

MOTOR PERFORMANCE AND ACTIVITIES OF DAILY LIVING IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER: A COMPREHENSIVE REVIEW

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Abstract

Juvenile Idiopathic Arthritis (JIA) is the most common chronic rheumatic disease of childhood and represents a heterogeneous group of inflammatory conditions characterized primarily by arthritis beginning before 16 years of age and persisting for at least six weeks. Although advances in disease-modifying antirheumatic drugs and biologic therapies have substantially improved disease control and long-term outcomes, pain remains one of the most frequent and distressing experiences reported by children and adolescents with JIA. Importantly, pain does not always correspond directly with objective inflammatory disease activity and may persist even when inflammation is adequately controlled. JIA-related pain is multidimensional and can be influenced by inflammatory processes, joint damage, fatigue, sleep disturbance, physical disability, emotional distress, pain-related beliefs, coping strategies and social circumstances. Persistent pain may interfere with mobility, exercise, self-care, education, social participation and family relationships, thereby affecting health-related quality of life. Adolescents may experience additional challenges because pain and physical limitations occur during a developmental period characterized by increasing independence, identity formation and preparation for adulthood. Effective pain management therefore requires more than pharmacological control of inflammation. Comprehensive assessment should consider pain intensity, frequency, location, interference with daily activities and psychological and social dimensions. Management may include appropriate treatment of the underlying arthritis, analgesic and anti-inflammatory medications, physiotherapy, physical activity, occupational therapy, psychological interventions, education and self-management support. Recent literature particularly emphasizes biopsychosocial and multidisciplinary approaches to persistent pain. This review discusses the nature and manifestations of pain in JIA, its effects on physical functioning and daily life, psychological and social consequences, and current approaches to assessment and management. It also highlights the need for individualized, patient-centred care that addresses pain as an important outcome in its own right rather than treating it solely as a marker of inflammation.

Keywords: *Juvenile Idiopathic Arthritis, JIA, pain, adolescents, chronic pain, physical functioning, quality of life, pain management, rehabilitation, psychological health*

1. Juvenile Idiopathic Arthritis and the Nature of Pain

Juvenile Idiopathic Arthritis (JIA) is a chronic inflammatory rheumatic condition affecting children and young people. It encompasses a heterogeneous group of disorders with different clinical manifestations, patterns of joint involvement and extra-articular features. The disease is defined by arthritis beginning before the age of 16 years, lasting for at least six weeks, and occurring after other possible causes of childhood arthritis have been excluded. The International League of Associations for Rheumatology classification system traditionally divides JIA into seven categories: systemic arthritis, oligoarthritis, polyarthritis rheumatoid factor positive, polyarthritis rheumatoid factor negative, psoriatic arthritis, enthesitis-related arthritis and undifferentiated arthritis. This

heterogeneity means that the experience of pain can vary considerably between individual patients (Petty et al., 2004).

Pain is one of the most important symptoms associated with JIA. Earlier literature described pain as the most common and distressing symptom reported by children with arthritis, with substantial consequences for physical, emotional, social and role functioning (Stinson, Luca and Jibb, 2012). Persistent pain can remain clinically significant even among children receiving disease-modifying antirheumatic drugs or anti-inflammatory therapy. For example, previous research summarized in the literature has reported that a substantial proportion of children with polyarticular arthritis continued to experience pain on many days despite treatment (Stinson, Luca and Jibb, 2012). These observations demonstrate that successful control of inflammation does not necessarily eliminate the patient's pain experience.

Pain associated with JIA is complex because it may arise from several interacting mechanisms. Active inflammation within joints can stimulate peripheral nociceptors and produce pain, tenderness, swelling and stiffness. Prolonged inflammation may also contribute to structural changes, altered movement patterns and physical disability, which can further contribute to discomfort. In some patients, pain may continue after inflammatory activity has decreased. Such persistent pain can involve altered pain processing, fatigue, poor sleep, emotional distress and learned behavioural responses to pain (Anthony and Schanberg, 2007; Stinson, Luca and Jibb, 2012).

