



Hôpital  
Erasme



ULB

# Prise en charge du patient greffé pulmonaire à distance



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Cardiaque et Pulmonaire



# Déclaration de liens

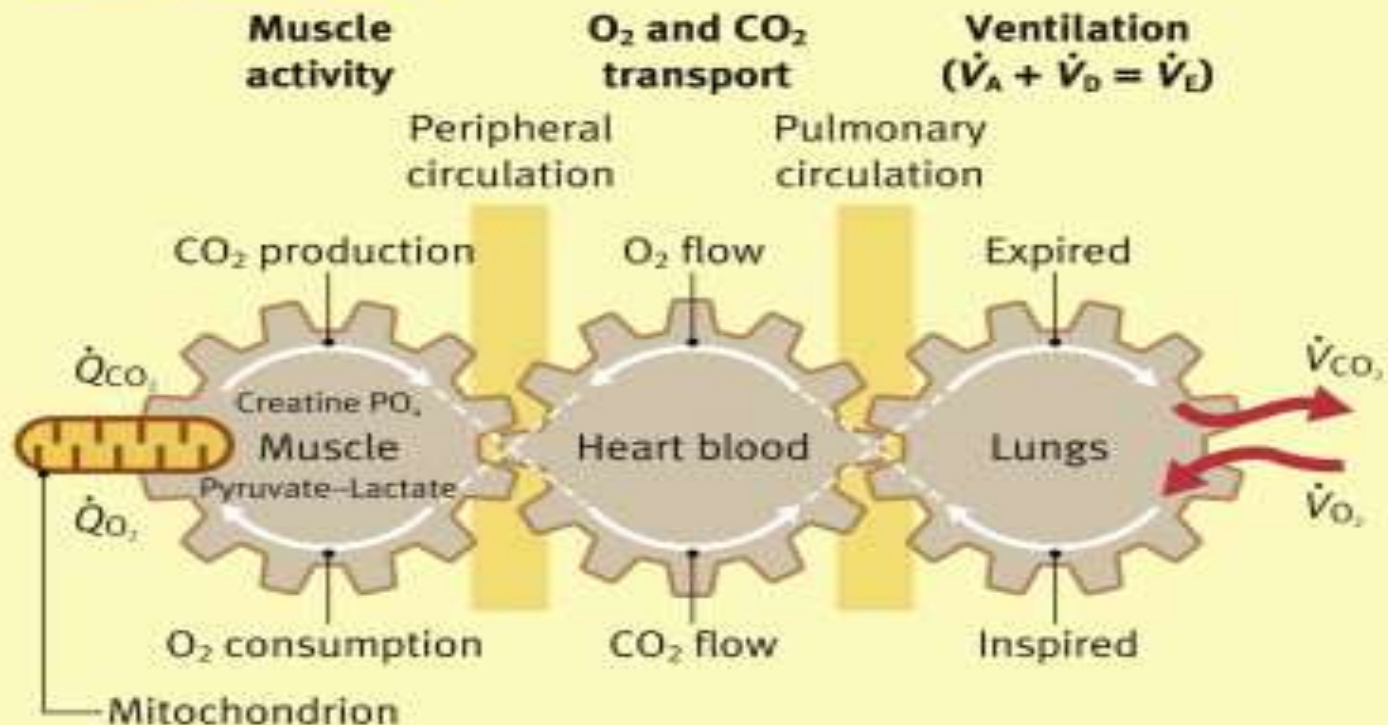
Mon intervention ne présente aucun conflit d'intérêt



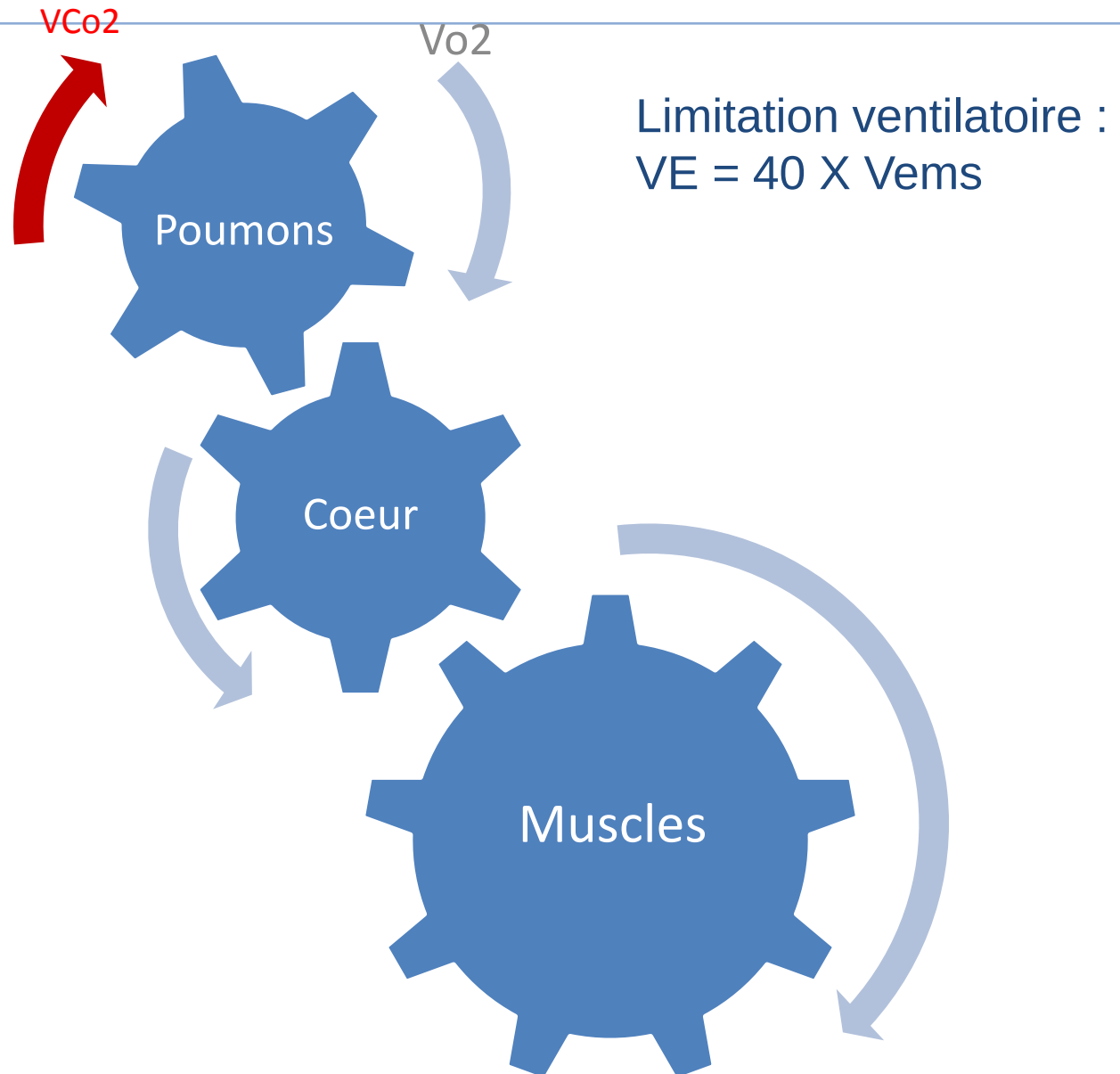
L'activité physique des patients greffés est considérée comme sédentaire dans les 3 mois post intervention

