

Designing a curriculum for knowledge/skills in pain medicine in postgraduate years 1 and 2 (PGY 1 and 2). Authors: J Trinca, E Shipton on behalf of the Faculty of Pain Medicine, ANZCA.

Executive Summary

The Faculty of Pain Medicine (a faculty representing the five major specialist colleges within the College of Anaesthetists) is keen to have further input into the development of education and standards for junior doctors. We believe we are in a unique position to be able to assist hospitals, educational bodies and government to improve the standard of pain education. The Education Committee of the Faculty of Pain Medicine (Australian and New Zealand College of Anaesthetists) has summarised the state of pain education for junior doctors locally and internationally in this document and completed an overview of pertinent issues around delivery of this type of education. The following summarises the areas covered under:

- (i) How the Faculty of Pain Medicine can help.
- (ii) The basic knowledge, skills and attitudes that should be achieved.

(i) To educate PGY 1 and 2 doctors in pain medicine

Fellows of the Faculty of Pain Medicine can assist hospitals by the following means:

- Providing minimum standards expected on entry and exit from PGY1 and 2.
- Designing standardised entry/exit test cases.
- Providing a recommended list of topics to the director of clinical training.
- Rotating doctors through acute pain services and chronic pain units.
- Running a workshop and providing guidelines prior to commencement of PGY1
- Providing access to regular meetings and case presentations.
- Providing access to online and specific educational material.
- Providing expertise via the local Faculty of Pain Medicine Fellow.
- Provide a letter to the hospital management explaining the health, economic, accreditation and malpractice risks of inadequate analgesic care by health professionals.

(ii) At end of PGY2 a doctor should:

- Have an understanding of how to manage acute pain and to prescribe appropriate treatment.

- Be able to accurately diagnose different types of pain; be able to assess and document modifying and maintaining factors, relevant history and co-morbidities that may impact on pain treatment; be able to record this in the patient records.
- Be able to write an analgesic plan in patient records.
- To have the ability to minimise and manage the adverse effects of analgesic agents specifically including safe use of opioids.
- Be able to accurately measure pain on a regular basis; to record response to analgesic therapy and any adverse effects.
- Be able to recognise when and who to call for help.
- Have a broad understanding of principles of assessing and treating persistent (chronic non-malignant pain) and the treatment of pain in palliative care setting.
- Be aware of the paths to specialise in pain medicine and palliative care.
- Be aware of sources of evidence-based pain management material.
- Have an attitude that: the management of severe pain is a medical priority.

Overview

The Australian Curriculum Framework for Junior Doctors (ACFJD) has been established after numerous stakeholders, including government, recognised a need for improved training. The framework now provides a skeleton to build the content of the framework and is in a “state of development” as input is received from the many stakeholders who are putting the framework into practice. The Medical Training Board (MTB) in New Zealand was established in November 2007 to oversee the curriculum for postgraduate years 1 and 2 in New Zealand.

Pain medicine is a relatively new medical specialty and, like the ACFJD, the Faculty of Pain Medicine (FPM) of the Australian New Zealand College of Anaesthetists (ANZCA) grew out of a need to better address adequate training for doctors regarding the management of pain. The World Health Organization has described the management of pain as a basic human right. The FPM has brought together five medical colleges (covering anaesthesia, medicine, surgery, rehabilitation medicine and psychiatry and more recently general practice) to share a common and interdisciplinary pathway to manage pain.

Because pain is a frequent presenting complaint to most medical specialists and primary care physicians, and has a high prevalence in the community, it is important that the correct factual knowledge, attitudes and skills are learned at an early stage of medical training to adequately manage this problem. The Faculty is keen to provide input into the ACFJD and the MTB as pain is recognised as the most common reason for medical presentation and is responsible for considerable healthcare use, misuse and cost.

The FPM hopes to assist hospitals in developing their pain medicine curriculum by:

- (i) Explaining why pain management skills are a priority educational objective in PGY1 and 2.
- (ii) Presenting data on the learning needs of junior doctors about pain.
- (iii) Making suggestions about who should be included in teaching pain management education to junior doctors.
- (iv) Discussing competencies relevant to pain medicine.
- (v) Suggesting baseline knowledge of pain curriculum that should be acquired at medical school prior to entry to PGY1 and to link this information with that provided to the Deans of medical schools regarding undergraduate pain education. This includes a possible pain knowledge-screening test.
- (vi) Suggesting competencies to be acquired through year PGY1 and 2 about pain.
- (vii) Providing suggested patient presentations for use as case studies to ensure essential exposure types of pain presentations that occur routinely (such as post-operative pain, low back pain and headache), as well as scenarios that represent the complexities of pain management (such as neuropathic pain, opioid resistant pain, pain and addiction interfaces, and the principles of prescribing of opioids effectively and safely).
- (viii) Providing suggested educational tools, materials and links to national guidelines and other online tools.
- (ix) Providing suggested rotations/linkages with recognised pain services and pain medicine specialists throughout Australia and New Zealand.

Importance of prioritising skills education in pain management in PGY1 and 2

- (i) *Prior learning about pain is likely to be inadequate and not uniform.*

Medical graduates emerge from the medical schools throughout Australia and New Zealand with varying and often minimal structured teaching about pain. In addition foreign graduates are having an increasing presence in Australian and New Zealand hospitals.

There is no formal pain education at many medical schools and no minimum standards can be assumed. Surveys previously undertaken suggest final-year medical students and medical graduates believe their knowledge inadequate to effectively manage pain. Furthermore pain knowledge testing of some samples of medical students and young graduates has shown consistent gaps.(1,2)

Pain medicine is a young specialty and is just beginning to have a presence in undergraduate education. Previous knowledge of pain in undergraduate education was piecemeal and not

taught in a structured way by clinicians experienced and expert in principles of pain medicine. Non-pain specialists can teach about most pain management presentations. But without exposure of these teachers to “best practice” and current practice, it is likely that outdated and incorrect habits will continue. Little will be taught about where to get help and what other management strategies are possible. PGY1 and 2 may be the only formal training that a doctor may receive in pain management.

(iii) Need for pain management skills in PGY1 and 2

Doctors in PGY1 and 2 need to gain pain management skills directly relevant to their work in hospitals during mandatory terms in anaesthesia* (in Australia not mandatory) medicine, surgery and emergency medicine in the following:

- Correct diagnosis of patients presenting with pain.
- Care for postoperative patient and medical patients in severe acute pain.
- Care of emergency room pain presentations.
- Care of pain at end of life (palliation).
- Prescribing of analgesic medications.
- Documentation of pain history and treatment plan in the medical record.

(iv) Needs for pain management skills beyond PGY1 and 2

- a) From PGY1 and 2, doctors will be moving toward specialty training or training in primary care. Again there may be little formal education in pain management. A set of general principles about pain management and the knowledge of where to go for help is necessary. Awareness of the existence of “pain medicine” as a specific specialty is needed as well.
- b) In medical practice settings, chronic pain is a common presenting problem. Early management and prevention of this problem can reduce disability and medical costs. Cost-effective care with a self-management focus can have a major impact on quality of life and health expenditure. Access to quality services with this type of approach is often difficult to organise and find. Doctors may have little preparation for providing this type of approach to this common clinical problem.

Note:

Chronic pain is often over investigated, incorrectly diagnosed and often results in numerous failed treatments.

Chronic pain is often managed by involvement of many practitioners in an unco-ordinated manner. Physicians unequipped to deal with chronic pain may “close the door” on these patients because they are unclear as to how to deal with unresolved pain when interventions don’t help. Often the skill of imparting correct knowledge and attitudes about pain to a patient is a simple and cost-effective intervention, which can have a major benefit for this patient group. These skills and attitudes may not be taught to junior doctors.

Pain clinics in Australia typically have waiting lists of 12 months or more that means that non-pain specialists need to be able to deal with general pain issues.

- c) Opioid prescribing in Australia has escalated over recent years to very high levels. Unfortunately not all of this opioid is used appropriately and much is diverted. Knowledge about correct use of these drugs is a high priority area both in terms of patient safety and ensuring ethical medical practice.
- d) There is evidence that approximately 12 per cent of pain clinic patients are suffering pain as a result of medical treatments (iatrogenic). It is vital that doctors are aware of medical procedures and drugs that can cause persistent pain and those patients are informed of this risk prior to undertaking these procedures. Continuing to treat patients suffering chronic pain with surgery and invasive treatments does not generally result in improvement of pain. This concept is linked with understanding the neurobiology of pain that is CRITICAL to good pain management practice.
- e) Specific data on “needs” about pain knowledge and junior medical graduates. There is little published data about the level of basic pain knowledge in medical graduates in Australia. The recent national survey of young medical graduates undertaken prior to the development of the Australian Curriculum Framework for Junior Doctors (ACFJD), which had a return rate of 14 per cent did not address specific questions about pain management training.(3)

In 1998, a pain knowledge test (PKT)(1) (appendix 1) was used to evaluate level of basic pain knowledge in a Melbourne cohort of medical graduates who were commencing their intern year in a large university teaching hospital. It found many areas of deficit, some of which have persisted with more recent use of the test in the same hospital up to and including 2008. This type of test could be of help to those planning education in PGY1 and 2, as it provides a screening tool to evaluate baseline knowledge and detect gaps. It also serves as an educational tool if feedback is given. The factual content of the test was developed after considering common errors made by doctors in patients presenting to a pain management clinic. The test revealed then that “more recent concepts and terminology and therapy about pain were in general unfamiliar to these graduates. Most junior doctors did not believe they were equipped to manage pain problems”.

Others at the University of Michigan have found the benefit of a general screening test at residency level to guide postgraduate teaching for junior doctors. As part of this process they have used 16 pain case scenarios to assess basic competency in medication management. This was followed by education to close the gaps identified. It was noted the Joint Accreditation of Health Care Organizations (JAHCO) mandate that pain management be part of junior doctor education.(4)

Another pilot survey in 1999 that may provide some local insight into needs of primary care doctors in regional Victoria is a needs assessment of general practitioners in Geelong (a regional centre of Victoria).(5) Forty-four general practitioners responded to the survey out of 190 targeted. This survey revealed that only 5/10 doctors on average (on a Likert scale) felt able to deal with management of chronic pain conditions. Most had not received any undergraduate education about pain. Most were unaware of the availability of a national evidenced-based document (National Health and Medical Research Council Acute Pain: Scientific Evidence) to guide management of acute pain. However, most were interested in learning more. They chose

case-base learning or “phone or email access to a pain specialist” as their preferred learning methods. The most popular topics chosen from an extensive list included: choosing the correct medications for different types of pain; learning the place and efficacy of psychological approaches to pain management; the need for evidenced-based guidelines; the management of acute back pain; and the diagnosis and management of complex regional pain syndrome (CRPS). The neurobiology of pain and the analysis of community resources to deal with pain were the least popular. This reflects a lack of awareness of importance of more recent knowledge of the mechanism of action of the pain system and its influence on how pain is diagnosed and managed.

