mario guarino aspirante medico d'urgenza
Napoli 19 Novembre 2016

IL MEOPA IN PREOSPEDALIERO: UN'ALTRA ARMA PER IL MEDICO D'URGENZA


NA80
0656


NA
T23738

Prendersi il posillipo

Anna
la futura pilota
ha fatto un… volo!

Chiamata della Centrale Operativa:

- Codice Giallo
- Ragazza investita
- E’ sveglia e cosciente

Da noi non esiste l’auto medica
Il luogo è a circa 4 km dall’Ospedale.
Ho con me il NOS e… gli occhiali!

Anna, 17 anni, circa 50 kg.
Seduta sul marciapiede, cosciente, lamenta dolore al ginocchio destro che non appare deformato. Come al solito la COT non ha allertato la Polizia Municipale, per fortuna la scena è sicura

A: vie aeree pervie

B: OPA negativo F.R. 20/min SaO_2 98% FiO_2 21%

C: P.A. 110/80 F.C. 105/min

D: CGS 15

E: NRS 7

La mettiamo in ambulanza per fare la secondary survey


2012.05.09 04:05:10

Curr Emerg Hosp Med Rep (2016) 4:11–18
DOI 10.1007/s40138-016-0092-3

PAIN MANAGEMENT IN PEDIATRICS (S. MACE, SECTION EDITOR)

Nitrous Oxide, From the Operating Room to the Emergency Department

Christine Huang[1] · Nathaniel Johnson[1]

Characteristics of the ideal PSA agent would include

(1) providing both sedation and analgesia,
(2) having a quick onset of action and rapid recovery upon discontinuation,
(3) preserving the cardiovascular and respiratory status of the patient,
(4) imparting an amnestic quality.

Nitrous oxide possesses many of these properties, making it an ideal agent for PSA in the emergency department,

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Pre-hospital Setting

Many traumatic patients arrive to the emergency department via pre-hospital emergency medical services (EMS). In addition to stabilizing the patient, part of the EMS objective is to provide initial pain management. The use of N_2O has been proposed and studied in the pre-hospital setting. In a double-blind multi-center study conducted in France, the investigators were able to show that pre-hospital administration of a fixed 50:50 ratio of N_2O:O_2 was effective in management of traumatic pain in the field [39]. However, further studies are needed to further assess the safety of its use in the pre-hospital setting.

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Table 2 Nitrous oxide: side effects and contraindications

More common side effects
Nausea/vomiting
Dizziness
Headache
Tingling
Euphoria
Diffusion hypoxia
Contraindications—any "trapped air" in the body
Examples of "trapped air" include
Pneumothorax
Chronic obstructive emphysema (COPD)
Pneumocephalus
Intraocular air bubbles
Middle ear effusions
Air embolism
Bowel obstruction
Decompression sickness
Bullous or emphysematous lung disease (such as advanced cystic fibrosis)
There has been a recent report of one case report of laryngospasm with aspiration with the administration of nitrous oxide as a sole agent

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(2) Due to its low solubility in the blood (blood–gas partition coefficient = 0.47), this allows for rapid onset of action in the brain (30–60 s) as well as rapid clearance through the lungs shortly after discontinuation [13]. In a busy emergency department, decreasing the length of stay for patients requiring procedural sedation for painful procedures is of benefit.

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(3) It provides a minor amnestic effect. Children who have been sedated with N_2O often have little recollection of the painful elements of the procedure [14].

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(4) It has a long history of having an excellent safety profile with few reported cases of adverse events. The most frequently reported adverse reaction is nausea and vomiting. There are few reported cases of serious injury from appropriate N_2O administration. There are no reported allergies to N_2O and it has not been shown to be associated with malignant hyperthermia [15]. There have been several case reports of nitrous oxide-induced myelopathy [16], polyneuropathy [17, 18], and seizure activity [19] reported. Some of these cases are associated with higher exposures and/or abuse.

