

ACAPS
2021

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CENTRE DE RECHERCHES
SUR LA COGNITION ET L'APPRENTISSAGE



Benefits of observing point-
light displays in postoperative
rehabilitation of the total knee
prosthesis

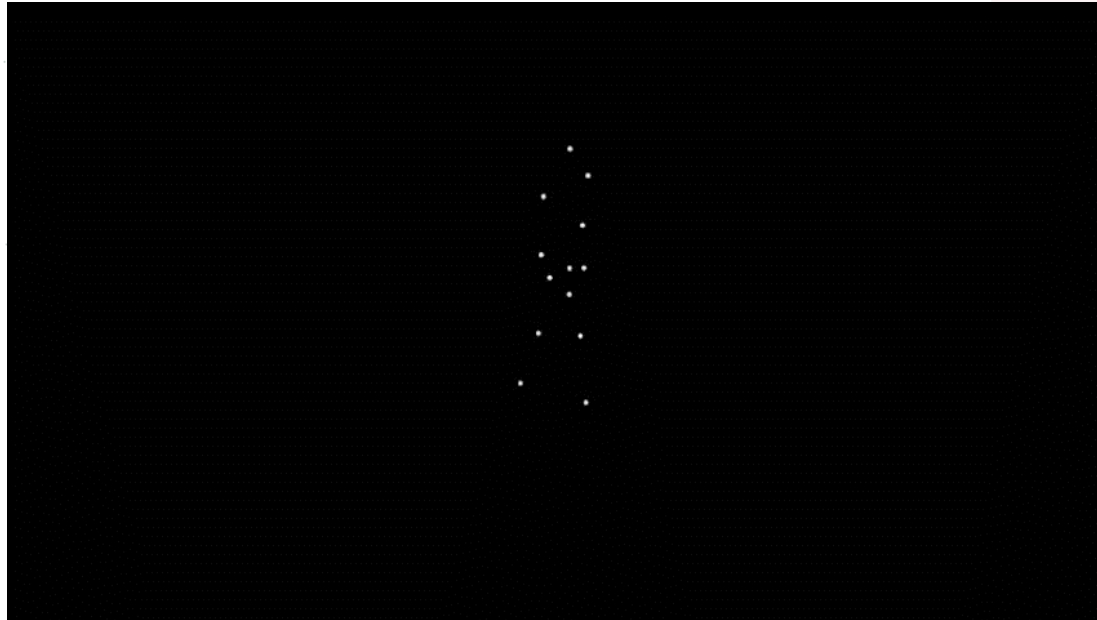
Gilles Renault, Christel Bidet-Ildei, Kévin Charuau , Yannick
Blandin , Amélie Le Franc, Anne Delaubier , & Romain David



