

Epidemiology

Youth and adolescent athletes are commonly affected by illness and injury where pain is a frequent complaint. Although there has been recent attention to the management of pain in the elite athlete (2), there is limited epidemiological data about the incidence and prevalence of pain in that group, and even less in the youth and adolescent athlete.

Of concern are recent reports of prescription opioid use in high school and adolescent-age students. Between 1994 and 2007, the rate at which opioids are prescribed to adolescents 15 to 19 yr has doubled (5,6). In a study of high school seniors, 8% and 12% of female and male athletes, respectively, reported the use of prescription opioids in the past year (7). The use of prescribed opioids among high school students before graduation has been associated with the risk of misuse of opioids after graduation. In addition, male adolescents participating in organized sports are 10 times as likely to unintentionally misuse opioids, twice as likely to be prescribed opioids, and 4 times more likely to use opioids intentionally for recreational purposes (3). Twenty-five percent of college-age athletes report the use of prescription opioids over a 1-yr period; approximately one in four report using opioids without a prescription (3,8). Substance use at the collegiate level has been documented (8,9), and these include alcohol, nicotine, marijuana, amphetamines, and cocaine. These substances can be used to self-medicate or modulate mood/emotion. Initiation typically begins in high school (9).

In Olympic athletes (2), treatment of pain has been reported to include analgesics (*e.g.*, acetaminophen), nonsteroidal anti-inflammatory drugs (NSAIDs), injectable NSAIDs, other injectable medications, nonopioid analgesics, opioids, transdermal medications, and supplements.

Types of Pain, Diagnosis, and Treatment

Diagnosis

Pain in the athlete is a common complaint; the diagnosis at times can be particularly challenging. Pain is a complex and dynamic interaction among and within the biological, psychological, social, and environmental factors unique to each individual that perpetuate, and even worsen, one another. Making a comprehensive diagnosis must address these factors, including anatomical and psychosocial contributors. The comprehensive diagnosis process results in a body of information that best determines the content and timing of the treatment (10).

Acute Pain

Acute pain in sports injuries is most often nociceptive/inflammatory or neuropathic. It is a normal, predictable physiological response to tissue trauma or disease. The sensation of pain is experienced within the individual's emotional and cognitive state (11). Acute pain generally is time limited, lasting 6 wk or less. When acute symptoms last longer than 6 wk (becoming subacute), the risk for acute transitioning to chronic pain increases. Therefore, emphasis should be placed on comprehensive acute pain diagnosis and treatment.

Diagnosis: Acute Pain

The diagnostic process for acute pain includes the following:

- Clinical history

- Mechanism of injury or onset of illness
- Previous local or kinetic chain injury or previous illness
- Associated symptoms (*e.g.*, swelling, instability, numbness, weakness, fever, shortness of breath)
- Activity or sport-specific limitations
- Training and conditioning history (*e.g.*, acute and chronic workload, periodization [12])
- General health (*e.g.*, medical conditions, medications, supplements, substance use, nutrition, sleep patterns)
- Physical maturation and emotional development
- Pain history
 - Onset (at time of injury or later)
 - Localization (local, diffuse)
 - Duration (how long since onset)
 - Quantification
 - Pain intensity
 - Pain interference (*e.g.*, with sport, school, sleep and mood)
 - Characteristics (*e.g.*, sharp, dull, radiating, burning)
 - Modifying factors (*e.g.*, movement, rest)
 - Radiation or referral (to/from other body sites)
 - Time (better or worse in mornings or nights)
 - Effect of prior treatments (*e.g.*, rest, modalities, splinting/bracing, medications)
- Psychological factors (examples) (3)
 - Psychological history
 - Depression/anxiety
 - Catastrophization
 - Importance of sport to the athlete
 - Parent/coach/peer and other social pressures
 - Support systems
- Physical examination
 - Painful site
 - Inspection, palpation, range of motion, joint testing, and special tests
 - Manual muscle examination for strength and strength balance (*e.g.*, shoulder internal/external rotation, and knee quadriceps/hamstring)
 - Effect of the examination on exacerbation or diminution of the pain
 - Emphasize comprehensive neurological examination and kinetic chain/biomechanical examination (12)
- Imaging to provide confirmatory information in the diagnostic process
- Laboratory and other specialized testing as indicated

Interventions for Acute Pain

Nonpharmacological Treatment for Acute Pain

Nonpharmacological treatment is fundamental and should be performed early to manage pain.

