

Existe-t-il une séance type? Optimisation des réglages



SCHULTHESS CLINIC
Musculoskeletal Centre

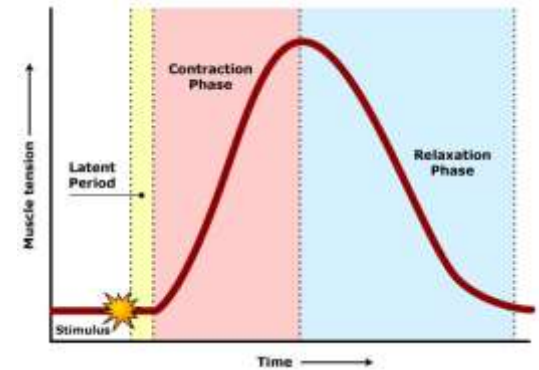
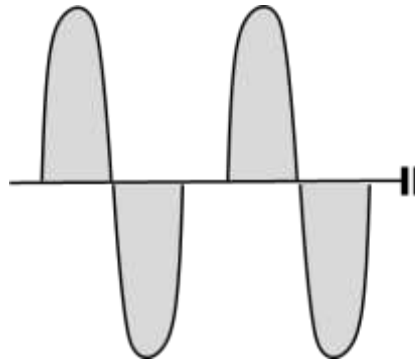
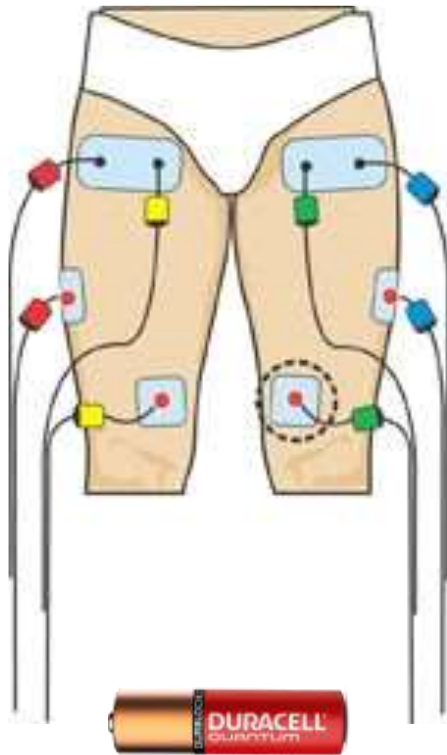


Human Performance Lab

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Stimulation Electrique NeuroMusculaire



SENM: objectifs

- Maintenir synthèse protéique
- Réduire stress oxydant musculaire
- Maintenir contrôle glycémique
- Préserver masse et fonction musculaires
- Réduire incidence polyneuromyopathie
- Eviter ↓ fonction physique et pulmonaire