Introduction

Very high perceptual capacities of human actions recognition

The paradigm of Point light display, Johansson 1973

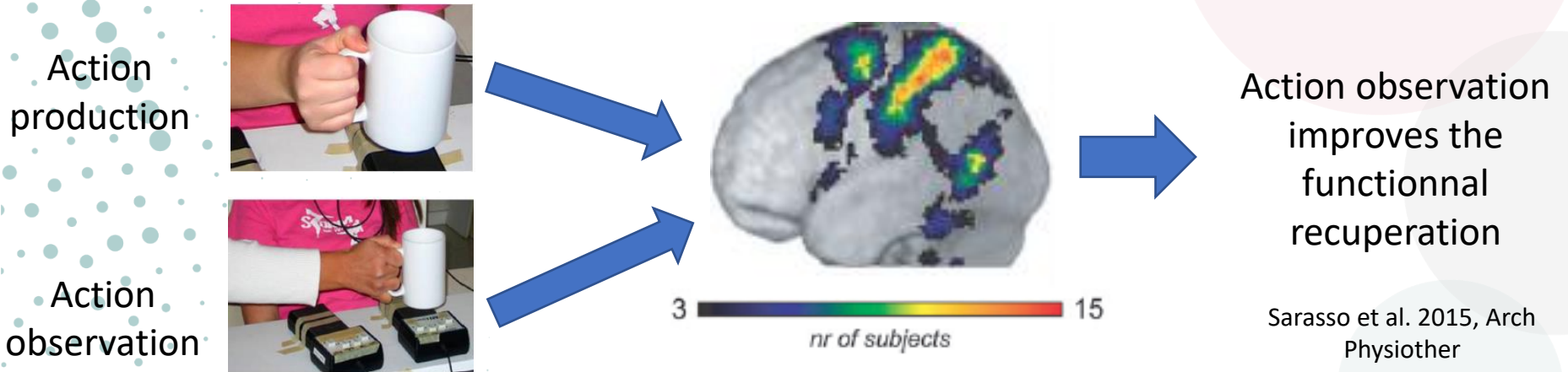


- Action
- Gender and identity
- Emotions and intention

Bidet-Ildei et al., 2011, L'Année
Psy

Introduction

Functional and structural equivalence between action production and action observation



Gazzola & Keysers, 2009, Cereb Cortex

Sarasso et al. 2015, Arch
Physiother

Objective and originality

Action observation has already demonstrated its benefit in the rehabilitation of patients with motor disorders (Sarasso, Gemma, Agosta, Filippi, & Gatti, 2015).

BUT no work has specifically studied the factors that intervene in this effect.

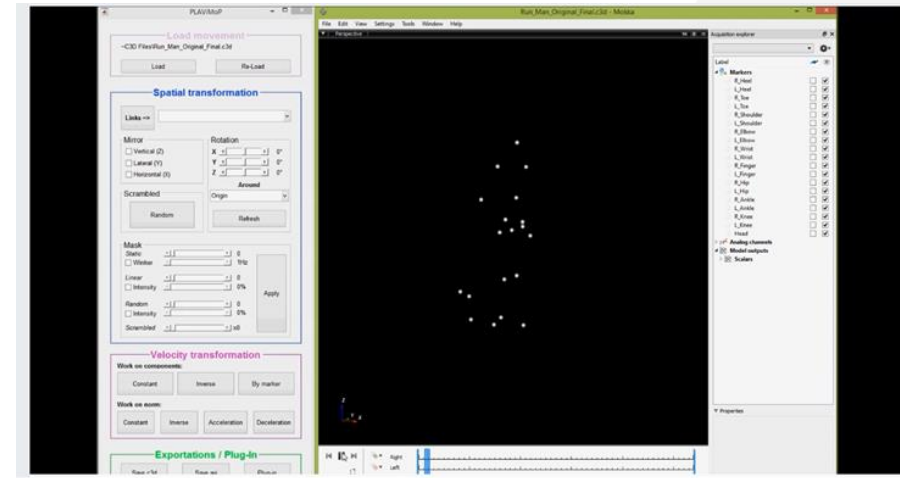
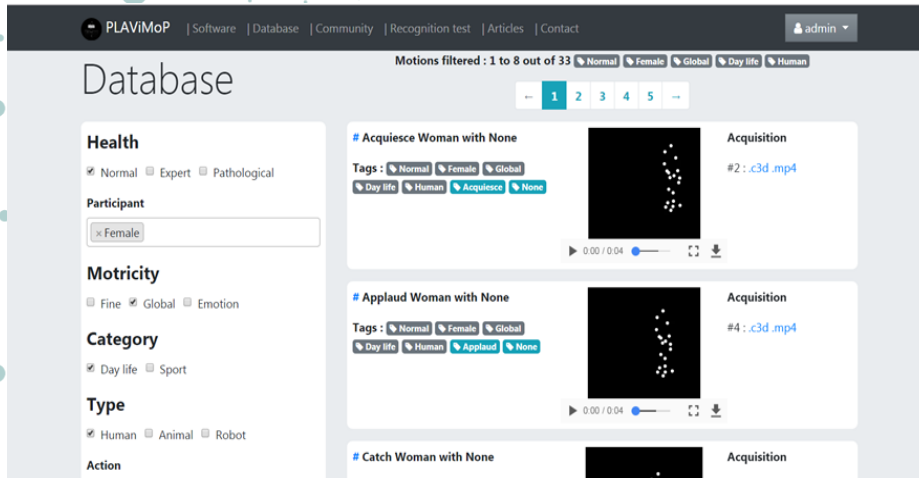
⇒ We used the platform [PLAViMoP](#) to determine the factors that influences the efficacy of action observation.



