

The Nose Knows

***Cost-Effectiveness
of Transnasal Therapies***





**This handy little fella
is taking us into
a new
treatment era**

Administration of medications to mucosal surfaces is time proven





**After all,
we've been
slugging folks
with NTG
for years!**

Ed Racht's Recent Addition of Vaginal Mucosal Meds Administration in the Ambulance





Fast and effective

intranasal medication delivery a viable option to IV/IM/rectal dosing in select cases

Reduces pain and bleeding

associated with nasal and oral instrumentation and nasogastric tube placement

Controlled delivery

for topical anesthetics and vasoconstrictors



Candidate Medications for Nasal Administration

Narcan
Versed
Glucagon
Fentanyl
Lidocaine
Epinephrine

“Intranasal fentanyl delivered as 150 microg/mL at a dose of 1.7 microg/kg was shown to be an effective analgesic in children aged 7 to 15 years presenting to an ED with an acute fracture when compared to intravenous morphine at 0.1 mg/kg.”

A randomized controlled trial comparing intranasal fentanyl to intravenous morphine for managing acute pain in children in the emergency department.

Borland M, Jacobs I, King B, O'Brien D.

Ann Emerg Med. 2007 May;49(5):721-2.

Checking the Price

*What is the definition
of “Cost Effectiveness?”*



Costs of Nasal Meds:

- MAD Syringe** - \$2.85 each
- Medication** - cheap generics
(by and large)

Cost of Medications

AWP

Narcan - \$2.28

Versed - \$2.52

Glucagon - \$87.50

Fentanyl - \$1.50

Cost of Medications

Return of
consciousness -
without vomiting

Priceless

Cost of Medications

Rob Woods, PharmD

Just in Time Pharmacy

706-868-1919

orders@justintimepharmacy.com

**We could all argue
that we should avoid
as many IV starts
as possible**





Agitated Delirium





Active Seizures



**What is the cost of a
lifelong case of
Hepatitis C
or
progressive HIV
from a needlestick?**

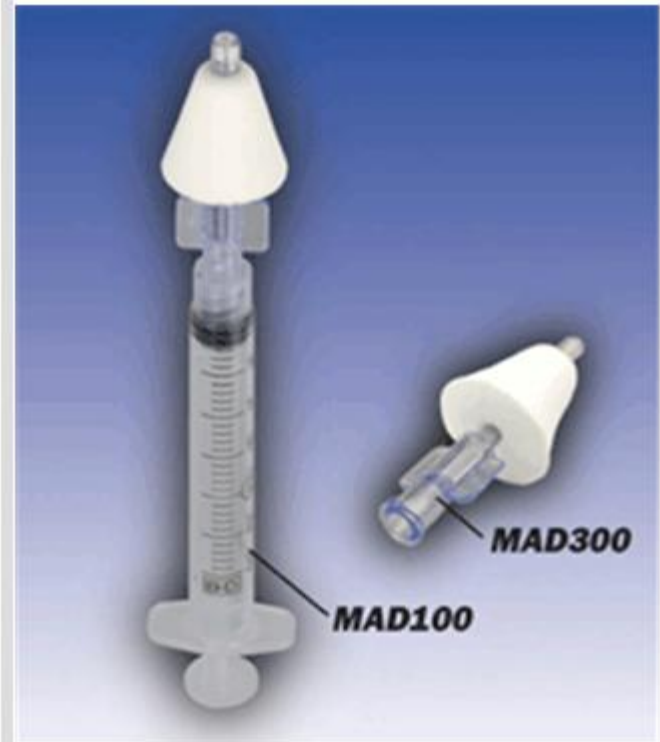


***Prehospital intranasal midazolam
for the treatment of pediatric seizures.***

Holsti M, Sill BL, et al.

Pediatr Emerg Care. 2007 Mar;23(3):148-53.

MAD100



Specifications

Typical partical size	30 microns
System dead space	0.09 mL
Tip diameter	0.17 inches (4.3 mm)
Applicator length	1.75 inches (4.5 cm)

**Patients treated with PR diazepam
in the prehospital setting
were significantly more likely
to have a seizure in the ED (OR, 8.4),
ED intubation (OR, 12.2),
seizure medications in the ED
to treat ongoing seizure activity (OR, 12.1)
admission to the hospital (OR, 29.3),
and admission to the
pediatric intensive care unit (OR, 53.5)**

CONCLUSIONS:

The IN-MAD midazolam controlled seizures better than PR diazepam in the prehospital setting and resulted in fewer respiratory complications and fewer admissions.

**What is the cost of
an ICU admit for a
child with seizures
who received rectal diazepam
vs. an ER visit only
for nasal midazolam?**

What is the estimated system cost of reducing the terror of a needlestick for a child?



Midazolam in a dose of 0.25 mg/kg administered intranasally provided adequate anxiolysis for the majority of children, allowing them to complete their treatment.



The use of intranasal midazolam in the treatment of paediatric dental patients. Gilchrist F, Cairns AM, Leitch JA. Anaesthesia. 2007 Dec;62(12):1262-5.

