SOCIETATEA ROMANA DE MEDICINA FIZICA DE RECUPERARE SI BALNEOCLIMATOLOGIE

Congresul Național de Medicină Fizică, de Recuperare și Balneoclimatologie

Covasna, 23 – 25 Aprilie 2026

ARB Asociatia Romana de Balneologie

# Case Study: Characteristics of the Rehabilitation Program for Patients with Post-Burn Sequelae

Izabela Maria Costache[1,2], Ruxandra Luciana Postoiu[1,2], Sorina Robu[1,2], Mihai Băilă[1,2], Gelu Onose[1,2]

**1. Teaching Emergency Hospital "Bagdasar-Arseni", Bucharest**
**2. University of medicine and pharmacy "Dr. Carol Davila" Bucharest**

I.S.M.H. · AMR Asociația Medicală Română · Universitatea de Medicină și Farmacie Carol Davila · Academia de Științe Medicale Experientia docet · Societatea Specialiștilor în Reabilitare Medicală și Medicină Fizică Republica Moldova

# Introduction

**Initial healing process**

## Pre-operative phase

**ROM limitaitons and edema buildup prevention:  splinting, positioning, passive mobilizations.**

## Post-operative phase

**Aggressive" therapy resumes fighting skin contractures through stretching**

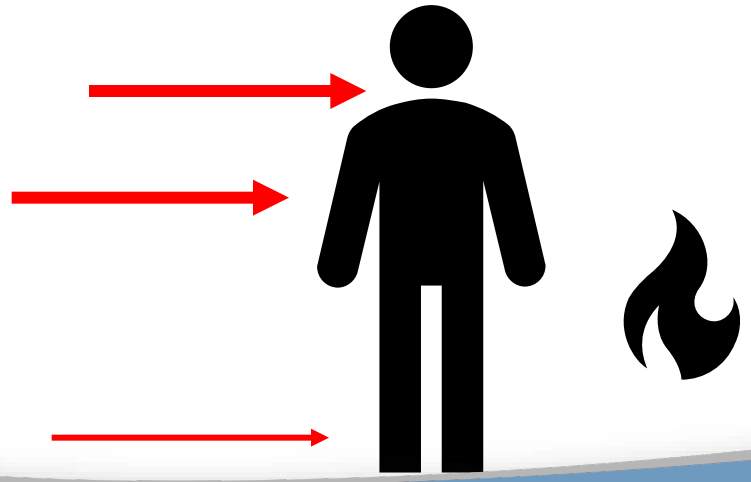
**Late healing process**

## Reconstructive phase

**Correction of structural limitations and functional regain**

# Introduction

- **Upper extremities** most commonly affected, followed by **neck** and lower limb[*, **]
- Increasing contracture severity is associated with progressively **poorer functional outcomes**: hand function, mobility, and self-care.[**]
- Disabling conditions can be reduced with improved standards of initial care: ***skin grafting for deep burns***, **physical therapy** and **positioning** during initial burns management injuries.[***, ****]



# Introduction

| Reconstructive phase | Late healing process |
| --- | --- |
| **Release surgery** | **Rehabilitation** |
| ▪ Excision of scar tissue and grafts, Z-plasty, full-thickness grafts, skin and muscle flaps. | ▪ Physical exercises and agents |
| Regaining functional movement patterns: range of motion (ROM), mobility. | Rebuilding strength and endurance. Correcting compensations and posture. |

# Introduction

- Exercise prescriptions (type, frequency, and intensity) must be tailored to the patient.
- Manual therapy is essential and can be doubled by physical agents used to improve tissue flexibility like:

**- Radial ESWT (2000-3000 shocks with maximum tolerated intensity)***

**- High-intensity focused ultrasound / HIFU (Intensity> 5W/cm$^2$, Fv= 3-10 MHz)****

- Heat producing procedures may be used to soften the skin before manual therapy: **heat packs, paraffin baths / warm hydrotherapy** ***

# Case presentation

- General information:

-age: 43

-gender: male

- Family history: none
- Living and working conditions: former construction worker
- Lifestyle habits (smoking, alcohol): none

