



European Society of  
Regional Anaesthesia  
& Pain Therapy

**ESRA ITALIA**

**ESRA** *Cè*

# XXIX CONGRESSO NAZIONALE

ESRA Italian Chapter  
**CESENA, Cesena fiere**

Presidente del congresso

**Vanni Agnoletti**

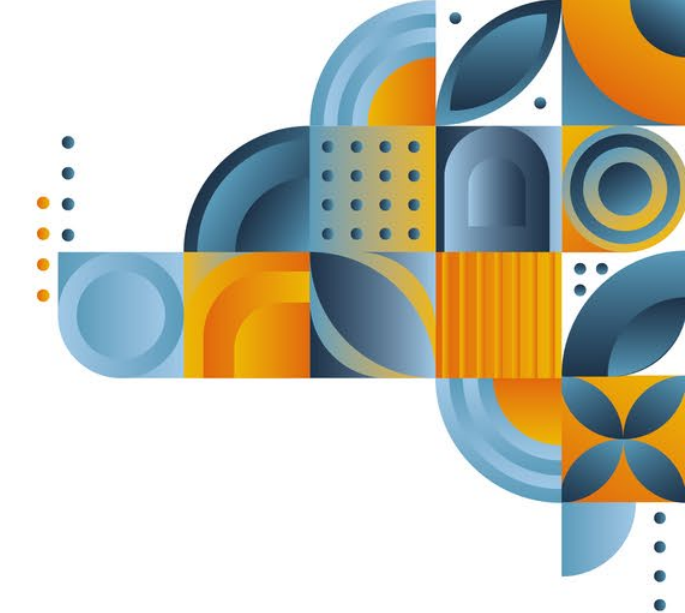
**Domenico Pietro Santonastaso**

**Andrea Tognù**

*7-9  
Novembre  
2024*

**MZ**  
EVENTS





# Mantenere la **rotta tra le onde** del parto: protocolli infusionali in analgesia peridurale

Dottoressa Daniela Recupero

ASST Spedali Civili di Brescia

Responsabile Anestesia Ostetrica





Focalizziamo bene  
l'obiettivo

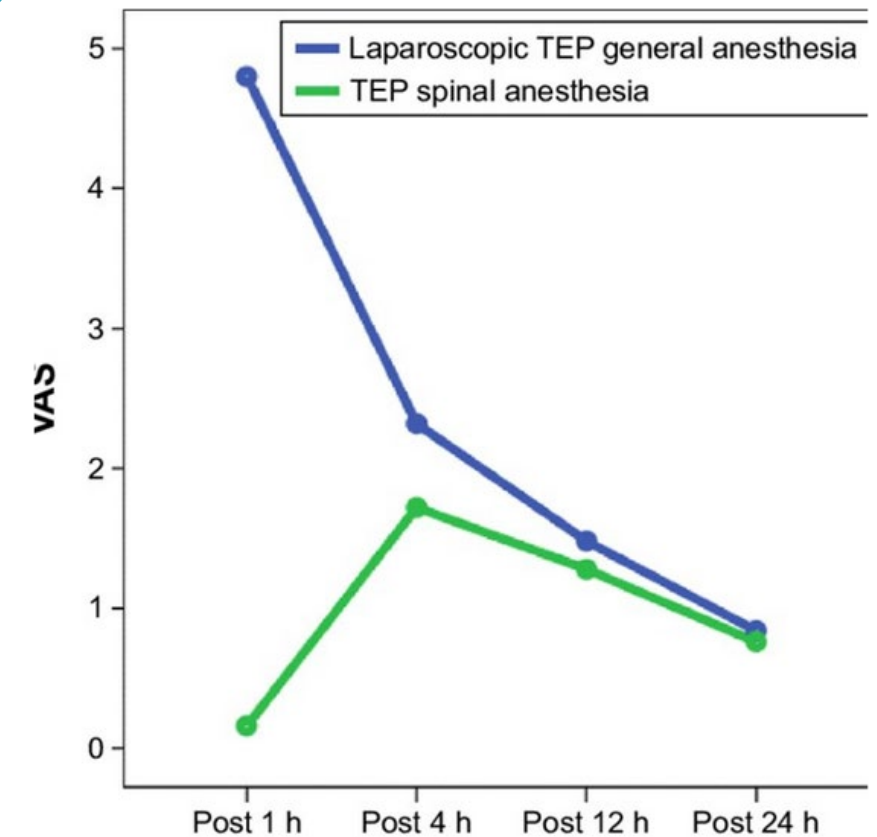
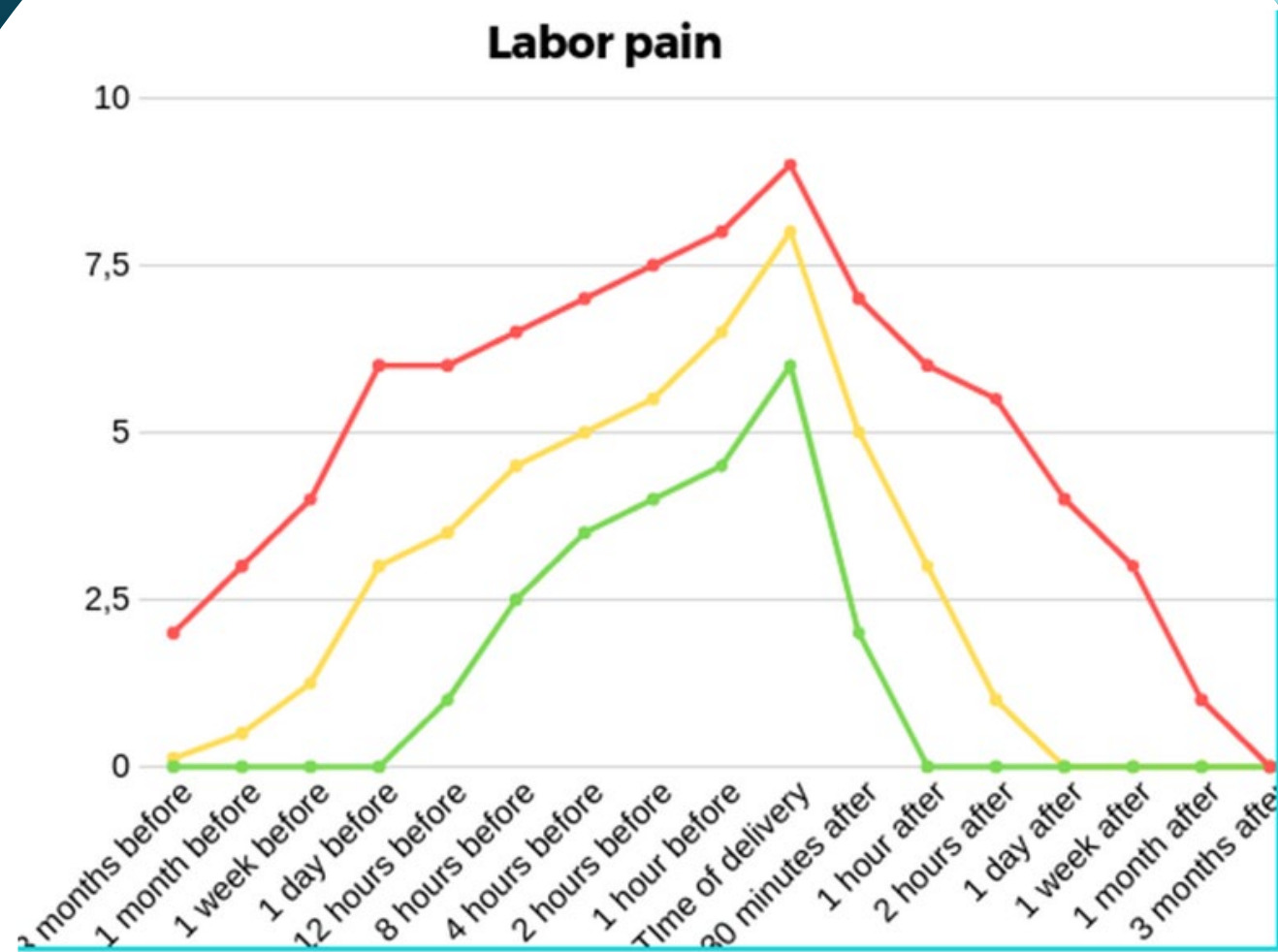


# Controllare il dolore del parto





# Il dolore del parto



# Il dolore postoperatorio



3, 2... 1!  
Here we go!

## Benessere materno fetale

La *soddisfazione* materna in termini di *equilibrio* fra la *percezione* delle contrazioni, la capacità di *muoversi* ed benessere psicologico.

## Benessere psicofisico?





- Ottenere un *piano analgesico*
- Gestire *il dolore lungo tutto il travaglio di parto*
- Non interferire con la *capacità motoria*



Siamo in grado di adattarci a tutti *i cambiamenti*  
e le evoluzioni durante il travaglio di parto?