The relationship between pain and disease activity is therefore not always straightforward. Pain can be associated with active inflammation, but its intensity may also be affected by psychological and social factors. A systematic review of psychosocial factors associated with JIA pain identified relationships involving pain beliefs, self-efficacy, social functioning, internalizing symptoms and well-being (Law et al., 2023). The findings support the understanding of JIA pain as a multidimensional phenomenon rather than simply a direct reflection of joint inflammation. [PubMed](#)

The distinction between disease activity and pain is particularly important in clinical care. If pain is assumed to indicate active inflammation in every case, there is a risk that persistent pain may be managed exclusively through escalation of anti-inflammatory treatment. Conversely, if pain is attributed entirely to psychological factors, the biological contribution of arthritis may be underestimated. A balanced approach recognizes that biological, psychological and social processes can interact to shape the pain experience (Anthony and Schanberg, 2007).

Pain may occur at different times and in different forms. Some children experience pain primarily during active joint inflammation, whereas others experience persistent or recurrent pain despite relatively low levels of inflammatory activity. Morning stiffness and pain after periods of inactivity may interfere with school preparation and mobility. Pain may also increase during physical activity when joints are affected or when muscle weakness and altered biomechanics are present. The unpredictable nature of pain can create uncertainty and may influence children's willingness to participate in normal activities.

JIA is also a condition that may extend into adolescence and adulthood. Contemporary evidence indicates that a proportion of patients continue to experience symptoms into adult life, making transition from pediatric to adult rheumatology an important aspect of long-term management (Horneff et al., 2025). [PubMed](#) Pain experienced during adolescence may therefore have implications beyond childhood and can affect the development of independence, education, employment preparation and social functioning.

The importance of pain should consequently be recognized as an independent clinical concern. Contemporary approaches to JIA increasingly emphasize patient-reported outcomes and quality of life in addition to traditional measures of inflammation and physical examination. Health-related quality of life is negatively affected by chronic pain and physical disability, and recent reviews have emphasized the need to incorporate children's own perspectives into assessment and treatment decisions (Młyńczyk et al., 2022; Di Nicola et al., 2025). [PubMed Central \(PMC\)](#)

2. Clinical Characteristics and Manifestations of Pain in JIA

The clinical presentation of pain in JIA is variable and depends partly on disease subtype, number and location of affected joints, duration of disease, inflammatory activity and individual pain-related factors. Pain may

involve large joints such as the knees, ankles and hips, or smaller joints of the hands and feet. In enthesitis-related arthritis, discomfort may involve tendon and ligament attachment sites. Systemic forms of JIA may involve widespread musculoskeletal discomfort in association with systemic manifestations.

Joint inflammation can produce several related symptoms, including pain, tenderness, swelling, warmth and restricted movement. Morning stiffness is another important manifestation and can be particularly disruptive to everyday activities. Children may require additional time to get dressed, walk, prepare for school or participate in morning activities. When stiffness is accompanied by pain, children may avoid movement because they anticipate discomfort. Over time, this avoidance can contribute to reduced physical activity and deconditioning.

Pain intensity is not necessarily constant. It can fluctuate according to disease activity, physical activity, stress, fatigue, sleep quality and other circumstances. Children may describe pain as intermittent, continuous, aching, throbbing or sharp. Some may have relatively mild pain but experience substantial interference with activities, while others may report severe pain but maintain relatively good functioning. Consequently, pain intensity and pain-related disability should not be considered identical concepts (Stinson, Luca and Jibb, 2012).

One important characteristic of JIA pain is its persistence. Earlier studies demonstrated that children may continue to report clinically significant pain despite receiving appropriate disease-modifying therapy (Stinson, Luca and Jibb, 2012). The persistence of pain is clinically important because prolonged pain can affect sleep, physical activity, emotional well-being and participation in school and social activities. Persistent pain can also produce fear of movement or concern that activity will worsen the disease.

Fatigue frequently accompanies pain in JIA. Pain and fatigue can reinforce one another: pain can interfere with sleep and physical activity, while fatigue can reduce coping resources and increase the perceived burden of pain. Poor sleep may further contribute to daytime tiredness, concentration difficulties and emotional distress. Previous reviews have identified relationships between pain, sleep disturbance and fatigue among children with JIA (Stinson, Luca and Jibb, 2012).