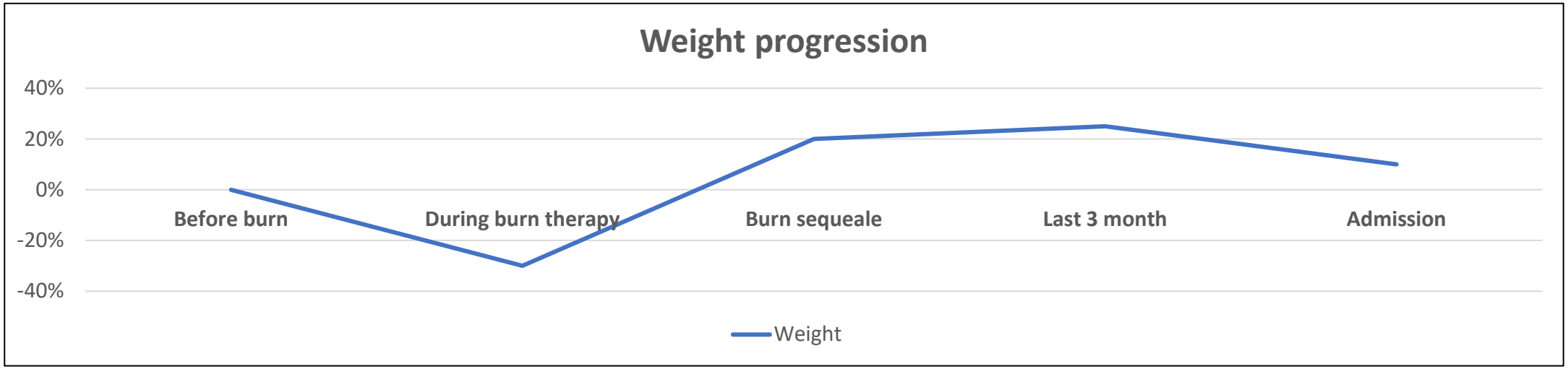
# Medical history

- Electrical burn – 44% body surface area
- Treatment received in the Netherlands and Germany.
- Major complications:  **Respiratory support: tracheostomy → subsequent decannulation; recurrent pneumonia (S. pneumoniae, S. aureus, Pseudomonas); extraction of front teeth; weight loss >10 kg.**
- Depressive disorder (posttraumatic/reactive) – currently being treated.
- Epidemiology: Skin colonization with MRSA and Pseudomonas aeruginosa.Treated lung abscess (September 17, 2025)).

# General physical examination and laboratory markers

- Cardiovascular and respiratory systems without complaints. Iron-deficiency anemia, Hypoalbuminemia.
- Height: 167 cm. Edentulous.Weight chart:

| Before burn | During burn therapy | Burn sequelae | Last 3 month | Admission |
|---|---|---|---|---|
| 70 kg | 50 kg (-30%) | 60 kg (+20%) | 75 kg(+25%) | 82 kg(+10%) |



# Clinical examination

- Severe joint contractures: cervical spine, shoulder girdle, elbows, wrists, fingers.
- Head and neck deposturing: flexion with lateral rotation to the right, thoric cyphosis, severe limb movement restricton.
- Moderate self-care dysfunction: no ambulation deficit; independent in ADL.

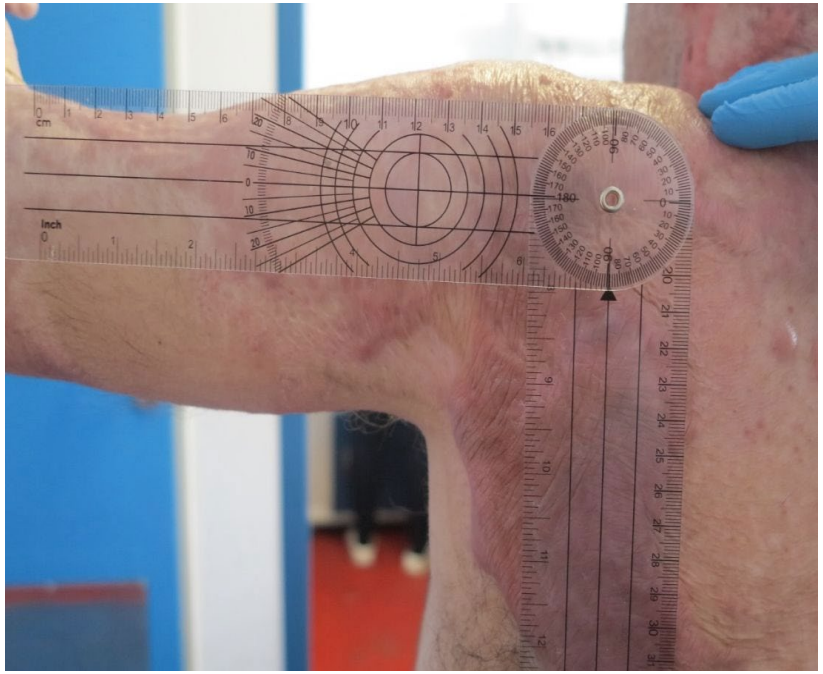
# Local examination

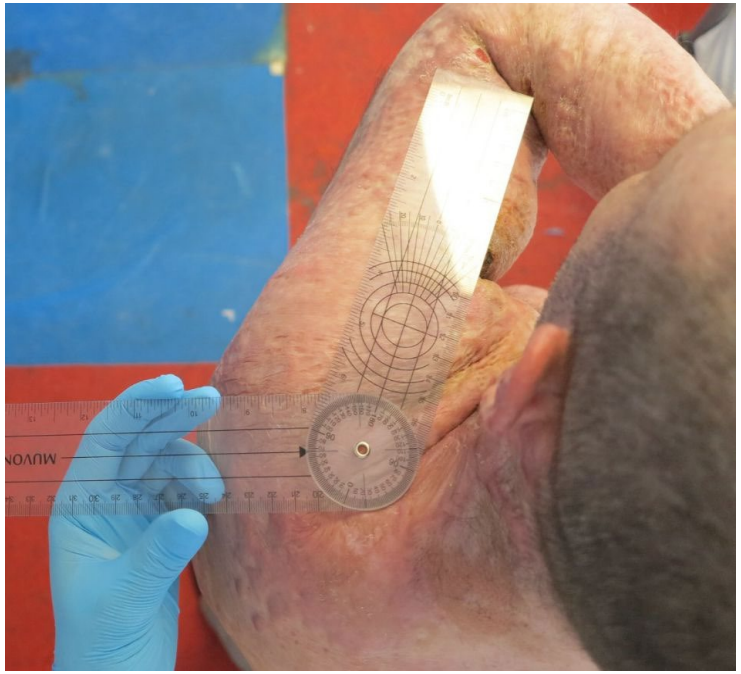
- Examination of the upper limbs – ROM:

