzah.daham@uomus.edu.iq

UOMU0103054

Hand Immobilization Splints

Eng. Hussein Dhameer Hussein

Introduction

- ▶ Physicians commonly order resting hand splints, also known as hand immobilization splints or resting pan splints.
- ▶ A resting hand splint is a static splint that immobilizes the fingers and wrist.
- ▶ The thumb may or may not be immobilized by the splint.
- ▶ Therapists fabricate custom resting hand splints or purchase them commercially.

Pre-molded Hand Splints

- ▶ Therapists can order pre-molded commercial splints according to hand size (i.e., small, medium, large, and extra large) for the right or left hand.
- ▶ An advantage of premade splints is their quick application (usually only straps require application).
- ▶ disadvantage is that the commercial splint may not exactly fit each person. With pre-molded splints, the therapist has little control over positioning joints into particular therapeutic angles.



Customized Splints

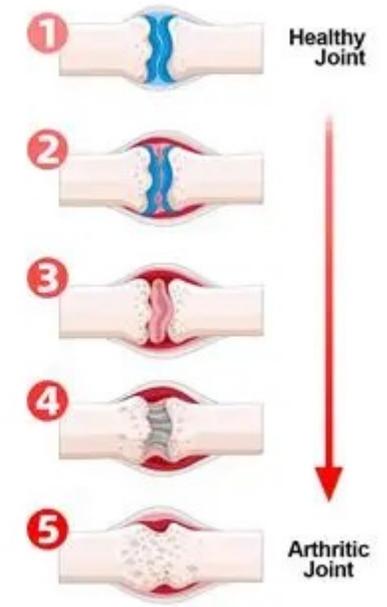
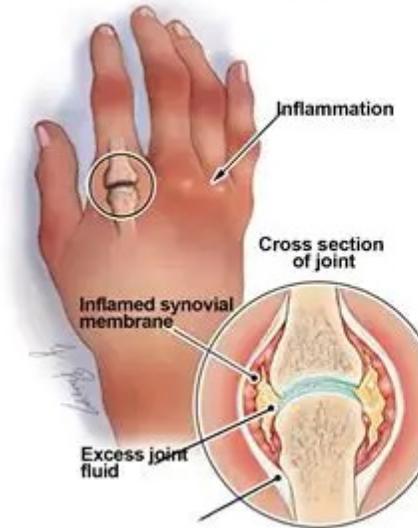
- ▶ A therapist can customize a resting hand splint by making a pattern and fabricating the splint from thermoplastic material.
- ▶ The advantage is an exact fit for the person, which increases the splint's support and comfort. The therapist also has control over joint positioning.
- ▶ A disadvantage is that customization may require more of the therapist's time to complete the splint and may be more costly.



Purpose of the Resting Hand Splint

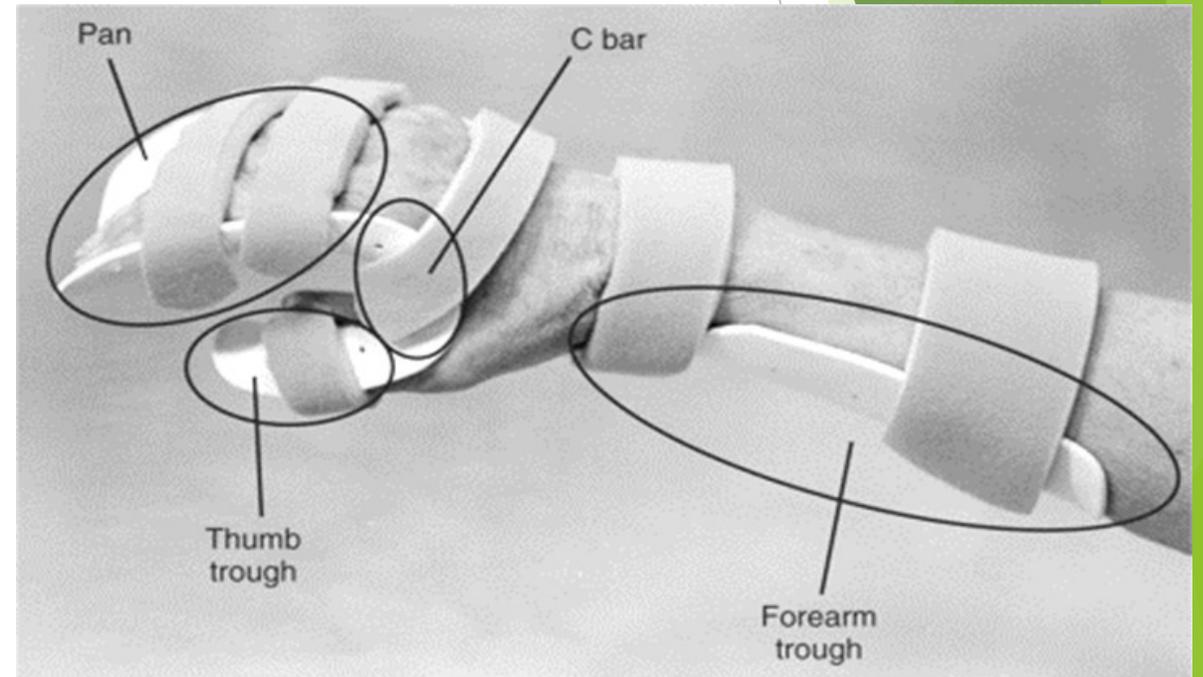
- ▶ The resting hand splint has three purposes: to immobilize, to position in functional alignment, and to retard further deformity.
- ▶ When inflammation and pain are present in the hand, the joints and surrounding structures become swollen and result in improper hand alignment.

