En “moderne” fødeepidural – muligheder og modaliteter

Anæstesilæge, Kim Ekelund, Rigshospitalet
10.55 – 11.10

En “moderne” fødeepidural ?

- Moderne?

1.5 Modern Epidural Analgesia

In the 1950s, **Philip Raikes Bromage** (1920–2013) (Fig. 1.13) took the practice of epidural anesthesia into the modern era. Born and educated in London, he became professor in anesthesia in Canada, the USA, and Saudi Arabia.

He published two major single-author textbooks on epidural anesthesia: *Spinal Epidural Analgesia* (1954) [38] and *Epidural Analgesia* (1978) [39]. The latter text covered all aspects of epidural anesthesia at the time of publication and it remains the reference book and a very valuable resource even today. It promoted safety and scientific basis for the practice of regional anesthesia. It played a pivotal role in the widespread acceptance and utilization of epidural analgesia for surgery, obstetrics, and pain management.

But the birth of modern obstetric analgesia can easily be traced back to **John Joseph Bonica** (1917–1994) (Fig. 1.14), an Italian-American physician, the father of the field of pain control, who devoted his career to the study of pain, establishing it as a multidisciplinary field. He created residency programs, chaired departments, wrote standard texts in the field, and had his work published in numerous languages. Among his huge number of publications, his masterpiece is *The Management of Pain* published for the first time in 1953 [40] and followed by numerous editions. His paper “*Peridural Block: analysis of 3637 cases and review*,” published in 1957 [41], is still today one of the most beautiful, in-depth, exhaustive descriptions of the epidural technique in all its practical aspects.

Bonica traced the path for a rational, reproducible, and effective approach for the abolition of pain in labor and delivery. He used a series of nerve blocks of various nociceptive pathways, including paracervical, segmental epidural, caudal, and trans-sacral blocks, to further refine the knowledge—due to Cleland’s previous work—of the nerve pathways that transmit labor pain to the central nervous system. He demonstrated that the upper part of the cervix and lower uterine segment are supplied by afferents that accompany the sympathetic nerve through the uterine and cervical plexus; the inferior, middle, and superior hypogastric plexuses; and the aortic plexuses.

Fig. 1.13 Philip Raikes Bromage (1920–2013) (from Douglas (2013) IJOA 22:272, with permission)

Fig. 1.14 John Joseph Bonica (1917–1994)

En “moderne” fødeepidural – muligheder og modaliteter?

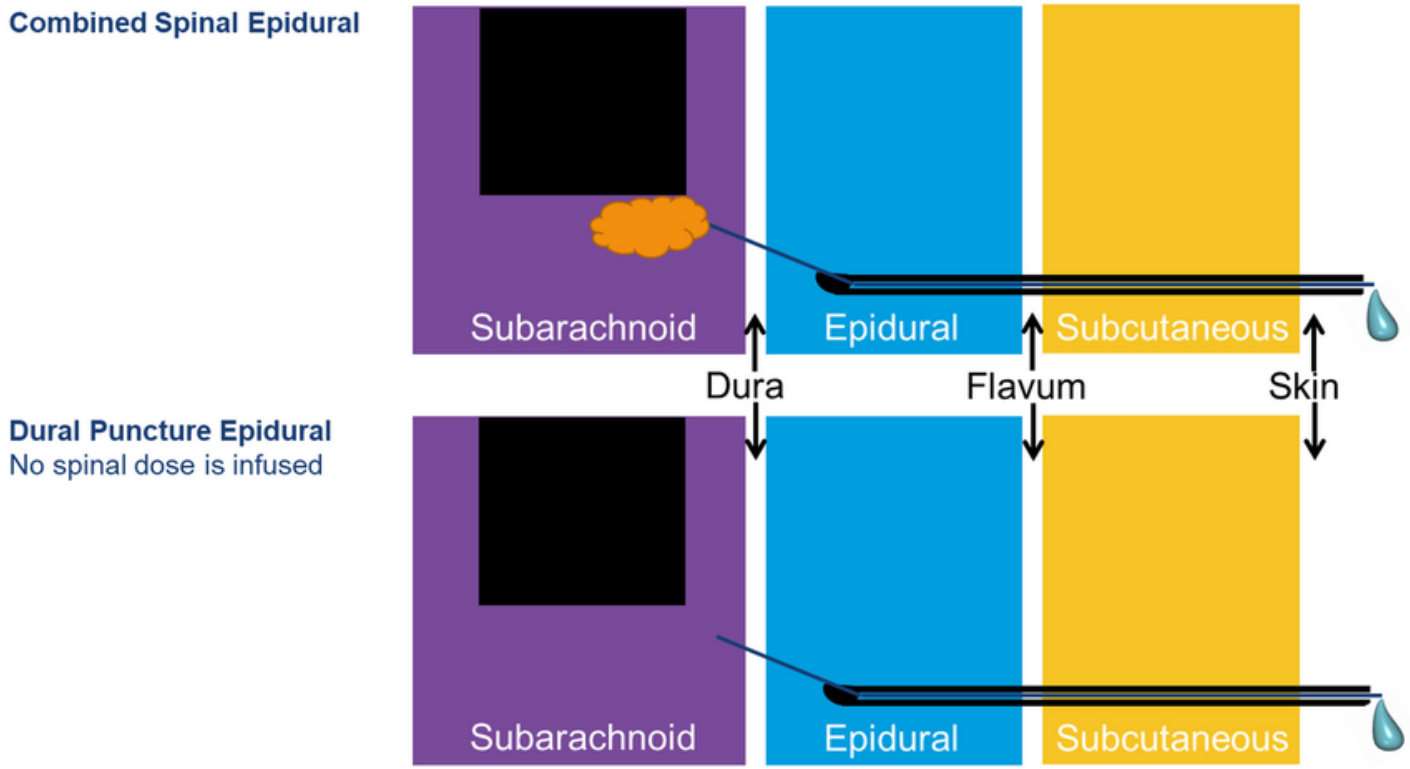
- Moderne?

Low-dose i.e., walking epidural
i.e. bupivacain ≤ 0,1% (1,0mg/ml)

En “moderne” fødeepidural – muligheder og modaliteter?

