

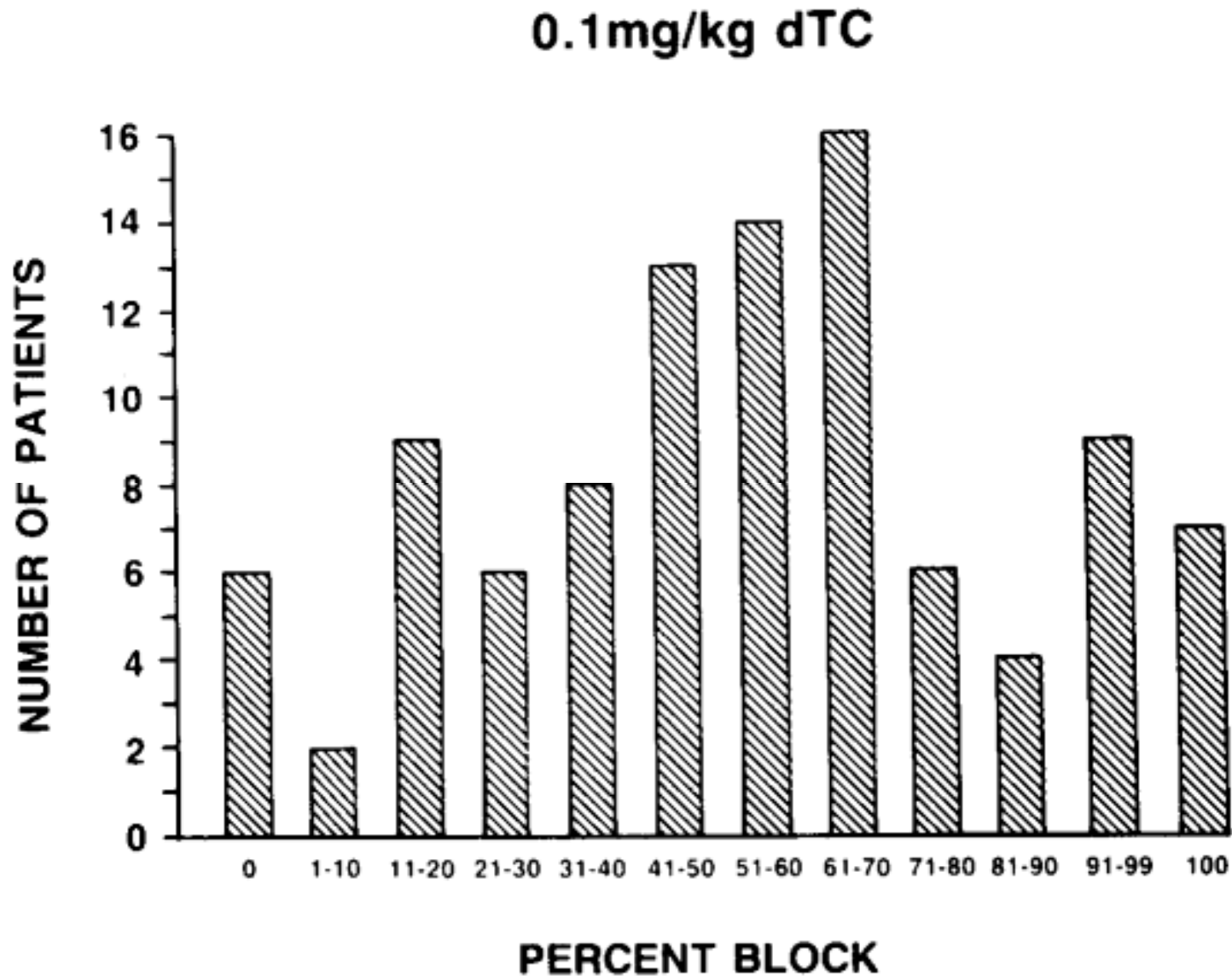


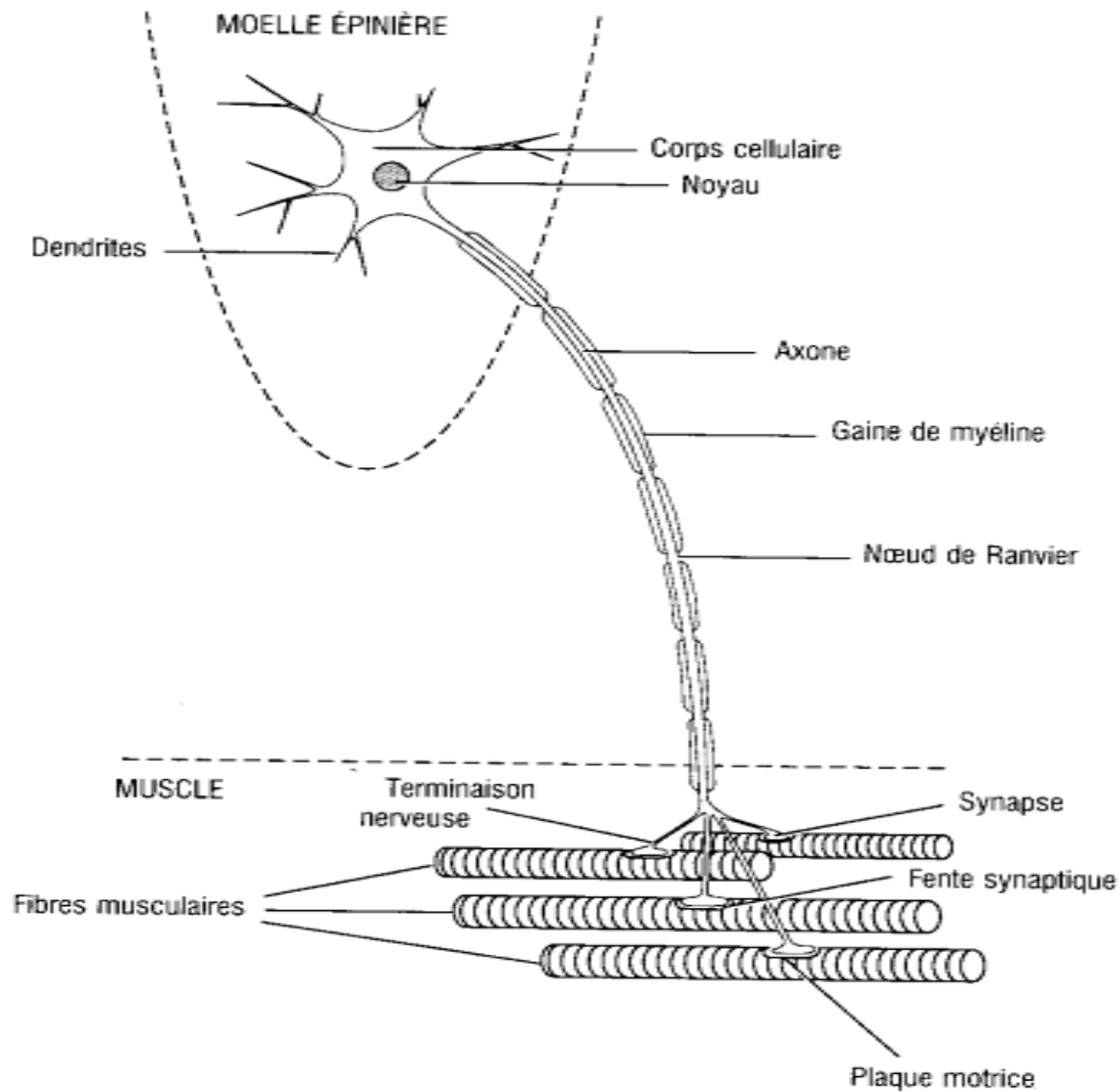
Monitorage de la curarisation

T. Fuchs-Buder

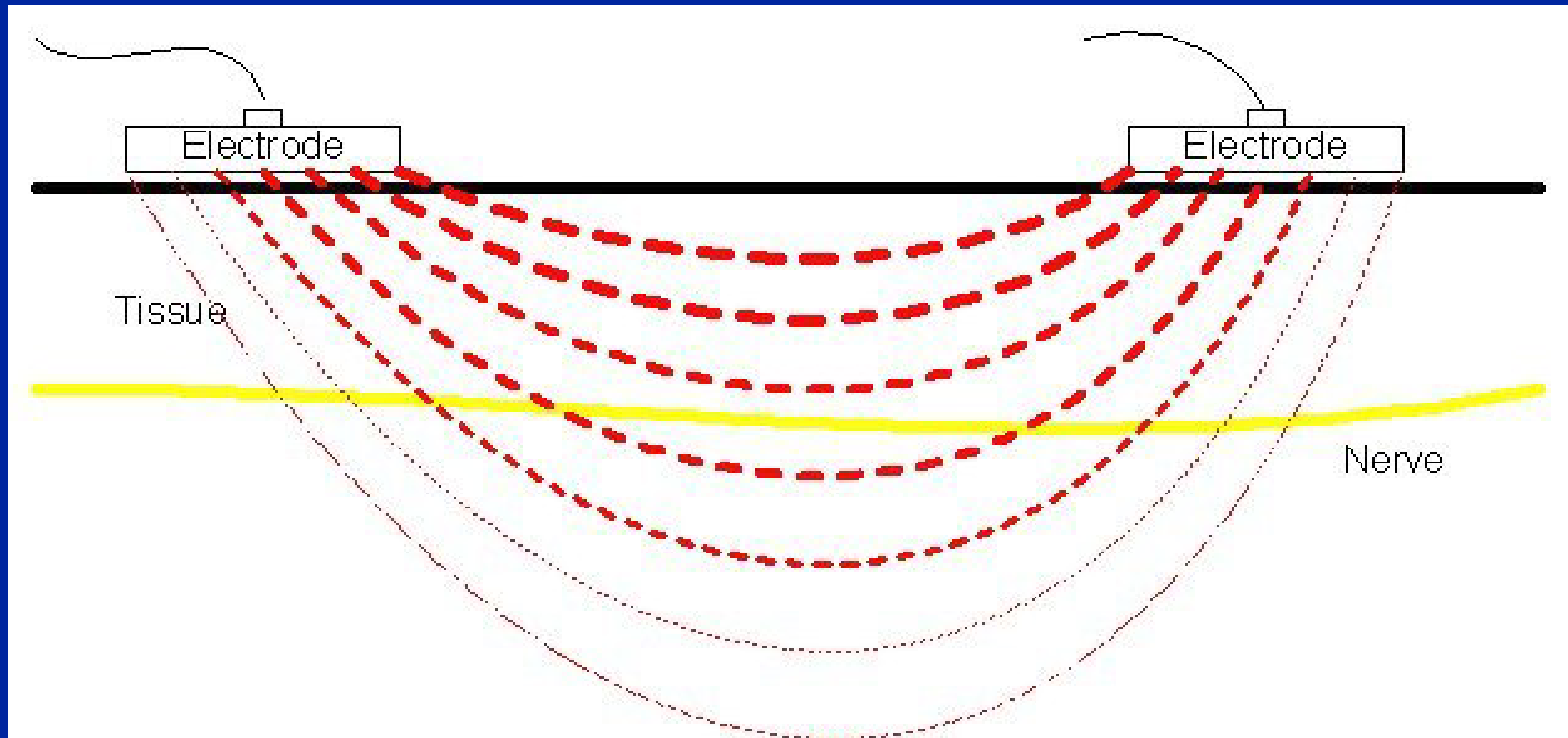
CHU de Brabois, Nancy, France

Variabilité interindividuelle



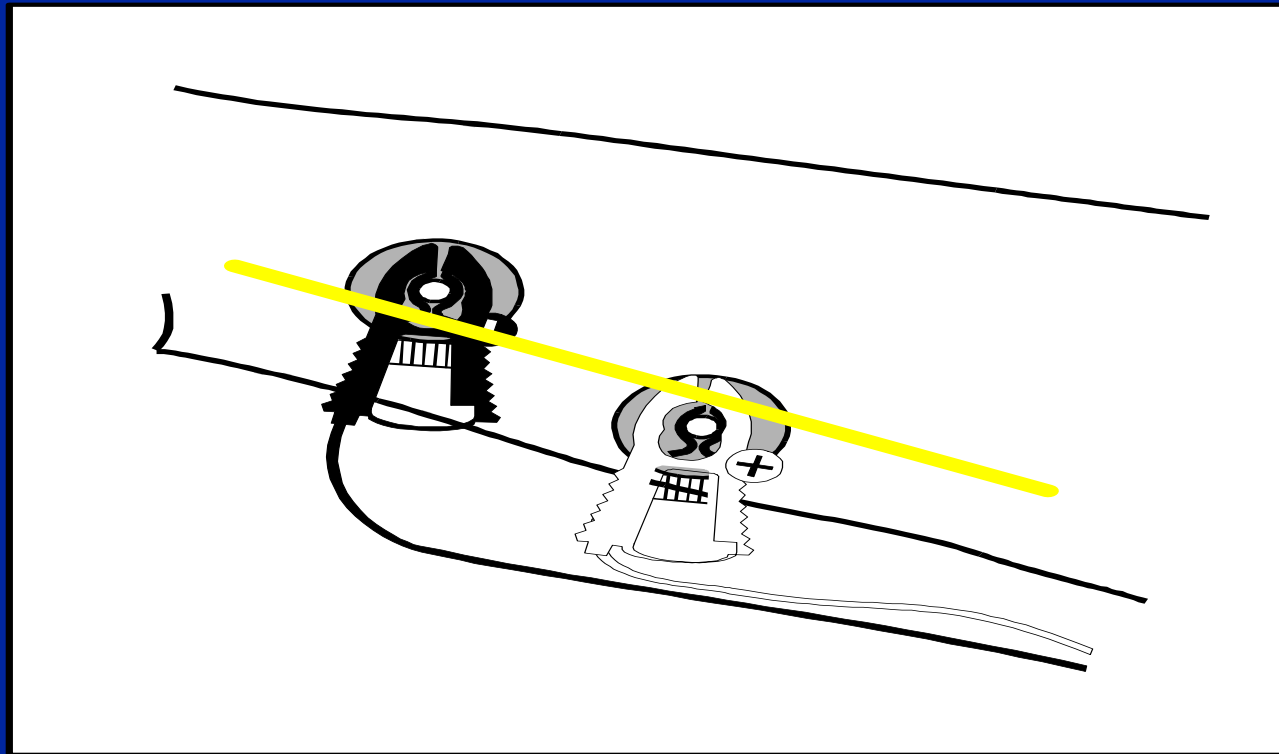


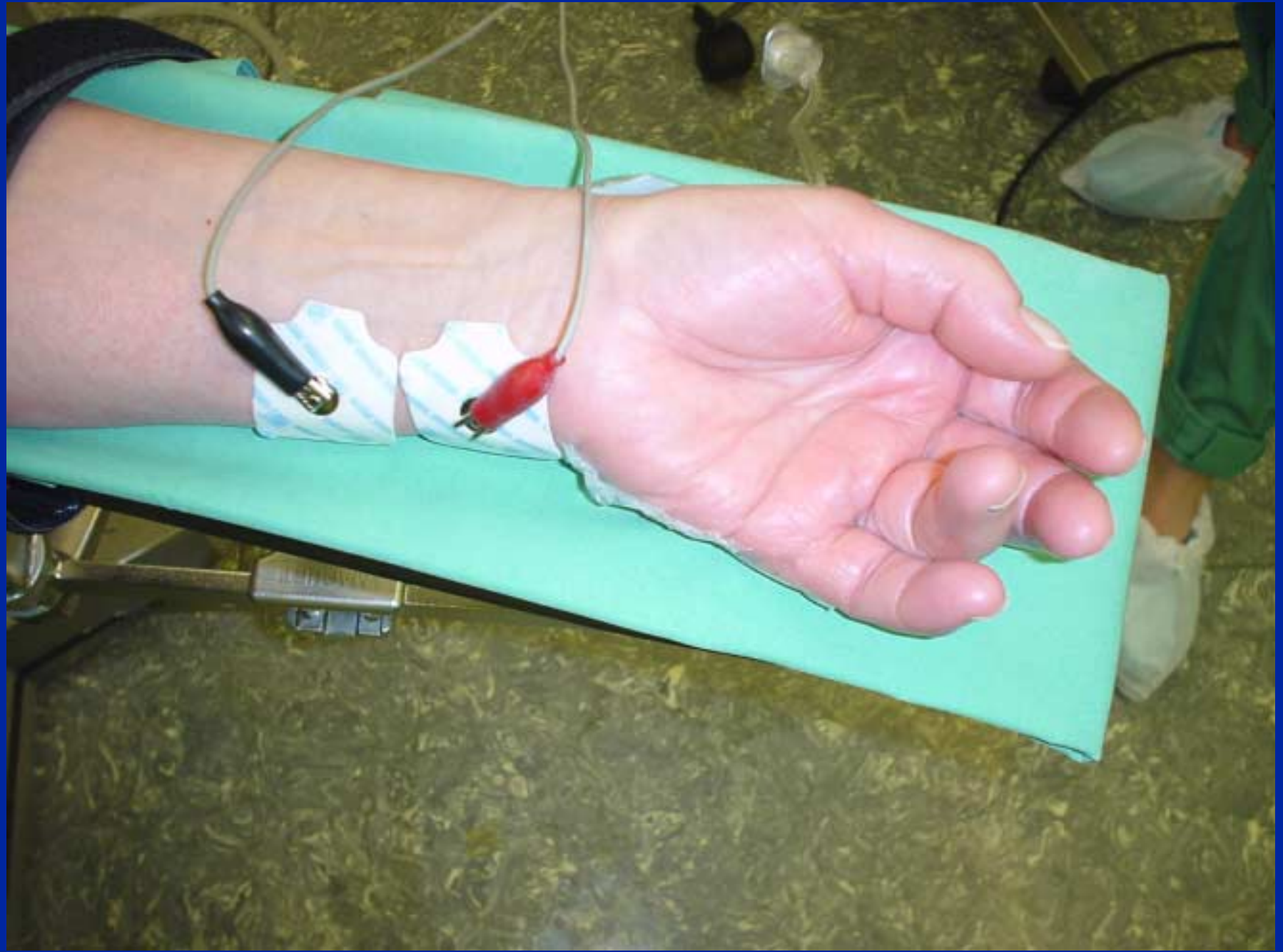
Distribution du courant

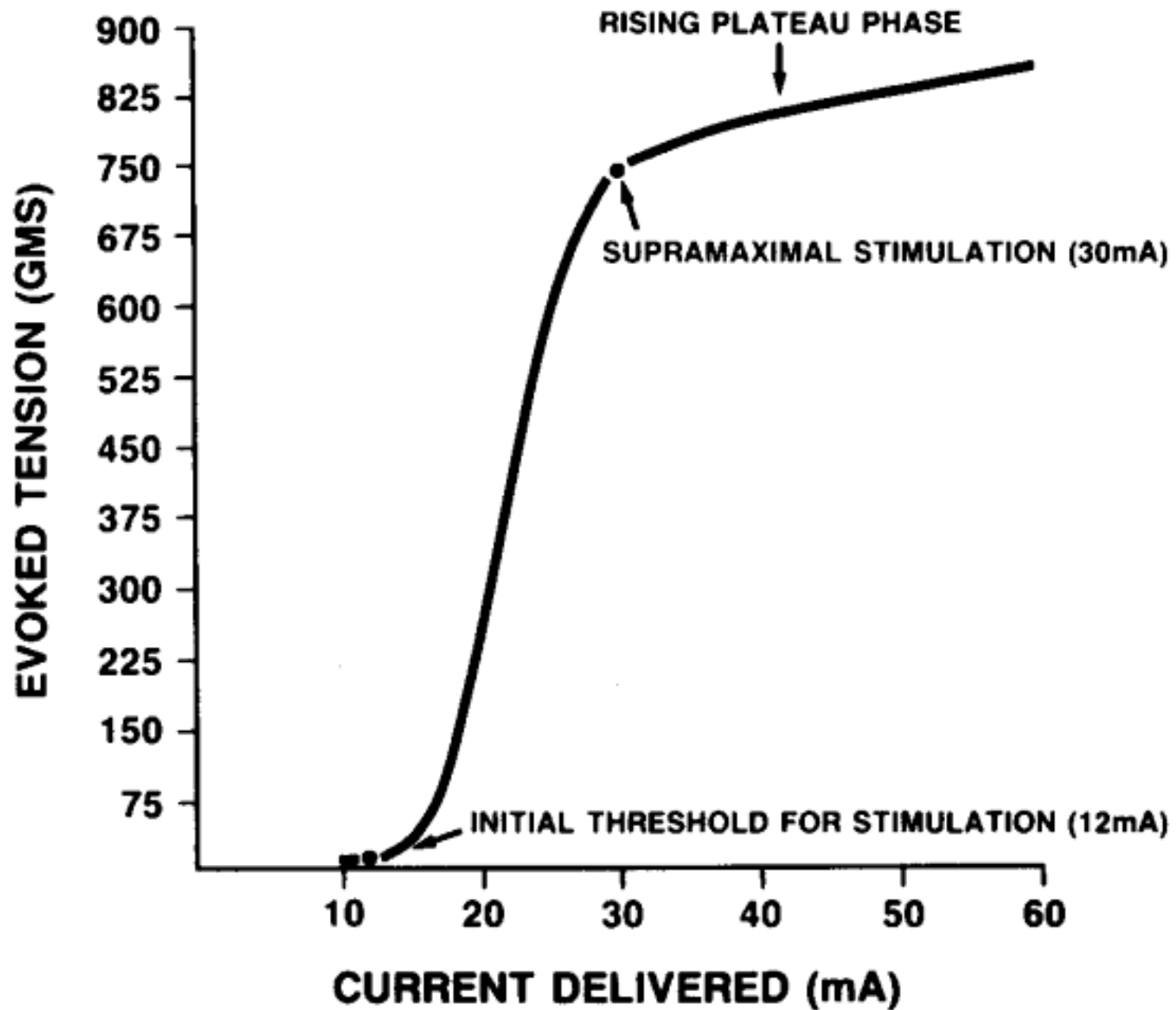


Position des électrodes

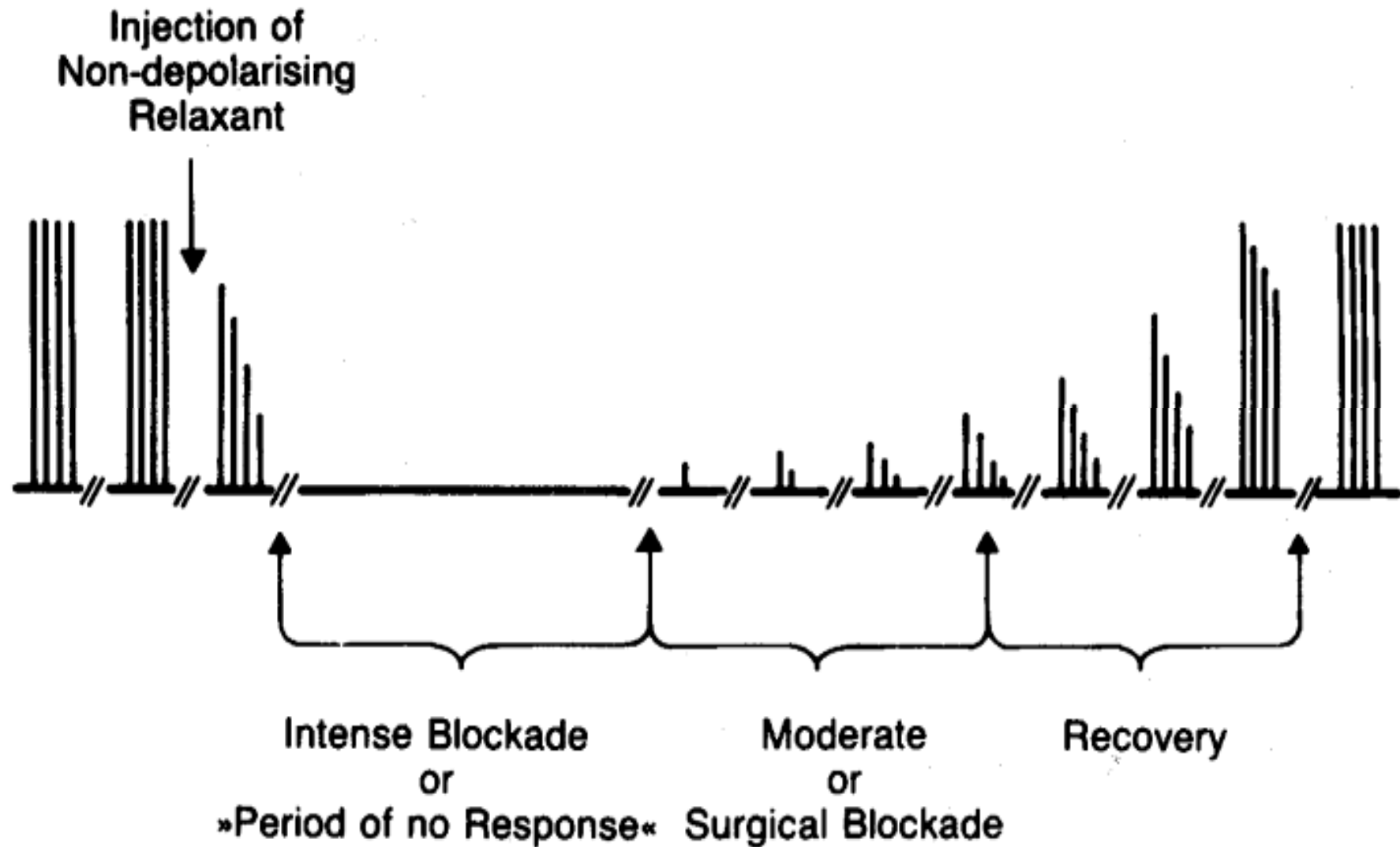
- Éventuellement de part et d'autre du nerf



