Differential Diagnosis: Nociceptive and Neuropathic Pain -

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disclosure

• Consultant to rekitt
What is a community?
DEFINITION COMMUNITY

- A community is a social group determined by geographic boundaries and/or common values and interests
  - Its members know and interact with one another.
  - It functions within a particular social structure and exhibits and creates norms, values and social institutions
SUBGROUPS IN THE COMMUNITY

A community may consist of different subgroups.
• These may be ethnic groups, occupational groups, religious groups etc.
• This simply means that within a community there will usually be a smaller group.
• A community may be homogeneous, i.e. the members share the same views, language, culture and approach to live, and a well-defined value system
• or heterogeneous i.e. the members do not share the same views. i.e. a collection of many individuals thrown together by change without any recognized common interests.
Communities

What is a community?
A COMMUNITY is a place where people:

- Work
- Play
- Live
KNOW THE TYPES

There are three broad types of community:

• Locality or neighbourhood – a group of people living together within a fixed geographic location.

• Social relationships – a set of social relationship mostly taking place within a fixed geographic location;

• Identity/common interest – a shared sense of identify such as a group of Drug addicts
Three types of communities are:

- **Urban**: a large community with many people and large buildings, a city
Three types of communities are:

🌐 **Urban** - a large community with many people and large buildings, a city

🌐 **Suburb** - a medium-sized community near a large city, houses are close together, you may see parks and malls
Three types of communities are:

- **Urban** - a large community with many people and large buildings, a city
- **Suburb** - a medium-sized community near a large city, houses are close together, you may see parks and malls
- **Rural** - a community where houses are far apart, there are a smaller number of people, and you may see farms and forests
TYPES OF COMMUNITY-3

• Some communities are stereotyped- e.g., the ghetto, the rural community, or the hippie community. Such labeling is dangerous, as wide differences do exist within each group
What is Pain??
The International Association for the Study of Pain defines pain as
✓ "an unpleasant sensory and emotional experience associated with
✓ actual or potential tissue damage or described in terms of such damage."

This definition recognizes pain as a subjective experience with both psychologic and sensory components.
• It also recognizes that tissue damage does not need to be present for pain to be experienced.
Ascending Pain Pathways

Involves peripheral receptors and sensory pathways and synaptic contacts in the brain stem and spinal column.
Involves peripheral receptors and sensory pathways and synaptic contacts in the brain stem and spinal column
CATEGORIES

• Pain has been categorized in a variety of different ways, and one division that has been particularly useful is nociceptive pain vs neuropathic pain (NP).
Pain and Pain Transmission

• Nociceptive pain results from activity in neural pathways caused by actual tissue damage or potentially tissue-damaging stimuli.

• Nociceptive pain
  • May be visceral or somatic
  • Designed to signal tissue damage or inflammation

Eg of nociceptive pain include
  ✤ pain after surgery,
  ✤ arthritis pain,
  ✤ mechanical low back pain, and
  ✤ pain associated with sports injuries.
Acute Pain

*Brief duration, goes away with healing, usually 6 months or less.*

- Not necessarily more severe than chronic
- May be sudden onset or slow in onset
- Examples are broken bones, strep throat, and pain after surgery, medical procedures, or injury
- Time limited
- May be associated with exacerbations of chronic conditions
Descriptions of Pain
Categories of Pain by Duration

**Chronic Cancer Pain**

*Pain is expected to have an end, with cure or with death.*

- Aggressive treatment
- Addiction not a concern
Categories of Pain by Duration

Chronic Non-Malignant Pain

*Pain has no predictable ending*

- Difficult to find specific cause
- Often can’t be cured
- Frequently undertreated
- Continues over a prolonged period of time or is associated with an injury that has not resolved in the expected amount of time
- Affects 1:5 persons
- Related to
  - Musculoskeletal disorders
  - Cancer
  - Neuropathic disorders
Categories of Pain by Type

Somatic

Source: Skin, muscle, and connective tissue
Examples: Sprains, headaches, arthritis
Description: Localized, sharp/dull, worse with movement or touch
Pain med: Most pain meds will help, if severe, need a stronger medication
Categories of Pain by Type

**Visceral**

Source: Internal organs

Examples: Tumor growth, gastritis, chest pain

Description: Not localized, refers, constant and dull, less affected with movement