MADdy[®] the Blowfish

Pediatric Mucosal Atomization Device

Deliver atomized medications directly into the lungs without interrupting ventilation to the patient.



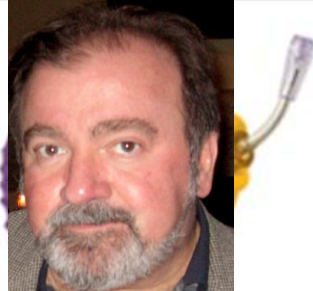
Specifications

Typical particle size	30 microns
System dead space	0.12 mL (with syringe) 0.07 mL (device only)
Tip diameter	0.17 inches (4.3 mm)
Overall length	4.5 inches (11.4 cm)

What about maybe the opposite device, maybe to help wake kids up that are heavily sedated?

Paul-y[®] the Terrorist

Checking Pediatric Level of Consciousness



Specifications

Typical particle size	30 microns
System dead space	0.12 mL (with syringe) 0.07 mL (device only)
Tip diameter	0.17 inches (4.3 mm)
Overall length	4.5 inches (11.4 cm)



BioTel EMS System supplies pre-hospital emergency medical services for over two hundred thousand people every year in the Dallas metro area.

[\(Click here for more info\)](#)

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[New ROC HS Reference Card](#)

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www.biotel.ws

UT Southwestern Medical Center at Dallas /BioTel EMS System
EMS Alert #07-01
APPROVED RF - 09 August 2007

EMS Alert # 07-01

Mucosal Atomizer Device (MAD)

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Mucosal Atomizer Device (MAD)

Medication administration in a certain subgroup of patients can be a very difficult endeavour. For example, an actively seizing or medically restrained patient may make attempting to establish an IV almost impossible which can delay effective drug administration. Moreover, the paramedic or other member of the medical team may be more likely to suffer a needle-stick injury while caring for these patients.

In order to improve prehospital care and to reduce the risks of accidental needle-stick, the Medical Direction Team has authorized the use of the Mucosal Atomizer Device (MAD) in certain patients. The MAD allows certain IV medications to be administered into the nose. The device creates a medication mist which lands on the mucosal surfaces and is absorbed directly into the bloodstream.

Not all medications may be administered via the intranasal route. Within the BioTel system, IN medications will be limited to

- Naloxone
- Midazolam

Medications administered via the IN route require a higher concentration of drug in a smaller volume of fluid than typically used in the IV route. In general, no more than 1 milliliter of volume can be administered during a single administration event.

Naloxone

Currently, the approved method and dose of naloxone in the Altered Level of Consciousness Treatment Guidelines reads . . .

8.

If hypoglycemia has been ruled out and there is evidence of narcotic use, administer

Adult	Pediatric
<ul style="list-style-type: none">• naloxone 0.4 mg every 5 minutes SLOW IV push until the respiratory rate improves and the patient can maintain a pulse oximetry reading of 96% OR until 2 mg has been given.• If IV access cannot be obtained, administer the naloxone IM.	<ul style="list-style-type: none">• naloxone 0.1 mg/kg SLOW IV push or IO (max single dose 0.4 mg) until the respiratory rate improves and the patient can maintain a pulse oximetry reading of 96% OR until 2 mg has been given.• If IV access cannot be obtained, administer the naloxone IM.

In systems with the MAD device, paramedics may administer naloxone via the nasal route in the same dose and concentration for both adult and pediatric patients.

Seizures

6. If actively seizing, administer

- | Adult | Pediatric |
|--|--|
| <ul style="list-style-type: none"> 2.5mg-5mg diazepam slow IV or IM until seizure stops or to maximum 10mg. | <ul style="list-style-type: none"> 0.5 mg/kg diazepam rectally until seizure stops or to a maximum 10mg |

Psychiatric/Behavioral

For extreme agitation

- | Adult | Pediatric |
|---|-----------|
| <ul style="list-style-type: none"> diazepam 2.5mg-5mg increments slow IVP until agitation relieved | |

In systems with the MAD device and midazolam, paramedics may administer midazolam via the nasal route instead of diazepam using the dosing chart below.

Patient age (yr)	Weight (kg)	IN Midazolam volume in ml (assuming 5mg/ml concentration)	
		Midazolam volume	dose (mg)
Neonate	3	0.3 ml	0.6 mg
<1	6	0.4 ml	1.2 mg
1	10	0.5 ml	2.0 mg
2	14	0.7 ml	2.8 mg
3	16	0.8 ml	3.2 mg
4	18	0.9 ml	3.6 mg
5	20	1.0 ml	4.0 mg
6	22	1.0 ml	4.4 mg
7	24	1.1 ml	4.8 mg
8	26	1.2 ml	5.2 mg
9	28	1.3 ml	5.6 mg
10	30	1.4 ml	6.0 mg
11	32	1.4 ml	6.4 mg
12	34	1.5 ml	6.8 mg
Small teenager	40	1.8 ml	8.0 mg
Adult or full grown teenager	50 or more	2.0 ml	10.0 mg

**Finally, what to do with administration
of the MAD in challenging patients
such as Ed Racht?**



ED!!! Give it a BREAK!!!





**Thank you, and
Good Afternoon!**