
MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN
MiPAIN
Michigan Pediatric Adolescent
Interdisciplinary Network


# MiPAIN

## Desensitization – Does it work for the chronic pain population?

Pediatric Rehabilitation Center

Presented By:
Joe Latocki, OTR/L
Michelle DeMarco, OTR/L

# What We Will Be Covering:

- Brief overview of the MiPain program
- Quick review of amplified musculoskeletal pain syndrome (AMPS)
- Desensitization key terms
- Current evidence for desensitization and treatment approaches
- Assessments
- Strategies for implementation of a desensitization protocol
- Case study example

# MiPain Program

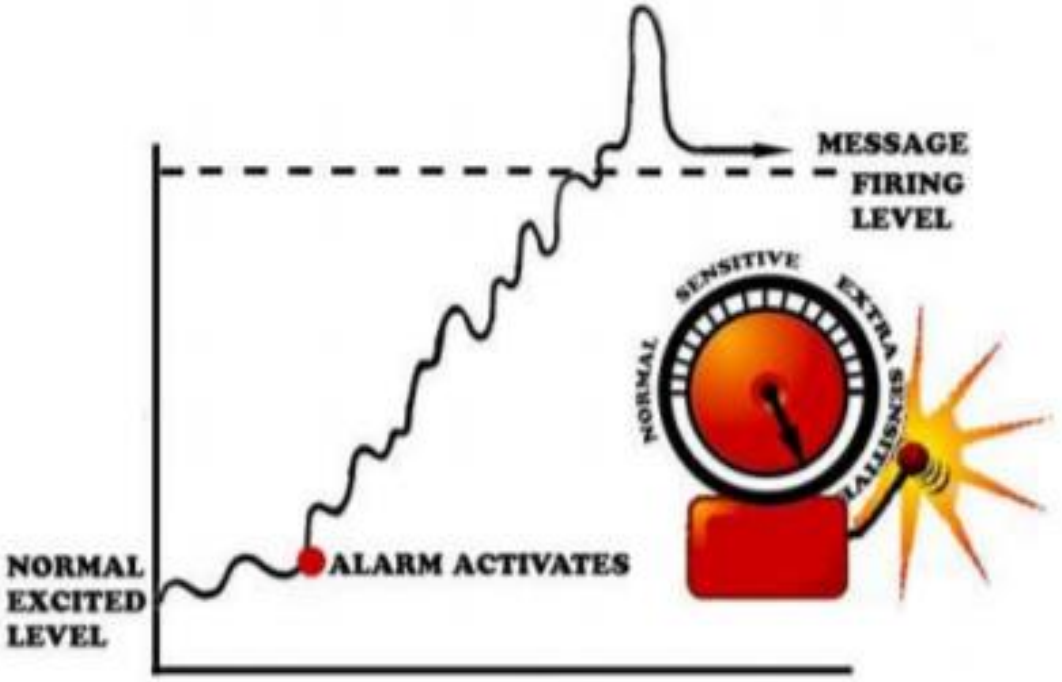
**MiPAIN program:**

- 4 kids in a group ages 9-21
- 3 days a week: Tuesday, Wednesday, Thursday
- 9am - 3pm
- 3 weeks
- 1 session cancelation policy

**Occupational therapy frequency:**

- 3 sixty minute sessions a week
  - ⅔ group of 4 format. ⅓ group of 2 format.