| Shoulder | | | |
|---|---|---|---|
| **Movement** | **Right** | **Left** | **Reference range** |
| Abduction | 40º (20%) | 90º (50%) | 0–160º |
| Adduction | not tested | 120º (65%) | 180–0º |
| Flexion | 30º (15%) | 90º (50%) | 0–180º |
| Extension | 20º (30%) | 30º (50%) | 0–60º |

# Local examination

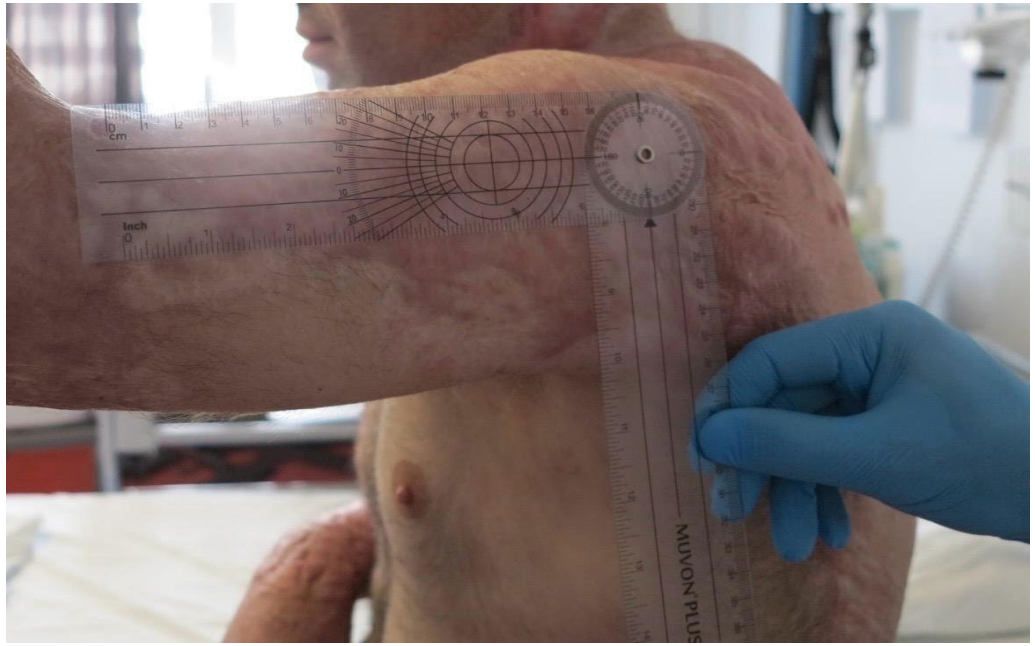
- Examination of the left upper limb -ROM

