

Plan UE13

6. La préhension et le membre supérieur: aspects cliniques

1. *L'évaluation fonctionnelle du MS*
2. *Evaluation clinique de l'habileté manuelle par questionnaire*
3. *Rappel de la dynamique de la préhension et extensions*
4. *Exemples cliniques: régénération du nerf médian / hémiplégie*
5. *Evaluation des performances en pathologie*
6. *Introduction sur le transfert*

8. Intérêt de la robotique dans la réadaptation

1. *Avantages*
2. *Concept de robot*
3. *State of the art*
4. *Etudes cliniques*

7. (Re)Apprentissage et ergonomie

1. *Introduction aux protocoles*
2. *Intérêt pour la rééducation*
3. *... mais littérature complexe*
4. *Généralisation, transfert et consolidation*
5. *Mouvements rythmiques*

La préhension et le membre supérieur: aspects cliniques

3. Rappel de la dynamique de la préhension et extensions

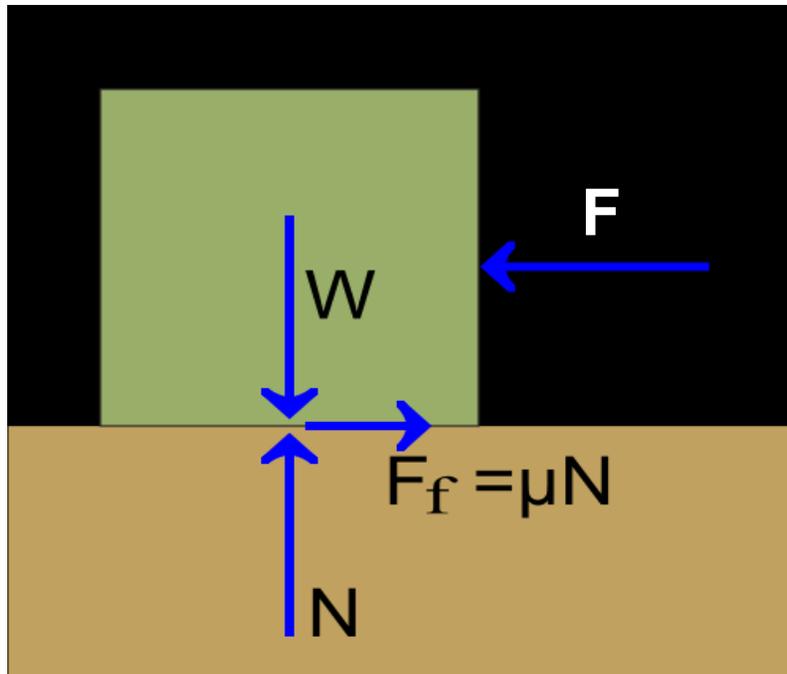
Un peu de mécanique

Les corps **élastiques** et **non élastiques**

- **Quantité de mouvement:** boules de billard ou boule de neige

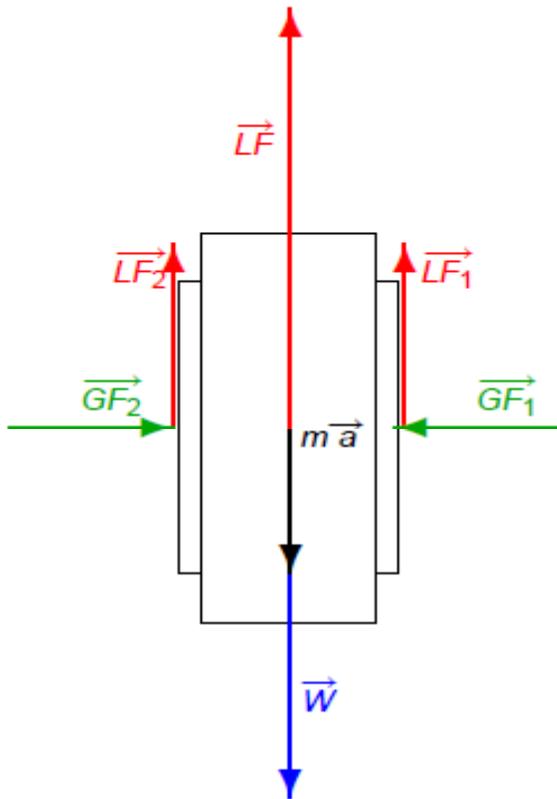
$$\vec{p} = \sum m\vec{v}$$

- **Friction:** livre sur une table ou ... le doigt sur une surface



$$\vec{F}_f \leq \mu \vec{F}_n$$

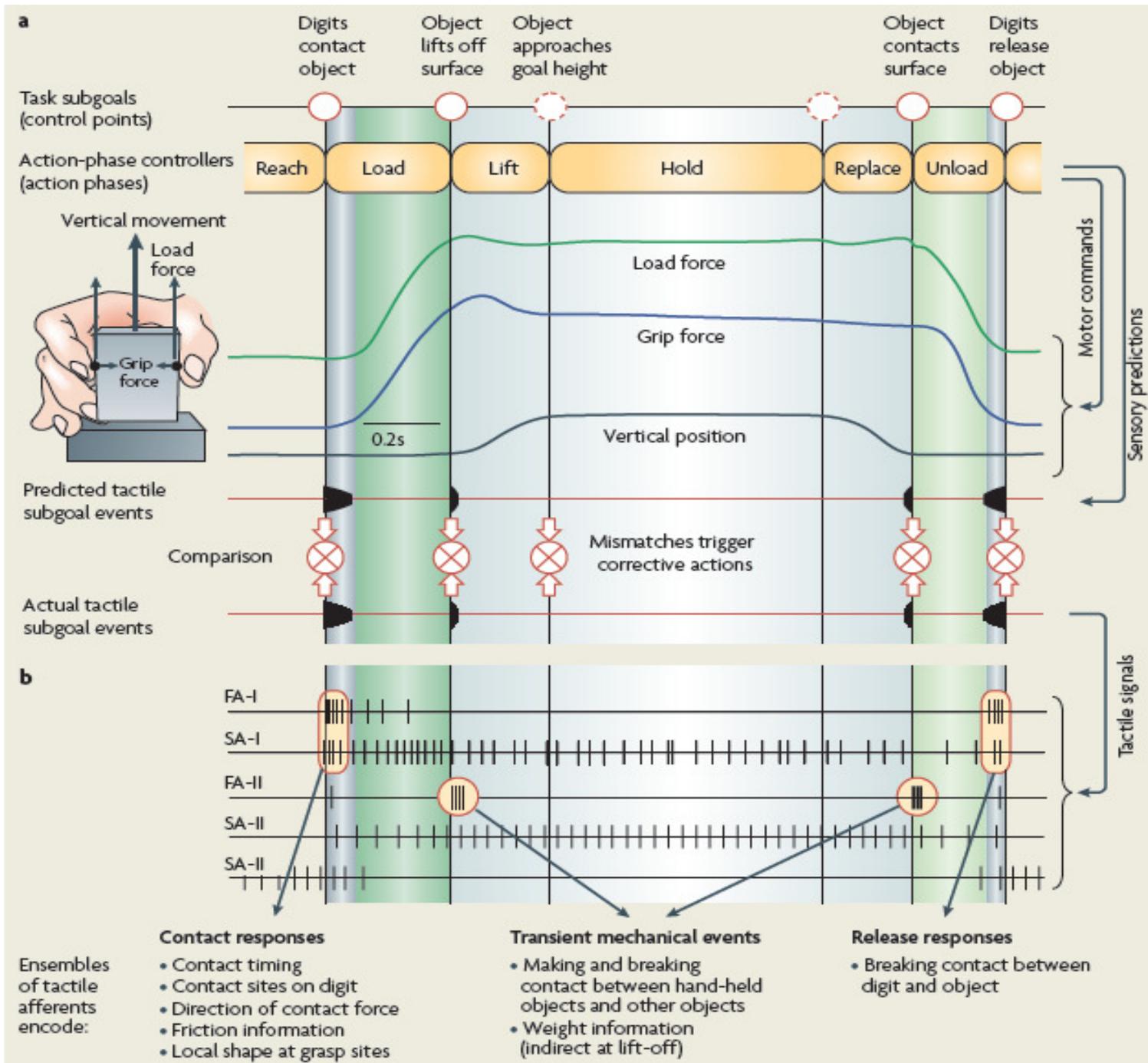
Encore un peu de mécanique



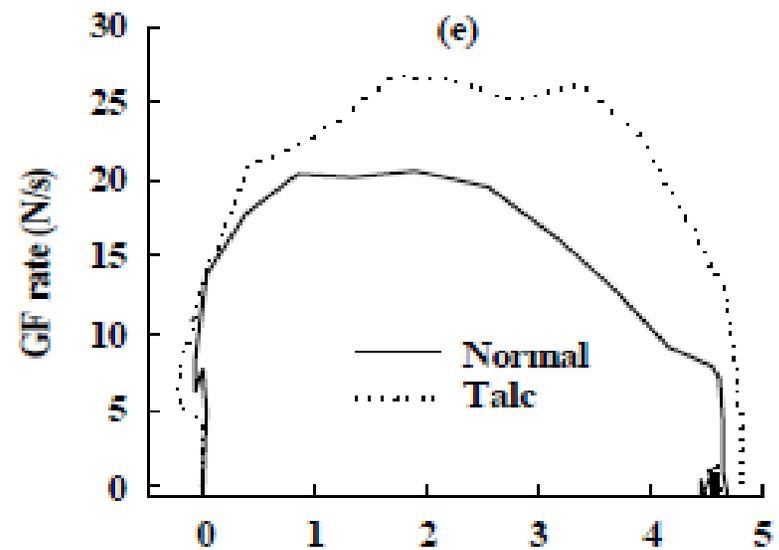
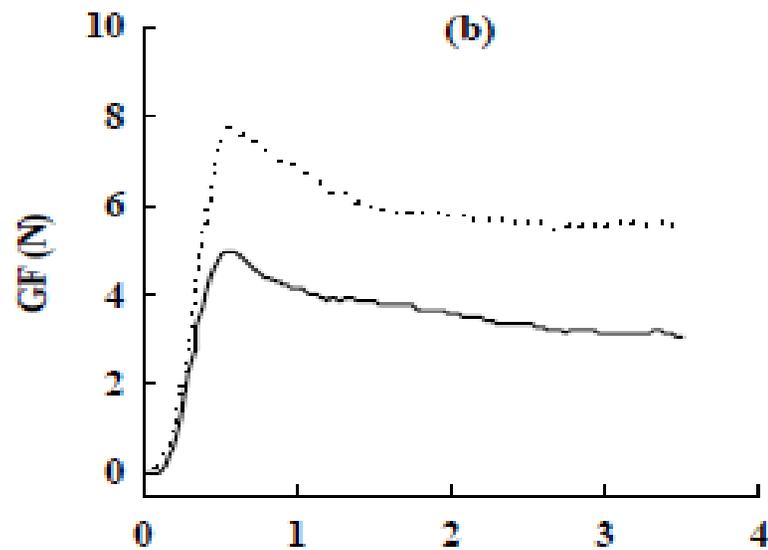
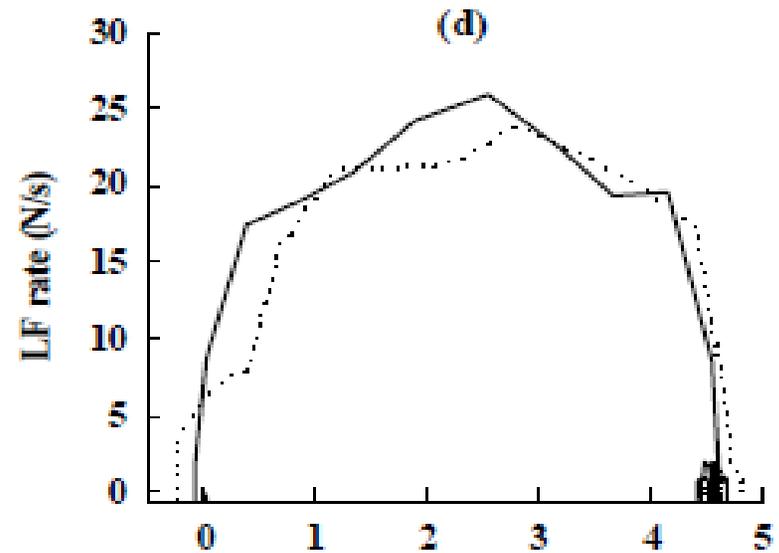
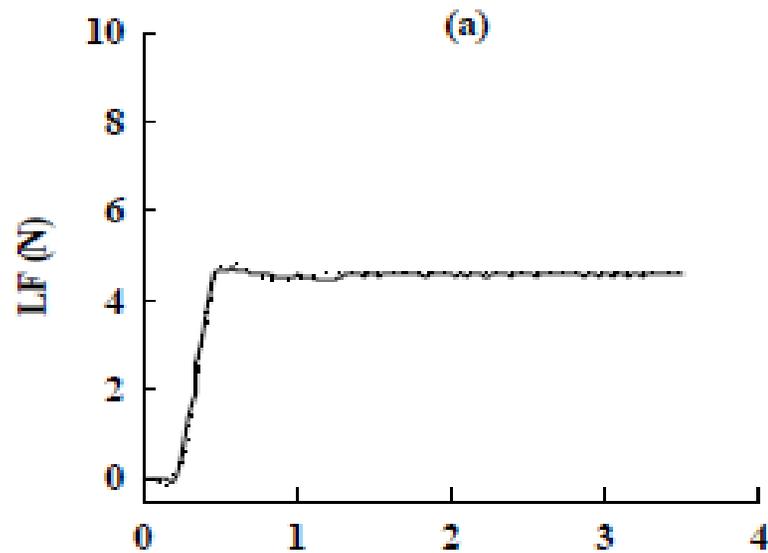
- \vec{GF} : Grip Force
- \vec{LF} : Load Force
- \vec{W} : Weight