Consistent with this small local survey was a national survey of directors of all family practice training programs throughout the United States. Seventy-one per cent of them believed their trainees had received inadequate training in the recognition and treatment of pain (6).

Another recent publication from the US regarding the perceived needs of geriatric trainees in respect to pain management across the nation also provides very helpful information about defining the necessary skills required to manage pain (7). The Weiner study addresses specialist training as perceived by the trainees and faculty. It sets out 19 skills that are deemed requirements for dealing with pain in the ageing population. The skill set provides a good framework to assess training curricula. Table 1 below sets out the criteria for measuring the content and quality of pain training as perceived by both trainee and faculty. The study indicated that specific areas of under-education included:

- Comprehensive musculoskeletal assessment.
- Neuropathic pain evaluation
- Indications for low back pain imaging.
- The role of multidisciplinary pain clinics and nonpharmacological modalities.
- The effect of physical and psychosocial comorbidities in formulating treatment goals.
- The effect of aging on analgesic metabolism and prescription.

This finding is likely to be similar in the Australian and New Zealand environment.

Table 1

Weiner DK, Turner GH, Hennon JG, Perera S, Hatmann S. The state of chronic pain education in geriatric medicine fellowship training programs: results of a national survey. *Journal of the American Geriatrics Society* 2005;53(10):1798-1805.

	Questionnaire item
1.	Taught to recognise potential pain behaviour indicators in those unable to report pain
2.	Taught the importance of comprehensive pain assessment in older adults
3.	Taught that pain and disease may be poorly associated
4.	Taught that patient self-report is criterion standard for diagnosing pain
5.	Taught that stress and mood can significantly affect pain experience

	Questionnaire item
6.	Taught to perform a comprehensive musculoskeletal examination
7.	Taught to identify reliable pain assessment tools for older adults
8.	Taught physical examination findings that support neuropathic pain
9.	Taught indications for obtaining x-rays/magnetic resonance imaging scans of lumbosacral spine in patients with low back pain
10.	Taught differences between acute, chronic non-malignant, and chronic malignant pain categories
11.	Taught to identify important pain-related outcome measures other than pain intensity
12.	Taught that pain is a treatable disorder and should be recognised as a discrete entity
13.	Taught to identify and weigh risk factors and benefits of opioid use in older adults with chronic non-malignant pain
14.	Taught pharmacokinetic and pharmacodynamic changes related to analgesic use in older adults
15.	Taught important drug-drug interactions, contraindications, and side effects of commonly used analgesics
16.	Taught to identify adjunctive agents for the management of chronic pain
17.	Taught the role of non-pharmacological modalities in chronic pain management
18.	Taught the role of a multidisciplinary pain clinic
19.	Taught about the effect of physical and psychosocial comorbidity in formulating treatment goals for older adults

Who should teach pain education to junior doctors?

An understanding of the knowledge, skills and attitudes required to adequately manage pain will obviously influence what is taught and how it is taught. Pain experts need to collaborate with medical educators. Multiple doctors and other health professionals involved in teaching pain management should possess the current knowledge. This is a field where interdisciplinary planning of curriculum is very important. It would be important to include a palliative care physician and an emergency physician alongside the pain medicine specialist in a planning team as there is much overlap. This will ensure a consistency of approach (Table 2). As many specialties will wish to teach specific pain topics that are important to their specialty, the pain management specialist may be best placed to teach topics of a more general content that include those mentioned in Table 3.

Table 2. List of contributors to pain management education for PGY1 and 2

Faculty of Pain Medicine Fellows and senior trainees; anaesthetists and registrars (with an interest in acute pain)

Palliative care physicians and trainees and nurse educators
Emergency physicians (specific areas)
Surgeons (specific areas)
Physicians (specific areas)
Pharmacists (specific interest)
Others – pain unit nurses, physiotherapists and psychologists
Educators (non-medical)

The Faculty of Pain Medicine has provided a list of pain medicine specialists and pain units (See Appendix 2).

Table 3. Suggested topics in which pain medicine specialists are well placed to provide education

Perioperative pain and management of adverse effects of analgesics
Understanding the neurobiology of pain
Psychological components of pain
Chronic pain
Use of analgesic medications and analgesic ladders
Complexities of pain diagnosis
Pain management when a readily identifiable cause for pain is not found
Addiction, dependence and tolerance
Mechanisms of pain diagnosis (including neuropathic pain, phantom pain)
Measurement of pain
Evidenced-based guidelines

Topics better covered by others include headache, cardiac chest pain, acute abdominal pain, and joint pain. For many of these pain syndromes, consensus-based or evidenced-based guidelines exist.

How to define the competency of the junior doctors regarding pain medicine? Skills, attitudes and knowledge

The minimum requirements can be obtained from the Faculty of Pain Medicine. Although curricula have been developed by organisations such as the International Association for the Study of Pain (IASP) for undergraduates and for various types of pain healthcare professionals (doctors, dentists, physiotherapists), these do not set out core competencies. The competency list provided by Werner et al (7) as set out in Table 1 covers many of the competencies needed for the management of chronic pain. This could be adapted for junior doctors. The requirements for education of junior doctors now used in the UK, “Foundation Years”(8) do set out a few competencies with respect to pain management and forms part of mandatory assessment.

At present, assessment of the proposed PGY1 and 2 year is not mandatory in Australia; therefore defining competencies not absolutely critical but clearly some type of assessment will ensure quality of education and will be an expectation of most educators.

In the UK, which has developed the first substantive and prescriptive program for education of junior doctors, the assessment is a requirement, and standards need to be met to progress

through the system. Each resident receives a list of expected competencies and doctors need to maintain a portfolio of significant events and are expected to use the list of competencies provided as a basis for personal review of progress. Assessment is by feedback of co-workers and consultants, and direct observation in the first year. In year two a list of “acute care scenarios” is used for assessment and tools to assess these are still under development. “Pain” is one of six groupings for the acute care scenarios and all doctors will be assessed as to be competent in the following aspects of assessment and treatment of pain as set out in Table 4.

Table 4. Foundation years: the United Kingdom Competencies in Pain (2007)

General

Be able to assess pain intensity
Be aware of existing national guidelines
Understand how presentation differs in the elderly
Recognise vulnerable patients
Understand the principles of child protection

Treatment of acute pain

Understand analgesic ladder
Treat pain promptly, effectively and safely (using appropriate analgesics)
Understand acute pain may present as a new event or in a setting of chronic pain (for example, palliative care)
Be able to manage: the core presentations; chest pain; abdominal pain/acute abdomen; pain in severe acute head injury and other injuries; large joint pain; and back

Attitudes

Nothing is mentioned

The general curriculum consists of seven main groups of clinical competencies. Competencies one to six are generic to all medical practice. Competency seven deals with acute care, and includes management of acute pain and the safe use of analgesic medications. Chronic illness management, including “chronic pain” is not specifically part of this training program. This may be a deficit. The acute pain principles are consistent broadly with the Australasian approach to acute pain management. These will be taught by various methods that include case-based discussions, mini clinical exercises, and direct observation. The reason chronic disease does not form part of PGY1 and 2 training is not clear. Pain medicine as a specialty is in its infancy in the UK and not a medical specialty as in Australia. There was no specific ‘pain expert’ representation on the development committee to promote inclusion of this common medical problem. A noticeable hole in this curriculum is the absence of competencies about attitude to pain. This has always been seen as critical in the quality of analgesia provided. For the pain content of the foundation years’ curriculum, see Appendix 3.

Assessment:

Potential ways that the Australian/ New Zealand graduates could be assessed in the future could include:

Use of a logbook
Attendance at meetings, clinics, pain rounds
Tests or quizzes

Simulated patients
Prescription writing
Standardised assessments
Completing web-based interactive tutorials

Appropriate knowledge and attitude levels (prevocational)

To develop standards of appropriate knowledge about pain, it becomes necessary to assume some level of pre-vocational pain knowledge. Educators can then build on this without wasting time repeating medical undergraduate education. At the completion of medical training, a guideline should be provided to educators with expectations of pain knowledge (on two levels). Minimum standards for knowledge at PGY1 and 2 can thus be developed. The document on undergraduate pain medicine supplied to the deans of medical schools by the Faculty of Pain Medicine in 2007 should help to define entry-level knowledge (see Appendix 4). Pain is a common clinical presentation to which medical students are exposed. Below is a suggested framework of knowledge and skills of pain medicine expected at entry to PGY1 – that is, prior to hospital practice.

Desired minimum pain knowledge and skills at day one of PGY1 (at completion of pre-vocational studies) are as follows:

- Awareness of the neurobiological basis for pain presentations (including psychological interactions).
- Familiarity with the mechanisms of action of analgesic agents.
- Familiarity with the measurement of pain.
- Familiarity with the methods used to treat basic acute postoperative pain.
- Knowledge of cancer pain management such as World Health Organization (WHO) analgesic ladder (the WHO suggests exposure to cancer pain treatment should be mandatory in all medical courses).

Table 5 sets out the fundamental knowledge of pain medicine that can be expected of a junior doctor. While most students may have been exposed to the fundamentals, they often have had little experience of their clinical application in the diagnosis of pain and its treatment. This fundamental knowledge should form the basis from which to build competency in PGY1 and 2.

Table 5. Fundamental knowledge of pain medicine for junior doctors

- Basic neurology, psychology, and physiology of pain systems (including basic terminology).
- Basic analgesic pharmacology and understanding of pharmacological interventions.
- Basic measurement pain tools and their application and the measurement of pain by patient self-report and as a requirement of routine patient monitoring.
- Patient assessment (history, examination, communication).
- Simple management of postoperative pain.
- The different types of pain (nociceptive, neuropathic, visceral).
- Referred pain.
- The different pain syndromes (phantom pain, complex regional pain syndrome).
- The modification of acute pain by psychosocial factors.
- How co-morbidities and age may impact on pain treatment.
- The persistence of chronic pain persisting after resolution of tissue injury.

- The consequences of uncontrolled acute pain.
- The in pain management.
- The individualisation of analgesic agents according to patient characteristics, age and co-morbidities.
- The stepwise analgesic prescribing and co-prescribing.
- Important analgesic drug interactions and contra-indications of their use.
- Analgesic adverse effects.
- Opioid tolerance, dependence and addiction.
- Principles of regional use of local anaesthetics and their adverse effects.
- The various routes and methods of analgesic delivery.
- Function as an indicator of control of acute pain.
- Monitoring of analgesic adverse effects.

Desired competencies in PGY1 and 2

The most basic competency suggested is to formulate a plan for the analgesic care of a hospital patient by actively applying the above knowledge. From day one in PGY1, the junior doctor should be able to record a pain management plan in the medical record. This should include pain history, co-morbidities, and medications (especially those that affect analgesic prescribing). They should be able to prescribe and (if necessary) administer analgesic medications safely and effectively by monitoring for pain relief and for adverse effects. Junior doctors should know where to get help and when to refer a problem to a pain medicine specialist.