- Moderne? Low-dose i.e., walking epidural
- Muligheder? Epidural (Epi) +/- spinal (CSE, DPE)

Forskellen på CSE og DPE



Standard epidural smlgn med CSE og DPE

Epidural

- - onset
- + standard teknik
- - flere boli
- - en-sidig
- + økonomi
- Udlandet
  Gold Standard

CSE

- + onset
- - teknik
- + færre boli
- + TopUp
- - økonomi
- Udlandet,
  + failed epi,
  + sent,
  + smerter…
  + BMI / spinal aid

DPE

- + onset
- - teknik
- + færre boli
- +TopUp
- - økonomi
- Udlandet…
  - ingen erfaring
  ? 25G (26G)
  + sakral udbredn.
  + BMI / spinal aid

En “moderne” fødeepidural – muligheder og modaliteter?

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- Modaliteter? Bolus, CEI, PCEA, PIEB, computer Kombinationer!

En “moderne” fødeepidural – muligheder og modaliteter?

- Moderne? Low-dose i.e., walking epidural
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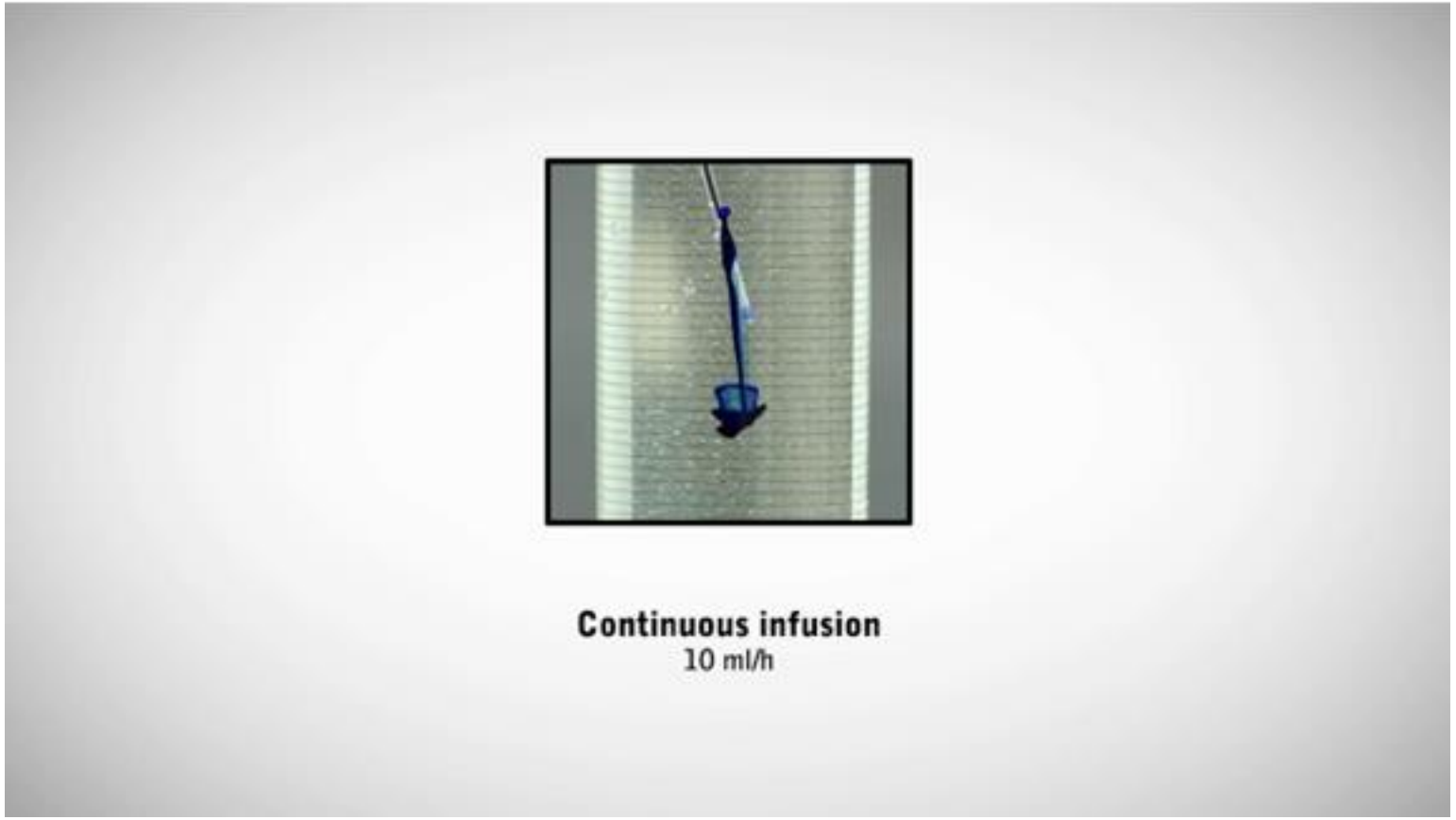
- Ordliste?