Relationships

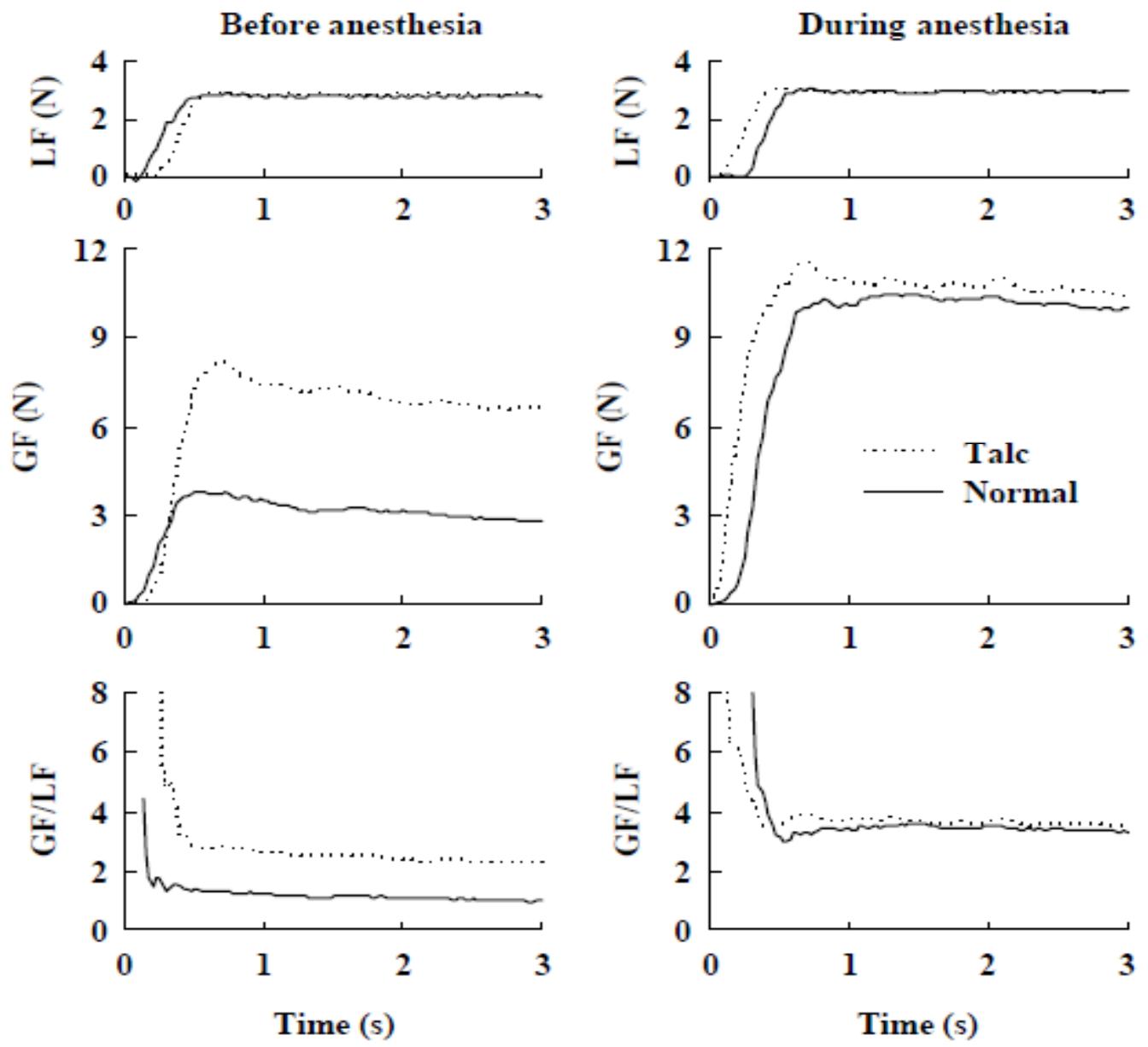
- $\|\vec{LF}\| \leq \mu \cdot \|\vec{GF}\|$
- $\vec{W} = m \cdot \vec{g}$
- $\vec{LF} = \vec{W} + m \cdot \vec{a}$