This 'desired competency' would encompass the following abilities:

(i) *General care skills (PGY1)*

The ability to:

- Formulate possible mechanisms for the pain presentation.
- Write up analgesic medications correctly on a drug or prescription chart.
- Explain pain to patients.
- Use analgesic agents via a multi-modal approach.
- Detect psychosocial factors that modulate pain response and to alter the care plan accordingly.
- Modify treatment in special patient groups (elderly, paediatric, confused).
- Ensure the regular measurement of function and monitoring of analgesic adverse effects.
- Get help in local environment and use available resources.
- Act promptly in managing severe pain.

(ii) *Accident and emergency (PGY1)*

The ability to:

- Control the acute pain of injured or surgical emergency patients with consideration of co-morbidities and current medications.
- Titrate intravenous opioid medication for severe acute pain.
- Investigate and manage back pain (acute); acute chest pain and headache and head injury, acute abdominal pain, and renal colic.
- Investigate and manage substance abuse and opioid-dependent patients presenting with pain (PGY2).

- Investigate and manage acute on chronic back pain (PGY2).

(iii) *Surgical ward (PGY1)*

The ability to:

- Provide simple postoperative care for abdominal, thoracic and orthopaedic surgery.
- Troubleshoot more complex analgesic techniques (epidural, patient controlled analgesia) and appropriately refer unsolved problems.
- Recognise and refer in a timely manner persistent pain after surgery (PGY2).

(iv) *Medical ward*

The ability to: (PGY1)

- Recognise severe pain and provide simple and safe oral analgesia.
- Recognise when analgesia is sub-optimum and refer in a timely manner.
- Effectively treat fractured ribs, crush fractures, chest pain and myocardial infarction, leg ulcers and burns (PGY2).
- Effectively treat cancer pain (and provide basic palliative care), neuropathic pain, acute joint pain and limb ischaemia (PGY1 and 2).

(v) *General skills for PGY2 and beyond*

- What to do when pain does not go away (PGY2)?
- Application of psychosocial and interventional approaches in pain medicine.
- Taking up pain medicine as a career.

Useful case-based studies and topics for discussions and tools for PGY1 and 2

Case-based studies are a desirable way of educating doctors and illustrating patient management. An educator could collect a series of patient scenarios over time. As part of some medical school curricula, case-based studies about acute post-operative pain including management of epidural and patient controlled analgesia may have been taught. These could remain available or be repeated in more depth at this level. As the junior doctors develop more experience with these simple techniques, CBL could be used to improve diagnosis of more complex pain and improve skills related to medication use and drug errors.

Suggested topics include:

(i) Case studies demonstrating complexities in pain *diagnosis* and *treatment*

- Complex regional pain syndrome.
- Central post stroke pain syndrome, post herpetic neuralgia.
- Referred pain (for example, testicular pain).
- Diagnosis of unilateral leg pain (somatic versus radicular).
- Lack of correlation MRI scans of lumbar spine and back pain.
- Cognitive behavioural therapy aimed at improved quality of life and not pain reduction.
- Importance of patient education about persistent pain.
- Available advanced techniques for pain reduction.
- Pain and substance abuse.
- Investigations for back pain.
- Evidence-base medicine in management of back pain.

(ii) Case studies demonstrating the complexities of analgesic prescribing

- a) Opioids.
 - Multiple opioids, age interaction, renal functions.
 - Meaning of opioid resistance/tolerance.
 - Routes and modes of administration of opioids including PCA.
 - Intravenous titration to individual requirements.
 - Long-term use of opioids.
 - Adverse opioid effects (nausea, vomiting, constipation, sedation).
 - Use of naloxone.

- b) Anti-inflammatories (NSAIDs):
 - Use as opioid sparing agents.
 - Controversies re use: COX1/COX2.
 - Use in specific types of surgery.
 - Adverse effects (for example, fit young patient with dehydration).

- c) Agents for neuropathic pain:
 - Types of agents including ketamine.
 - Why these are helpful?
 - Use in acute, chronic and cancer pain.
 - Use of numbers-needed-to-treat (NNTs).
 - Neuropathic pain scales.

- e) Miscellaneous: Methoxyflurane, nitrous oxide, local anaesthetic use.

Useful tools for PGY1 and 2

There seems little available published data as to the best way to impart pain knowledge, skills and attitudes. If the Geelong general practitioner survey is any guide (5), pain management is best learned on the job by case-based learning. However some baseline knowledge is necessary in the form of reading material or online material. A subject that requires more complex understanding, such as neurobiology of pain, which is difficult to absorb, is probably best taught by an expert reinforced by structured material. This could be well supported by interactive online material.

In 2007, an attempt was made to tackle basic acute pain education on a large scale in Australia: the National Prescribing Scheme (NPS) completed a national education project aimed at improving management and prescribing of doctors in the setting of acute postoperative pain. It used an audit and feedback approach in combination with academic detailing of junior medical staff and nurses.(15) Some baseline data was collected about current practice, including pain assessment, documentation, measurement, prescribing and communication on admission and discharge. Several stakeholders, including the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine, prepared a consensus document outlining specific content of educational material, which was delivered to a large number of junior medical staff, pharmacists and nurses throughout the country. Such material is available for use and an audit tool will shortly become available for individual hospital settings, which will allow similar local auditing of practice that could be followed by specific needs-based education (see Appendix 5).

Similar projects include the Victorian Quality Council (VQC) 'Pain Toolkit' project, which addresses acute pain management in hospitals. Educational material is available online.(11) The National Institute of Clinical studies (NICS, part of the National Health and Medical Research Council) have run similar projects on cancer pain and pain in the emergency department. (16) Such projects provide excellent material and unearth data on learning needs and barriers to change. Possible gateways to education about pain are found in Table 6. An example of a curriculum used in 2008 is found in Appendix 12:

Table 6. Opportunities for teach pain medicine to PGY1 and 2

Lectures, textbooks
Orientation week workshops
Lunchtime case discussions
Acute pain rounds, chronic pain clinic visits
Questions and answer sessions
Palliative care rotation or chronic pain service rotation
Website (hospital or college-based)
Online problem based learning
Troubleshooting pocket textbooks
Web-based guidelines
Feedback from experts about performance and case management
Audit and feedback
Logbook

Other resources:

Numerous textbooks and guidelines exist. ANZCA and FPM are reviewing their extensive document on acute pain. This is available online and regularly updated. It is also available in hard copy. The Therapeutic Guideline Series has two guidelines available with good content. For useful texts, see References 9-14. Faculty members have contributed material and others are available (see Appendices 7-12).

List of accredited pain services and pain medicine specialists:

For a list of accredited pain medicine units and acute pain services, see Appendix 2.

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Appendices

Appendix 1. Pain knowledge questionnaire

Appendix 2. Faculty of Pain Medicine: List of pain medicine specialists, accredited pain training units, and acute pain services

Appendix 3. The pain content of the foundation years' curriculum in the United Kingdom

Appendix 4. Document on undergraduate education in pain medicine supplied to the deans of medical schools by the Faculty of Pain Medicine, 2008

Appendix 5. Academic brief National Prescribing Service APOP project

Appendix 6. Pain Orientated Physical Examination (POPE): Faculty of Pain Medicine, 2007

Appendix 7. Opioid Analgesic Rules of Five

Appendix 8. Analgesic guideline for simple acute pain

Appendix 9. Ten points about pain

Appendix 10. PowerPoint example for new interns, part 1 and 2

Appendix 11. Notes on basic pain neurobiology and terminology

Appendix 12. Example of a curriculum used in 2008

Appendix 1. Pain knowledge questionnaire

This questionnaire is designed to test basic knowledge of pain mechanisms and management. It is designed to test factual knowledge not reasoning ability. The questionnaire has been given to a variety of health professionals to assess the level of current knowledge so that changes can be made to professional teaching if necessary. Thus do not spend too long on the questions. You will either know the answer immediately or not. Do not feel embarrassed if you do not know the answer. It is important that a true reflection of knowledge is obtained to make changes to teaching. The questionnaires are anonymous but are numbered to ensure accurate sampling.

NB. THIS QUESTIONNAIRE IS PROPERTY of UNIVERSITY of SYDNEY and is COPYRIGHT and CANNOT BE REPRODUCED WITHOUT PERMISSION of author.

Place a cross in the box that best describes your assessment of each statement.

1. Level of disability in chronic pain patients is associated more with psychological variables such as distress and unhelpful thoughts, than with abnormality of objective tests.

- True
- False
- Don't Know

2. Complex regional pain syndrome (CRPS) is the current name for a condition previously known as reflex sympathetic dystrophy (RSD).

- True
- False

Don't Know

3. Reflex sympathetic dystrophy is caused by protracted stimulation of the sympathetic nervous system due to anxiety.

True

False

Don't Know

4. Reflex sympathetic dystrophy is best managed by early intervention with sympathetic blockade and avoiding all weight-bearing exercise.

True

False

Don't Know

5. Cognitive behavioural treatment has little place in management of common chronic pain syndromes.

True

False

Don't Know

6. Central sensitisation is a term applied to alterations in the dorsal horn of the spinal cord, causing a heightened response to noxious and non-noxious stimuli.

True

False

Don't Know

7. Central sensitisation is an explanation of the mechanism of allodynia.

True

False

Don't Know

8. Central sensitisation may be blocked by the pre-emptive use of NMDA receptor antagonists.

True

False

Don't Know

9. The most effective management of chronic back pain is panadeine forte as needed, avoid activities that cause pain and regular anti-inflammatories.

True

False

Don't Know

10. There is no place for the use of parenteral daily/weekly regular pethidine in the treatment of chronic pain.

True

False

Don't Know

11. Chronic severe pain can sometimes be made worse by escalating doses of opiates, such as decreasing opiate dose can improve pain sometimes.

- True
- False
- Don't Know

12. Pethidine can cause twitches and fitting due to: high levels of a pethidine metabolite causing central stimulation.

- True
- False
- Don't Know

13. Opiates used to treat acute pain should be used in appropriate doses, freely, to decrease pain levels, as this will rarely result in drug addiction.

- True
- False
- Don't Know

14. There is approximately an eight to tenfold variation in individual response to opiates in individuals of same age and weight.

- True
- False
- Don't Know

15. The term sciatica is now regarded as a misnomer for the common symptom of pain radiating down one leg.

- True
- False
- Don't Know

16. Pain that travels down a leg is commonly due to disc prolapse.

- True
- False
- Don't Know

17. Phantom lower limb pain will be completely eliminated by a complete spinal anaesthetic to the level of T10 (the umbilicus).

- True
- False
- Don't Know

18. Patients describing pain due to the sheets of their bed lightly touching their skin are describing symptoms of anxiety.

- True
- False

Don't Know

19. Tricyclic antidepressants help some types of pain because they specifically treat associated depression.

True

False

Don't Know

20. Considering the pathophysiology of pain, chronic severe testicular pain should always be cured by orchidectomy.

True

False

Don't Know

21. Noxious stimulation in one site can result in the sensation of pain in another site up to three spinal segments above or below.

