

FACT SHEET

Pediatric Chronic Pain

INTRODUCTION

This fact sheet provides an overview of current evidence-based recommendations related to key aspects of evaluation, treatment, functional prognosis, and key considerations for common chronic pain diagnoses related to pediatric physical therapy intervention.

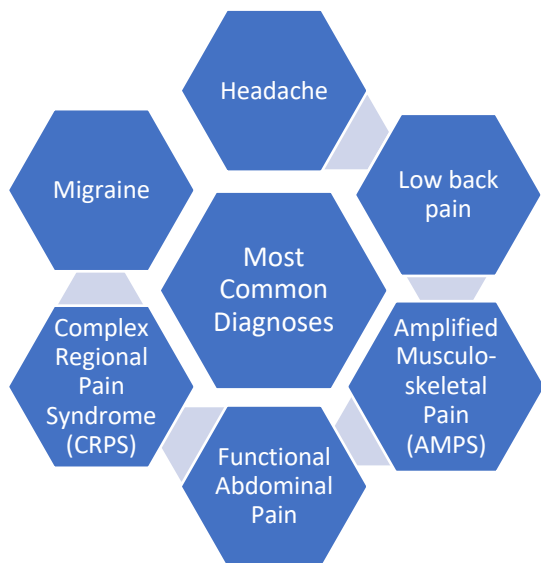
WHAT IS CHRONIC PAIN?

Chronic pain is defined as recurrent or persisting pain lasting longer than 3-6 months¹, which does not respond in an acceptable or timely manner to standard treatment. For children, chronic pain should not be defined by an absolute parameter such as months but instead should consider existing pain that extends beyond the expected period of healing. Chronic pain in children is the result of a dynamic integration of biological processes, psychological factors, and sociocultural variables.

ETIOLOGY AND RISK FACTORS

Pediatric chronic pain occurs in 11-38% of the population; however, only 3% of children with chronic pain require more intensive services. While the exact cause of chronic pain is largely unknown, there are several common causes and risk factors associated with the development of pediatric and adolescent chronic pain.

FIGURE 1: Most Common Causes of Pediatric Chronic Pain



Chronic pain can develop after a specific, acute injury,² as a consequence of a chronic disease process,⁴ or from dysfunction of pain pathways.² Figure 1 highlights the most common diagnoses associated with pediatric chronic pain. Risk factors include pediatric obesity, psychological comorbidities, atypical brain development, and poor body posture or biomechanics of movement.^{2, 5, 6} Common comorbidities include anxiety, depression, emotional symptoms, low self-esteem, chronic health issues, decreased social engagement, decreased physical functioning.^{4, 7}

ASSESSMENT, TESTS, AND MEASURES

General assessment includes pain related history, previous interventions, current weight bearing status or precautions, and pain intensity/frequency.³ To assess the impact of pain on flexibility, strength, endurance, balance, posture, activities of daily living (ADLs), and functional mobility you will want to utilize measures that are both subjective and objective.

Several tests and measures may be used when assessing chronic pain based on the child's age, functional ability, level of deconditioning, and willingness to engage. Below are the most current, evidence-based assessments for use with children with chronic pain. Physical examination alone does not provide sufficient information related to psychological aspects and beliefs about pain and functioning.³

TABLE 1: Assessment, Tests, and Measures

Pain	
<i>Subjective</i>	Graded Chronic Pain Scale-Revised
	Numerical Pain Rating Scale
<i>Objective</i>	Chronic Pain Behavioural Pain Scale for Adults
	University of Alabama Birmingham
Physical Functioning ^{8, 9}	
<i>Subjective</i>	Lower Extremity Functional Scale
	Upper Extremity Functional Index
<i>Objective</i>	Bruininks-Oseretsky Test of Motor Proficiency, Second Edition
	Timed Up and Down the Stairs
	Timed Up and Go
	6 Minute Walk Test
	Functionally Relevant Physical Exercises
Goal Based	
	Canadian Occupational Performance Measure
Psychological Functioning ^{4, 8}	
<i>Subjective</i>	Functional Disability Index
	Child Depression Inventory
	Multidimensional Anxiety Scale for Children
	PROMIS: Physical, Mental, and Social health subsections
	Pain Coping Questionnaire
	Social Support Scale
	Child Self-Efficacy Scale
	Pediatric Quality of Life Inventory version 4.0