**Dosaggi farmacologici (ossitocina )**



**Variabili procedurali (rexi , tocolisi )**



**Complicanze ostetriche (distocie , ecc...)**



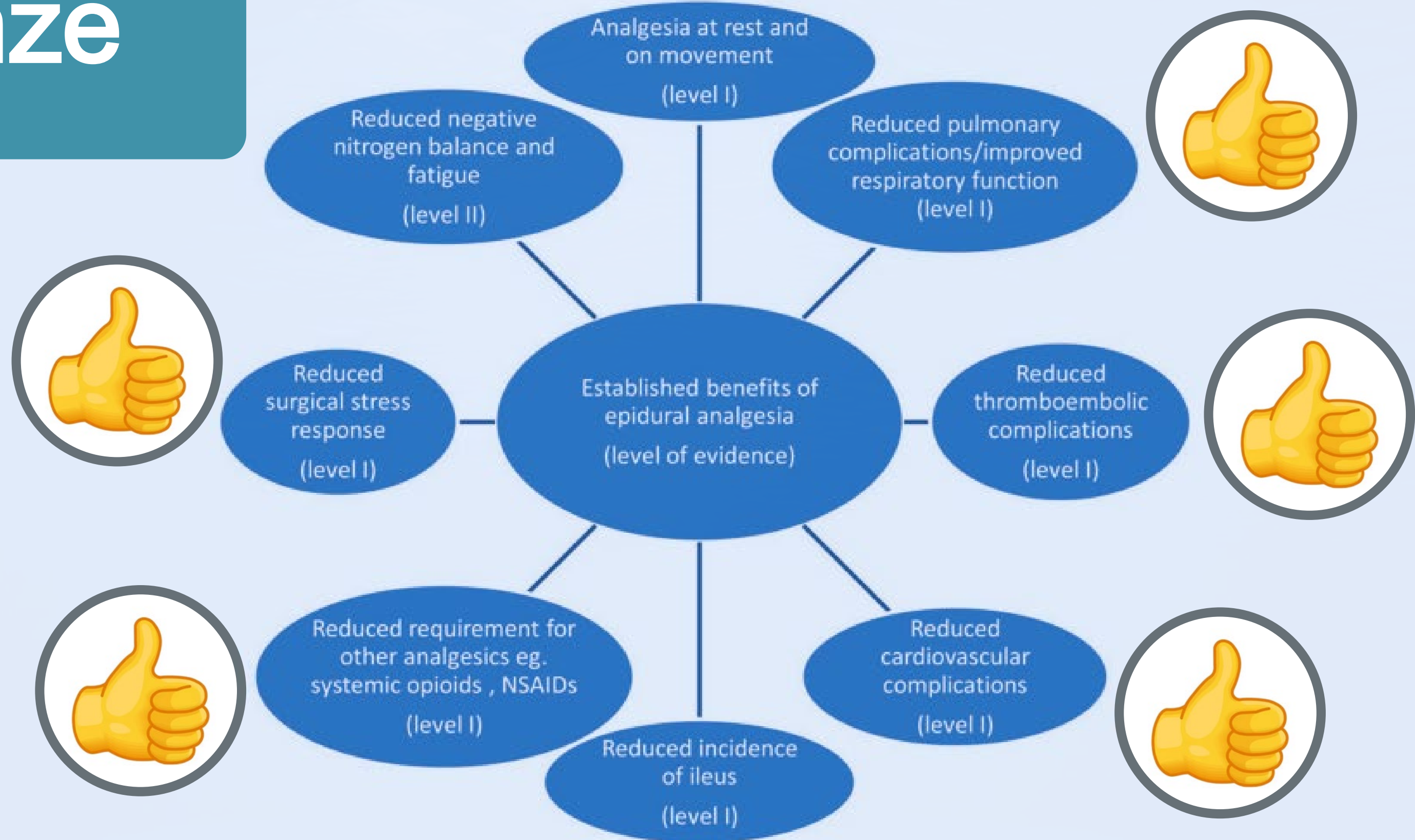
A large sea turtle, likely a Galapagos tortoise, is shown swimming in clear blue water. The turtle's head and front flippers are visible, and it appears to be moving towards the right. The background shows a coral reef with various types of coral and some smaller fish.

# Obiettivo o obiettivi?

- **Controllo del dolore**
- **Soddisfazione materna**
- **Salvaguardia della attività motoria**
- **Controllo della paura**
- **Mantenimento durante il travaglio**



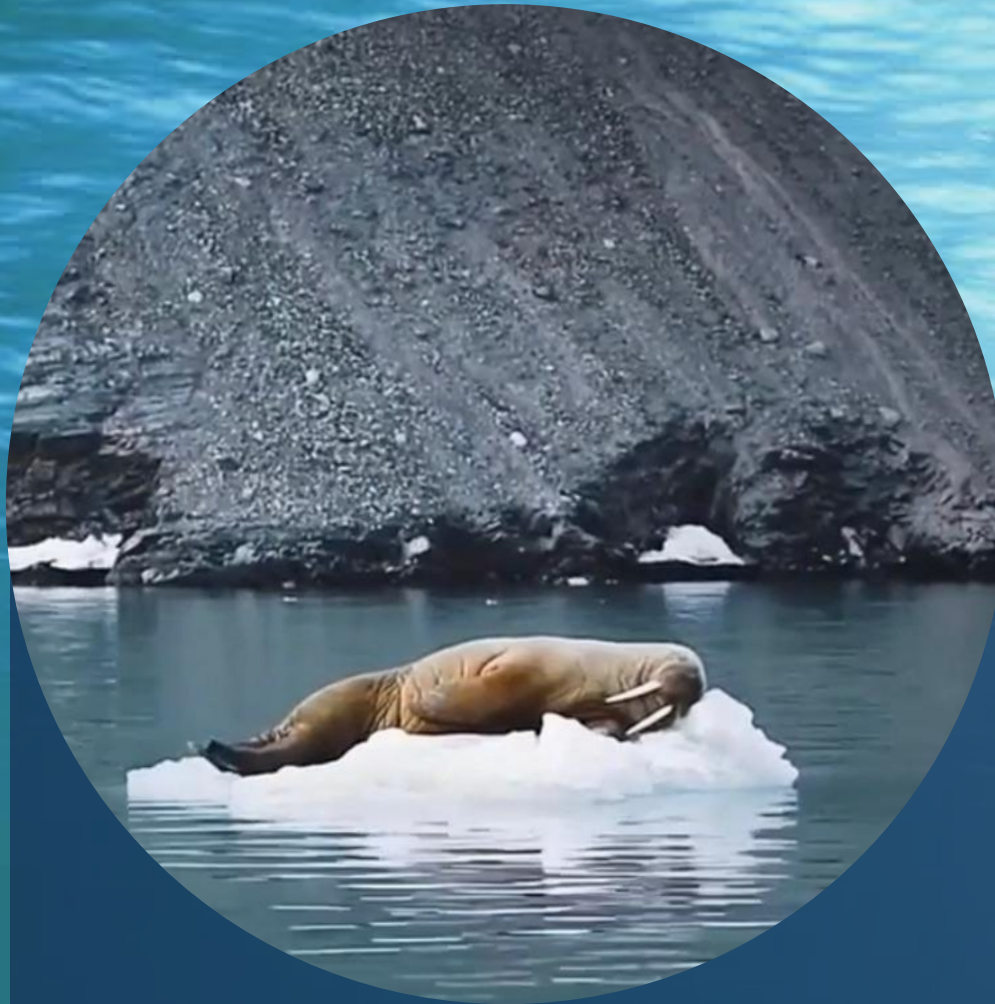
# Evidenze



**Fig 1** Benefits of effective epidural analgesia (level of evidence in support of these from a range of surgical specialities).