True

False

Don't Know

22. Non steroidal anti-inflammatory drugs are useful for pain because their major action is blockade of the opiate receptor.

True

False

Don't Know

23. Do you believe your understanding of pain is adequate for your clinical needs?

Yes

No

Don't Know

24. Have you had any formal education specifically in pain management?

Some

Minimal

None

25. Do you think that medical graduates *should* be able to successfully answer the previous questions *prior* to commencing clinical practice as a doctor?

Yes

No

26. The financial cost of pain as a disease entity is one of the three highest expenses of our health budget.

True

False

Don't Know

Appendix 2. Faculty of Pain Medicine - List of pain medicine specialists, accredited pain training units, and acute pain services

Pain medicine specialists

Refer to <http://www.anzca.edu.au/fpm/fellows/list-of-fellows> for an up-to-date list of pain medicine specialists.

Accredited pain training units and acute pain services

Refer to <http://www.anzca.edu.au/fpm/trainees/training-unit-accreditation> for an up-to-date list of updated accredited pain training units.

Appendix 3. Summary of “foundation years” competencies

(1) UK foundation years requirements re pain management:

Mandatory from August 2007

- Doctors take responsibility for learning.
- Competence and performance assessed objectively throughout program.
- Successful completion PGY1: GMC registration.
- Successful completion PGY2: professionally accountable for patient safety and able to commence specialist training.
- Curriculum set out.
- Core competencies defined.
- Delivery of training defined.
- Feedback and assessment under development.
- Syllabus available.

(2) Foundation program syllabus

Each subject divided into: Knowledge, skills, attitudes

Subject: 7.1 is ‘Management of acutely ill patients’

Knowledge: safe use of analgesics (routes and methods)

Skills: select, prescribe and monitor safe and effective analgesia for patients with acute pain and acute pain in chronic pain setting

Attitudes: nil stated

(3) Core competencies re pain in UK foundation years specific to PAIN

(i) Generic skills (this is included under section 7:Acute care section ix)

Safely and effectively administers common analgesics

PGY1

- Evaluates patient in pain.
- Makes patient comfort a priority.
- Prescribes opioid and non-opioid analgesics safely.
- Re-evaluates efficacy of treatment in timely manner.
- Monitors for side effects to analgesic medications.
- Safely uses anti-emetics to treat or prevent nausea/vomiting
- Aware of risks of addiction to analgesic medications.

PGY2

Considers effect of hepatic and renal dysfunction on analgesics

Assesses effects of analgesics in a timely manner

Considers analgesics may temporarily mask severity of illness

(ii). Training and assessment

Training must include terms in general medicine, general surgery and acute care

Assessment of acute care:

- Airway problems.
- Breathing problems.
- Circulation problems.
- Neurological problems.
- Psychiatric/behavioural problems.

Pain

Assessment of pain

- Be aware of existing national guidelines.
- Understand how presentation differs in elderly.
- Recognise vulnerable patients.
- Understand principles of child protection.

Treatment of acute pain

- Understand analgesic ladder.
- Treat pain promptly, effectively and safely (using appropriate analgesics).
- Understand acute pain may present as a new event or in a setting of chronic pain (for example, palliative care).
- Be able to manage the core presentations.
- Chest pain.
- Abdominal pain/acute abdomen.
- Severe acute head injury.
- Large joint pain.
- Back pain injuries.

**Appendix 4. Faculty of Pain Medicine (FPM): Pain and the undergraduate medical curriculum.
(Authors: J Trinca, E Shipton)**

Background:

A *curriculum* consists of: Objectives for learning; assessment of these objectives; and educational experiences to learn these objectives.

The FPM can help develop pain medicine training in the undergraduate medical curriculum as follows:

1. Providing information about the availability of accredited pain medicine units for access by medical schools for the training of medical students.
2. Providing a list of pain medicine specialists who could be approached to teach aspects of pain medicine.
3. Encouraging the inclusion of a suitable pain medicine specialist on the curriculum committee to integrate pain medicine principles into the overall curriculum.
4. Providing minimum standards for a graduating medical student regarding knowledge of pain medicine as well as a checklist (Appendix 8).
5. Providing basic core-learning plan for medical students (including texts, taxonomy, and references).
6. Providing educational material (including problem-based learning cases for acute, chronic and cancer pain).
- 7 Providing the POPE (Pain Orientated Physical Examination) DVD, and various pain scales.
8. Providing a bank of questions or tasks (patient presentations) that could be used for assessment.
9. Providing online resources to medical students.

What are other pain faculties/organisations doing about undergraduate medical curriculum?

1. There seems to be increasing moves towards consideration of pain medicine into the undergraduate curriculum (for example, University of Toronto) (Watt-Watson J, Stevens B, Katz J, et al. *Pain*. 2004;109:73-85).
2. The European Federation of International Association for the Study of Pain (IASP) chapters recently published a draft on the undergraduate medical curriculum in pain medicine (Appendix 2).
3. The American Academy of Pain Medicine has published a statement about the undergraduate medical curriculum on its website giving recommendations on incorporating pain medicine into the curriculum of all American medical schools. (Appendix 3).

LEARNING OBJECTIVES IN PAIN MEDICINE FOR MEDICAL UNDERGRADUATES (Appendix 4.)

1. Being able to adequately diagnose and describe pain presentations (with symptoms and signs) using pain terminology; to modify mood, cognitions, and coping skills; to modify maintaining features (pathology, behaviours, social) if relevant; and to work out possible mechanisms resulting in pain (inflammatory, neuropathic, myofascial, referred, visceral, somatic etc).
2. Being able to adequately record and measure pain and its effect on function; and record and measure any treatment responses.
3. Being able to recognise differences between acute and chronic pain and differences between the approaches.
4. Being able to recognise the differences between the palliation of pain and the management of pain to improve function.
5. To understand the following:
 - Potential drug groups that help block different receptors/pathways.
 - Interventional approaches that are commonly used in acute pain to block pain.
 - Non-analgesic approaches to treat some common types of pain.
 - Cognitive behavioural approaches to help manage responses to ongoing pain.
6. To develop a management plan for a simple pain condition (for example, post-operative pain); and how to monitor for the adverse effects of treatment.
7. To recognise more complex or unrelieved pain problems that need timely referral to a pain medicine specialist.
8. To understand the role of: chronic pain clinics; pain medicine specialists; interdisciplinary pain management; and selective interventions.
9. To understand the role of acute pain services and their importance.
10. To understand palliative care services in the treatment of pain at the end of life.
11. To understand the potential for harm from uncontrolled pain; drug errors; adverse effects of drugs; interventional adverse effects; inappropriate use of opioids; and co-morbidities.
12. To obtain a list of suitable pain medicine units and acute pain services to access.
13. To have access to knowledge resources and links such as the Faculty of Pain Medicine (FPM/ANZCA) Acute Pain Scientific Evidence; POPE DVD; access to web-based resources, the five guidelines for opioid use in acute pain: and the five guidelines for opioid use in chronic non-cancer pain (Appendix 5 and 6).

Framework to achieve the learning objectives:

1. Early introduction of pain concepts

This is in order that aspects of the pain experience can be appreciated prior to any patient care. The knowledge gained is reinforced by ongoing clinical exposure, as pain will frequently be part of many conditions studied.

2. Basic general overview of the concepts of the neurophysiology of pain

This must be linked to clinical phenomena (MRI scan findings; and animal and human experiments). The pain system is not simply a hard-wired network but is dynamic and always changing and can be modulated. Multiple interactive inhibitory and excitatory systems affect the experience. There are interactions with the immune systems and hormonal and body systems as well. Changes in nerve cells peripherally and centrally occur as a consequence of ongoing nociceptive stimulus; these are important concepts that outlast the stimulus.

3. Some suggested topics:

Attention and pain; placebo

Recurrent pain after neurosurgical ablative procedures

Phantom pain

Referred pain

Types of pain (nociceptive, neuropathic)

Complex regional pain syndrome

Post stroke pain (inhibitory role of thalamus)

Central sensitisation (role of N-methyl-D-Aspartate (NMDA) receptors)

Peripheral sensitisation (role of inflammatory mediators)

Assessment: A quiz.

4. Knowledge of analgesic medications

Overview of pharmacology of analgesic drugs, such as: paracetamol; anti-inflammatories (NSAIDs); opioids and tramadol; tricyclic antidepressants and clonidine; NMDA receptor antagonists (ketamine); local anaesthetics; and anticonvulsants.

Overview of the practical use of these drugs - these include: adverse effects; co-prescribing; addiction/dependence/tolerance; drug interactions; effects of age and patient co-morbidities; and methods of drug delivery.

Assessment task: Write a prescription for postoperative pain in a fit healthy patient.

5. Patient scenario (scripted) for classical neuropathic, inflammatory and simple musculoskeletal pain

Use a pain-orientated history taking and examination to demonstrate the mechanisms of pain.

Assessment: Pain history, pain measurement, and a management plan.

Some core patient scenarios

Severe post-operative pain

Patient scenarios for severe post-operative pain that impact on vital functions (for example, upper abdominal surgery with severe pain affecting the respiratory system; a Whipples procedure with use of an epidural; and opioids and multimodal analgesia).

These should demonstrate the principles of acute postoperative pain. Attending acute pain rounds could reinforce this learning

Assessment: A case report.

Uncontrolled cancer pain (both palliative and non-palliative)

Approach to multimodal analgesia according to mechanism; how to administer opioids around the clock, and for breakthrough/incident pain.

Attending a palliative care rotation should reinforce the learning.

Chronic non-cancer pain associated with chronic inflammatory disease (for example, rheumatoid arthritis)

Attending a rheumatology rotation should reinforce the learning.

Ongoing low back pain

Normal investigations; disability; and use of the correct educational advice and approach. Attending a general practice rotation, or a pain clinic could reinforce the learning.

Distressed patient with pain

Take a patient with a high level of distress, catastrophic thinking, and a high opioid use. Learn to recognise that patient needs more complex care.

Attending chronic pain clinic rotation could reinforce the learning.

CRPS post arm fracture

Symptoms and signs of CRPS; principles of treatment; and need for early referral.

Attending a pain clinic should reinforce the learning.

Acute herpes zoster/post-herpetic neuralgia

Get an understanding of the approach to neuropathic pain.

Attending a neurology rotation or a pain clinic should reinforce the learning.

Substance abuse and pain

Attending a pain clinic, or drugs and alcohol clinic should reinforce the learning.

Chronic pain and coping skills

Overcoming disability despite experiencing pain.

Attending pain clinic with rehabilitation or cognitive behavioural therapy (CBT) should reinforce the learning.

Outline Curriculum on Pain for Medical Schools: IASP Ad hoc Sub-Committee on Medical School Courses and Curriculum

Although doctors make most formal decisions as to the management of pain, it has been obvious for a long time that medical undergraduate teaching on the subject of pain leaves much to be desired. Many medical schools teach very little about pain at both the preclinical or clinical levels, and information is poorly integrated.