- PRICE (Protection, Rest, Ice, Compression, and Elevation) has long been advocated in the initial management of acute musculoskeletal injuries, despite a lack of any high-quality studies to support its use globally (13). However, cold therapy has been shown to be particularly helpful in reducing pain in the first 1 to 3 d.

- Early reductions of dislocated joints are important in the management of acute pain.
- Use of splinting/bracing/casting, crutches, taping, or wrapping may help limit the severity of the injury and associated pain.
- Treatment to normalize range of motion, strength, and endurance, and to correct biomechanical contributors to pain and injury locally and along the course of the kinetic chain
 - These treatments should be started as soon as possible without aggravating the injury and will likely have individual variability based on the athlete, the injury, and the demands of the sport.
- Exercise activates endogenous antinociceptive pathways and may improve sleep and mood.
- Improving sleep hygiene may improve pain relief and promote healing.
- Psychological strategies such as distraction and relaxation may provide pain relief.
- In select situations, aspirating a painful hematoma and draining a large effusion may play a role in improving pain following injury (13).
- Modalities that have not been shown to provide reliable and consistent efficacy for pain relief beyond the short term include low-level laser therapy, ultrasound, electrical stimulation, massage therapy, myofascial trigger point treatments, and acupuncture. Athletes may respond to one or more of these modalities on an individual basis, based on their perception of the inherent value and expectations and the skill of the clinician.
- Supplements have an unclear role in pain and healing due to low-quality evidence (14).
- Although relative rest and immobilization can be beneficial, prolonged total rest and immobilization have no role in reducing pain or injury healing.

Pharmacological Treatment for Acute Pain

A nonpharmacological approach is a fundamental component of managing acute pain even when medications are indicated (2).

- In the youth and adolescent athlete, medication dosing is based on age and weight.

A previous publication states:

- *“Medications should be prescribed at the lowest effective dose for the shortest period of time. They should be discontinued if they are ineffective or not tolerated, and as the pain from the injury subsides.*
- *Medications should be prescribed in a manner consistent with established, recognized pharmacological and pharmacodynamic principles, including route of administration, time of onset of action, effectiveness for pain relief, risks and potential side effects and complications.*
- *Consideration of an athlete’s medical and medication history is essential.*

- *Physicians prescribing analgesic medications to athletes should possess an understanding of the prevailing rules and regulations regarding prohibited substances and Therapeutic Use Exemptions specific to the governing body that controls the athlete’s sport.*
- *Prescription medications should only be provided to athletes by licensed healthcare providers who understand potential side effects or misuse of medications, and whose licensure includes this scope of practice. Physicians prescribing analgesic medications to athletes should possess a complete understanding of indications and prevailing guidelines regarding their use. Written documentation of each assessment and prescription is a basic standard of care.*
- *Medications should not be prescribed to athletes for prevention of pain or injury.” (2)*

Topical Medications: Acute Pain

- Most topical treatments (e.g., counter-irritant, rubefacient, menthol) address cutaneous nociceptive contributions to pain.
- Topical NSAIDs primary effect is through systemic absorption; some have direct anti-inflammatory effect on superficial synovial joints.
- There is limited evidence of efficacy in the youth and adolescent athlete.