# Pediatric Chronic Pain Epidemiology

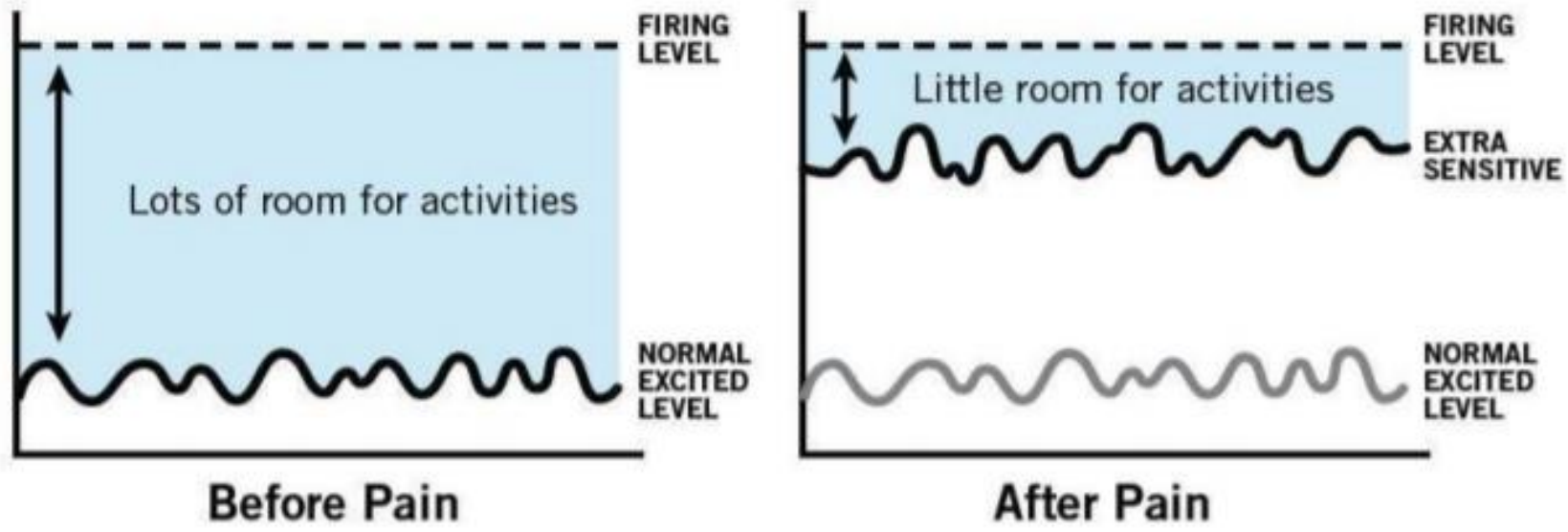



*International Spine & Pain Institute Session 1 p.11*

# Pediatric Chronic Pain Epidemiology

INTERNATIONAL SPINE & PAIN INSTITUTE

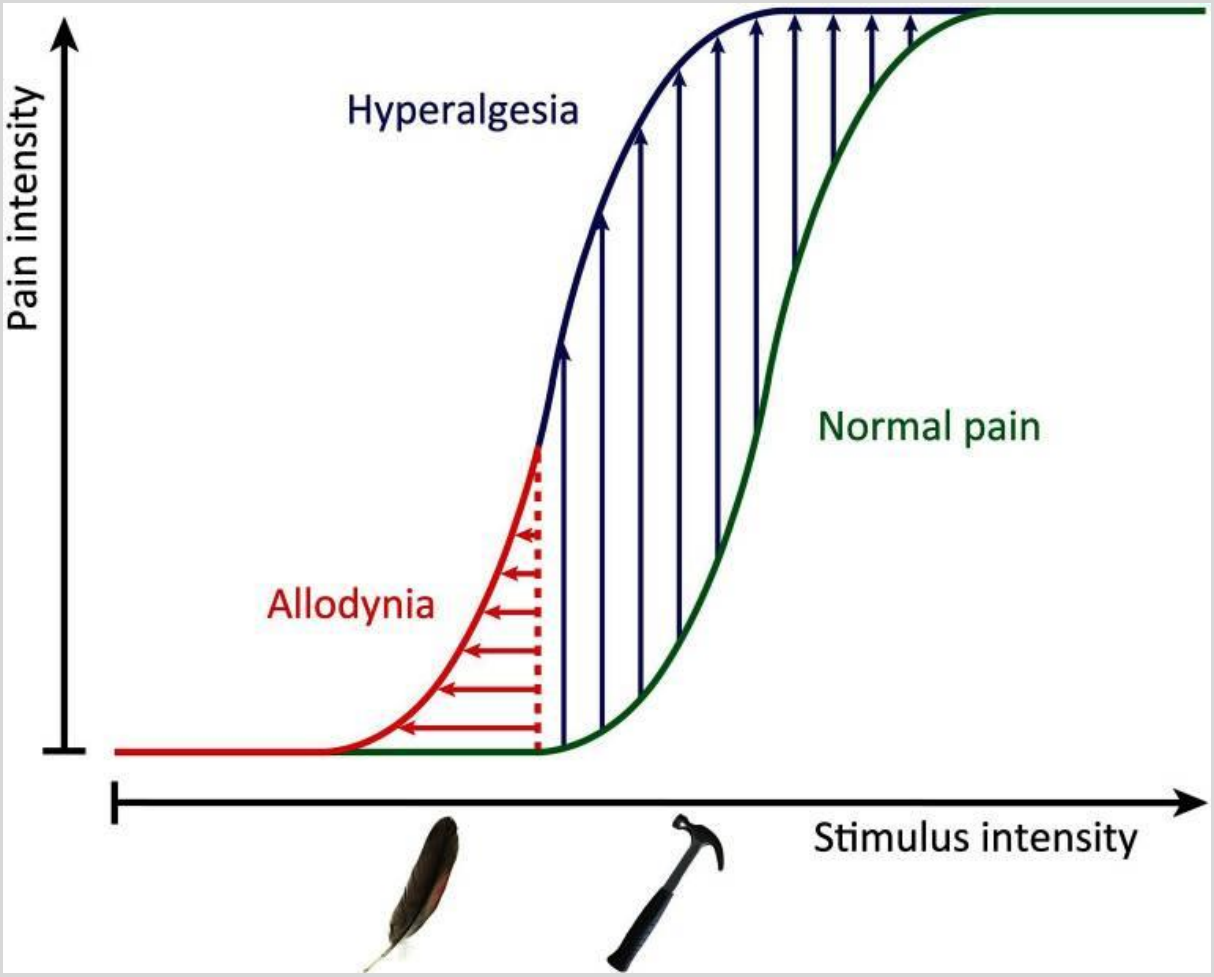
## Completely changes their life



# Key Terms

- Allodynia[4]:
  - painful response to generally non-painful stimuli
  - example: clothing, bed sheets
- Hyperalgesia[4]:
  - heightened pain response to generally painful stimuli
  - example: deep pressure, injuries
- Hyperesthesia[4]:
  - general hypersensitivity to any sensory stimuli

# Allodynia vs. Hyperalgesia




(Lolignier, S., Eijkelkamp, N., & Wood, J. N.,2015)

# Statistics

- 15%-50% of all individuals with neuropathic pain, experience allodynia[16]
- 74% of adult patients with complex regional pain syndrome  experience allodynia[13]
- 76% of children with CRPS experience allodynia[14]

# Current Evidence

- The Effectiveness of Desensitization Therapy for Individuals with Complex Regional Pain Syndrome: A Systematic Review[1]
  - Examined effect of desensitization in patients with CRPS
  - 10 articles included (2001-2013)
  - Types of desensitization:
    - chemical, tactile, thermal, and pressure desensitization
    - tactile was most prevalent
  - 68 patients total
  - Ages: 8-57

# Current Evidence

- The Effectiveness of Desensitization Therapy for Individuals with Complex Regional Pain Syndrome: A Systematic Review[1]
  - Only one study examined the effects of tactile desensitization in isolation
  - Outcome measures included:
    - pain, allodynia, and/or function
  - Results:
    - All studies showed support of including desensitization as a part of the treatment approach for CRPS.
    - Supported a graded desensitization approach

# Current Evidence

- Highlights from literature
  - Evidence supporting use of desensitization used in combination with motor tasks for CRPS [12].
  - Patients with increased allodynia tended to have decreased tactile discrimination in the affected area[3]