Stevens et al. *CC* 2009

Routsi et al. *CC* 2010

Abdellaoui et al. *ERJ* 2011

Maffiuletti et al. *BMC Med* 2013

Weber-Carstens et al. *AJRCCM* 2013

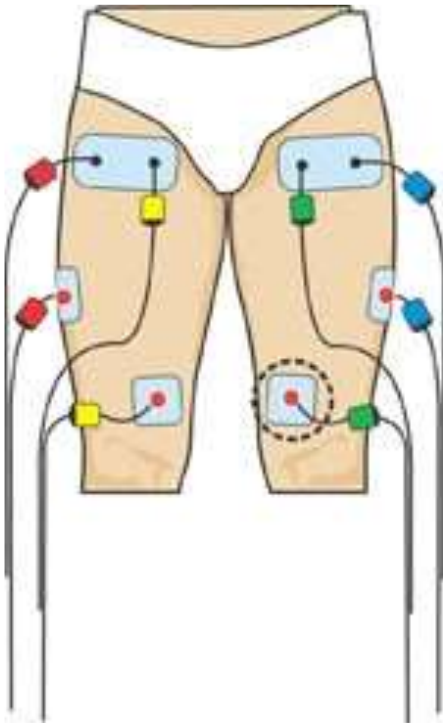
SENM: problèmes

- Contrôle **dosage**
- **Recrutement** musculaire
- **Fatigue**
- **Inconfort**



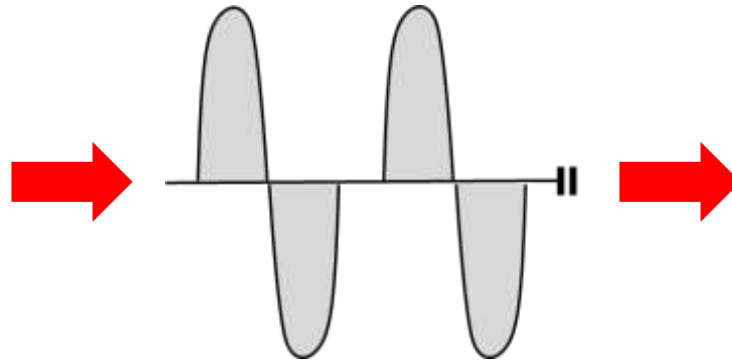
Trois phases = trois types de réglages

1. Préparation



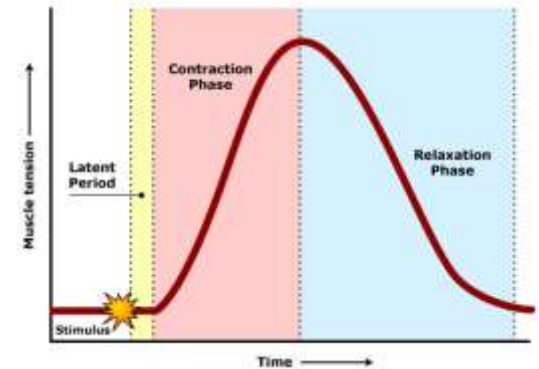
Réglages
généraux

2. Stimulation



Réglages
courant

3. Vérification



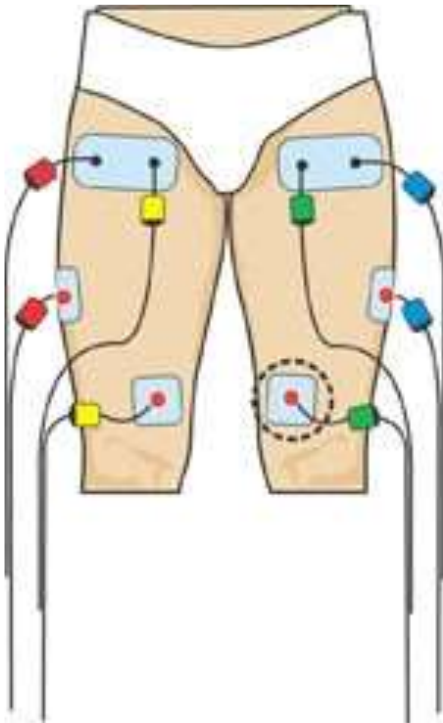
Réglages
efficacité

1. Préparation: réglages généraux

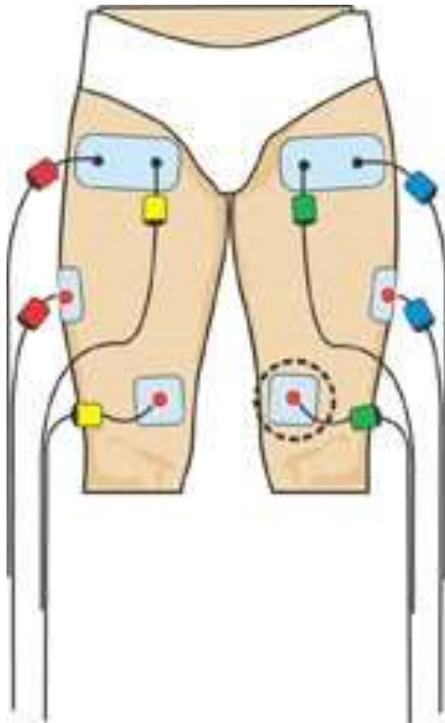
1.1. Position sujet

1.2. Electrodes

1.3. Stimulateur



1. Préparation: réglages généraux



1.1. Position sujet $\begin{cases} \text{Longueur m optimale} \\ \text{Variation longueur m} \end{cases}$

1.2. Electrodes

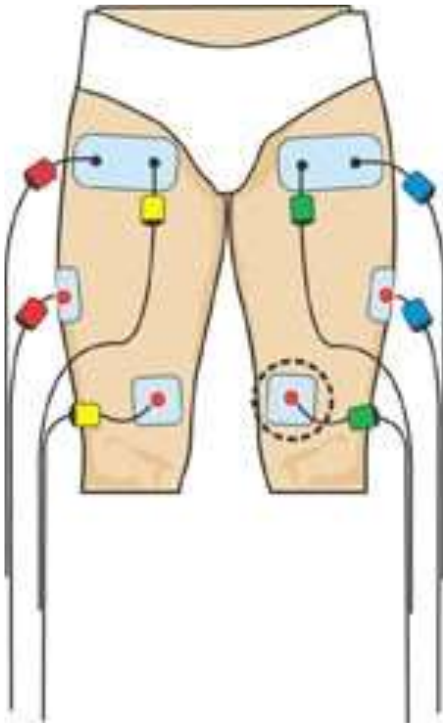