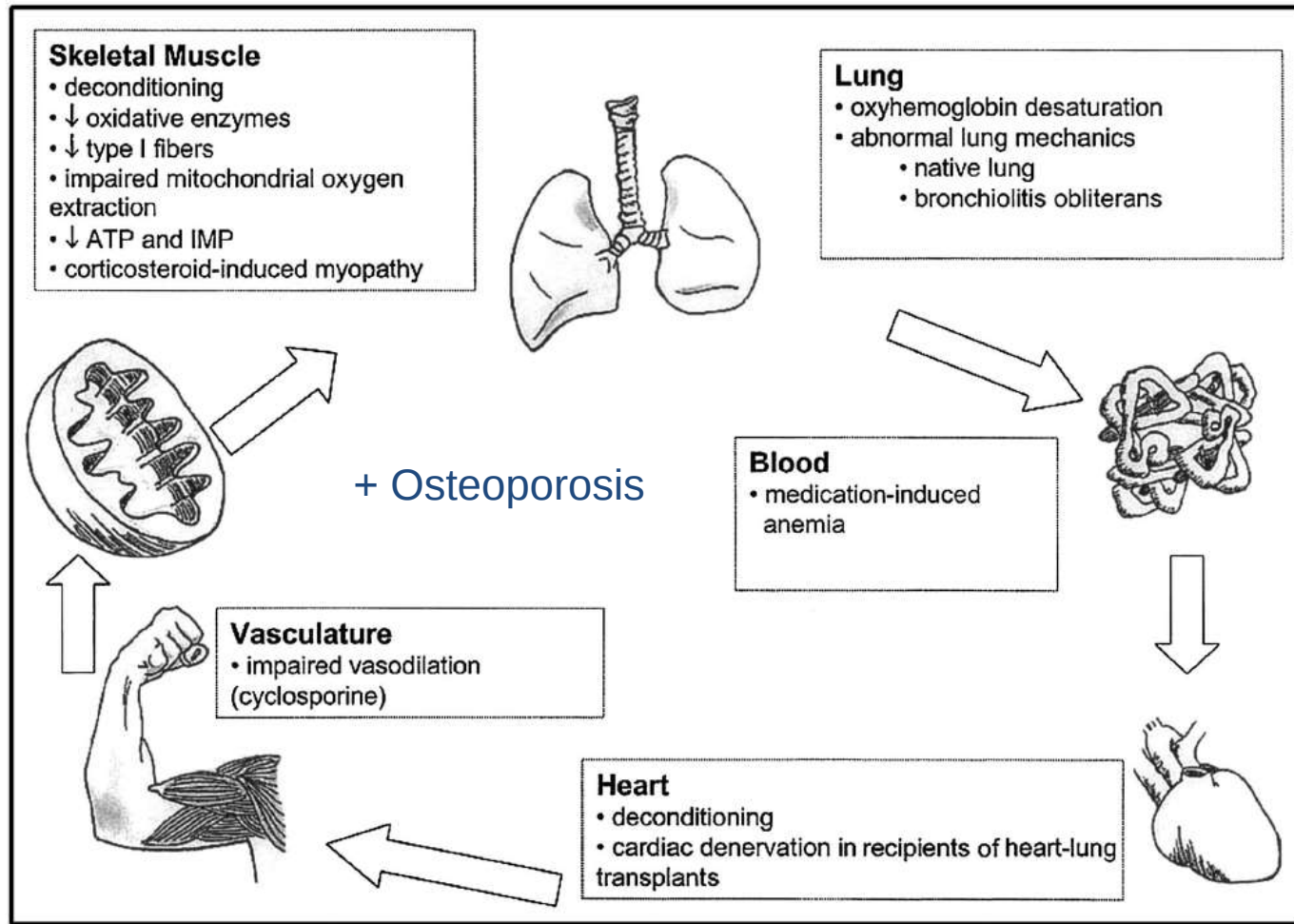


## The interaction among the pulmonary, cardiovascular and skeletal muscle systems during exercise



$\dot{V}_A$ , ideal alveolar ventilation/time;  $\dot{V}_D$ , physiologic dead space ventilation/time;  $\dot{V}_E$ , total ventilation during expiration/time;  $\dot{Q}_{\text{O}_2}$ ,  $\text{O}_2$  consumption;  $\dot{Q}_{\text{CO}_2}$ ,  $\text{CO}_2$  production;  $\dot{V}_{\text{O}_2}$ ,  $\text{O}_2$  uptake;  $\dot{V}_{\text{CO}_2}$ ,  $\text{CO}_2$  output; creatine  $\text{PO}_4$ , creatine phosphate. Courtesy of Wasserman



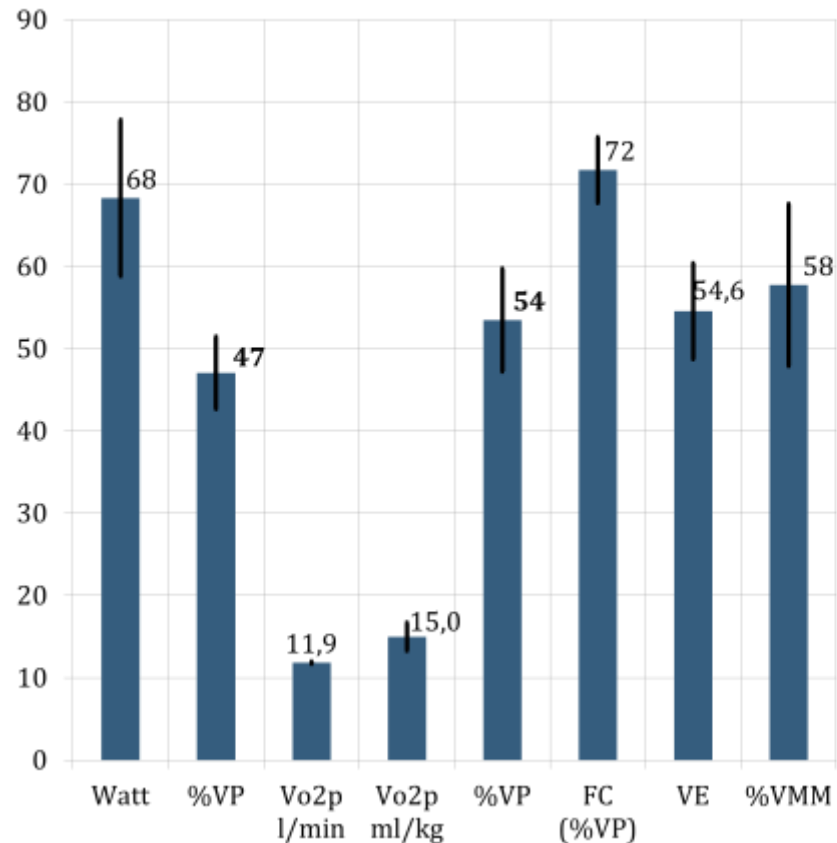


- Étude rétrospective sur 12 patients greffés de 2014-2015

| Population N=12 | Moyenne | Écart-type |
|-----------------|---------|------------|
| Âge (années)    | 54      | 13         |
| BMI             | 23,3    | 4,7        |
| Vems (l)        | 2,38    | 0,78       |
| Vems (%VP)      | 83      | 29         |



**Paramètres analysés au cours de l'ergospirométrie**



NOM Prénom : [REDACTED] Age: 67 ans  
 Numéro Identité : 490430ML01 Genre: M  
 Date examen : 9/11/2016 ; 15:38:27 Taille: 169 cm  
 Opérateur : A. Gillet (8386)  
 Médecin Presc. : Dr. Knoop  
 Indication : bilan post GBP 2  
 Médication : habituelle

CommentairesPlainte principale: dyspnée

ECG : pas de modification du ST, ESV isolée ✓  
 Réponse tensionnelle très (trop) importante jusqu'à 24/070

Examen maximal sur le plan métabolique (QRp = 59%  
 Seuil ventilatoire à 64% de la VO2max mesurée et à 44% de la VO2max prédite.

  
