

**Using a Pain Treatment Continuum:
A Logical and Cost Effective Approach
To
The Management of Chronic Pain**

By

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Pain and Society

The costs of unrelieved pain and disability arising from chronic pain in our population is staggering. It is estimated that approximately 30% of the general population of the US suffers from chronic pain.ⁱ According to Lemrow et al., back pain is the 3rd leading cause for doctor's office visits and the 2nd leading cause for hospital admissions in the US.ⁱⁱ In a recent study of the general population of the state of Michigan called **The Michigan Pain Study**, it was found that one in five adults, or about 1.2 million people in Michigan suffer from some form of chronic, ongoing or recurring pain.ⁱⁱⁱ In the workplace, in this population, pain is responsible for 400,000 workers, or 12 percent of the Michigan work force, failing to show up for work at some point last year. Of the pain sufferers surveyed, 35 percent missed more than 20 days of work in the last year. In a 1992 study on the dollar impact on 12 diverse and large US businesses, disability costs these businesses an average of \$2500 per employee.^{iv} During the period from 1980 to 1990, temporary disability cost the U.S. federal government 6.5 billion dollars and during the same period, the states 4.5 billion dollars. Combined, during this period, disability cost the U.S. a whopping 11 billion dollars.^v

Besides being a drain on our scarce health-care resources, unrelieved pain and suffering is far too costly to patients and their families. Unrelieved pain's direct costs to patients and their families are loss of job, loss of income, loss of savings and therefore security, loss of insurance, and loss of self esteem. These losses and the weight that they produce on these patients is staggering. Unrelieved pain leads to depression, anger, isolation and even suicide in these patients. The Michigan Pain Study³, referenced to above, conducted by the public opinion firm, EPIC/MRA of Lansing, surveyed 1,500 Michigan residents, 18 and older, to determine the severity of the chronic pain problem, how people cope, access to treatment and the effectiveness of available pain care. Of the 1.2 million people in Michigan who suffer from chronic pain, 42 percent say pain has affected their relationships with spouses, family members and fellow workers. Nearly half (48 percent) experience depression, 18 percent have overdosed on pain medication and 10 percent, about 120,000, have contemplated suicide. Looking for solutions for their pain has led to five percent of the chronic pain sufferers in this population (representing approximately 60,000 adults) to drink alcohol, including 18 percent of whom admit to overdosing on their medication. 29% of the population felt that they were losing sleep from their chronic pain. Indeed these figures paint a gloomy and compelling picture of the true costs of chronic, unrelieved pain on our society.

The Evaluation of Pain:

The treatment of cancer and chronic non-cancer related pain requires that the pain treatment physician first understand and evaluate the nature of the patient's pain generation, the psychological and behavior factors operant in the creation of chronic pain or perpetuating the pain, and the possible treatment modalities that are appropriate for the patient's specific pain syndrome. Because

chronic pain is never unidimensional, solely biological or solely psychological, but almost always multidimensional involving neurophysiological systems as well as emotional and behavioral systems with resultant degrees of emotional and functional disability, an interdisciplinary evaluation and treatment plan is essential for treatment success. An interdisciplinary pain team, at the very least, should include physicians with specialized training in the evaluation, diagnosis, and treatment of chronic pain, a nurse or nurses trained to treat and care for patients with chronic non-malignant or malignant pain, cognitive and behavioral, goal oriented, pain oriented psychologists, and a team of therapists whose orientation is focused on physical and vocational functional restoration. Other members of the team might include psychiatrists, neurologists, surgeons, vocational rehabilitation specialists, nutritionists, etc. Once a pain syndrome-specific diagnosis is established by this pain team through review of records, taking of an appropriate pain related history (includes the pain complaint in the patient's own words, a history of events related to the generation of the pain complaint or complaints and all attempts, successful and unsuccessful, in treating the pain), review of pertinent imaging studies, appropriate physical examination, an evaluation for cognitive and behavioral operant mechanisms, and examination of the patient's musculoskeletal capacity to function, a parallel pain treatment plan is created by the pain team. This plan should address the neurophysiologic processes operant in the patient's pain generation, the cognitive, emotional, and behavioral processes involved in creating chronicity of the patient's pain, and the functional disability caused by the underlying organic generators and pain. It cannot be too overly stressed that success in treatment of the chronic pain patient rests on addressing all of the neurophysiologic, cognitive and behavioral, and functional disability mechanisms operant in pain chronicity.