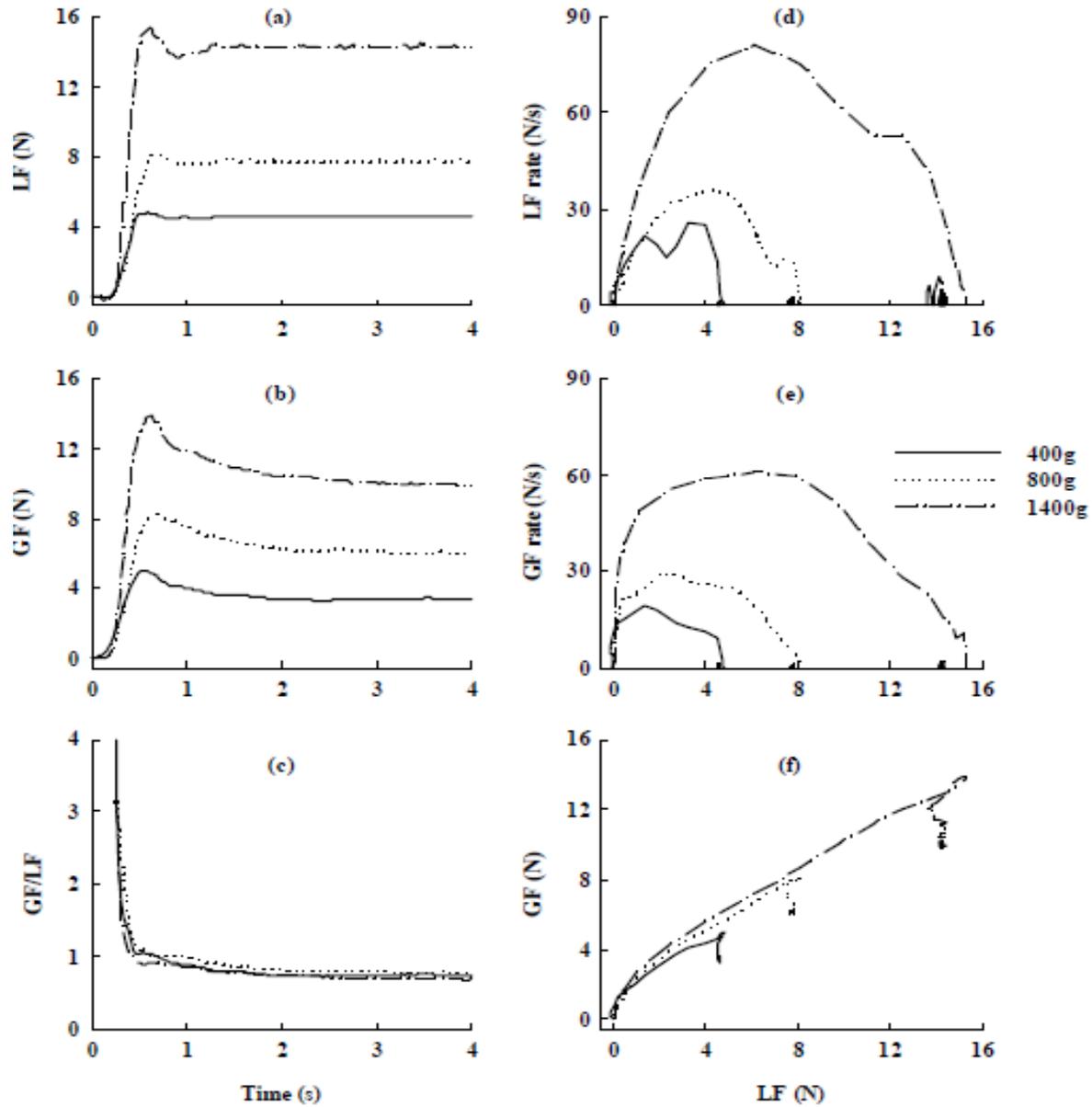
Adaptation à la friction



Anesthésie



Adaptation au poids



Différentes prises

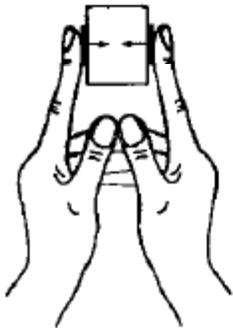
(1) Precision Grip



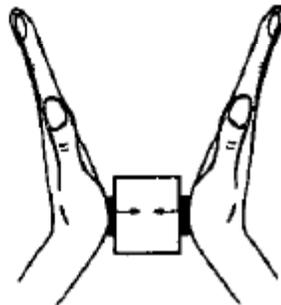
(2) Pincer Grip



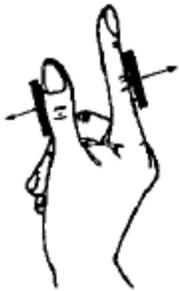
(3) Index Finger Grip



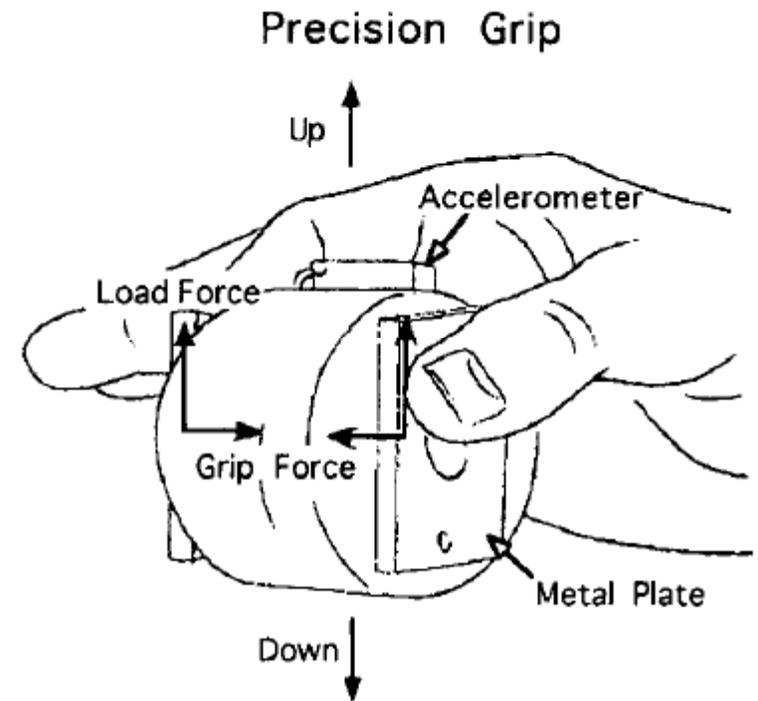
(4) Heel Grip



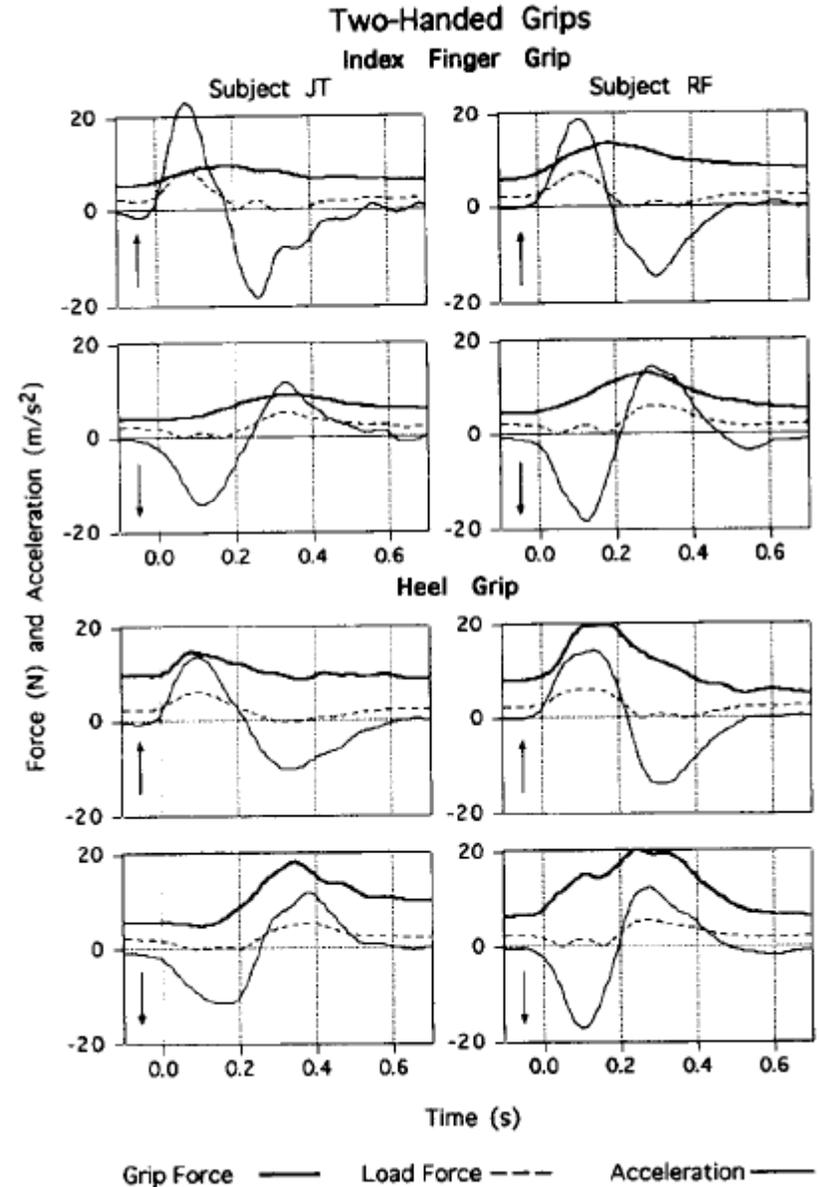
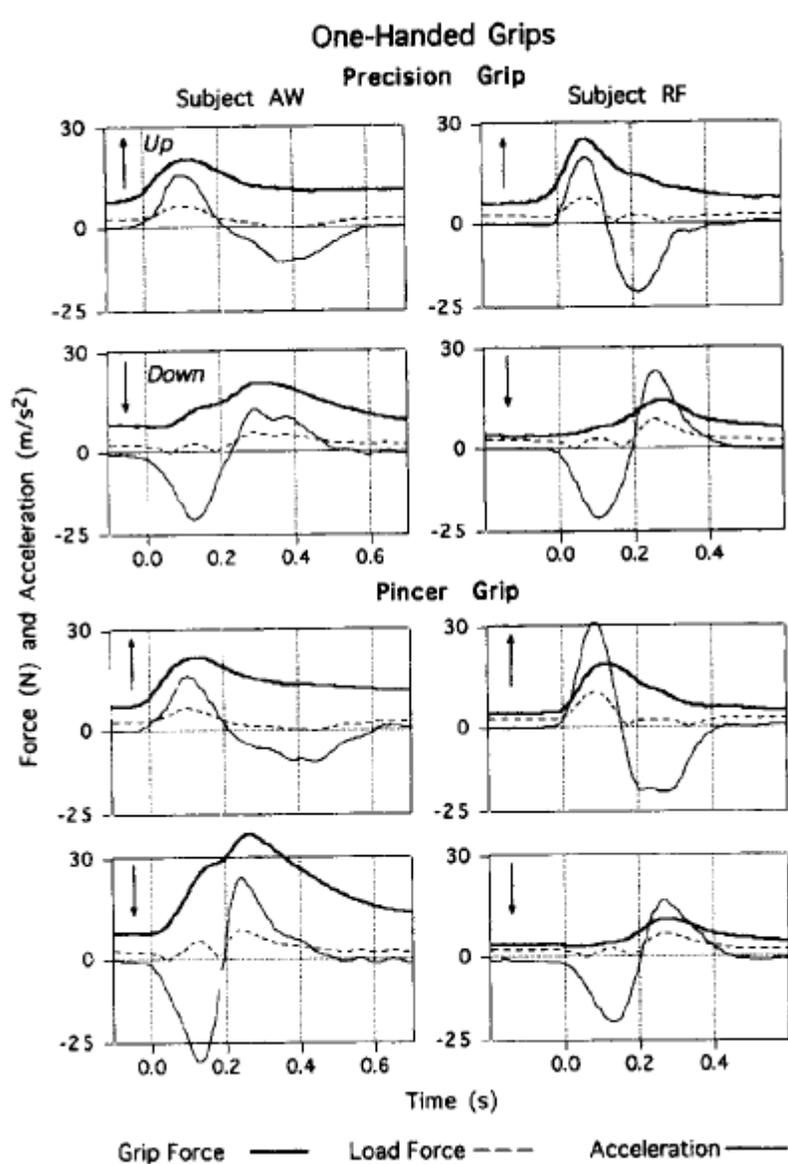
(5) Precision "Pig"



(6) Thumb "Pig"

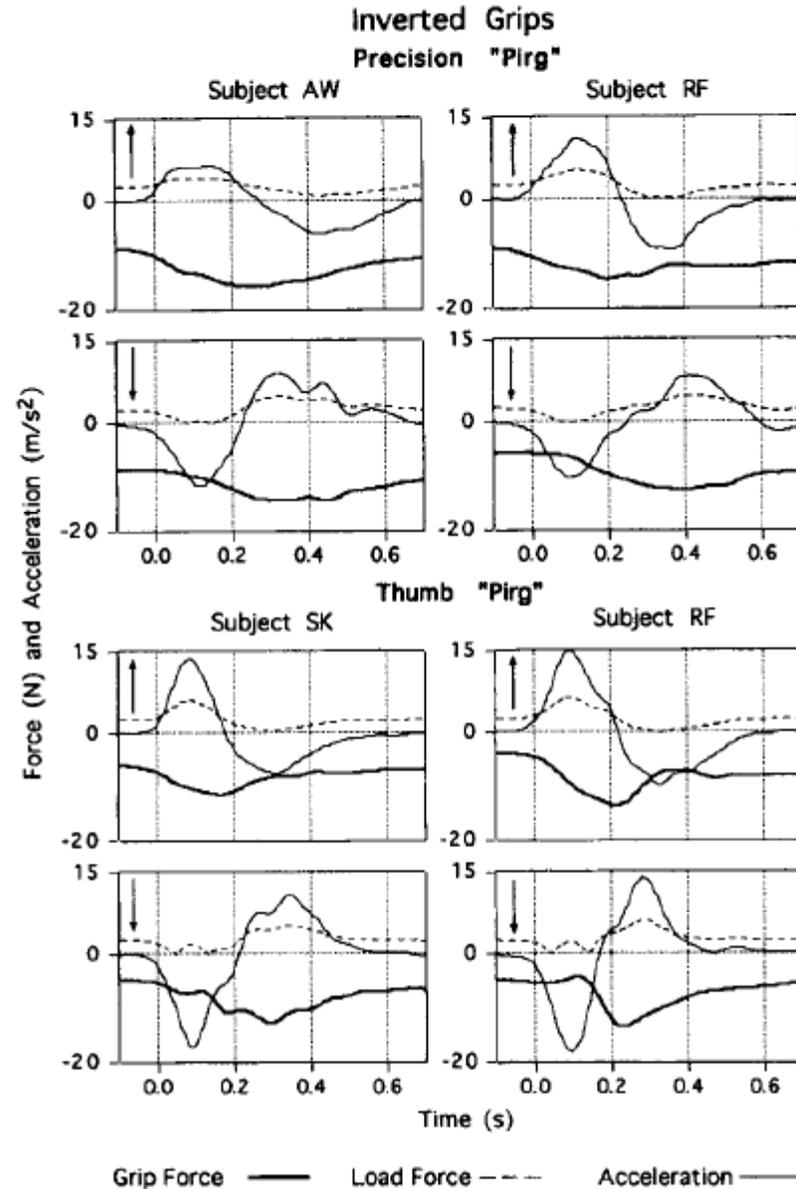
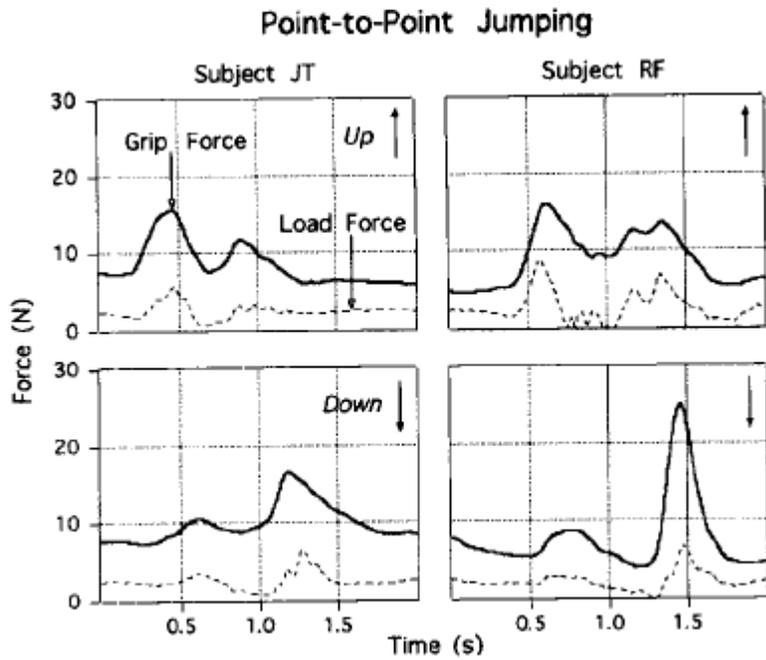