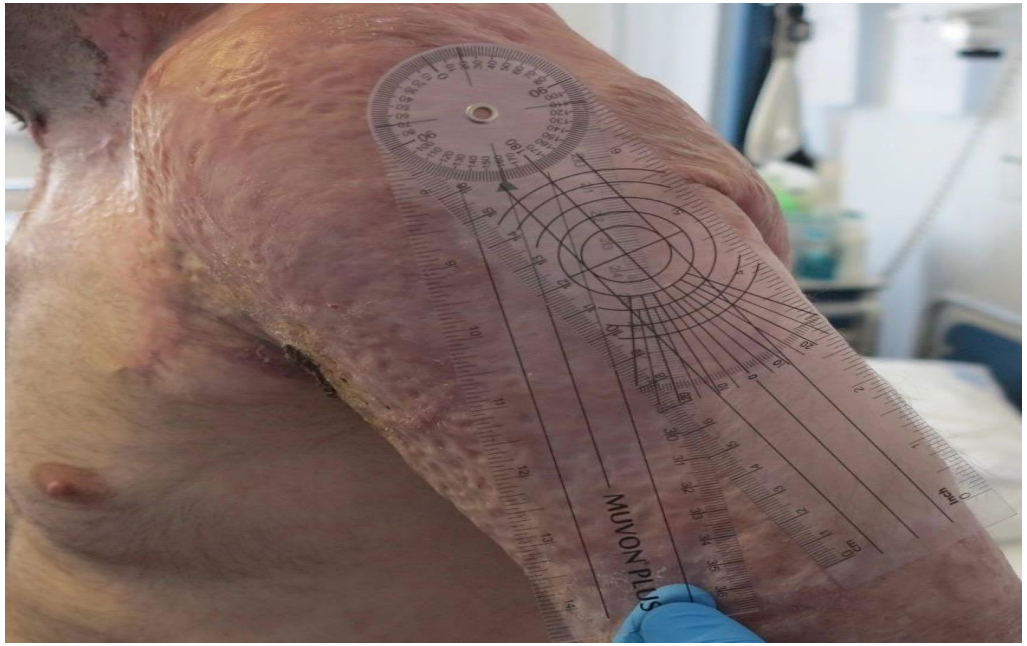




# Local examination

- Examination of the left upper limb -ROM



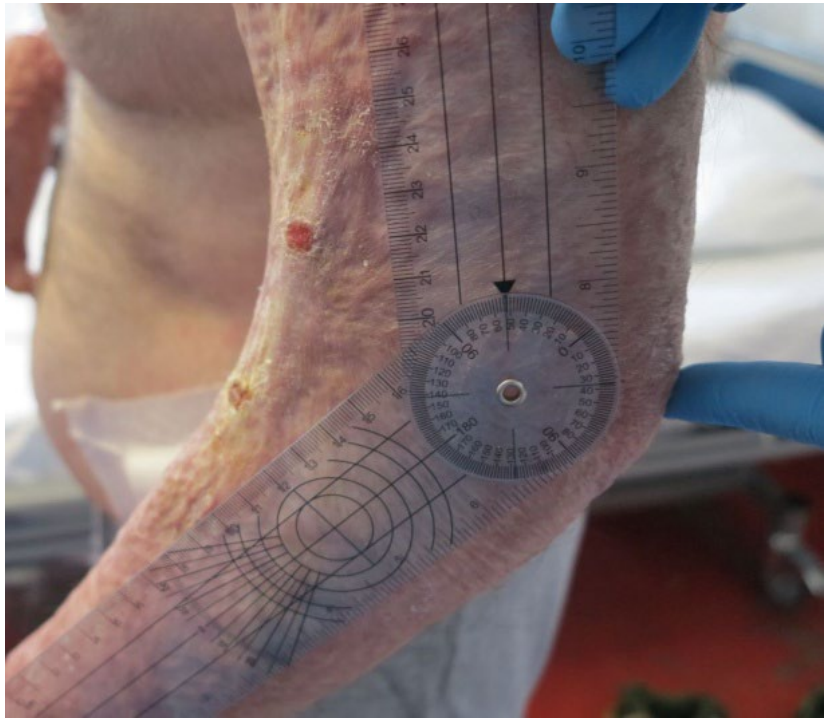
# Local examination

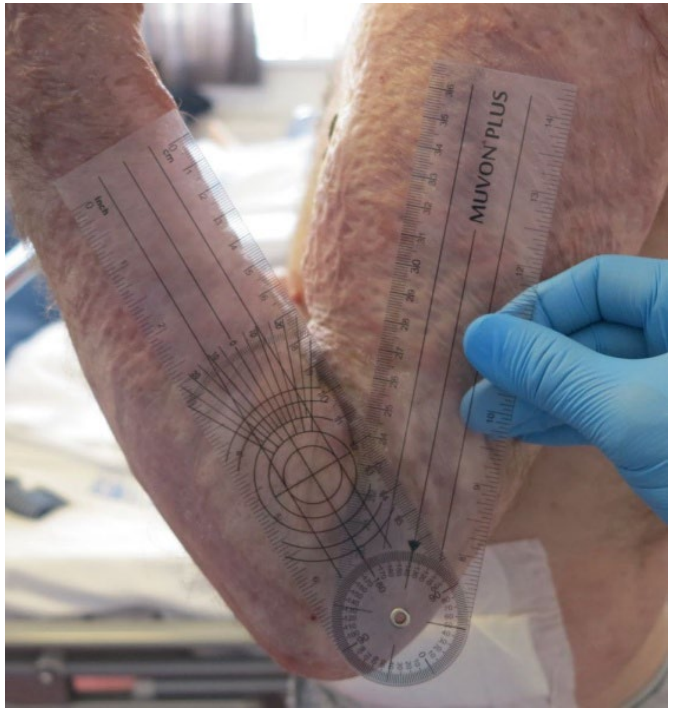
- Examination of the upper limbs – ROM:

| Elbow | | | |
|---|---|---|---|
| **Movement** | **Right** | **Left** | **Reference range** |
| Flexion | 50º (**55**%) | 60º (**65**%) | 0–90º |
| Extension | 80º (**90**%) | 80º (**90**%) | 0–90º |

