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TITLE:

Interventional Pain Management Techniques for Shoulder Pain

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Objectives for Airways Content on Chronic Shoulder Pain

At the end of this course, you should be able to:

1. Describe the prevalence of shoulder pain in the population and across different age groups.

2. Explain how nursing theory can be applied to develop better patient educational tools.

3. Identify non-surgical interventional tools that can be utilized in patient evaluation and treatment plans.

4. Analyze the mechanisms of action of nerve blocks, prolotherapy, platelet-rich plasma, and nerve ablations.

5. Describe a plan for CRNAs to integrate these therapies into their practice to improve patient quality of life.

Chronic Shoulder Pain: Prevalence, Challenges, and Innovations in Management

Chronic shoulder pain is the third most common reason for musculoskeletal consultations annually, affecting up to 14% of the population. This condition not only causes severe disability but also significantly diminishes the quality of life for those affected. Conservative treatments, such as physical therapy and over-the-counter pain medications, often fail to provide sufficient relief for chronic shoulder pain. As the condition persists, the efficacy of these methods diminishes. Unfortunately, surgical interventions, while usually viewed as a last resort, are not always evidence-based and frequently fail to meet patients' expectations for relief and recovery.

The prevalence of shoulder pain increases linearly with age due to natural wear and tear, making it a significant public health concern. Among 20-year-olds, rotator cuff disease affects approximately 9.2% of the population, but this number rises dramatically to over 62% in individuals over 80 years old. Chronic

shoulder pain and the accompanying weakness impair sleep, limit mobility, and reduce overall quality of life. While effective non-surgical therapies exist, information about these options is often scarce or inaccessible to the public. Furthermore, chronic pain is inherently complex, requiring nuanced approaches to both diagnosis and treatment.

Addressing Knowledge Gaps in Chronic Pain Management

A significant knowledge deficit exists regarding optimal interventional pain techniques for managing chronic shoulder pain and impaired shoulder mobility. Some of the most common interventional treatments include nerve blocks, intra-articular and tendon steroid injections, prolotherapy, platelet-rich plasma (PRP), and radiofrequency ablation (RFA) or pulsed radiofrequency ablation (PRFA) targeting the suprascapular and selective axillary nerves. These techniques offer promising alternatives to surgery, but awareness and understanding of their applications remain limited among patients and some healthcare providers.

As the demand for ultrasound-guided interventional pain treatments grows, healthcare systems may need to adapt by expanding the scope of practice for Certified Registered Nurse Anesthetists (CRNAs). This change could increase access to care for individuals suffering from chronic pain, leveraging the synergy between technological advancements and expert medical practitioners.

Non-Surgical Interventions: Advancing Chronic Pain Treatment

Prolotherapy

Prolotherapy, short for "proliferative therapy," stimulates the body's natural healing processes by injecting irritants—typically solutions like dextrose or saline—into damaged tissues. This technique promotes localized inflammation, triggering the growth of new, stronger tissue to stabilize and strengthen the shoulder joint. First developed in the 1930s, prolotherapy has evolved into a refined and reliable treatment option for chronic pain, particularly in conditions such as osteoarthritis and ligament laxity. Its non-surgical nature and ability to enhance shoulder function make it an appealing choice for comprehensive pain management when combined with physical therapy.

Nerve Blocks of the Shoulder

Nerve blocks are a cornerstone of regional anesthesia. They offer targeted pain relief by interrupting the transmission of pain signals from the shoulder to the brain. Initially developed for surgical pain management, nerve blocks are now valuable for chronic pain treatment. Using ultrasound guidance, providers can precisely target nerves like the suprascapular or axillary nerves to reduce inflammation and provide lasting relief. While typically temporary, nerve blocks can sometimes disrupt chronic pain patterns permanently, offering patients significant improvements in mobility and quality of life.

Steroid Injections

Steroid injections deliver potent anti-inflammatory medications directly to affected areas, such as the shoulder joint or surrounding tissues. These injections have been a standard treatment for

decades, particularly inflammatory conditions like arthritis or bursitis. Guided by ultrasound for precision, steroid injections can alleviate pain and swelling for weeks or months, enabling patients to regain mobility and improve their daily functioning.

Platelet-Rich Plasma (PRP)

PRP therapy harnesses the body's healing capabilities by concentrating platelets from the patient's blood and injecting them into damaged tissues. Platelets contain growth factors that accelerate tissue repair, making PRP a promising option for treating chronic shoulder pain caused by injuries like rotator cuff tears or osteoarthritis. While still relatively new, PRP is gaining popularity due to its potential to improve shoulder function without invasive procedures.

Radiofrequency Ablation (RFA) and Pulsed Radiofrequency (PRF) Ablation

RFA and PRF ablation use high-frequency electrical currents to disrupt nerve signals responsible for chronic pain. These techniques provide long-lasting relief by applying targeted energy to specific nerves—often for six months to a year or more. PRF, a newer adaptation, modulates pain signals without permanently damaging nerve tissue, offering an even safer option for pain management. These procedures, performed under ultrasound or fluoroscopic guidance, represent a minimally invasive alternative to surgery for those with refractory shoulder pain.

Conceptual Framework and Patient Empowerment

Dorothea Orem's Self-Care Deficit Theory emphasizes the importance of education in empowering patients to take control of their health and well-being. Guided by this framework, for our doctoral project, we began developing a chronic pain app that aims to bridge the knowledge gap by providing accessible, user-friendly information about non-surgical interventional treatments. The app fosters informed decision-making and self-advocacy in managing chronic pain by equipping patients with a deeper understanding of their options.

Broader Implications and Future Directions

The Chronic Pain Application significantly advances patient education, clinical practice, and nursing theory. By increasing awareness of non-surgical pain management options, the app has the potential to:

- **Enhance patient outcomes** by promoting evidence-based, minimally invasive treatments.
- **Influence healthcare systems** to prioritize cost-effective, less invasive pain management strategies over surgery.
- **Expand the CRNA role** in advanced pain management, addressing the growing demand for interventional pain services.

Future iterations of the app will incorporate treatments for additional chronic pain conditions and evaluate user engagement to refine its educational content. Ultimately, empowering patients with knowledge can catalyze systemic changes, reducing chronic pain's economic and personal burdens.

This initiative aspires to transform chronic pain management by integrating technological innovation with evidence-based

practices, enhancing accessibility, patient autonomy, and quality of care.

Conclusion

Insights from our literature review can support more informed clinical decision-making, enabling the development of tailored pain management strategies that better address individual patient needs. Furthermore, demonstrating the efficacy of non-surgical pain management options could encourage healthcare systems to adopt these less invasive and potentially more cost-effective strategies, reducing the economic burden associated with surgical interventions.

The Chronic Pain Application enhances patients' understanding of chronic pain and the available interventional treatment options. The demand for interventional pain providers and support for expanding anesthesia services will increase by empowering patients with knowledge. This empowerment also aligns with the trajectory of CRNA specialization in advanced pain management. As awareness and demand for ultrasound-guided interventional pain treatments grow, healthcare organizations operating under supervisory models may be prompted to broaden the CRNA scope of practice, thereby improving access to care for individuals suffering from chronic pain.

Beyond patient education, this application has the potential to catalyze further research and innovation in pain education, treatment modalities, and the evaluation of digital tools by end users. By enhancing patient understanding, the Chronic Pain Application could stimulate demand for specialized pain providers and contribute to the continued development and expansion of anesthesia services. It supports the acceleration of CRNA specialization in advanced pain management, paving the way for more accessible and effective care for those with chronic pain.