“Tools of the Trade”

The pain treating physician should know and understand all of the appropriate “tools of the trade” for the treatment of pain of both terminal illness and non-malignant origin. Not only should the pain treating physician understand and know how to use these pain treating tools, but the physician should know when to use these tools appropriately. Because the management of chronic pain belongs to practitioners of differing skills and capabilities, it should be stressed here that the emphasis here is on knowledge of the tools of the trade and not specifically on the technical ability to use all of the tools available to the pain team. The tools of the pain practitioner include all of the modalities and therapies, either conservative and invasive, used for treating chronic and cancer related pain syndromes. These tools can be broadly organized as non-invasive and invasive therapies. **See figure #1**

Non-invasive therapies include cognitive and behavioral therapies, rehabilitational pain medicine, and alternative pain relieving therapies such as acupuncture, acupressure, meditation/relaxation, nutrition, Qui-gong, etc. Interventional pain management includes a whole compendium of pharmacologic interventions including non-opioid analgesics, opioid analgesics, and adjuvant medications. Non-opioid analgesics include centrally acting non-opioids such as methotrimiprazine, tramadol, and acetaminophen and the

peripherally and centrally active non-steroidal anti-inflammatory agents (NSAIDs). Opioid analgesics are broadly categorized as pure agonists, and agonist/antagonist opioid analgesics. These agents, like the NSAIDs, work both peripherally and centrally to reduce the sensation of pain. Adjuvant medications, agents that are labeled for other medical purpose but have analgesic or co-analgesic properties, include the heterocyclic antidepressants, serotonin specific reuptake inhibitor antidepressants (SSRIs), membrane stabilizing drugs such as anticonvulsants, local anesthetic oral analogs and local anesthetics, alpha-1 blocking agents, beta blockers, calcium channel blocking agents, etc. Other invasive include interventional therapies such as peripheral and central neural blocking techniques, sympathetic nervous system blocking techniques, continuous epidural or plexus anesthesia, continuous pleural anesthetic techniques, chemical, surgical and thermal neurolysis, and finally neuromodulatory techniques including transcutaneous nerve stimulation, spinal cord stimulation, deep brain stimulation and intraspinal continuous infusion of opioids alone or opioids in combination with local anesthetics and or alpha 2 adrenergic agents such as clonidine.

Thinking Algorithmically: Using a Pain Treatment Continuum:

Pain management was an idea whose time had come in the 1970's. Because of the tragic consequences of poor pain control in cancer patients and a new and growing demand for improvement in pain control in patients suffering their impending deaths, the world health organization, in the early 1980's published their guidelines for control of pain in these patients. These guidelines were and still are an attempt to simplify pain management for cancer patients, underscoring simple interventions that could be used by technologically advanced as well as technologically deprived societies. **See figure #2**

The pharmacologic tailoring approach of these guidelines group cancer related pain syndromes by severity and intensity into mild, moderate, and severe pain and suggest "tailoring" strength and potency of pain medications to the severity of the pain syndrome. Non-opioid medications such as the NSAIDs and adjuvant medications are suggested for mild to moderate cancer pain. Weak to moderate strength opioids such as codeine and hydrocodone in combination with non-opioid and adjunctive medications are suggested for moderately severe cancer pain by these guidelines. Potent opioids such as morphine, hydromorphone, methadone, etc., together with non-opioids and adjuvant medications, are suggested for strong and severe cancer related pain. Guidelines for dose escalations, sequential drug trials, and management of medication related side effects and symptoms are also suggested by these guidelines.

Approximately 90-95% of cancer pain syndromes can be well controlled using guidelines established by the World Health Organization (WHO).^{vi} Because there are non-invasive and invasive multiple modality choices for the treatment of chronic non-malignant pain, we suggest that these patients be treated using an

algorithmic treatment continuum such as the one suggested by the WHO for cancer patients. Obeying the time honored medical principle of utilizing the most simple and least invasive intervention appropriately possible for any given medical problem, we suggest listing available pain therapies by increasing order of both invasiveness and cost. According to this suggested pain treatment continuum we would suggest first utilizing therapies that are least invasive and least costly in series (utilize one therapy at a time, abandoning those that do not work, advancing to more invasive therapies as in climbing a ladder) or in parallel (utilize more than one therapy simultaneously and advancing to more costly and invasive therapies as the therapies tried fail to provide pain relief) , and then, as lesser invasive therapies fail to provide adequate analgesia, utilizing therapies of increasing levels of intervention until either a single therapy or a combination of therapies is found to be efficacious. Choices for the treatment of chronic pain are listed in figure #1. A suggested algorithm or continuum for the treatment of chronic non-malignant pain is suggested by **figure #3**. The therapies listed are in order from most conservative to more invasive procedures. It is the belief of this author, as others, that, if another corrective surgery is indicated for correction of pathology causing the pain, that procedure should be a high priority in the continuum and would meet most physician's criteria as "most conservative." This approach, however, is controversial since another surgery might fail and lead to further pain and suffering. This continuum might suggest to the reader that therapies should be tried in a series, starting a new intervention when previous interventions fail. The continuum, as presented here, merely lists therapies in order of increasing levels of intervention and perhaps cost. As stated above these therapies might be used in parallel. An example of using these interventions in parallel is a patient with failed back surgery syndrome who is on NSAIDs, weak opioids, tri-cyclic antidepressants, membrane stabilizers and is participating in a cognitive/behavioral, functional restorative program. Epidural analgesia is used to facilitate this patients functional restorative program.