Différentes prises

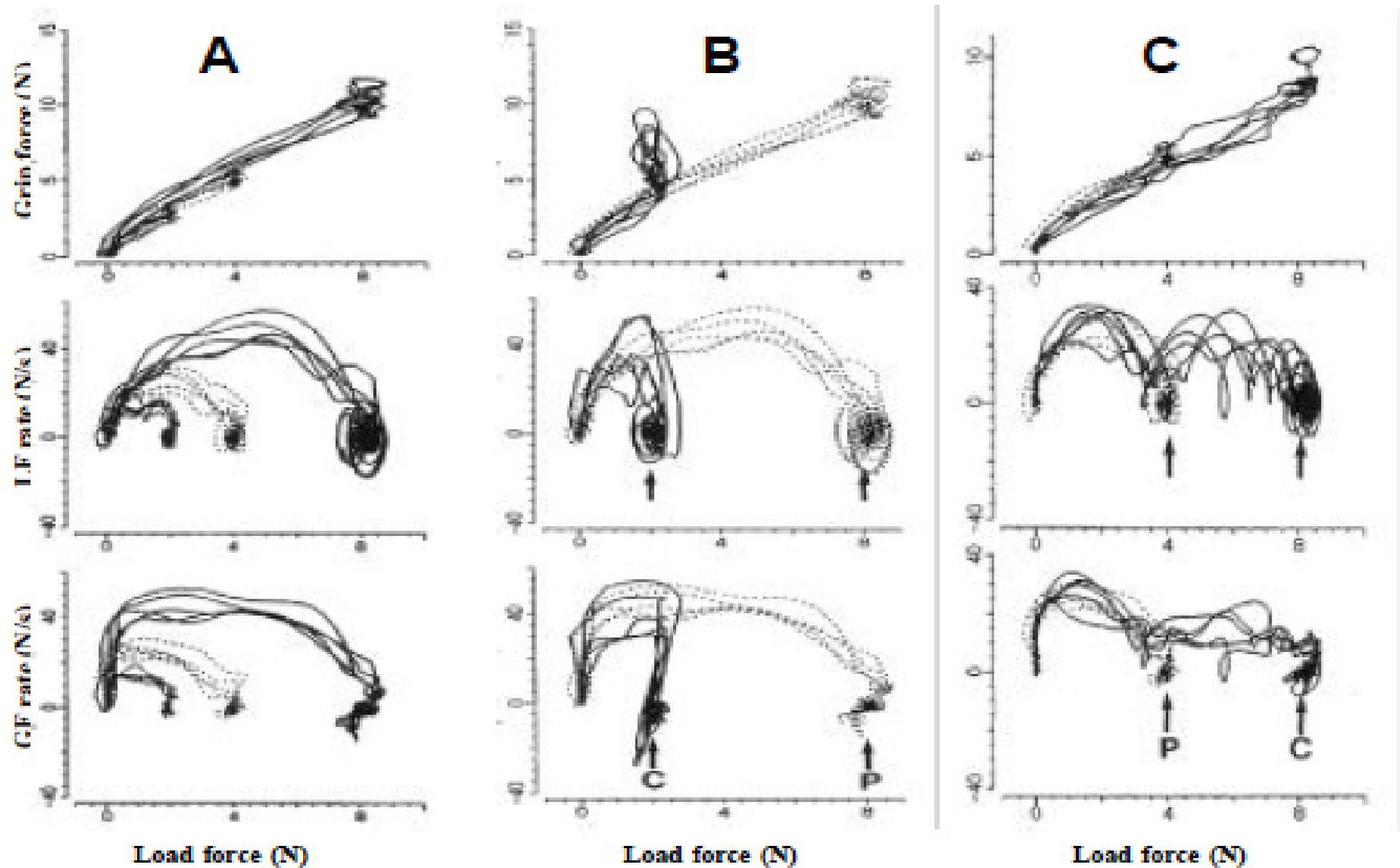


Différentes prises

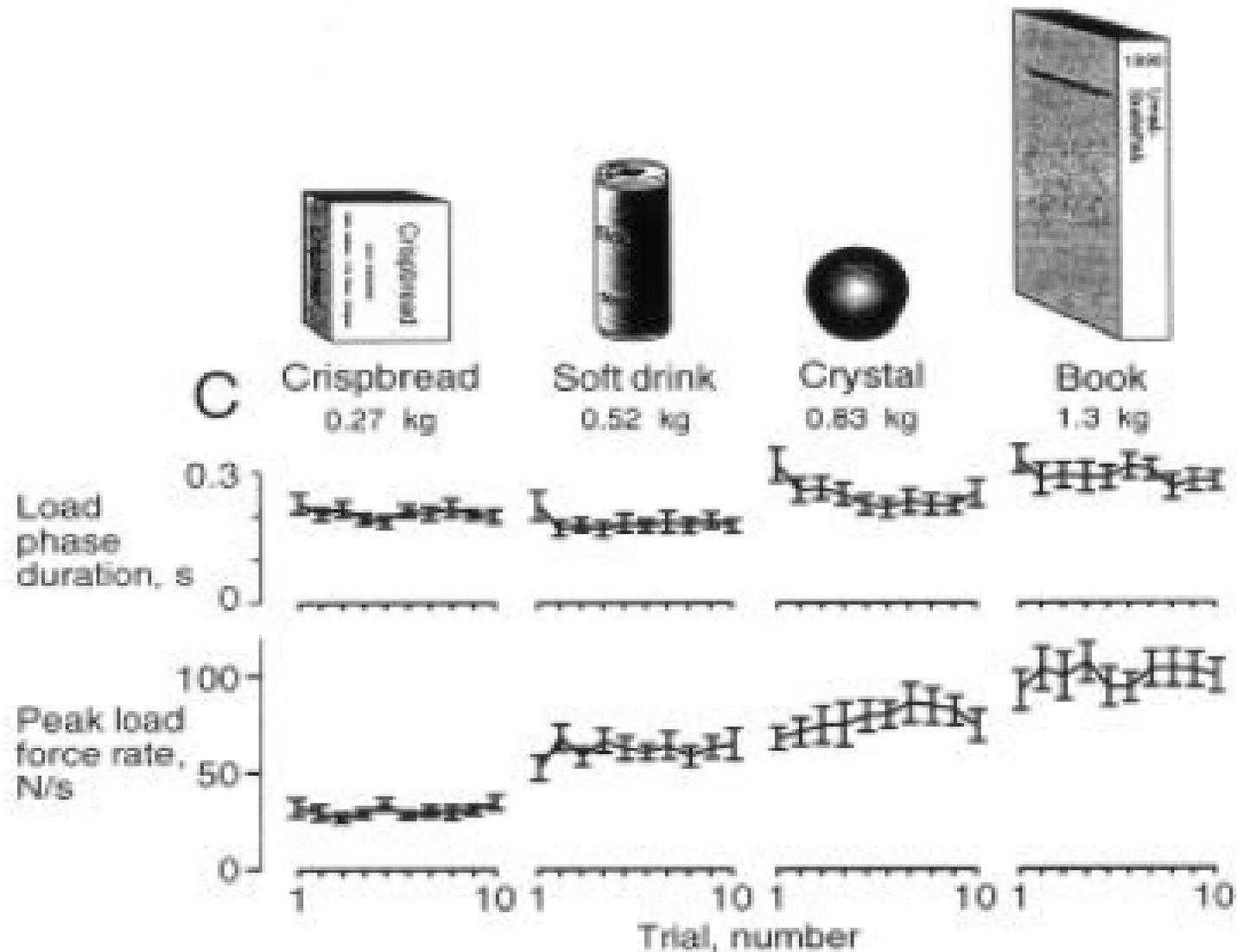
GF < 0 mais restent synchro



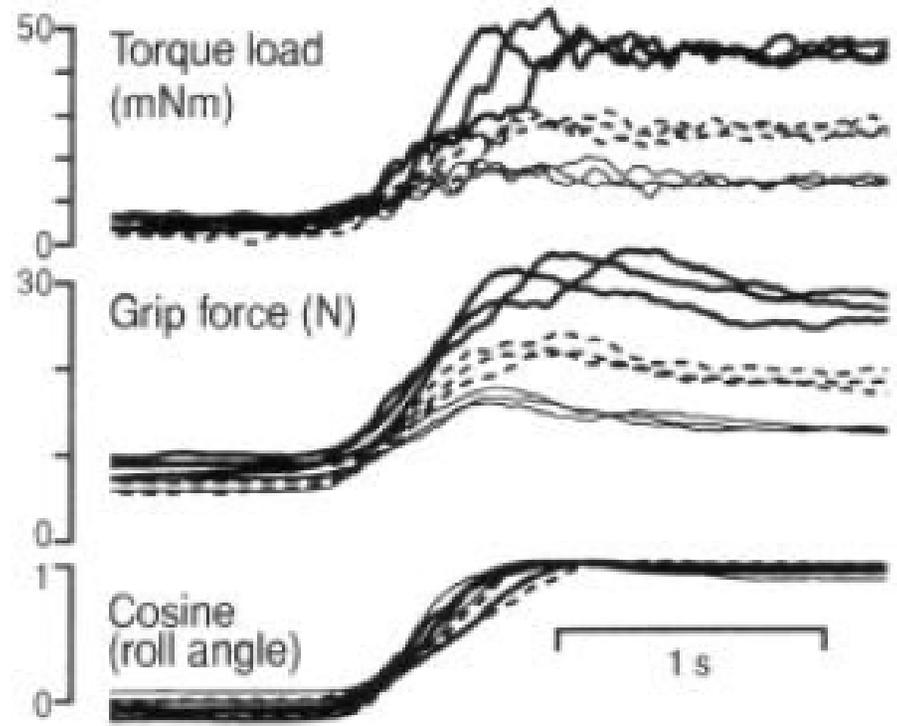
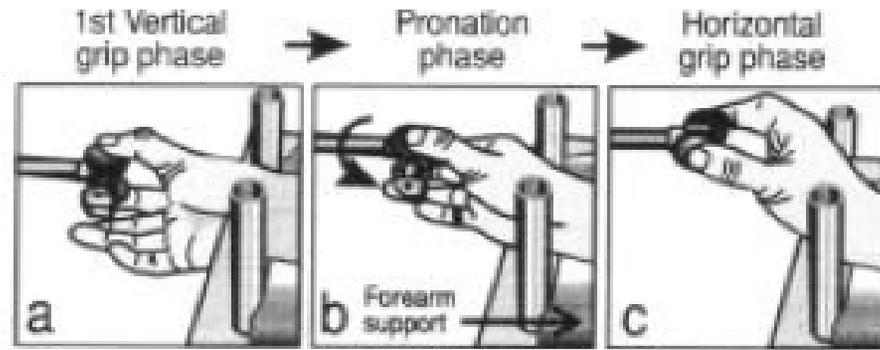
Adaptation au poids