  - Evidence shows shrinkage of cortical maps on primary somatosensory cortex (SI) on the contralateral side to the limb affected with CRPS. Amount of shrinkage linked to severity of pain[3]
  - Combined graded desensitization and motor tasks led to a decrease in pain, improvement in tactile discrimination, and restoration of cortical maps in patients with UE pain and hypersensitivity due to CRPS[3].

# Current Evidence

- Highlights from literature:
  - Graded approach with regards to both the texture used and the motor task performed[3][12]
  - Following desensitization, patient's demonstrated decreased size of allodynic region.[2].
  - Decrease in patient's pain intensity following desensitization protocol[2][12]

# Graded Motor Imagery

**Stage 1,** participants see a series of photographic flash cards, and are asked to identify (as quickly as possible) whether the depiction is of a left or right limb.
**Stage 2**, participants imagine moving the affected limb into the position demonstrated on the photograph, while the affected hand rests comfortably.
**Stage 3** involves mirror therapy, whereby both limbs are moved to adopt simple postures as demonstrated on the photograph [20]

*Moseley GL (2004). Graded motor imagery is effective for long standing complex regional pain syndrome: A randomised controlled trial. Pain 108: 192-198.*

# Graded Motor Imagery

"It seems plausible that GMI may provide an avenue to start rehabilitation at a manageable level for a patient who complains that pain is too severe to perform any kind of limb movement." p[19]

*Pollard C (2013) Physiotherapy management of complex regional pain syndrome New Zealand Journal of Physiotherapy 41(2): 65-72.*

# Standardized Assessments

## Allodynia Hypersensitivity Scale

- No standardized measure was identified to assess tactile hypersensitivity
- Allodynia and Hypersensitivity Scale was created to meet the needs of the MiPain program.
- Only completed if patient is hypersensitive to tactile stimulation
- Implemented using a standardized protocol
- Overall, data collection shows that patients exit with reduced tactile hypersensitivity.