PLAViMoP: a platform which facilitates the manipulation of human movements

A database comprising about 200 human and robotic movements

Two softwares to manipulate easily the PLD sequences

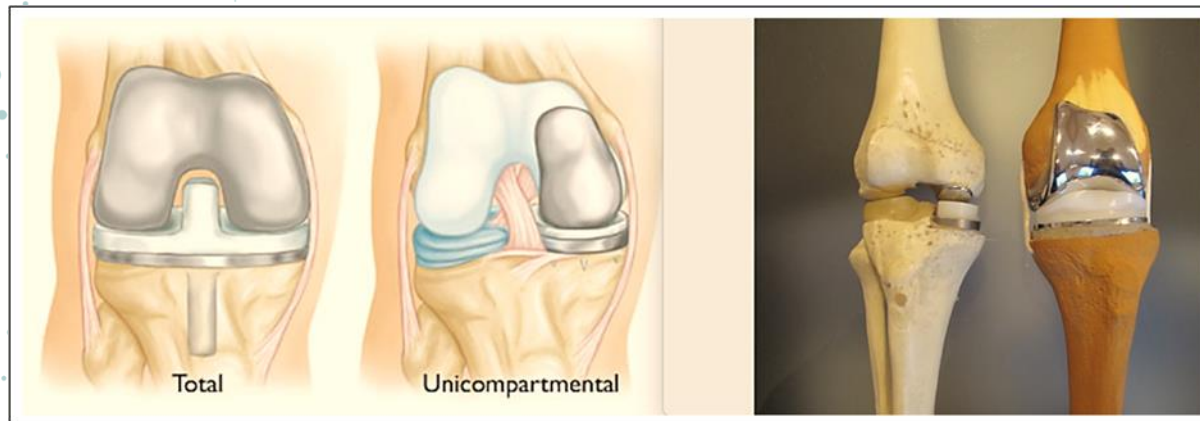


Decatoire et al. 2019, BRM

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Objective

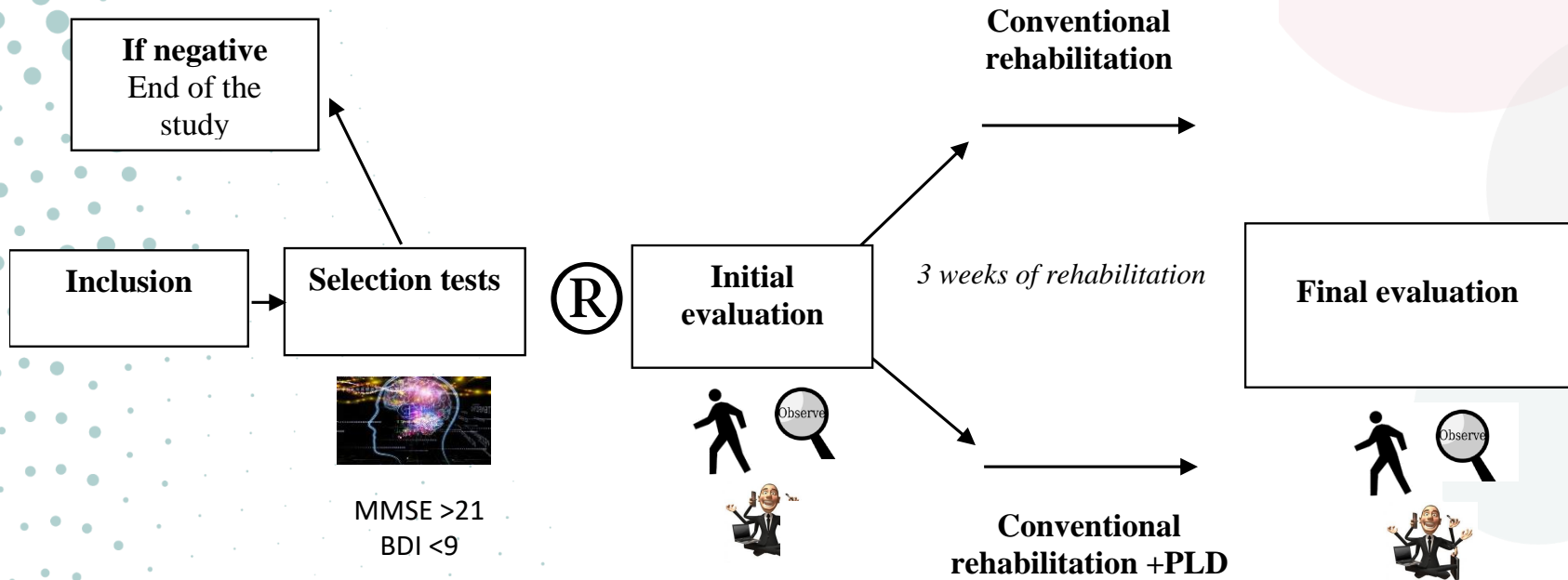
Demonstrate the benefits of observing point-light displays to recover functional ability for patients in postoperative rehabilitation of the total knee prosthesis



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Method

Procedure: a comparative randomized pilot study



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Method

Participants: 29 adults (16 women, 13 men, Mean age= 62,5 years) with a total knee arthroplasty were divided randomly in two groups.

Independent Samples T-Test ▼

	t	df	p
Age	-0.870	27	0.392
IMC	-0.302	25	0.765
score EVA	-1.058	25	0.300
Score TUG_pr.-test	NaN ^a		
Score WOMAC pr.-test	-1.169	27	0.252 ^b
reconnaissance PLD-pr.-test	1.051	27	0.303
d.tection PLD pr.-test	0.781	27	0.441
score-auto-efficacit. pr.-test	0.449	27	0.657

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Initial and final evaluations