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(5) It is easily transportable. The units that are manufactured for supplying nitrous oxide in the emergency department are small and portable making it easy to store and transport between patient rooms.

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PAIN MANAGEMENT IN PEDIATRICS (S. MACE, SECTION EDITOR)

Nitrous Oxide, From the Operating Room to the Emergency Department

Christine Huang[1] · Nathaniel Johnson[1]

Conclusions

Although limited as solely an anesthetic agent, nitrous oxide remains a versatile and useful tool for treatment of pain and anxiety from the operating room to the dental office to the emergency department. Its efficacy and safety is well established, particularly in the pediatric emergency department, where its use alone or in combination with other agents can help facilitate performing painful and/or anxiety-provoking procedures such as the reduction of fractures and repair of lacerations.

Its use is limited by the ability to provide adequate ventilation/scavenging, as well as the ability to appropriately secure the agent and its delivery equipment to prevent abuse. As with any agent, there exists the potential for harm with its use. Notably, when used for PSA in the emergency department, these risks are low, but increase with increased duration of use, increased dose, concurrent use of other medications, and with complicating host factors.

Potential future applications of N_2O, following further study, may include treatment of pain in EMS patients while still in the pre-hospital setting.

Academic Emergency Medicine
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ORIGINAL RESEARCH CONTRIBUTION

Nitrous Oxide for Early Analgesia in the Emergency Setting: A Randomized, Double-blind Multicenter Prehospital Trial

Jean-Louis Ducassé, MD, Georges Siksik, MD, Manon Durand-Béchu, MD, Sébastien Couarraze, RN, Baptiste Vallé, MD, Nathalie Lecoules, MD, Patrice Marco, RN, Thierry Lacombe, PharmD, and Vincent Bounes, MD

Table 2
Baseline Clinical and Demographic Characteristics

Group	Nitrous Oxide and Oxygen (n = 30)	MA (n = 30)
Age (years)	37 (26–66)	29 (23–50)
Males	20 (67)	19 (63)
Body mass index (kg/m^2)	24.5 (22–29.6)	24.2 (20.7–26.9
Localization of pain		
Upper limb	11 (37)	8 (27)
Lower limb	12 (40)	15 (50)
Back trauma	6 (20)	7 (23)
Thoracic trauma	1 (3)	0
Pain rating on NRS at time 0	6 (5–6)	6 (5–6)
Physiology time 0		
Heart rate (min^{-1})	83 (72–88)	84 (69–96)
Respiratory rate (min^{-1})	18 (16–20)	18 (16–20)
Systolic pulse pressure (mm Hg)	135 (120–146)	134 (117–155)
Diastolic pulse pressure (mm Hg)	83 (73–90)	81 (70–98)
SpO_2 (%)	99 (98–100)	99 (98–99)

Results are expressed as n (%) or median (IQR).
IQR = interquartile range; MA = medical air.