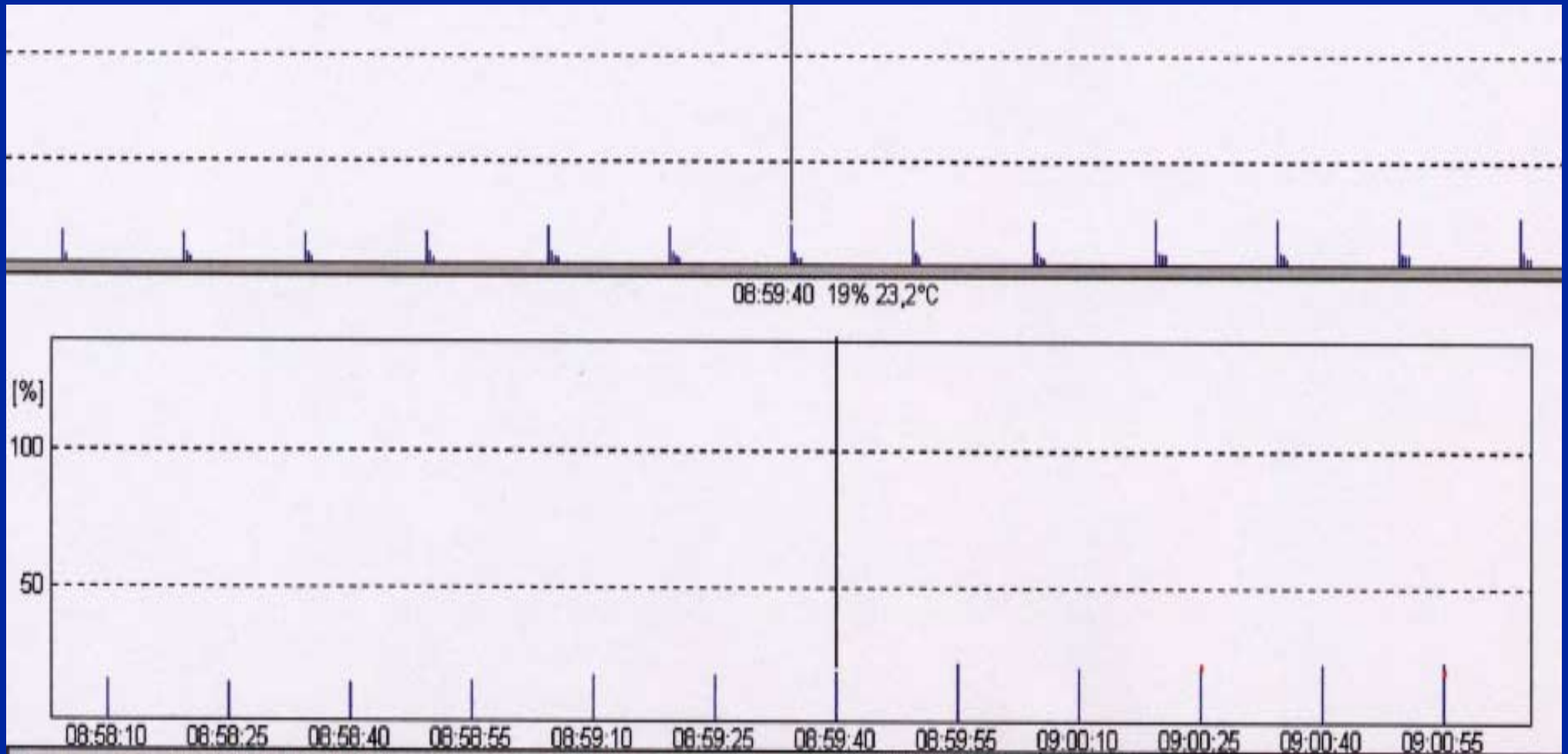




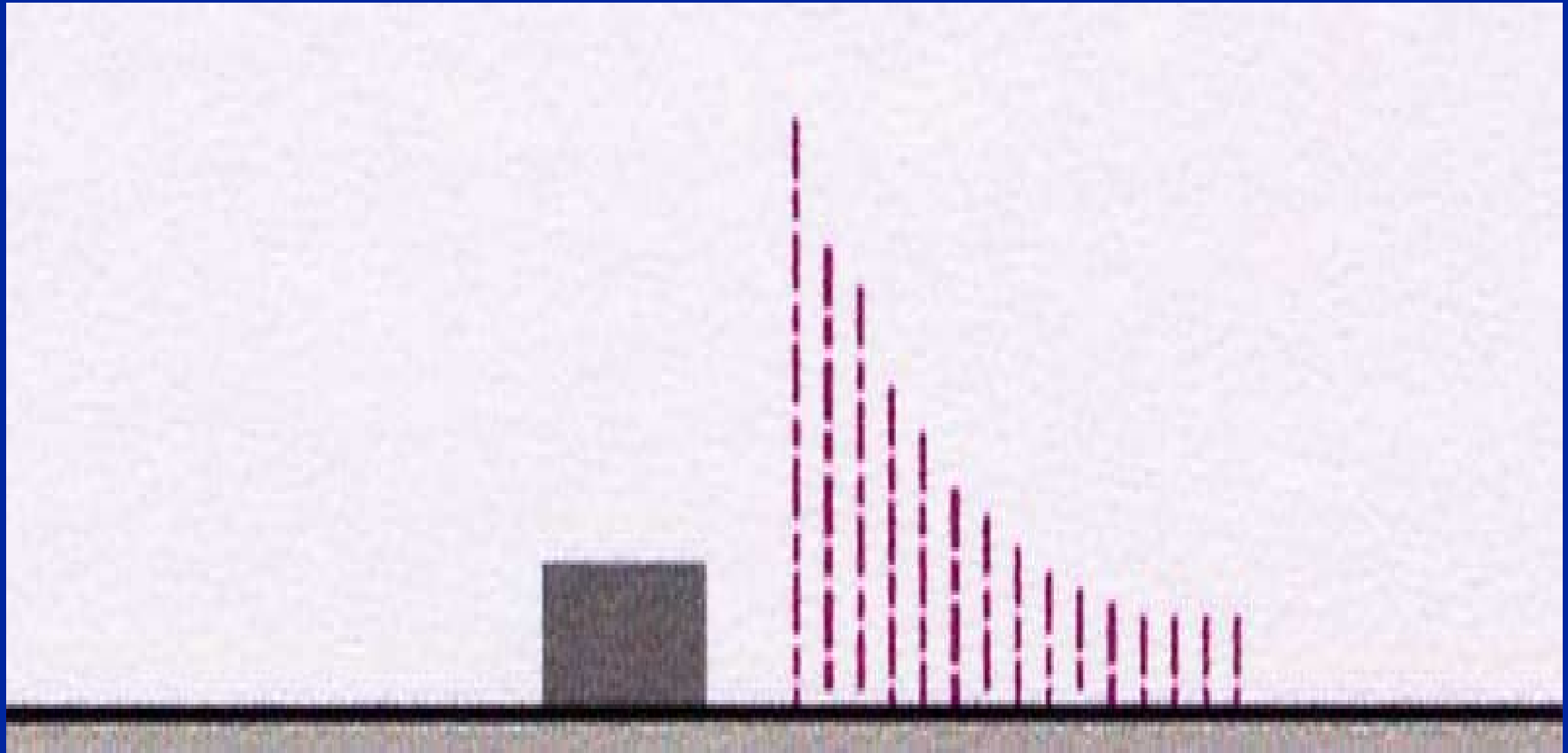
Train de quatre

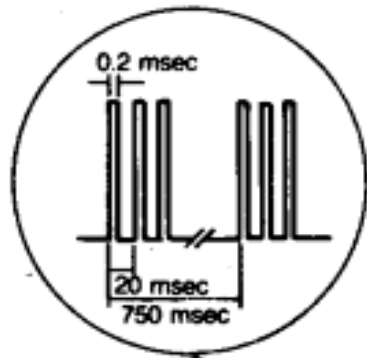


Décurarisation et train de quatre



Compte post-tétanique



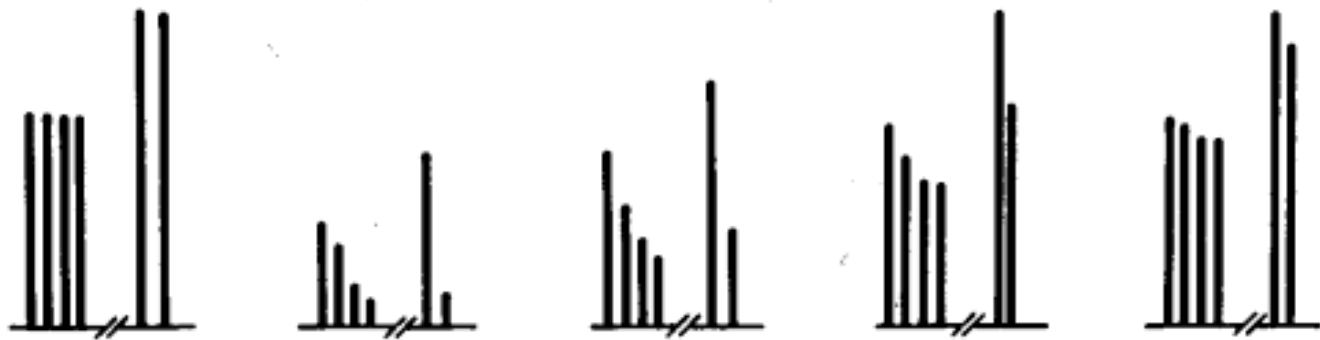


Stimulation:



TOF DBS_{3,3}

Response:



TOF and
DBS_{3,3} ratios

1.0

0.2

0.4

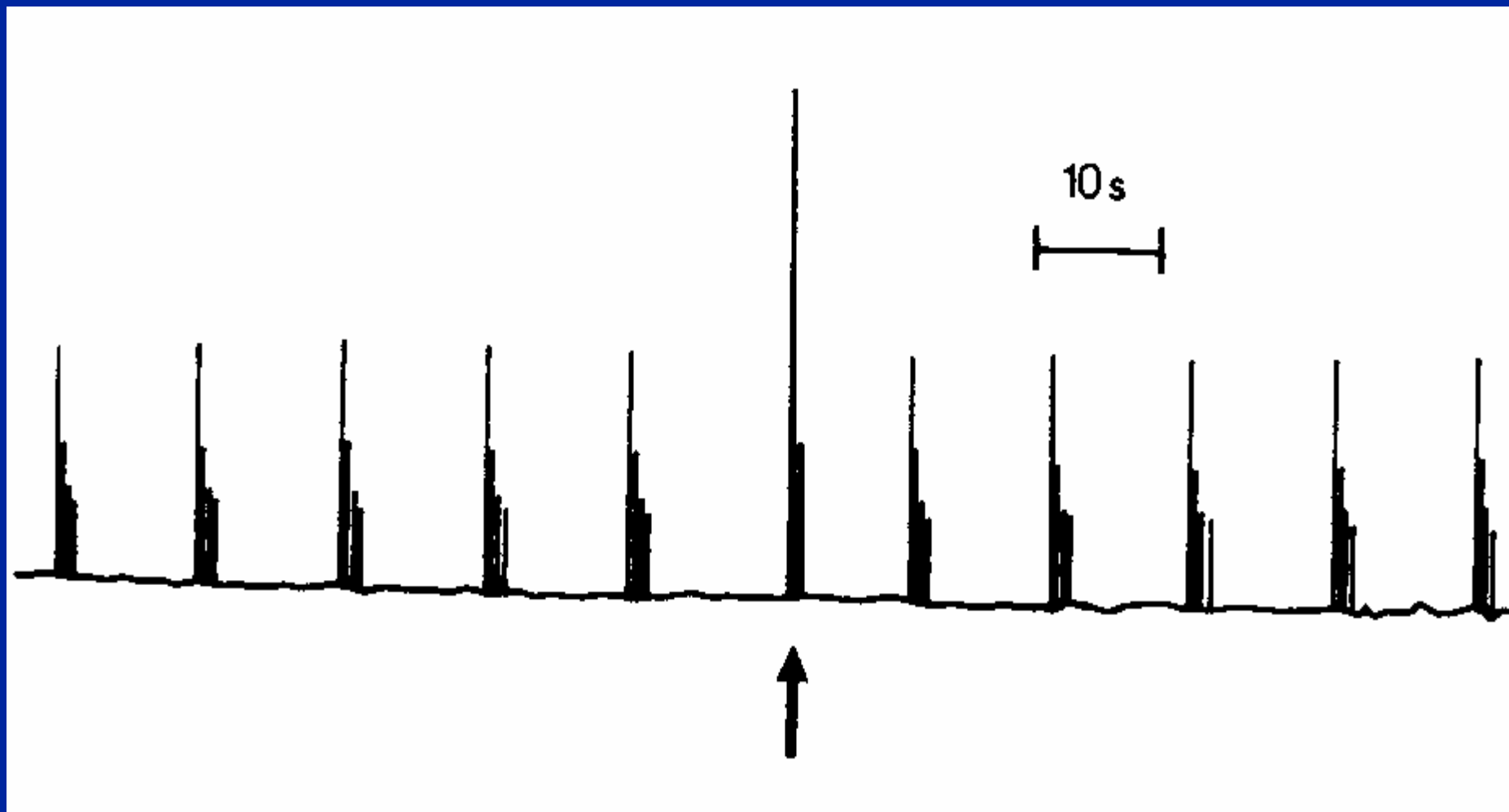
0.7

0.9

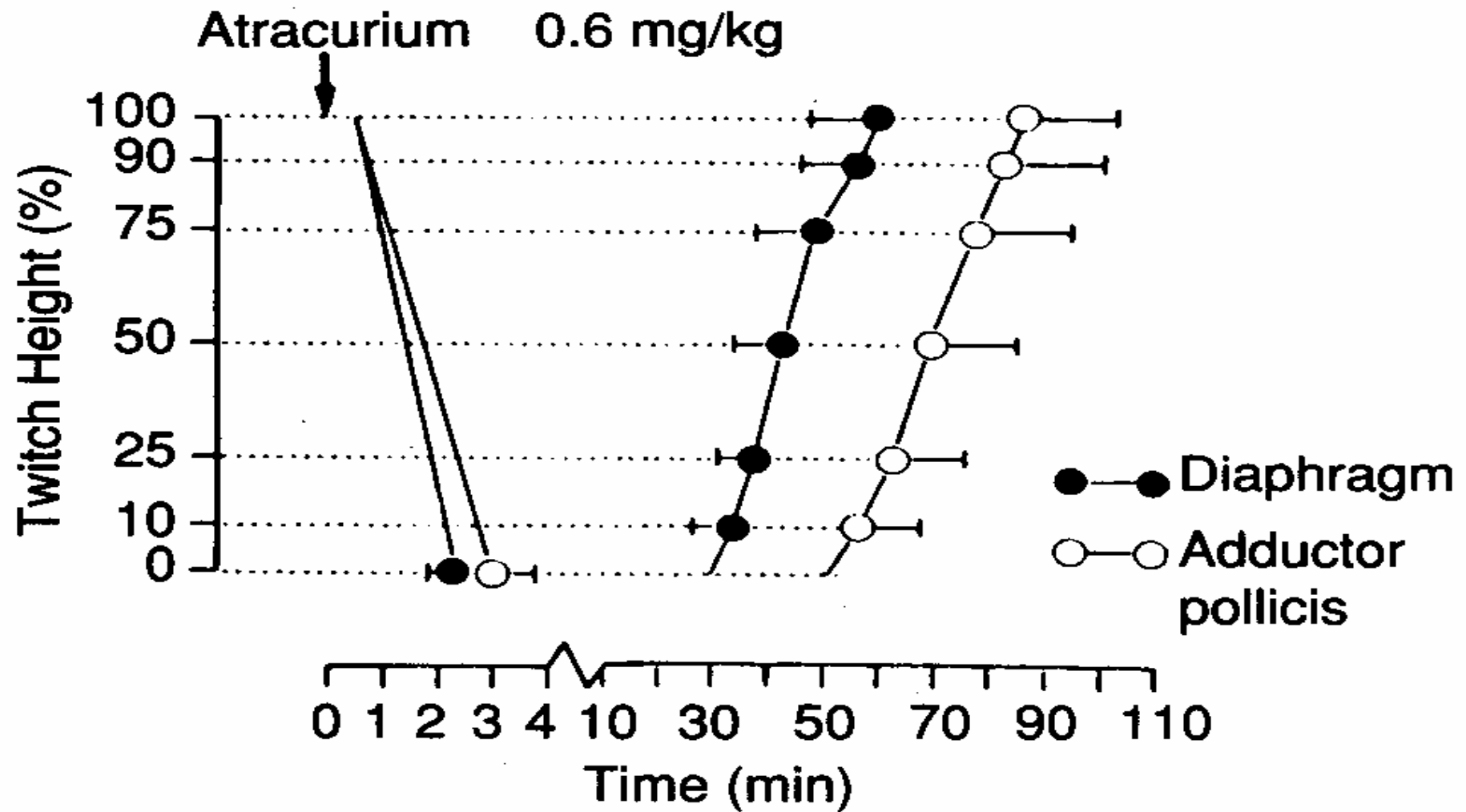
Control

Recovery

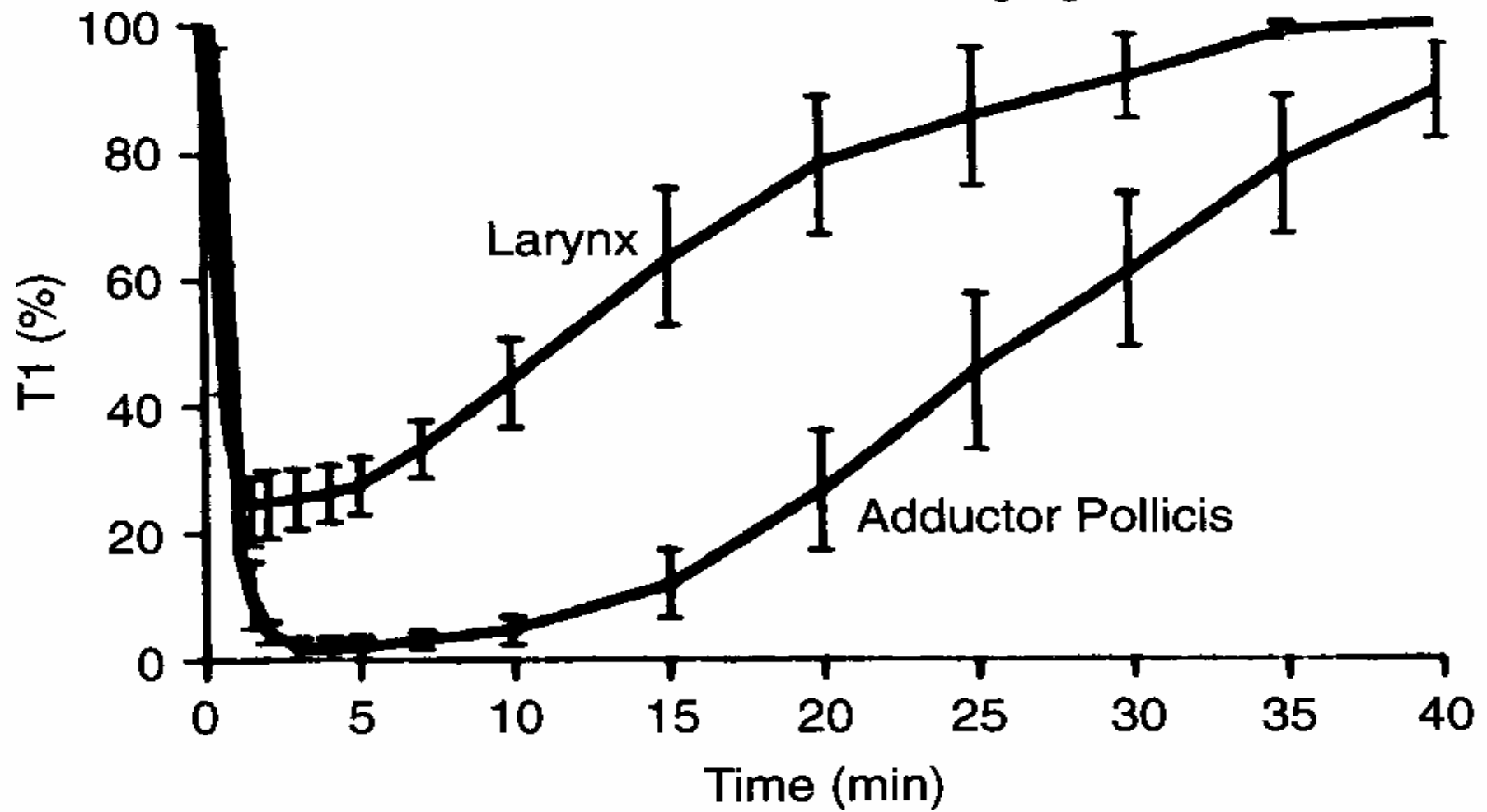
DBS versus TOF



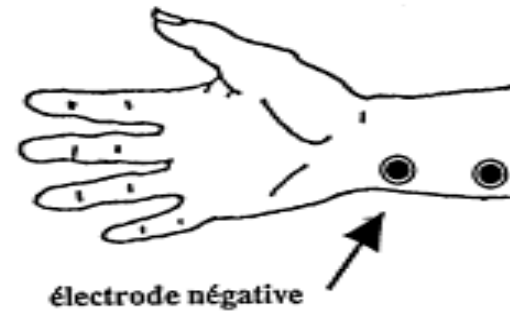
Diaphragme et muscles périphériques



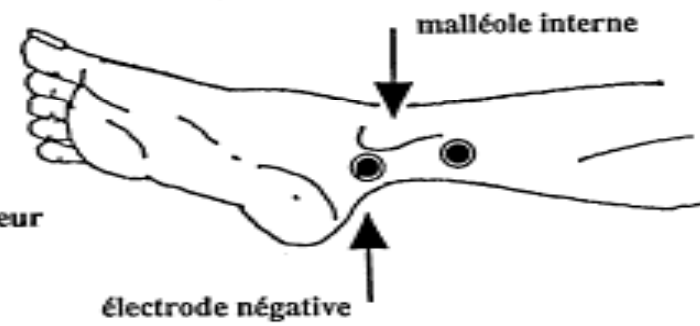
Rocuronium, 0.5 mg/kg