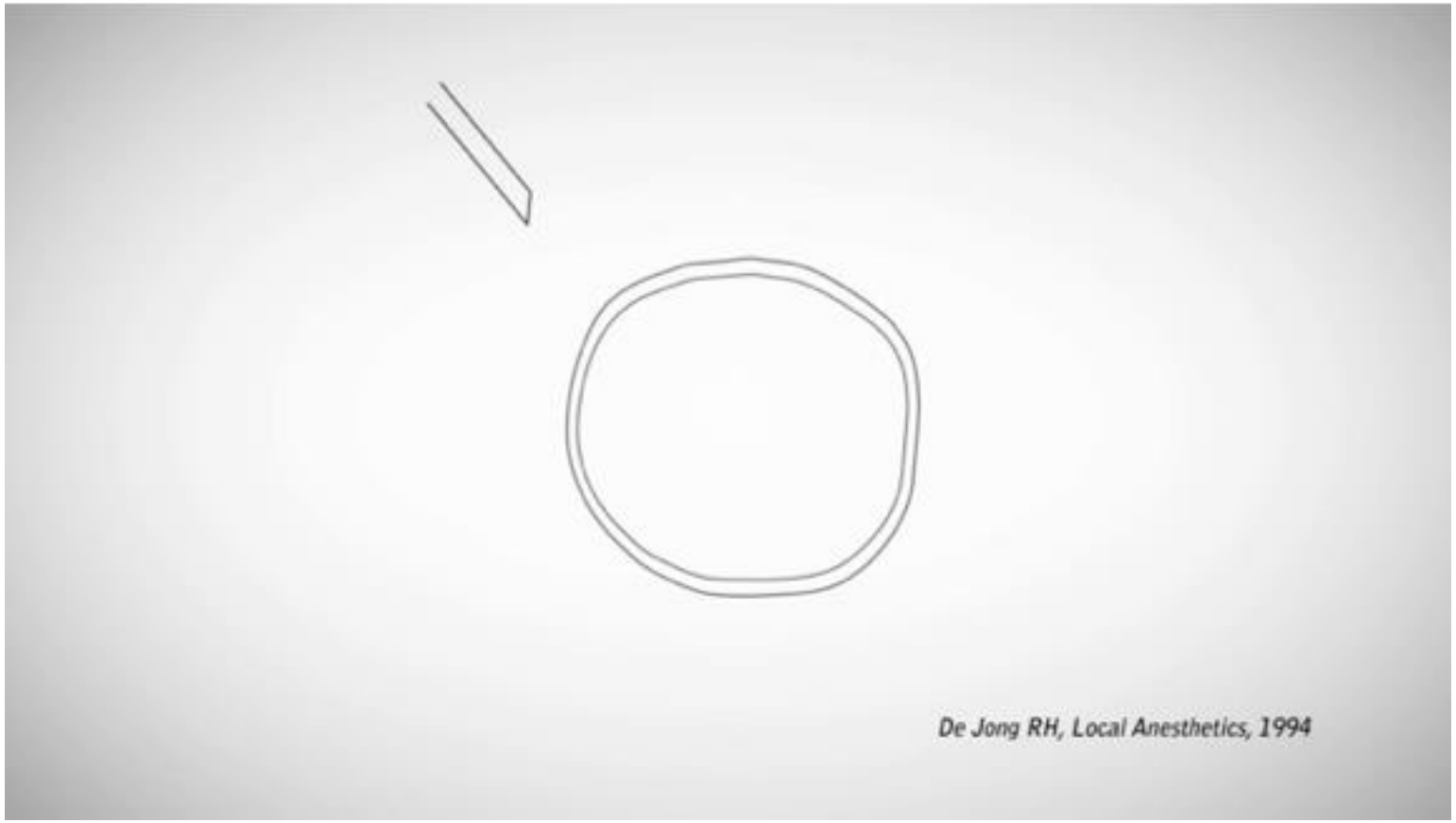
Bolus: Jordemoder / patient
PCEA: Pt Controlled Epi Analgesia,
CEI: Continous Epi Infusion
PIEB: Programmed Intermittent Epi Bolus
Computer: Intelligent infusion/bolus
Kombinationer!