doi: 10.1111/acem.12072

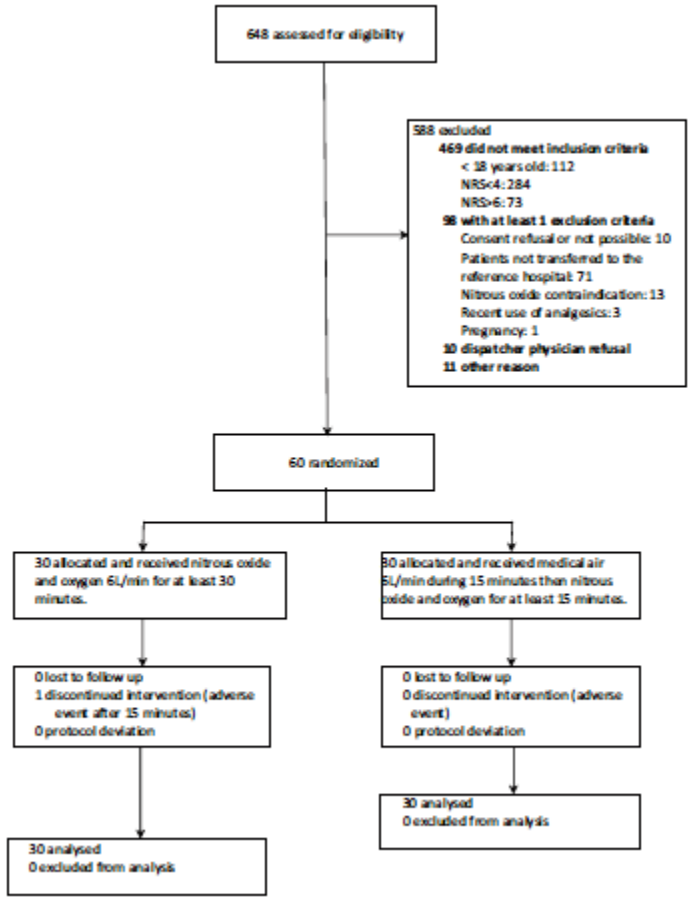

Figure 1. Study flow. NRS = numeric rating scale.

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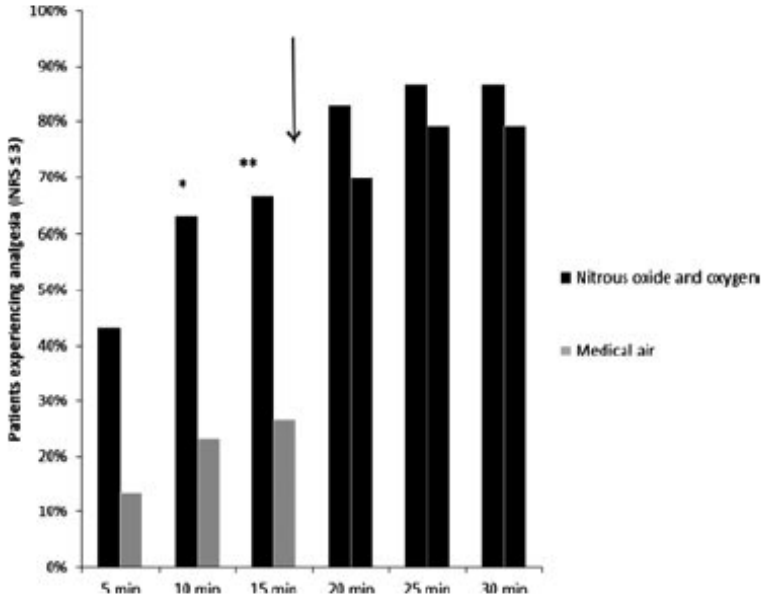

Figure 2. Patients experiencing analgesia (the arrow indicates when every patient received nitrous oxide and oxygen). *p < 0.001, **p < 0.0001. NRS = numeric rating scale.