# Allodynia Hypersensitivity Scale

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | NAME | DATE | light touch | deep pressu | brushing | towel rubbin | vibration | cold temper | Repeated sti | total |
| 2 | Patient A | 10/24/2017 | 0 | 3 | 1 | 4 | 5 | 4 | 7 | 24 |
| 3 | | | 0 | 2 | 3 | 2 | 3 | 4 | 4 | 18 |
| 4 | Patient B | 10/26/2017 | 0 | 0 | 7 | 0 | 7 | 0 | 0 | 14 |
| 5 | | 12/20/2017 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 6 | Patient C | 11/2/2017 | 7 | 9 | 8 | 10 | 0 | 8 | 6 | 48 |
| 7 | | 12/20/2017 | 0 | 3 | 0 | 2 | 0 | 3 | 3 | 11 |
| 8 | | 3/22/2018 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9 | Patient D | 10/11/2017 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | | | | | | | | | | |
| 11 | Patient E | 10/17/2017 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| 12 | | | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| 13 | Patient F | 10/17/2017 | 1 | 3 | 1 | 2 | 6 | 5 | 7 | 25 |
| 14 | | 11/30/2017 | 0 | 3 | 1 | 2 | 3 | 4 | 3 | 16 |
| 15 | | 1/9/2018 | 3 | 2 | 2 | 6 | 6 | 8 | 5 | 32 |

# Allodynia Hypersensitivity Scale

**Allodynia Hypersensitivity Scale findings:**

- Based upon change in score from initial evaluation until the end of the MiPain program.
- 30 patients' scores were included
- Average decrease of 10.3 points
- High of 37 point decrease.
- 2 patients scored higher on post-test than pre-test

# Standardized Assessment Considerations:

- Two-point discrimination
- Pain perception questionnaires (BATH, etc.)
- Measuring size of pain region
- Pressure gauge

# Patient Factors to Consider

- How do we know if the patient is a good candidate for a desensitization protocol?
- Which protocol should you choose?

# Strategies for Implementation

- Graded progression based upon patient's tolerance
  - variation in textures used
- Used in combination with movement/exercise
- Embedded within functional activities and routines
  - shower
  - dressing (i.e clothing textures)
- Individualized home exercise program
  - at least 1-8 minutes of daily desensitization multiple times a day.
- Involvement of caregivers for improved carryover

# Case Study Example

- Patient demographics
  - 9 years old
  - Complex regional pain syndrome
  - Left lower extremity pain and hypersensitivity
  - high level athlete
- Initial evaluation:
  - using crutches
  - Allodynia Hypersensitivity Scale: score 56
  - minimal physical activity
  - occasionally missing school or leaving early
  - often avoids washing LLE in shower
  - could not sit with knee flexed at 90 degrees

# Case Study Example

- Treatment approach:
  - Coordinated outpatient OT, PT, and Psychology
  - Frequency: 2-3x/week
  - Interventions included:
    - movement
    - weight bearing
    - desensitization
    - functional activities
    - mirror visual feedback
    - scheduled decrease in use of crutches

# Case Study Example

- Self Administered Desensitization included:
  - shaving cream
  - dry towel
  - wet towel
  - soft brush
  - sensory brush
  - textured massage roller
  - vibration
- Incorporated mirror visual feedback with these textures on non-affected LE
- Textures were graded up based upon tolerance
- Included both patient and therapist completing desensitization during session

# Case Study Example

- Outcomes
  - Allodynia Hypersensitivity Scale re-assessment score: 33
    - Improved by 23 points
  - Ambulating without upper extremity support
  - Independent with all ADL's
  - Increased activity levels

# References


[1] Helmers, Lauryn M., Donnelly, Kira L., Verberne, Olivia M., & Allen, Roger J (2015). The Effectiveness of Desensitization Therapy for Individuals with Complex Regional Pain Syndrome: A Systematic Review. *Physical Therapy Research Symposium*. 13. https://soundideas.pugetsound.edu/ptsymposium/13

[2] Lewis, J. S., Coales, K., Hall, J., & Mccabe, C. S. (2011). Now you see it, now you do not: Sensory–motor re-education in complex regional pain syndrome. *Hand Therapy, 16*(2), 29-38. doi:10.1258/ht.2011.011005