WOMAC

The Western Ontario and MacMaster Universities Osteoarthritis Index (WOMAC)

Name: _____ Date: _____

Instructions: Please rate the activities in each category according to the following scale of difficulty: 0 = None, 1 = Slight, 2 = Moderate, 3 = Very, 4 = Extremely

Circle one number for each activity:

Pain

1. Staircase	0	1	2	3	4
2. Bed/Couch	0	1	2	3	4
3. Household	0	1	2	3	4
4. Walk	0	1	2	3	4
5. Stair/Escalator	0	1	2	3	4

Stiffness

1. Morning stiffness	0	1	2	3	4
2. Difficulty walking after 10 min. in the day	0	1	2	3	4

Physical Function

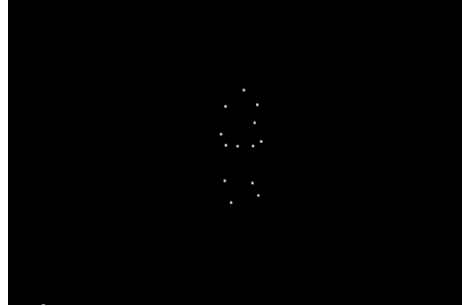
1. Overall difficulty	0	1	2	3	4
2. Ascending stairs	0	1	2	3	4
3. Descending stairs	0	1	2	3	4
4. Bending	0	1	2	3	4
5. Bending to lift	0	1	2	3	4
6. Walking on flat surface	0	1	2	3	4
7. Getting in/out of car	0	1	2	3	4
8. Getting in/out of bus	0	1	2	3	4
9. Getting in/out of plane	0	1	2	3	4
10. Getting in/out of train	0	1	2	3	4
11. Getting in/out of boat	0	1	2	3	4
12. Getting in/out of taxi	0	1	2	3	4
13. Getting in/out of lift	0	1	2	3	4
14. Getting in/out of bus	0	1	2	3	4
15. Getting in/out of train	0	1	2	3	4
16. Getting in/out of boat	0	1	2	3	4
17. Getting in/out of taxi	0	1	2	3	4