# Abbiamo alternative ?



## *INFUSIONE DI REMIFENTANIL*

Errori di dosaggio  
Sedazione



## *STRATEGIE NON FARMACOLOGICHE*

Potere analgesico scarso



## *METODICHE INALATORIE*

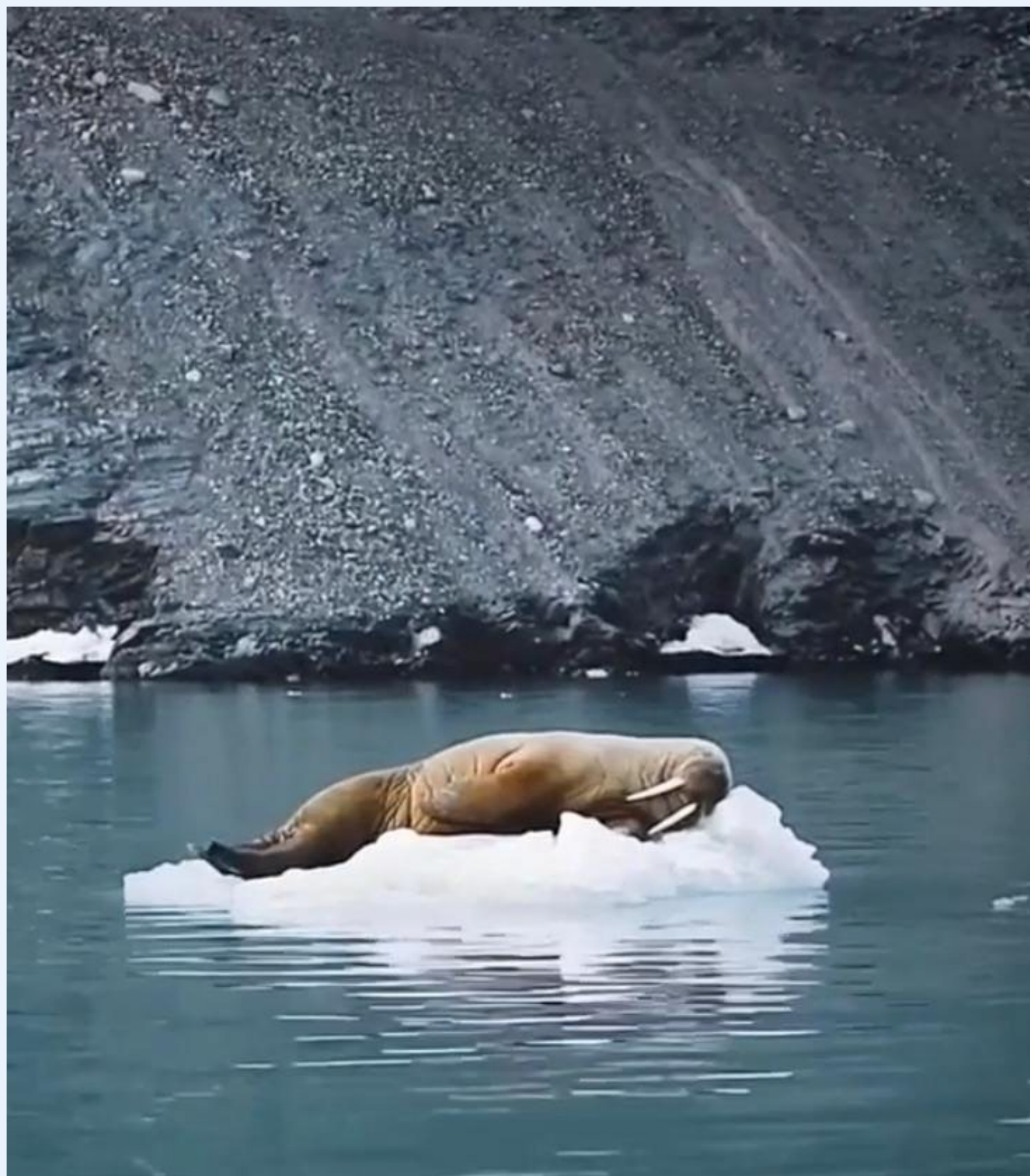
Solo se impossibilità alla  
peridurale



# Progetto



*Dopo il posizionamento  
il lavoro comincia.....*





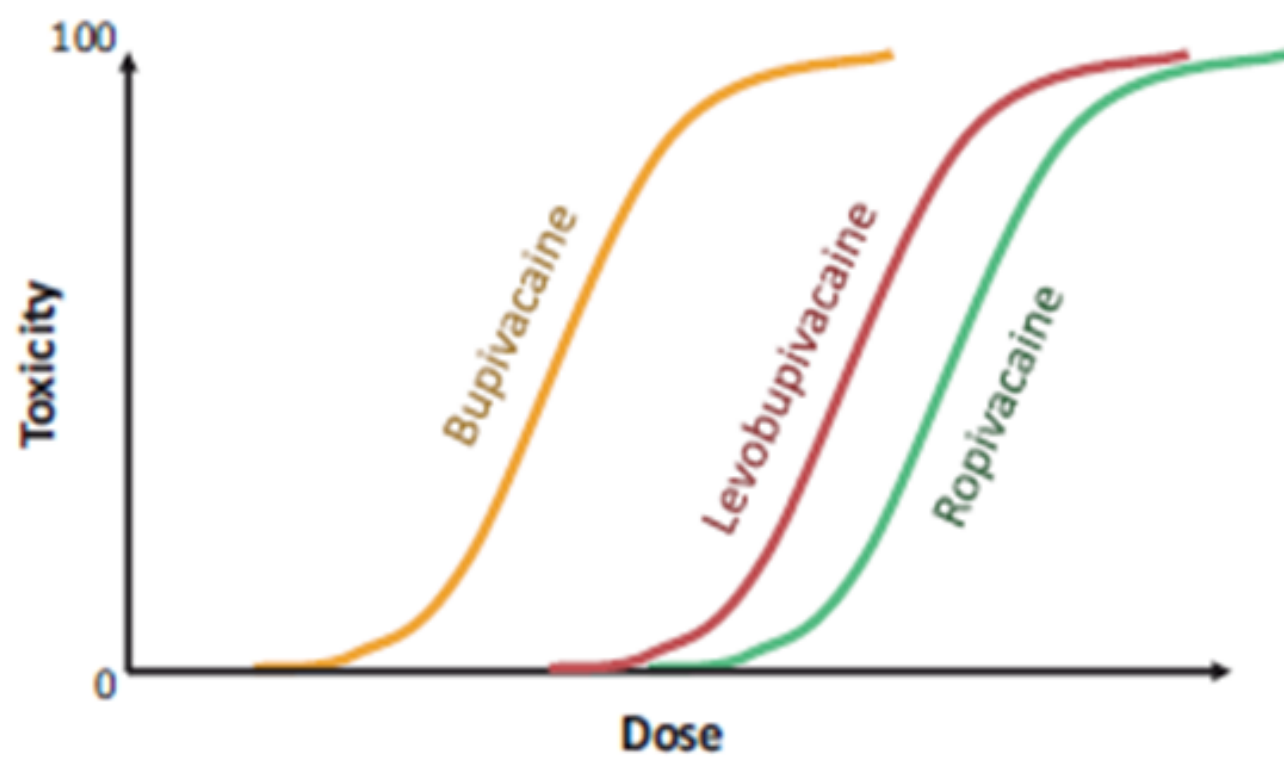
# Quali strumenti ?