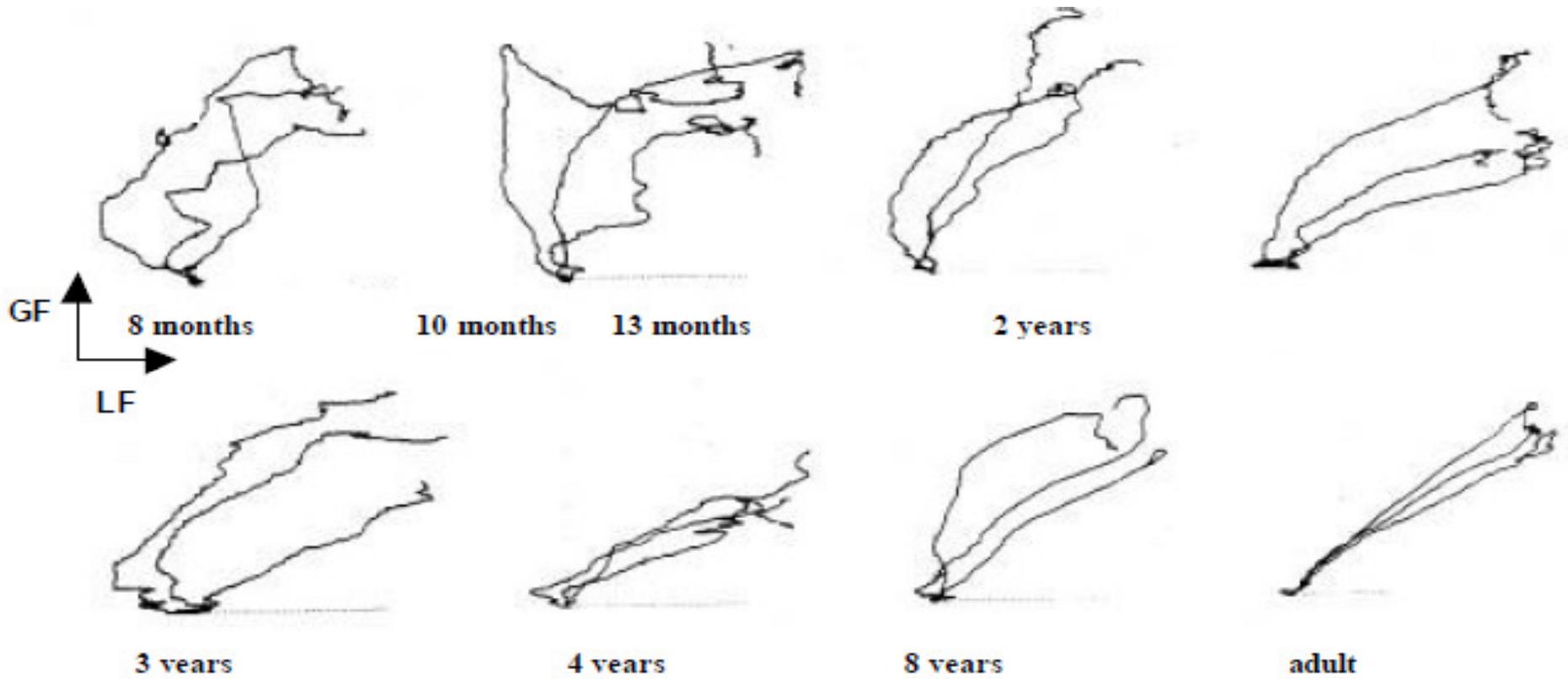
Expérience et histoire



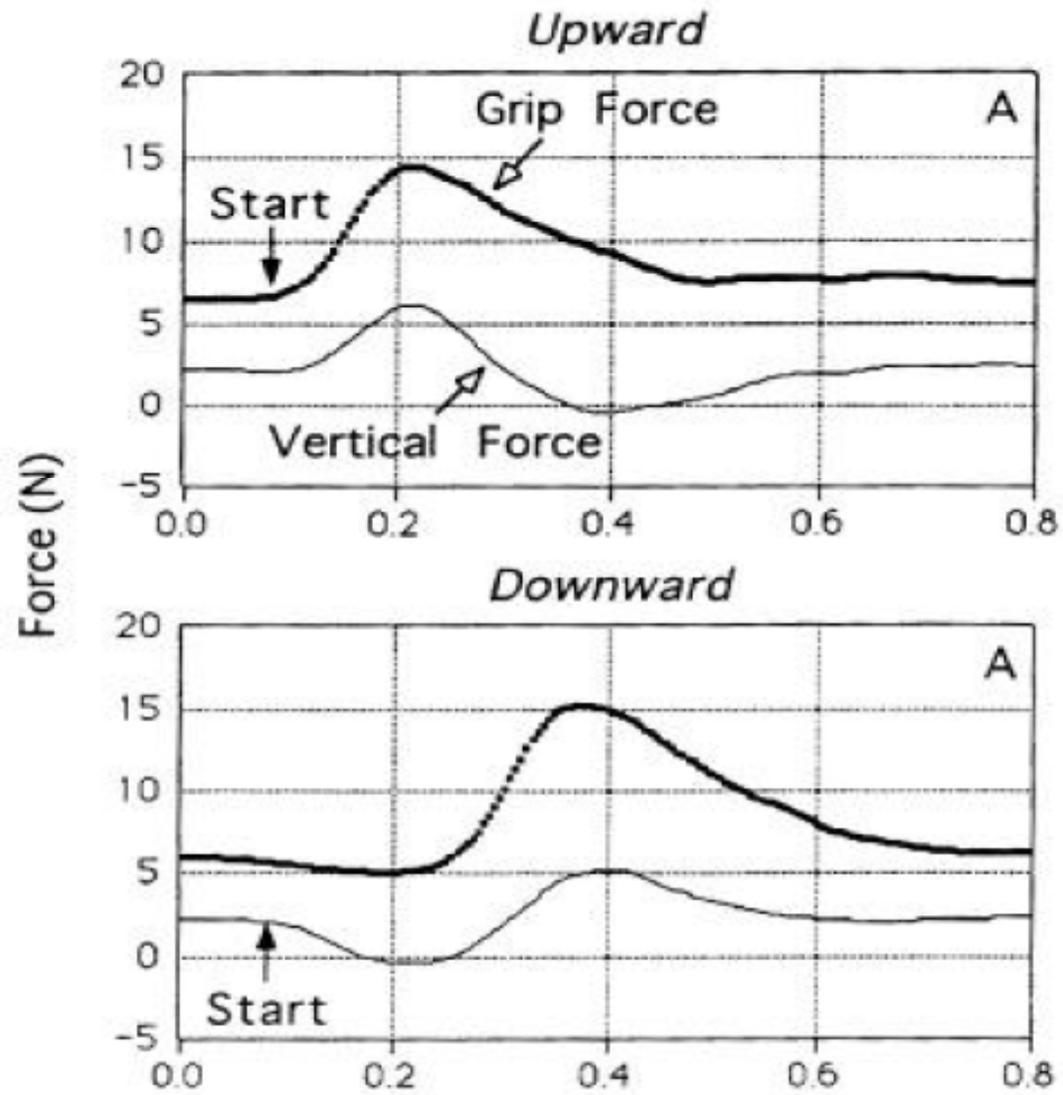
Adaptation au couple



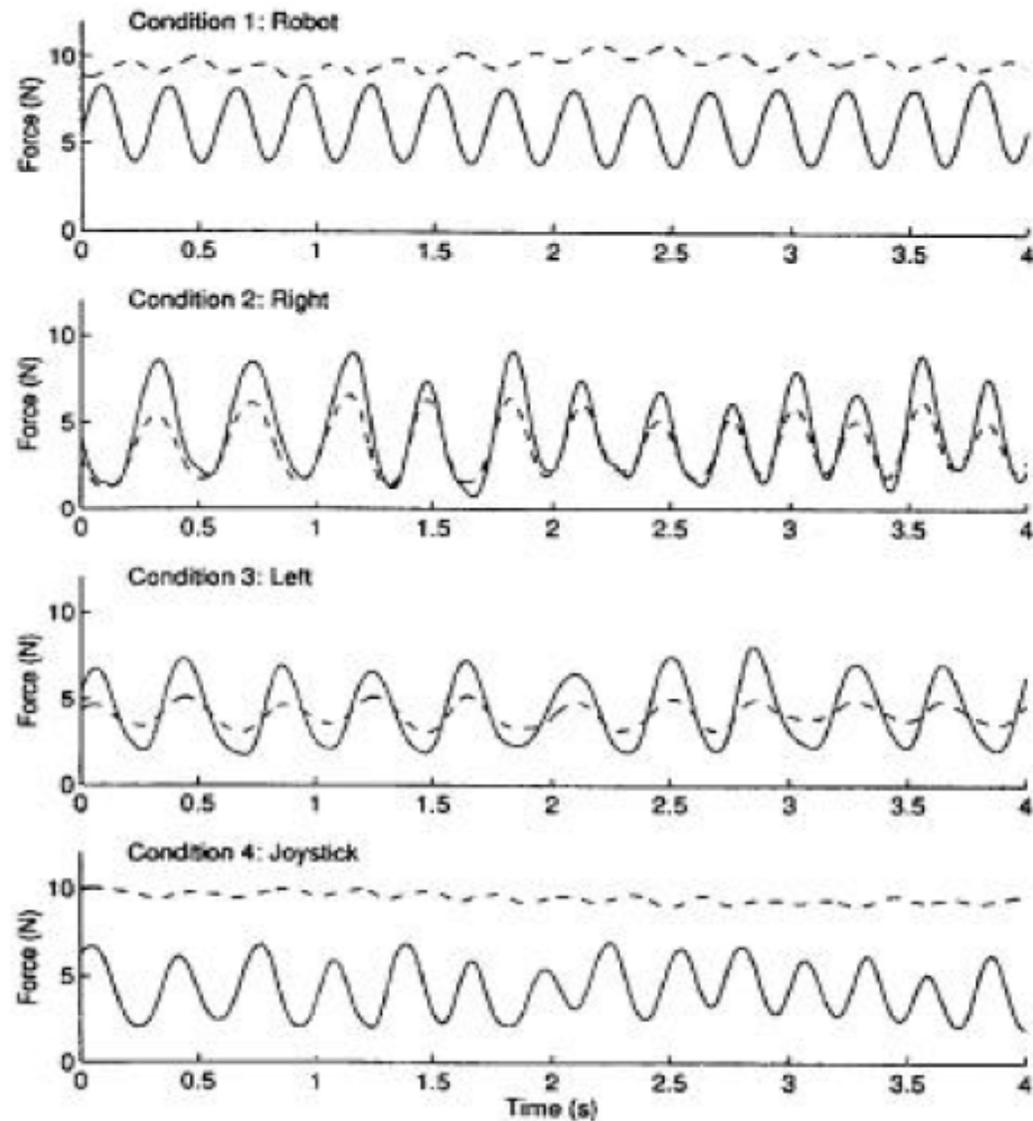
... tout s'apprend !



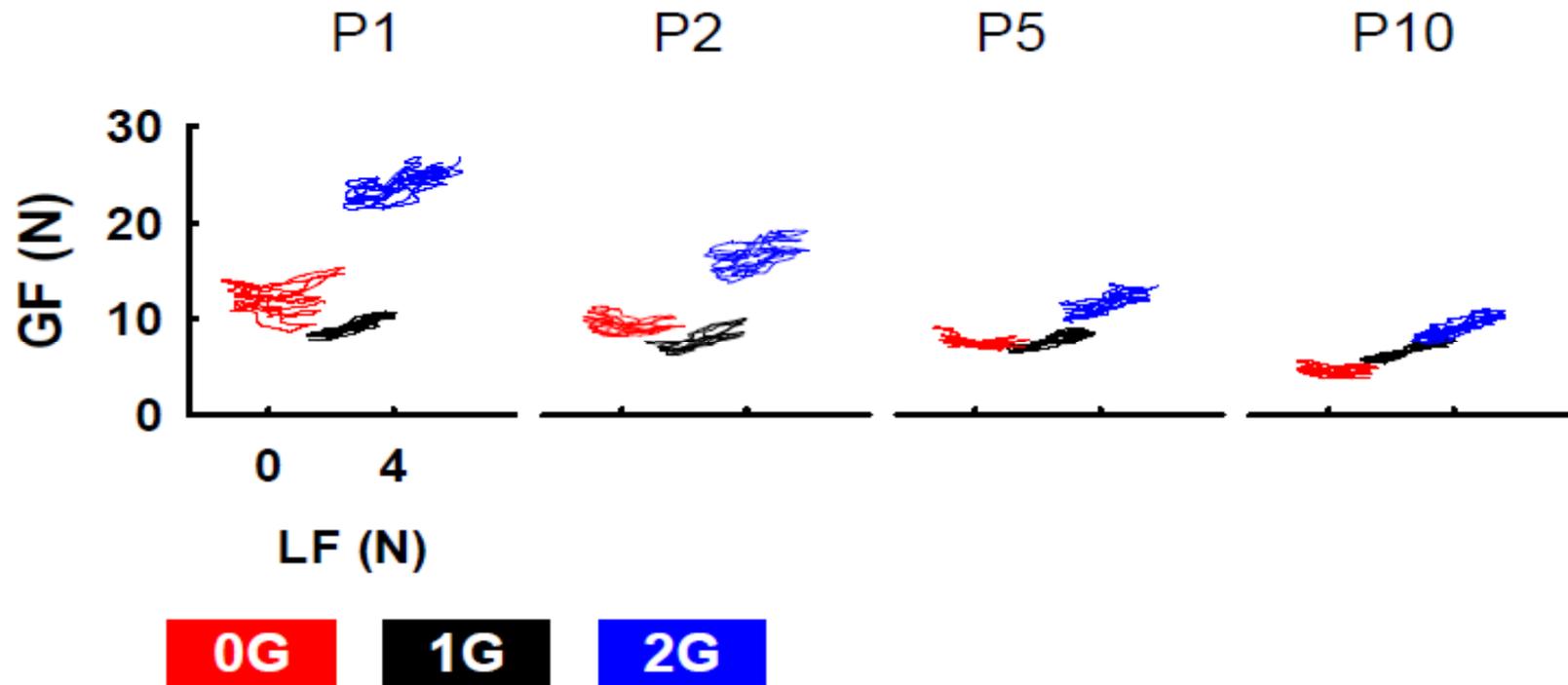
Mouvements point à point



Prédiction de la GF



Adaptation gravitationnelle

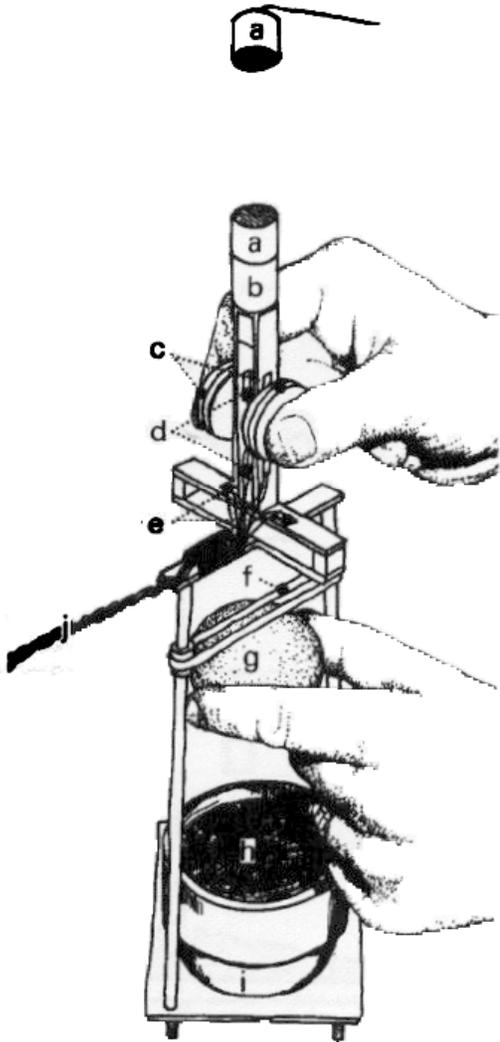




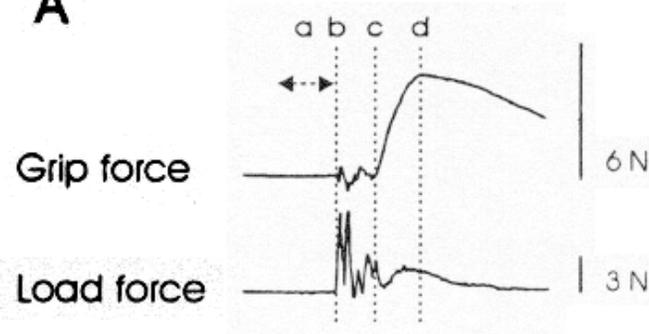
Changements rapides
de LF dans des
situations courantes