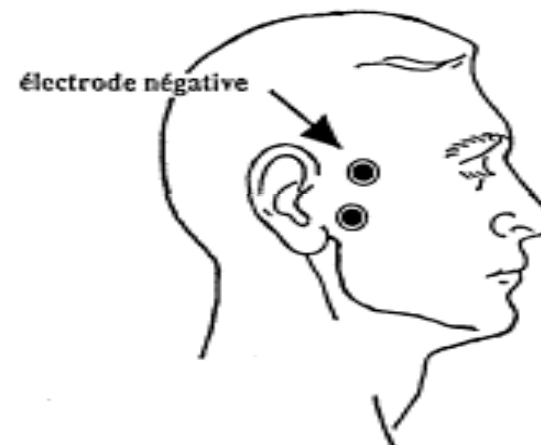
Le nerf cubital



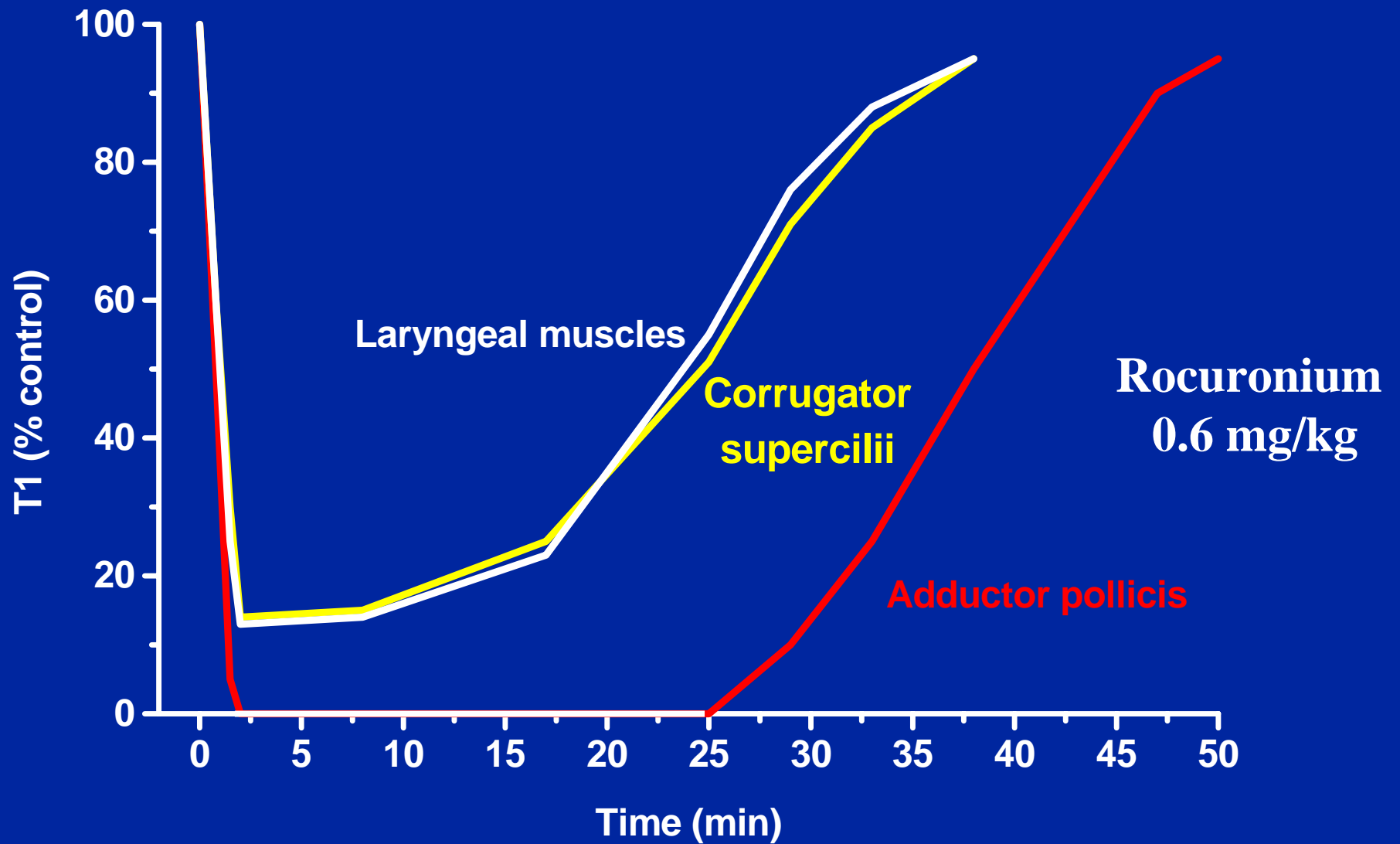
Le nerf tibial postérieur



Le nerf facial

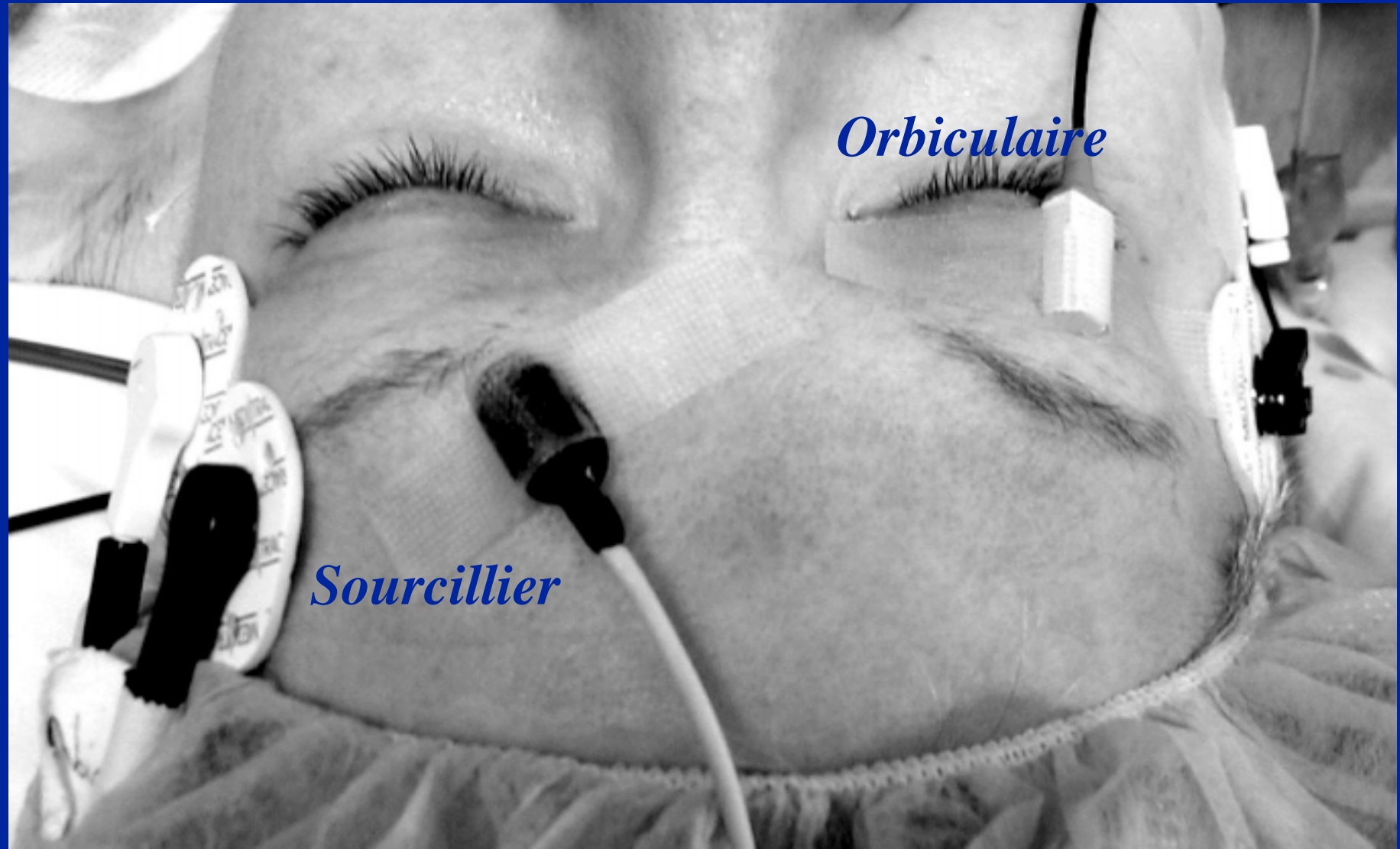


Muscle sourcilier



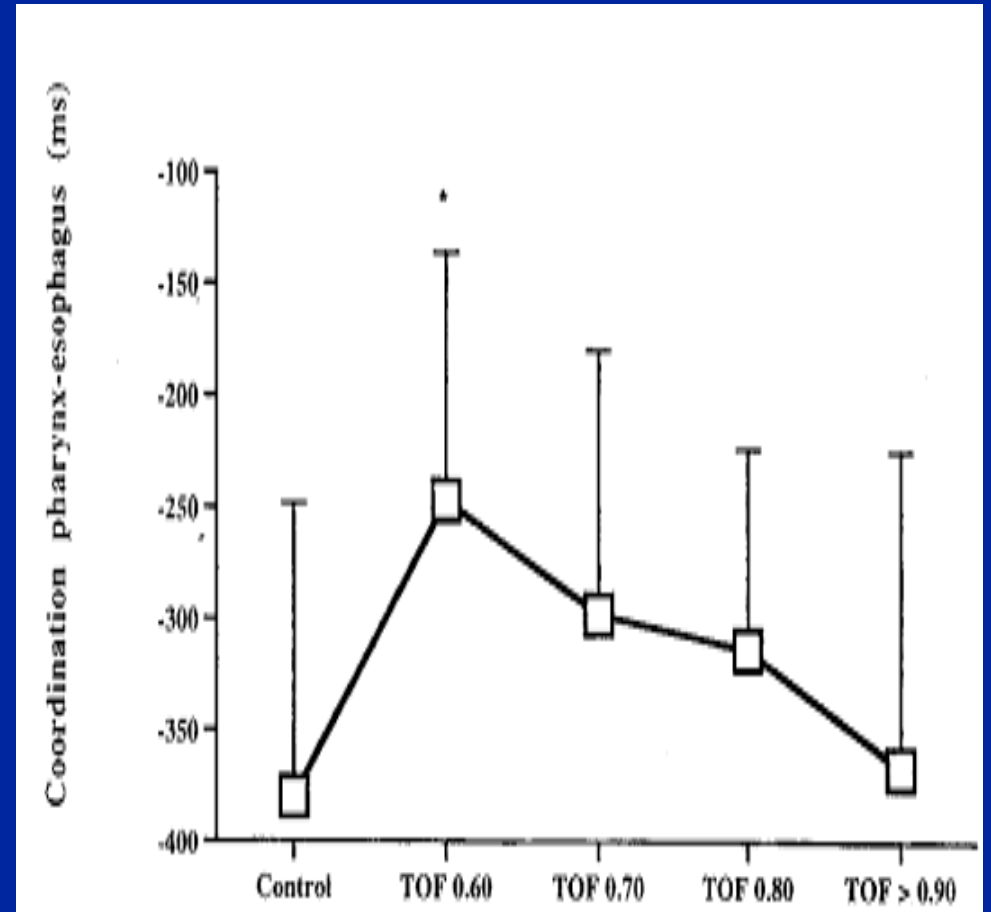
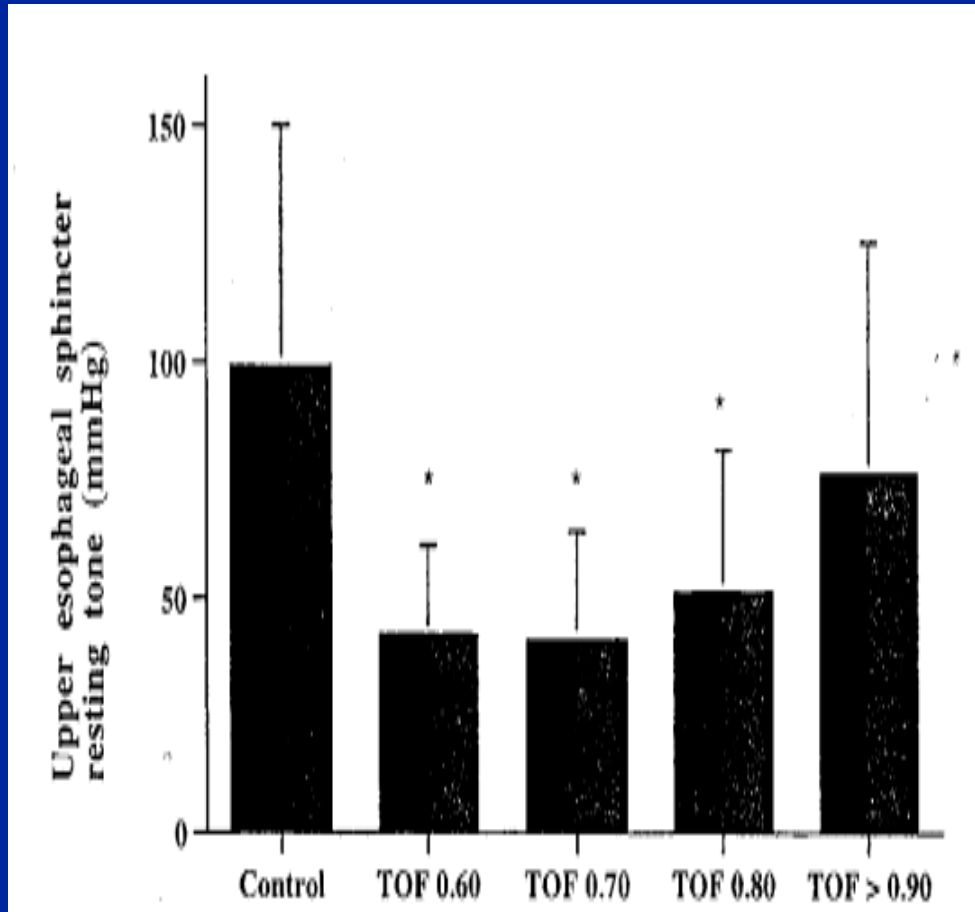
Donati F. Anesthesiology 2001, 95: 96-101