Changing medical undergraduate curricula is never an easy task. It is one that needs to be catalysed and facilitated in a variety of ways. As part of its aim to increase educational standards in the field of pain IASP set up an Ad Hoc Sub-committee on Medical School Courses and Curriculum in November 1985. The members of the committee represented the entire range of disciplines with an interest in pain. The committee set itself the task of producing an outline model pain course that would indicate (by listing topics), the issues that should be covered in a medical undergraduate curriculum. Each member of the committee was asked to provide a list of subjects. These were combined into a single list that was circulated to all members and after revision an agreed version was submitted to Council at its August 1987 meeting where it was accepted.

The committee hoped that those involved in Medical School Curriculum planning might use the Outline to draw the attention of their colleagues to the areas that ought to be covered if medical graduates are to be adequately prepared for the management of pain. Suggestions have purposely been avoided on how these might be put into practice in terms of hours or location in the curriculum.

Outline Summary

- Introduction and overview
- Definition of pain
- Ethical issues
- Basic sciences
- Clinical sciences
- Clinical presentation of pain

Management

- General principles
- Clinical pharmacology
- Neuro-stimulation techniques
- Nerve blocks
- Surgical techniques
- Psychotherapeutic and behavioural approaches
- Physical therapy
- Pain in special contexts
- Evaluation of methods for treating pain

Proposed Curriculum on Pain for Medical Undergraduates

1. Introduction and overview

Pain as a public health problem
Epidemiology: societal consequences
Economic impact
Medico-legal and compensation issues

2. Definition of pain

Relationship between acute and chronic pain
Philosophical issues
Historical aspects of the study of pain
Biological significance of pain (survival value) should also be interwoven into all appropriate topics

3. Ethical issues

Pain research in humans and animals
Pain disability and litigation
Pain in children
Pain and opiate dependence

4. Basic sciences

Neuroanatomy
Neurophysiology
Biochemistry
Pharmacology
Psychology, sociology, anthropology

Topics

Peripheral receptors, afferent fibres, spinal terminations and spinal processing of nociceptive information; ascending tracts, transmitters (peptides and amino acids), supraspinal sites of termination of ascending tracts, descending control of nociceptive information and pain modulation.

Affective, cognitive, behavioural, and developmental aspects; Pain attribution; Self-esteem, self-efficacy, and perceived self-control.

Interpersonal issues; sick role; illness behaviour (normal and abnormal); the influence of political, governmental, and social welfare programs; and the role of the family.

Cultural differences in pain meanings and treatment approaches.

5. Clinical sciences

Pathology (somatic and psychosocial)
Trauma and injury (compressed or severed nerve)
Deafferentation pain
Musculoskeletal pain
Visceral and referred pain
Migraine, muscle contraction headache

Temporomandibular pain
Psychiatric disorders
Herpes zoster
Pain in neurological disease
Pain and cancer

6. The clinical presentation of pain

Descriptions of major syndromes (acute and chronic)
Illness behaviours associated with pain (denial and amplification)
Pain as a coded message of psychosocial distress

7. Management

a. General principles

The measurement, quantification and recording of pain
The multi-perspective approach (multidisciplinary pain clinics)
The clinician-patient relationship

b. Clinical pharmacology

Non-steroidal anti-inflammatory drugs (NSAIDs)
Systemic and spinal opioids, endorphins
Local anaesthetics
Other drugs (anticonvulsants, antidepressants, and agents influencing 5-HT and endorphins)

c. Neuro-stimulation techniques

Transcutaneous nerve stimulation
Epidural stimulation
Brain and spinal cord stimulation
Acupuncture

d. Nerve blocks

Local anaesthetics
Neurolytic solutions

e. Surgical techniques

Nerve decompression
Neurosurgical techniques
Orthopaedic techniques

f. Psychotherapeutic and behavioural approaches

Individual, family, and group psychotherapy
Cognitive-behavioural therapy
Relaxation techniques (biofeedback, etc.)
Hypnotherapy, operant approach, stress management

g. Physical therapy

Exercise, massage, heat, hydrotherapy, etc.

8. Pain in special contexts

Postoperative (including prophylaxis)

Children and infants (signs of pain, evaluation and management, physiology, acute and chronic pain)

Cancer-related pain (death and dying, palliative care)

Aged

Intellectually retarded

Pregnancy and childbirth

Occupational issues (e.g., overuse syndromes, post-traumatic stress disorders)

9. The evaluation of methods for treating pain

Measurement of pain, disability, associated distress and suffering

Choice of outcome measures

Evaluation of analgesic therapy

Assessment of pain relief

(Reference: Pilowsky, I., Editorial - An outline for medical schools. *Pain* 1988; 33: 1-2).

Appendix 2

Proposed framework by European Federation of IASP Chapters (EFIC) for an Undergraduate Pre-clinical Curriculum to provide Medical Students in Europe with Fundamentals on Pain Medicine

Notes:

This framework was developed in light of the IASP 'Outline curriculum on pain for medical schools' [Pilowsky committee report 1987; the IASP 'Core curriculum for professional education in pain' (Fields, HL ed., IASP Press, 1995, and draft update 2002), feedback from EFIC Council, and discussions among EFIC and IASP principals].

It is intended to provide the student beginning with background for later instruction in mechanism-based diagnosis and therapy.

The curriculum is built horizontally, cutting across specific pain diagnoses.

Users may wish to modify the order in which the main topic categories are presented. However, the suggested order has internal logic (e.g. pain definitions considered only after the student has had contact with central issues).

Users may wish to distribute the main topic categories as modules in more general courses (e.g. neuroscience, psychology). However, it is intended that each student be exposed to all of the main topic categories.

Like any course of studies, it is possible to adjust the number of teaching hours by expanding or contracting the level of detail entered into for each topic. A value in: percent (%) of course time, and course time in hours (assuming 20h as net total) is provided as a guide. This breakdown is

not intended to reflect the relative importance of the various main topics, but rather the relative time typically required to master the key concepts involved.

Appropriate reading materials should accompany the curriculum. In addition, source references should be provided to permit the student to investigate individual topics in greater depth. Under ideal conditions the course should be accompanied by independent work assignments, a laboratory practicum, and some exposure to pain patients and physicians.

I. Neurobiology of pain (40%, 8h)

a) Normal biology

Anatomy, physiology, pharmacology of primary afferent neurons

Anatomy, physiology, pharmacology of spinal cord and trigeminal brainstem neurons including modality convergence (Wide dynamic Neurons/ multi-receptive neurons and flexor reflexes)

Ascending pathways (including to cerebellum, brainstem, and limbic forebrain)

Descending control pathways and state-induced analgesia (including placebo)

Response properties of supraspinal areas including non-invasive imaging in humans

Acute and late effects of lesions to identified pathways/areas

Opioids, NSAIDs, local anesthetics - pharmacology including receptors and endogenous ligands

b) Pathobiology

Inflammation and peripheral sensitisation including effects on phenotype of primary afferent neurons

Axotomy effects on phenotype of primary afferent neurons (including ectopic hyperexcitability)

Consequences of demyelination for axonal conduction and ectopic hyperexcitability.

Central sensitisation

Other effects of peripheral inflammation and of axotomy on spinal/ trigeminal brainstem processing (including sprouting, map reorganisation, altered gene expression)

Effects of peripheral tissue and nerve pathology on supraspinal processing (including map reorganisation)

Experimental models (human and animal) for the study of pain pathobiology

Concept of chronic pain as a disease rather than a symptom

II. Impact of pain as a public health problem (20%, 4h)

a) Quality of life (QOL)

Consequences of *acute* pain (trauma, postoperative, obstetric) including stress, immunosuppression, effects on rate of recovery

Consequences of *chronic* pain on the individual (QOL, sleep, disability, psychology, stigmatisation), including inter-individual variability (including sex and ethnicity)

Consequences of chronic pain on the patient's relation with carers (including family/friends, healthcare professionals and the larger society)

Under-prescription and under-administration of analgesics

Risks of substance abuse associated with pain management

Transition from acute to chronic pain (biology, psychology, and social interactions)

Pain and illness behaviour used by patients as a signal of psychosocial distress

Risk factors (including genetics, environment; is there a pain-prone personality?)
End-of-life problems, palliative care, and the issue of assisted suicide
Ethical considerations: failure to relieve pain (including in medical procedures, children, and obstetrics); what is acceptable?
Ethical considerations: experimentation on humans and animals

b) Financial burden

Prevalence/epidemiology (including variation with age)
Types and limits of third-party coverage; compensation
Effects of pain and disability on employment
Costs to employers and to society (including comparison with other major diseases)
Physician liability and other medico-legal issues
High-tech versus low-tech management approaches (cost-effect analysis)

III. Assessment (20%, 4h)

a) Measurement

Definitions of pain
Basic pain measurement (visual analogue scale, numerical scales, quantitative sensory testing, thermographs and other autonomic variables) with discussion of specificity and scaling
Problems of assessment in special groups (children, elderly, and non-verbally)
Effects of compensation status (financial and psychosocial) on pain/illness behaviour
Critical evaluation of clinical trials and meta-analyses
Pain as a 5th vital sign (alongside pulse, blood pressure, temperature, and respiration)

b) Diagnosis

Signs, symptoms, syndromes, and progression (natural history)
Major systems and diagnostic categories (IASP taxonomy, International Headache Society diagnostic guidelines; and psychiatric diagnostic guide DSM-IV)
Clinical diagnostic entities versus mechanism-based diagnosis

IV. Introduction to Pain Medicine (20%, 4h)

a) Pain management delivery systems (with historical context)

General practice; relevant specialties; sub-specialisation in pain medicine; narrow spectrum versus multidisciplinary pain clinics; rational expectations; and the concept of 'pain management'
Types of management: drug treatments; nerve and spinal blocks; stimulators; surgical, physical, and psychological and psychiatric; and non-medical

b) Some examples of acute and chronic pain conditions, and their management

Acute medical conditions
Trauma and postoperative pain
Arthritis
Headache
Low back pain
Neuropathic pain

Cancer pain
Visceral pain (e.g. chronic pelvic pain)

Appendix 3

A Position Statement from the American Academy of Pain Medicine (AAPM) Undergraduate Education Committee

Pain is the most common reason why patients seek medical care. While pain may be a symptom of an underlying disease or injury, it can also become a persistent symptom of an autonomous neurophysiological process, in which situation it may constitute a unique neurobiological disorder. It has been demonstrated that all forms of pain, including acute, chronic, and that associated with terminal illness, are often poorly managed with consequent needless suffering.

The American Academy of Pain Medicine, in its position statement on Chronic Pain and Quality Care at the End of Life, and the American Pain Society, in a similar statement, affirmed that effective pain and symptom management is an ethical obligation of all healthcare providers and organisations. One of the main impediments to skillful end of life care is the lack of quality undergraduate education on pain management, end of life care, and palliative care. The Liaison Committee on Medical Education, the national accrediting authority for medical education programs leading to the M.D. degree in U.S. and Canadian medical schools, recently mandated education and clinical experience in end-of-life care in its standards for accreditation. This was an important step; however, of equal importance is education in the broader scope of pain medicine for medical professionals. While pain control is a significant component of end-of-life care, such care represents only a small fraction of the scope of knowledge and skills of pain medicine in which all medical students must be educated in order for the public to obtain skillful care for such problems as acute and chronic pain. Curriculum changes are necessary to ensure that future health care professionals are competent to provide expert pain diagnosis and treatment. The American Academy of Pain Medicine encourages its members to contribute to the education of future healthcare professionals in pain medicine, end-of-life care, and palliative care.