Oral Medications: Acute Pain

NSAIDs and acetaminophen

- Prescribed to relieve nociceptive/inflammatory pain because inflammation sensitizes peripheral nociceptors.
- Acetaminophen demonstrates weak peripheral, but more potent central anti-inflammatory effects.
 - Risk associated with use include hepatotoxicity
- Choice of NSAID is not determined by differences between analgesic effects.
 - “None of the evidence thus far has shown a discernable difference between any of them for the outcome of pain” (15).
 - Risks associated with NSAID use include gastrointestinal injury and bleeding.
 - In injuries associated with potential ongoing bleeding, nonselective NSAIDs may worsen bleeding, whereas acetaminophen and selective cyclooxygenase-2 inhibitor medications are preferred.
 - NSAID choice is based on differing side-effect profiles (e.g., selective cyclooxygenase-2 reduces gastrointestinal injury and spares platelet function).
- No current data show that NSAIDs inhibit muscle, bone, tendon, and ligament healing in injured athletes.
- NSAIDs plus acetaminophen combination is more effective than either alone and does not increase adverse health risks.
- NSAID agents should not be prescribed to athletes for pain or injury prevention.
- Youth younger than 12 yr should not use aspirin.

Muscle relaxants

- Play a role in acute pain management but have poor evidence of primary skeletal muscle relaxant effects.
- Mild sedating effect may improve sleep and may produce daytime sedation.
- Cyclobenzaprine is pharmacologically near-identical to tricyclic antidepressant drugs.
- Youth younger than 12 yr should not be prescribed muscle relaxants.

Opioids

- May be indicated for moderately severe or severe acute pain when nonopioid medication and nonpharmacological treatments are insufficient.
- Always prescribe for the lowest dose and shortest duration to limit opioid exposures, particularly relevant in the youth and adolescent athlete population.
- Up to a 3-d prescription is sufficient for most common athletic injuries. A 1- to 2-wk prescription is adequate for more significant injuries, including those requiring surgery.
 - At the first prescription refill, misuse risk screening should begin, including prescription monitoring database queries.
 - Signs and symptoms of problematic opioid use include sedation, apathy, early refill requests, and lost prescriptions.
- Excessive supply of unused opioid contributes to misuse, abuse, and addiction and should be properly disposed.
- When initiating opioid treatment, begin preparing your patient's taper plan and set patient expectations.
- Do not initiate extended-release/long-acting opioids unless the prescription is required for long-term use (e.g., cancer-related, sickle cell disease).
- The combination of opioids with sedative-hypnotics can be lethal (16).
- Using one or more nonopioid analgesics and nonpharmacological treatments may limit the need for opioids (17).
- Acute-on-chronic pain is best treated according to acute pain management principles.
- When prescribing opioids and other controlled substances, be aware of existing and emerging state and federal laws, regulations and guidelines.

Injectable medications

There is a lack of evidence guiding the use of injectable medications for treatment of pain in youth and adolescent athletes. Therefore, they should be used with caution. They may be considered as an adjunctive component for managing acute pain to facilitate treatment. In select cases, local anesthetic injections may be considered to facilitate same-day return to play (RTP), but not in a weight-bearing joint (2).

- Combining a targeted injectable agent with appropriate nonpharmacological measures (e.g., padding or

bracing) may decrease pain and limit disability, and may allow RTP.

- Avoid intratendon or intraligament injections (2).
- Analgesia that allows competition should not place the athlete at risk for worsening injury.
- Physicians administering injectable analgesic medications to athletes should possess a complete understanding of the prevailing rules and regulations regarding prohibited substances and Therapeutic Use Exemptions specific to the governing body that controls the athlete's sport.
- There is insufficient evidence to support the use of injectable NSAIDs (e.g., ketorolac) for same-day RTP in youth and adolescent athletes.
- Injectable NSAID agents should not be prescribed to athletes for pain or injury prevention.
- Corticosteroid injections have a role in relieving pain, but have no role for same-day RTP.
- Biologics (e.g., platelet-rich plasma) are not indicated to reduce pain and/or facilitate same-day RTP.