Pain may also be associated with functional disability. A child experiencing painful knees or ankles may have difficulty walking long distances, climbing stairs, running or participating in sports. Hand pain may affect writing, typing, dressing and manipulating objects. Hip involvement may interfere with sitting, walking and recreational activities. Consequently, the functional consequences of pain depend not only on its intensity but also on the anatomical location and activities required in the child's daily environment.

Another important feature is the multidimensional nature of pain. Pain includes sensory characteristics, but the individual's interpretation of pain also influences the experience. Children's beliefs about the meaning of pain may affect their behaviour. If pain is interpreted as evidence of serious damage, children may become fearful and avoid movement. If children develop confidence in their ability to manage symptoms, they may be more capable of maintaining activity and participating in rehabilitation. Research examining psychosocial factors has found associations between pain and beliefs, self-efficacy, social functioning and emotional symptoms (Law et al., 2023). [PubMed Central \(PMC\)](#)

The child's family environment may also influence pain management. Parents and caregivers often play a major role in medication administration, healthcare appointments, physical activity and emotional support. Excessive protection may unintentionally reinforce avoidance of activity, whereas appropriate encouragement can support independence. At the same time, caregivers must recognize that persistent pain is real and should not be dismissed simply because objective inflammation appears limited.

The distinction between pain intensity and pain interference is particularly valuable. Pain intensity describes how strong pain feels, whereas pain interference concerns how much pain disrupts daily functioning. Contemporary pain assessment therefore recommends consideration of both dimensions, along with coping and broader psychosocial factors (Weiss et al., 2014). [PubMed](#)

Pain should consequently be viewed as a dynamic experience that can change throughout the course of JIA. A child may have high pain during a disease flare and lower pain after treatment, while another child may continue to experience pain despite clinical remission. Regular assessment is therefore necessary rather than relying solely on occasional clinical observations.

3. Effects of JIA-Related Pain on Physical Functioning and Daily Life

Pain associated with JIA can affect almost every aspect of physical functioning. Children and adolescents are expected to develop progressively greater independence in self-care, education, mobility and social participation. Persistent pain and stiffness can interfere with this developmental process and may result in dependence on parents or caregivers for activities that peers perform independently.

Mobility is one of the most obvious areas affected by pain. Lower-limb joint involvement can make walking, running and climbing stairs difficult. Children may alter their gait to reduce discomfort, potentially placing additional stress on other joints or muscles. Reduced mobility may then decrease participation in physical activity. Over time, physical inactivity can contribute to reduced muscle strength, endurance and overall fitness.

Physical activity is particularly important during childhood and adolescence because it supports healthy musculoskeletal development and psychological well-being. However, children with painful joints may avoid sports or exercise because of discomfort or fear of worsening their condition. Appropriate physical activity and physiotherapy are therefore important components of comprehensive JIA management. Evidence from recent reviews indicates that conservative interventions, including physical exercise and hydrotherapy, have been investigated for pain management in JIA (Santos et al., 2024). [PubMed](#)

Pain can interfere with activities of daily living such as bathing, dressing, grooming, eating, writing and using school equipment. Hand and wrist symptoms can make buttons, zippers, pens and other small objects difficult to manipulate. Lower-limb symptoms can interfere with dressing, footwear and mobility. Such limitations can be particularly frustrating for adolescents who are attempting to establish greater personal independence.

School functioning is another major area of concern. Pain, stiffness and fatigue may result in delayed arrival at school, absenteeism, reduced participation in physical education and difficulty concentrating during lessons. Repeated absences may create academic difficulties and may also reduce social contact with classmates. Adolescents may worry about being perceived as different from their peers because of mobility limitations or visible symptoms.

Qualitative research has shown that young people living with JIA may experience an ongoing tension between managing illness and attempting to maintain a normal childhood or adolescent identity. Themes identified in qualitative research include unpredictable pain, dependency, stigma, misunderstanding and a strong desire to preserve normality (Tong et al., 2012). [PubMed](#) Pain can therefore affect not only what children physically do but also how they understand themselves and their relationship with others.