CEI, fordeling ved infusion

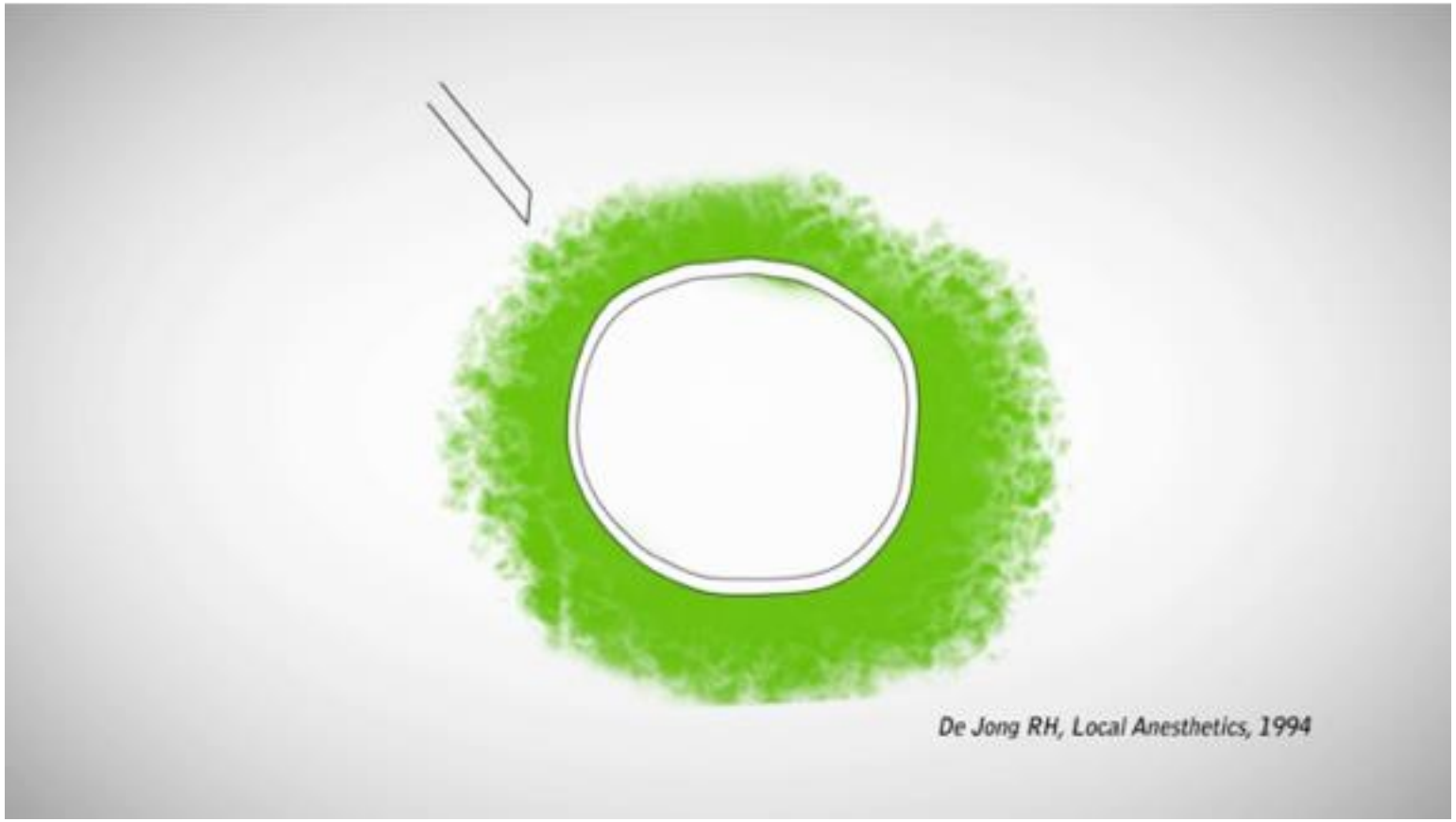


PIEB, fordeling ved bolus

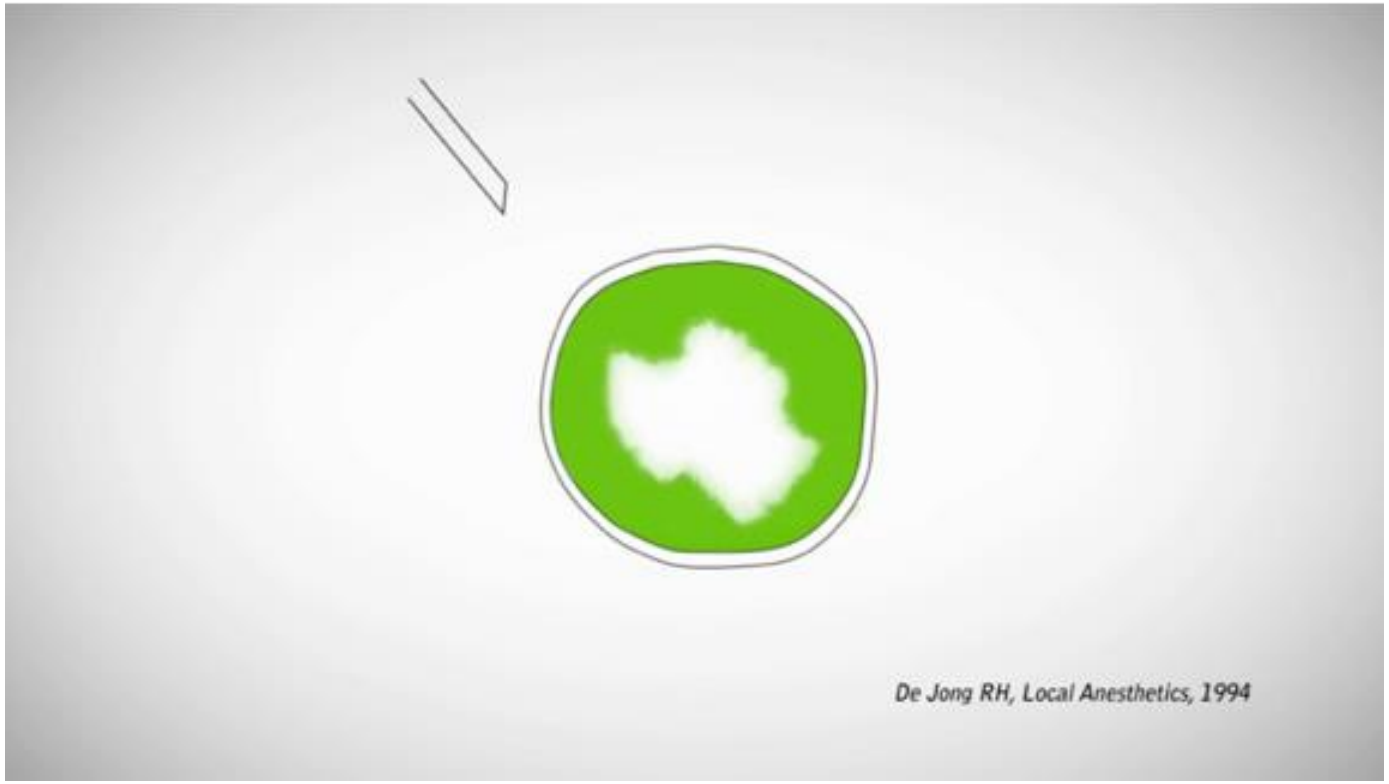
PIEB/CEI før…



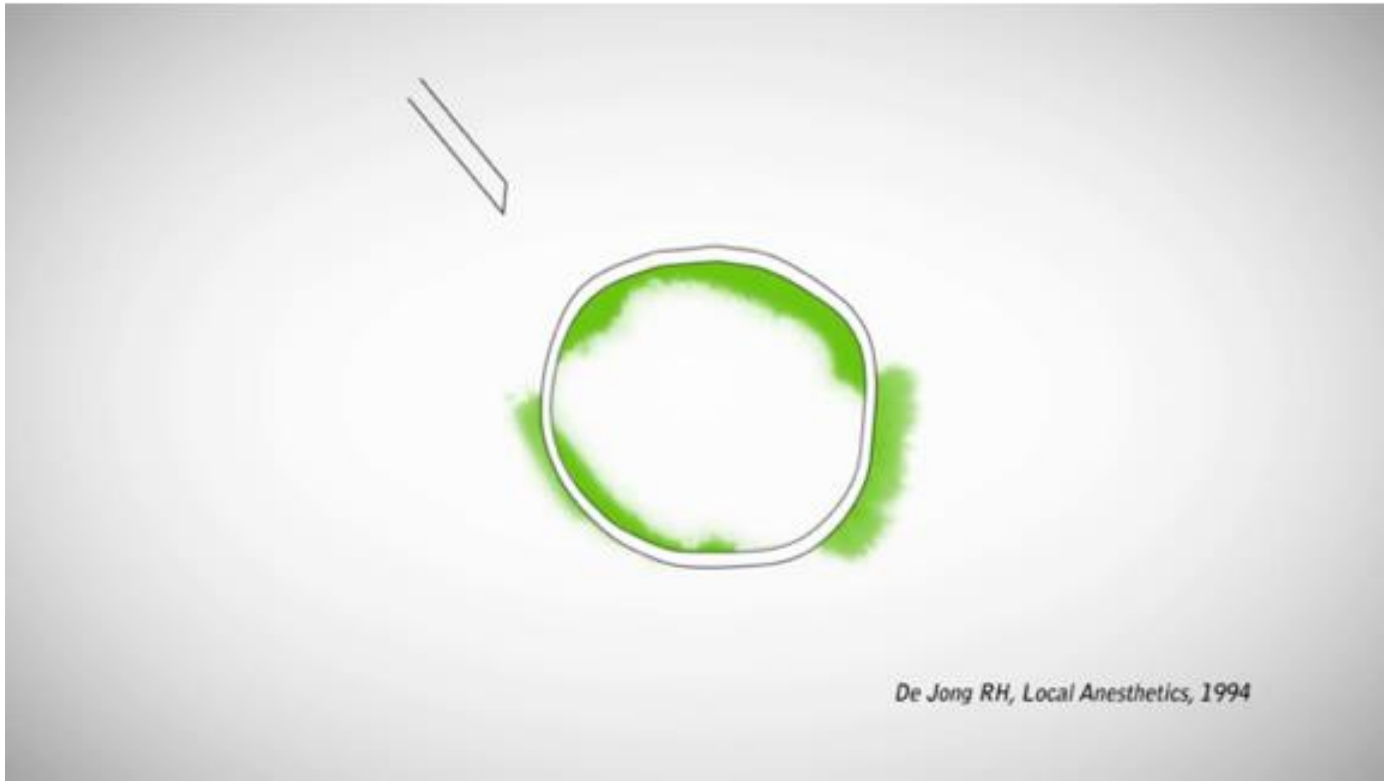