Take Score: _____ / 68 = _____ %

Comments: Interpretation (to be completed by therapist only):



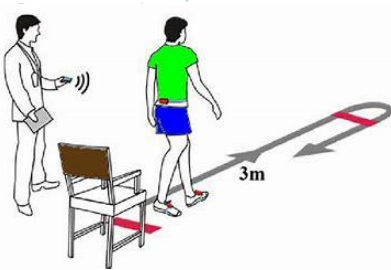
Recognition



Detection



TUG



Auto-efficacy questionnaire

<p>7. Je suis capable de résoudre les problèmes qui se présentent à mon travail.</p> <p>8. Je suis capable de prendre des décisions importantes.</p> <p>9. Je suis capable de gérer les situations difficiles.</p> <p>10. Je suis capable de faire face à la pression.</p> <p>11. Je suis capable de faire face à la frustration.</p> <p>12. Je suis capable de faire face à la déception.</p> <p>13. Je suis capable de faire face à la perte.</p> <p>14. Je suis capable de faire face à la solitude.</p> <p>15. Je suis capable de faire face à la tristesse.</p> <p>16. Je suis capable de faire face à la colère.</p> <p>17. Je suis capable de faire face à la peur.</p> <p>18. Je suis capable de faire face à la honte.</p> <p>19. Je suis capable de faire face à la culpabilité.</p> <p>20. Je suis capable de faire face à la gêne.</p> <p>21. Je suis capable de faire face à la gêne.</p> <p>22. Je suis capable de faire face à la gêne.</p> <p>23. Je suis capable de faire face à la gêne.</p> <p>24. Je suis capable de faire face à la gêne.</p> <p>25. Je suis capable de faire face à la gêne.</p> <p>26. Je suis capable de faire face à la gêne.</p> <p>27. Je suis capable de faire face à la gêne.</p> <p>28. Je suis capable de faire face à la gêne.</p> <p>29. Je suis capable de faire face à la gêne.</p> <p>30. Je suis capable de faire face à la gêne.</p>		
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Rehabilitation