# Local examination

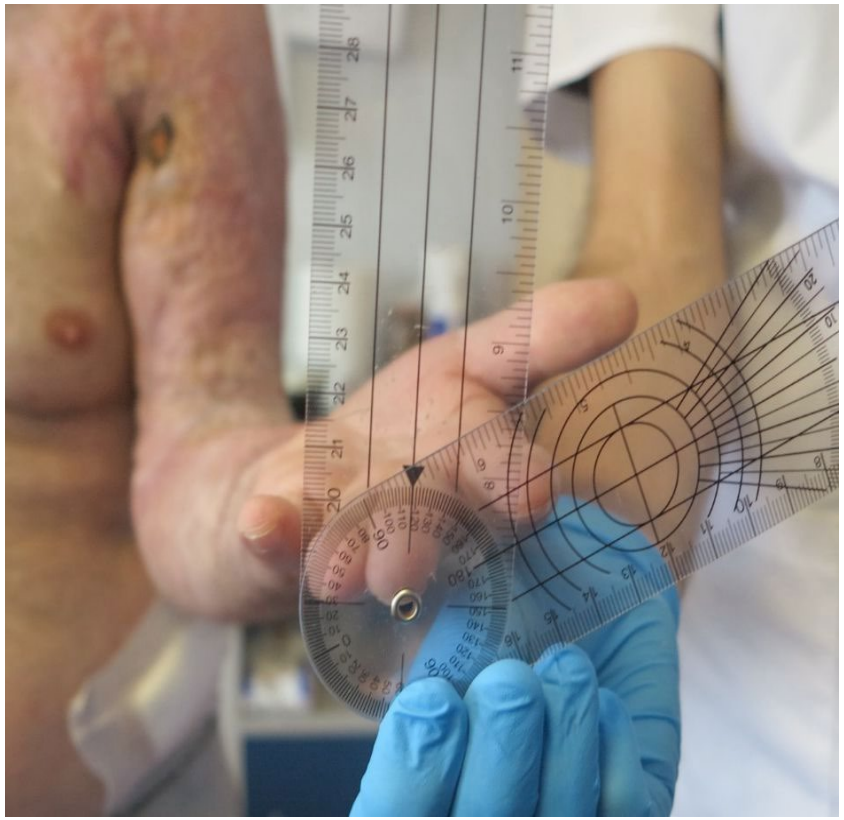
- Examination of the left upper limb - ROM





# Local examination

- Examination of the left upper limb - ROM



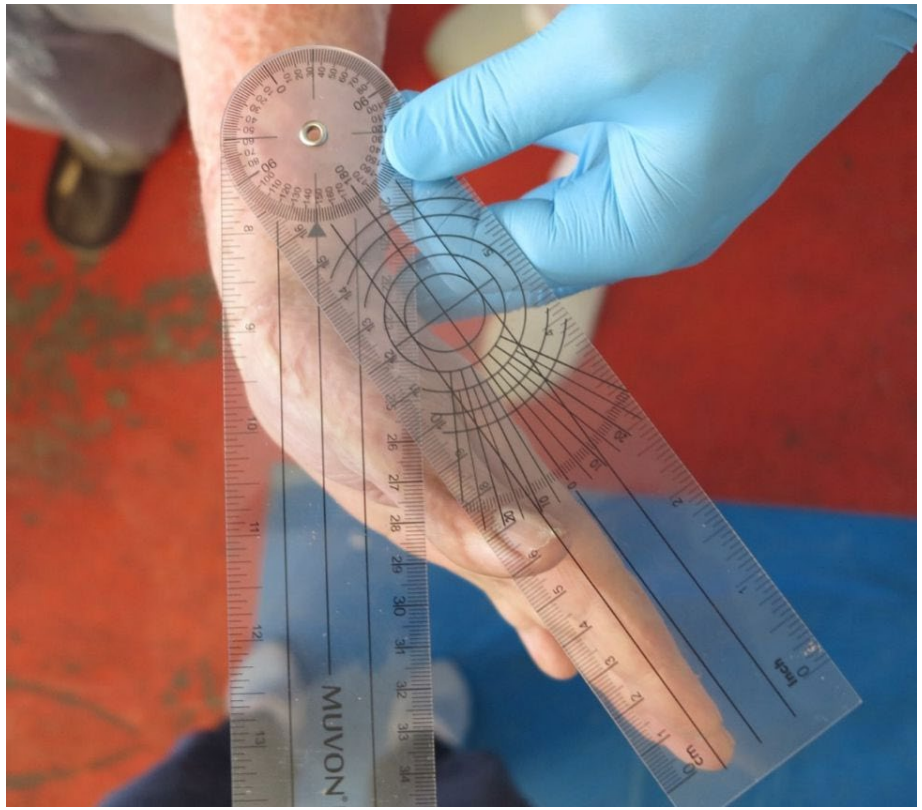
# Local examination

- Examination of the upper limbs – ROM:

| Hand and fingers | | | |
|---|---|---|---|
| **Movement** | **Right** | **Left** | **Reference range** |
| Flexion | 20º (25%) | 70º (90%) | 0–80º |
| Extension | 30º (35%) | 30º (35%) | 0–80º |