PIEB efter bolus start



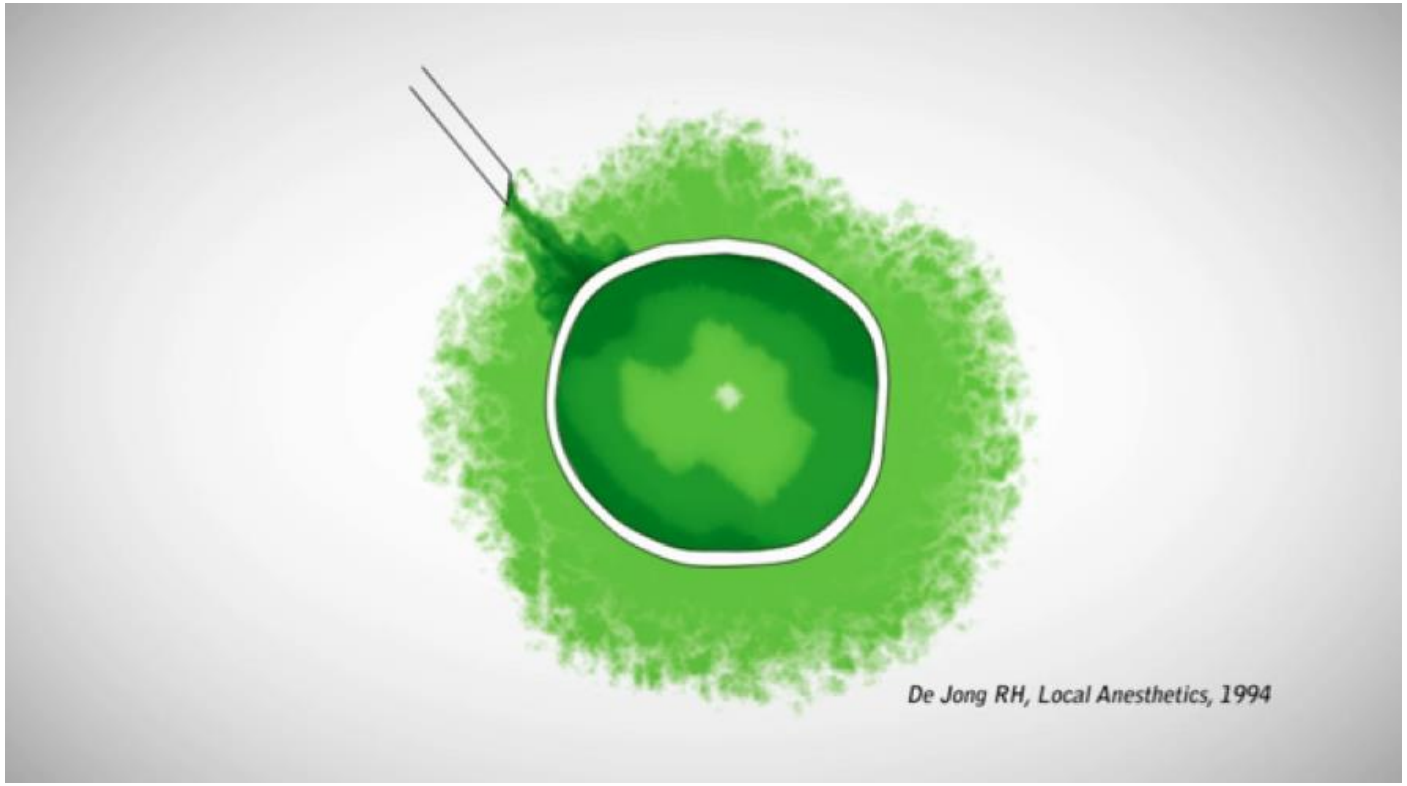
PEIB efter bolus ophør



PIEB, bolus diffunderer væk



CEI, kværner bare løs….



Epidural Infusion: Continuous or Bolus?

To the Editor:

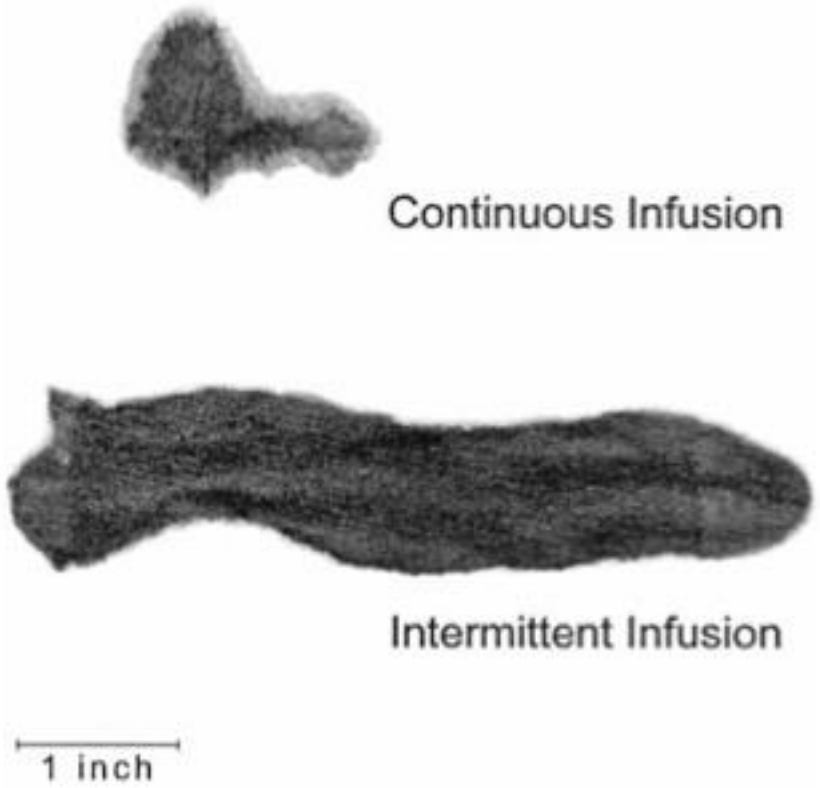


Figure 1. Area of diffusion of the contrast agent during continuous and intermittent infusions.

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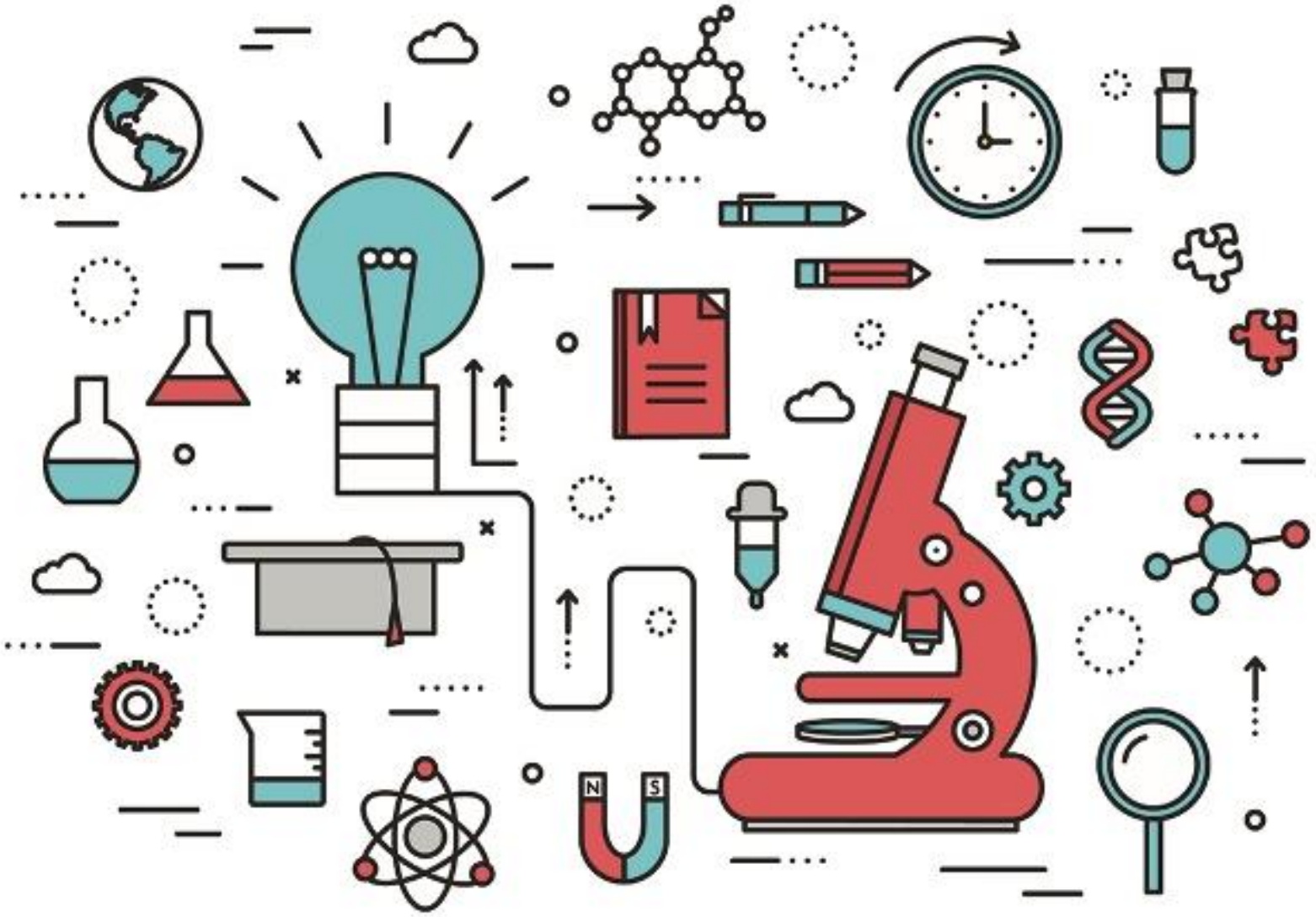
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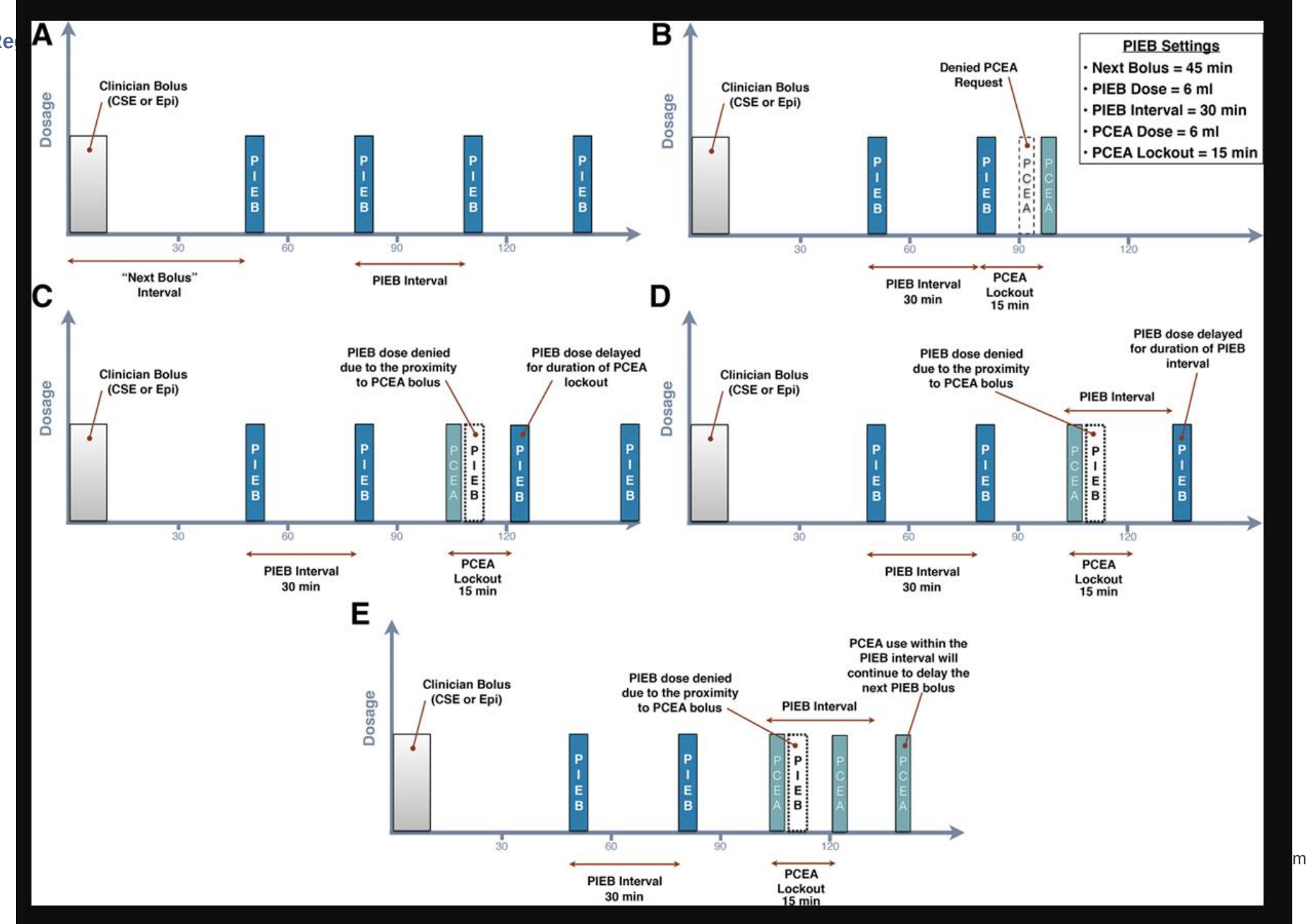
A
Clinician Bolus
(CSE or Epi)
Dosage
PIEB
30
60
90
120
"Next Bolus"
Interval
PIEB Interval
B
Clinician Bolus
(CSE or Epi)
Denied PCEA
Request
PCEA
PIEB Interval
30 min
PCEA
Lockout
15 min
PIEB Settings
· Next Bolus = 45 min
· PIEB Dose = 6 ml
· PIEB Interval = 30 min
· PCEA Dose = 6 ml
· PCEA Lockout = 15 min
C
Clinician Bolus
(CSE or Epi)
PIEB dose denied
due to the proximity
to PCEA bolus
PIEB dose delayed
for duration of PCEA
lockout
PIEB Interval
30 min
PCEA
Lockout
15 min
D
Clinician Bolus
(CSE or Epi)
PIEB dose denied
due to the proximity
to PCEA bolus
PIEB Interval
PIEB dose delayed
for duration of PIEB
interval
PIEB Interval
30 min
PCEA
Lockout
15 min
E
Clinician Bolus
(CSE or Epi)
PIEB dose denied
due to the proximity
to PCEA bolus
PIEB Interval
PCEA use within the
PIEB interval will
continue to delay the
next PIEB bolus
PIEB Interval
30 min
PCEA
Lockout
15 min