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|                 |          |
|-----------------|----------|
| Charge          | Watt     |
| VO2             | L/min    |
| VO2 sp          | ml/kg    |
| VO2sp, (BMI=24) |          |
| Q.R.            |          |
| VO2/FC          | ml/#/min |
| V.E.            | L/min    |
| Eq CO2          |          |
| PetCO2          | mm Hg    |
| SaO2            | %        |
| F.C.            | #/min    |
| TA Sys.         | mm Hg    |
| TA Dia.         | mm Hg    |

Exploration cardio-vasculaire:  
 Pente VO2/watts diminuée (9ml/min/watt),  
 Pente FC/VO2 normale (3.9bpm/ml/min/Kg).  
 FCpic = 85%FCMT, évolution normale du pouls d'O2 (jusque 8.8ml/min/bpm, 81%prédit)  
 Récupération chronotrope normale (FCp-FCrec 1' et 2': 31 et 35 bpm (cut-off CAD = 12 et 22 bpm (CHF 6/1min))  
 Exploration respiratoire et échanges gazeux:  
 Hyperventilation d'effort (VE/VCO2 @ SV : 40, PetCO2 @ SV : 35mmHg), pente VE/VCO2 : 34  
 Réserve ventilatoire normale VE/VMM = 61% (estime au départ du VEMS mesuré le 8/11/16=>2.27L 80%VP)  
 Pas de désaturation à l'effort

CONCLUSIONS:

- Capacité d'effort modérément limitée, situant [REDACTED] à 69 % des valeurs prédites de VO2 (56 % des VP en W), soit 17.6 ml/Kg.min, compte tenu d'un BMI à 22.8
- Limitation de type déconditionnement périphérique
- Par rapport à l'examen du 1/06/2016, amélioration de la charge soutenue de 10 %, de la VO2p de 10 % et du SV de 20 %, pour une FCp majorée et un QRp diminué. Equivalents respiratoires inchangés. Pente VE/Vco2 diminuée de 4 points.