Farmaci  
Cateteri  
Dispositivi di infusione

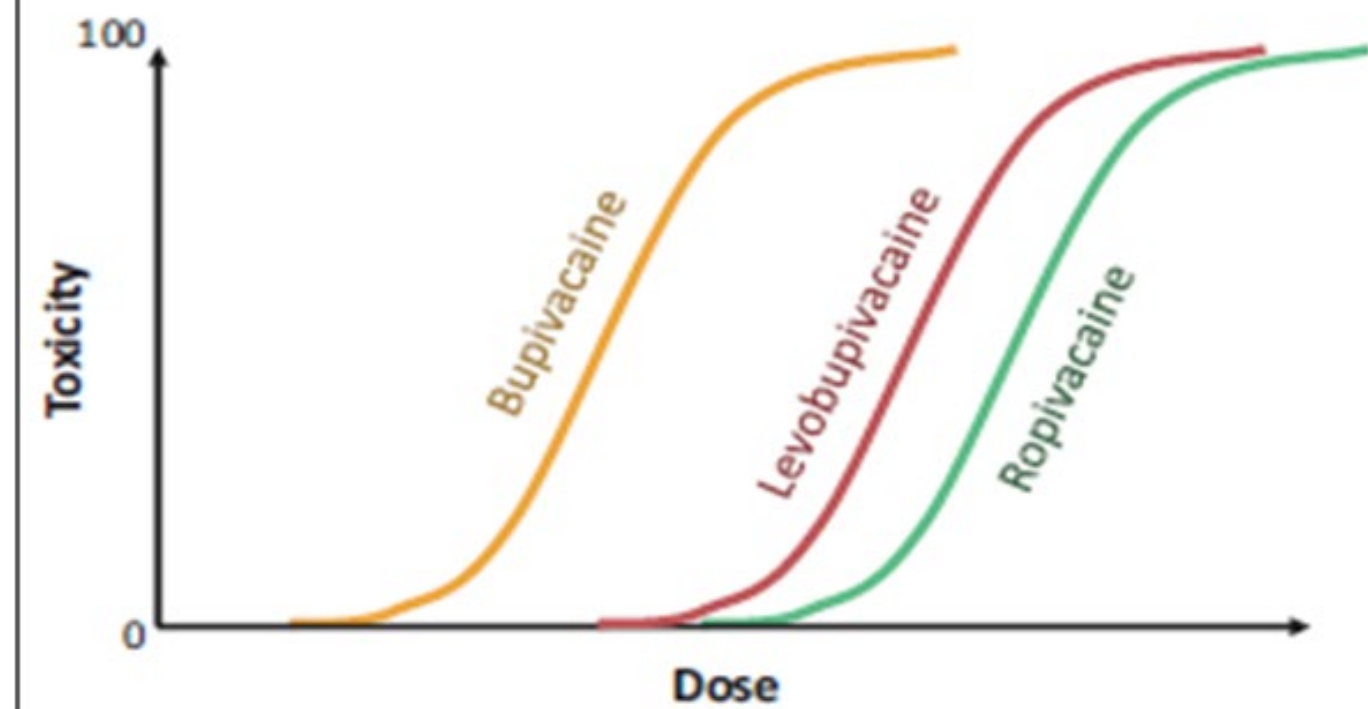




## Relative Potencies

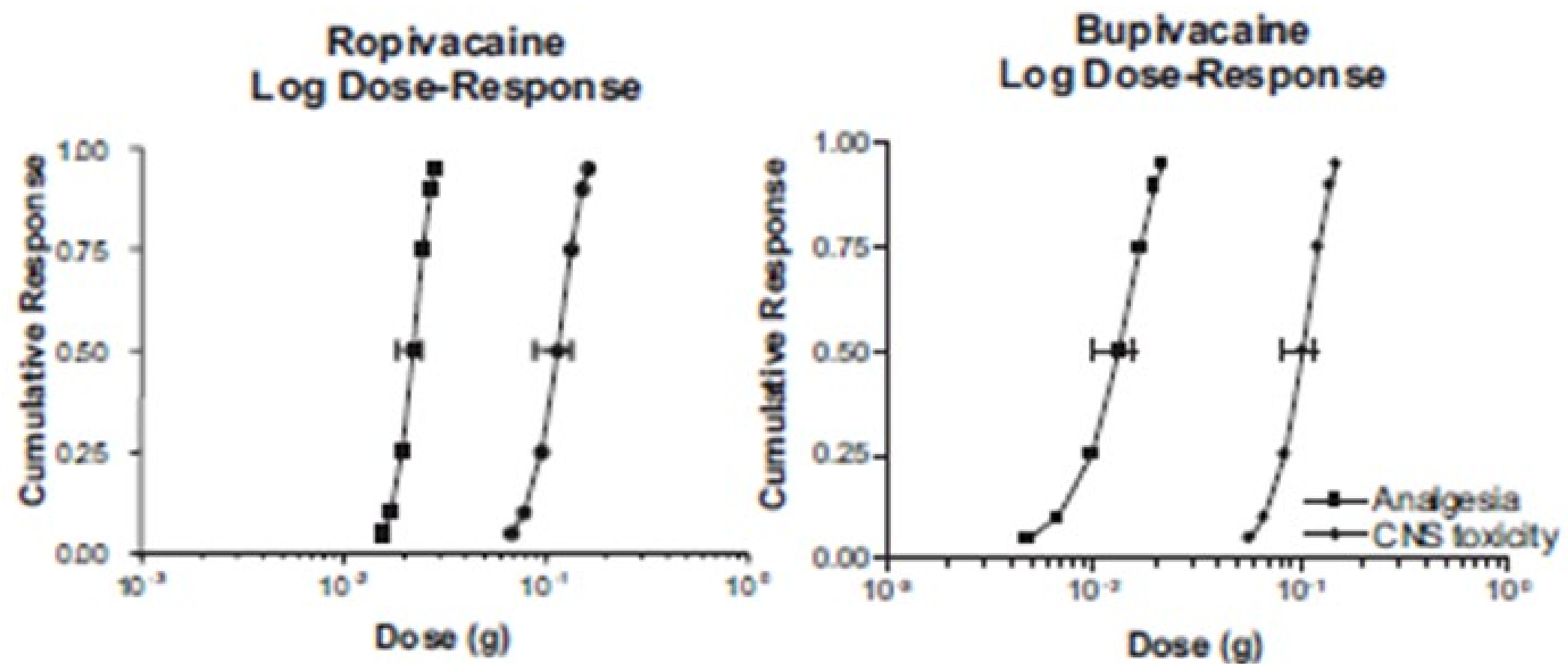


## Relative Toxicities





# Therapeutic index



**Safety: Bupivacaine = Ropivacaine**




# Neuroassiale ok... Quali altri i farmaci?

## 2022 Narrative Review

CNS Drugs (2022) 36:877–896  
<https://doi.org/10.1007/s40263-022-00936-y>

### REVIEW ARTICLE

## The Options for Neuraxial Drug Administration

Henning Hermanns<sup>1</sup> · Elke M. E. Bos<sup>1</sup> · Mark L. van Zuylen<sup>1</sup> · Markus W. Hollmann<sup>1</sup>  · Markus F. Stevens<sup>1</sup>

Accepted: 14 June 2022 / Published online: 15 July 2022  
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**Table 3** Synopsis on state of approval of neuraxial drugs

	FDA approval Epidural	FDA approval Intrathecal
<i>Local anesthetics</i>		
Lidocaine	Yes	Yes
Bupivacaine	Yes	Yes
Levobupivacaine	Yes	No
Ropivacaine	Yes	No
Mepivacaine	Yes	No
Chloroprocaine	Yes	Yes
Tetracaine	No	No
<i>Opioids</i>		
Morphine	Yes	Yes
Sufentanil	Yes	No
Fentanyl	No	Yes
Hydromorphone	No	No
Buprenorphine	No	No
Diamorphine	No	No
Tramadol	No	No
Methadone	No	No
Meperidine	No	No
Levorphanol	No	No
Butorphanol	No	No
Oxymorphone	No	No
Pentazocine	No	No
<i>Calcium channel antagonists</i>		
Ziconotide	No	Yes
Gabapentin	No	No
Verapamil	No	No
<i>GABA agonists</i>		
Baclofen	No	Yes
Muscimol	No	No
Midazolam	No	No





## The Options for Neuraxial Drug Administration

Henning Hermanns<sup>1</sup> · Elke M. E. Bos<sup>1</sup> · Mark L. van Zuylen<sup>1</sup> · Markus W. Hollmann<sup>1</sup>  · Markus F. Stevens<sup>1</sup>

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# Conclusioni

However, despite extensive use, the amount of approved medications for intrathecal and epidural use remains limited, especially for adjuvants. Hence, there is ongoing off-label use in clinical practice on a regular base. To ensure both patient safety but also legal safety for healthcare givers, a joint effort by practitioners, researchers, pharmaceutical industry, and authorities should be advocated in order to aid the risk-benefit analysis.

A fronte di un  
estensivo uso nello  
spazio peridurale e  
intratecale il  
numero di farmaci  
approvati a tale uso è  
limitato , soprattutto  
per gli adiuvanti.





# Protocollo NULLIPARA

## NULLIPARA

Dilatazione cervicale	Posizione della testa	Dose iniziale		Dose successiva	
Cm		Farmaco e dose	volume totale (ml)	farmaco e dose	volume (ml)
2-3	-2 / -1	Sufentanil 10y	5 - 10	Ropivacaina 0.10%	20
3-5	-1	Ropivacaina 0.10% Levobupivacaina 0.0625% e Sufentanil 10y	15 - 20	Ropivacaina 0.10% Levobupivacaina 0.0625%	20
>6		Ropivacaina 0.10% Levobupivacaina 0.0625% e Sufentanil 10y	20	Ropivacaina 0.15%-0.20% Levobupivacaina 0.125%	10
Dilatazione completa	-1 / 0	Ropivacaina 0.15%	20		



# Protocollo PLURIPARA

## PLURIPARA

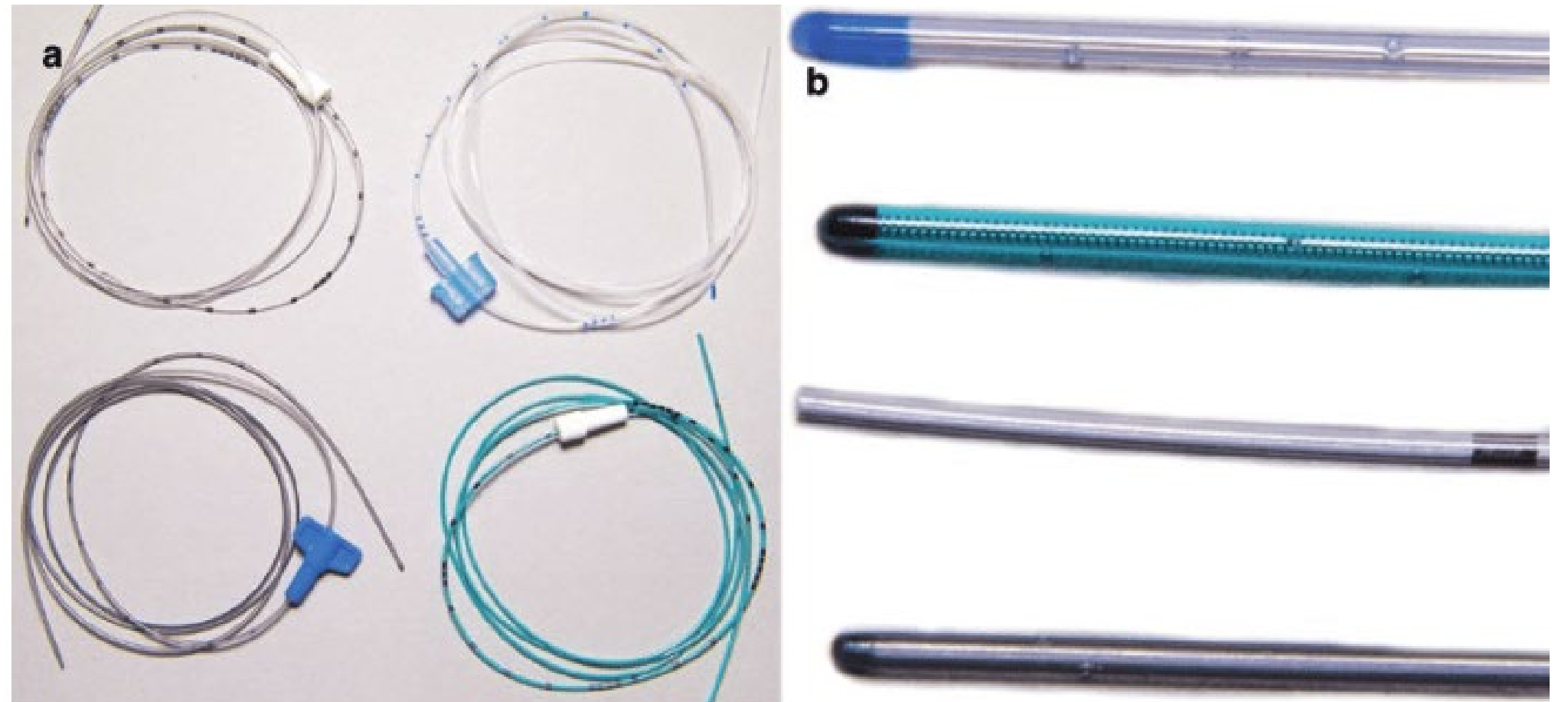
Dilatazione cervicale	Posizione della testa	Dose iniziale	Dose successiva
-----------------------	-----------------------	---------------	-----------------

centimetri		Farmaco e dose intratecale	Volume intratec. (ml)	Farmaco e dose epidurale	Volume epidurale (ml)
3 - 4	-2 /-1	Ropivacaina 0.04% o Levobupivacaina 0.04% e Sufentanil 2-2,5 y	5	Ropivacaina 0.10% o Levobupivacaina 0.0625%	15-20
6 - 7	-1	Ropivacaina 0.06% o Levobupivacaina 0.05% e Sufentanil 2-2.5 y	5	Ropivacaina 0.15% o Levobupivacaina 0.0125%	10-15
Dilatazione completa	-1/0	Ropivacaina 0.06% o Levobupivacaina 0.05% e Sufentanil 2-2.5 y	5		