Undergraduate Medical Education on Pain Management, End-of-Life Care, and Palliative Care

Recommendations:

1. Pain medicine, end-of-life care, and palliative care should be required elements of the core medical school curriculum.
2. Integrated multidisciplinary courses are preferable to isolated lectures or clinical hours to optimise understanding and effectiveness in the provision of basic pain medicine, end-of life care, and palliative care.
3. These courses should be planned and implemented by a designated faculty group with demonstrated training and experience in pain medicine, end-of-life care, and palliative care.

E-mail aapm@amctec.com

Web site <http://www.painmed.org>

Appendix 4

10 POINTS THAT MEDICAL STUDENTS SHOULD KNOW

Pain pathways and “plasticity” of Central Nervous System in pain

Transition of acute to chronic pain, risk factors, and possible prevention.

Pain is always a BIOPSYCHOSOCIAL experience

Treat pain using multi-modal therapies (physical and psychological)

Differences between acute, chronic and cancer pain

Why does this matter?

Chronic pain as a disease in its own right

Chemical imbalance in pain neurotransmitters

Assessment of pain

Pain history

- response to treatment
- ability to diagnose nociceptive and neuropathic pain
- history / descriptors / response to treatment.

Difficulties in assessment at extremes of age and in cognitively impaired patients

Appropriate drugs / treatments for the different types of pain

Acute pain use short duration - quick acting drugs, or temporary nerve blocks

Chronic pain - long acting oral drugs or long-term interventions

Cancer pain - may use both

Knowledge of pharmacology and *appropriate use* of medication recognising there are differences with acute and chronic pain:

Simple analgesics such as NSAIDS, Coxibs, opioids, and local anaesthetics (lignocaine, ropivacaine, bupivacaine, levobupivacaine)

Adjuvant medication such as tricyclic antidepressants/anti-epileptic Drugs, and other co-analgesics (eg. ketamine and clonidine)

Interventions

Acute pain – nerve blocks, epidural and other temporary local anaesthetic catheters, inhalational analgesia

Chronic pain – diagnostic and therapeutic blocks and prolonged implanted catheters, stimulators

Cancer pain – both

Management of the more “difficult” patients including the opioid-tolerant patient, the patient with substance abuse issues (including opioids) and pain, patients with other co-morbidities which may impact on appropriate pain therapies (e.g. renal/ hepatic impairment, sleep apnoea)

Awareness of possible drug interactions

Serotonin syndrome

In addition there are simple guidelines governing the use of opioids in acute and in chronic pain

Appendix 5

Guidelines for Opioid Use in Acute Pain

Not all opioids are the same. Be aware of differences in opioid pharmacology. Recognise variations in opioid pharmacology using different routes.

Initial opioid dose should be based on patient age and not weight in opioid naïve patients.

There is a need to monitor sedation rather than respiratory rate as an indicator of respiratory depression.

Forget equi-analgesic dose tables (for example with repeated dosing conversion oral morphine: methadone can vary 2:1 to 20:1).

Controlled release opioids are not used for acute pain, at least not in the initial stages.

(Hutchison RW. Challenges in acute post-operative pain management. Am J Health Syst Pharm. 2007 Mar 15;64(6 Suppl 4):S2-5).

Appendix 6

Guidelines for Opioid Use in Chronic Pain

Select the patient appropriately.

Slow release preparations only.

Usually prescribe no breakthrough medication. Patients requiring breakthrough need re-evaluation of slow release dosage and dosage interval or re-education in managing their pain.

Educate the patient about their responsibilities and your expectations.

(Ballantyne JC. Opioid analgesia: perspectives on right use and utility. Pain Physician. 2007;10:479-91).

Have a full discussion of long-term effects of pain (neuroendocrine / hyperalgesia).

Appendix 7

Suggested Absolute minimum requirements for medical graduate (final year)

Explain difference between acute and chronic pain and its management
Explain difference between neuropathic and nociceptive pain and drugs used to treat
Write a prescription for postoperative pain day one after surgery
Write a prescription for severe cancer pain
Explain how to refer a patient to a local pain clinic

Appendix 8

Suggested 10 point checklist for medical schools assessing pain in undergraduate curriculum

Do you have the following?

A Pain Medicine Fellow on curriculum committee?

Training in Pain Medicine throughout the syllabus (especially in palliative care and acute pain medicine)?

Attendance of lectures/tutorials devoted to the neurobiology of the pain system, and about analgesic medications?

The opportunity to attend acute pain rounds, pain clinic, and palliative care rounds?

Resources/ guidelines or web-based information on pain medicine

Assessment of pain related topics?

Appendix 5 - Academic brief National Prescribing Service APOP project

Optimal postoperative pain management begins in the preoperative period

Pain is subjective and each individual patient's experience of pain is different.

Reasons for these differences include:

- age
- co-morbidities including chronic pain
- concurrent medication and other substance intake
- mechanisms of pain – nociceptive, neuropathic
- modifying factors e.g. mood, cognition, coping strategies
- genetics.

Conduct preoperative patient evaluation:

- Ask the patient and/or their carers to help establish pain history (consider the above).
- Document in the patient's medical record, otherwise state that there are no relevant factors.
- Discuss pain management strategies and expectations in the preoperative period.

Measure pain regularly using a validated pain assessment tool

Regular and routine assessment of pain will result in improved pain management.¹

- The patient's own assessment of pain is the most reliable and should be used when possible.¹
- Use a pain measurement tool appropriate to patient's mental status, age and language.
- Measure pain scores both at rest and on movement/function to assess the impact

on functional activity.1–3

- Re-assess pain regularly and before/after administering analgesia or other pain management strategies.
- Document pain assessment measurements as part of routine observations.

Validated pain assessment tools

Patient measures

- Visual analogue scale (VAS; figure 1).
- Numerical rating scale (NRS; figure 2).
- Verbal descriptor scale e.g. none/mild/moderate/severe.
- Wong–Baker faces scale (figure 3).

Observer measures

- Behavioural pain scale.3

When prescribing analgesia

- Use a variety of approaches (**multimodal** analgesia) to improve analgesia and decrease doses of individual agents.4
- Paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) are valuable components of multimodal analgesia.1
- When using analgesics on a regular basis have additional ‘prn’ medication available for breakthrough pain.
- Use individualised doses of analgesic(s) administered at appropriate dose intervals and titrate to patient response.4

Routes of administration:

- Use intermittent intravenous (IV) opioids to gain initial control of severe pain, as IV administration provides rapid and reliable drug absorption.1
(Note: prescription of nurse-administered IV opioids is not recommended for ongoing analgesia on general wards.)
- Consider subcutaneous route for ongoing parenteral opioids, avoid intramuscular route (painful and less predictable absorption).1
- Once the oral route has been established, use when possible.1

Paracetamol

Useful adjunctive analgesic agent

Consider regular order rather than prn

When combined with opioids, increases pain relief¹

Regular (1 g every 4–6 hours) use can reduce opioid requirements by 20–30%¹

Provide clear directions when prescribing >1 paracetamol-containing preparation

Maximum 4 g daily dose usually recommended in healthy adults; reduce dose in malnourished, underweight patients

Avoid in severe liver dysfunction

Only prescribe IV (avoid rectal) if oral is inappropriate¹

NSAIDs

(e.g. conventional: ibuprofen, COX-2 selective: celecoxib)

Adjunctive analgesics for use with opioids and/or paracetamol¹

Inadequate for severe pain when given alone, but can reduce opioid requirements¹

Limit prescription to two to three days then review⁴

Adverse effects of NSAIDs are significant; may limit use¹

Modify dose or avoid in congestive heart failure, those at risk of renal effects

(renal disease, hypovolaemia, hypotension, concurrent use of other nephrotoxic agents), the elderly

Lower risk of GI bleeding or ulcers with COX-2 selective NSAIDs¹

Tramadol

Weak opioid with serotonergic and noradrenergic effects, as effective as morphine for some types of moderate postoperative pain, less so for severe acute pain⁵

Less risk of respiratory depression and constipation

Avoid in patients with history of seizures

Use with caution in severe renal impairment and the elderly

Be aware of rare, but potentially serious, drug interactions with SSRIs, TCAs, pethidine, warfarin, St John's Wort

Opioids

(e.g. morphine, oxycodone, fentanyl, hydromorphone, pethidine, dextropropoxyphene)

Prescribe opioid dose based on age, use lower initial dose in the elderly and titrate upwards⁵

Be aware of potential for prescribing and administration errors with immediate and sustained-release preparations

Be aware of factors that may increase risk of opioid overdose (e.g. concurrent sedatives, opioid naïve, sepsis)

Prescribing multiple opioids via multiple routes increases risk of opioid overdose and is generally not recommended

Do not use morphine or pethidine in severe renal impairment⁵

Avoid pethidine (accumulation of toxic metabolite norpethidine, drug interactions) and dextropropoxyphene (unsafe in overdose, ceiling effect)

Monitoring – respiratory depression and sedation (patients on opioids ± sedatives)

- Respiratory rate alone as an indicator of respiratory depression is of limited value and hypoxaemic episodes may occur in the absence of a reduced respiratory rate.
- Sedation scores are a more reliable indicator – respiratory depression is almost always preceded by sedation. The sedation score measures the patient's level of wakefulness and their ability to respond appropriately to verbal command. A four-point scale (box 1) is recommended.

Monitoring – nausea and vomiting

- Effective antiemetics in the postoperative period include 5HT₃ antagonists, droperidol and dexamethasone.
- Consider co-prescribing more than one antiemetic, each with a different mechanism of action, with instructions to add a drug from a different class if the first agent is ineffective

Monitoring for other adverse events

Regular review will reduce the risk of serious side effects developing and will allow for adjustment of doses, dosage interval and alteration of analgesics as necessary.

Side effects for the following include:

- **Opioids** – constipation (consider prescribing of prophylactic laxatives), urinary retention, itch, confusion and postural hypotension.
- **NSAIDs** – GI (peptic ulceration), renal (monitor renal function e.g. in renally impaired patients, and those being treated with ACEIs, diuretics and aminoglycoside antibiotics), bronchospasm, platelet inhibition (increased blood loss).
Risk and severity of side effects is generally increased in the elderly.

There is evidence of gaps in discharge planning leading to significant harm. A pain management plan, as a component of discharge planning, should be clearly communicated to the patient and/or their carer, general practitioner and other community based health professionals. A pain management plan is essential for patients at increased risk of pain after discharge (see below). This is likely to improve the patient's post-discharge pain experience, utilisation of outpatient services and prevent surgical complications.