It is essential that the team physician understand the following:

- Pain is a multifactorial sensory and emotional experience.
- The site of pain is not always related to an anatomic injury at that site.
- The diagnostic process must evaluate all aspects (anatomical and psychosocial) of pain causation.
- Nonpharmacological treatments are fundamental in the treatment of acute and postacute pain management of injuries.
- Medications, in particular opioids if prescribed, should be utilized at the lowest effective dose for the shortest duration.
- There is a lack of evidence guiding the use of injectable medications for treatment of pain in youth and adolescent athletes and should be used with caution.
- Wrapping, splinting, or bracing an acute injury may help with pain reduction.
- Periods of prolonged immobilization should generally be avoided following an extremity injury.

It is desirable that the team physician do the following:

- Perform the comprehensive diagnostic evaluation
- Understand the role of exercise to improve pain and function from acute injury
- Understand the biopsychosocial confounders of pain and how to actively manage them
- Utilize rehabilitation principles as part of nonpharmacological management
- Educate athletes/parents regarding their expectations so that pain management goals are well understood and realistic
- Work with the athletic care network to provide treatments based on the comprehensive diagnosis
- Recognize signs and symptoms of potential of problematic opioid use.

Chronic Pain

Chronic pain is a state in which pain persists beyond the usual course of an acute disease or healing of an injury. It may or may not be associated with acute injury or operative procedure. Chronic pain is typically considered to be pain that persists for more than 12 wk (1).

Chronic pain is a compilation of unpleasant sensory, emotional, and cognitive experiences, associated with autonomic, endocrine, metabolic, physiological, and behavioral responses and can include persisting anatomical injury. There may be variation in the characteristics of chronic pain over time. If pain has not been previously comprehensively assessed and treated, the diagnostic process for acute pain should be used with special emphasis on psychological and social factors, because these often become more prominent obstacles to recovery over time.

In other cases, the treatments may not have achieved the goals of pain management. This may suggest incomplete treatment, and reevaluation may be required.

Diagnosis: Chronic Pain

When pain persists beyond 6 wk to 12 wk, the acute pain diagnosis should be reviewed. The diagnostic process should be revisited to identify any persisting anatomical or medical sources of pain, or overlooked psychosocial contributors to pain. The chronic pain diagnostic process should include expanded emphasis on psychosocial factors and home and school environments that may contribute to the athlete's distress. This holistic approach provides information for the initiation of comprehensive treatment to optimize outcomes. Consider consultation within the athletic care network and with other specialists for athletes in this age population.

The diagnosis process for chronic pain includes the following:

- Clinical history
 - Follow the acute pain history model
 - Comprehensive review of all prior diagnostic tests and treatments and their effect on function and pain
 - Changes in general health (*e.g.*, medical conditions, medications, supplements, substance use, nutrition, sleep patterns)
 - Assess athlete and parent beliefs and expectations about the athlete's pain
- Pain history
 - Changes in location, intensity, and duration
 - Evaluation for findings of abnormal pain response (*e.g.*, spreading pain, paresthesias, changes in skin, co-occurring fatigue, headaches, recurrent abdominal or pelvic pain, color/temperature, pain out of proportion to the index injury)
 - Effect of pain on quality of life and sports function and performance (18)
 - Although several numerical pain scores are validated in the pediatric population, these do not assess the emotional or functional aspects of pain and may not capture this other relevant information in the youth and adolescent athlete.
- Psychosocial history (3)
 - Social stresses

- Coping mechanisms and support network
- Home and school environments
- Evaluate competitive, coach-, and team-related stresses
- Self-identity as an athlete
- Screen or refer for depression and anxiety (*e.g.*, Patient Health Questionnaire-4)
- Physical examination
 - Reevaluate the painful site (change from baseline: range of motion, strength/strength balance, joint examination).
 - Evaluate for new signs (*e.g.*, color, abnormal sensitivity, temperature change, widespread tenderness).
 - Reevaluate the kinetic chain evaluation and biomechanics of the sports motions.
 - Assess for pain behaviors (*e.g.*, exaggerated responses to physical examination, behavioral regression).
- Imaging/Laboratory
 - Question further imaging or laboratory studies, unless indicated by history and physical examination findings.
 - Consider consultation within the athletic care network and with other specialists for athletes in this age population.