Sleep is another important area affected by pain. Pain may make it difficult to fall asleep, cause nighttime awakening or reduce sleep quality. Poor sleep can subsequently contribute to fatigue, irritability, reduced concentration and greater difficulty coping with pain. This creates a potentially self-reinforcing cycle in which pain disrupts sleep and poor sleep increases the burden of pain and fatigue.

Fatigue can independently affect daily functioning. A young person may report that even when pain is relatively manageable, fatigue prevents participation in sports, social activities or schoolwork. When pain and fatigue occur together, their combined impact can be greater than either symptom alone. Consequently, assessment of JIA should not focus solely on swollen or tender joints but should also consider the broader effect of symptoms on daily life.

Physical disability can also affect family dynamics. Parents may need to provide assistance with transportation, dressing, household tasks or other activities. While family support is essential, prolonged dependence can sometimes produce frustration for both the young person and caregivers. Adolescents may particularly struggle with the tension between needing support and wanting independence.

The transition from adolescence to adulthood presents additional challenges. Young adults may need to manage medication independently, attend healthcare appointments without parents, continue education, enter employment and make decisions about physical activity and lifestyle. Persistent pain can complicate this transition by limiting physical capacity or creating uncertainty about future functioning. Effective transition care should therefore address pain management alongside disease control, self-management skills and psychosocial needs.

Health-related quality of life is strongly connected to these functional experiences. Research among adolescents with JIA has demonstrated that quality of life can be impaired, particularly in areas related to gross motor and systemic functioning. Pain, functional disability and disease activity have all been associated with variation in quality-of-life outcomes (Shaw et al., 2006). [PubMed](#)

Recent systematic reviews have further emphasized the importance of systematically incorporating health-related quality-of-life measures into JIA research and clinical care. A review of phase III clinical trials found that quality of life was not consistently included as a major endpoint, highlighting the need for stronger incorporation of patient-centred outcomes (Di Nicola et al., 2025). [PubMed Central \(PMC\)](#)

Thus, the effects of JIA-related pain extend well beyond the joints. Pain can influence movement, independence, education, sleep, fatigue, social participation and family life. Addressing these consequences is essential for achieving meaningful improvements in the lives of children and adolescents with JIA.

4. Psychological, Social and Quality-of-Life Effects of Pain

The psychological and social dimensions of JIA pain are particularly important because adolescence is a period of major emotional and social development. Chronic pain can interfere with this development by limiting participation, increasing dependence and creating uncertainty about the future.

Children and adolescents with persistent JIA pain may experience frustration, sadness, anxiety or emotional distress. The unpredictable nature of symptoms can contribute to feelings of limited control. A young person may be uncertain whether they will be able to participate in an activity planned for the following day because pain and fatigue can change unexpectedly.

The relationship between pain and psychological well-being is often bidirectional. Pain can contribute to emotional distress, while anxiety, low mood and stress may increase attention to pain and reduce coping capacity. The systematic review by Law et al. (2023) found associations between JIA pain and internalizing symptoms, lower well-being, reduced social functioning and lower health-related quality of life. The review also identified evidence suggesting that psychological factors may predict subsequent pain and that relationships can operate in both directions. [PubMed](#)

Pain-related fear is another important psychological concern. Children may fear that physical activity will cause additional joint damage or increase pain. Such beliefs can lead to avoidance of exercise and social activities. Avoidance may provide short-term relief but can reduce physical conditioning and confidence over time. Education and graded physical activity can help young people understand the difference between appropriate movement and activities that genuinely place excessive stress on affected joints.

Social functioning can also be affected. Adolescents may feel different from their peers because they cannot participate in sports, outings or other activities. Some may require accommodations at school or additional time to complete tasks. Visible physical differences, mobility aids or difficulty keeping pace with peers can contribute to self-consciousness.

Qualitative research has identified the problem of stigma and misunderstanding among young people with JIA. Because pain may not always be externally visible, children can feel that others do not understand the seriousness of their condition (Tong et al., 2012). [PubMed](#) This can create a particularly difficult situation: the young person experiences genuine pain and limitation but may appear physically healthy to teachers, classmates or acquaintances.