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- Medicin? Bupi, Ropi, Levo, +/- opioid Dosis, interval…

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Dosis, interval…
- Mere? Patienttilfredshed, Safety og Økonomi?

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Dosis, interval…
- Mere? Patienttilfredshed, Safety og Økonomi?

Epidural start efter spinal (CSE)?

- Alle boli er tests…

PDPH efter dura punktur (CSE & DPE)?

- Ikke et problem…

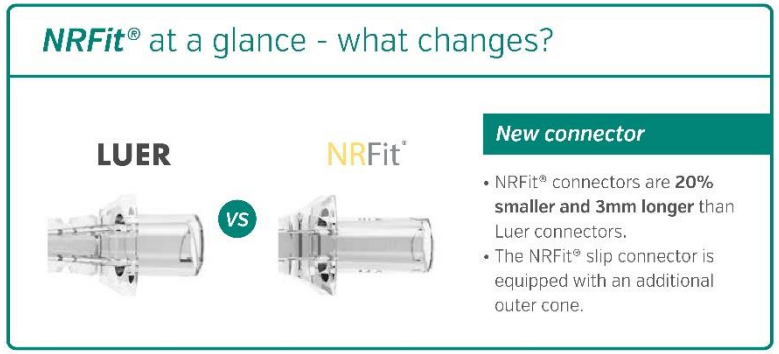
Fremtidens epidural?

”Sexet”

- Assisted epidurals
  - UL
  - Respons
- Personalized pumps

”Bestemt ikke-sexet”