=&gt; Belle amélioration, continuer d'encourager la revalidation

## CYSTIC FIBROSIS

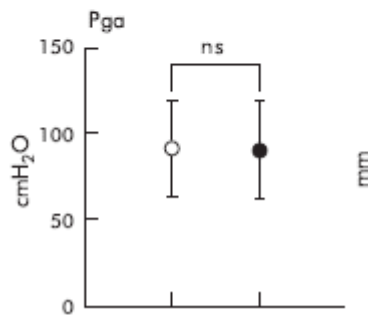
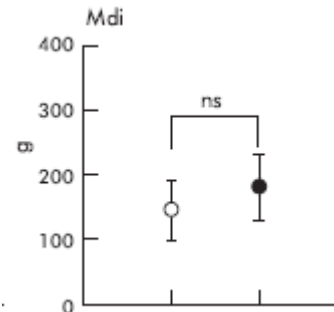
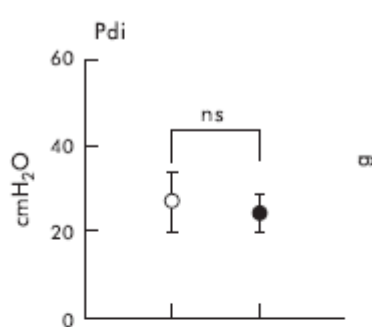
# Preferential reduction of quadriceps over respiratory muscle strength and bulk after lung transplantation for cystic fibrosis

C Pinet, P Scillia, M Cassart, M Lamotte, C Knoop, C Mélot, M Estenne

*Thorax* 2004;**59**:783–789. doi: 10.1136/thx.2004.021766

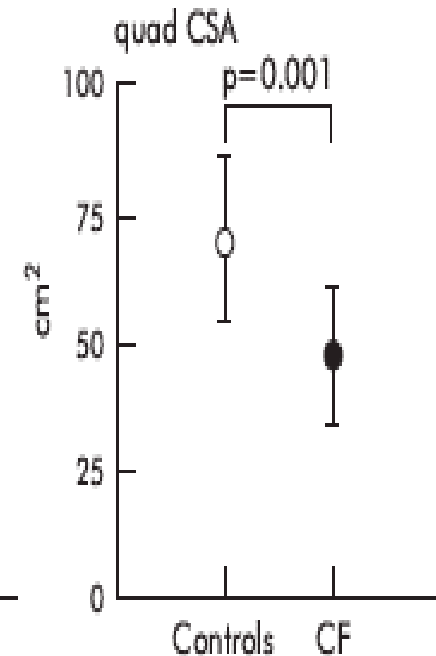
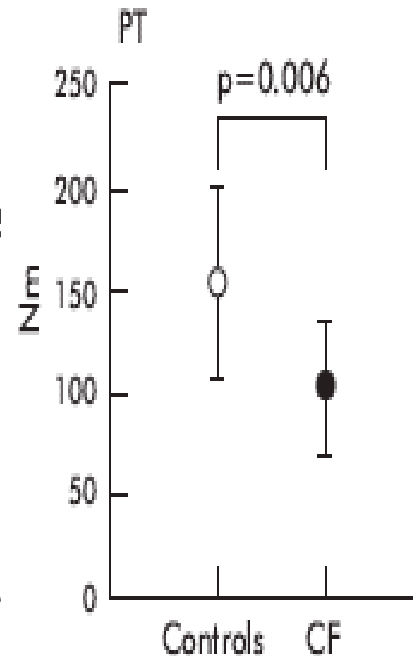
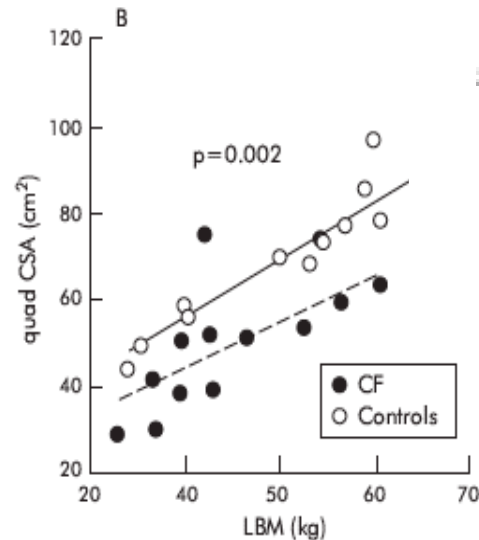
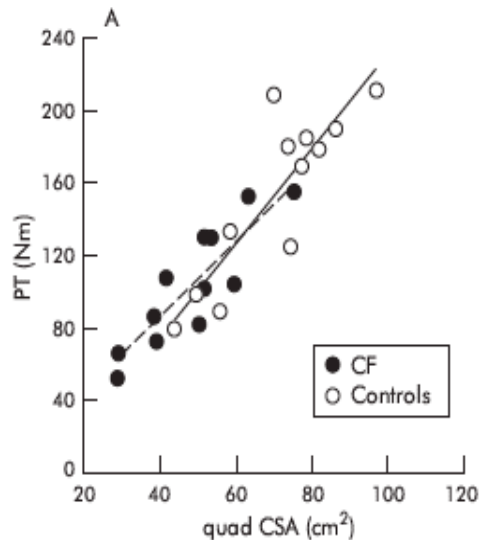
- Fonction pulmonaire
- Force du diaphragme
- Masse du diaphragme
- Force des abdominaux
- Surface du quadriceps
- Force du quadriceps