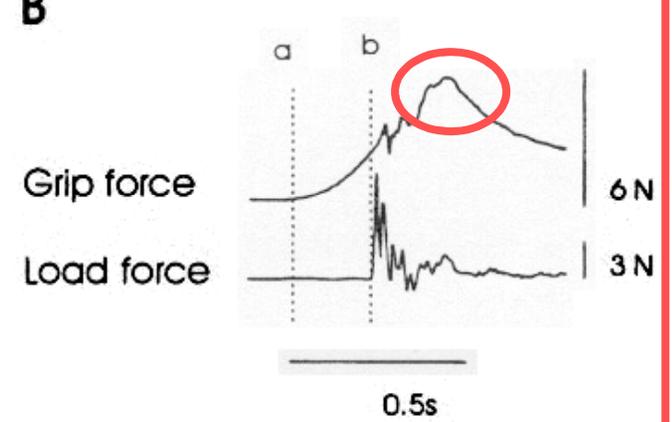
Réponse reflex



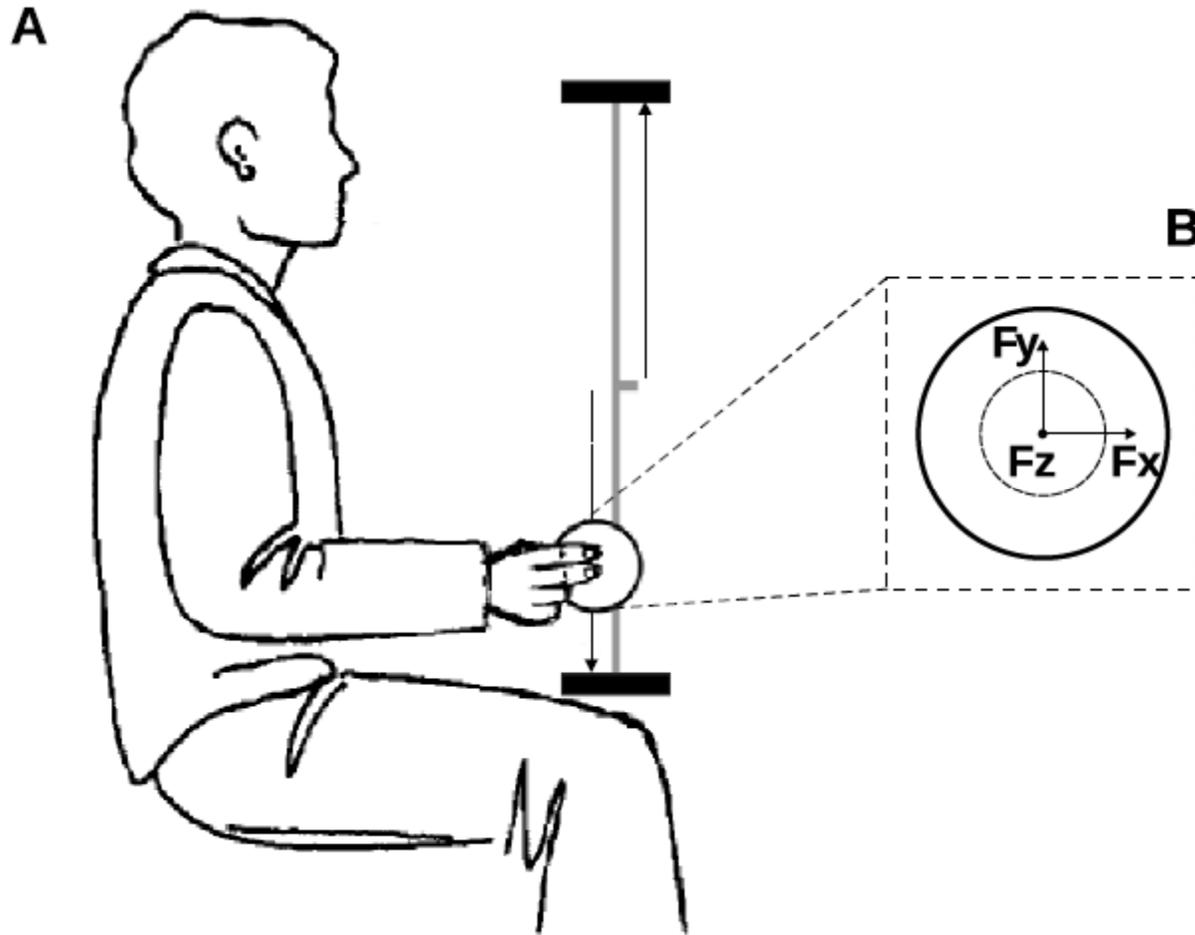
A



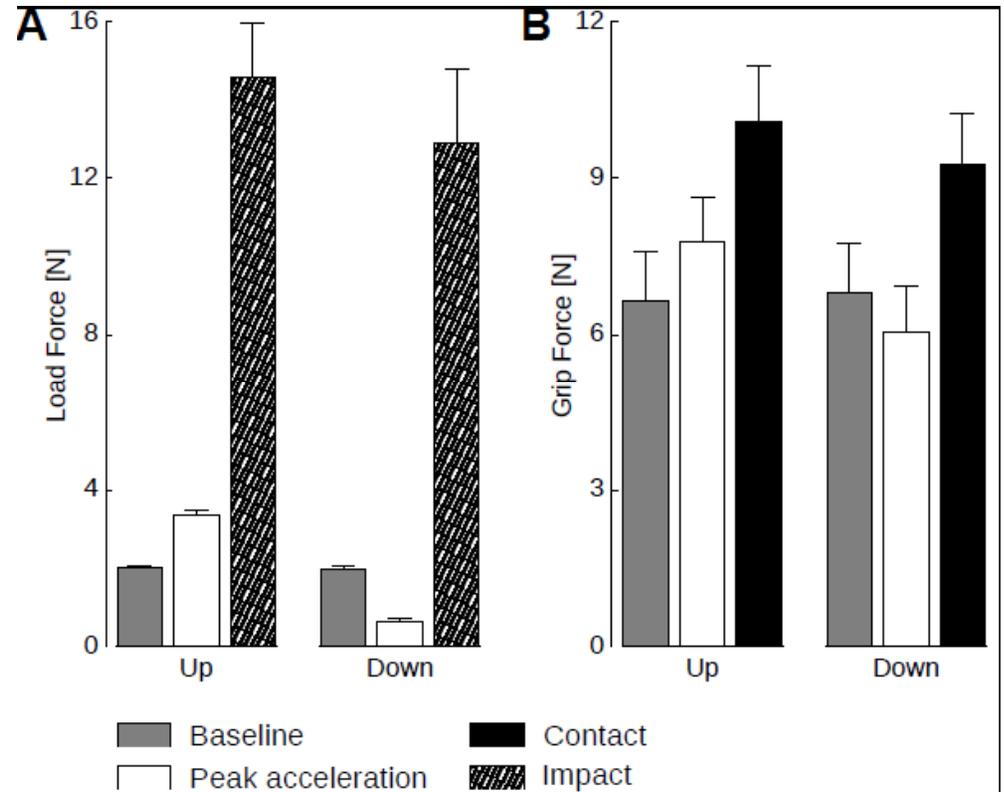
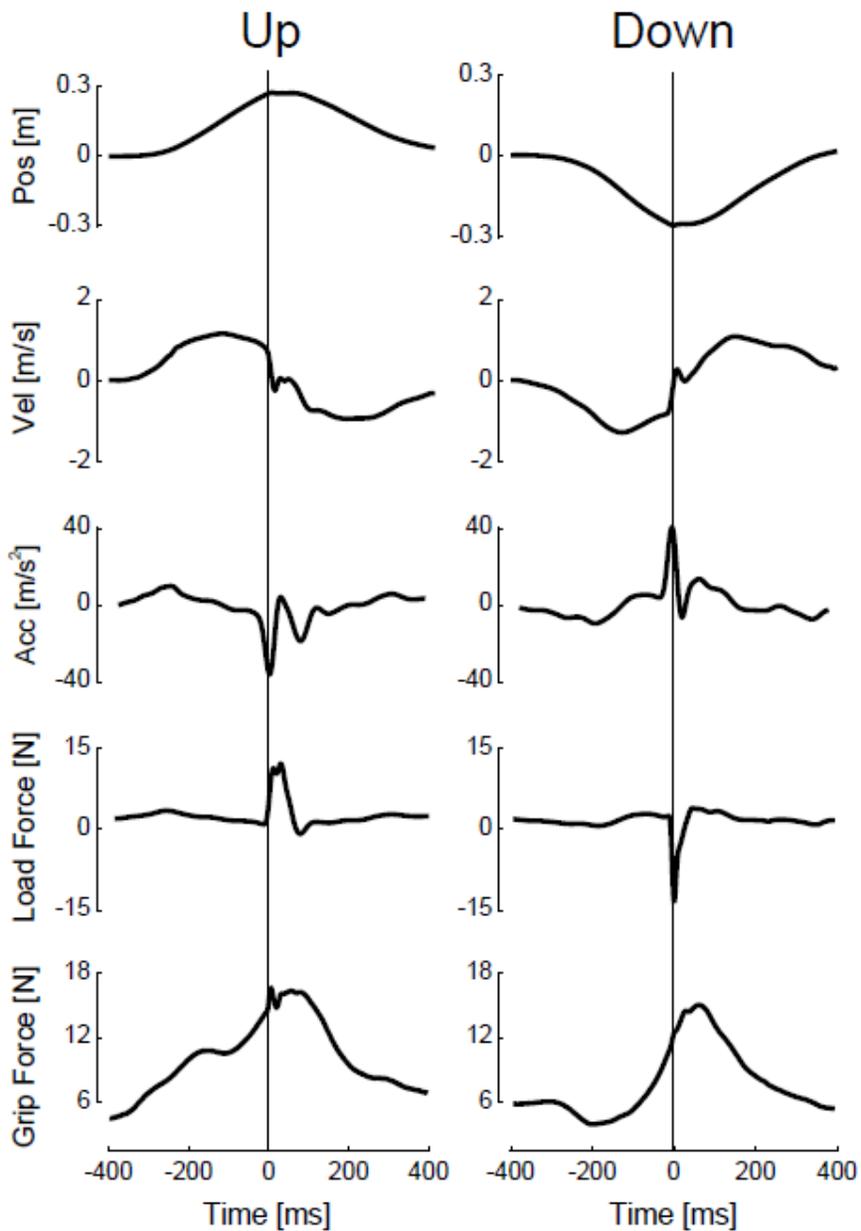
B