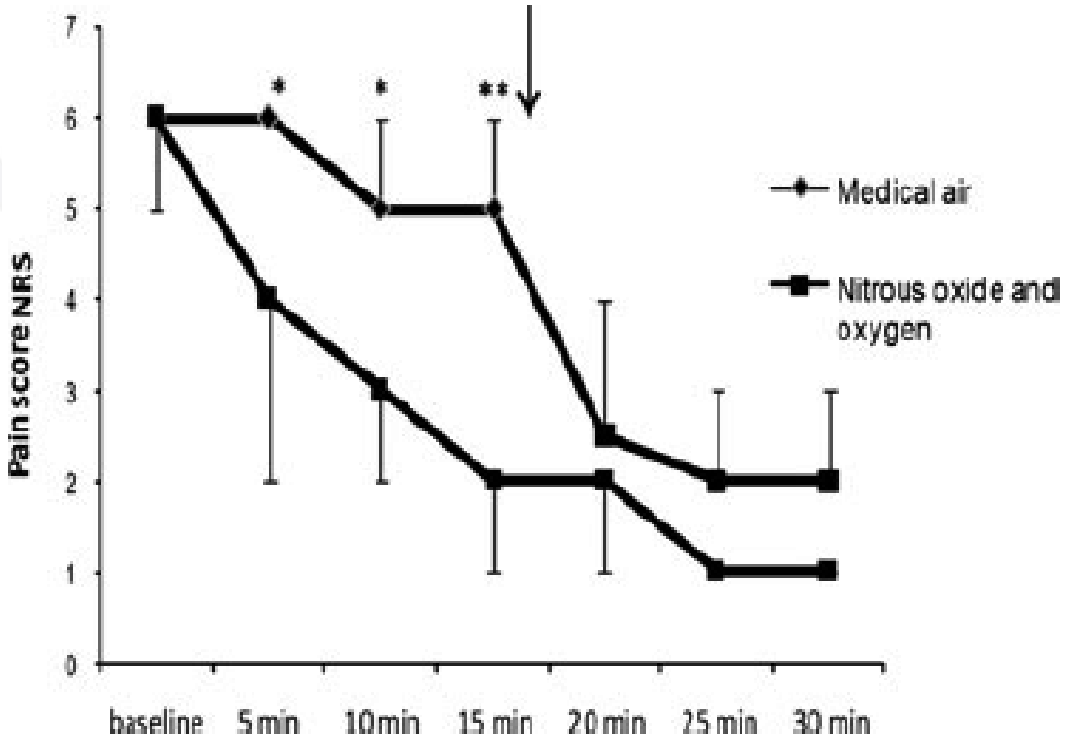

Figure 3. Pain scores (the arrow indicates when every patient received nitrous oxide and oxygen). *p < 0.001, **p < 0.0001. NRS = numeric rating scale.

doi: 10.1111/acem.12072

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CONCLUSIONS

This study demonstrates the efficacy of nitrous oxide for the treatment of moderate pain from trauma in adult patients in the prehospital setting. We found a difference in pain relief at 5 minutes and at all subsequent time points. Early analgesia in a prehospital setting can be obtained with the use of 50% nitrous oxide and oxygen.

doi: 10.1111/acem.12072

Table 3
Clinical Characteristics of Patients at T15 and Adverse Events During the First 30 Minutes by Group

Group	Nitrous Oxide and Oxygen (n = 30)	MA (n = 30)
Adverse events from T0 to T15	0	0
Adverse events from T15 to T30 Nausea	1 (3)	3 (10)
Sedation score = 1	5 (17)	4 (13)
Physiology at T15		
Heart rate (min^{-1})	76 (72–83)	81 (67–92)
Respiratory rate (min^{-1})	17 (15–20)	18 (16–20)
Systolic blood pressure (mm Hg)	131 (120–148)	129 (117–136)
Diastolic blood pressure (mm Hg)	79 (71–85)	81 (69–85)
SpO_2 (%)	99 (99–100)	99 (98–100)

Results are expressed as n (%) or median (IQR).
IQR = interquartile range; MA = medical air.

Sedazione Analgesia Urgenza

Andavo al…Massimo!

Chiamata della Centrale Operativa:

- Codice Giallo
- Incidente di motorino a via Nuova Agnano
- Scena sicura?

Siamo l'ambulanza del San Paolo.
Il target dista circa 2 km dall' Ospedale.

Massimo, 45 anni, circa 75 kg.
Scena: riferito tamponamento posteriore (in realtà non è vero);
Agitato, molto sofferente, lamenta dolore all'anca e all'arto inferiore sin.
Evidente deformità della gamba

Primary Survey

A: vie aeree pervie
B: OPA negativo. F.R. 30/min SaO_2 100% FiO_2 30%
C: P.A. 150/95 F.C. 100/min
D: CGS 15
E: NRS 11!!!