1.3. Stimulateur

1. Préparation: réglages généraux

1.1. Position sujet

1.2. Electrodes → Point(s) moteur(s)

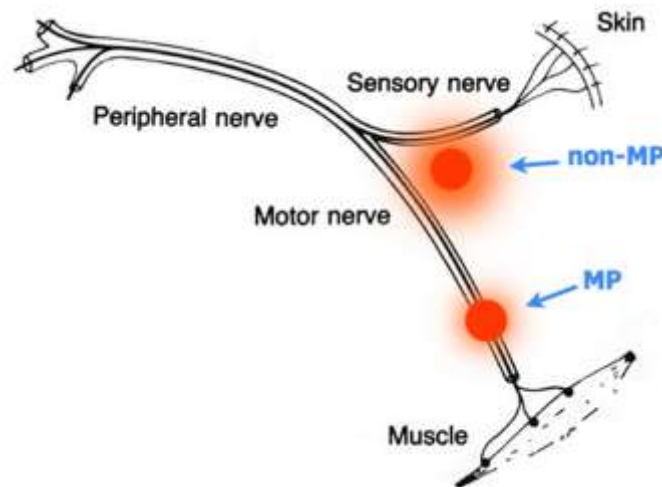
1.3. Stimulateur





SENM point moteur vs. classique

- Contrôle **dosage**
- **Recrutement** musculaire
- **Fatigue**
- **Inconfort**

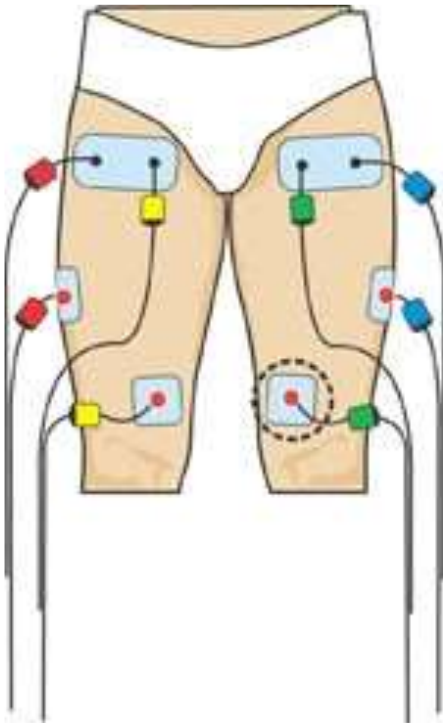


1. Préparation: réglages généraux

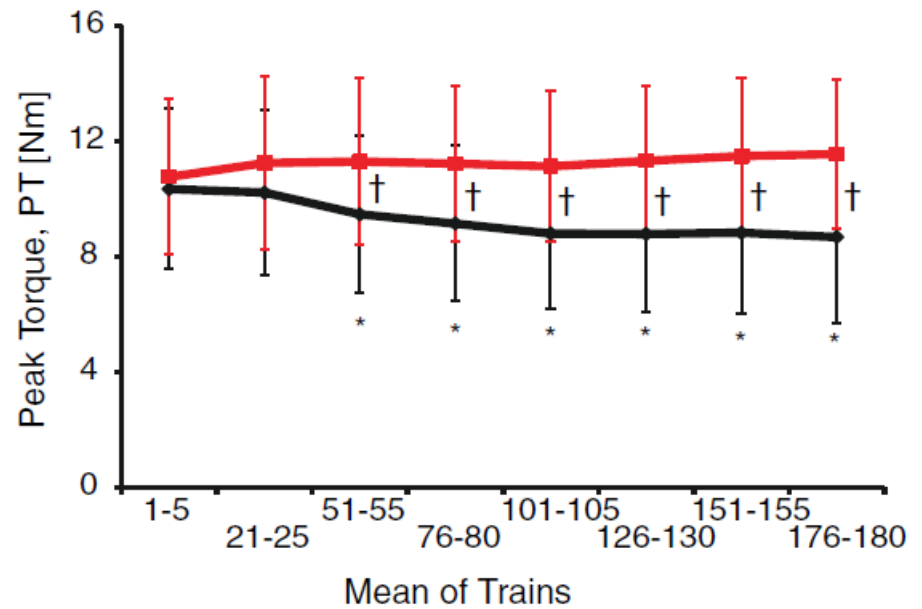
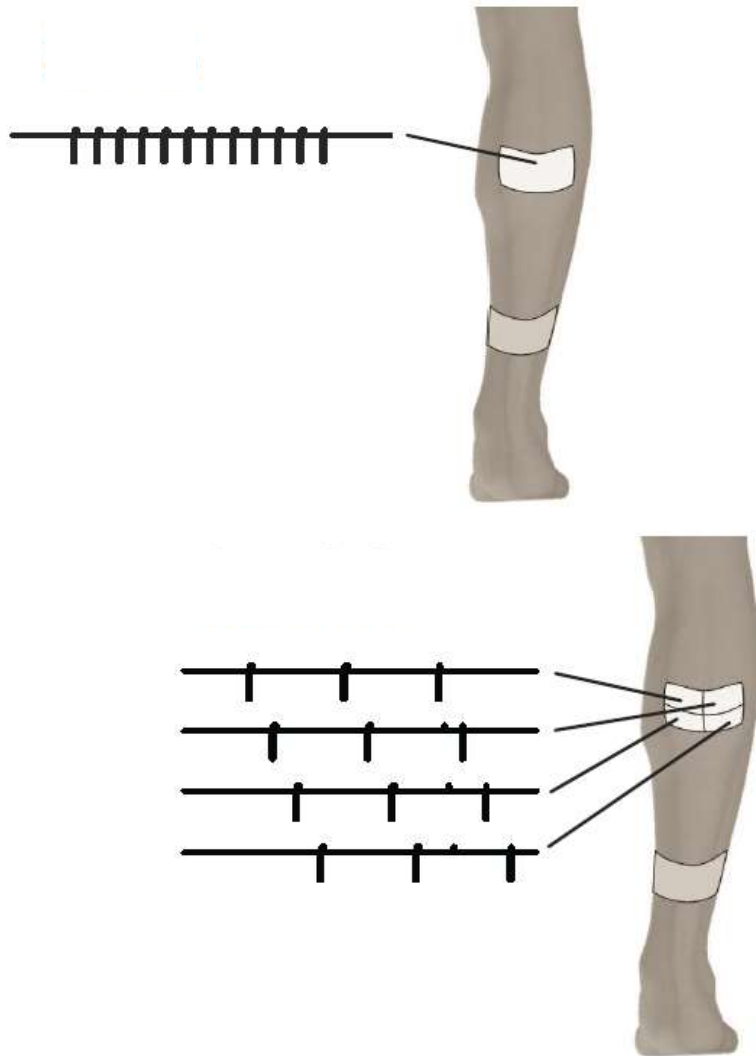
1.1. Position sujet

1.2. Electrodes

1.3. Stimulateur → Courant distribué



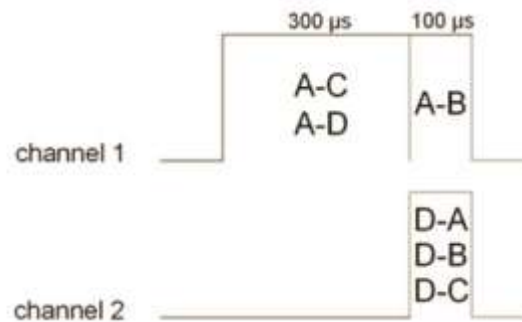
Courant distribué



Malesevic et al. *MN* 2010
Sayenko et al. *EJAP* 2014

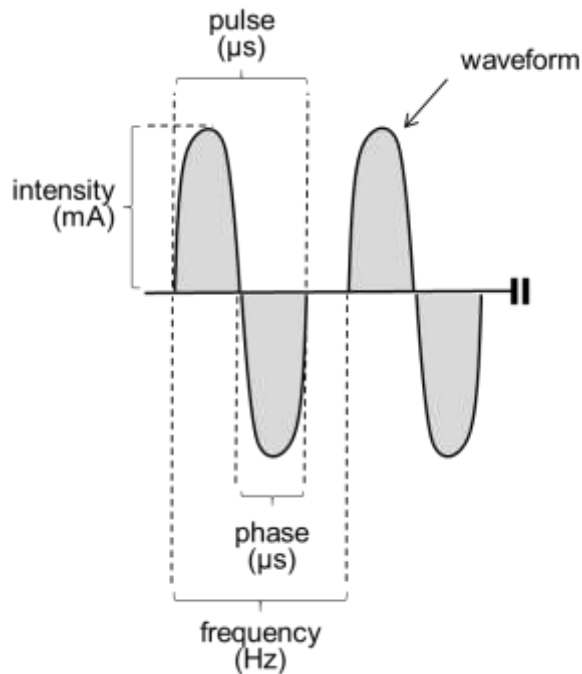
SENM courant distribué vs. classique

- Contrôle **dosage**
- **Recrutement** musculaire
- **Fatigue**
- **Inconfort**



Feil et al. *AJSM* 2011
Maffiuletti et al. *EJAP* 2014
Morf et al. *APMR* 2015
Vivodtzev et al. *BRI* 2017

