



 **BOC**  
A Member of The Linde Group

ENTONOX<sup>®</sup>

Conquering procedural pain in children

BOC: Living healthcare



## Pain and the perception of pain

“Inadequate relief of pain and distress during childhood painful medical procedures may have long-term negative effects on future pain tolerance and pain responses.”<sup>1</sup>

Despite the fact that children are known to be just as vulnerable to pain as adults, if not more so, deficiencies in child pain management persist even in developed countries.

“Advances in health care, such as new knowledge of pain prevention strategies, have not been consistently translated into decreased prevalence or intensity of pain experienced by children in hospitals.”<sup>2</sup>

The United Nations Convention on the Rights of the Child recognises the entitlement of children to special consideration in health care, but their ability to perceive, respond to and be harmed by pain is still widely underestimated<sup>3</sup>.

Painful procedures are a routine part of medical care in paediatric and emergency departments, such as venipunctures, bladder catheterizations, lumbar punctures and bone marrow aspirations.

Children who have experienced the unpleasantness of pain are understandably reluctant to undergo further distressing procedures. Even small children can accurately recall details of painful procedures, and these memories can easily become exaggerated making subsequent procedures more distressful<sup>1</sup>.

Younger children exposed to pain subsequently develop behavioural disturbances in the form of increased crying, neediness and difficulty settling down. These changes may persist for days or weeks<sup>5</sup>. The long-lasting effects of pain in children have underlined the necessity of providing reliable pain management to reduce their experience of pain at the first exposure. Pain-related behavioural changes have been shown to diminish after the use of nitrous oxide/oxygen<sup>6</sup>.





## ENTONOX® answers the need for fast and effective pain relief during minor procedures

ENTONOX is a ready-to-use gas mixture consisting of 50% nitrous oxide and 50% oxygen. Its analgesic properties can help to reduce the pain and discomfort felt by children during painful procedures<sup>7</sup>. ENTONOX is easy to use and can be administered by trained nurses, thereby avoiding more resource demanding options.

Certain procedures that were previously carried out in operating departments can now, in many cases, be performed in regular wards or outpatient clinics. The rapid onset of action and mild side-effects associated with the use of ENTONOX analgesia reduce the need for postoperative monitoring<sup>8</sup>.

ENTONOX analgesia has repeatedly been shown to be an efficacious choice of pain relief for minor painful paediatric procedures<sup>4,9,10,11</sup>. It has also been shown to reduce treatment times and ease recovery.

ENTONOX not only has a rapid onset of action (induction time is only a few minutes), but its effects diminish rapidly after cessation of administration. The administration of ENTONOX requires no needles, stitches or bad tasting medicine and minimal staff training and patient instruction.

- Easy to administer, no IV lines
- Short induction time – only a few minutes
- Mild side-effects
- Shorter recovery time.



## Proven to control pain and anxiety in children

The use of ENTONOX® analgesia to eliminate procedural pain in children has been examined in relation to lumbar puncture, bone marrow aspiration, laceration repair, minor procedures, puncture and repositioning of fractures, among other procedures<sup>4</sup>.

ENTONOX analgesia is seen as a valuable, if underused, method of pain relief in emergency and paediatric care. In many emergency care situations, as well as a variety of minor painful procedures, there is an obvious need for a rapid and easy-to-use analgesic that can be safely administered.

The efficacy of nitrous oxide/oxygen in outpatient surgical procedures is well documented<sup>7</sup>. The mixture has been shown to be highly effective in reducing the pain and anxiety felt by children and minimising the need for postoperative monitoring<sup>8,12,13</sup>. Its use has been associated with high satisfaction ratings among children, as well as their parents and medical staff<sup>14</sup>. One study showed satisfaction among parents and nurses at more than 90%<sup>11</sup>.

The sedative properties of ENTONOX help make the child less apprehensive before and during the procedure.

The side-effects associated with short-term use of ENTONOX are mild and wear off quickly<sup>15</sup>, minimising the need for postprocedural monitoring and enabling a more efficient use of hospital resources. Dizziness and mild nausea are the most commonly seen side-effects and vanish shortly after exposure<sup>4</sup>.

- Analgesic and sedative properties
- Non-invasive, effective pain relief
- Easy to use
- Safe – minimises the need for post-procedural monitoring
- High patient/parent/staff satisfaction.





## Raising the bar in patient and user safety

BOC Healthcare has developed a complete ENTONOX® analgesia solution to ensure safe handling and delivery.

ENTONOX is distributed in lightweight cylinders, which means less effort in lifting, carrying and operating the cylinder. The integrated cylinder valve ensures patient and user safety, with no need to change the regulators, no requirement to make connections at high cylinder pressure, and no risk of high pressure leaks.

The integrated valve provides you with the means for safe, quick and easy connection of equipment for the administration of ENTONOX. Quick coupling of the ENTONOX cylinder to the demand valve makes it easier for children to use.

- Lightweight cylinders
- Integrated valve
- Controlled gas release.





## Caring for the working environment

According to the American Society of Anesthesiologists' task force on trace anesthetic gases there is insufficient evidence to recommend any routine medical surveillance of personnel exposed to trace concentrations of waste anesthetic gases as long as routines are followed that ensure compliance with existing occupational limits<sup>16</sup>.

To minimise the potentially negative effects on health from chronic exposure to trace concentrations in the working environment most authorities have set clear recommendations on ambient air quality.

The maximum limits set in the UK and Ireland for the average exposure level, measured over an eight hour period is 100 ppm.

This is well below the limits that are likely to have any effect on the midwives and medical personnel working within the hospital or at the patient's home. These levels should be adhered to wherever ENTONOX is used<sup>16</sup>.

- ENTONOX should be administered in rooms with proper ventilation and/or air exchange systems set to the proper levels.
- National air quality guidelines should be followed.

## References

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