Interventions for Chronic Pain

When pain transitions from acute to chronic pain that interferes with daily function, it is much more likely to have a significant nociplastic component. The goal of treating chronic pain is not necessarily to decrease pain intensity; it is to improve athletic and daily function and decrease reliance on the health care system. Educate the athlete and family about chronic pain and the goals of treatment. This treatment is best offered as part of an interdisciplinary, multimodal approach.

Interventions include the following:

- Nonpharmacological pain management
 - Fundamental in the treatment of chronic pain
 - Psychosocial (*e.g.*, cognitive behavioral therapy, mindfulness, relaxation)
 - There is strong evidence that supports regular aerobic exercise, which may include sport participation.
 - Other activating modalities have less evidence but may be considered (*e.g.*, yoga).
 - In some cases, passive interventions (*e.g.*, acupuncture) may provide symptom relief but the focus of treatment should remain on increasing function and decreasing reliance on the health care system.
 - Optimize sleep and nutrition.
- Pharmacological pain management
 - Oral medications
 - If persistent nociceptive, inflammatory pain: consider acetaminophen, NSAIDs.
 - If nociplastic and/or neuropathic pain: consider antidepressant category agent with serotonin norepinephrine reuptake inhibition (*e.g.*, duloxetine or cyclobenzaprine) and/or "gabapentinoid" antiepileptics (*e.g.*, gabapentin or pregabalin). These two categories of medicines demonstrate analgesic efficacy, negligible risk of misuse, abuse and addiction, and

improvement of mood and sleep. Gabapentin is a first-line medicine but may not be well absorbed. Pregabalin is very well absorbed.

- Opioids should not be used in this age population without specialty consultation.
- Injectable medications
 - If there is persistent nociceptive, inflammatory pain component: corticosteroid and nonsteroidal injection may be considered.
 - There is paucity of evidence for the use of platelet-rich plasma in the youth and adolescent athlete (19). Further study is required before routine use is recommended in this age population (20).
- Topical medications may be indicated in persistent nociceptive, inflammatory pain.
- Cannabinoids (*e.g.*, marijuana) are not indicated for the youth and adolescent athlete.
- Interventional pain procedures may play a limited role in select cases as part of an interdisciplinary, multimodal approach.
- Surgical intervention
 - May be indicated in persistent anatomic injury
 - Postoperative pain management should follow the same approach as acute pain, avoiding escalating doses of opioids.

It is essential that the team physician understand the following:

- The need to review the diagnosis, and if indicated, repeat the diagnostic process to establish the comprehensive diagnosis.
- In managing an athlete with chronic pain, nonpharmacological treatment is fundamental.
- Treatment of chronic pain is best offered as part of an interdisciplinary approach.
- A multimodal care plan (*e.g.*, exercise, nutrition, cognitive behavioral techniques, relaxation, improved sleep) is safer, possibly more effective, and probably more durable than pharmaceuticals.
- Opioids should not be used in this age population without specialty consultation.

It is desirable that the team physician do the following:

- Routinely record athlete-reported severity of pain and pain interference with function, overall well-being, sleep, and mood to monitor treatment effectiveness (*e.g.*, see Figs. 1 and 2).
- Educate student athletes regarding what pain is and how it is relieved, because expectations and misunderstandings affect response to treatment.
- Understand nonopioids, such as antidepressants and antiepileptics, are preferred treatments for nociceptive or neuropathic pain.