TREATMENT AND INTERVENTION

Physical therapy intervention should aim to:

- Facilitate return to independent age-appropriate functioning¹⁰⁻¹²
- Assist in re-engagement in age-appropriate activities^{2, 12}
- Improve coping and self-efficacy to continue forward gains despite the presence of pain^{2, 10}

TABLE 2: Key Components of Treatment

Component of Treatment	Additional Details
Activity Pacing ^{3, 14}	<ul style="list-style-type: none"> • Gradual progression, progressing single variable related to activity or movement at a time. • Use of tools to support pacing (rate of perceived exertion (RPE), pain activity traffic light) • Incorporation of pace breaks to reflect on current activity and need for modifications as appropriate
Aquatic intervention ¹¹	<ul style="list-style-type: none"> • Warm water temperature (90-92 degrees Fahrenheit) • Water resistance activities for aerobic and strength exercises • Buoyancy of water facilitates ease of movement

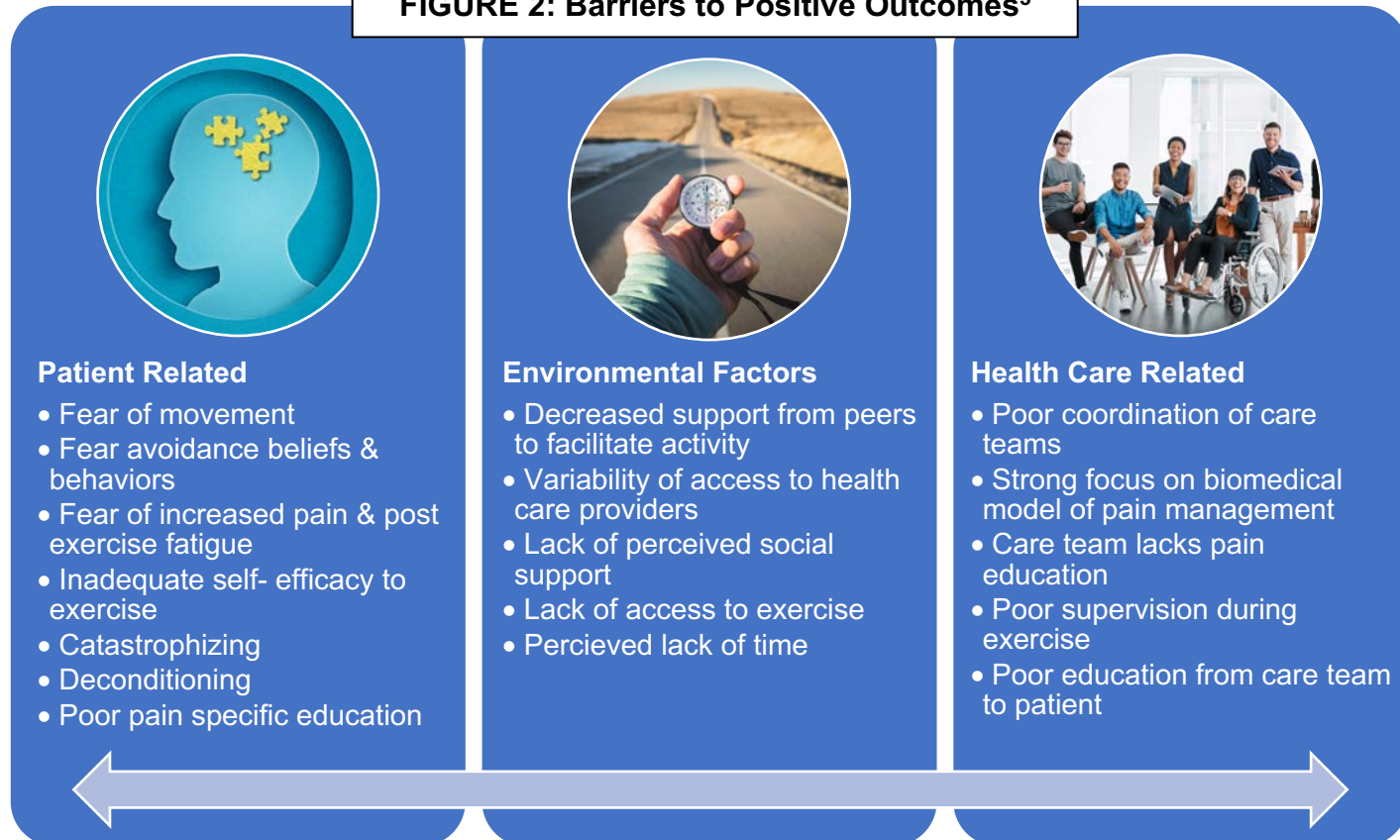
Cardiorespiratory fitness ^{3, 5, 6, 11}	<ul style="list-style-type: none"> • Moderate to vigorous aerobic exercise using a graded approach
Correction of muscle imbalances ⁵	<ul style="list-style-type: none"> • Stretching of over-activated muscles • Strengthening of inhibited muscles
Education ^{3, 6, 10, 13}	<ul style="list-style-type: none"> • Pain education: identify chronic pain vs acute conditions, neuroscience education, fear avoidance beliefs. • PT specific education: biomechanical issues, impact of exercise on the nervous system, posture, and body mechanics (physical activity, passive activity, rest), lifting techniques. • Parent coaching: modelling and training with focus on shifting attention and behavioural response to encourage function in the presence of pain
Flexibility and mobility training ^{3, 5, 11}	<ul style="list-style-type: none"> • Proper length of musculature and mobility of joints to support movement, positioning, and physical activity
Function based exercises ^{6, 9}	<ul style="list-style-type: none"> • Practice of functional, day-to-day movements (sit to stand, walking, static stand, reaching, lifting)