Mumble, mumble, questo è pieno di coca!
Lo mobilizziamo con "cucchiaio" ma non riusciamo ad immobilizzarlo su spinale per il decubito antalgico
Secondary in itinere

Mumble, mumble, Massimo ha un gran dolore.
Di sicuro il femore è fratturato. Chiede ripetutamente di lasciare il telefono (e forse qualche altra cosa) ad un'amica.
Lello si prepara a prendere la vena (nella primary è stato impossibile) ed io che faccio?

E’ chiaro che ci vuole un oppiaceo potente e veloce (ce lo possiamo permettere vista la pressione).
Ma ancora prima ricordiamoci del gas… e della Ale-Cam

Massimo

Durante il trasporto è tranquillo, **il dolore è passato da 11 a 5 solo con il NOS!**

E' in corso l'infusione di Fentanyl.

La secondary mette in evidenza solo la sospetta (evidente) frattura di femore a sinistra.

In P.S.

Primary e Secondary. …
Mumble, mumble… non sappiamo cosa si è pippato, sarebbe necessaria una sedazione, ma abbiamo già utilizzato il Fentanyl e se poi va in depressione respiratoria?
E chi se ne frega, noi sappiamo gestire gli eventi avversi!

MIDAZOLAM
0.05 - 0.1 mg e.v.

Abbiamo già fatto il Fentanyl e quindi partiamo da 0.05 mg./Kg.
Somministriamo 4 mg e.v. E, successivamente altri 2 mg. fino a raggiungere una Ramsay di 4.
Ora può andare in Radiologia


ALDI , MASSIMO

PREHOSPITAL CARE

A systematic review of the safety of analgesia with 50% nitrous oxide: can lay responders use analgesic gases in the prehospital setting?

S C Faddy, S R Garlick

Emerg Med J 2005;**22**:901–906. doi: 10.1136/emj.2004.020891

Table 2 Methodological quality of trials of 50% nitrous oxide for pain relief

Study	Loss to follow up (n/N (%))	Method of randomisation and allocation concealment	Blinding
Castera *et al*, 2001[15]	0/100 (0)	Random numbers. Allocation concealment not stated	Nurse and patient
Forbes and Collins 2000[22]	0/102 (0)	States randomised. Allocation concealment not stated	None
Triner *et al*, 1999[19]	0/22 (0)	Computer-generated sequence, sealed envelopes	Investigators and patient
Burton *et al*, 1998[17]	0/30 (0)	Computer sequence generated by nurse not involved in study	Investigators and patient
Natini-Gudmarsson *et al*, 1996[16]	2/40 (5)	Randomly assigned. Allocation concealment not stated	Not stated
Saunders *et al*, 1995[14]	0/131 (0)	Randomly allocated. Allocation concealment not stated	Investigators and patient
Evans *et al*, 1995[1]	0/30 (0)	Sealed unmarked envelopes from box	Not stated
Saunders *et al*, 1994[20]	0/89 (0)	Stratified block randomisation	Investigators and patient
Lindblom *et al*, 1994[21]	0/50 (0)	Block randomisation, blocks of 10. Closed envelopes	Investigators and patient
Henderson *et al*, 1990[14]	Not stated	Not stated	Outcome assessor
Harrison *et al*, 1987[23]	0/70 (0)	Patient's choice of analgesia	Unclear
Kerr *et al*, 1975[18]	35/116 (30)	Block randomisation. Sequentially numbered cylinders	Investigator and patient