Family relationships may also be influenced by chronic pain. Parents can become concerned about protecting their child from pain, while the child may perceive some restrictions as excessive. Conversely, inadequate recognition of pain can leave the child feeling unsupported. Effective family communication and shared decision-making are therefore important.

Adolescents may also experience difficulties with body image and self-esteem. Joint swelling, changes in physical appearance, growth-related problems, reduced participation in sports or reliance on medication can affect how young people perceive themselves. These concerns may be particularly important during adolescence, when peer acceptance and physical identity become increasingly significant.

Mental health should therefore be considered an integral component of JIA management. A recent review emphasized that young people with arthritis may be vulnerable to mental health difficulties and that psychological problems can be associated with greater pain, disability and reduced quality of life (Hawley et al., 2025). [PubMed](#)

Quality of life is a broad outcome that incorporates physical, emotional, social and role functioning. Pain is a major contributor to reductions in health-related quality of life in JIA. Studies have demonstrated that adolescents with JIA can experience significant difficulties in multiple quality-of-life domains, and pain and functional disability are important contributors (Shaw et al., 2006).

Patient-reported outcome measures are therefore increasingly important. Instruments such as the Pediatric Quality of Life Inventory and disease-specific measures can provide information that may not be captured through clinical examination alone. Systematic reviews indicate that several generic and disease-specific instruments can be useful for evaluating quality of life in children with JIA (Młyńczyk et al., 2022). [PubMed](#)

Importantly, psychological support should not be interpreted as suggesting that JIA pain is “only psychological.” Rather, psychological factors form one component of a complex biopsychosocial pain experience. Biological inflammation, physical disability, sleep, mood, beliefs, family relationships and social participation can interact. A comprehensive approach therefore recognizes the legitimacy of pain while addressing factors that may maintain or worsen it.

The social consequences of pain also emphasize the importance of school-based and community support. Teachers may need information about the condition and appropriate accommodations. Physical education programmes may require modification rather than complete exclusion. Maintaining social participation can help protect psychological well-being and reduce feelings of isolation.

Overall, the quality-of-life consequences of JIA pain demonstrate why pain should be considered an important clinical outcome in its own right. Successful management should aim not merely to reduce pain scores but to help young people participate in meaningful activities, develop independence and maintain psychological and social well-being.

5. Assessment and Management of Pain in Juvenile Idiopathic Arthritis

Effective pain management begins with comprehensive assessment. Pain should be assessed regularly rather than assumed to be adequately controlled whenever inflammatory disease activity is low. Clinical assessment should consider pain intensity, frequency, duration, location, timing, aggravating and relieving factors, functional interference, sleep, fatigue, emotional well-being and coping strategies (Stinson, Luca and Jibb, 2012; Weiss et al., 2014).

Pain intensity can be assessed using age-appropriate scales. Younger children may use visual or faces-based scales, whereas older children and adolescents can often use numerical rating scales. However, a single pain score provides limited information. A child reporting moderate pain may continue normal activities, whereas another child with similar pain intensity may be unable to attend school or participate in sports. Assessment should therefore include pain interference and functional impact.

Patient-reported outcomes are valuable because they capture the child's own perspective. Children and adolescents should be encouraged to describe their pain directly whenever developmentally appropriate rather than relying exclusively on parental reports. Parents can provide valuable information, but their perception of pain may differ from that of the child. Contemporary patient-centred care therefore emphasizes the child's voice.

Management of JIA pain should first address active inflammatory disease. Disease-modifying antirheumatic drugs and biologic therapies are important because controlling inflammation can reduce joint pain and prevent long-term structural damage. Treatment decisions depend on JIA subtype, severity, disease duration, prognostic factors and individual patient characteristics. Current approaches emphasize early and effective treatment and treat-to-target principles (Horneff et al., 2025). [PubMed](#)

Non-steroidal anti-inflammatory drugs may be used for symptomatic relief in appropriate circumstances. Other analgesic approaches may be considered depending on the severity and persistence of symptoms. Medication

selection should be individualized according to age, disease characteristics, other treatments, contraindications and potential adverse effects. Pain management should not depend solely on analgesic medication, particularly in persistent pain.