Individual with rheumatoid arthritis



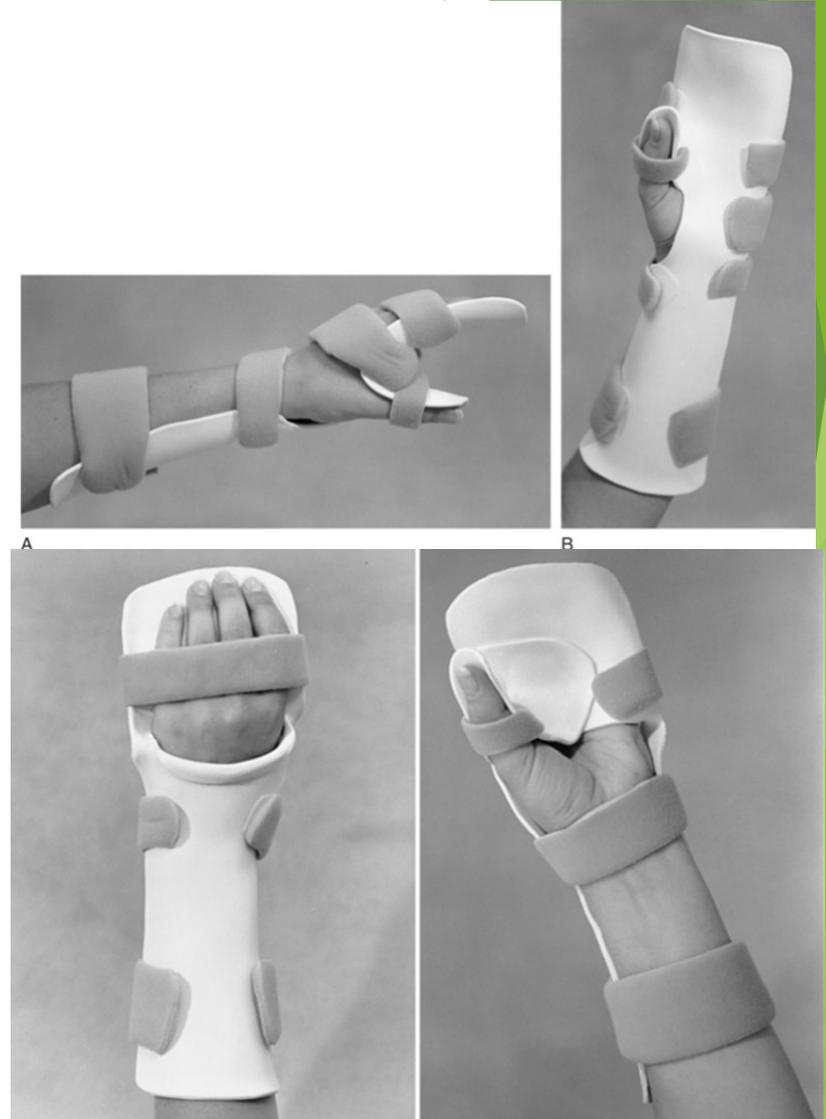
Splint structure

- ▶ The therapist must know the splint's components to make adjustments for a correct fit. Four main components comprise the resting hand splint: the forearm trough, the pan, the thumb trough, and the C bar.



Desired splint

- ▶ When a great amount of forearm support is desired, a volarly based forearm trough is the best design.
- ▶ When the volar surface of the forearm must be avoided because of sutures, sores, rashes, or intravenous needles, a dorsally based forearm trough design is frequently used .
- ▶ Dorsally based troughs can be a helpful design for applying a resting hand splint to a person with hypertonicity.