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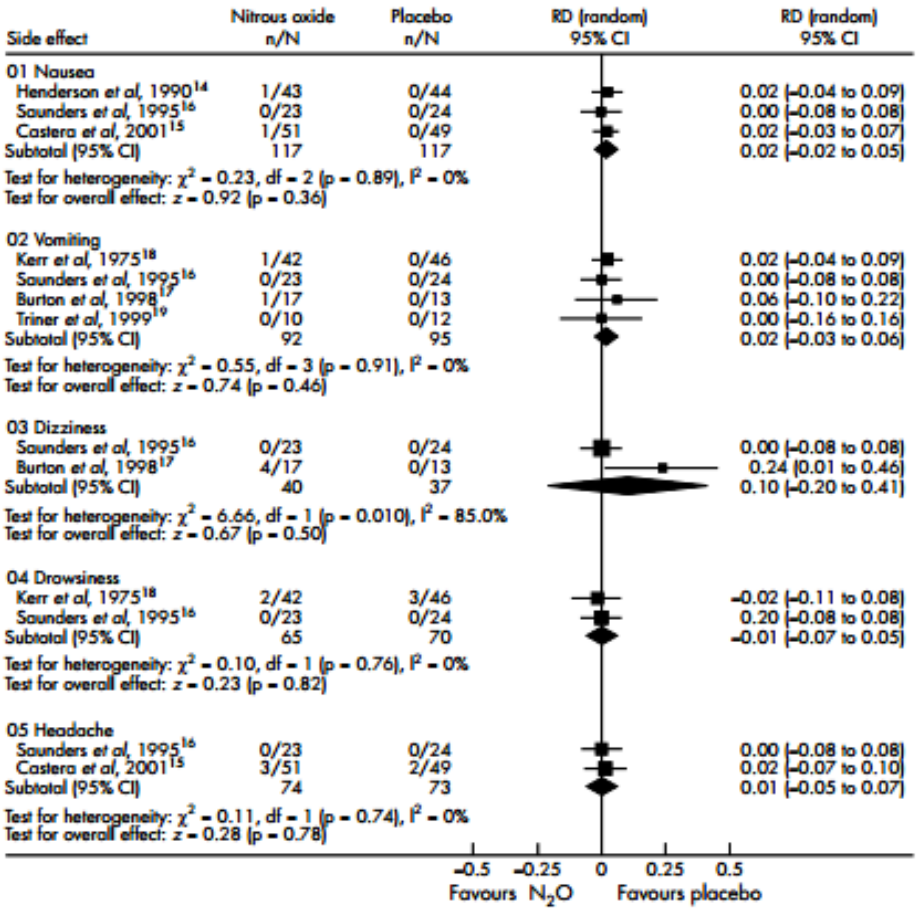

Figure 1 Pooled analysis of adverse effects from studies comparing 50% nitrous oxide (N_2O) with placebo.

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Table 3 Comparison of recovery time of patients receiving 50% nitrous oxide (N_2O) and patients given placebo or conventional analgesia

Study	No of patients	Study population	Pain source	Recovery time (min)		p value
				50% N_2O	Control	
50% nitrous oxide *v* placebo						
Saunders *et al*, 1994[20]	60	Adult	Colonoscopy	32*	36*	Not stated
50% nitrous oxide *v* conventional medication						
Forbes and Collins, 2000[22]	102	Adult	Colonoscopy	30 (30–45)	60 (30–110)	<0.0001
Notini-Gudmarsson *et al*, 1996[10]	38	Adult	Colonoscopy	49 (28–148)	83 (29–300)	<0.05
Evans *et al*, 1995[1]	30	Children	Fracture reduction	30 (15–60)†	83 (60–150)†	<0.01
Saunders *et al*, 1994[20]	59	Adult	Colonoscopy	32*	60*	<0.001
Lindblom *et al*, 1994[21]	50	Adult	Colonoscopy	0 (0–5)‡	37.5 (10–75)‡	0.0001

Recovery time stated as median (range) unless stated otherwise: *median; †mean (range); ‡median (interquartile range).