Muscle sourcillier



Donati F. Anesthesiology 2001, 95: 96-101

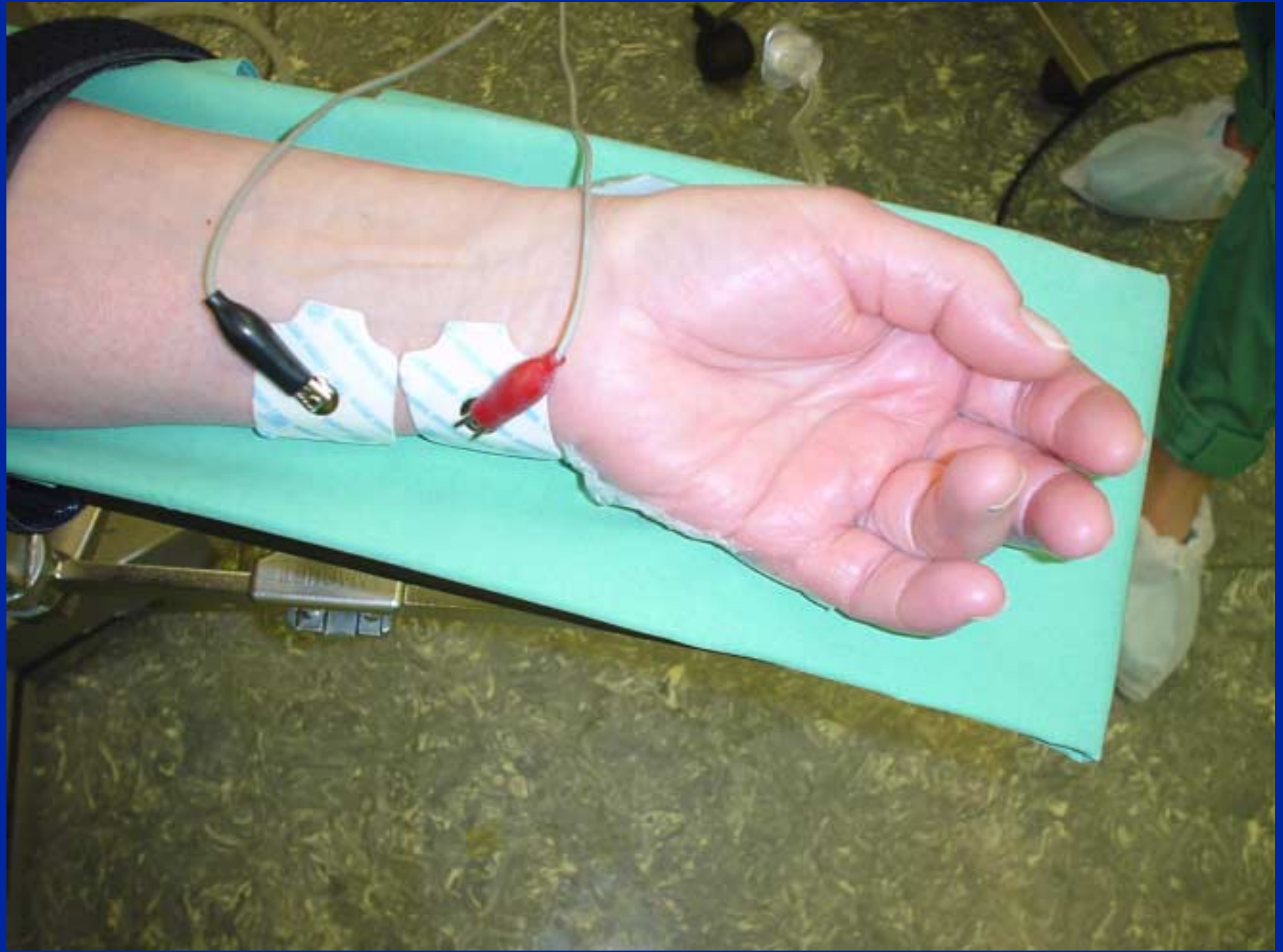
Déglutition et muscles des VAS



L.I.Eriksson, Anesthesiology, 1997; 87: 1035

Estimation de la curarisation

- Estimation clinique
- Estimation visuelle ou tactile
- Mesure de la force musculaire
- Accélérographie







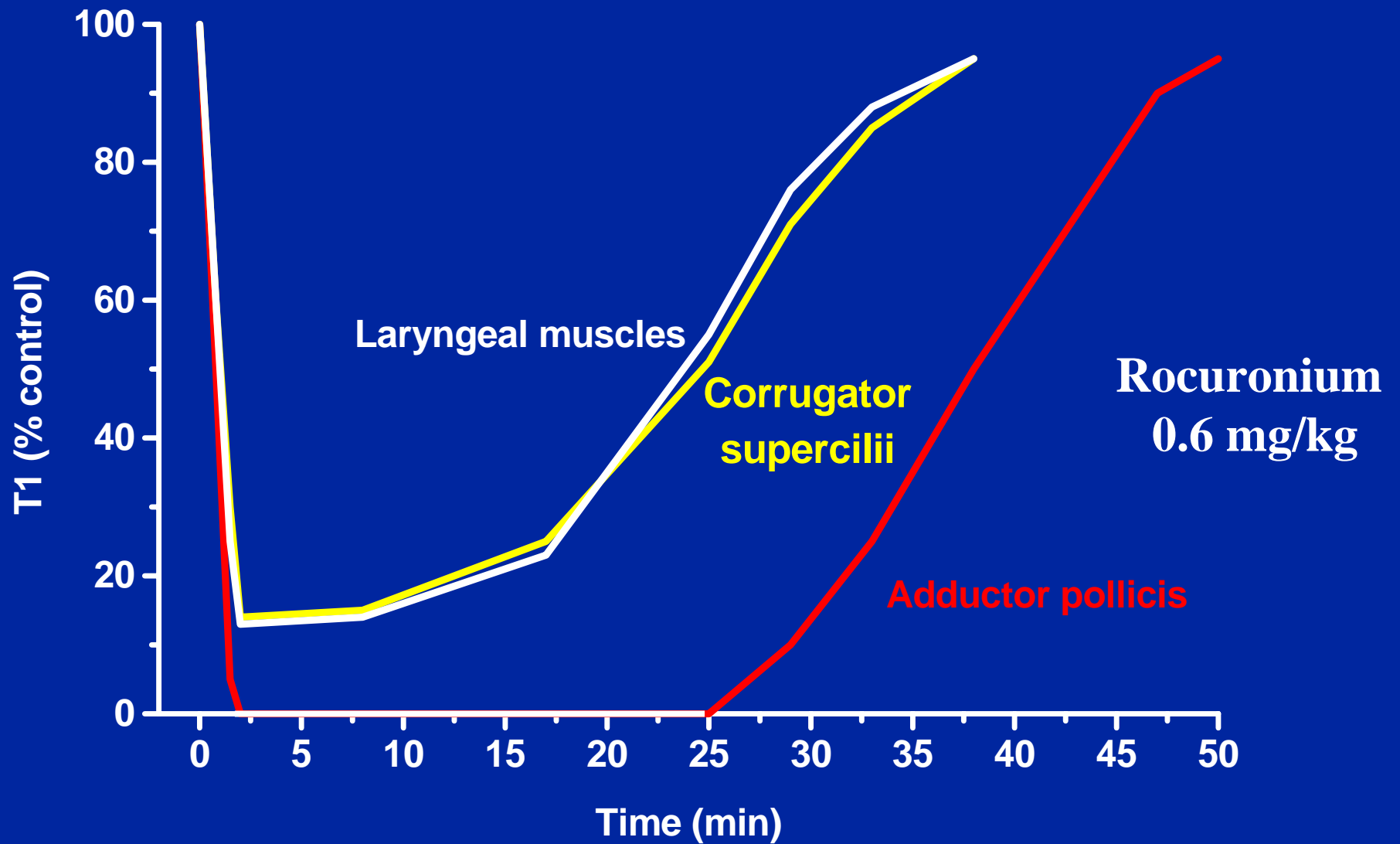
Induction



Buts de la curarisation

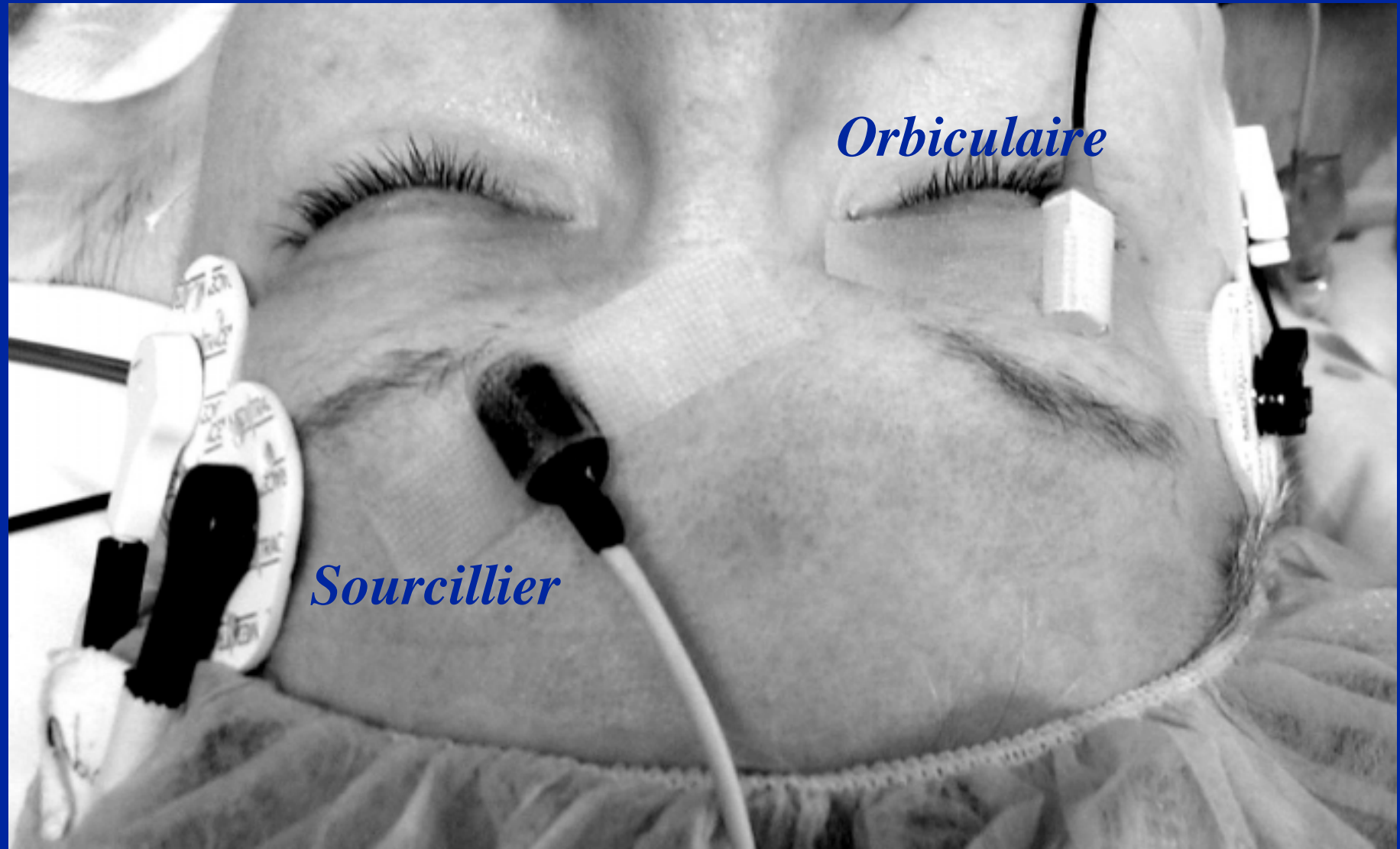
- **Intubation facile et atraumatique**
- **Facilitation de la ventilation contrôlée**
- **Relâchement musculaire durant la chirurgie**