Factors associated with increased risk of pain and/or complexity of analgesic requirements post-discharge:

- Patient characteristics⁵ – age, debilitated, cognitive impairment, severe liver disease, renal impairment, peptic ulcer disease, chronic pain or low pain threshold, multiple admissions for pain, obstetric patients.
 - Surgery types¹ – thoracic, abdominal surgery, surgery involving major disruption of muscle, bone or nervous tissue, bone grafts.
 - Concurrent medicines⁵ – opioid antagonists, chronic opioids, SSRIs, monoamine oxidase inhibitors, central nervous system depressants, warfarin, St John's wort, ACEIs, diuretics.
- *Consult Acute Pain Service or Pain Specialist where necessary (if available).

Management action:

- Review analgesia requirements and consider relevant risk factors 24 hours before discharge.
- If prescribing a strong opioid, consider limiting quantity prescribed.
- Prescribe drugs for symptomatic relief of side effects where necessary (e.g. antiemetics and laxatives).

Pain management plan⁸ at discharge includes:

- A list of all analgesics, with dosage and administration times.
- Instructions on anticipated/intended duration of therapy and reducing/ceasing therapy where appropriate.
- Important consumer-specific medicines information (e.g. adverse reactions including allergies, drug interactions, ceased medicines).
- For paracetamol-containing analgesics, give (written) information about safe use, including maximum daily dose of paracetamol.
- Instructions for monitoring and managing side effects
- Methods to improve function while recovering including non-pharmacological methods for relieving pain.
- Contact person for pain problems (uncontrolled or persistent pain) and other postoperative concerns (e.g. bleeding and infections).

Communicate ongoing pain management plan to both patients

and primary healthcare professionals at discharge

The information contained in this material is derived from a critical analysis of a wide range of authoritative evidence. Any treatment decisions based on this information should be made in the context of the individual clinical circumstances of each patient. Reviewed by: Dr C Roger Goucke, Dr Jane Trinca, Dr Pamela E Macintyre, Professor Stephan A Schug, Faculty of Pain Medicine, Australian and New Zealand College of Anaesthetists.

Appendix 6 - Pain Orientated Physical Examination (POPE): Faculty of Pain Medicine, 2007

Go to the following website to download and watch a video file of the Pain Orientated Physical Examination (POPE):

<http://www.anzca.edu.au/fpm/resources/books-and-publications/pope>

Appendix 7 – Five Rules for Opioid Use

FIVE RULES FOR OPIOID USE IN ACUTE PAIN.

1. Not all opioids are the same. Be aware of differences in opioid pharmacology. Recognise variations in opioid pharmacology using different routes.
2. Initial opioid dose should be based on patient **age** and not weight in opioid naïve patients
3. Need to monitor **sedation** rather than respiratory rate as an indicator of respiratory depression
4. Forget equianalgesic dose tables – with repeated dosing conversion oral morphine :methadone can vary **2:1 to 20:1**
5. When to use controlled release opioids (not for acute pain, at least in the initial stages)

5 RULES FOR OPIOID USE IN CHRONIC non-cancer PAIN.

1. Select the appropriate patient.
 2. Slow release preparations only.
 3. No breakthrough. Patients requiring breakthrough need re-education in managing their pain.
 4. Educate the patient about their responsibilities and your expectations.
 5. Full discussion of long-term effects (neuroendocrine / hyperalgesia).
-

Appendix 8: - 5 STEPS to Effective SIMPLE ANALGESIA for ACUTE PAIN (Author:Jane Trinca 2006)

NOTE: This guide is one approach to management of acute pain based on evidence and clinical experience. The guide describes very basic principles that provide a basis for expansion as required. For more sophisticated techniques contact Acute Pain Service (APS).

(1) Evidence:

- Be aware of the evidence-based resource available to guide management of Acute pain on the NH&MRC website: www.nhmrc.gov.au/publications

(2) Assessment: The 6 “M”s

- Assess Mechanism of pain because management of each mechanism may require a different approach. Multiple mechanisms may be present

Myopathic	Inflammatory	Neuropathic
-responds better to massage, heat, stretch, trigger-point therapy, activation	-Generally responsive to one or combination of medications: NSAIDS / opioids/ tramadol, heat/cold	- often more responsive to TCAs (low dose) eg amitriptyline or anti-convulsants eg pre-gabalin & less responsive to opioid

- Assess presence of **Modifying or Maintaining factors** (eg mood, unhelpful thinking, incorrect information, unhelpful behaviours and Medications)
- **Measure** level of pain at rest and with function
- **Monitor** response to treatment by assessing pain level, function and mood and any side effects that are relevant to each type of analgesic.
- **Medical conditions of relevance eg renal fn, respiratory fn, CNS depression, sepsis, gastric conditions, hepatic, cardiac, opioid dependence, age, frail**

(3) Record:

- **Pain level at rest and with function**
- **Ongoing Response to treatment (pain and function) eg ability to cough**
- **Treatment plan including non-drug strategies**
- **Medications on admission and current analgesic therapies (on drug chart)**
- **Record any side effects eg drowsiness, Nausea/ vomiting**

(4) Medications:

- Determine **route** of administration required. Oral/ IV/ SC
- Parenteral analgesia will only be necessary if:
 - poor gut absorption,
 - fasting or
 - rapid titration is necessary due to changing pathology. In this situation **IV route** is used & **should only be used on a temporary basis** for pure opioids under direct medical supervision
 - **Subcutaneous route** is the preferred option for ongoing parenteral opioid analgesia viz MORPHINE
- Generally all medications (simple analgesia) should be given by the one route.
- Generally only one drug from each category of analgesic family should be used. (When using opiates a slow release + breakthrough formulation is often appropriate.)

Suggested Step Ladders of Analgesics Austin Health

(THINK COMBINATIONS for inpatient & discharge prescription)

I. Nociceptive Pain

Drug	Common Contra-indications or Reasons for dose modification
1. Paracetamol Oral, Rectal or IV	Severe liver dysfunction
2. +/- NSAID Oral: diclofenac, 25mg tds with food Parenteral: Ketorolac 10mg tds IV	Renal dysfunction, shock, dehydration, PUD, Bleeding, CCF, HT, oedema, type of surgery
3. +/- Tramadol (initially use without pure opioid as has significant N/V side effect) Dose: 50-100mg 6hrly oral or IV. (If IV should be given over 20mins to minimise N/V)	Epilepsy, SSRIs or high dose TCAs, Renal dysfunction
or Opioid (initially use without tramadol) Oral: Oxycodone (eg oxynorm 5-10mg 2 hrly prn, oxycontin SR 10mg bd), oral morphine liquid or IV/ SC morphine or IV fentanyl (AVOID MORPHINE in RENAL IMPAIRMENT **see below	Age, renal impairment, liver dysfunction, CNS depression, respiratory failure.
If no response consider neuropathic or myofascial pain	

II. Neuropathic

TCA eg amitriptyline 10mg nocte	Significant Cardiac disease, other Antidepressants, urinary retention
Eg Pregabalin 75-150mg bd or Gabapentin	Pregabalin needs APS approval
Other agents: eg Sodium Valproate, Tegretol,	Numerous side effects: needs careful monitoring

III. Myofascial

Responsive to non-drug techniques: trigger point treatment, heat, massage, stretch, posture and movement correction techniques

****Opioid dosage is more related to age than weight. In opioid naïve adults there is at least a 10-fold difference in individual sensitivity at same weight and age.**

Rough guide to Parenteral (subcutaneous) Morphine 2-4hrly prn

Age	SC opioid dose
18-55	10
56-70	7.5
70-80	5
>80	2.5

Note NALOXONE dose for respiratory depression or profound sedation =0.1mg (Monitor sedation and repeat as required)

(5) Help:

There are various options to deal with problems not addressed by this recommendation. The Acute Pain Service offers more sophisticated options and advice.

Appendix 9: - 10 POINTS THAT MEDICAL STUDENTS SHOULD KNOW
(Author: E Shipton)

Pain pathways and “plasticity” of Central Nervous System in pain

Transition of acute to chronic pain, risk factors, and possible prevention.

Pain is always a BIOPSYCHOSOCIAL experience

Treat pain using multi-modal therapies (physical and psychological)

Differences between acute, chronic and cancer pain

Why does this matter?

Chronic pain as a disease in its own right

Chemical imbalance in pain neurotransmitters

Assessment of pain

Pain history

- response to treatment
- ability to diagnose nociceptive and neuropathic pain
- history / descriptors / response to treatment.

Difficulties in assessment at extremes of age and in cognitively impaired patients

Appropriate drugs / treatments for the different types of pain

Acute pain use short duration - quick acting drugs, or temporary nerve blocks

Chronic pain - long acting oral drugs or long-term interventions

Cancer pain - may use both

Knowledge of pharmacology and *appropriate use* of medication recognising there are differences with acute and chronic pain:

Simple analgesics such as NSAIDS, Coxibs, opioids, and local anaesthetics (lignocaine, ropivacaine, bupivacaine, levobupivacaine)

Adjuvant medication such as tricyclic antidepressants/anti-epileptic Drugs, and other co-analgesics (eg. ketamine and clonidine)

Interventions

Acute pain – nerve blocks, epidural and other temporary local anaesthetic catheters, inhalational analgesia

Chronic pain – diagnostic and therapeutic blocks and prolonged implanted catheters, stimulators

Cancer pain – both

Management of the more “difficult” patients including the opioid-tolerant patient, the patient with substance abuse issues (including opioids) and pain, patients with other co-morbidities which may impact on appropriate pain therapies (e.g. renal/ hepatic impairment, sleep apnoea)

Awareness of possible drug interactions

Serotonin syndrome

Appendix 10 - PowerPoint example for new interns - part 1 and 2

To view *Intern pain education 2008 (1) for Curriculum PGYI&2* visit the following website:

<http://www.anzca.edu.au/fpm/resources/educational-documents/intern%20pain%20education%202008%20-1-%20for%20Curriculum%20PGYI-2.ppt/view>

To view *Pain in acute setting and beyond for interns CRPS 2008* visit the following website:

<http://www.anzca.edu.au/fpm/resources/educational-documents/Pain%20in%20acute%20setting%20and%20beyond%20for%20interns%20CRPS%20008.ppt/view>

Appendix 11 - Notes on basic pain neurobiology and terminology for junior doctors (Author J Trinca)

Introduction of pain concepts

Pain is a common presenting medical complaint and a symptom that most students themselves will have experienced. It is useful to reflect about your observations of the pain experience of yourself and others. The spectrum of pain presentation is very intriguing and not as straight forward as you may expect. For that reason "Pain Medicine" is now a medical specialty. If you develop some understanding about the complexities of the pain system early in your career you will be able to appreciate the subtleties of pain expression and be much better equipped to understand and manage this common problem

(1) Basic general overview of the concepts of the neurophysiology

As neurobiology of pain is complex and an evolving science, it can be an overwhelming subject, it is important that the explanations are very basic at first and linked to clinical examples.. The main emphasis needs to be directed to the principle that the "pain system" is not a simple hard-wired network but is always changing and can be modulated by numerous other body systems. This system has multiple and parallel interactive inhibitory and excitatory neural pathways affecting the experience, and that there are interactions with the immune system, and other hormonal and body systems. The fact that changes in nerve cells peripherally and centrally, as a consequence of ongoing nociceptive stimulus can outlast the stimulus and become active independent of a stimulus is an important concept.