Graded repetitive practice of movements despite pain ^{10, 11}	<ul style="list-style-type: none"> • Graded “in-vivo” exposure to decrease pain-related avoidance and fear of movement. <ul style="list-style-type: none"> • Gradually increase in activity including repetitions, range of motion, speed of movement, and stability or support
Goal Setting ³	<ul style="list-style-type: none"> • Collaborative goal setting with the child and caregivers • Focus on improved functioning, addressing functional impairments, and reducing disability
Flexibility and mobility training ^{3, 5, 11}	<ul style="list-style-type: none"> • Proper length of musculature and mobility of joints to support movement, positioning, and physical activity
Movement therapies ¹¹	<ul style="list-style-type: none"> • Yoga, Tai chi, and Pilates • Facilitate health and wellness by encouraging proactive participation and self-management
Motor control ^{3, 6, 15, 16}	<ul style="list-style-type: none"> • Activation and coordination of the deep muscles that support the spine and neck. • Sensory motor training • Biofeedback for postural re-education
Passive intervention can be helpful but have a less significant role compared to active intervention ^{6, 10, 15}	<ul style="list-style-type: none"> • Transcutaneous Electrical Nerve Stimulation • Massage • Acupuncture/ Dry Needling • Spinal Manipulation
Strength training ^{3, 5, 6, 11}	<ul style="list-style-type: none"> • Stabilization of muscles and joints • Core strengthening • Muscle endurance to support prolonged movement and posture. <ul style="list-style-type: none"> • Isometrics for slow twitch fiber activation • Low intensity exercise to improve neuromuscular coordination of postural musculature
Return to social life, leisure activities, school mobility, and sports ^{2, 17}	<ul style="list-style-type: none"> • Practice of skills to support return to social and leisure activities. • Recommendations for gradual return to sports • Relapse prevention education and recommendations