2. Stimulation: réglages courant



2.1. Forme onde

2.2. Modulation

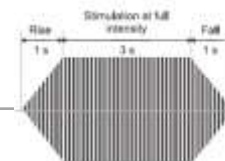
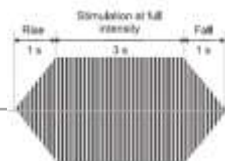
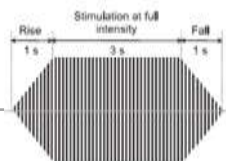
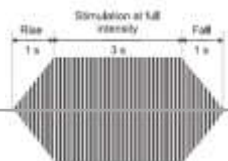
2.3. On-off ratio

2.4. Fréquence

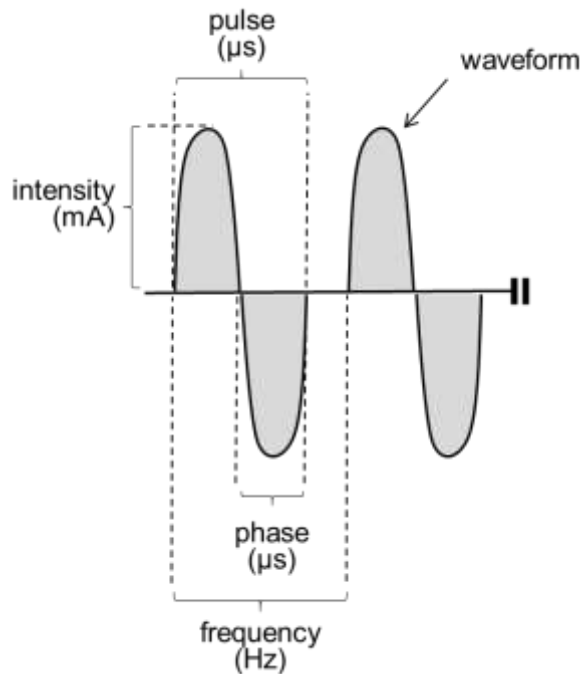
2.5. Intensité

2.6. Durée impulsion

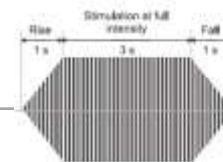
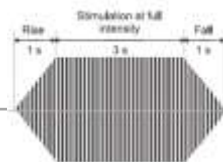
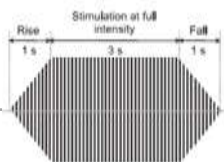
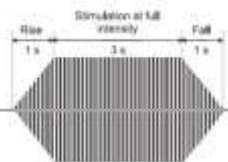
Lieber & Kelly *PT* 1991



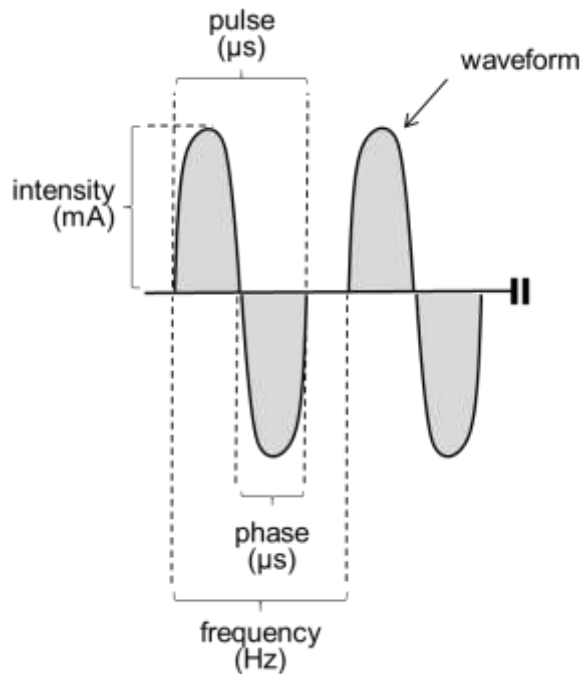
2. Stimulation: réglages courant



- 2.1. **Forme onde** → Biph rect/sinus
- 2.2. **Modulation** → ~1 s
- 2.3. **On-off ratio** → 1:3 (ex. 7:23 s)
- 2.4. **Fréquence** → ~50 Hz
- 2.5. **Intensité** → fonction tension
- 2.6. **Durée imp.**



2. Stimulation: réglages courant



2.1. **Forme onde**

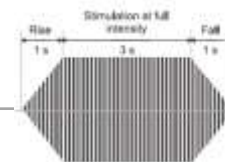
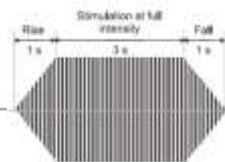
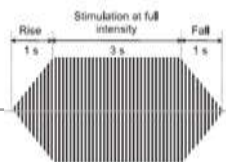
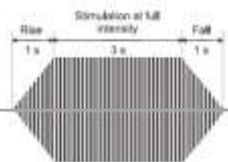
2.2. **Modulation**