|                           | CF patients<br>(n = 12) | Controls<br>(n = 12) | Mean (95% CI)<br>difference* |
|---------------------------|-------------------------|----------------------|------------------------------|
| Age (years)               | 33.8 (8.6)              | 32.8 (6.6)           | 1.1 (–5.7 to 7.9)            |
| Sex                       | 8M/4F                   | 8M/4F                | –                            |
| Height (cm)               | 1.68 (0.07)             | 1.70 (0.09)          | –0.02 (–0.1 to 0.05)         |
| Weight (kg)               | 53.6 (8.5)              | 61.3 (12.2)          | –7.7 (–17 to 1.6)            |
| BMI (kg/m <sup>2</sup> )  | 19.0 (1.8)              | 21.1 (3.1)           | –2.1 (–4.3 to 0.1)           |
| LBM (kg)                  | 44.0 (8.5)              | 50.8 (11.0)          | –6.8 (–15.5 to 1.8)          |
| FBM (kg)                  | 9.7 (3.6)               | 10.6 (2.6)           | –0.9 (–3.7 to 1.9)           |
| TLC (% pred)              | 100 (9)                 | 103 (10)             | –3 (–12 to 6)                |
| FRC (% pred)              | 114 (20)                | 108 (22)             | 6 (–13 to 25)                |
| FEV <sub>1</sub> (% pred) | 97 (14)                 | 101 (10)             | –4 (–15 to 7)                |
| VC (% pred)               | 94 (12)                 | 103 (10)             | –9 (–19 to 1)                |



- Pas de modification de la pression du diaphragme
- Pas de modification de la masse
- Pas de modification pression abdominale

- La force de 49%
- La masse de 45%
- Pas de rapport surf/force



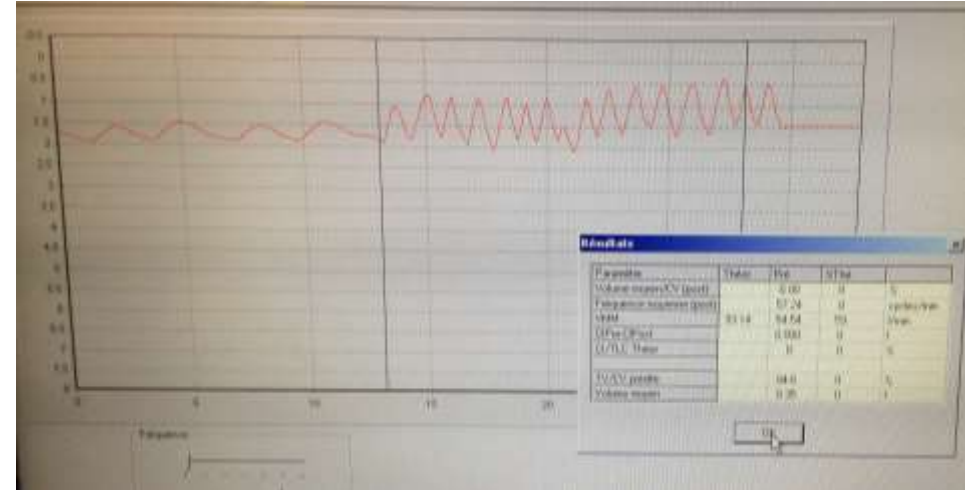
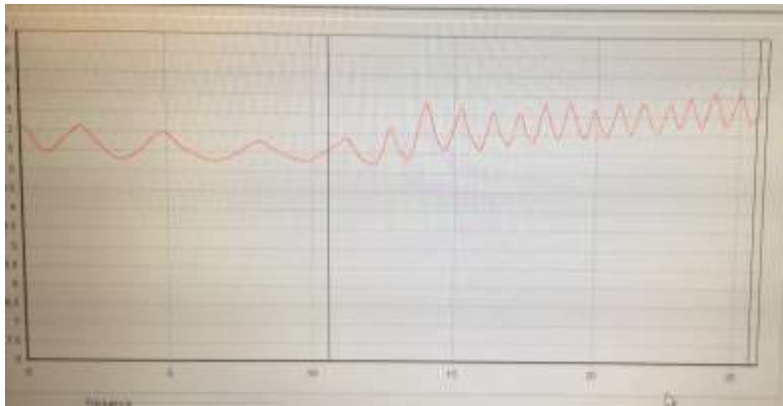
- 62 ans – 169cm – 51kg
- Bilan 1 ans post greffe < emphysème

|      |         |
|------|---------|
| CPT  | 5,52/86 |
| CV   | 3,26/86 |
| CVF  | 3,16/86 |
| Vems | 2,27/80 |

| Charge | Vo2     | Ve | %VMMth | %Vmmvrai |
|--------|---------|----|--------|----------|
| 90/56  | 17,6/69 | 55 | 61     | 100      |