Feature of splint

- ▶ The pan of the splint supports the fingers and the palm.
- ▶ The therapist conforms the pan to the arches of the hand, thus helping to maintain such hand functions as grasping and cupping motions.
- ▶ The pan should be wide enough to house the width of the index, middle, ring, and little fingers when they are in a slightly abducted position.
- ▶ The sides of the pan should be curved so that they measure approximately $\frac{1}{2}$ inch in height.
- ▶ The curved sides add strength to the pan and ensure that the fingers do not slide radially or ulnarly off the sides of the pan.
- ▶ However, if the pan's edges are too high the positioning strap bridges over the fingers and fails to anchor them properly.

Cont.

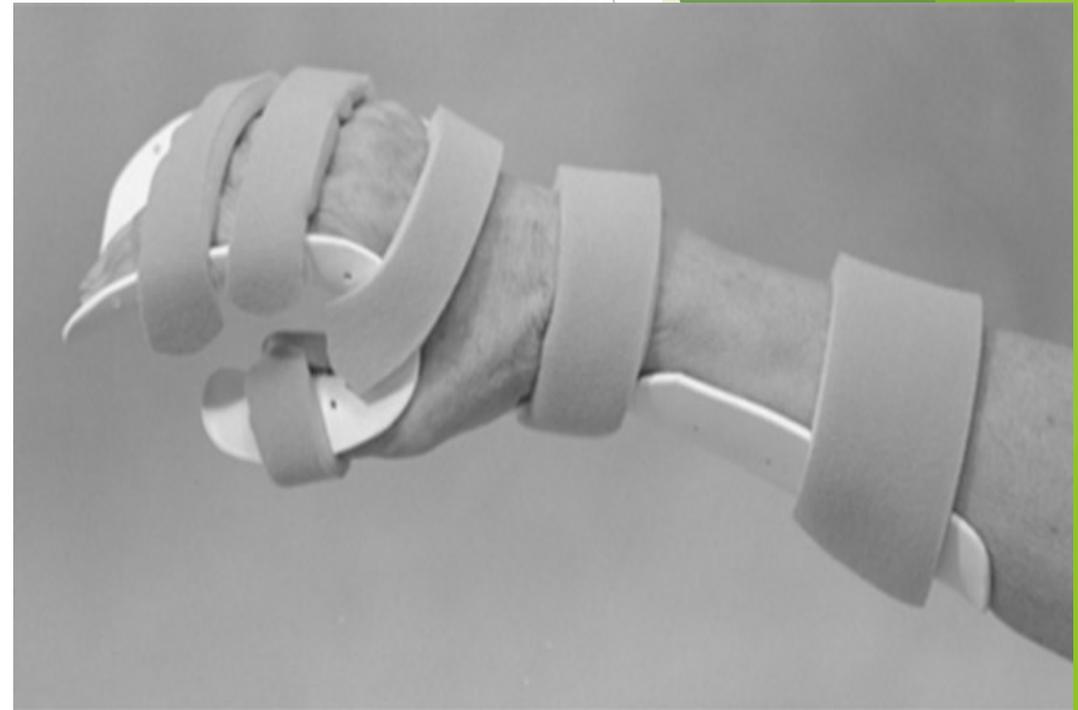
- ▶ The thumb trough supports the thumb and should extend approximately $\frac{1}{2}$ inch beyond the end of the thumb.
- ▶ This extension allows the entire thumb to rest in the trough. The width and depth of the thumb trough should be one-half the circumference of the thumb, which typically should be in a palmarly abducted position.
- ▶ The therapist should attempt to position the carpometacarpal (CMC) joint in 40 to 45 degrees of palmar abduction and extend the thumb's interphalangeal (IP) and metacarpal joints.
- ▶ The C bar keeps the web space of the thumb positioned in palmar abduction. If the web space tightens, it inhibits cylindrical grasp and prevents the thumb from fully opposing the other digits.

Resting Hand Splint Positioning

- ▶ Generally, two types of positioning are accomplished by a resting hand splint:
 1. a functional (mid-joint) position
 2. antideformity (intrinsic-plus) position.
- ▶ Diagnostic indication determines the general position used.

Functional Position

- ▶ To rest the wrist and hand joints, the resting hand splint positions the hand in a functional or mid-joint position. One functional position that we suggest places the:
 1. wrist in 20 to 30 degrees of extension,
 2. thumb in 45 degrees of palmar abduction,
 3. metacarpophalangeal (MCP) joints in 35 to 45 degrees of flexion,
 4. all proximal interphalangeal (PIP) and distal interphalangeal (DIP) joints in slight flexion.



Antideformity Position

- ▶ The antideformity position is often used to place the hand in such a fashion as to maintain a tension/distraction of anatomic structures to avoid contracture and promote function. The antideformity position places the
 1. wrist in 30 to 40 degrees of extension,
 2. the thumb in 40 to 45 degrees of palmar abduction,
 3. the thumb IP joint in full extension, the MCPs at 70 to 90 degrees of flexion,
 4. the PIPs and DIPs in full extension .