2.3. **On-off ratio**

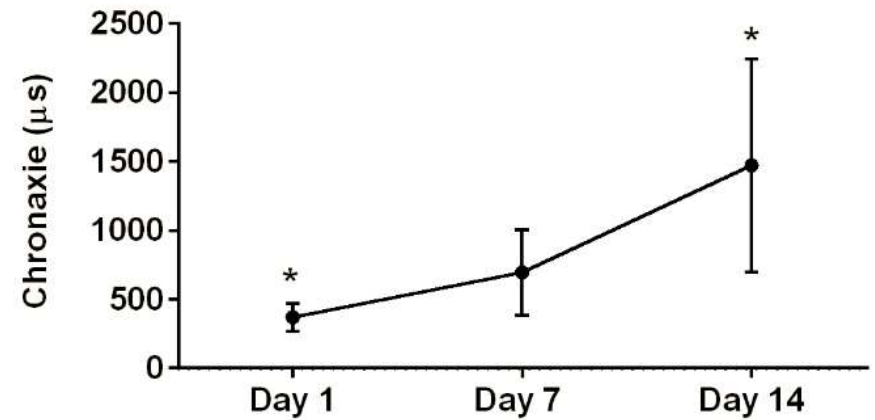
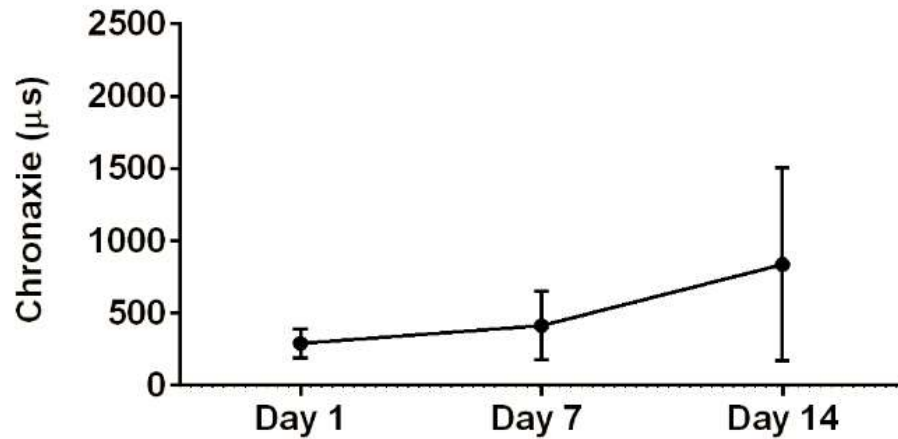
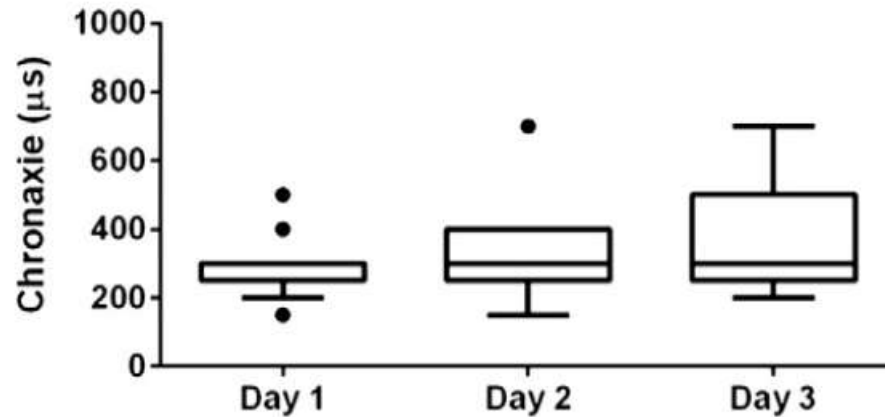
2.4. **Fréquence**

2.5. **Intensité**

2.6. **Durée imp.** → chronaxie

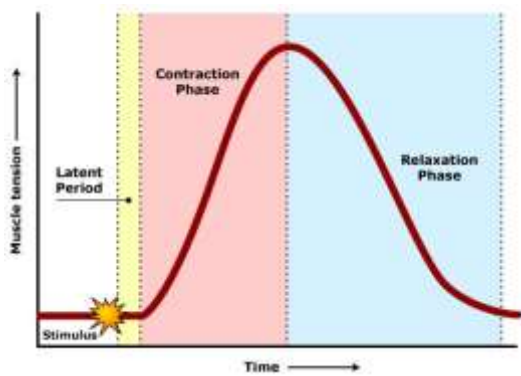


Chronaxie-based SENM (?)