Home Program Development ^{3,11,5}	<ul style="list-style-type: none"> • Prioritize input from children and families regarding their needs, abilities, limitations, goals, and lifestyle with focus on preferred means of physical activity. • Warm up: recommend general warm up with dynamic movements and stretching of large muscle groups. • Minimum duration and frequency of 20-30 minutes, 2-3 times per week • Activity: <ul style="list-style-type: none"> • Functional multi-joint exercises • Flexibility and joint mobility to support alignment. • Strengthening begin with 1–2 sets of 8–12 repetitions using a low resistance training intensity (i.e., $\leq 60\%$ 1 repetition maximum) • Aerobic training, focus on a low to moderate intensity exercise (50-60% of max heart rate) • Cool Down: Static stretching techniques and self-myofascial release
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PROGNOSIS AND BARRIERS

While there is no “cure” for chronic pain, treatment can improve pain, functional capacity, sleep, depression, anxiety, joint mobility, attention, and energy level.¹¹ Previous studies, although limited, show that chronic pain can resolve over time (2- to 7-years),¹⁸ but also point to the importance of intervention to decrease disability, improve school attendance, progress towards goals, and reduce functional disability regardless of existing pain.¹⁹

FIGURE 2: Barriers to Positive Outcomes³



KEY POINTS

- The most common types of pediatric chronic pain are headache, functional abdominal pain, and musculoskeletal pain.^{8, 12}
- Chronic pain often is accompanied by comorbid symptoms such as anxiety, depression, low self-esteem, decreased social engagement, and decreased physical activity related to chronic health issues.^{1, 20}
- The goal of physical therapy intervention, as it relates to pediatric chronic pain treatment, is to restore function, improve coping during the presence of pain, and to improve activity level and participation in daily tasks.^{8, 10, 12} This can be done by facilitating repeat exposure to movement despite ongoing pain, education related to chronic pain, and helping individuals enhance daily activity and exercise.
- Key aspects of physical therapy treatment include pain education, graded exercise progression, attention to posture, body mechanics, and movement quality.

CONCLUSION

Physical therapy plays a key role in restoring function for children and adolescents with chronic pain. Physical functioning should improve prior to changes in pain level or experience. Graded progression of activity, pain education, and attention to movement quality are key components of treatment.

REFERENCES

1. Treede RD, Rief W, Barke A, et al. Chronic pain as a symptom or a disease: the IASP Classification of Chronic Pain for the International Classification of Diseases (ICD-11). *Pain*. Jan 2019;160(1):19-27. doi:10.1097/j.pain.0000000000001384
2. Friedrichsdorf SJ, Giordano J, Desai Dakoji K, Warmuth A, Daughtry C, Schulz CA. Chronic Pain in Children and Adolescents: Diagnosis and Treatment of Primary Pain Disorders in Head, Abdomen, Muscles and Joints. *Children (Basel)*. Dec 10 2016;3(4)doi:10.3390/children3040042
3. Kroll HR. Exercise Therapy for Chronic Pain. *Physical Medicine and Rehabilitation Clinics of North America*. 2015/05/01/ 2015;26(2):263-281. doi:10.1016/j.pmr.2014.12.007
4. Liossi C, Howard RF. Pediatric Chronic Pain: Biopsychosocial Assessment and Formulation. *Pediatrics*. Nov 2016;138(5)doi:10.1542/peds.2016-0331
5. Molina-García P, Ariza-Vega P, Estévez-López F. Chapter 42 - Physical activity and exercise in the prevention of musculoskeletal pain in children and adolescents. In: Rajendram R, Patel VB, Preedy VR, Martin CR, eds. *Treatments, Mechanisms, and Adverse Reactions of Anesthetics and Analgesics*. Academic Press; 2022:499-512.
6. Landry BW, Fischer PR, Driscoll SW, et al. Managing Chronic Pain in Children and Adolescents: A Clinical Review. *Pm r*. Nov 2015;7(11 Suppl):S295-s315. doi:10.1016/j.pmrj.2015.09.006
7. Meints SM, Edwards RR. Evaluating psychosocial contributions to chronic pain outcomes. *Prog Neuropsychopharmacol Biol Psychiatry*. Dec 20 2018;87(Pt B):168-182. doi:10.1016/j.pnpbp.2018.01.017
8. Mirek E, Logan D, Boullard K, Hall AM, Staffa SJ, Sethna N. Physical Therapy Outcome Measures for Assessment of Lower Extremity Chronic Pain-Related Function in Pediatrics. *Pediatr Phys Ther*. Apr 2019;31(2):200-207. doi:10.1097/pep.0000000000000587
9. Kempert H, Benore E. Functionally relevant physical exercises as an objective measure of clinical improvement in pediatric chronic pain. *J Pediatr Rehabil Med*. Feb 18 2023;doi:10.3233/prm-220036
10. Harrison LE, Pate JW, Richardson PA, Ickmans K, Wicksell RK, Simons LE. Best-Evidence for the Rehabilitation of Chronic Pain Part 1: Pediatric Pain. *J Clin Med*. Aug 21 2019;8(9)doi:10.3390/jcm8091267