Conclusion:

Because unrelieved pain is far too costly to our society in many ways, it is imperative that the pain treating physician understand that there are many tools offered to treat pain. It is imperative that this physician not only have knowledge of these tools, but know how and when to use them so that their use is both clinically and cost effective. An attempt in this chapter has been made to help the reader of this text to organize his or her knowledge of pain medicine and the treatment "tools of the trade" in a fashion that might logically assist in planning for successful treatment. We have presented a suggested treatment continuum that obeys the time honored medical principle of utilizing the most simple therapies first before attempting the use of more invasive therapies. The suggested continuum here might raise the possibility of therapeutic controversy (which therapy should come before another). It is not the scope of this chapter to address these controversies. The resolution of these controversies will only come with thoughtful scientific comparative studies that address therapeutic efficacy.

Tools Of The Trade

I. Non-Invasive Therapies:

- A. Exercise program
- B. Cognitive/Behavioral medicine
 - 1. improve understanding of pain mechanisms
 - 2. improve coping skills
 - 3. relaxation, self-hypnosis, etc.
 - 4. improvement of pacing mechanisms
 - 5. biofeedback
 - 6. self locus of control
- C. Physical therapy
- D. Occupational therapy
- E. Chiropractic manipulation
- F. Nutrition
- G. Massage therapies
- H. Alternative therapies
 - 1. acupuncture
 - 2. acupressure
 - 3. Qui Gong
 - 4. aroma therapy
 - 5. magnet therapy
 - 6. herbal therapy
 - 7. etc.

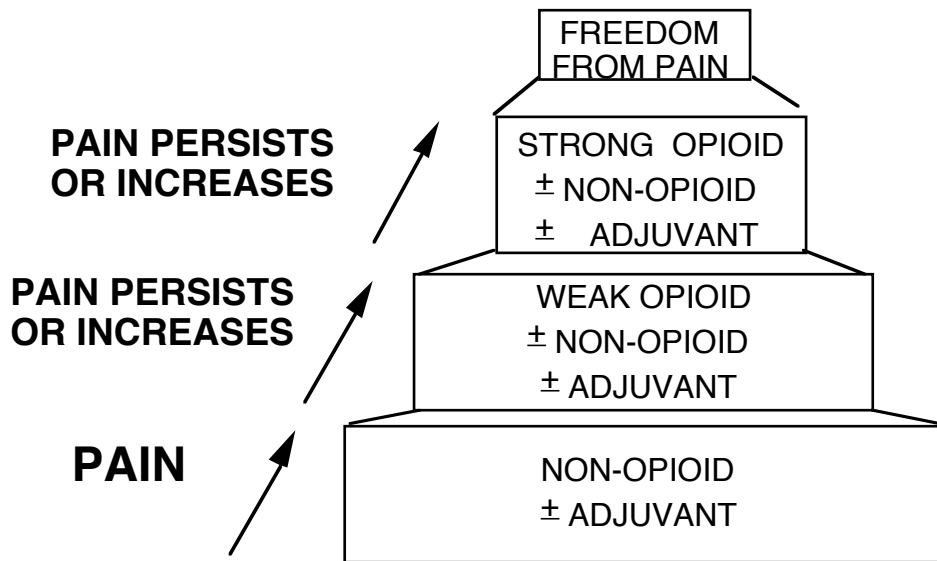
II Invasive Therapies

- A. Pharmacologic Pain Medicine
 - 1. Over the counter medications
 - 2. NSAIDs
 - 3. Weak/moderate opioid preparation (combination agents)
 - propoxyphene/acetaminophen
 - hydrocodone/acetaminophen
 - hydrocodone/ibuprofen
 - codeine/acetaminophen
 - oxycodone/ASA
 - oxycodone/acetaminophen