Russo et al. *MN* 2007
Silva et al. *JCC* 2016

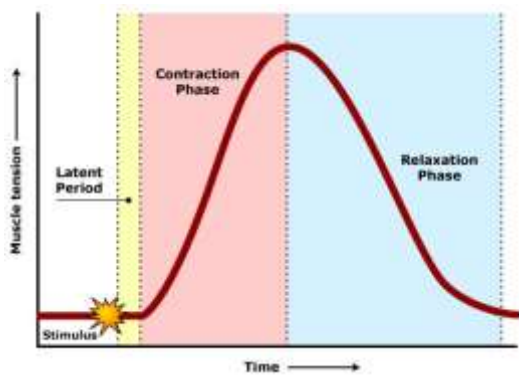
3. Vérification: réglages efficacité



**3.1. Tension =
force évoquée**

3.2. Planification

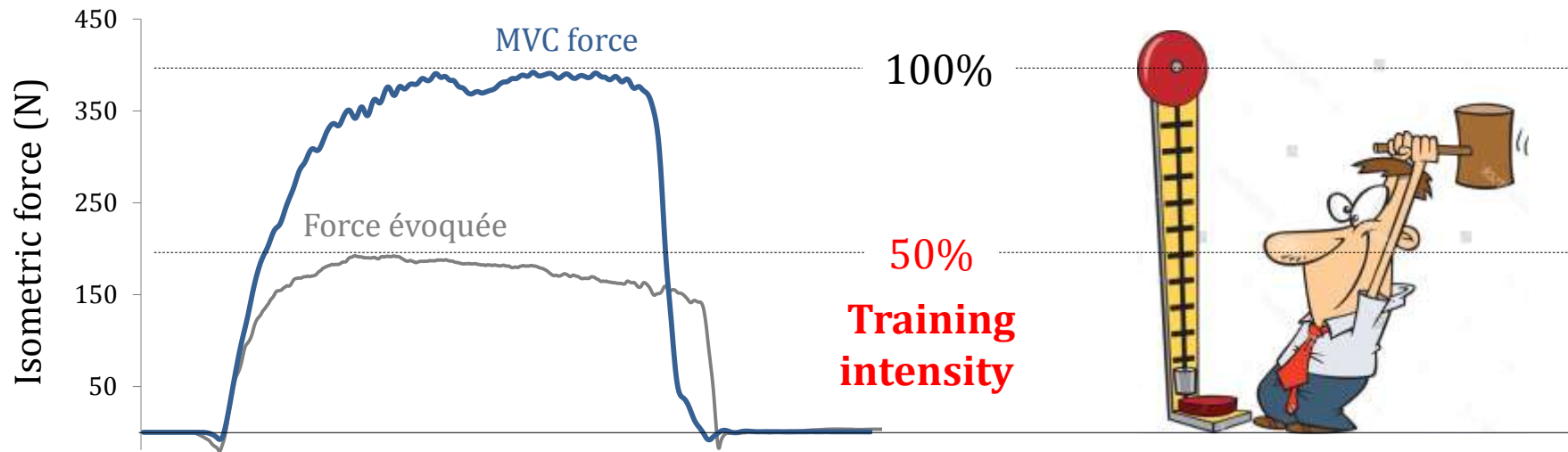
3. Vérification: réglages efficacité



**3.1. Tension =
force évoquée → contrôle**

3.2. Planification

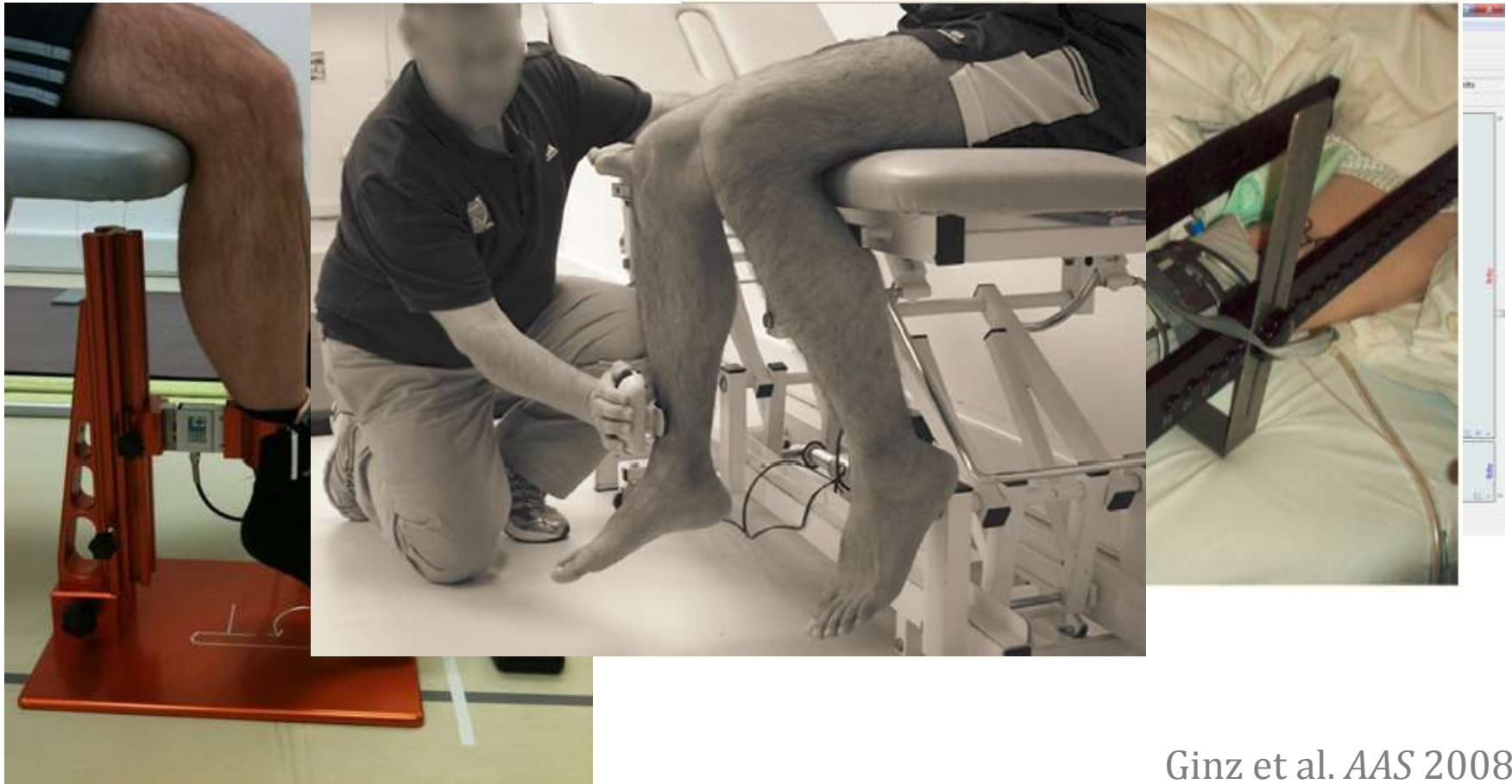
Contrôle force évoquée



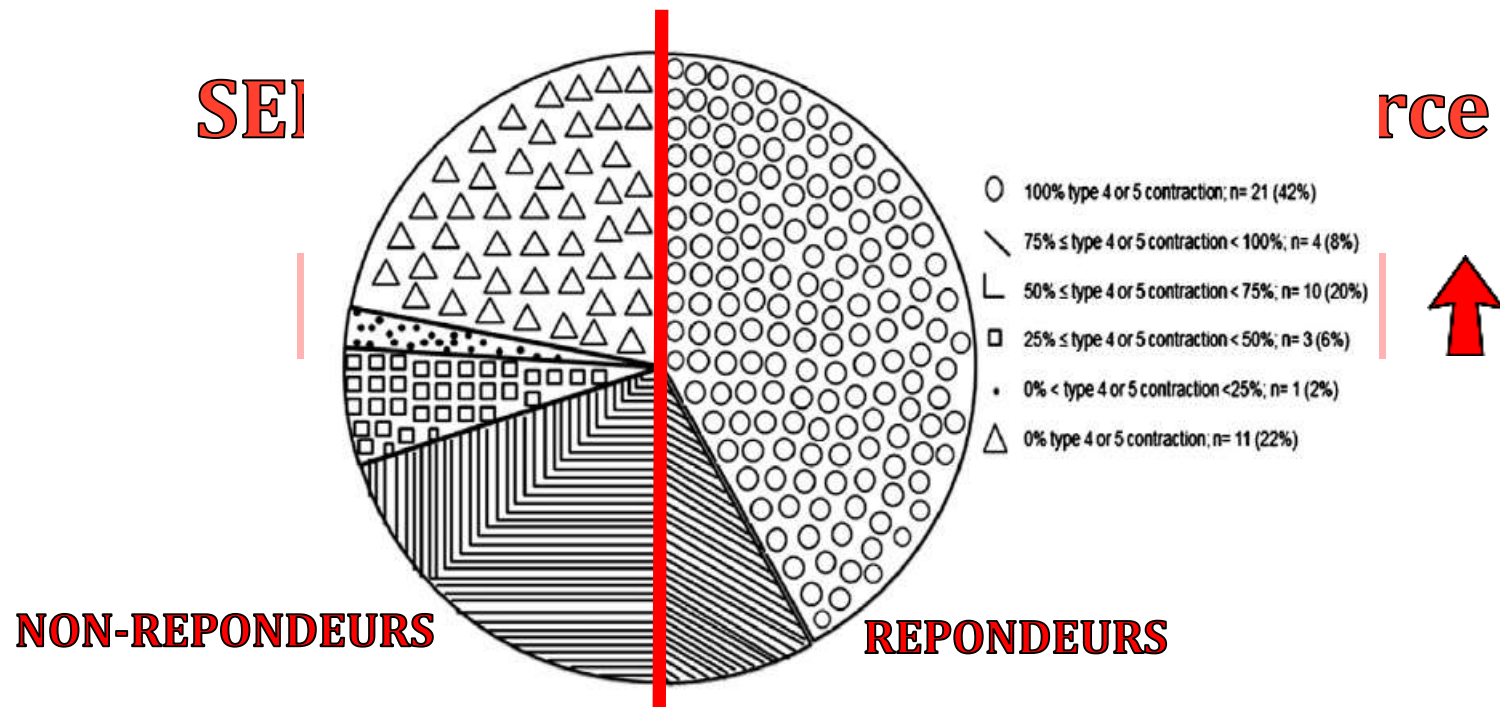
Meilleur indicateur du **dosage** !

Efficacité traitement $\propto$ training intensity

Contrôle force évoquée



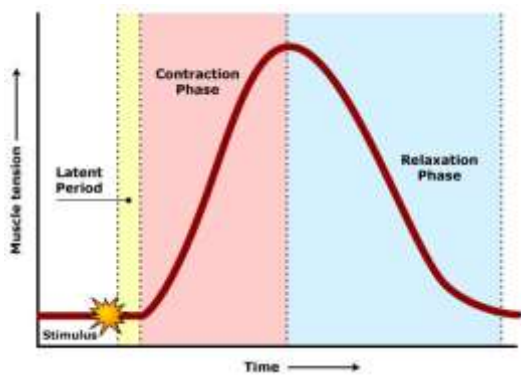
Ginz et al. *AAS* 2008
Vivodtzev et al. *CC* 2014
Poulsen et al. *BRI* 2015



Supplement 1: Scale for rating the quality of muscle contractions

Type 1	No palpable or visible contraction
Type 2	Just palpable but no visible contraction
Type 3	Just palpable and just visible contraction
Type 4	Palpable and visible contraction (partial muscle bulk)
Type 5	Palpable and visible contraction (full muscle bulk)