Monitorage et intubation

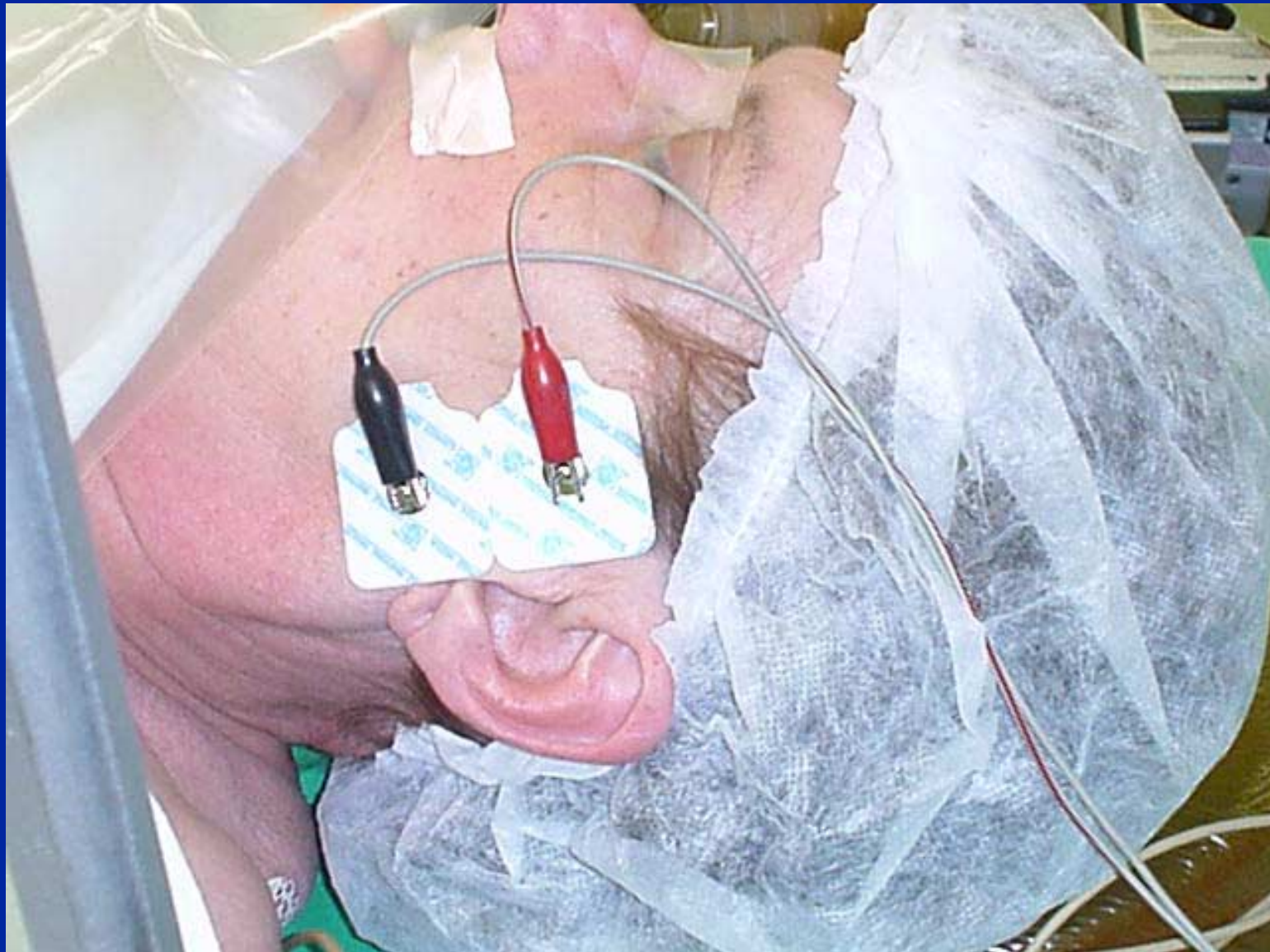


Donati F. Anesthesiology 2001, 95: 96-101

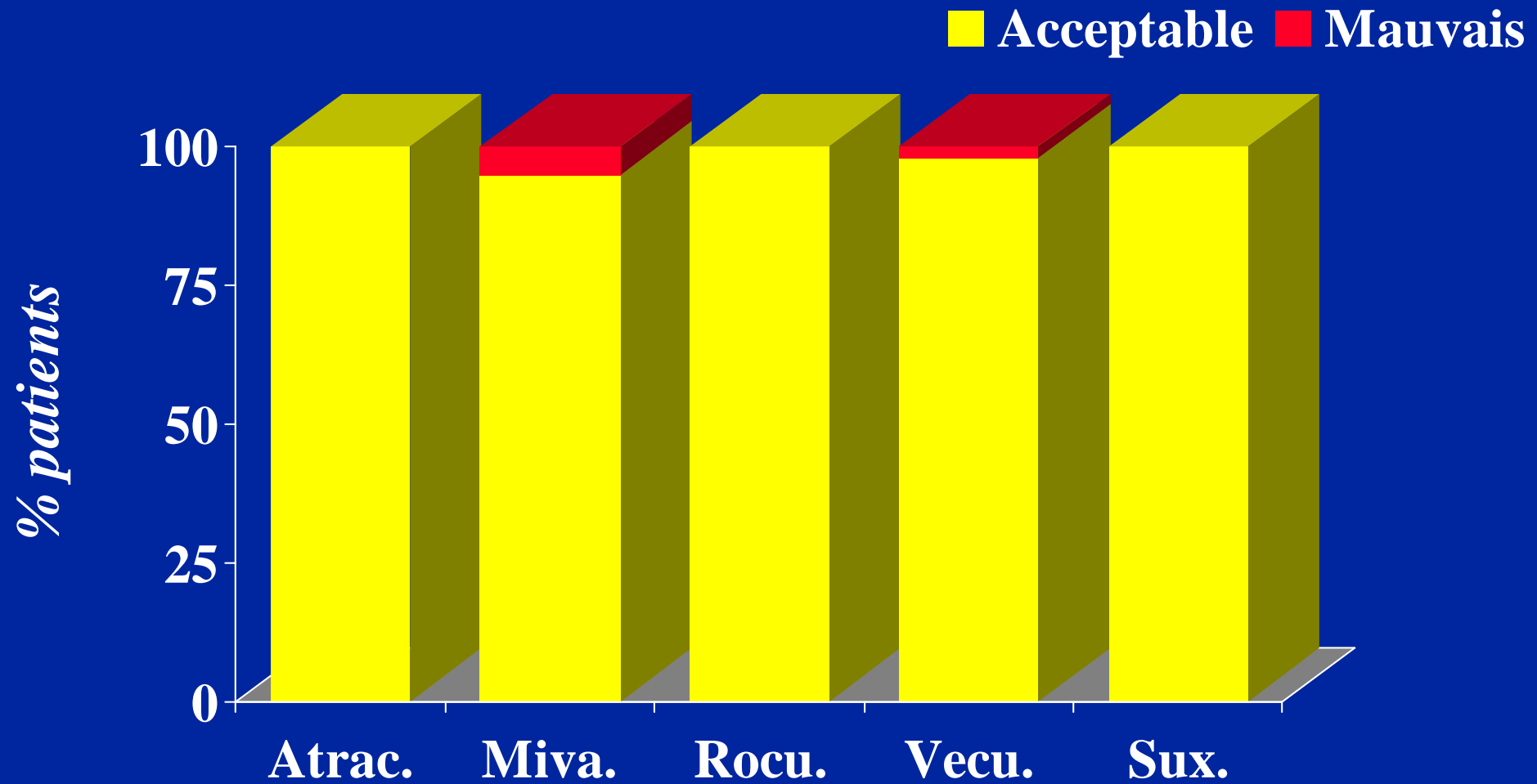
Monitoring du sourcilier



Donati F. Anesthesiology 2001, 95: 96-101



Monitoring lors de l'intubation



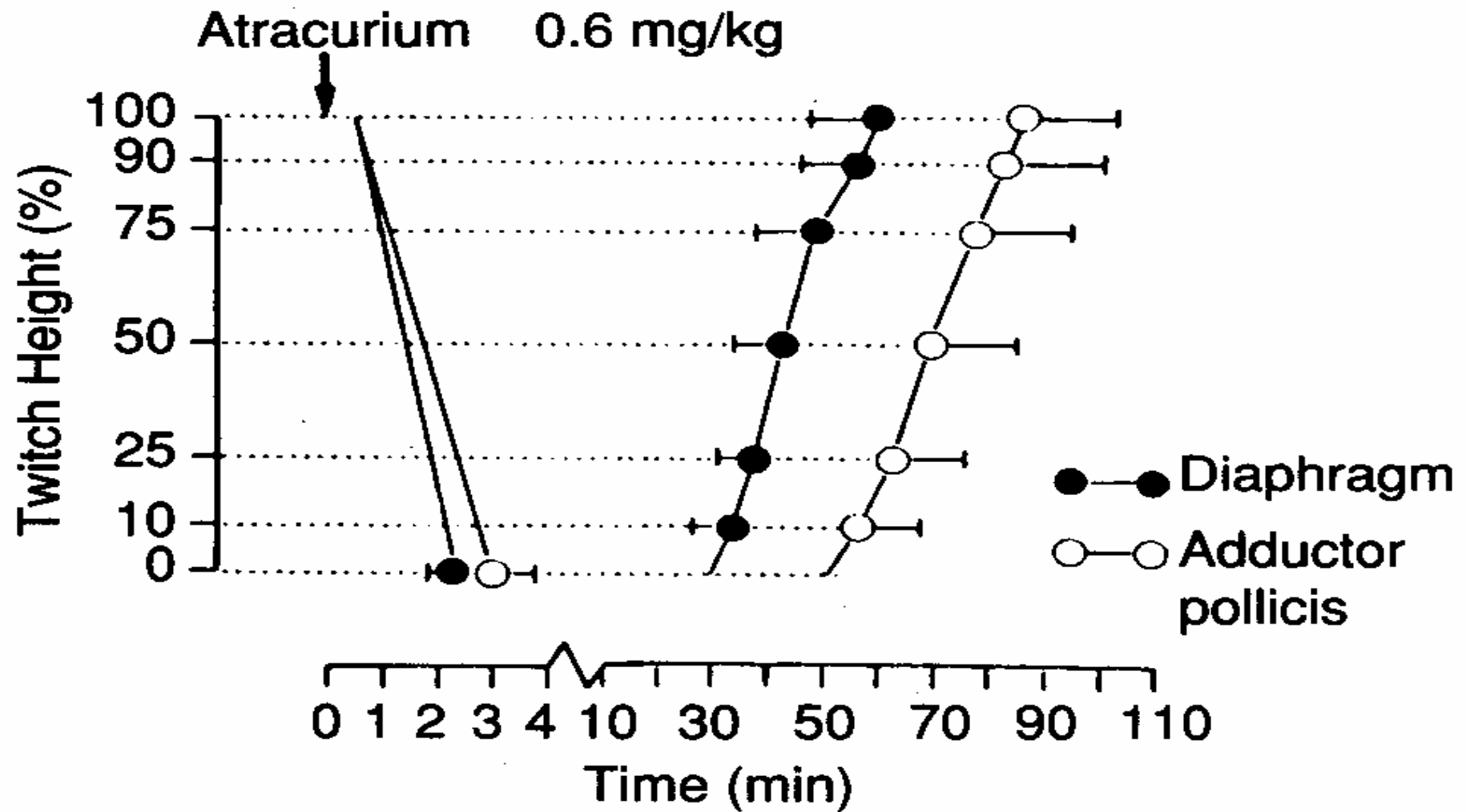
Le Corre F. Anesth Analg 1999, 89: 1305-10

Per-opérateur

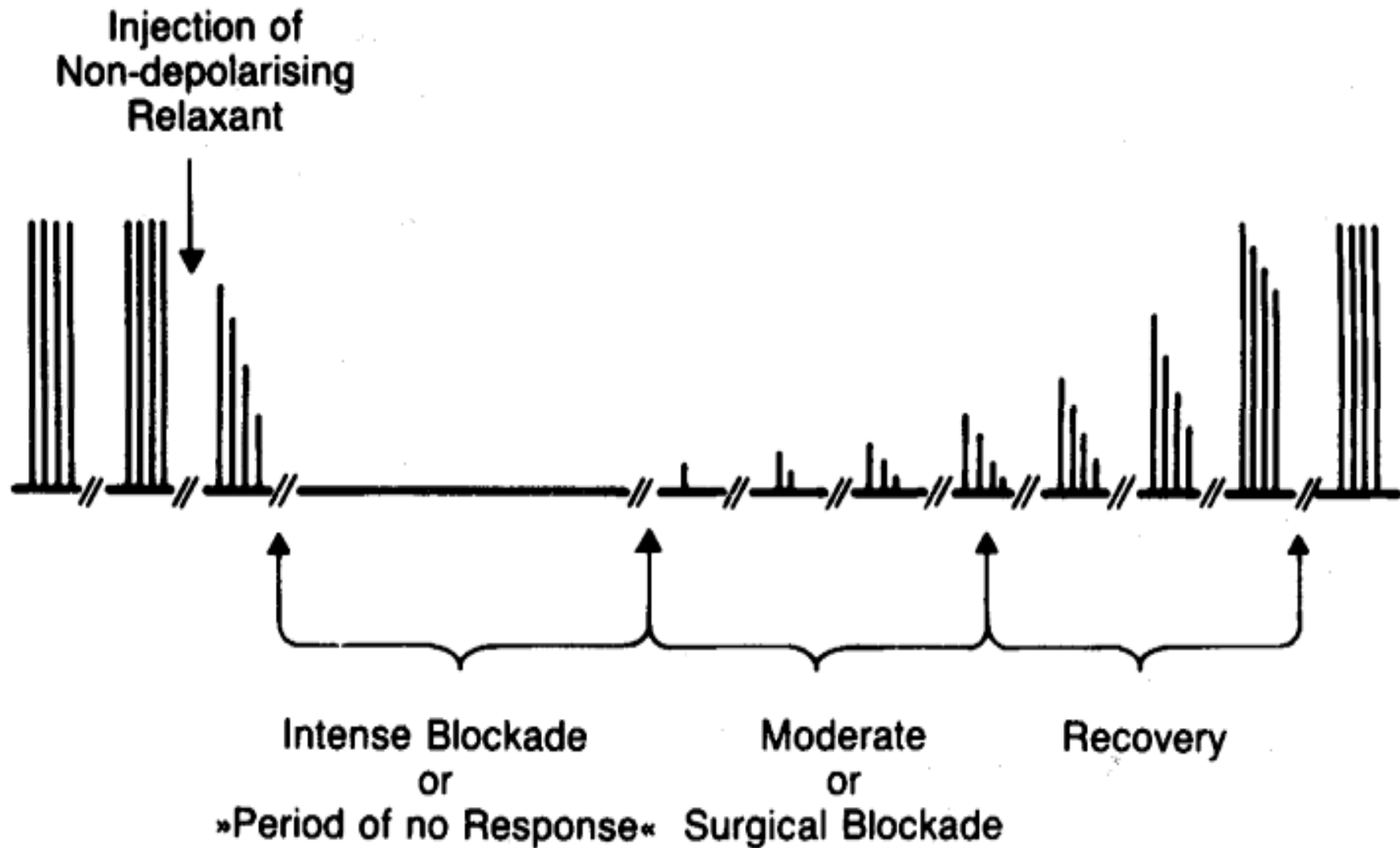
Absence de paralysie diaphragmatique

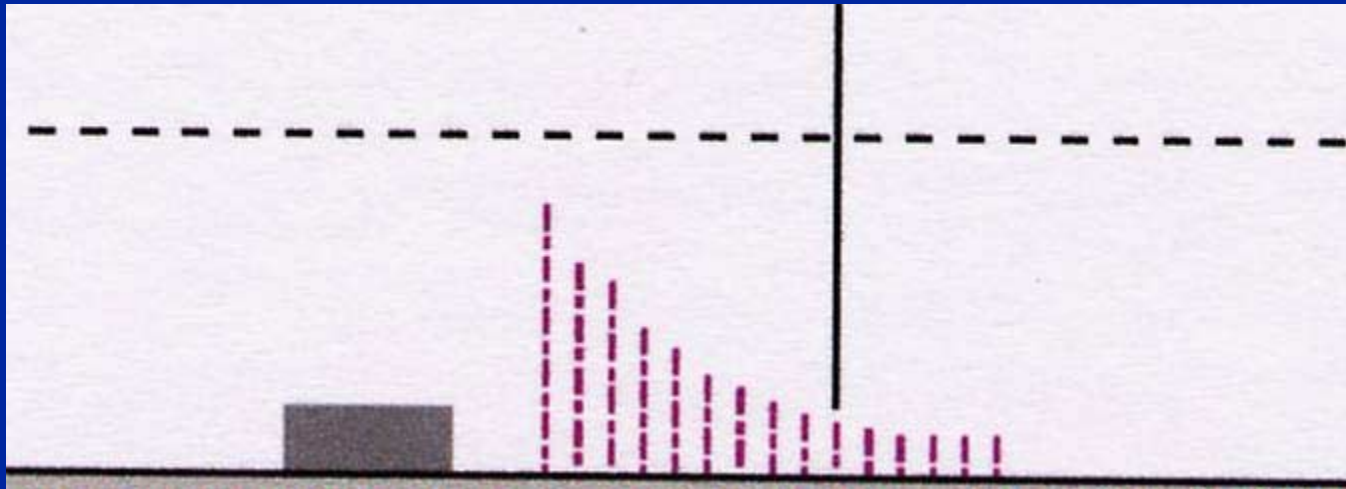
- **Hoquet**
- **Toux**
- **Poussée sur les viscères**

Diaphragme et muscles périphériques



Train de quatre





Réveil



Curarisation résiduelle en SSPI

- Lunn JN. *Anaesthesia* 1983 ; 38 : 1090-6
36 décès liés à l'anesthésie
→ 11 détresses respiratoires post opératoires
⇒ 50% due à une curarisation résiduelle
- Tiret L. *Can J Anaesth* 1986 ; 33 : 336-44
67/ 200 000 décès
⇒ 50% dus à une détresse respiratoire post opératoire

Incidence de la curarisation en SSPI

TOF ratio < 0.70
(% de patients)

Longue durée d'action

1979	d-tc, Panc, Gal	42
1988	Panc	36
1990	Panc	39

Durée d'action intermédiaire

1988	Atracurium	4
1988	Vecuronium	9
1990	Atracurium	2
1990	Vecuronium	4

Durée d'action courte

1996	Mivacurium	12
------	------------	----

CURARISATION RESIDUELLE EN S.S.P.I.

	<i>Décurarisés</i>	<i>Curarisés</i>
n	329 (58 %)	239 (42 %)
âge	45 (18-85)	50 (18-83)
extubés à l'arrivée	290	145

BAILLARD et al., Br. J. Anaesth., 2000

Décurarisation complète

TOF = ?