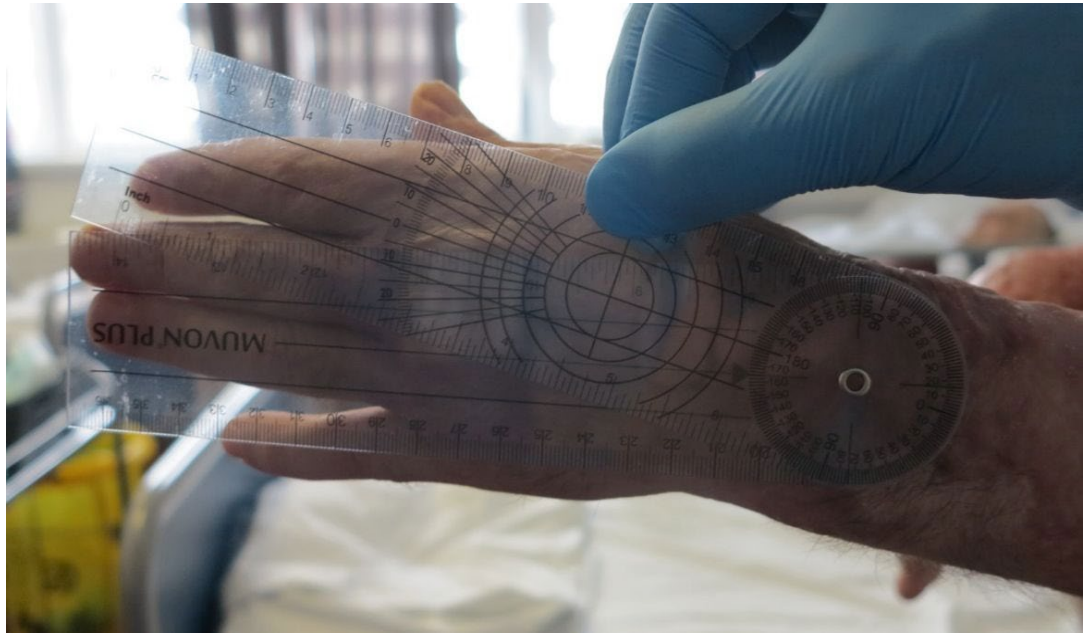
# Local examination

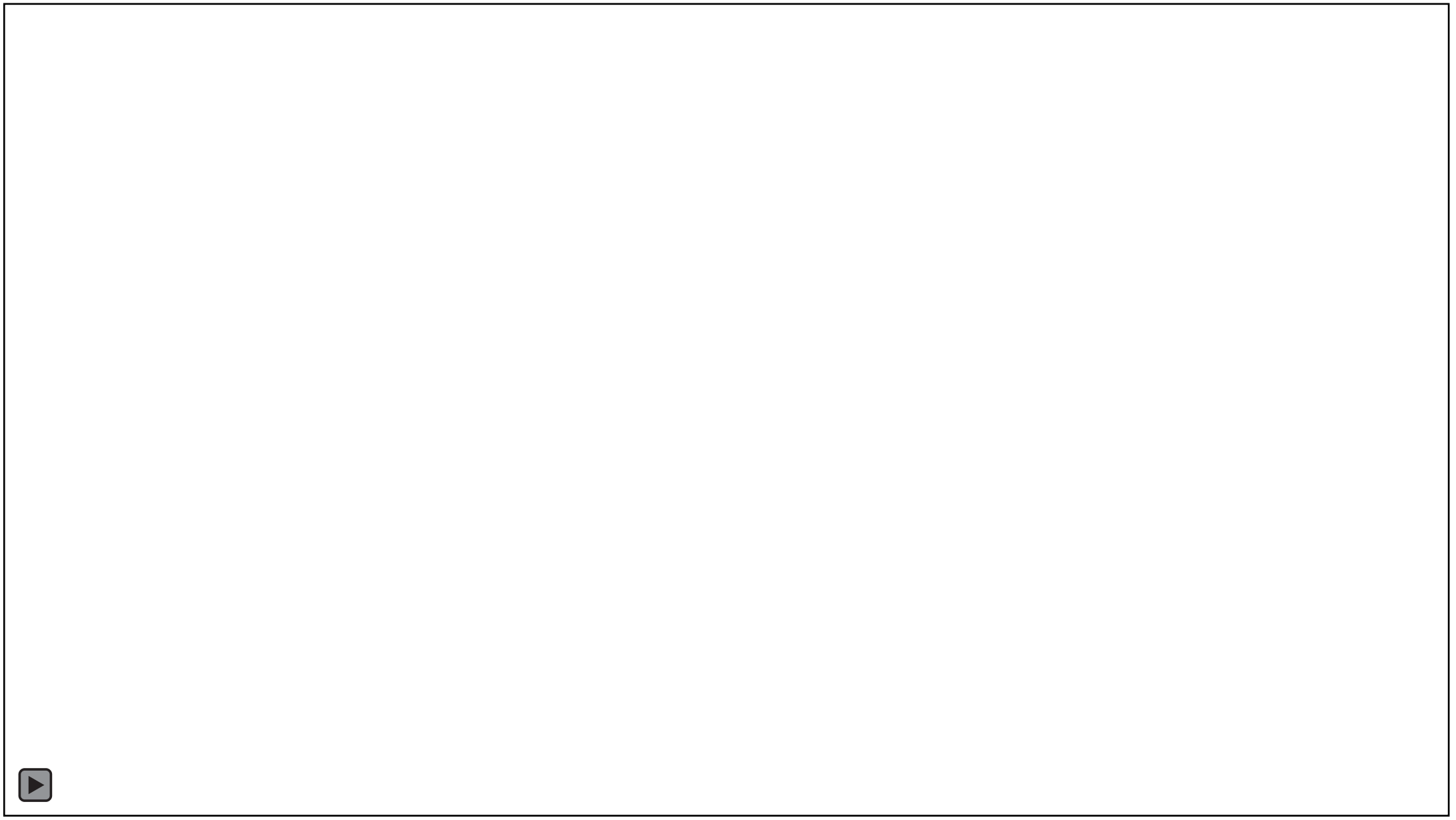
- Examination of the left upper limb - ROM