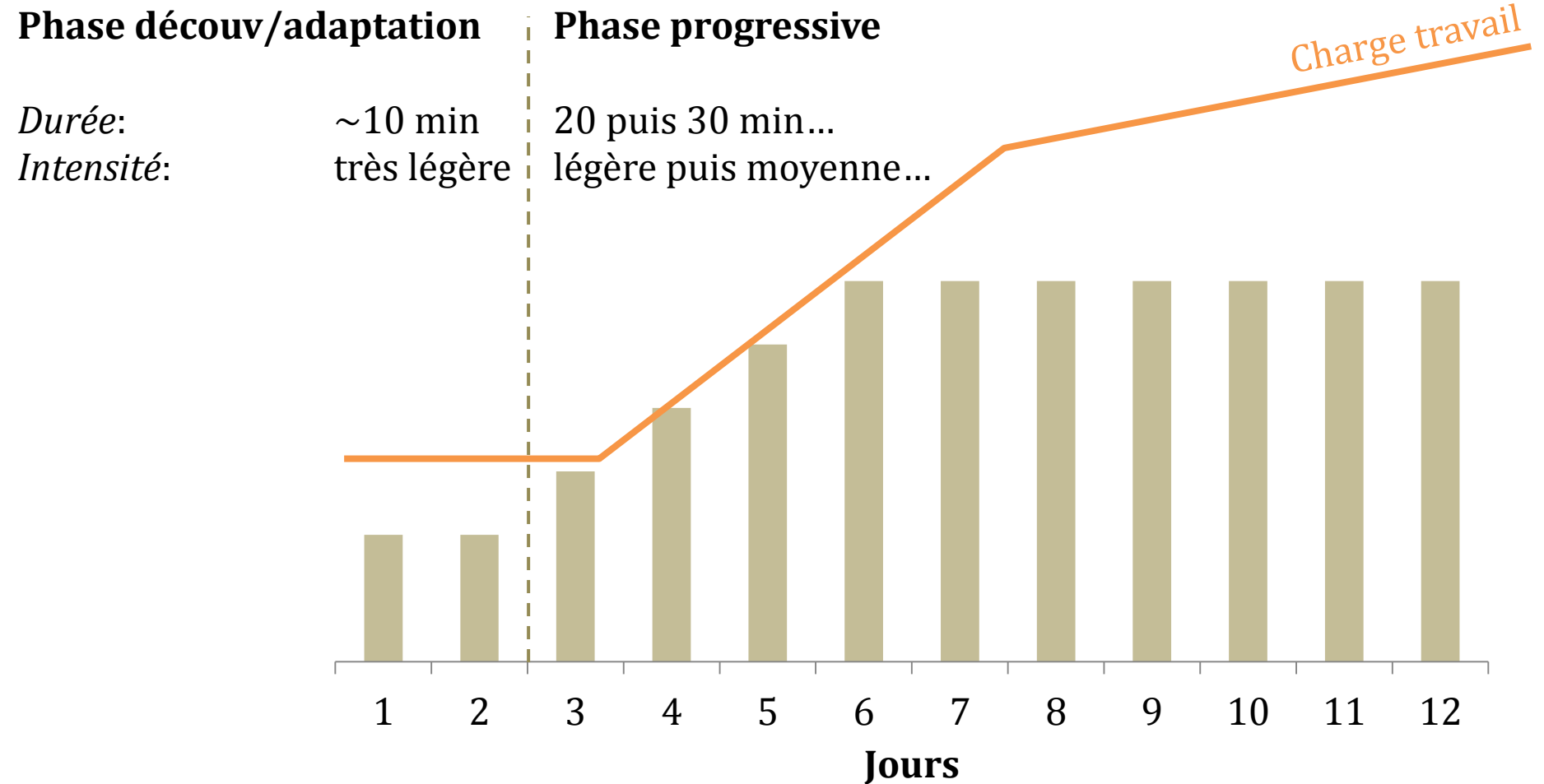
3. Vérification: réglages efficacité

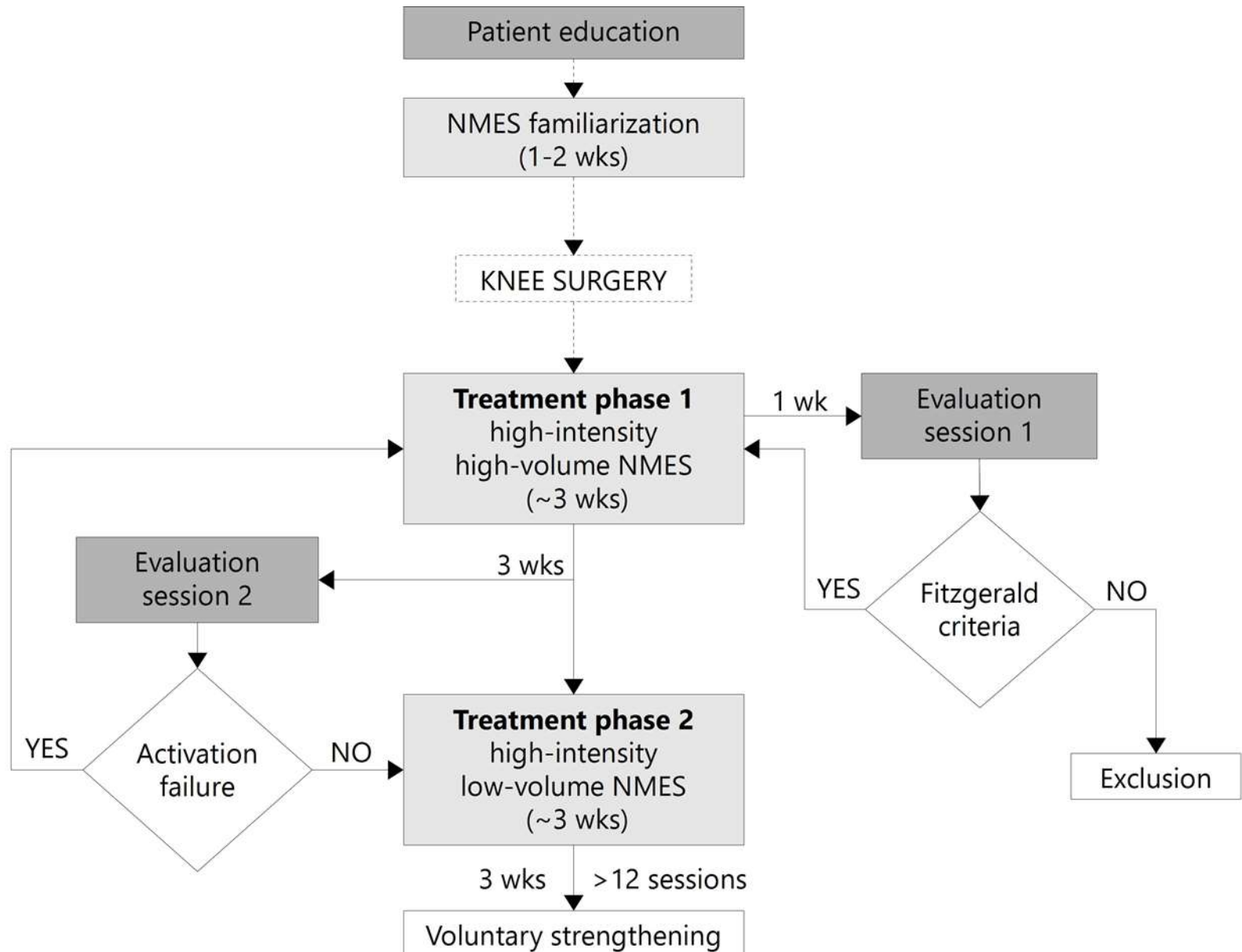


**3.1. Tension =
force évoquée**

3.2. Planification → traitement

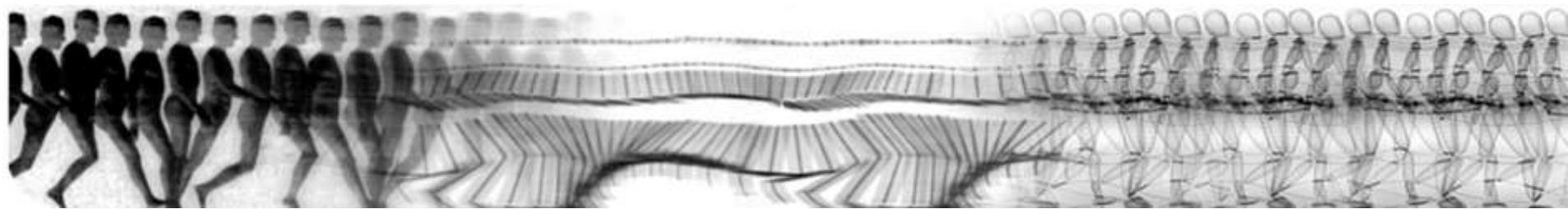
Planification traitement





En conclusion

- **Contrôler force évoquée**
 - **Utiliser stimulation distribuée ou localiser point moteur**
 - **Déterminer chronaxie (?)**
 - **Planifier traitement**
- ...tout en utilisant des réglages plutôt classiques



MERCI

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