## ■ Test d'hyperventilation



VMM vraie 49,22 L/min

VMM th 68,80 L/min



VMM vraie 54,54 L/min

VMM th 90,8L/min



## Physical Activity in Daily Life 1 Year After Lung Transplantation

Daniel Langer, PT, MSc,<sup>a,b</sup> Rik Gosselink, PT, PhD,<sup>a,b</sup> Fabio Pitta, PT, PhD,<sup>c</sup> Chris Burtin, PT, MSc,<sup>a,b</sup>  
Geert Verleden, MD, PhD,<sup>b</sup> Lieven Dupont, MD, PhD,<sup>b</sup> Marc Decramer, MD, PhD,<sup>b</sup> and  
Thierry Troosters, PT, PhD<sup>a,b</sup>

>40 ans

>12 mois post transplantation

Pas d'infection

N=18 emphysème

N=2 fibrose

N=1 Htap

N=1 Bronchectasie

**Table 1.** Anthropometric Characteristics of Study Subjects

|                 | Gender<br>(M/F) | Age<br>(y) | Height<br>(cm) | Weight<br>(kg) | FEV <sub>1</sub><br>(%pred) |
|-----------------|-----------------|------------|----------------|----------------|-----------------------------|
| Lung recipients | 12/10           | 59 ± 5     | 168 ± 7        | 66 ± 14        | 79 ± 18 <sup>a</sup>        |
| Controls        | 12/10           | 58 ± 7     | 169 ± 8        | 66 ± 10        | 110 ± 17                    |

BMI, body mass index; FEV<sub>1</sub>, forced expiratory volume in 1 second.

<sup>a</sup>Statistically significant difference between groups ( $p < 0.01$ ).

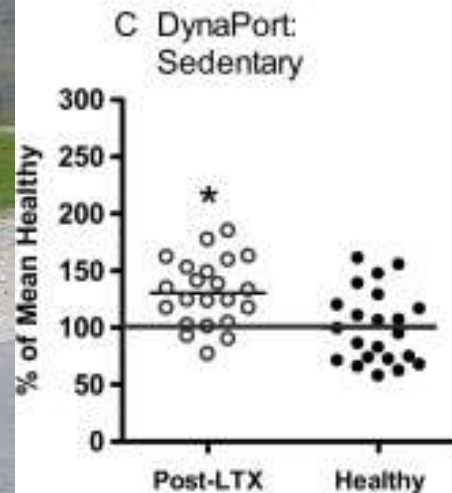
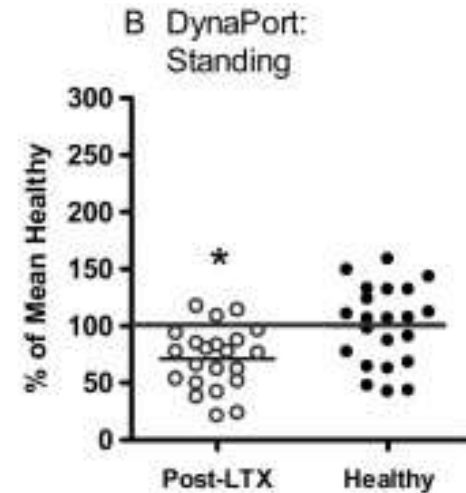
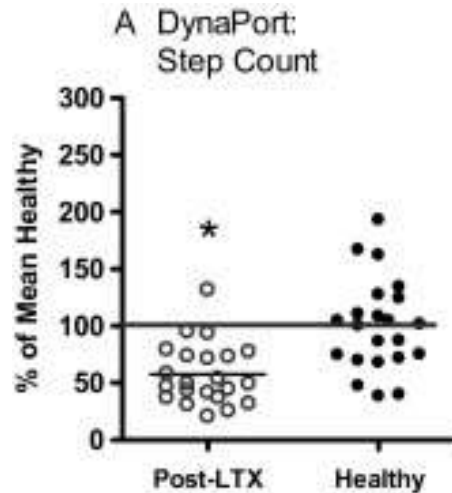
**Table 3.** Peripheral and Respiratory Muscle Force and Exercise Capacity of Study Subjects

|                          | Lung recipients | Controls  | Δ    | 95% CI of Δ  | p    |
|--------------------------|-----------------|-----------|------|--------------|------|
| Handgrip (kgF)           | 36 ± 16         | 40 ± 9    | -4   | -12 to 4     | 0.35 |
| MIP (cmH <sub>2</sub> O) | -76 ± 48        | -91 ± 59  | 15   | 51 to -21    | 0.41 |
| MEP (cmH <sub>2</sub> O) | 159 ± 44        | 186 ± 42  | -27  | -55 to 1     | 0.06 |
| Quadriceps (Nm)          | 102 ± 36*       | 155 ± 35  | -53  | -76 to -30   | 0.00 |
| 6MWD (m)                 | 483 ± 66*       | 696 ± 77  | -213 | -257 to -169 | 0.00 |
| Wmax (Watt)              | 74 ± 23*        | 182 ± 56  | -108 | -136 to -80  | 0.00 |
| VO <sub>2,max</sub> (L)  | 1.2 ± 0.3*      | 2.4 ± 0.6 | -1.2 | -1.5 to -0.9 | 0.00 |

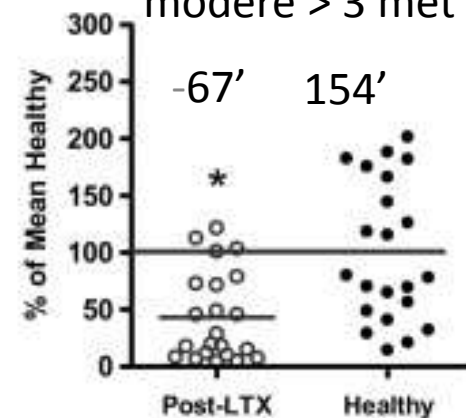
Data are expressed as mean ± Standard Deviation. Δ, mean difference between groups; 95% CI, 95% confidence interval; p, probability of difference when the null hypothesis is true (no difference between groups); Handgrip, Handgrip Force; MIP, Maximal Inspiratory Pressure; MEP, Maximal Expiratory Pressure; Quadriceps, Maximal Isometric Quadriceps Force; 6MWD, Six-minute walking distance; Wmax and VO<sub>2,max</sub>, maximum workload and maximal oxygen consumption achieved during a maximal incremental cycle ergometer test.