11. Ambrose KR, Golightly YM. Physical exercise as non-pharmacological treatment of chronic pain: Why and when. *Best Pract Res Clin Rheumatol*. Feb 2015;29(1):120-30. doi:10.1016/j.berh.2015.04.022
12. Hechler T, Kanstrup M, Holley AL, et al. Systematic Review on Intensive Interdisciplinary Pain Treatment of Children With Chronic Pain. *Pediatrics*. Jul 2015;136(1):115-27. doi:10.1542/peds.2014-3319
13. Moseley GL, Butler DS. Fifteen Years of Explaining Pain: The Past, Present, and Future. *J Pain*. Sep 2015;16(9):807-13. doi:10.1016/j.jpain.2015.05.005
14. Kempert H. Teaching and applying activity pacing in pediatric chronic pain rehabilitation using practitioner feedback and pace breaks. Commentary. *Pediatric Pain Letter*. June 2021 2021;23(2):31-42.
15. Flynn DM. Chronic Musculoskeletal Pain: Nonpharmacologic, Noninvasive Treatments. *Am Fam Physician*. Oct 15 2020;102(8):465-477.
16. Malfliet A, Kregel J, Coppieters I, et al. Effect of Pain Neuroscience Education Combined With Cognition-Targeted Motor Control Training on Chronic Spinal Pain: A Randomized Clinical Trial. *JAMA Neurol*. Jul 1 2018;75(7):808-817. doi:10.1001/jamaneurol.2018.0492
17. Friedrichsdorf SJ, Goubert L. Pediatric pain treatment and prevention for hospitalized children. *PAIN Reports*. 2020;5(1)
18. Wager J, Ruhe AK, Stahlschmidt L, et al. Long-term outcomes of children with severe chronic pain: Comparison of former patients with a community sample. *Eur J Pain*. Jul 2021;25(6):1329-1341. doi:10.1002/ejp.1754
19. Randall ET, Smith KR, Conroy C, Smith AM, Sethna N, Logan DE. Back to Living: Long-term Functional Status of Pediatric Patients Who Completed Intensive Interdisciplinary Pain Treatment. *The Clinical Journal of Pain*. 2018;34(10)
20. Liossi C, Johnstone L, Lilley S, Caes L, Williams G, Schoth DE. Effectiveness of interdisciplinary interventions in paediatric chronic pain management: a systematic review and subset meta-analysis. *Br J Anaesth*. Aug 2019;123(2):e359-e371. doi:10.1016/j.bja.2019.01.024

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Developed by expert contributors Heidi Kempert, PTA and Rachel Heines, PT, DPT. Supported by the Fact Sheet Committee of APTA Pediatrics.

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