Pain Med: Stronger pain medications
Categories of Pain by Type

**Bone Pain**

Source: Sensitive nerve fibers on the outer surface of bone

Examples: Cancer spread to bone, fx, and severe osteoporosis

Description: Tends to be constant, worse with movement

Pain Med: Stronger pain meds, opiates with NSAIDS as adjunct
<table>
<thead>
<tr>
<th>Category</th>
<th>Source</th>
<th>Examples</th>
<th>Description</th>
<th>Pain Meds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuropathic</td>
<td>Nerves</td>
<td>Diabetic neuropathy, phantom limb pain, cancer spread to nerve plexis</td>
<td>Burning, stabbing, pins and needles, shock-like, shooting</td>
<td>Opioates+tricyclic antidepressants or other</td>
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NP

• Neuropathic pain
  • Results from damage to the central or peripheral nervous system
• NP is chronic pain that is initiated by nervous system lesions or dysfunction and can be maintained by a number of different mechanisms.
• NP may be present without any readily demonstrable physical findings.\(^5\)
NP can arise from a variety of different conditions that affect the peripheral and/or central nervous systems

- Disorders of the brain or spinal cord, such as multiple sclerosis, stroke, and spondylotic or posttraumatic myelopathy, can lead to NP.
- Peripheral nervous system disorders that may be involved in the development of NP include diseases of the spinal nerve roots, dorsal root ganglia, and peripheral nerves.
- Damage to peripheral nerves that occurs in association with amputation, radiculopathy, carpal tunnel syndrome, and other entrapment neuropathies can also give rise to NP.⁴
NP can arise from different conditions that affect the peripheral and/or central nervous systems

- Abnormal sympathetic nerve activation, catecholamine release, and activation of free nerve endings or neuromas can give rise to sympathetically mediated pain.\(^4\)

- NP can also be associated with infectious disease, most notably human immunodeficiency virus (HIV). Cytomegalovirus, which is often present in patients with advanced HIV disease, may also cause debilitating low back pain, radicular pain, and myelopathy.

- NP is a common and important source of morbidity in patients with cancer. Such pain in cancer patients can arise from tumor-related compression of neural tissue or nervous system injury secondary to radiation or chemotherapy.\(^4,6\)
a number of different pathologic processes have been suggested as factors in their development and maintenance.

These include

• insertion of ion channels into nerve fiber membranes,
• alterations in receptors associated with increased levels of inflammatory cytokines,
• sprouting of primary afferent axon terminals in the dorsal horn of the spinal cord,
• cross-talk between sympathetic and somatosensory afferents,
• reduced numbers of gamma-aminobutyric acid-containing neurons in the spinal cord, and
• hyperexcitability associated with increased glutamatergic neurotransmission secondary to upregulation of metabotropic glutamate receptors in the dorsal horn.3, -
Results of Untreated Pain

• Depression, anxiety, decreased socialization
• Sleep disturbance
• Impaired ambulation
• Increased healthcare use and costs
Chronic Pain

Negative consequences

• Decreased socialization
• Withdrawal from daily life
• Fatigue
• Sleep disturbance
• Irritability
• Physical deconditioning
• Stress
• Depression
Pain Assessment of the Patient

• Primary types of behaviors consistent with the presence of pain
  • Facial expression
    • Grimacing
    • Frowning
    • Frightened face
  • Verbalizations/vocalizations
    • Sighing
    • Moaning
    • Chanting (repeating)
Pain Assessment of the Patient

• Primary types of behaviors consistent with the presence of pain
  • Body movements
    • Tense posture
    • Guarding
    • Gait changes
    • Mobility changes
  • Interpersonal reactions
    • Aggressiveness
    • Combativeness
    • Withdrawal
Pain Assessment of the Patient

• Primary types of behaviors consistent with the presence of pain
  • Changes in activity patterns or routines
    • Appetite changes
    • Changes in sleep periods
    • Increased wandering
  • Mental status changes
    • Crying
    • Increased confusion
    • Irritability
Pain Management Goals

• Relieve acute and chronic pain
• Employ appropriate pharmacological and nonpharmacological techniques
• Minimize side effects
Nonpharmacological Pain Management Techniques

• Relaxation techniques
• Heating pads
• Cold compresses
• **Biofeedback**: is a process that enables an individual to learn how to change physiological activity for the purposes of improving health and performance
• Music therapeutic touch
Pharmacological Management