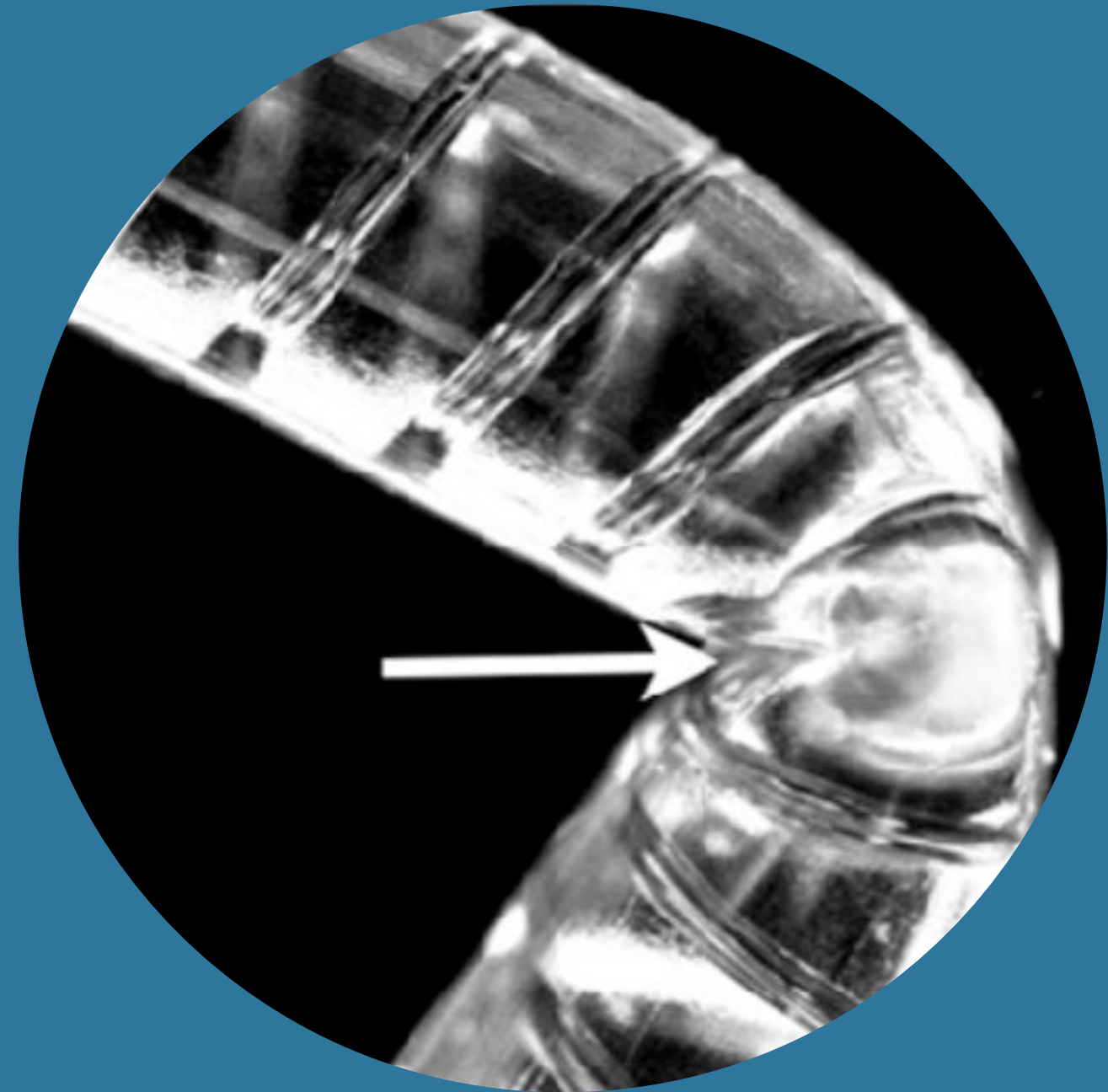
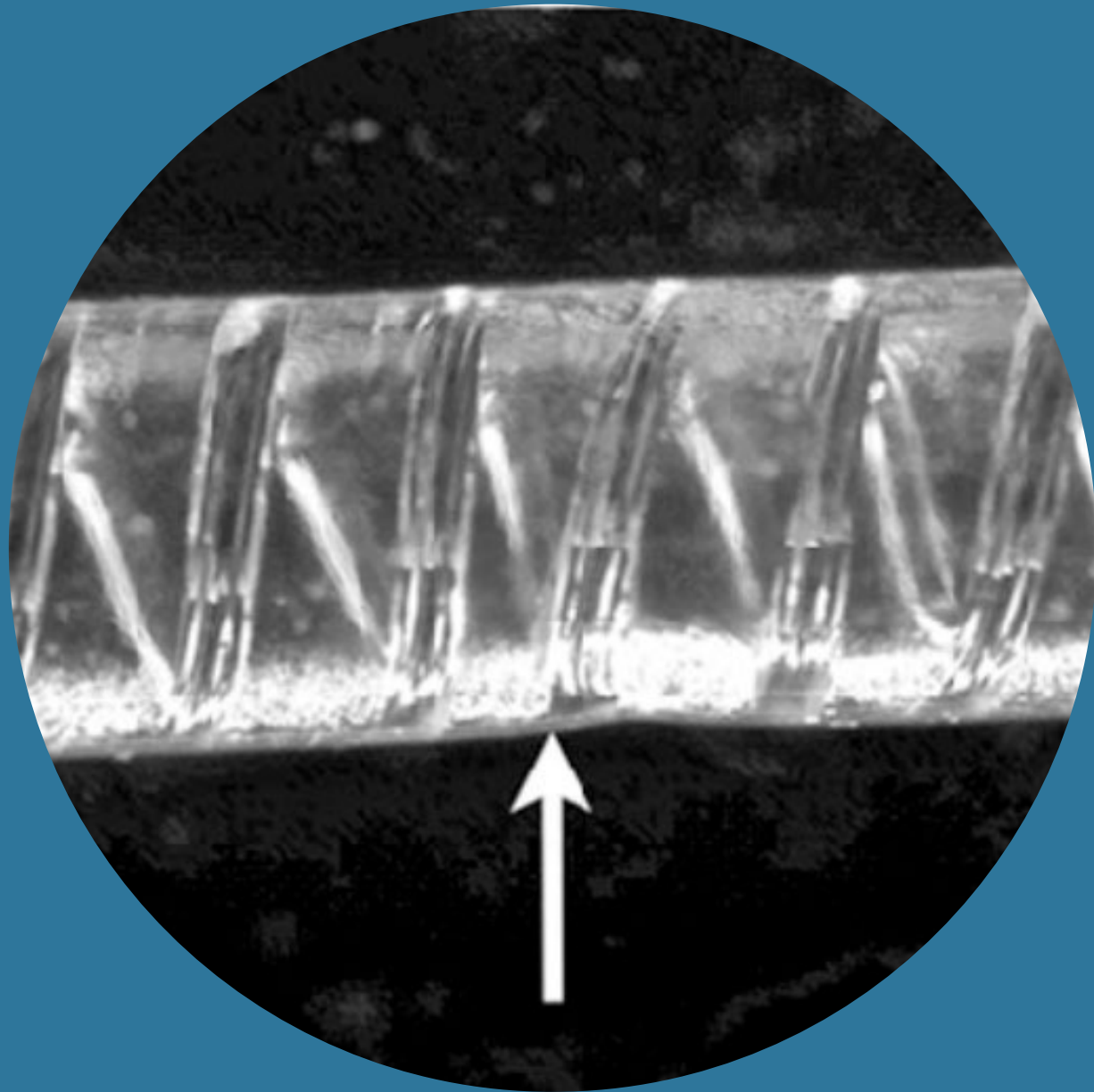
# Quali cateteri ?

Armati  
Non armati  
Monoforati  
Pluriforati





# Perchè armati ?





# Infusione continua o intermittente?

## Multiorifice epidural catheters



Continuous Infusion

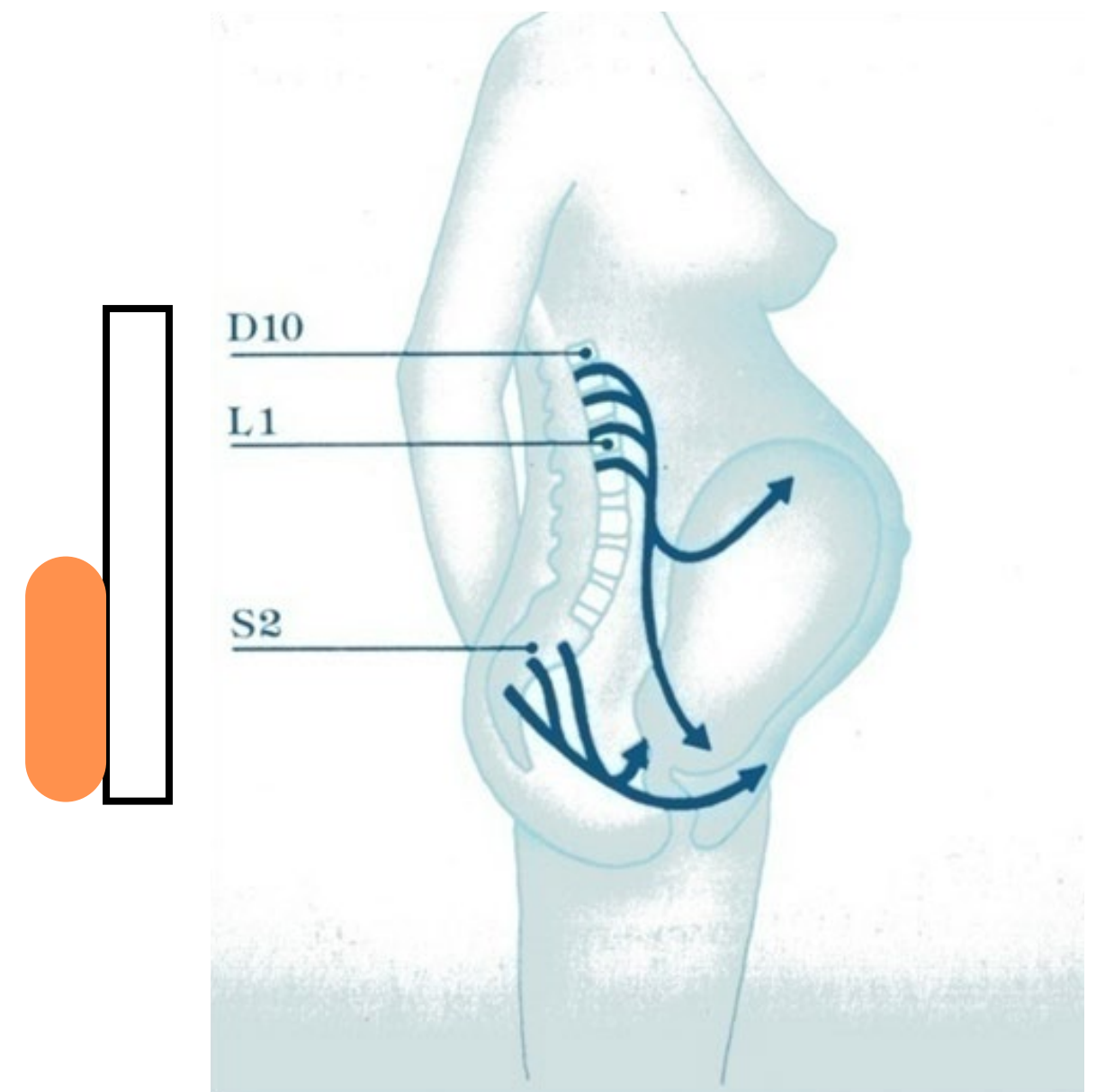


Intermittent Infusion

1 inch

- Better diffusion
- Differential flux

Kaynar AM and Shankar KB Anesth Analg 1999





# Quale dispositivo infusivo ?

Sicurezza/affidabilità

Volume erogato

Tempo di erogazione





Quali variabili  
da considerare ?