# Local examination

- Examination of the left upper limb - ROM





# Positive diagnosis and PRM objectives

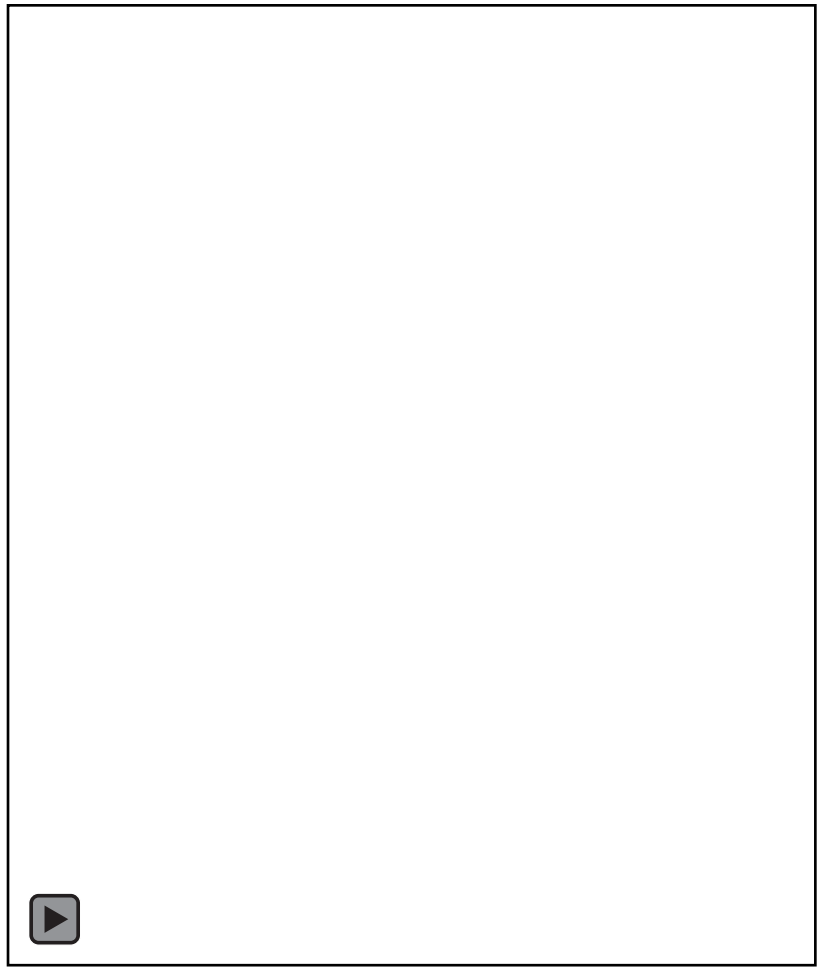
- Post-burn scars with ongoing management of keloid scarring in the anterior axillary line and left cubital region

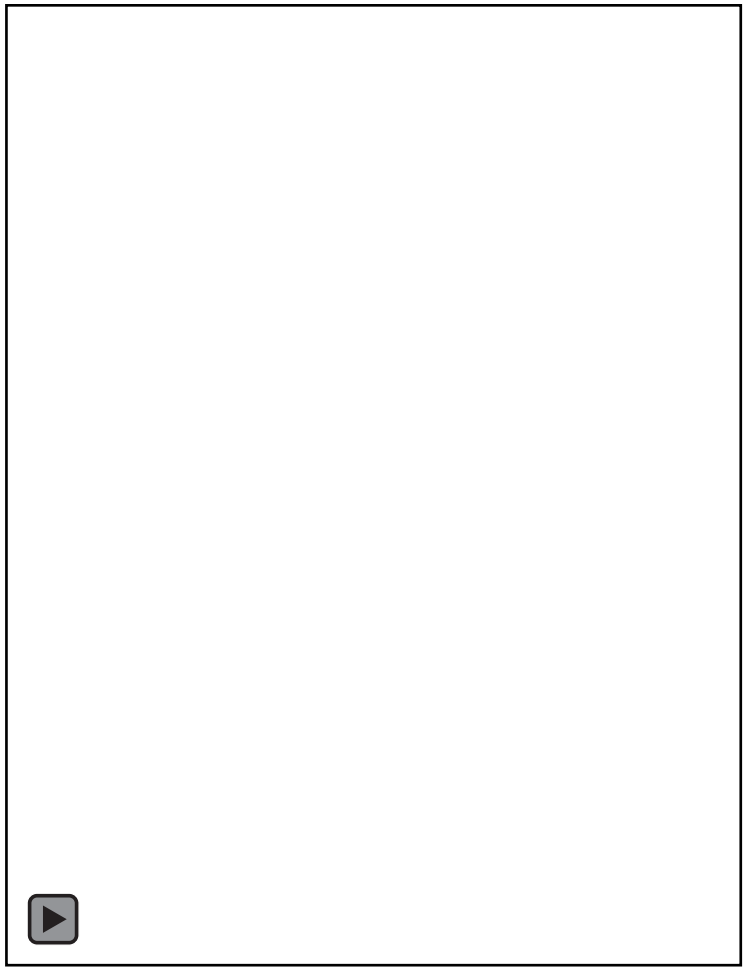
**Objectives:**

The goal of physical exercise is to regain and maintain range of motion (ROM), good posture and muscle strength, as well as to prevent immobilization in poor postures.