• Non-opioid Analgesics
  • Used for mild to moderate nociceptive pain
  • Anti-inflammatory drugs (NSAIDs)
    • Carry risk of gastrointestinal bleeding and impaired renal function
      • Avoid persistent use in older adult population
    • Acetaminophen (Tylenol)
      • Use safe with older adults having normal kidney and liver function and no history of alcohol abuse
      • Dosages not to exceed 4,000 mg/day
Pharmacological Management

• Non-opioid Analgesics
  • Anti-inflammatory drugs (NSAIDs)
    • Cyclooxygenase-2 (COX-2)
      • Tramadol
        • Used for moderate pain
        • May cause dizziness, nausea, and headache
Pharmacological Management

• Opioid analgesics
  • Used for moderate to severe pain management
  • May be used for long periods of time without risk of organ damage
  • Available in a variety of routes
  • Titrate slowly
  • Mild sedation and cognitive impairment are anticipated in initial therapy
Pharmacological Management

- Opioid analgesics
  - Potential medications
    - Morphine
    - Meperidine
    - Methadone
Ibuprofen is a well-established analgesic and antipyretic with proven clinical efficacy in treating a range of common painful conditions, including:

- Headache,
- migraine,
- backache,
- dental pain,
- period pain,
- musculoskeletal pain,
- sore throat,
- cold and flu symptoms,
- and fever.

Ibuprofen targets all types of everyday pain, delivering fast and effective relief.

Ibuprofen provides superior pain and fever relief to paracetamol at over-the-counter (OTC) doses.

In treating acute pain conditions, ibuprofen is as effective as other non-steroidal anti-inflammatory drugs (NSAIDs; e.g. diclofenac and naproxen) and more effective than aspirin.

Ibuprofen is as well tolerated as paracetamol, with superior gastro-intestinal (GI) safety vs. other NSAIDs.

This slide deck summarises the current evidence supporting the efficacy of ibuprofen and its first-line position in the OTC treatment of common pain conditions.
Ibuprofen – acute pain indications

• Ibuprofen is available OTC to treat acute pain conditions and may also be prescribed for chronic pain conditions
  ➢ OTC pain indications are short-lasting, non-serious conditions that can be self-diagnosed. These include:¹
    • Rheumatic or muscular pain, backache, neuralgia, migraine, headache, dental pain, period pain, fever, symptoms of cold and flu
  ➢ Chronic indications (prescription-only) differ from the OTC indications. These include:²
    • Rheumatoid arthritis, juvenile idiopathic arthritis, other musculoskeletal disorders, postoperative analgesia, mild-to-moderate pain including period pain, migraine, dental pain, fever with discomfort and pain in children, post-immunization pyrexia and post-operative pain

• Surgical dental pain models can be used as a suitable surrogate to support ibuprofen use in many OTC indications³
  ➢ Dental studies (e.g. third molar extraction) show OTC ibuprofen products are highly efficacious in providing pain relief³

• Ibuprofen provides a good efficacy and safety profile for treating acute pain indications⁴–⁷

How do NSAIDs work?

1. Inhibition of COX-2
   The inducible COX-2 enzyme produces prostaglandins at the site of pain or trauma. Prostaglandins increase inflammation and increases our sensitivity to pain.\(^1,2\)

2. Effects on prostaglandin production
   By inhibiting COX-2, NSAIDs reduce the production of key prostaglandins, therefore reducing pain and inflammation at sites of injury or damage in the body.\(^2\)

3. Reduction in inflammation, pain and pyrexia
   Through effects on COX and prostaglandins, NSAIDs effectively reduce inflammation, reduce the feeling of pain and lower fever.\(^1,2\)

NSAIDs target the source of pain.
How does ibuprofen work?

Ibuprofen efficacy in relieving pain

- Ibuprofen: proven effective in relieving acute pain in adults and superior to paracetamol at OTC doses (up to 120 mg/day)

- Analgesic efficacy confirmed in evidence-based reviews and meta analyses:
  - Single-dose ibuprofen (200 mg or 400 mg) is highly efficacious and superior to placebo
    - Cochrane review in acute post-op pain
  - Single-dose ibuprofen (400 mg) is superior to paracetamol and aspirin in acute pain
    - Review of 119 OTC analgesic trials
  - Ibuprofen is more effective for treatment of adult pain and fever than paracetamol, and equally safe
    - Meta-analysis of 85 clinical studies

Ibuprofen is effective in relieving headache

- Headache: the most frequent reason patients self-medicate with analgesics\(^1\)
  - Tension-type headache (TTH) ranks as the most common headache disorder\(^2\)
- Clinical evidence in TTH shows ibuprofen is *more effective* than paracetamol, and *as effective as* other NSAIDs\(^4\text{-}^9\)