\*Statistically significant difference between groups.

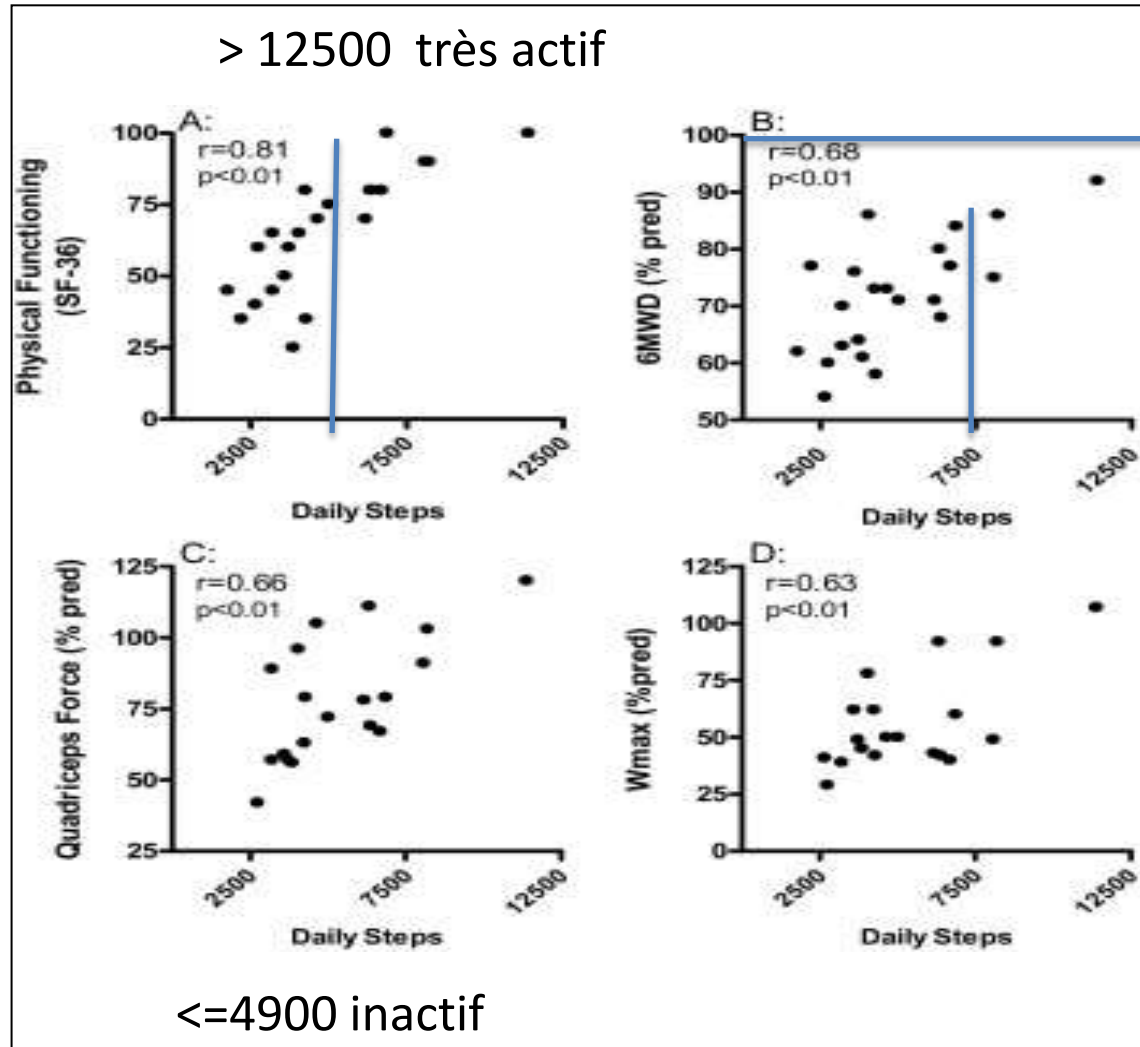
- Niveau d'activité des patients greffés pulmonaire à un an