- 4. Pure strong opioid agonists
 - morphine
 - oxycodone
 - meperidine
 - fentanyl
 - sufentanil
 - methadone
 - levorphanol
 - hydromorphone
- 5. Agonist antagonist agents
 - buprenorphine
 - butorphanol
 - Dezocine
 - nalbuphine
 - pentazocine
- 7. Adjuvant medications
 - tricyclic antidepressants
 - serotonin reuptake inhibitors(SSRI's)
 - anticonvulsants
 - phenothiazines
 - Na channel blocking agents
 - Ca channel blocking agents
 - alpha-2 agonists
 - muscle relaxants
 - B-blockers
 - amphetamines
 - caffeine

- B. Anesthetic blocking techniques
- C. Neuromodulatory techniques
 - 1. Transcutaneous nerve stimulation
 - 2. Spinal cord stimulation
 - 3. Deep brain stimulation
 - 4. Intraspinial drug delivery
 - 5. Intraventricular drug delivery
- D. Neuroablative techniques
 - 1. chemical
 - 2. thermal
 - 3. surgical

Figure #1 This figure lists possible therapies for pain management, “the tools of the trade”, to be used in pain management listed in order of increasing levels of invasiveness. This list might not be all inclusive and might also raise some controversy as to which therapies are more invasive than others.



WHO ANALGESIC LADDER

Figure #2 The WHO ladder is an attempt by the World Health Organization Committee on Cancer Pain Management to suggest an algorithm of pain management for patients with cancer pain that developed as well as third world countries could easily implement. These guidelines suggest tailoring pharmacologic therapy according to the level of pain that the patient is experiencing. For mild pain the guidelines suggest using non-opioid analgesics with or without adjuvant medications. If pain persists the guidelines suggest adding a mild opioid to the above therapy. If pain still persists then a strong opioid should be added to the previous level of therapy.

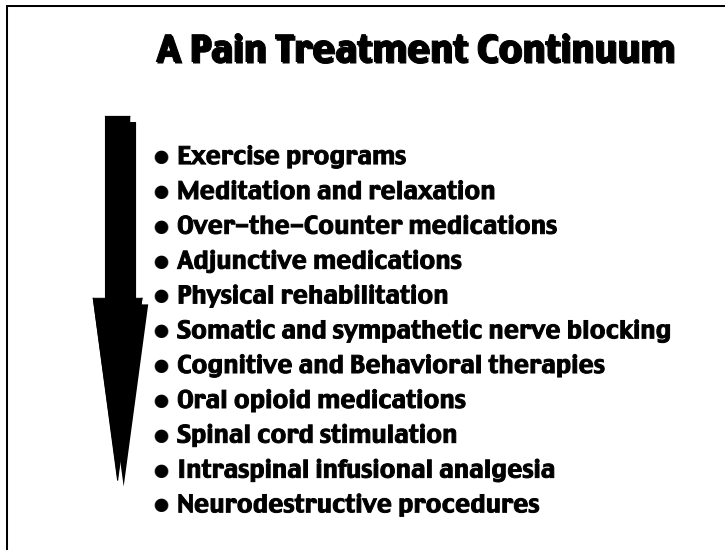


Figure #3 The pain treatment continuum is a suggested algorithm by this author to the reader for the appropriate use of possible pain management therapies. These therapies are listed in order of increasing invasiveness. The algorithm appears that the suggested therapies be used in series, abandoning therapies that don't work and enlisting more invasive therapies in sequential order. In actuality, these therapies can be used in parallel with one or more therapies being tried at the same time.

ⁱ Bonica JJ: Chronic non-cancer pain, Anderson S, Bond M, Mehta M, Swerdlow M, eds..
Lancaster, UK: MTP Press, 1987:13.

ⁱⁱ Lemrow N et al.: The 50 most frequent diagnosis-related groups, diagnoses and procedures: statistic by hospital size and location. Department of Health and Human Services

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Agency for Health Care Policy and Research, Public Health Service, September 1990.

ⁱⁱⁱ The Michigan Pain Study: EPIC/MRA 4710 W. Saginaw Hwy. Lansing Michigan 48917-2601,
1997.

^{iv} Chelius J, Galvin D, Owens P: Disability: it's more expensive than you think. *Business Health*
10:80, 1992.

^v United States Department of Commerce statistical abstracts, 113th ed. Table 579 and 587, US.,
Department of Commerce, 1993.

³ The Michigan Pain Study: EPIC/MRA 4710 W. Saginaw Hwy. Lansing Michigan 48917-2601,
1997.

^{vi} World Health Organization, Cancer Pain Relief, 2nd ed., World Health Organization,
eds., Geneva, 1989.