Perioperative Pain Management

Pain is an inevitable consequence of surgery. Most postoperative pain management is based on opioid prescriptions

alone. However, less than half of patients in the general population report adequate pain relief with this strategy (21). Multimodal pain management is a more effective strategy, resulting in reduced opioid prescription and consumption and better quality of pain management (*e.g.*, pain intensity, pain with activity, sleep) (22). This approach involves preoperative, intraoperative, and postoperative assessments and interventions, all of which are interdependent and need to be used together in the comprehensive management.

Preoperative

- Follows the same principles of acute pain management
- Patient and family education and expectations regarding the operative procedure are a key intervention. Examples include providing print and electronic materials, guidelines for postoperative prescriptions, empathic discussion of pain, and setting pain expectations.
- Identify and develop a treatment plan for patients at risk for high levels of postoperative pain.

Intraoperative and postoperative

- Efficient surgery (*e.g.*, minimal tissue handling, tissue damage, and tourniquet time)
- Multimodal pain management (pharmacological plus nonpharmacological)
 - Pharmacological (*e.g.*, opioids, NSAIDs, acetaminophen, gabapentin/pregabalin)
 - Immediate preoperative celecoxib has been shown to be effective.
 - Local, intra-articular, intralesional local anesthetic
 - Regional anesthetic
- Postoperative interventions
 - Nonpharmacological (*e.g.*, cold, bracing/splinting, modalities)
 - Follows the same principles of acute pain management
 - Pharmacological
 - Minimize opioid prescription (time, quantity, refills, individualize per patient, procedure)
 - Step-down medications (opioid taper, nonopioid, NSAID, acetaminophen)

It is essential that the team physician who is managing perioperative pain understand the following:

- Perioperative pain is not managed by opioid medication alone.
- Preoperative patient and family education and expectations are important.
- Multimodal intraoperative and postoperative strategies
- Multimodal pharmacological administration and protocols

It is desirable that the team physician who is managing perioperative pain do the following:

- Assemble a multidisciplinary team to address all aspects of multimodal treatment.

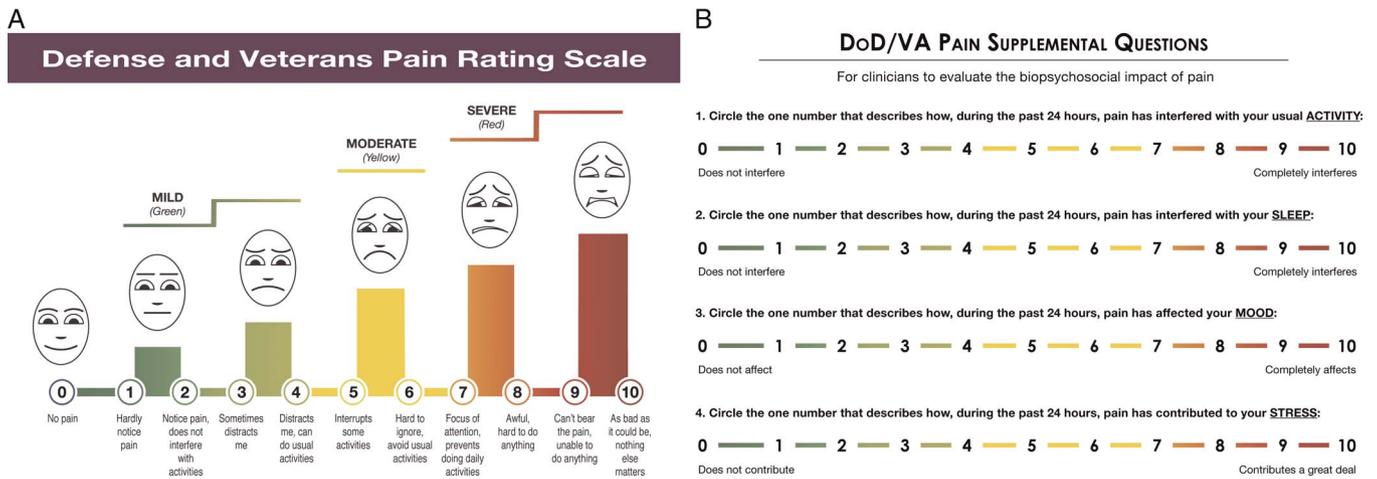


Figure 1: Department of Defense (DoD)/Veteran's Affairs (VA) rating scale (A) and pain supplemental questions (B).