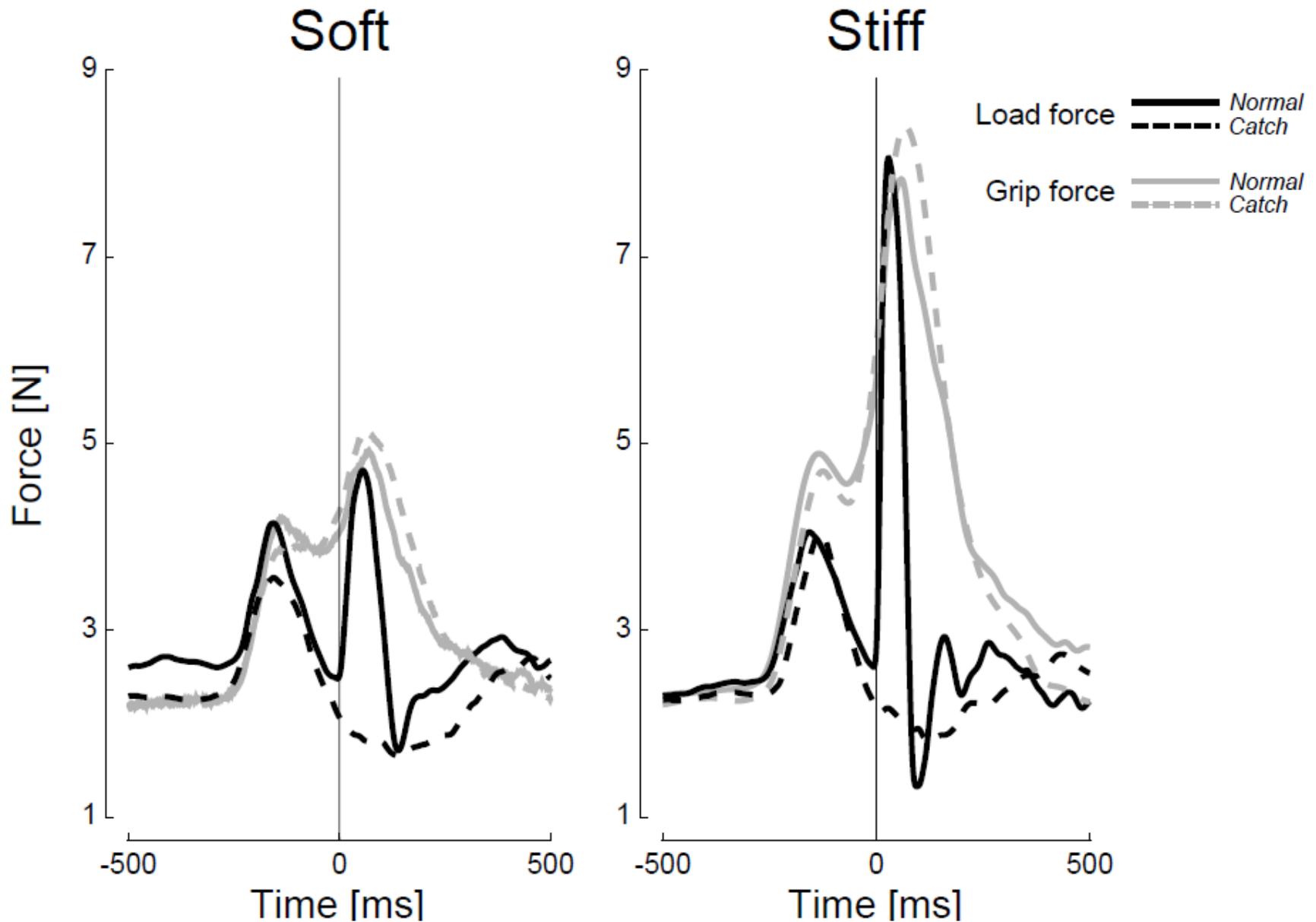
Réponse reflex ??



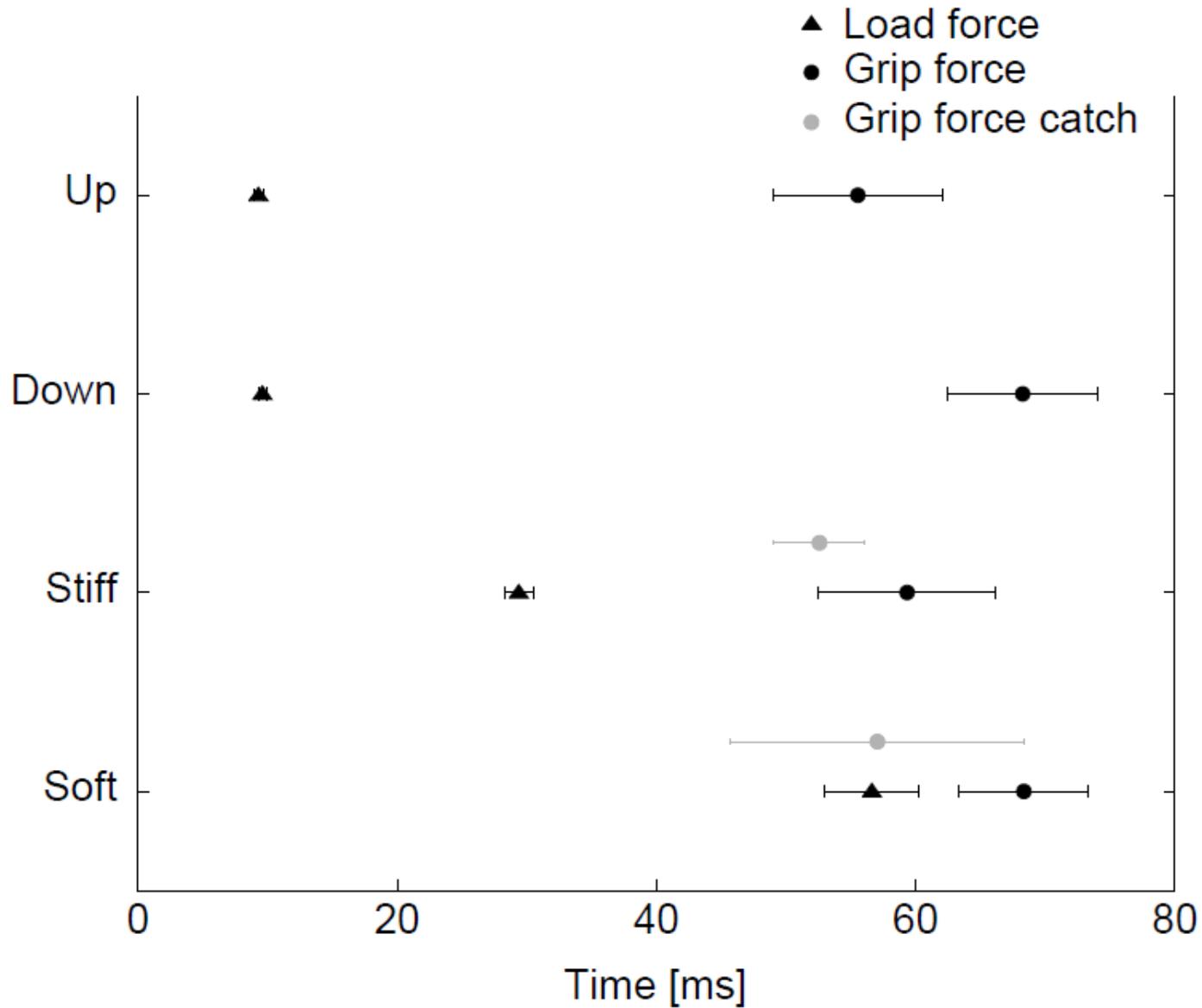
Réponse reflex ??



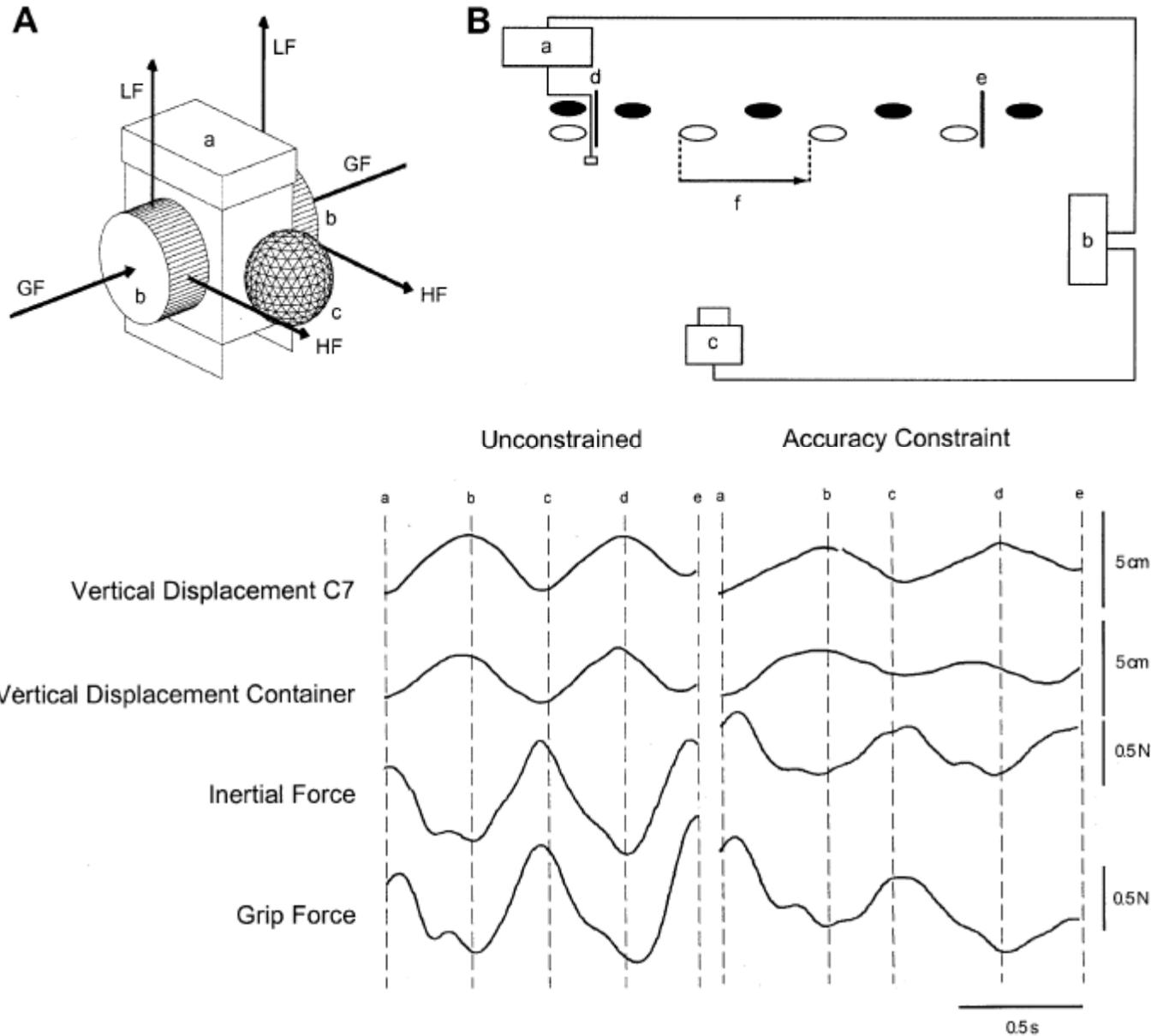
Réponse reflex ??



Réponse reflex ??