<table>
<thead>
<tr>
<th>Starts to relieve headache from 15 minutes(^4)</th>
<th>Superior to paracetamol(^5)</th>
<th>Similar efficacy to other NSAIDs</th>
</tr>
</thead>
</table>
| • Significant reduction in headache pain intensity vs. placebo from 15 mins (p<0.05) *[RCT in 70 TTH sufferers]*\(^4\) | • Significantly more effective headache relief vs. paracetamol (p<0.01) *Ibuprofen users achieved faster, more complete headache relief than those on paracetamol or placebo [Randomised study of 445 patients]*\(^2\) | • As effective as aspirin\(^6,^7\) *
  *But provides more fast-acting relief at OTC doses*\(^7\)
  [2 double-blind trials in >200 patients]\(^7\) |
| • Equivalent pain relief to diclofenac, naproxen and ketoprofen\(^8,^9\)
  [2 single-dose, double-blind studies in nearly 1000 TTH patients]\(^8,^9\) | **| ** |

Ibuprofen delivers superior relief of TTH compared with paracetamol

- Ibuprofen is more effective at relieving TTH than paracetamol
- Randomised, placebo-controlled trial in 445 TTH sufferers

Ibuprofen is effective in migraine

Randomised trial of 729 migraine sufferers\(^1\)

- Ibuprofen delivered effective relief of migraine headache for up to 8 hours
- Ibuprofen improved ancillary symptoms and limitations of migraine activity

Systematic review and meta-analysis\(^2\)

- Ibuprofen significantly reduced pain intensity or eliminated pain within 2 hours vs. placebo
- Ibuprofen significantly relieved photophobia and phonophobia

“A single dose of ibuprofen is effective in relieving the pain and functional disability of migraine”

Cochrane Review\(^3\)

# Ibuprofen is effective in treating dental pain

| Ibuprofen in dental pain | • Maximum pain relief and longest duration of analgesia at 400 mg\(^1\) \([\text{Single-dose RCT}]\)  
| | • Patients are 3 x more likely to obtain moderate to excellent pain relief with ibuprofen vs. placebo\(^2\) \([\text{55 study meta analysis}]\)  
| | • Less than half of patients get at least 50% pain relief with a single dose of ibuprofen\(^3\) \([\text{Cochrane review of 72 studies}]\) |
| Ibuprofen vs. paracetamol | • Clinically superior analgesia vs. paracetamol across all pain measures\(^4\) \([\text{Single-dose trial, } n=706]\)  
| | • Lower NNT compared with paracetamol – 3.2 vs. 5.0\(^5\) \([\text{Cochrane review of 85 trials}]\) |
| Ibuprofen vs. other NSAIDs | • Consistently more effective than aspirin (650 mg)\(^6\) \([5 \text{ trials, } n>1000]\)  
| | • Superior to aspirin with a lower NNT – 3.2 vs. 4.9\(^7\) \([\text{Cochrane review of 85 trials}]\) |

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Ibuprofen is effective in treating dental pain

Ibuprofen provides superior relief from dental pain compared to paracetamol

Ibuprofen is effective in period pain

- Period pain affects three quarters of women\(^1\)
  - It is caused by prostaglandin overproduction in the uterus\(^1,2\)

**Ibuprofen vs. paracetamol**
- NSAIDs effective for period pain and provide significantly better relief than paracetamol
- *[Cochrane review of 73 RCTs in dysmenorrhoea]\(^2\)*

**Ibuprofen vs. naproxen**
- All treatments effective *except paracetamol*
- Ibuprofen users:
  - 70% less likely to have daily life affected vs. 30% for naproxen
  - Most favourable risk-benefit profile of all evaluated treatments
- *[Systematic review: 56 RCTs of OTC ibuprofen, naproxen, mefanamic acid, aspirin and paracetamol in primary dysmenorrhoea]\(^3\)*

**Ibuprofen vs. diclofenac**
- Good period pain relief with ibuprofen for 6 hours after dosing — superior to placebo (p<0.05) and equivalent to diclofenac
- *[Double-blind trial in 60 women with moderate-to-severe primary dysmenorrhoea]\(^4\)*

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Ibuprofen is effective in backache