Concentrazione



Volume



Tempo





# Finestra terapeutica

Effetto



Tempo



# Finestra terapeutica ?

EFFETTO

TEMPO

CONCENTRAZIONE







**Finestra terapeutica = Target clinico**



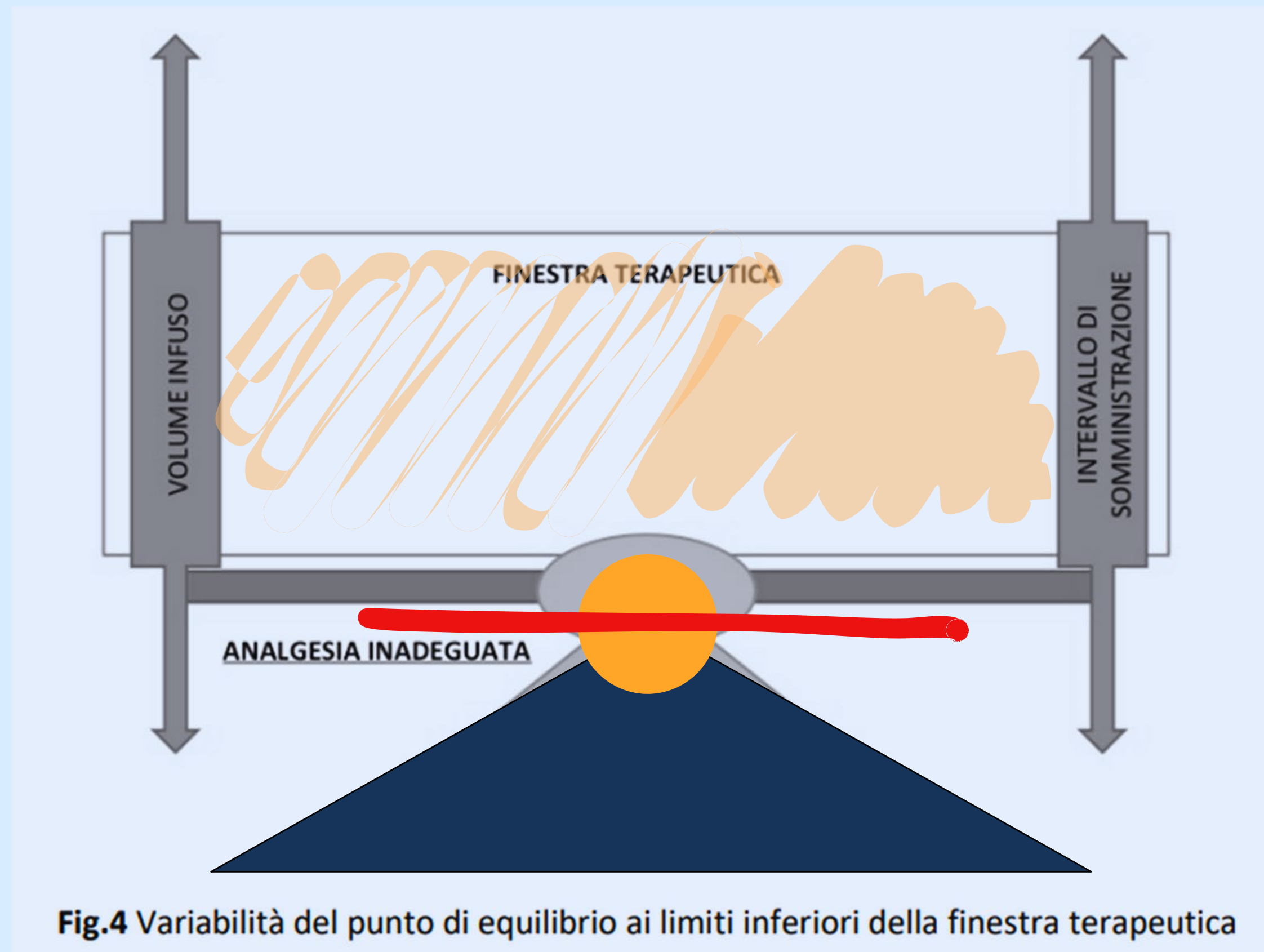


PUNTO  
DI  
EQUILIBRIO





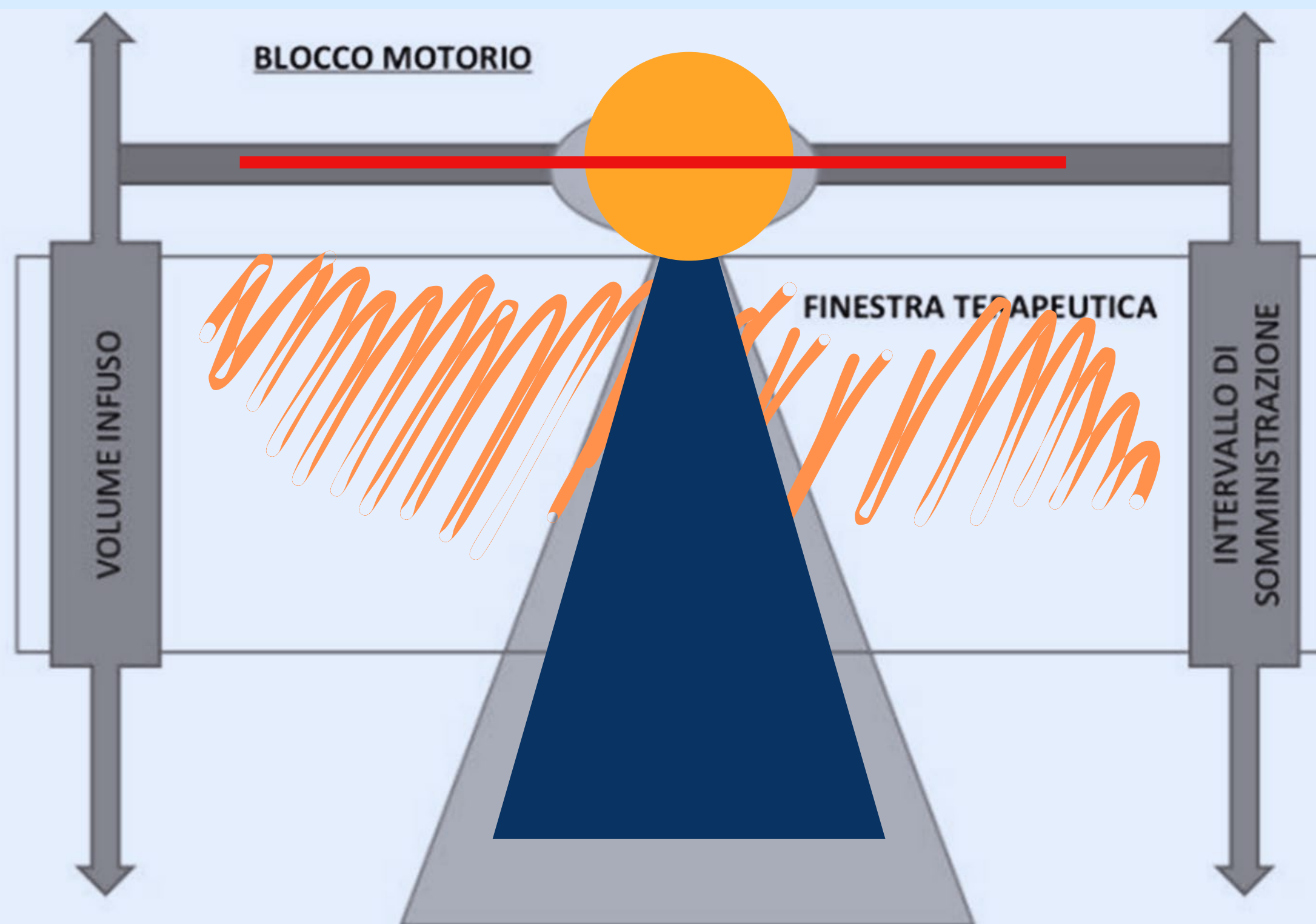
## Analgesia inadeguata







Blocco motorio





## Quali strategie infusive?

- Single shot
- Infusione continua
- TOP -UP
- PIEB
- PCEA



# Modern labor epidural analgesia: implications for labor outcomes and maternal-fetal health



Elliott C. Callahan, MD; Won Lee, MD; Pedram Aleshi, MD; Ronald B. George, MD, FRCPC