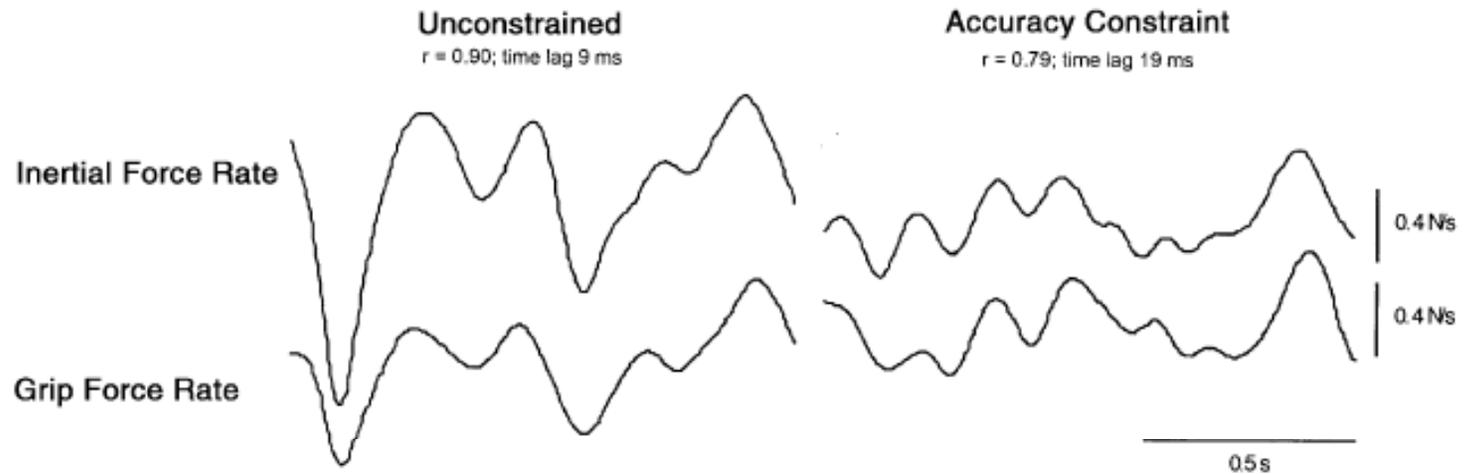


Transport et locomotion

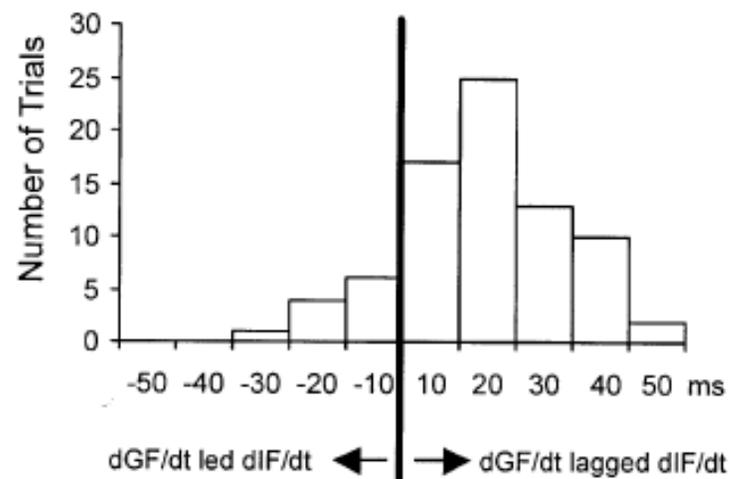


Transport et locomotion

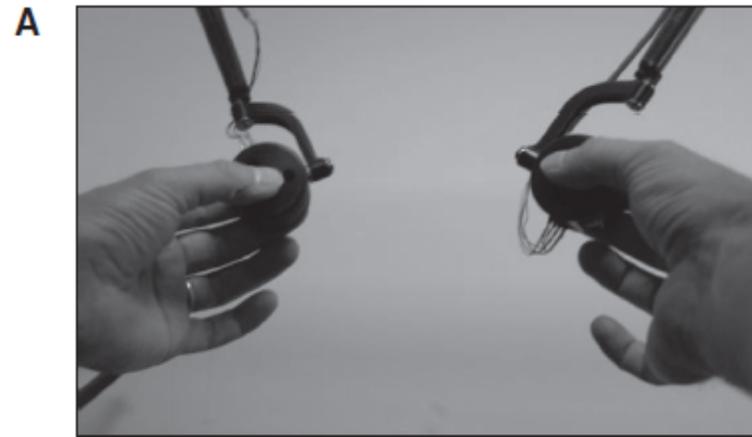
A



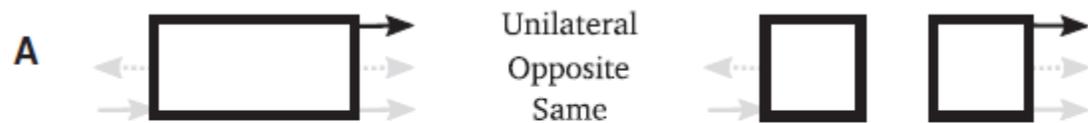
B



Manipulation bimanuelle

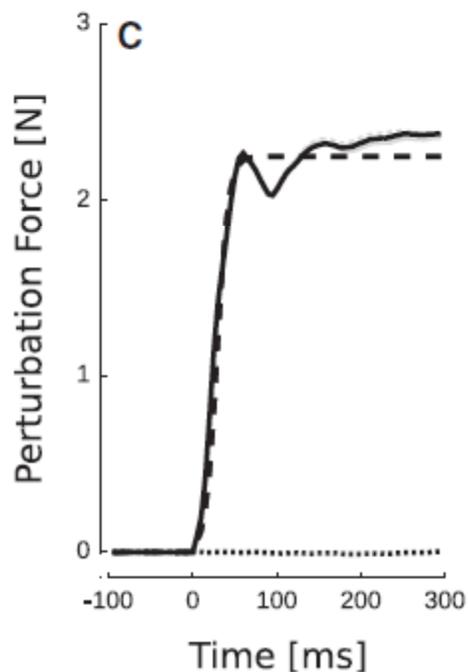
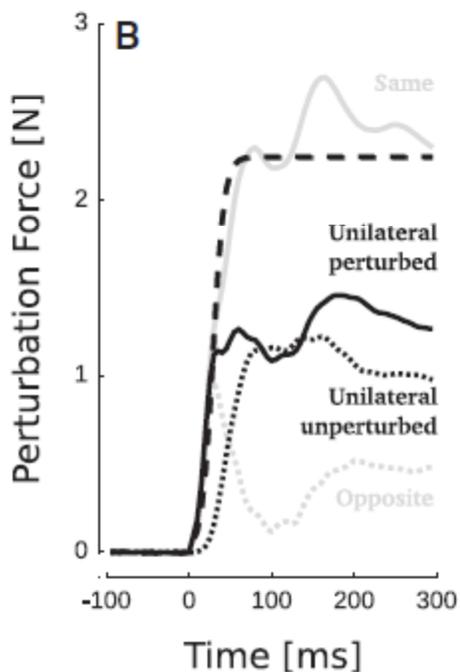


Manipulation bimanuelle



1 object

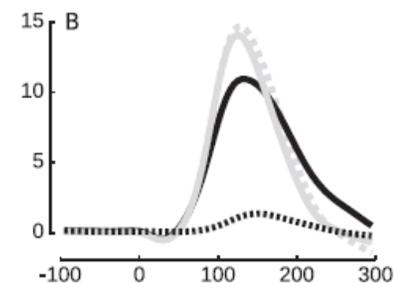
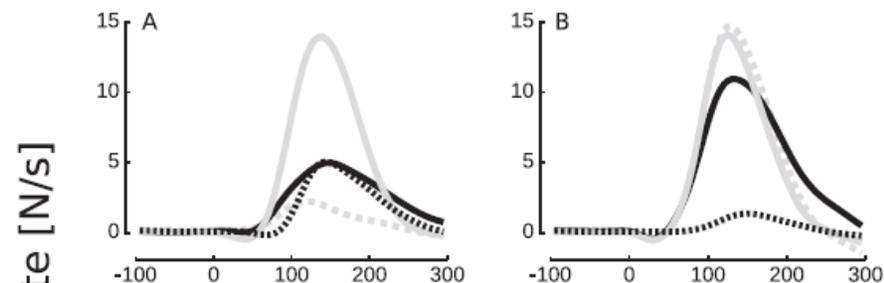
2 objects



Normal trials

1 object

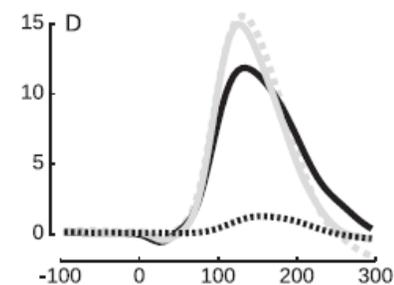
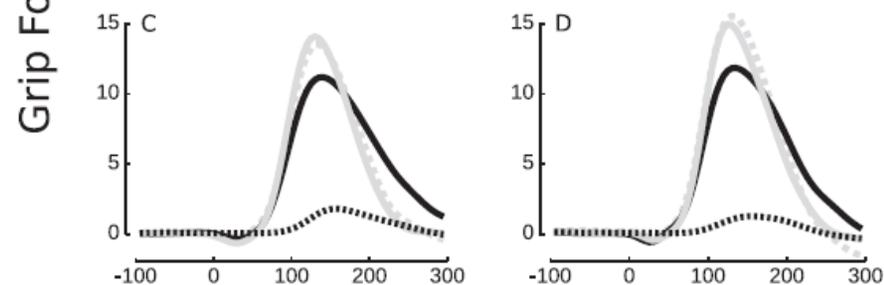
2 objects



Catch trials

1 object

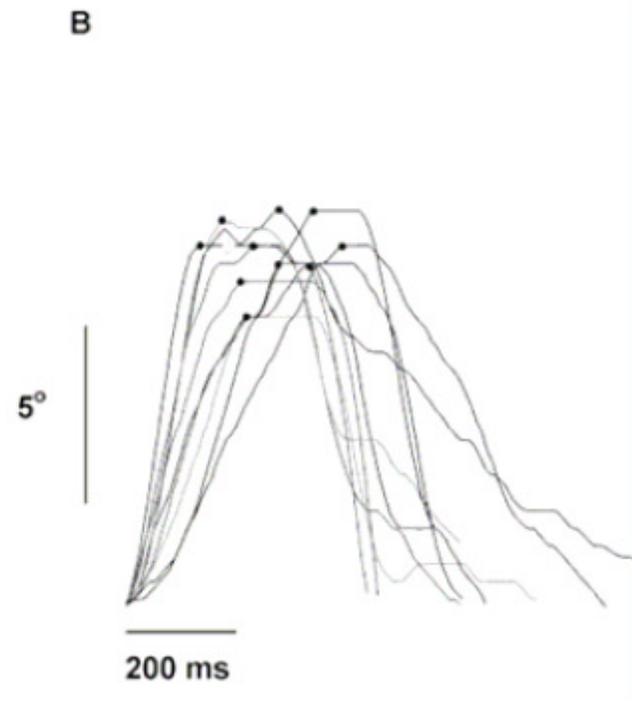
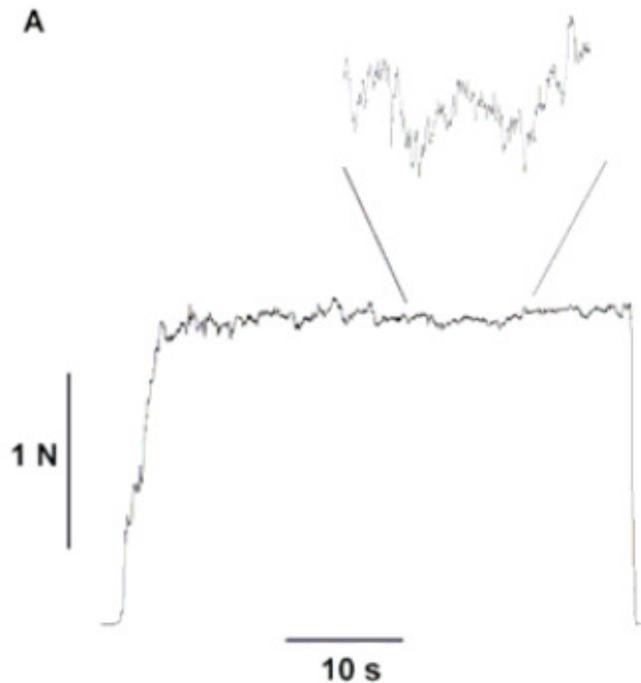
2 objects



— Normal trial
- - - Catch trial

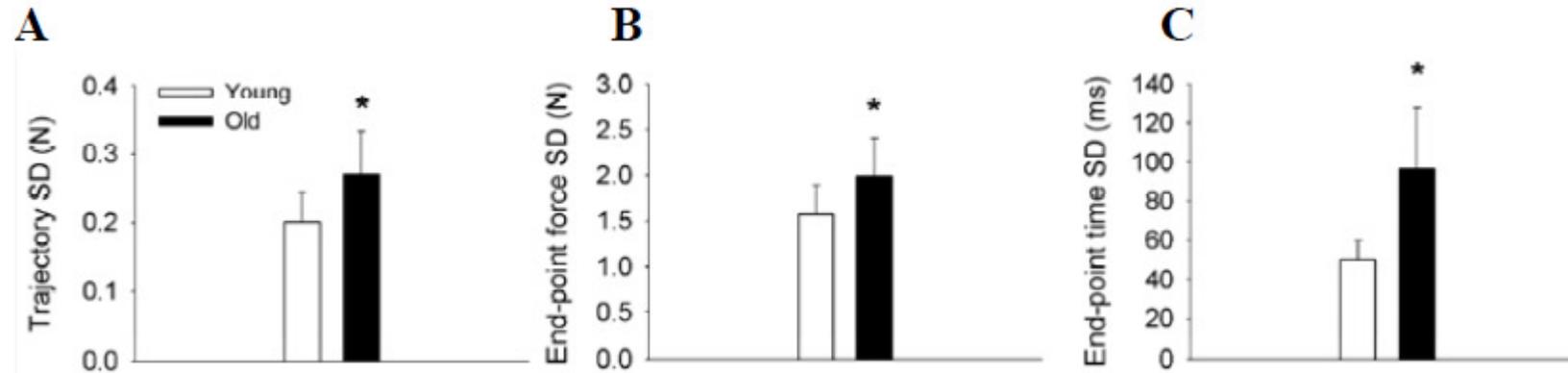
..... Unilateral unperturbed
— Unilateral perturbed
..... Opposite
— Same

Effet de l'âge sur le contrôle



Variabilités spatiale et temporelle incontrôlables
chez un sujet jeune

Effet de l'âge sur le contrôle



Variabilités spatiale et temporelle **amplifiées** chez un sujet âgé