- Back pain: a common painful condition affecting 80% of population during lifetime\(^1\)
- Clinical evidence shows OTC ibuprofen (up to 1200 mg/day) relieves pain and improves movement in backache sufferers:
  - Significant reduction in back pain at rest, pain on movement and movement restriction at Day 5 and Day 10 (p<0.001)\(^2\)
    - Double-blind, parallel-group trial of 60 patients with recent onset low back pain
  - Greater mean Day 1 pain relief from non-specific acute low back pain vs. paracetamol\(^3\)
    - Randomised, single-blind study of 371 patients
  - Effective relief of moderate-to-severe acute back pain (p<0.05 vs. placebo) and equivalent efficacy to diclofenac\(^1\)
    - Double-blind, randomised trial in 372 back pain sufferers

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Ibuprofen is effective in musculoskeletal pain

- Important role for OTC analgesics in the treatment of musculoskeletal pain including sports-related strains, sprains, contusions and other mild, but painful, injuries¹

**OTC ibuprofen in musculoskeletal pain**

- Significant efficacy in acute musculoskeletal injury based on pain relief scores and patient/physician evaluation \( p \leq 0.01 \) [Double-blind, randomised trial, \( n=178 \)]
- Effective in acute soft tissue injuries: reducing time to injury recovery and relieving pain at rest, pain on movement and swelling² [Double-blind study, \( n=100 \)]

**Ibuprofen (400 mg) vs. paracetamol (1000 mg)**

- Numerically better relief of knee pain and improvement in knee stiffness at Day 10 versus paracetamol³ [Double-blind, randomised trial, \( n=892 \)]

**Ibuprofen (400 mg) vs. aspirin (600 mg)**

- Significantly lessened pain on movement vs. aspirin \( p < 0.05 \) in minor soft tissue injury; favourable to aspirin \( p < 0.1 \) in reducing tenderness and severity of swelling⁴ [Multi-centre, parallel-group study, \( n=142 \)]

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Ibuprofen is effective in cold and flu

<table>
<thead>
<tr>
<th>OTC ibuprofen in cold and flu</th>
<th>OTC ibuprofen vs. other NSAIDs in cold and flu</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Placebo-controlled trial (n=80)</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td><strong>3 day, double-blind randomised trial (n=356)</strong>&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>– Ibuprofen significantly reduced cold symptoms:</td>
<td>– Reduced flu-like symptoms in 90% of patients</td>
</tr>
<tr>
<td>*Headache (p=0.008)</td>
<td>– Superior to placebo (p&lt;0.001) and similar to diclofenac for relief of fever, aches and pains</td>
</tr>
<tr>
<td>*Earache (p=0.01)</td>
<td></td>
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<tr>
<td>*Muscle and joint pain (p=0.045)</td>
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<tr>
<td>*Lowered body temperature (p=0.02)</td>
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<tr>
<td>*Reduced number of sneezes by 40% (p=0.02)</td>
<td></td>
</tr>
<tr>
<td><strong>Cochrane review (9 RCTs, n=1000)</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
<td><strong>Double-blind, randomised study (n=2815)</strong>&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>– Significant clinical benefit with ibuprofen, relieving numerous cold symptoms</td>
<td>– Rated good to excellent for cold and flu pain by 84% of patients – significantly more than aspirin (p=0.02)</td>
</tr>
</tbody>
</table>

Ibuprofen (400 mg) is an effective analgesic in easing the pain of sore throat and difficulty in swallowing, and is superior to paracetamol\textsuperscript{1–4}.

**Double-blind trial of 29 sore throat patients\textsuperscript{1}**
- Effective sore throat pain relief; onset of analgesia at 10 min lasting for 10 hours

**Double-blind study in 133 sore throat sufferers\textsuperscript{2}**
- Superior to paracetamol (1000 mg) in relieving acute sore throat pain
- Significantly improved intensity of pain on swallowing (p<0.001), difficulty in swallowing (p<0.001) and pain relief (p=0.007) vs. paracetamol

**Double-blind trial in 120 patients\textsuperscript{3}**
- Significantly more effective than paracetamol (1000 mg) on all pain relief and pain intensity rating scales after 2 hours (p<0.01)
- Superior overall analgesia vs. paracetamol

**Double-blind study of 113 patients\textsuperscript{4}**
- Significantly superior sore throat relief vs. paracetamol (1000 mg)
- More effective than paracetamol in reducing intensity of sore throat pain and easing difficulty in swallowing

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Ibuprofen is more effective than paracetamol in relieving sore throat