Psychological Issues in Managing Pain in Youth and Adolescent Athletes

Athletes often have a unique relationship with pain. Athletic injury or illness, and the associated pain generated is often an accepted consequence of participation in sports. However, the athlete's psychological response to pain is affected by their perception of the illness or injury producing pain; the effect of pain on short- and long-term abilities and goals; the athlete's

life activities outside of sports; expectations, whether real or imagined, for treatment; and relationship with the athletic and/or mental health care network (3).

Youth and adolescents who do not have effective strategies to cope with distress are at increased risk of using maladaptive approaches that are damaging (e.g., misuse of prescription medication, self-medication). When athletes attempt various pain management strategies but continue to struggle with

The screenshot shows the website for the Defense & Veterans Center for Integrative Pain Management. The main heading is "Defense & Veterans Pain Rating Scale (DVPRS)".

Clinical Resources

- Pain Assessment Screening Tool and Outcomes Registry (PASTOR)
- Joint Pain Education Program (JPEP)
- DVCIPM (MARA) Book Project
- Defense & Veterans Pain Rating Scale (DVPRS)
- National Capital Region Pain Initiative (NCRPI)
- Air & Ground Pain Casually Evacuation
- Military Clinical Practice Guidelines
- Pain Management Shared Interest Groups
- Battlefield Acupuncture
- Pain Management Task Force
- Human Performance Resource Center
- Opioid Overdose Education & Naloxone Distribution Program (OEND)

Testimonial:

"I used the DVPRS yesterday afternoon for the first time. Indeed, the process allowed me to obtain information from the patient I think I would otherwise not have appreciated from my usual assessment. Specifically, it was the way the pain has interfered with her sleep that bothered her the most, affecting her mood and causing her stress. That conversation confirmed the choices she and I had made about how to address her pain. The rating scale added depth to my understanding and made me feel more solid in my recommendations..."

Jennifer Boyd, PA-C
Primary Care Provider in a Federally Qualified Health Center, West Virginia

The DVPRS is a graphic tool clinicians can use to facilitate self-reported pain diagnoses from patients.

DVPRS Scale: A free pain reporting scale for diagnostic use

DVPRS Supplemental Questions: Supplemental questions for use with the DVPRS.

DVPRS (Single Page Format): DVPRS Scale & Supplemental Questions with enlarged font.

NOTE: Permission is granted for clinicians and researchers to freely use the Defense and Veterans Pain Rating Scale (DVPRS) as is, without alteration. If used in revised or altered form, it should not be referred to as the Defense and Veterans Pain Rating Scale.

Using the DVPRS

There is a small graphic at the bottom with the text "DVPRS LBIRTH? from DVCIPM 5".

Figure 2: Defense & Veterans Pain Rating Scale (DVPRS).

pain, they may question the competency of the athletic care network.

Pain can cause emotional distress including irritability, anger, sadness, and worry. In an acute crisis (*e.g.*, risk of harm to self or others), an emergency response is required. In the absence of an acute crisis, referral(s) to a member of the mental health network (3) should be considered when distressing emotions last more than 2 wk and cause daily interference in functioning.

Coexisting and preexisting mental health disorders, if unrecognized and untreated, will interfere with ordinarily effective treatments for pain.