Auteurs	Année	TOF Ratio
Ali	1975	> 0.7
Bevan	1988	> 0.8
Isono	1991	
D'honneur	1992	> 0.9
Eriksson	1992	> 0.9
Kopman	1997	> 0.9

TOF mesuré à l'adducteur du pouce

**Buts du monitoring durant la
phase de décurarisation**



**Détecter une curarisation
résiduelle**

Diaphragme
Orbiculaire œil
Cordes vocales
Paroi abdominale

Adducteur du pouce

[Fléchisseur du gros orteil
Muscle génio-hyoidien]

Masséter
Muscles supra-hyoidiens

-



D
C
E
U
R
A
R
S

+

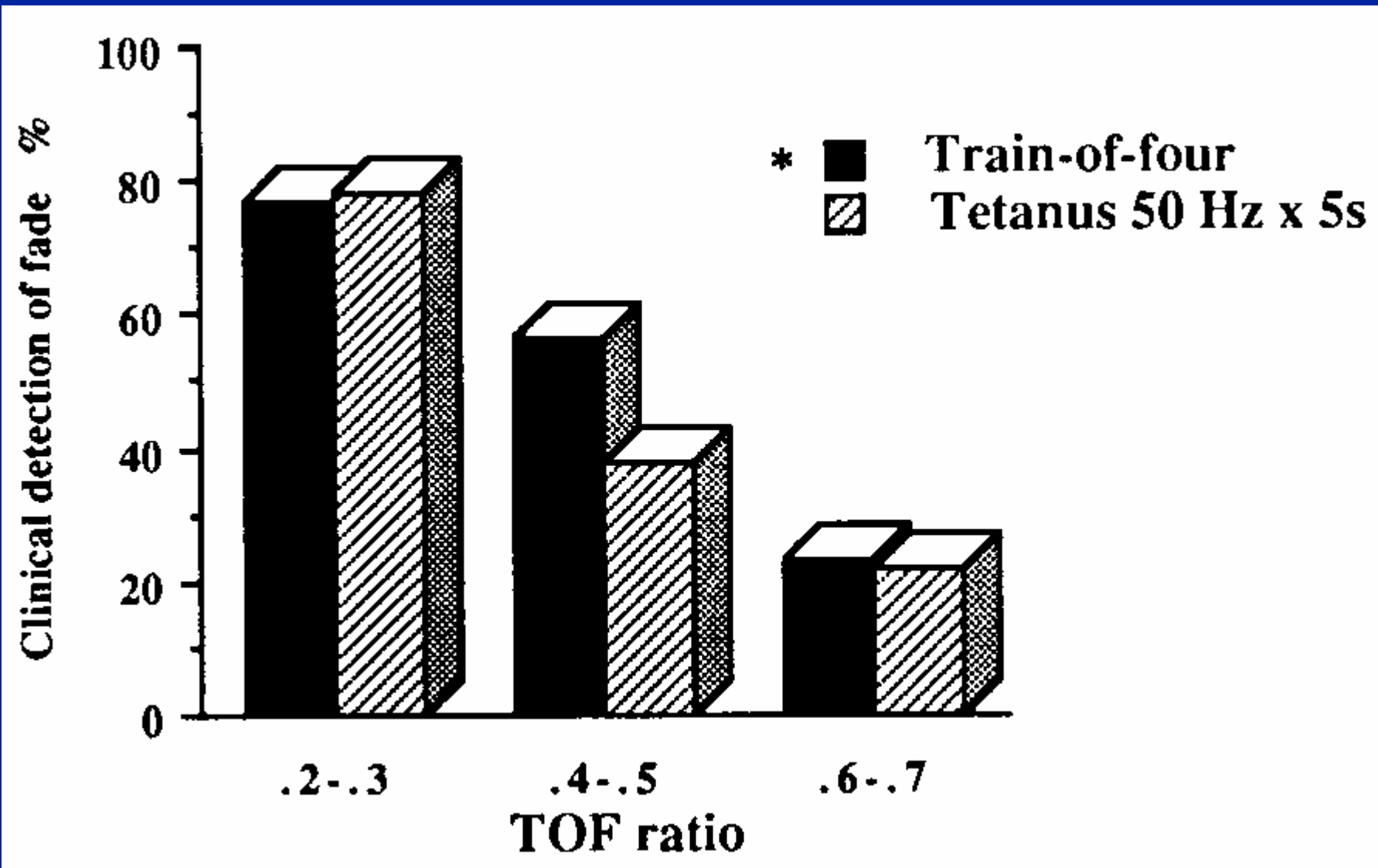
Monitorage per opératoire

	OUI	Non
n	20	19
Durée (min)	176 ± 67	149 ± 58
TOF ratio	88.6 ± 17.9	71.5 ± 28.0*
Proportion de patients avec TOF < 70 %	15	47*

* : p<0.05

- M. ± SD
- Pancuronium/Enflurane/Fentanyl
- estimation tactile du TOF en per opératoire

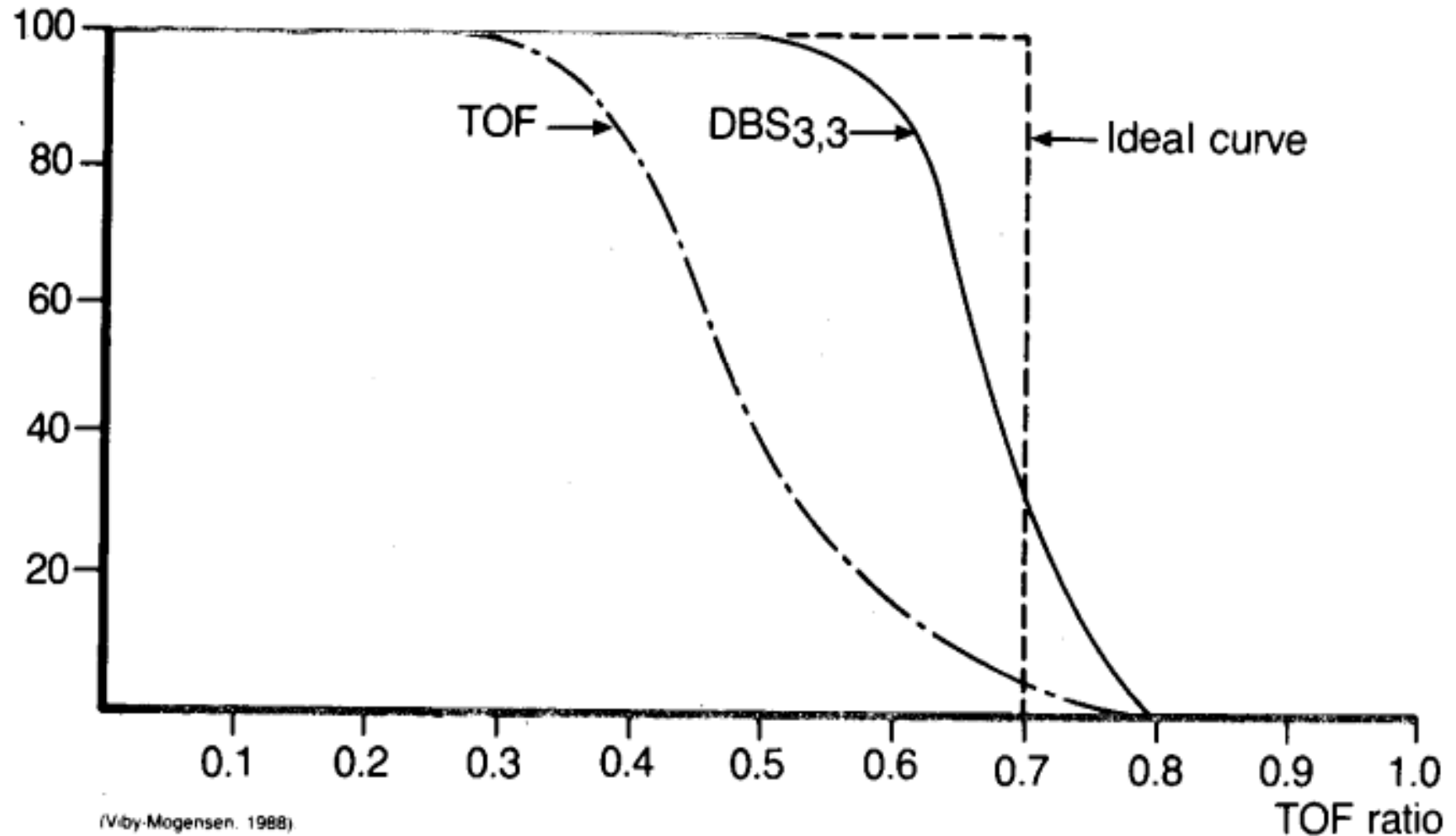
Shorten GD. *Can J Anaesth* 1995;42:711-5



J.Y. Dupuis, can J Anaesth 1990; 37: 397

Train de quatre et DBS

Fade detectable manually (%)



(Viby-Mogensen, 1988)

Valeur la plus basse du test

	Moyenne	SD	Range
Head lift	0.62	0.09	0.48 - 0.75
Leg lift	0.59	0.05	0.50 - 0.65
Abaisse langue	0.86	0.08	0.68 - 0.95

n = 10 volontaires

Mivacurium (5 μ g/kg, 2 μ g/kg/min)

Kopman AF. *Anesthesiology* 1997:765-71



Décurarisation

Mesure objective



Oui

TOF > 0,9

Non

~~**TOF**~~

DBS

Implications cliniques

Une décurarisation complète impose un retour du rapport T4/T1 à plus de 90%

En l'absence de mesure objective, le DBS doit être associé à des tests cliniques :

→ Head lift test

→ Test de l'abaisse langue

Table 2. Individual Mechanomyographic TOF ratio and the corresponding response after a single Acceleromyographic TOF, 100 Hz Tetanus and DBS (n = 40)

No.	MMG TOF ratio	AMG TOF ratio ≥ 0.9	100 Hz Tetanus No fade	DBS No fade
1	0.06			
2	0.16			
3	0.18			
4	0.20			
5	0.24			
6	0.28			
7	0.39			+
8	0.44			+
9	0.47		+	
10	0.48			
11	0.50			
12	0.52		+	+
13	0.57	+		+
14	0.60		+	+
15	0.60			+
16	0.63			+
17	0.66			+
18	0.67			+
19	0.72			+
20	0.73		+	+
21	0.76	+	+	+
22	0.76	+		+
23	0.79	+		+
24	0.79			+
25	0.80			+
26	0.81	+	+	+
27	0.82	+		+
28	0.84	+		+
29	0.85	+	+	+
30	0.86	+		+
31	0.87		+	+
32	0.90	+		+
33	0.90	+		+
34	0.91	+	+	+
35	0.91	+	+	+
36	0.92	+		+
37	0.93		+	+
38	0.94	+	+	+
39	0.94	+	+	+
40	1.00	+		+

AMG = acceleromyography; DBS = double-burst stimulation; MMG = mechanomyography; TOF = train-of-four.

+ = AMG TOF ratio ≥0.9, no detectable fade after 100 Hz Tetanus or DBS, respectively.

Table 4. Negative Predictive Values of Different Acceleromyographic TOF Ratios

Acceleromyographic TOF ratio	Negative Predictive Value		
	Group A	Group B	
		Data not normalized	Data normalized
0.9	37 (20–56)	40 (23–59)	89 (70–98)
0.95	70 (51–85)	60 (41–77)	92 (75–99)
1.0	97 (83–100)	77 (58–90)	96 (80–100)

Values are presented as percent and 95% confidence interval.

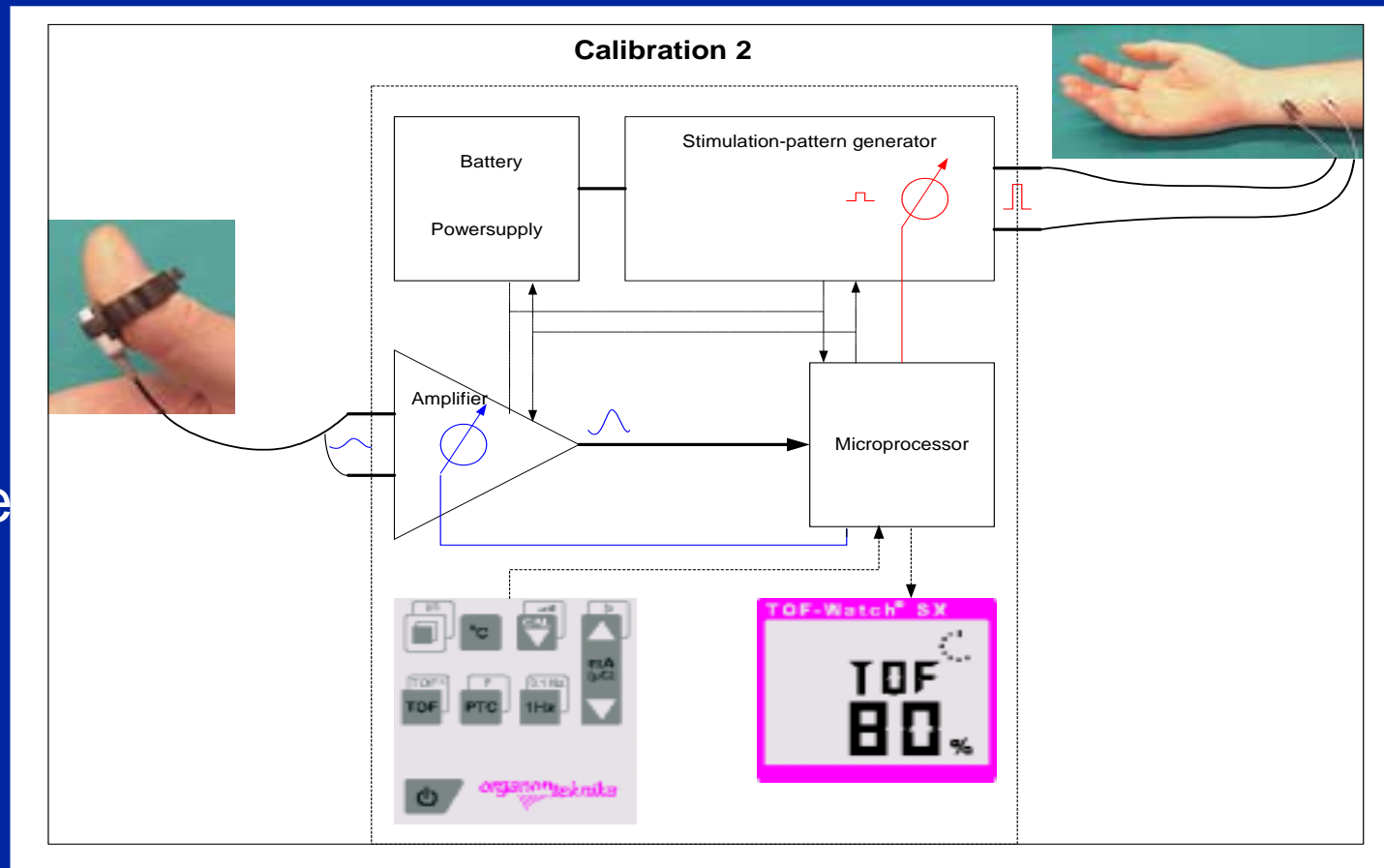
Negative predictive value = percent of patients without residual paralysis at acceleromyographic train-of-four ratios of 0.9, 0.95, and 1.0; TOF = train-of-four.

Calibration

	Cal	Cal 1	Cal 2	Mode manuel
TOF-Watch	✓			
TOF-Watch S		✓	✓	✓
TOF-Watch SX		✓	✓	✓