Basics of neurobiology of pain:

These days we understand a little bit about the mystery of persistent pain due to advances in basic science.

The gate theory of pain developed by Melzack (a psychologist) and Wall (a neurophysiologist/ anatomist) in the 1960's is thought to be the turning point that changed the way clinicians and scientists thought about the pain system. This theory changed the concept of pain from one of a rigid system of nerves that relayed nociception to the brain to one of an interactive system that was a balance of excitatory and inhibitory inputs from several different systems with modification of the primary stimulus in the spinal cord. This theory explained clinical phenomena such as why cutting of nerves did not result in permanent cure of pain and why men who were severely injured in battle, would often not complain of pain.

Today we have scientific evidence from studies on molecular biology and receptors that the pain system is very "plastic" and dynamic. In addition recent evidence from functional Magnetic Resonance Imaging (fMRI) and Positron Emission Tomography (PET) demonstrate that the pain system is much more interactive with other neural networks than was previously thought.

The following facts may be helpful in understanding persistent pain:

Peripheral sensitisation:

When tissues are injured mediators are released which result in nociceptors becoming sensitised ie the threshold at which they fire is lowered (peripheral sensitisation). As well as this, chemicals are transported from peripheral nerves to central nerves e.g. Nerve growth Factor, which can alter the function of the dorsal root ganglion and effect immune function. Primary hyperalgesia will result.

Nerve injury:

When nerves are cut, ectopic foci of activity develop both at the site of the lesion and in the dorsal root ganglion. In addition there is an increase in alpha-adrenergic receptors found on c fibres.

Central sensitisation:

When the central nervous system is bombarded by repeated noxious stimuli. A state of central sensitisation can result in which several receptors that maintains equilibrium in the nociceptor, in particular NMDA receptor, is activated in tandem with other receptors. This causes the entire system to enter a vicious cycle of upregulation initiated by calcium entry into the central neuron. This upregulation is called central sensitisation.

A full discussion of the neurobiology of pain is beyond the scope of this chapter that focuses on post-operative pain. However the teaching of pain management currently lies within the specialty of anaesthesia so it is important that you gain a wider understanding of the basis of pain. It is suggested that the student takes time to gain an understanding of the following topics below:

Suggested topics for review:

Exploration of the following topics will expand your understanding of pain. The list is not complete but gives some important examples:-

- Attention and pain,
- Placebo and pain
- Recurrent pain after neurosurgical ablative procedures

- Phantom pain (neuromatrix)
- Referred pain (Lissau tract and WDRs)
- Types of pain: nociceptive, neuropathic
- Complex regional pain syndrome
- Post stroke pain (inhibitory role of thalamus)
- Central Sensitisation (role of the NMDA receptor leading to changes in pain transmission)
- Peripheral sensitisation (role of inflammatory mediators)

1. Definition of Pain

The International Association for the Study of Pain (IASP) definition of pain:
Pain is as an unpleasant sensory and emotional experience associated with potential tissue damage or described in terms of such damage.

Another definition which is helpful is: "Pain is what the patient says hurts".

These two definitions emphasise the individual nature of the pain experience and the importance of the psyche in the reaction to physical pain. Sometimes there may not be any obvious physical cause for the pain that can be detected on routine tests but we know that pain does not always follow tissue damage and may arise spontaneously from changes in the structure and internal chemistry of peripheral and central neurons or changes in balance between the excitatory and inhibitory pathways involved in pain perception. The patient always needs to be taken seriously. The reaction of the health professional to the patient's pain can influence how the patient reacts to the pain in the future.

In general terms pain is often empirically divided into acute and chronic pain, cancer pain and non-cancer pain. Pain may also be divided into types of pain reflecting the pathogenesis ie neuropathic, nociceptive and myofascial. "Pain of psychological origin" in its general use has become a very unpopular term as this condition implies that the pain is not real. Most pain has a physical basis that is modified by psychological mechanisms and behavioural reactions to the pain. Other delusional and hallucinatory pains described by this term are very rare indeed. Almost all pain generally presents with a combination of physical features and psychosocial features, the latter of which may serve as significant modifying factors.

Pain is often classified as acute, chronic or cancer related. Whilst these divisions are helpful in one way, they should be used with care, as pain is often multidimensional and there is wide crossover. For example, a patient with cancer pain may have nociceptive, neuropathic and myofascial pain. The pains may have acute and chronic aspects, some of which may be non-malignant. All the components of this pain need to be diagnosed and addressed separately to achieve a good overall treatment as different types of pain respond differently to therapies.

2. Taxonomy

Pain is difficult to classify however there are some common characteristics of different types of pain and many pains have been classified into syndromes to assist clinicians in developing treatment approaches that are based on the best evidence available at this stage. Classifying pain also helps in collecting data about pain and treatment responses.

The International Association for the Study of Pain (IASP)(* web reference) is an international body made up of health-care professionals and basic scientists who work together to better understand pain and provide an excellent educational resource.

The IASP has produced a taxonomy that was last updated in 1994 and is an ongoing document that provides information on the definition of pain terms and provides a classification of pain. This document is very useful to the clinician.

Some definitions that may be helpful:

1. Hyperalgesia: An increased response to a stimulus that is normally painful.
3. Hyperaesthesia; Increased sensitivity to stimulation, excluding the special senses. (Hyperaesthesia includes allodynia and hyperalgesia)
4. Allodynia: Pain due to a stimulus that does not normally cause pain ie allodynia involves a change in the quality of the sensation
5. Dysaesthesia: An unpleasant, abnormal sensation, whether spontaneous or evoked.
6. Hypoalgesia: Decreased sensitivity to stimulation, excluding the special sensors
7. Hyperpathia: A painful syndrome characterised by an abnormal painful reaction to a stimulus, especially repetitive, as well as increased threshold. (pain may be explosive with aftersensations and poor localisation or identification of stimulus)
8. Nociceptor: a receptor preferentially sensitive to noxious stimulus or to a stimulus that would become noxious if prolonged. Nociceptive pain is generally regarded as pain due to primary tissue damage as a consequence of release of inflammatory mediators
9. Neuropathic pain: pain initiated or caused by a primary lesion or dysfunction in the nervous system.
10. Neuralgia: pain in the distribution of a nerve or nerves
11. Central pain: type of neuropathic pain that is confined to a lesion or dysfunction of central nervous system and usually involves abnormal sensibility to temperature and to noxious stimulation
12. De-afferentation pain: Descriptive term used to describe a pain resulting from loss of input to CNS due to nerve avulsion. This may result in loss of inhibitory input from that part of the body supplied by the traumatised nerves causing severe pain. This is a type of neuropathic pain.

13. Myofascial pain: A pain syndrome that may occur in any voluntary muscle with local and referred tenderness and a tense, shortened muscle.
14. Visceral pain: Nociceptors from viscera have relatively larger receptive fields than those in skin. There is often a large amount of convergence with nerves from somatic structures and the autonomic nervous system at the level of the dorsal horn onto the central transmission neurons. It is debatable whether true visceral pain exists that is distinct from deep somatic pain. Characteristic of visceral pain:-
 - Poorly localised
 - Produces non-specific regional or whole-body responses
 - Produces strong autonomic responses
 - Leads to sensitisation of somatic tissues (secondary muscle pain)
 - Produces strong affective responses
15. Referred pain: This term refers to any pain that is experienced in a different site to that of the pathological process generating the pain and occurs due to central convergence of primary afferent neurons onto the same central transmission neuron. It must also be remembered that after primary afferents enter Lissau's tract where they can spread three segments up and down adding to the convergence. Referred pain can come from both somatic structures and viscera. There may be referral even between visceral structures
16. Somatic pain: Refers to pain from the body wall structures. Somatic pain can be superficial or deep. Superficial pain is well localised but the differences between deep somatic and visceral pain are less clear. See above
17. Radicular pain: This term refers to pain that is due to axons being stimulated along their course rather than peripheral terminals and pain is perceived as arising from affected afferents. Other neural elements apart from nociceptors are activated so the sensation is more than pure nociception. Radicular pain differs from referred somatic pain in the following ways: Somatic referred is deep aching with margins that are hard to define and there is no cutaneous distribution. Radicular pain is lancinating and may be perceived along narrow bands reminiscent of but not the same as dermatomes. It is perceived in the skin as well as deeply depending on activation of cutaneous branches of nerve.

Note the term "Sciatica" is now regarded as a misnomer for the common symptom of pain that travels down a leg. Pain traveling into the leg may be either "somatic referred" (common) or radicular (less common).
18. Complex regional pain syndrome (CRPS type I and II): this term describes the group of syndromes that were previously referred to as Reflex "Sympathetic Dystrophy" and "Causalgia". The name change occurred to separate the clinical syndrome from being attributed to an abnormality of the sympathetic nervous system that may or may not be implicated. CRPS type I refers to a syndrome that generally develops in a limb after trauma which may be quite minor. It is associated with oedema, changes in skin blood flow, abnormal sudomotor activity in the region of pain, and/or allodynia and hyperalgesia and reduced motor control. Pain may be improved by blockade of the sympathetic nervous system (sympathetic maintained pain) or be unaffected by such measures (sympathetic

independent pain). Successful treatment involves early diagnosis and restoration of function using analgesia and other psychophysical techniques

Appendix 12- Example of PGY1 Pain Curriculum 2008

Session 1

January: Intern orientation week: 40-minute station (small group 8) conducted by Director of Acute Pain Service (APS) and nurse consultant to APS
Pain knowledge test given out and collected after 10 minutes (see appendix 1)
Analgesic guideline distributed (see appendix 8)
Contact details and resources for acute and chronic pain service distributed
ANZCA Acute Pain website link supplied
Standards for pain measurement for hospital supplied/taught
Interns asked to fill in a hospital drug chart for 2 patients - a young patient post appendectomy; a 96 year old post surgery for #neck of femur
Feedback given back on prescription writing
Answer sheet given for knowledge test with brief explanation

Session 2

March: lunchtime meeting (Pain Medicine Specialist)
PowerPoint presentation (interactive) "Acute pain management in the hospital setting" (see appendix 12)

Issues addressed:

- (1) Feedback from results of pain knowledge test regarding level of their basic understanding of pain
- (2) Academic messages of the APOP project relevant to the specific hospital given with data from the hospital about prescribing practice that became a discussion point
- (3) Case examples of good and bad prescribing from recent weeks
- (4) Case examples of previous naloxone use cases to illustrate co-morbidities and opioids

Session 3

July: Review of basic concepts regarding acute pain
Chronic pain and more complex acute pain
Case-based learning with quiz

Session 4

September: Palliative care

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