[3] Pleger, B.,Tegenthoff, M., Ragert, P., Förster, A., Dinse, H. R., Schwenkreis, P., Nicolas, V., & Maier, C. (2005), Sensorimotor returning in complex regional pain syndrome parallels pain reduction. Ann Neurol., *57*, 425-429. doi:10.1002/ana.20394

[4] International Association for the Study of Pain. (2018). IASP Terminology. Retrieved from https://www.iasp-pain.org/Education/Content.aspx?ItemNumber=1698

[5] Lolignier, S., Eijkelkamp, N., & Wood, J. N. (2015). Mechanical allodynia. *Pflugers Archiv: European journal of physiology, 467*(1), 133–139. doi:10.1007/s00424-014-1532-0

[6] Simon, A., & Collins, C. (2018). Lifestyle Redesign for chronic pain management: A retrospective clinical efficacy study: A retrospective clinical efficacy study. *AJOT*. July/August 2017, Volume 71, Number 4.

[7] Lagueux, E., Charest, J., Lefrançois-Caron, E., Mauger, M.-E., Mercier, E., Savard, K., & Tousignant-Laflamme, Y. (2012). Modified graded motor imagery for complex regional pain syndrome type 1 of the upper extremity in the acute phase. *International Journal of Rehabilitation Research*, *35*(2), 138–145. doi: 10.1097/mrr.0b013e3283527d29

[8] Moseley, L. G., & Wiech, K. (2009). The effect of tactile discrimination training is enhanced when patients watch the reflected image of their unaffected limb during training. *Pain*, *144*(3), 314–319. doi: 10.1016/j.pain.2009.04.030

# References


[9] Watson, Danielle & Velsher, Mel. (2016). Seeing Relief: Mirror Box Therapy as a Treatment for Chronic Regional Pain Syndrome. *School of Occupational Master's Capstone Projects.* 3.

[10] Lewis, Jenny & McCabe, C.S. (2010). Body Perception Disturbance (BPD) in CRPS. *Practical Pain Management.* Retrieved from http://eprints.uwe.ac.uk/10851/1/PPM_Apr2010_CRPS_Lewis_McCabe.pdf

[11] Louw, Adriaan., Puentedura, Emilio., Schmidt, Stephen., Zimney, Kory., Podolak, Jessica., . . . Marth, Lindsay. (2019). Therapeutic Neuroscience Education I: Teaching People About Pain 2019 Lab Manual. *International Spine &*

[12] Harden, R. N., Oaklander, A. L., Burton, A. W., Perez, R. S., Richardson, K. , Swan, M., Barthel, J. , Costa, B. , Graciosa, J. R. and Bruehl, S. (2013), CRPS Diagnostic and Treatment Guidelines. Pain Med, 14: 180-229. doi:10.1111/pme.12033

[13] Allen, R. J. (2006). Physical Agents Used in the Management of Chronic Pain by Physical Therapists. *Physical Medicine and Rehabilitation Clinics of North America, 17*(2), 315-345. doi:10.1016/j.pmr.2005.12.007

[14] Stanton-Hicks, M. (2010). Plasticity of Complex Regional Pain Syndrome (CRPS) in Children. Pain Medicine, 11(8), 1216–1223. doi: 10.1111/j.1526-4637.2010.00910.x

[15] Sherry, D & Krpcio D. (2011) Amplified Musculoskeletal Pain (AMP): A Guide for Families

[16] He Y, Kim PY. Allodynia. (2019). In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; Available from: https://www.ncbi.nlm.nih.gov/books/NBK537129/

# References

[17 Palmero, T., & Law, E. (2015) *Managing your child's chronic pain.* Oxford, New York: Oxford University Press.
[18] International Spine & Pain Institute - Session 1-4
[19] Pollard C (2013) Physiotherapy management of complex regional pain syndrome New Zealand Journal of Physiotherapy 41(2): 65-72.
[20] Moseley GL (2004). Graded motor imagery is effective for long standing complex regional pain syndrome: A randomised controlled trial. Pain 108: 192-198.
[21] Royal College of Physicians (2018) 'Complex Regional Pain Syndrome in adults UK guidelines for diagnosis, referral and management in primary and secondary care, ' RCP London website. May 2012. Available: <https.rcplondon.ac.uk/sites/default/files/documents/complex-regional-pain-full-guideline.pdf>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QUESTIONS?