□ Activité d'intensité modérée > 3 met

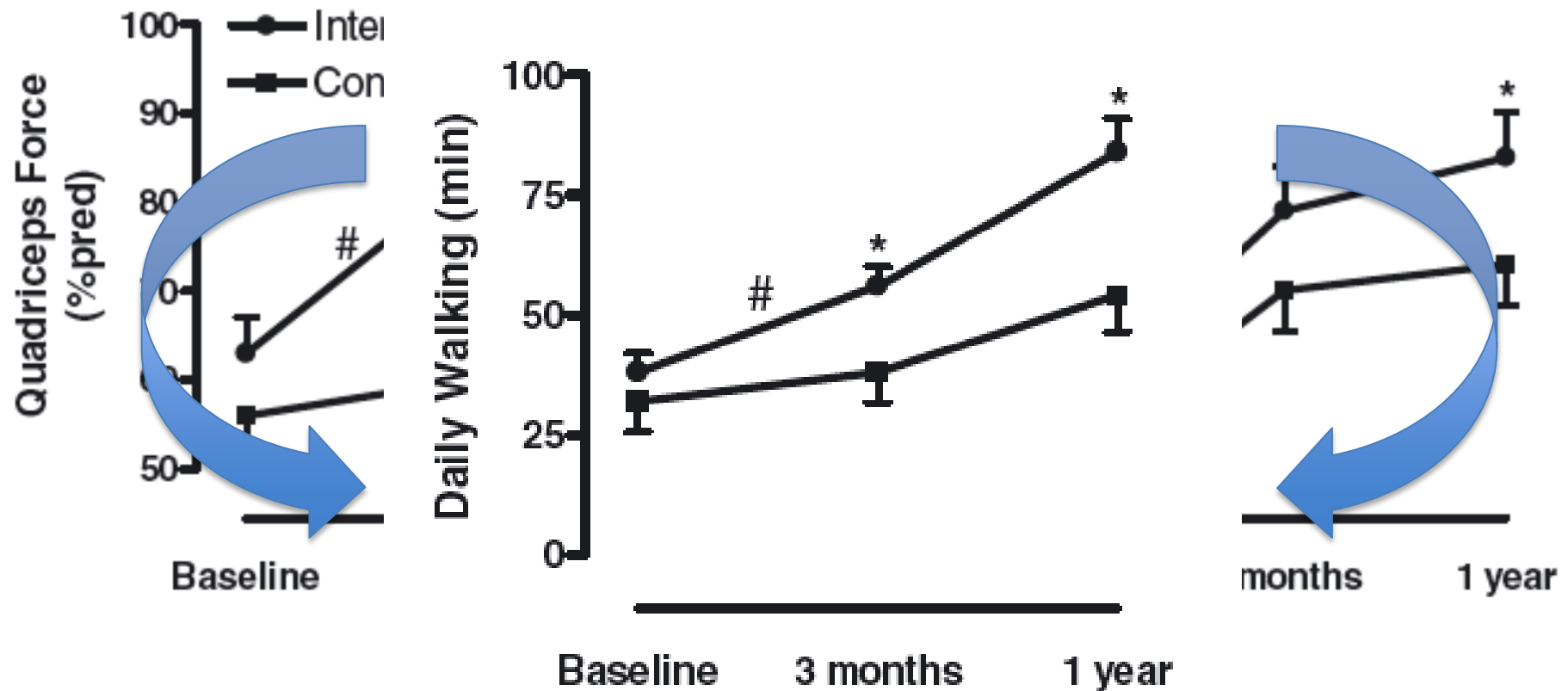


- Personne 50 Kg
- 3-5 Mets 25-50 W
  - Passer l'aspirateur
- 5-7 Mets 60-70 W
  - Monter à vit. lente d'escaliers
- 7-9 Mets 75-100 W
  - Monter à vit. modérée d'escaliers



# EFFETS DE LA REVALIDATION

|                             | Intervention<br>(mean ± SD) | Control<br>(mean ± SD) | Adjusted difference <sup>1</sup><br>(95% CI) | p-Value |
|-----------------------------|-----------------------------|------------------------|----------------------------------------------|---------|
| FEV <sub>1</sub> (%pred)    |                             |                        |                                              |         |
| Pre-LTx                     | 33 ± 20                     | 26 ± 10                |                                              |         |
| Baseline                    | 79 ± 18                     | 69 ± 17                |                                              |         |
| 3 months                    | 89 ± 18                     | 80 ± 22                | 1 (−9 to 11)                                 | 0.888   |
| 1 year                      | 92 ± 20                     | 89 ± 25                | −3 (−16 to 10)                               | 0.615   |
| QF (%pred)                  |                             |                        |                                              |         |
| Pre-LTx                     | 78 ± 22                     | 75 ± 25                |                                              |         |
| Baseline                    | 63 ± 16                     | 56 ± 22                |                                              |         |
| 3 months                    | 82 ± 20                     | 60 ± 18                | 17 (9 to 24)                                 | 0.001   |
| 1 year                      | 92 ± 21                     | 71 ± 20                | 16 (7 to 25)                                 | 0.001   |
| 6MWD (%pred)                |                             |                        |                                              |         |
| Pre-LTx                     | 53 ± 11                     | 50 ± 16                |                                              |         |
| Baseline                    | 56 ± 10                     | 51 ± 14                |                                              |         |
| 3 months                    | 79 ± 8                      | 70 ± 10                | 9 (3 to 15)                                  | 0.008   |
| 1 year                      | 86 ± 7                      | 74 ± 11                | 12 (5 to 19)                                 | 0.002   |
| Wmax (%pred)                |                             |                        |                                              |         |
| Baseline                    | 47 ± 15                     | 39 ± 14                |                                              |         |
| 3 months                    | 63 ± 23                     | 50 ± 22                | 13 (−2 to 29)                                | 0.093   |
| 1 year                      | 69 ± 20                     | 53 ± 23                | 16 (1 to 31)                                 | 0.042   |
| VO <sub>2,max</sub> (%pred) |                             |                        |                                              |         |
| Baseline                    | 55 ± 15                     | 47 ± 14                |                                              |         |
| 3 months                    | 71 ± 26                     | 59 ± 21                | 12 (−5 to 28)                                | 0.149   |
| 1 year                      | 78 ± 27                     | 63 ± 24                | 15 (−2 to 33)                                | 0.082   |



- Notion de revalidation court terme et long terme
- Juguler effets secondaires des IS
- En prévision des rejets et surinfections ultérieurs

# Merci de votre attention

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