Physical therapy is an important component of multidisciplinary care. Appropriate exercise can help maintain joint range of motion, muscle strength, flexibility, physical capacity and confidence in movement. Exercise programmes should be individualized according to the child's disease status and functional abilities. Excessive avoidance of physical activity can contribute to weakness and deconditioning, whereas appropriately prescribed activity can support physical function.

Hydrotherapy may be useful for some children because water can reduce the mechanical load on painful joints while permitting movement and exercise. Other physical interventions, including strengthening programmes and orthotic approaches, have also been examined in the literature. Recent systematic evidence has investigated exercise, hydrotherapy, orthoses and other conservative approaches for JIA pain (Santos et al., 2024). [PubMed](#)

Occupational therapy can assist children in adapting daily activities and developing strategies to preserve independence. For example, children with hand pain may benefit from techniques or assistive devices that reduce stress during writing, dressing or other tasks. School accommodations may also be recommended where necessary.

Psychological interventions are increasingly recognized as important components of persistent pain management. Cognitive behavioural approaches can help young people understand the relationship between thoughts, emotions, behaviour and pain. Such interventions may address catastrophizing, fear of movement, coping, relaxation and problem-solving. Evidence supports the incorporation of psychological approaches within multidisciplinary care rather than viewing psychological intervention as separate from medical treatment (Weiss et al., 2014).

Self-management education can also be valuable. Young people can learn to recognize symptoms, follow treatment plans, balance activity and rest, use appropriate exercise and develop strategies for coping with pain. As adolescents approach adulthood, self-management becomes particularly important because responsibility for medication and healthcare gradually shifts from parents to the young person.

Sleep management should also be considered. Establishing consistent sleep routines, addressing nighttime pain and managing fatigue may improve overall functioning. Because pain, fatigue and sleep can interact, addressing only one factor may not be sufficient.

Family involvement is important, particularly for younger children. Parents can support medication adherence, physical activity and emotional coping. At the same time, treatment should gradually encourage age-appropriate independence. Families can be taught how to provide appropriate support without unintentionally reinforcing excessive avoidance of activity.

A biopsychosocial framework provides a useful basis for integrating these approaches. The framework recognizes that pain can arise from biological processes while being influenced by psychological and social factors. International recommendations for inflammatory arthritis pain similarly emphasize patient-centred assessment and a biopsychosocial perspective, including consideration of pain characteristics, inflammation, joint damage, psychological factors, treatment preferences and daily functioning (Geenen et al., 2018). [BMJ Arthritis Research & Care](#)

Technology may provide additional opportunities for pain management. Online education, mobile applications and digital self-management interventions can potentially improve access to information and support, particularly for adolescents who are comfortable using digital platforms. Earlier JIA literature identified Internet-based approaches as promising methods for supporting disease self-management (Stinson, Luca and Jibb, 2012). However, digital interventions should complement rather than replace appropriate clinical care.

Recent evidence also suggests that non-pharmacological management deserves greater attention. A systematic review of randomized controlled trials identified exercise, hydrotherapy, orthoses, online cognitive behavioural therapy and other conservative interventions as areas of investigation for chronic JIA pain (Santos et al., 2024). [PubMed](#)

Ultimately, the most appropriate strategy is multidisciplinary. Pediatric rheumatologists, nurses, physiotherapists, occupational therapists, psychologists, pain specialists, educators and families may all contribute to effective management. The treatment plan should be individualized according to the child's disease, pain pattern, developmental stage, preferences and goals.

6. Current Perspectives, Research Needs and Conclusion

Pain remains an important and sometimes under-recognized component of Juvenile Idiopathic Arthritis. Although modern treatments have improved inflammatory disease control, children and adolescents may continue to experience clinically meaningful pain. The persistence of pain despite disease-directed therapy demonstrates that pain cannot always be understood as a simple indicator of inflammatory activity.