Calibration automatique

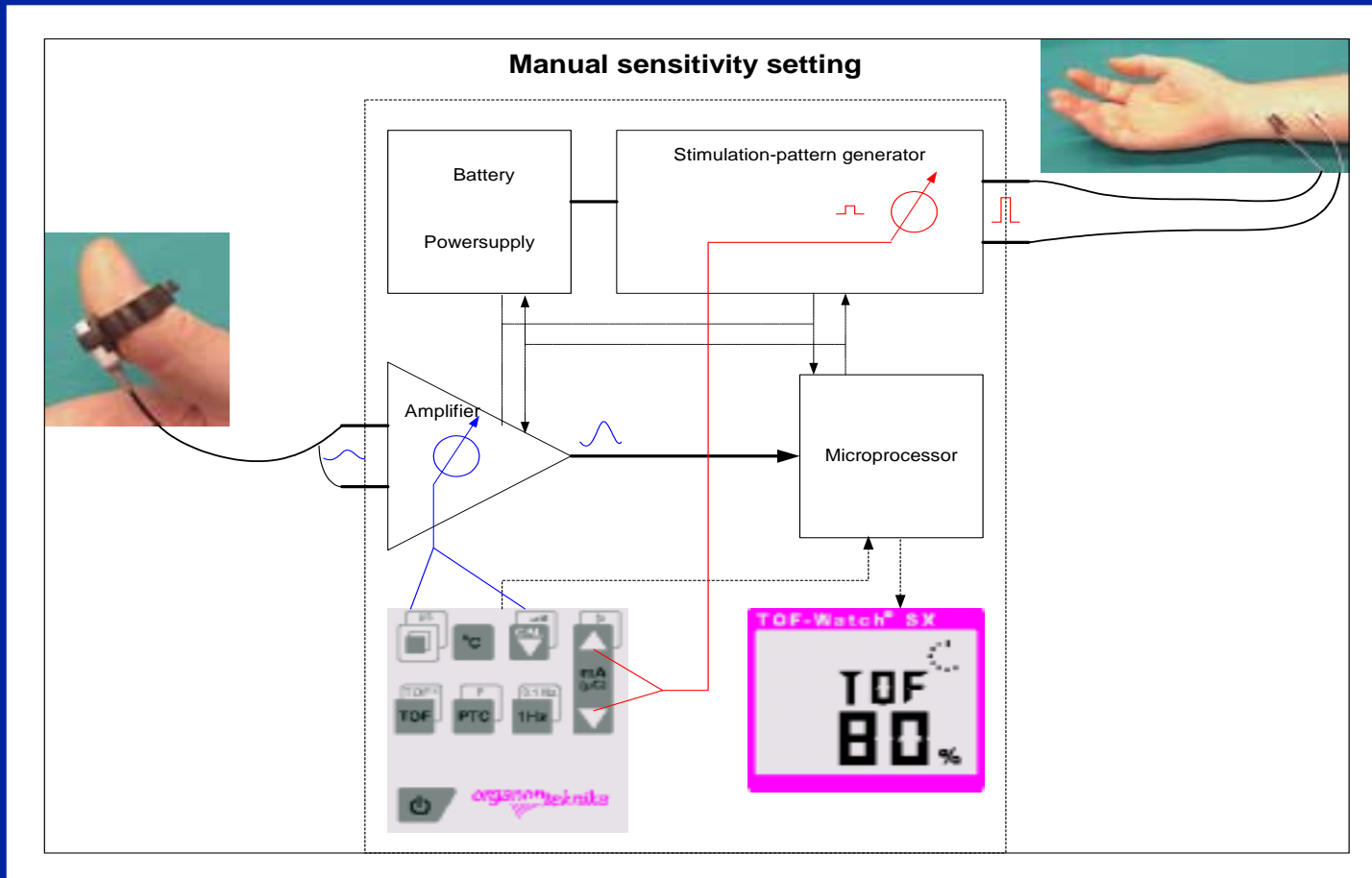
Règlage automatique du gain



Règlage automatique de l'intensité du courant

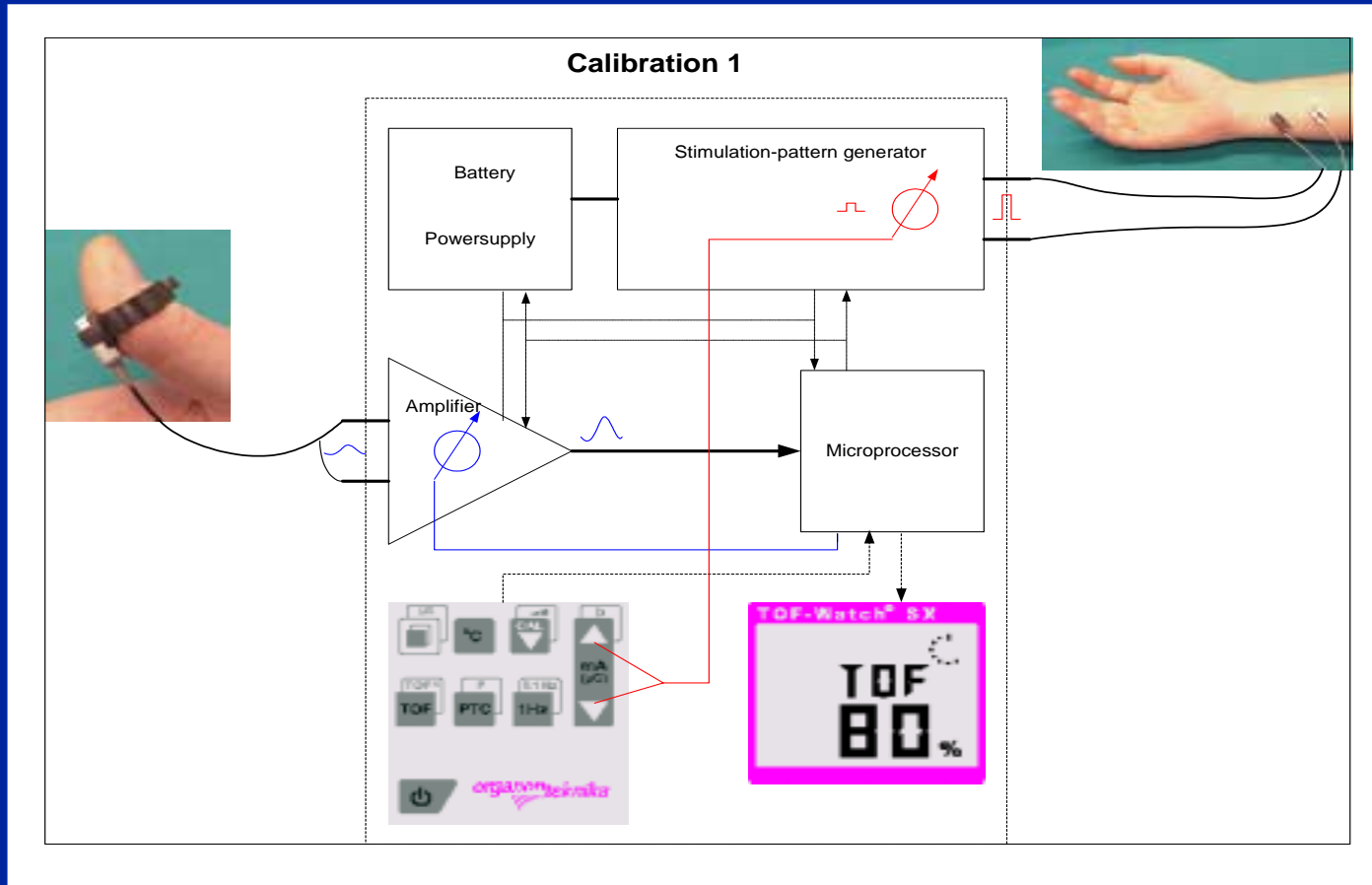
Mode manuel

Gain
prédéfini



Courant
prédéfini

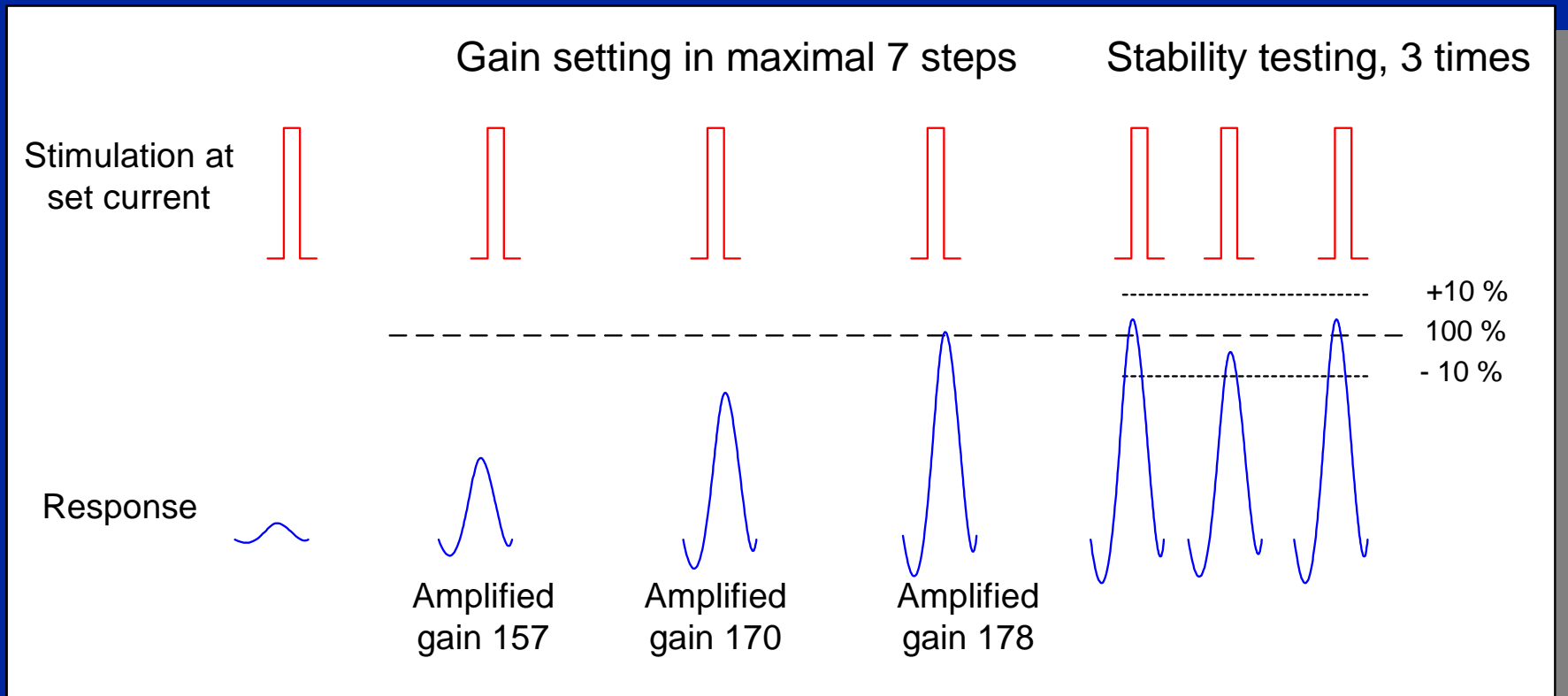
Calibration “CAL” & “CAL 1”



Courant
prédéfini

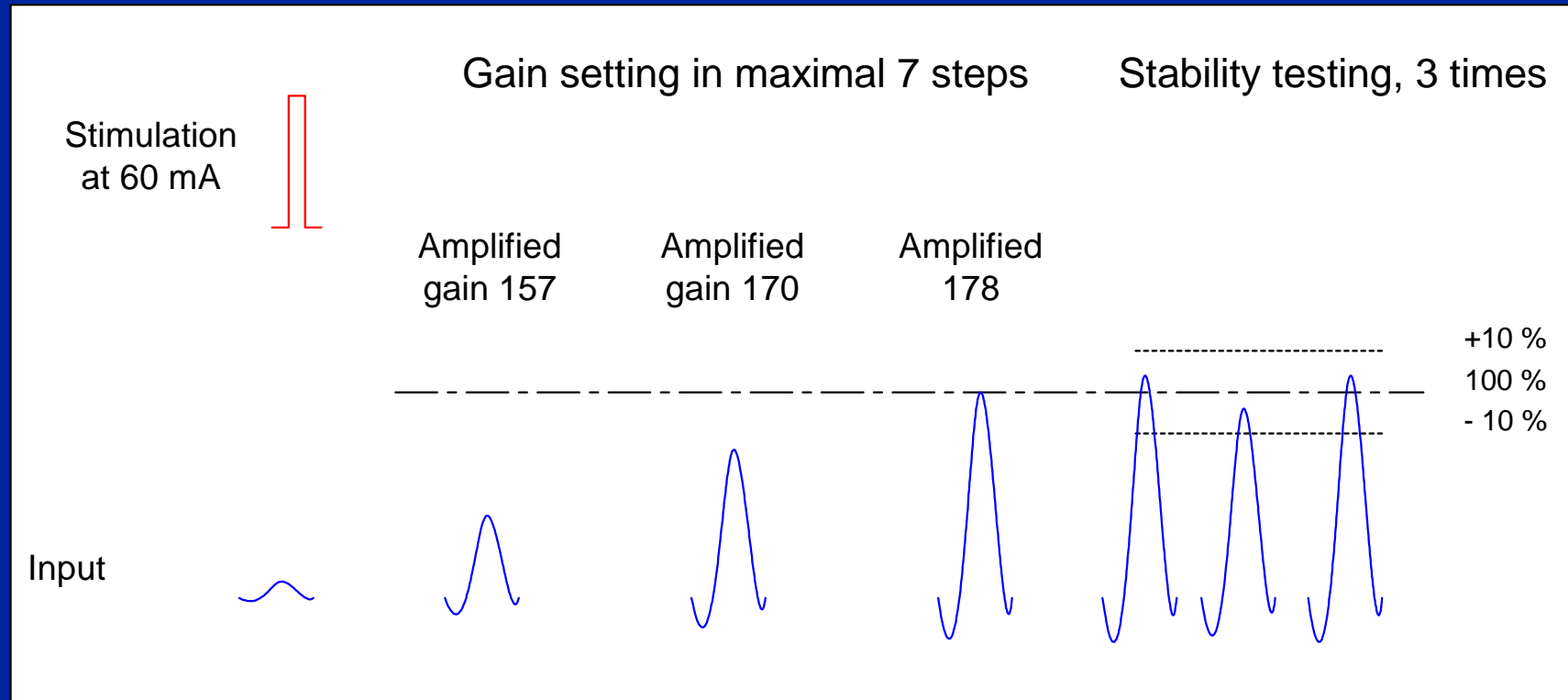
Gain réglé
automatiquement

Calibration “CAL” & “CAL 1”



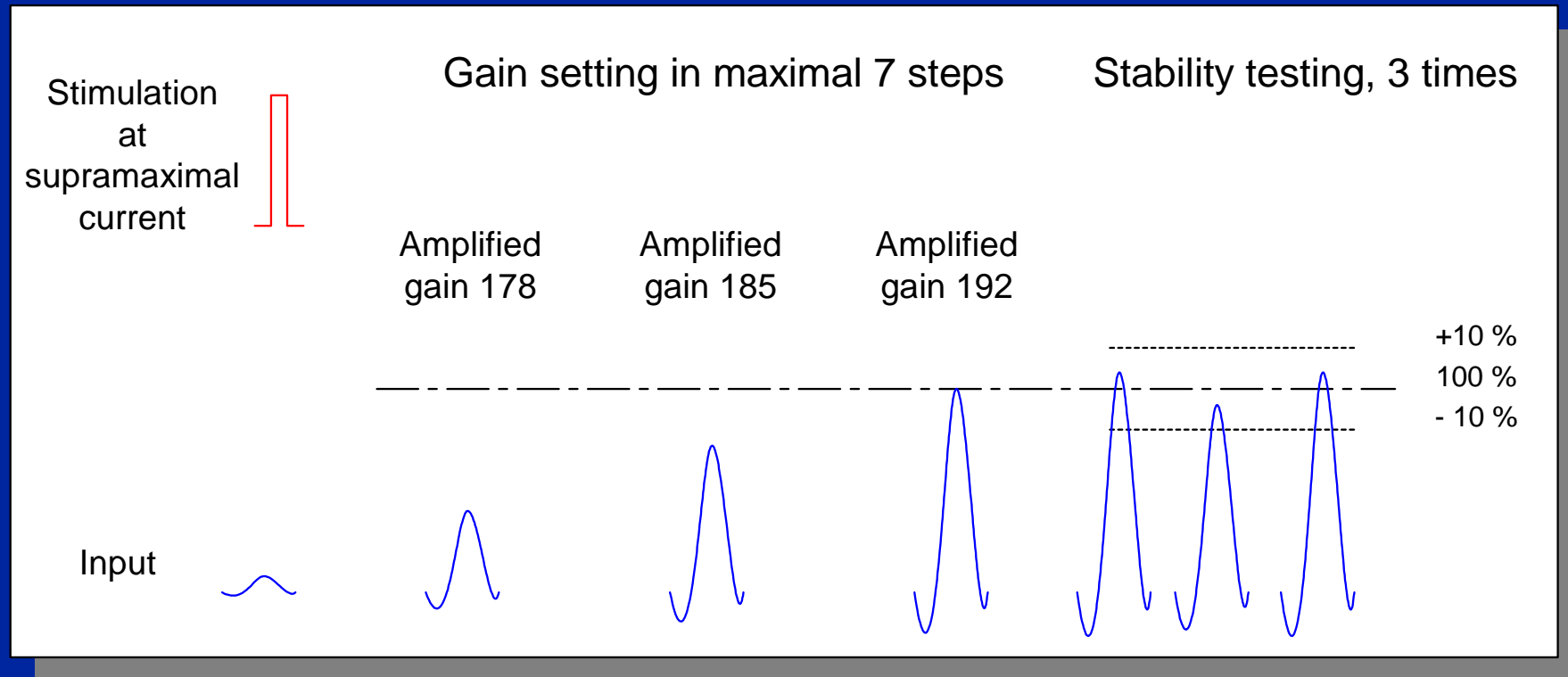
Gain is automatically in- or decreased until response is equal to 100 % at stimulation current set by the user.

Calibration “CAL 2” step a



Gain is automatically in- or decreased until response is equal to 100 % at stimulation current of 60 mA.

Calibration “CAL 2” step c



Gain is automatically in- or decreased until response is equal to 100 % at supramaximal current.