PREHOSPITAL CARE

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Table 4 Need for additional medication in patients receiving 50% nitrous oxide (N_2O) compared with placebo or conventional analgesia

Study	No of patients	Study population	Pain source	Additional medication (n (%)) 50% N_2O	Control	p value
50% nitrous oxide v placebo						
Triner *et al*, 1999[19]	22	Adult	Migraine headache	2 (20)	10 (83)	0.008
Saunders *et al*, 1994[20]	60	Adult	Colonoscopy	3 (10)	13 (43)	0.007
50% nitrous oxide v conventional medication						
Notini-Gudmarsson *et al*, 1996[10]	38	Adult	Colonoscopy	0 (0)	1 (5)	0.31
Saunders *et al*, 1994[20]	59	Adult	Colonoscopy	3 (10)	5 (17)	0.47
Lindblom *et al*, 1994[21]	50	Adult	Colonoscopy	1 (4)	5 (20)	0.19
Harrison *et al*, 1987[23]	70	Adult	Labour	1 (5)	40 (80)	<0.0001

PREHOSPITAL CARE

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CONCLUSIONS

Fifty per cent nitrous oxide has previously been shown to have similar efficacy for pain relief for a range of procedures compared to conventional analgesia with intravenous analgesic regimens, including opioid analgesia. This review has shown that side effects are uncommon and major adverse events such as hypotension and oxygen desaturation could not be attributed to nitrous oxide inhalation. Recovery from sedative effects of nitrous oxide is faster compared with intravenous analgesia.

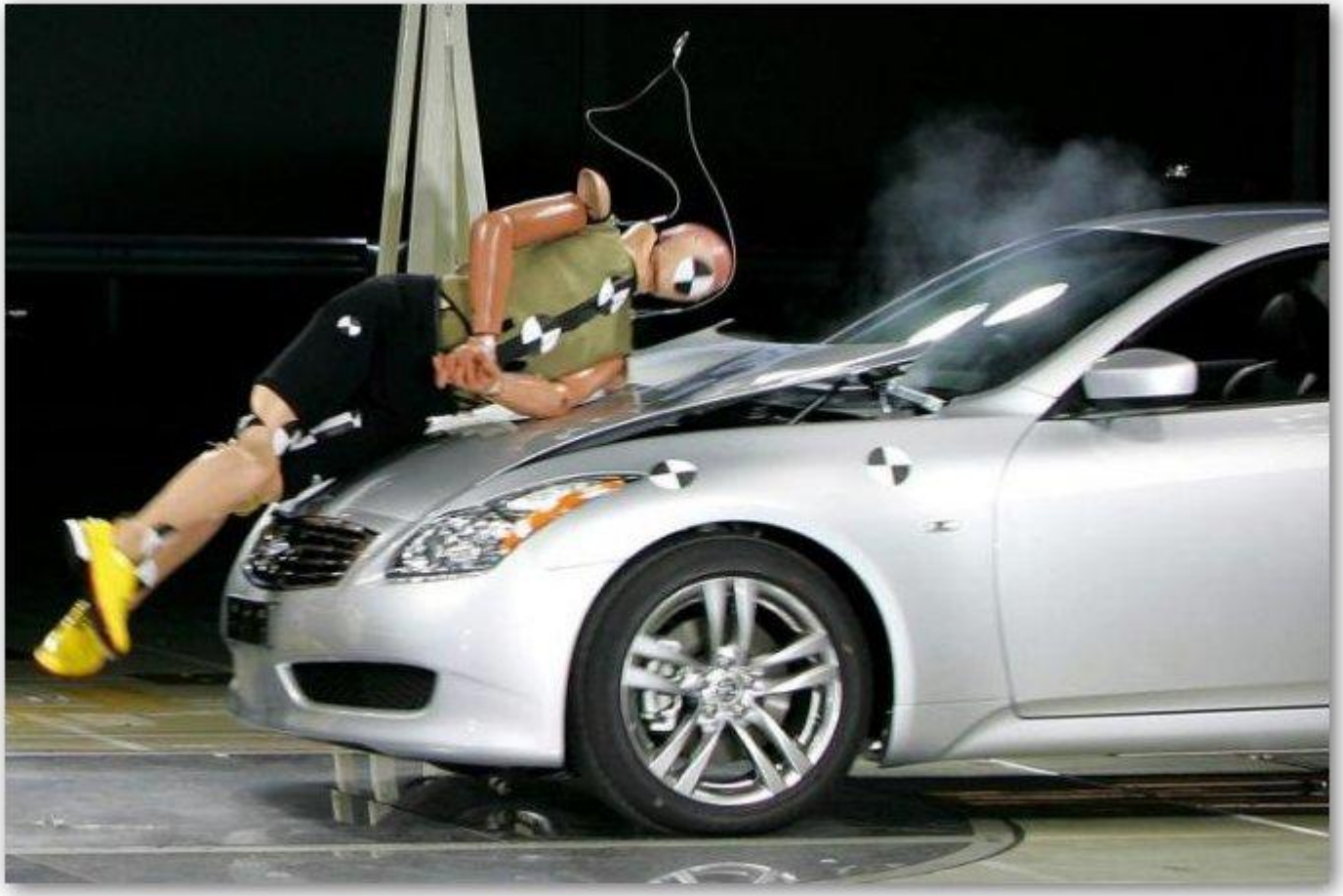
Nitrous oxide at a concentration of 50% is an effective and safe form of analgesia. The side effect profile of this agent suggests that it could be used safely by adequately trained lay persons in the prehospital setting.