- Ibuprofen provides superior relief of sore throat pain compared with paracetamol\(^1\)
- Double-blind clinical trial of 113 acute sore throat sufferers\(^1\)

Ibuprofen is effective in treating fever

- Multi-centre trial of ibuprofen 400 mg in 2,626 adults with fever\(^1\)
  - Significant reduction in body temp from 30 mins up to 6 hours (p<0.00001)
  - Rated as effective/very effective by 94% of patients and 96% of treating GPs
  - Onset of rapid and effects long-lasting

- Single-dose trial ibuprofen 400 mg vs. naproxen 500 mg in 91 febrile patients\(^2\)
  - Significantly reduced body temp from 1 hour to 6 hours versus placebo (p<0.05)
  - Greater antipyretic efficacy vs. naproxen at hours 1 and 2

Ibuprofen is effective in treating fever

Ibuprofen effectively reduces fever

Key efficacy benefits of fast-acting ibuprofen formulations

- Compared with standard ibuprofen, fast-acting salt formulations:¹
  - Enter the body as a salt which then dissociates in the blood plasma to ibuprofen acid (standard format)
  - Offer more rapid absorption and faster initial pain reduction (due to shorter $T_{\text{max}}$)²
  - Offer more effective, long-lasting pain relief

- Updated analysis of dental pain trials in more than 8,000 patients:¹
  - 200 mg fast-acting ibuprofen as effective as 400 mg standard ibuprofen – with a more rapid onset of analgesia

- Faster and significantly superior pain relief delivered by fast-acting ibuprofen formulations confirmed by other studies in dental pain³,⁴

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Key efficacy benefits of fast-acting ibuprofen formulations

Fast-acting ibuprofen formulations give better pain relief than standard ibuprofen\(^1\)

Ibuprofen has an excellent safety profile

- As safe as placebo when used acutely\(^1,2\)
  - Confirmed by Cochrane reviews of single doses in headache and post-operative pain\(^1,2\)
- Comparable GI tolerability to paracetamol\(^3\)
  - Similar rate and severity of GI adverse events at OTC doses\(^4-6\)
- Lowest GI risk of all NSAIDs\(^3\)
  - Better tolerated than aspirin, naproxen and diclofenac at OTC doses\(^7,8\)
- No increased cardiovascular risk with OTC usage\(^9\)

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Ibuprofen has an excellent safety profile

Ibuprofen has a significantly lower GI event rate than paracetamol\(^1\)

Ibuprofen recommended first-line for pain in expert guidelines

- **Ibuprofen: first-line in headache**
  - Recommend first-line for TTH in European Federation of Neurological Societies (EFNS) and European Headache Federation (EHF) expert headache guidelines\(^1,2\)
  - Recommended by the EFNS as “first choice” NSAID for TTH based on favourable GI side effect profile\(^1\)

- **Ibuprofen: first-line in migraine\(^2,3\)**
  - Recommended first-line in EHF and EFNS expert guidelines\(^2,3\)

- **Ibuprofen: first-line for period pain\(^4\)**
  - Recommended first-line for dysmenorrhoea in Canadian gynaecology guidelines to relieve pain and improve daily activity\(^4\)

- **Ibuprofen: first choice for sore throat\(^5\)**
  - Recommended first choice treatment for relief or acute sore throat symptoms by European Society for Clinical Microbiology\(^5\)

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• Summary

- Excellent clinical efficacy in headache, migraine, backache, dental pain, period pain, musculoskeletal pain, sore throat, cold & flu and fever.
- Pain-relieving power supported by the experts.

**Ibuprofen is clinically proven to relieve pain and reduce fever**

**Ibuprofen delivers superior pain and fever relief to paracetamol**

**No other NSAID is more effective in treating acute pain conditions**

- Superior efficacy to paracetamol in acute pain and fever in adults.
- Proven to be significantly better than paracetamol in headache, dental pain, back pain, musculoskeletal pain and sore throat.
- As effective as diclofenac and naproxen in headache, dental pain, period pain, back pain, musculoskeletal pain and cold & flu.
- Superior pain relief to aspirin in single-dose use.

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MONEY:

- can buy a bed, but not sleep
- can buy books, but not knowledge
- can buy food, but not an appetite
- can buy a clock, but not time
- can buy a position, but not respect
- can buy medicine, but not health
- can buy amusement, but not happiness
- can buy jewelry, but not beauty
Questions
Some bibliography