

[NM-311] Interventional Procedures for Chronic Pain in Children and Adolescents: A Qualitative Systematic Literature Review

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Background: Significant controversy surrounds the utility of interventional procedures for managing pediatric chronic pain states. Interventional procedures are a widely accepted modality for pain management in adults. The use of such techniques in children is supported by case reports, case series, and very few randomized controlled studies. Indications for such approaches to pediatric chronic pain management remain unclear; we conducted a literature review to determine the prevalence, indications, and types of interventional techniques performed in children and adolescents who suffer from chronic pain.

Methods: Searches of PubMed, Medline, and OVID databases for articles published between January 1970 and March 2013 were performed. Prospective and retrospective studies, case reports, and case series in patients age 0 to 18 years were considered for inclusion. Studies were evaluated by each author and grouped by type of procedure, type of study describing each procedure, and indication for performance of procedure.

Results: 133 studies were included in the review. 25 prospective and 7 retrospective studies, 17 case series, and 84 case reports were identified. Procedure modalities included neuraxial blocks (N=23), peripheral nerve blocks (N=58), sympathetic blocks (N=18), Bier block (N=5), neurolysis (N=1), intrathecal baclofen administration (N=20), and intra-articular steroid injection (N=5) (Table 1). Reported indications for specific procedures based on our review are summarized in Table 2.

Conclusion: Interventional procedures may serve as useful adjuncts to managing chronic pain conditions in children, especially in cases that are refractory to noninvasive treatments. In this review, we have summarized the current knowledge and reported practices of interventional management in children with chronic pain. The majority of literature on this topic consists of case reports and retrospective studies. Most prospective studies focused on intrathecal baclofen administration. Peripheral nerve blocks are the most commonly performed interventional technique for managing chronic pain in children. This review serves as starting point from which we can generate a larger evidence base regarding the benefits and potential risks of performing such procedures in children and adolescents; ultimately, more prospective randomized controlled trials are needed to better address these questions.

References:

Walker SM. Pain in children: recent advances and ongoing challenges. *Br J Anaesth* 2008; 101:101-110.

Goddard JM. Chronic pain in children and young people. *Curr Opin Support Palliat Care* 2011; 5:158-163.

| Procedure Type | Studies | No. of Cases | Indications | Imaging Guidance |
|--------------------------|----------------------|--------------|--|---------------------------------|
| Neuraxial blocks | Case report | 12 | Refractory pain, cancer pain, excessive sedation, phantom limb pain, CRPS | Fluoroscopy Ultrasound CT |
| | Case series | 7 | | |
| | Prospective study | 2 | | |
| | Retrospective study | 2 | | |
| Peripheral blocks | Case report | 51 | Refractory pain, cancer-related pain, excessive sedation, phantom limb pain, neuralgia, CRPS, slipping rib syndrome, myofascial pain syndrome, chronic abdominal wall pain | Ultrasound |
| | Case series | 4 | | |
| | Prospective study | 2 | | |
| | Retrospective study | 1 | | |
| Sympathetic blocks | Case report | 14 | Unexplained abdominal pain, CPRS, herpes zoster | Fluoroscopy Ultrasound CT |
| | Case series | 2 | | |
| | Prospective study | 2 | | |
| Bier block | Case reports | 1 | CRPS, neuropathic pain | |
| | Case series | 1 | | |
| | Prospective study | 1 | | |
| | Retrospective study | 2 | | |
| Neurolysis | Case report | 1 | Refractory pain, cancer pain, spasticity | Fluoroscopy Ultrasound CT |
| | Case series | 1 | | |
| | Prospective study | 1 | | |
| Neurostimulation | Case series | 1 | | Fluoroscopy |
| Intrathecal baclofen | Case report | 4 | Spasticity and dystonia | Fluoroscopy |
| | Case series | 1 | | |
| | Prospective study | 15 | | |
| Intra-articular steroids | Case report | 1 | Juvenile idiopathic arthritis (JIA), osteitis condensans | |
| | Retrospective study. | 2 | | |
| | Prospective study | 2 | | |

| Areas Affected by Chronic Pain | Clinical Symptoms and Syndromes | Interventional Procedures |
|--------------------------------|---|---|
| Head | Migraine | → Peripheral nerve blocks (trigeminal and occipital) |
| | Persistent neuropathic headache | → Peripheral nerve blocks (trigeminal, occipital, and C2 nerve root) |
| | Cystic fibrosis | → Supraorbital nerve block |
| Abdomen | Neuropathic pain after surgery | → Peripheral nerve blocks (rectus sheath blocks or transversus abdominis plane blocks) |
| | | → Thoracolumbar nerve roots blocks |
| | | → Peripheral nerve blocks (ilioinguinal and perineural catheters) |
| | Cystic fibrosis (recurrent pancreatitis) | → Celiac plexus block |
| | Cancer pain (visceral pain) | → Long-standing epidural administration with tunneled catheter |
| | | → Intrathecal analgesia and continuous intrathecal analgesia |
| CHEST PAIN | Costochondritis | → Intercostal nerve blocks |
| | Tietz's syndrome | |
| | Slipping rib cage syndrome | |
| | Cystic fibrosis | → Thoracic epidural analgesia |
| BACK PAIN | Spondylolysis, spondylolisthesis, disk degeneration, disk herniation, spinal cord tumors, sickle cell disease | → Epidural analgesia |
| | Myofascial pain syndrome | → Trigger point infiltrations |
| LIMB PAIN | | → Trigger point |
| | | → Joint infiltration |
| | Fibromyalgia | → Spinal, epidural, and regional blocks |
| | Juvenile arthritis | → Epidural and regional blocks |
| | Phantom limb pain and Cancer pain | → Femoral/axillary cutaneous nerve block |
| | Sickle cell crisis pain (VOC) | → Bier block (guanethidine, bretilium, lidocaine) |
| | Meralgia paresthetica | → Sympathetic chain blocks (stellate ganglion blocks, lumbar sympathetic blocks) |
| | CRPS I and II (allodynia, hyperalgesia, edema, changes in skin blood flow) | → Neuromodulation via spinal cord stimulation (rarely used) |
| | | → Continuous peripheral nerve blocks (brachial plexus catheters), sciatic nerve catheters |