Psychosocial factors that can influence pain in youth and adolescent athletes include the following:

- Optimism/Self-efficacy
- Stress
 - Stress in athletics is a risk factor for athletic injury and pain. This is seen especially in athletes with high external stress or ineffective coping skills.
- Depression or anxiety
 - A risk factor for poor treatment response in youth and adolescent athlete with acute or chronic pain
 - Youth with depression or anxiety may benefit from antidepressant medication, cognitive behavioral therapy, or a combined approach and may improve pain outcomes.
- Pain-related anxiety
 - Pain catastrophizing, exaggerated negative mental thoughts or perceptions related to actual or anticipated experience with pain is associated with increased pain and pain-associated disability.
 - Fear of pain or reinjury can lead to avoidance of physical activity, which can lead to increased pain and decreased functioning in multiple areas of life including school, sports, and social activities.
- Disordered eating/eating disorders
 - A youth or adolescent athlete with disordered eating/eating disorder may initially present with complaints of pain (*e.g.*, abdominal pain, headache)
 - Left unaddressed in youth and adolescent athletes, chronic pain may not improve.
 - Diagnosis may be delayed, compared with adolescents without pain (23).
 - Untreated chronic pain may also lead to disordered eating/eating disorders
- Disrupted sleep
 - Affects pain and recovery in the athlete
- Substance use disorders
 - A youth or adolescent athlete with substance use disorder may initially present with complaints of pain.
 - Complicates pain management and recovery in the athlete

Parent/guardian response to the athlete's pain can influence pain and pain-associated disability (24). It is normal for parents to worry about their children and want to protect them from pain, but protective behaviors predict increased pain-related disability (25). Also, research suggests that a high amount of family conflict can hinder recovery from pain (26).

Peer relationships are extremely important for adolescents. Attending school is one of the best ways for them to maintain contact with friends while recovering from an injury. It can also be helpful for them to remain involved with the team, perhaps in an administrative or managerial role.

Relationship with coaches, administrators, and other team members can positively or negatively affect the pain experience and response to treatment.

Psychological pain management and treatment strategies

When pain is transitioning from acute to disabling subacute pain, engaging the mental health care network is important for treatment. Intervening at this time may prevent this transition, which is a primary goal in managing pain.

Providing education to the athlete, their parents/guardians, and the athletic care network can facilitate accurate understanding of pain and realistic expectations for recovery.

There are two types of specific and active therapies (cognitive behavioral therapy and acceptance and commitment therapy) that have been shown to be effective for youth/adolescent chronic pain. There are also standardized tools to assess progress, including the Functional Disability Inventory for children and adolescents (27).

Because chronic pain is very complex and difficult to treat, if a youth/adolescent athlete's pain has transitioned to the chronic state, it is best managed in an interdisciplinary pediatric pain clinic.

Psychological factors associated with use of medication

Athletes who develop subacute or chronic pain are at more risk of developing comorbid psychological conditions and have a higher risk for addiction with the use of opioid pain medications (28). Subacute and chronic pain management strategy should shift from alleviating pain to preventing chronic pain and disability.

It is essential that the team physician understand the following:

- There is a psychological response to pain, with multiple psychosocial factors that complicate the diagnosis and treatment response.
- Youth and adolescent athletes with pain who lack effective coping strategies may self-medicate with prescription and illicit substances, which can lead to substance use disorders.
- Parent/guardian, peer, and coach relationships and other social support resources are important and can influence the response to pain and recovery in the youth and adolescent athlete.

It is desirable that the team physician understand the following:

- When pain is transitioning from acute to disabling subacute pain, engaging the mental health care network is important for treatment. Intervening at this time may prevent this transition, which is a primary goal in managing pain.
- If a youth/adolescent athlete's pain has transitioned to the chronic state, it is best managed in an interdisciplinary pediatric pain clinic.

- Providing education to athletes, parents/guardians, coaches, and other members of the athlete care network is important in influencing the athlete's response to pain.

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