- Depressive disorder – currently receiving treatment.
- Mild iron-deficiency anemia.

# Physical and occupational therapy





# Evolution – admission / discharge

| Shoulder | Admission | Discharge |
|---|---|---|
| Abduction | 90º | 95º (+5º) |
| Adduction | 120º | 120º |
| Flexion | 90º | 100º (+10º) |
| Extension | 30º | 35º (+5º) |
| **Elbow** | **Admission** | **Discharge** |
| Flexion | 60º | 65º (+5º) |
| Extension | 80º | 85º (+5º) |
| **Wrist and hand fingers** | **Admission** | **Discharge** |
| Flexion | 70º | 75º (+5º) |
| Extension | 30º | 40º (+10º) |
| Radial deviation | 20º | 20º |
| Ulnar deviation | 20º | 25º (+5º) |

# Discussions – Case Study

- The rehabilitation program led to an improvement in range of motion (ROM) – having a positive impact on functionality
- Recovery requires ongoing exercise program to optimize results - aiming to correct posture.
- The patient needs surgical treatment of the right upper limb and cervical region.

# Conclusion

- Post-burn therapy is multidisciplinary.
- Late post-burn rehabilitation targets the restoration of function through mobility, strength, and movement re-education and correcting compensations and posture.
- The therapy needs to be tailored to patient needs.
- Physical agents may help achieve this objectives, needing futher study validation.

# References

Slide 2

* Esselman PC. Burn rehabilitation: an overview. Arch Phys Med Rehabil. 2007 Dec;88(12 Suppl 2):S3-6. doi: 10.1016/j.apmr.2007.09.020. PMID: 18036978.

** ISBI Practice Guidelines Committee; Steering Subcommittee; Advisory Subcommittee. ISBI Practice Guidelines for Burn Care. Burns. 2016 Aug;42(5):953-1021. doi: 10.1016/j.burns.2016.05.013. PMID: 27542292.

# References

Slide 3


* Huma khan, Pirtik Rai, Rafia Nazar, Jahanzeb Ahmed, Mansoor Ahmed, Salman Khan. Prevalence of Post-Burn Contractures and Their Impact on Functional Activities among Burn Survivors: A Cross-Sectional Study. JHWCR [Internet]. Available from: https://jhwcr.com/index.php/jhwcr/article/view/1339

** Sunil kumar, C. N., None, G., Sharma, B. P. & None, T. N. (2025). Our Experience With Post Burn Contractures And Their Surgical Management. *Journal of Contemporary Clinical Practice, 11*(9), 725-732.

*** Esselman PC. Burn rehabilitation: an overview. Arch Phys Med Rehabil. 2007 Dec;88(12 Suppl 2):S3-6. doi: 10.1016/j.apmr.2007.09.020. PMID: 18036978.

**** ISBI Practice Guidelines Committee; Steering Subcommittee; Advisory Subcommittee. ISBI Practice Guidelines for Burn Care. Burns. 2016 Aug;42(5):953-1021. doi: 10.1016/j.burns.2016.05.013. PMID: 27542292.



*** Esselman PC. Burn rehabilitation: an overview. Arch Phys Med Rehabil. 2007 Dec;88(12 Suppl 2):S3-6. doi: 10.1016/j.apmr.2007.09.020. PMID: 18036978.

**** ISBI Practice Guidelines Committee; Steering Subcommittee; Advisory Subcommittee. ISBI Practice Guidelines for Burn Care. Burns. 2016 Aug;42(5):953-1021. doi: 10.1016/j.burns.2016.05.013. PMID: 27542292.

# References

Slide 4

* Yang Y, Kang J, Jiang T, Schmitz C, Weng C, Zhang L. Safety and efficacy of treating post-burn pathological scars with extracorporeal shock wave therapy: A meta-analysis of randomised controlled trials. Wound Repair Regen. 2022 Sep;30(5):595-607. doi: 10.1111/wrr.13037. Epub 2022 Jun 23. PMID: 35691021.
** Anastasova VN, Georgiev AA, Zanzov EI, Velkova KG, Krasteva ES. High-Intensity Focused Ultrasound Thermotherapy for Scar Treatment. Ann Burns Fire Disasters. 2023 Mar 31;36(1):63-67. PMID: 38680902. PMCID: PMC11044736.
*** Güler, I.; Bastiaanse, J.; Zoric, A.; Salazar, C.R.M.; Stelling, H.; Grieb, G. Integrative medicine in burn care: A conceptual framework and study protocol for a multimodal non-pharmacological intervention programme. *Adv. Integr. Med.* 2026, *13*, https://doi.org/10.1016/j.aimed.2026.100645.

# Disclosure statement

**The authors declare no actual or potential conflict of interest in relation to this program/presentation.**

# Congresul Național de Medicină Fizică, de Recuperare și Balneoclimatologie

**Covasna, 23 – 25 Aprilie 2026**

**Thank you for your attention!**