Carmela, si è rotta le … corna!

Chiamata della Centrale Operativa:

- Codice Rosso
- Bambina investita a viale Dhorn
- Scena sicura.

Siamo l’ambulanza del San Paolo.
Il target dista circa 4 km dall’ Ospedale.



Camela, 13 anni, circa 45 kg.
Scena: la troviamo seduta sulla poltroncina dello chalet. Riferisce di essere stata urtata da un motorino mentre attraversava (dinamica minore) riportando abrasioni e contusioni alle braccia e alle gambe.
Tranquilla, poco sofferente, lamenta dolore al livello delle escoriazioni.

Primary Survey

A: vie aeree pervie
B: OPA negativo. F.R. 18/min SaO_2 99% FiO_2 30%
C: P.A. 110/70 F.C. 90/min
D: CGS 15
E: NRS 7!!!

La immobilizziamo su spinale
Secondary in itinere

Mumble, mumble, Carmela è minorenne, tranquillizziamo i genitori per telefono e facciamo salire in ambulanza anche i 2 fratelli anch'essi minorenni (presa in carico).

Lello si prepara a prendere la vena (ma la dobbiamo preparare) ed io che faccio?

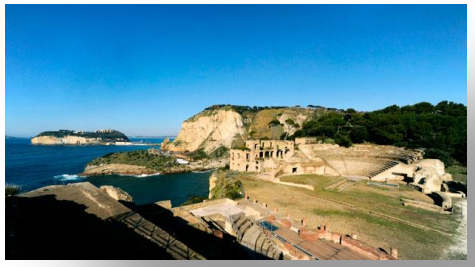
E’ chiaro che basta del ghiaccio (che non abbiamo) e il paracetamolo

Ma abbiamo il gas…

Carmela

Durante il trasporto è tranquilla, anzi vivace e, a tratti disinibita per il NOS. Il dolore si sta riducendo ed attiviamo tutte le tecniche di empatia e comunicazione (farmaci a somministrazione timpanica).

1772 Joseph Priestley



Pausilypon

“paùein + lype”
tregua dagli affanni,
cessazione del dolore

Prendersi il Posillipo: darsi il buon tempo, accompagnarsi ad una bella donna per trascorrere un po’ di tempo in maniera gioiosa. La locuzione fa riferimento ad una famosa collina partenopea, Posillipo, un luogo amenissimo dove gli innamorati sono soliti appartarsi.