- Same-old-same-old
- Non-Luer-Lock = NRFit



- PIEB Optimal Set-Up

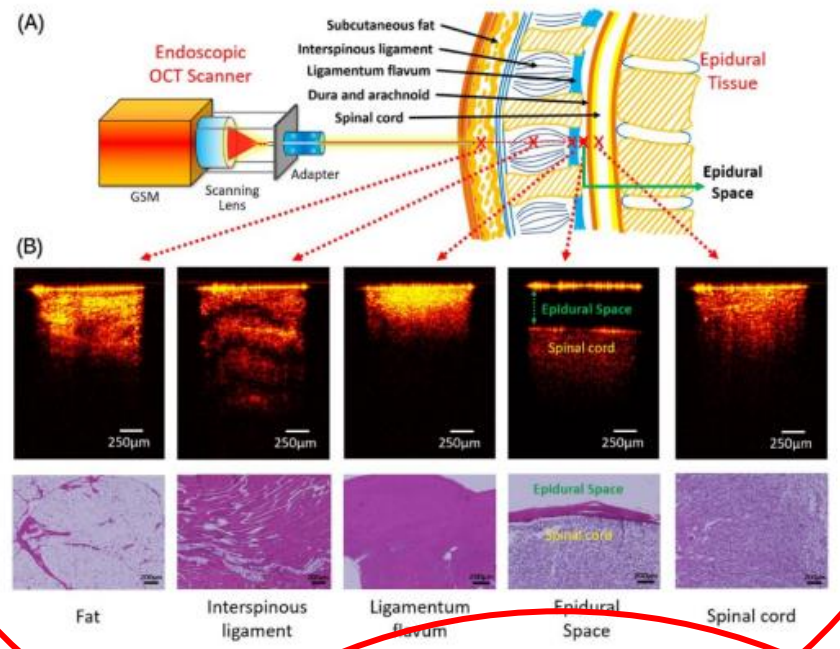
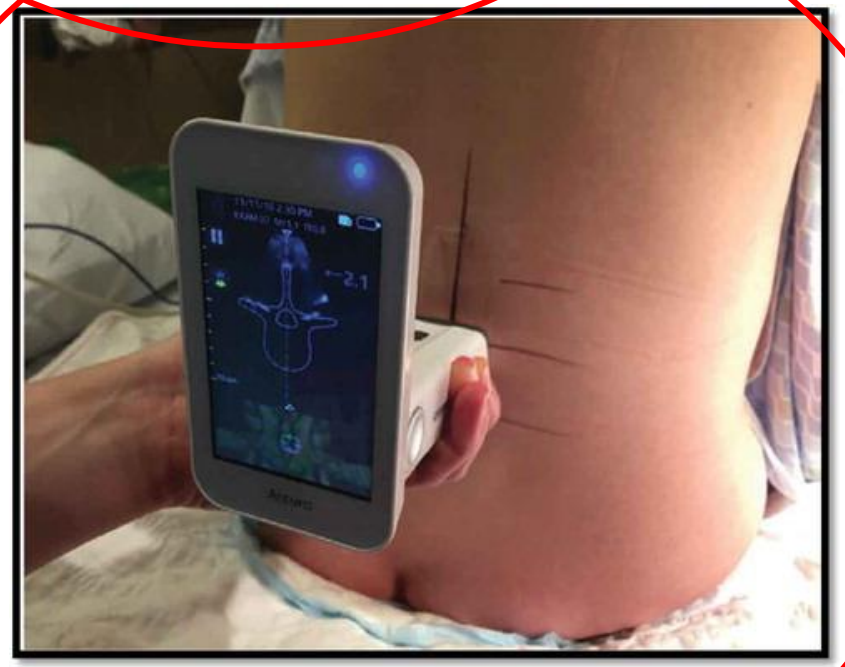
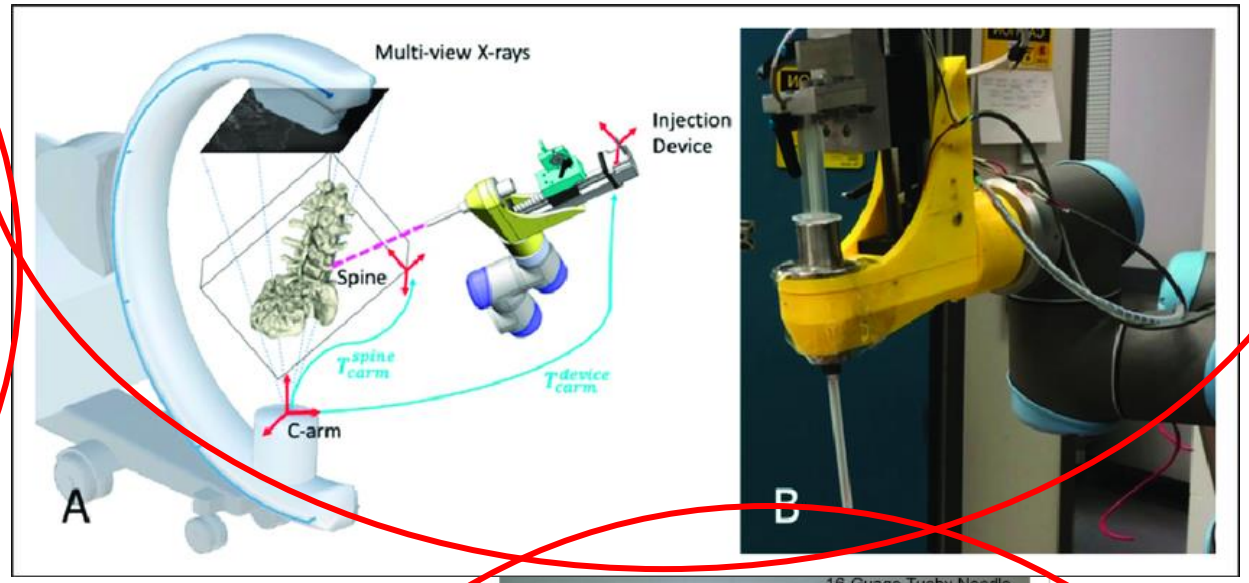


Figure 10. (**A**) Endoscopic OCT scanner setup and the representative OCT images of five epidural tissue layer categories. (**B**) Histology results of different tissue layers. Reprinted with permission from Ref. [12].





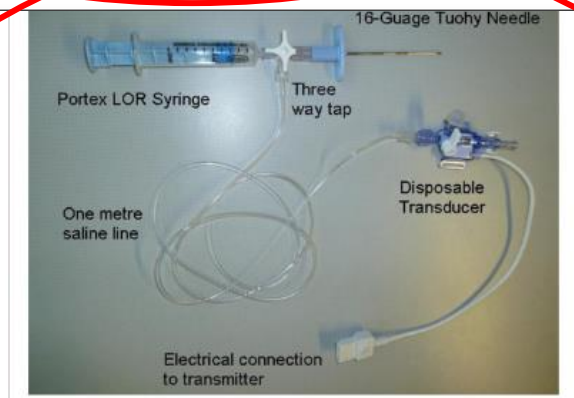


Figure 3. The disposable epidural pressure measurement system. Reprinted with permission from [13].

Figure 4. Screen print of the software interface to monitor and record pressure. Reprinted with permission from [13].