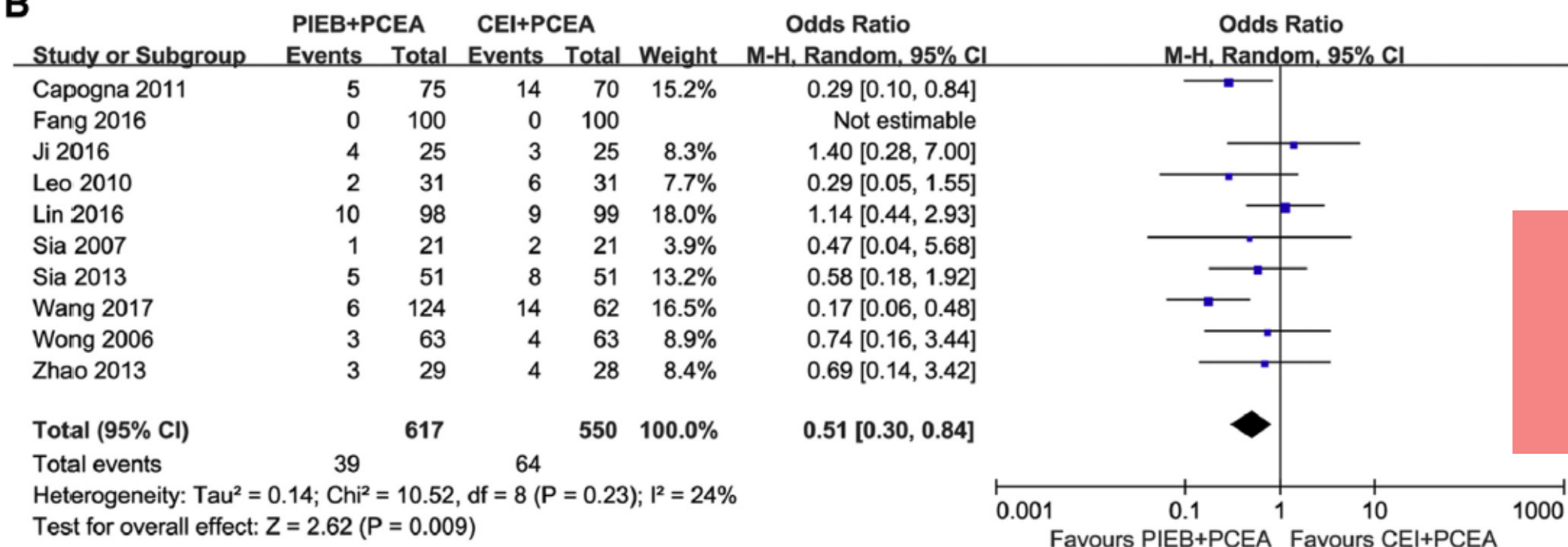
Xu et al,<sup>33</sup> 2019

Systematic review  
and meta-analysis

11 RCTs including  
1367 patients of  
mixed parity

PIEB+PCEA vs  
CEI+PCEA

**B**



Forest plot of studies comparing PIEB+PCEA with CEI+PCA for the outcome of mode of delivery. **A**, Forest plot of the pooled analysis for mode of delivery (cesarean delivery). **B**, Forest plot of the pooled analysis for mode of delivery (assisted vaginal delivery). Reproduced from Xu et al<sup>33</sup> under Creative Commons CC BY license.

CEI, continuous epidural infusion; CI, confidence interval; PCEA, patient-controlled epidural analgesia; PIEB, programmed intermittent epidural bolus.

Callahan. Effects of epidural analgesia in labor. Am J Obstet Gynecol 2023.

PIEB+PCEA group  
had: decreased  
incidence of  
assisted vaginal  
delivery and  
breakthrough pain,  
higher maternal  
satisfaction, and  
shorter duration of  
labor

## PIEB + PCEA vs CEI + PCEA@OUTCOME



**Automated mandatory bolus versus basal infusion for maintenance of epidural analgesia in labour (Review)**

Tan HS, Zeng Y, Qi Y, Sultana R, Tan CW, Sia AT, Sng BL, Siddiqui FJ

# 2023 18 STUDI PER 4590 DONNE IN TRAVAGLIO PIEB vs CI

**Authors' conclusions**

Overall, AMB is associated with lower incidence of breakthrough pain, reduced LA consumption, and may improve maternal satisfaction. There were no significant differences between AMB and BI in the incidence of caesarean delivery, instrumental delivery, duration of labour analgesia, and Apgar scores. Larger studies assessing the incidence of caesarean and instrumental delivery are required.