Current literature increasingly supports a multidimensional understanding of JIA pain. Biological factors include inflammation, joint involvement, tissue changes and physical disability. Psychological factors include anxiety, mood, pain beliefs, coping, self-efficacy and fear of movement. Social factors include family relationships, school participation, peer interactions and social support. These factors may interact dynamically over time (Anthony and Schanberg, 2007; Law et al., 2023).

One important area for future research is the relationship between pain and objective disease activity. Pain and inflammatory activity do not always correspond closely, suggesting that clinicians should avoid interpreting every episode of pain as evidence of uncontrolled inflammation. Recent work has specifically highlighted the need to better understand the relationship between pain and markers of disease activity in JIA (Law et al., 2026).

[PubMed](#)

Another research need concerns the long-term experience of pain. Many studies focus on children during relatively short periods, whereas persistent pain can continue across adolescence and into adulthood. Longitudinal research is needed to understand which children are most likely to develop persistent pain and which biological, psychological and social factors contribute to long-term outcomes.

Research should also give greater attention to adolescents and young adults. This population faces unique developmental challenges involving independence, education, employment, relationships and transition to adult healthcare. Pain that is inadequately managed during this period may interfere with these important developmental tasks.

Patient-reported outcomes should receive greater emphasis. Clinical measures such as joint counts and inflammatory markers remain essential, but they cannot fully capture the child's lived experience. Pain intensity, pain interference, fatigue, sleep, physical functioning, mental health and quality of life should be considered alongside traditional measures of disease activity. Recent evidence indicates that health-related quality of life has not always been sufficiently incorporated into JIA clinical research, supporting the need for more systematic patient-centred assessment (Di Nicola et al., 2025). [PubMed Central \(PMC\)](#)

There is also a need for stronger evidence regarding non-pharmacological interventions. Exercise, physiotherapy, hydrotherapy, psychological interventions and self-management programmes appear promising, but research quality and intervention approaches vary. Future studies should investigate which interventions work best for specific pain patterns and patient groups. Combining physical and psychological approaches may be particularly valuable for children with persistent pain.

Mental health represents another important research and clinical priority. Psychological distress may both result from and contribute to pain. Early recognition of anxiety, depression and other emotional difficulties may help prevent the development of more severe functional impairment. Integrated mental health support should therefore become an accepted component of pediatric rheumatology care rather than being reserved for severe psychological problems.

The transition from pediatric to adult services also deserves attention. Some individuals with JIA continue to have symptoms after reaching adulthood, making continuity of care important. Transition programmes should address medication management, disease knowledge, pain coping, physical activity, education, employment and psychological well-being.

The overall management philosophy should be patient-centred. The goals of treatment should be discussed with the young person and family and may include reducing pain, improving mobility, returning to school, participating in sports, sleeping better, increasing independence or improving emotional well-being. Treatment success should therefore be defined by meaningful improvements in everyday life rather than by laboratory or clinical measures alone.

In conclusion, pain is a central component of the experience of Juvenile Idiopathic Arthritis. It can arise from inflammatory disease but may also persist through complex interactions among physical disability, fatigue, sleep disturbance, psychological factors and social circumstances. Pain can substantially affect mobility, activities of daily living, education, social participation, emotional health and quality of life. Evidence from the literature demonstrates that adolescents with JIA may experience significant impairment across multiple dimensions of life and that pain is an important contributor to this burden (Shaw et al., 2006; Stinson, Luca and Jibb, 2012).

Effective pain management therefore requires regular and multidimensional assessment. Treatment should combine appropriate control of the underlying inflammatory disease with physical rehabilitation, exercise, occupational therapy, psychological support, education and self-management. A biopsychosocial and multidisciplinary model provides the most appropriate framework for addressing persistent pain.

The future of JIA pain management should move toward individualized care in which the child's or adolescent's experience is placed at the centre of clinical decision-making. Greater use of patient-reported outcomes, longitudinal monitoring, multidisciplinary interventions and early psychological support may improve long-term outcomes. Most importantly, pain should not be considered merely a secondary symptom of arthritis. It is an important clinical and quality-of-life outcome that deserves direct recognition, assessment and treatment throughout childhood, adolescence and the transition to adulthood.

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