Ridotta incidenza di  
breakthrough pain



Ridotto consumo  
di farmaci



Migliore soddisfazione  
materna





# Tempo





Effetto

Blocco motorio  
effetti collaterali

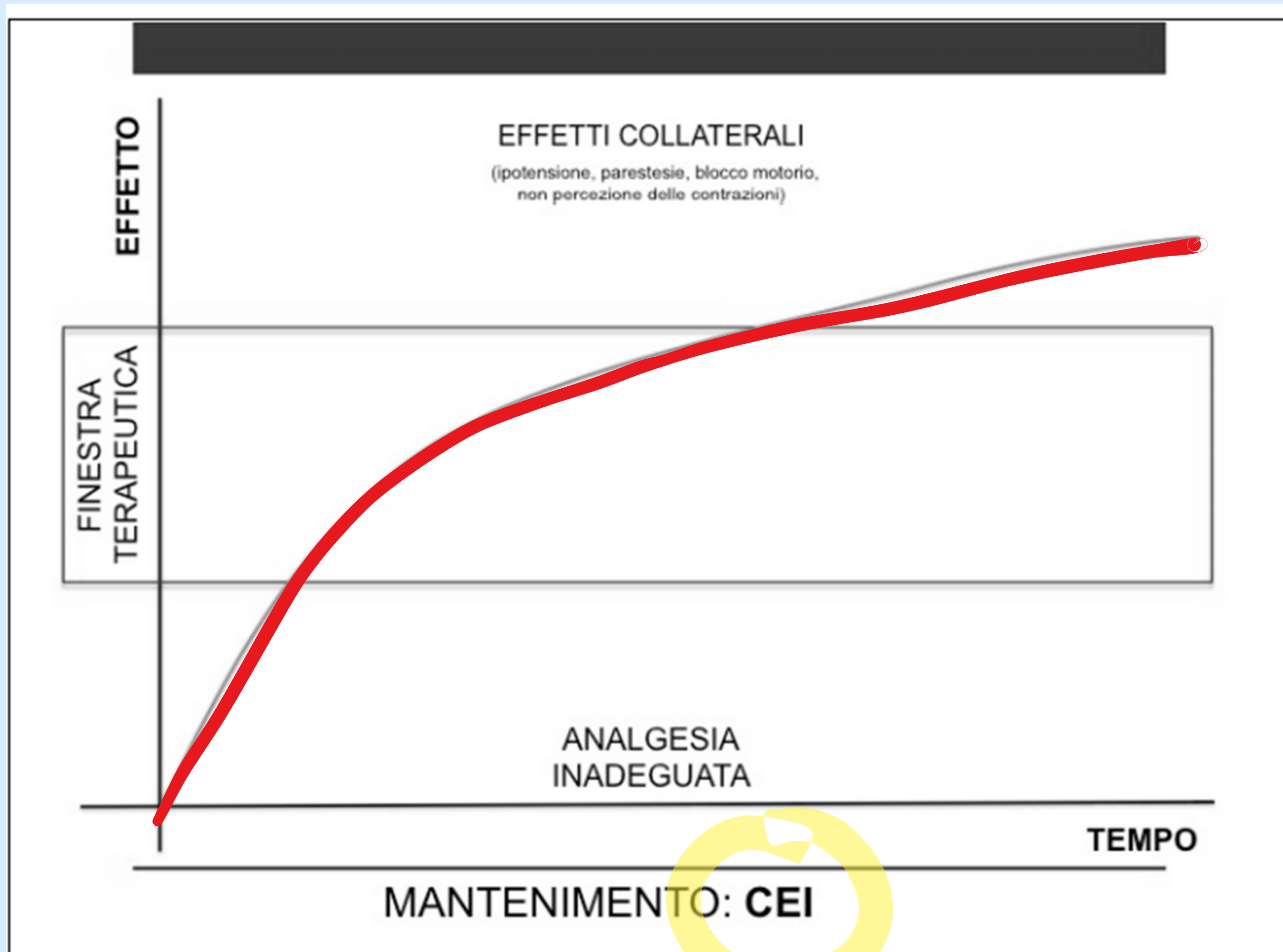
Finestra  
terapeutica



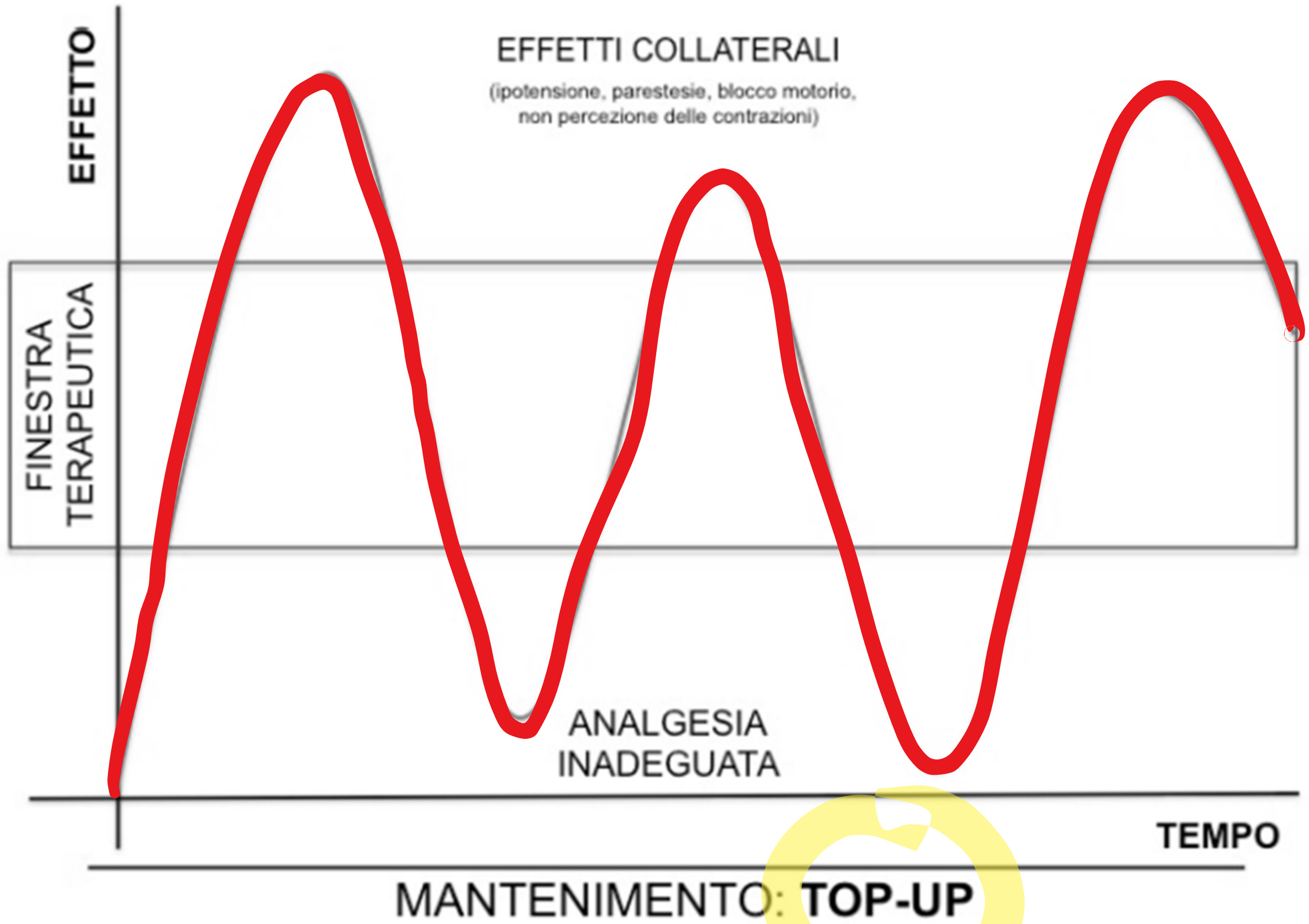
Analgesia inadeguata -  
dolore

Tempo

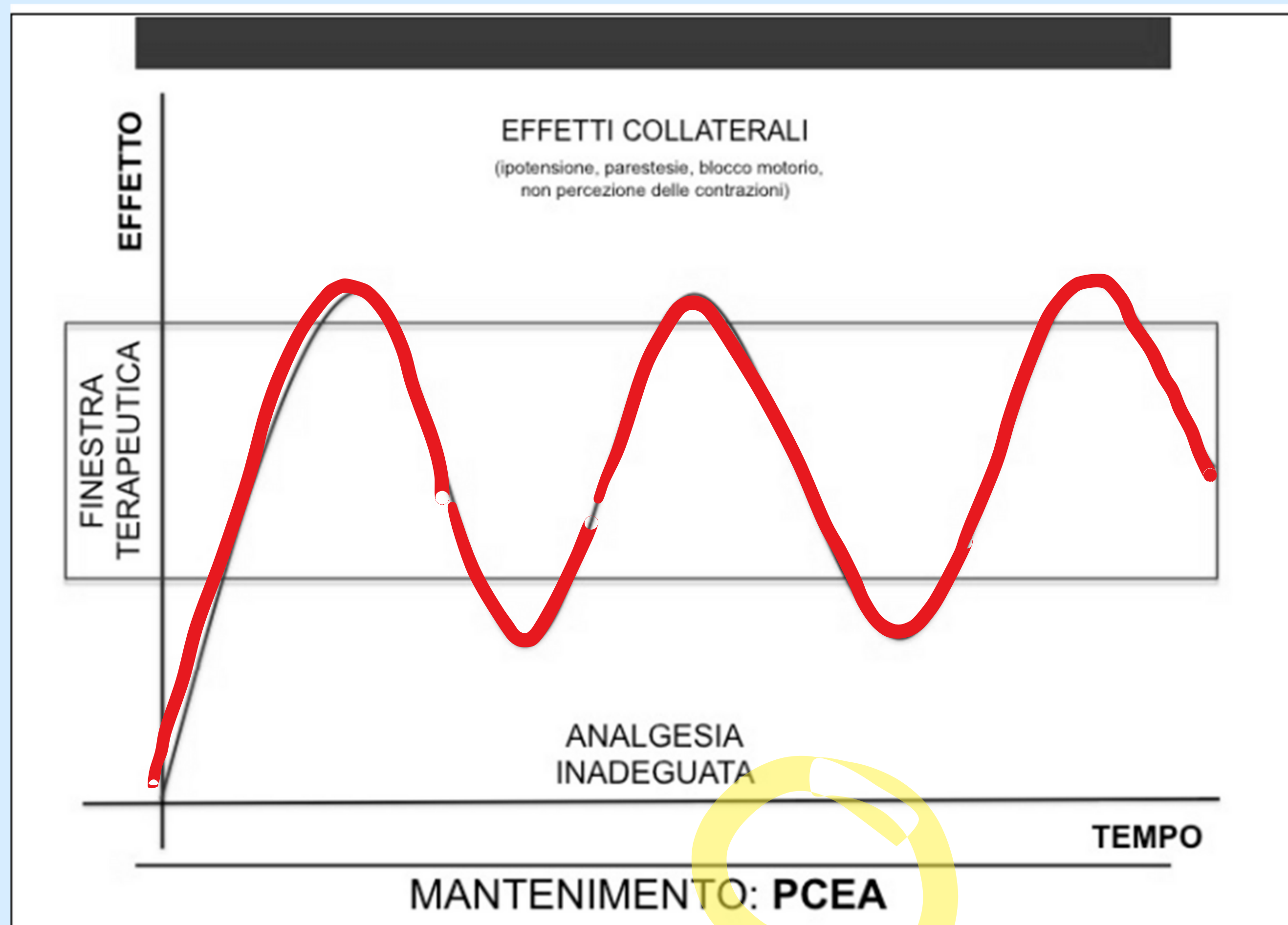
















EFFETTO

## EFFETTI COLLATERALI

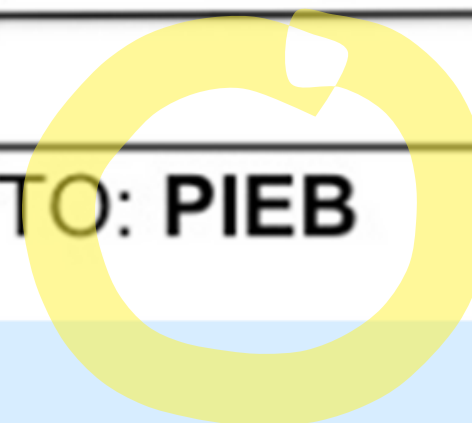
(ipotensione, parestesie, blocco motorio,  
non percezione delle contrazioni)

FINESTRA  
TERAPEUTICA

ANALGESIA  
INADEGUATA

TEMPO

MANTENIMENTO: **PIEB**







Contents lists available at [ScienceDirect](#)

Journal of Clinical Anesthesia

journal homepage: [www.elsevier.com/locate/jclinane](http://www.elsevier.com/locate/jclinane)



## Review

# Influence of different volumes and frequency of programmed intermittent epidural bolus in labor on maternal and neonatal outcomes: A systematic review and network meta-analysis

Ryan Howle<sup>a,b</sup>, Sophie Ragbourne<sup>c</sup>, Danaja Zolger<sup>c</sup>, Adetokunbo Owolabi<sup>c</sup>, Desire Onwochei<sup>c,d</sup>, Neel Desai<sup>c,d,\*</sup>

<sup>a</sup> Department of Anaesthesia, Rotunda Hospital, Dublin, Ireland

<sup>b</sup> Department of Anaesthesia, Mater Misericordiae University Hospital, Dublin, Ireland

<sup>c</sup> Department of Anaesthesia, Guy's and St Thomas' NHS Foundation Trust, London, United Kingdom

<sup>d</sup> King's College London, London, United Kingdom

## 5. Conclusions

Overall, this meta-analysis and systematic review indicates that PIEB 5/30 and PIEB 10/60 may represent the optimal PIEB regimens from the perspective of volume and time interval. PIEB 5/30 was not inferior to PIEB 10/60 in regard to the need for rescue analgesia and decreased the pain score at 4 h when compared to PIEB 2.5/15, PIEB 5/60 and PIEB

10/60. PIEB 10/60 was superior to PIEB 2.5/15, PIEB 4/45 and PIEB 5/60 with respect to the need for rescue analgesia and PIEB 10/60 followed by PIEB 5/30 were best placed to lower the cumulative dose of local anesthetic in labor, resulting in a reduction in the incidence of lower limb motor blockade with PIEB 10/60. No differences were present between the various PIEB combinations of administered volume and dose interval for maternal satisfaction. The quality of evidence for the two primary outcomes, the need for rescue analgesia and the maternal satisfaction, was low. PIEB 10/40 was not subject to investigation in randomized controlled trials but sequential allocation studies have revealed its potential to be effective in 90% of nulliparous women in the first stage of labor. The quality of the evidence for the primary outcomes, the need for rescue analgesia and future research should focus on PIEB 5/30, PIEB 10/40 and PIEB 10/60 and how the method of analgesia initiation, nature and concentration of local anesthetic, design of epidural catheter and rate of administration might influence outcomes related to the mother and neonate.

2024  
30 trials dal  
2004 al 2022





**ANESTESISTA  
OPERATORE**



**TECNOLOGIA**





The background of the entire slide is a photograph of ocean waves. The water is a deep blue-grey color, and the waves are captured in a way that shows their texture and movement, with white foam visible on the crests. The lighting is somewhat dim, giving it a moody, atmospheric feel.

"La vita è come andare in bicicletta :  
se vuoi stare in equilibrio devi muoverti

"

Albert Einstein

***GRAZIE***