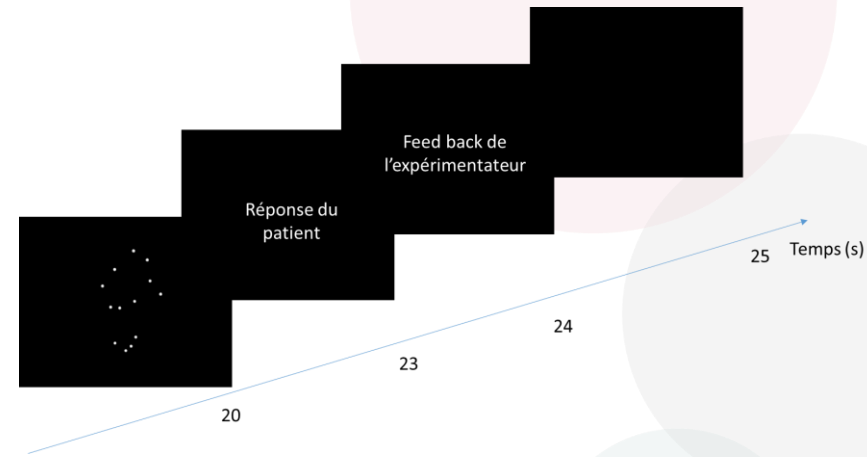
Conventionnal rehabilitation



2* 90 minutes
5 times a week

Control and experimental groups

PLD visualisation



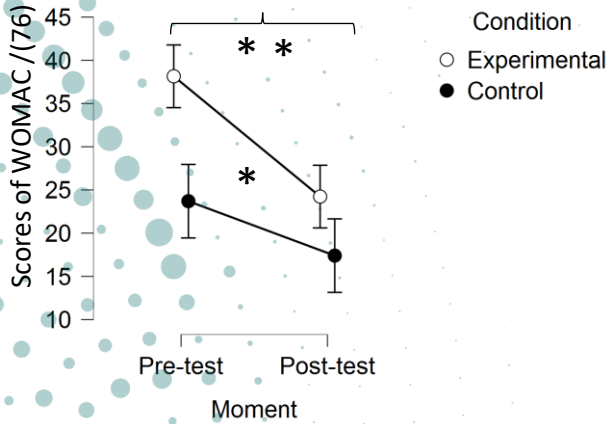
2* 5 minutes
3 times a week

Experimental group

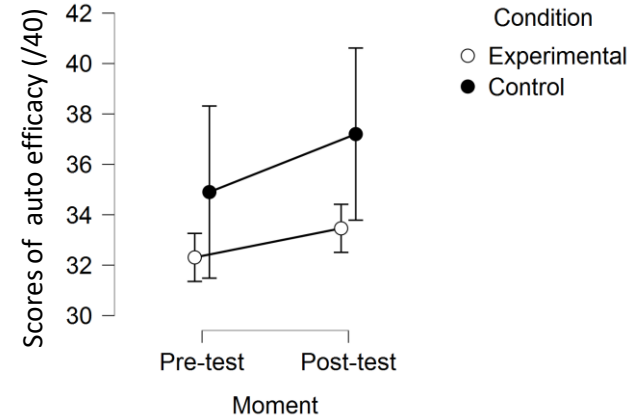
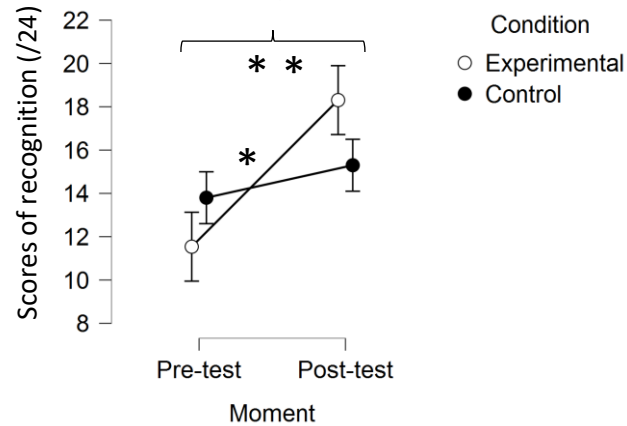
Results



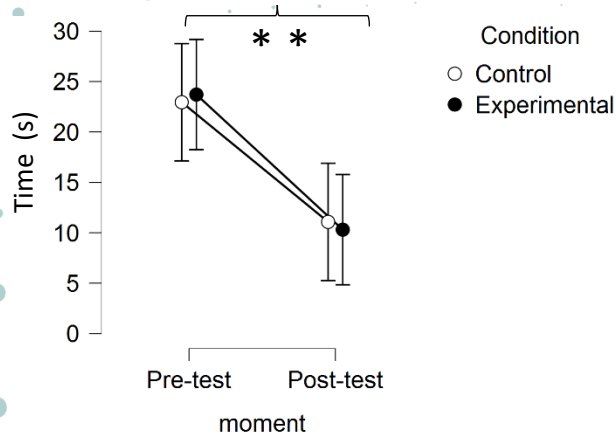
WOMAC



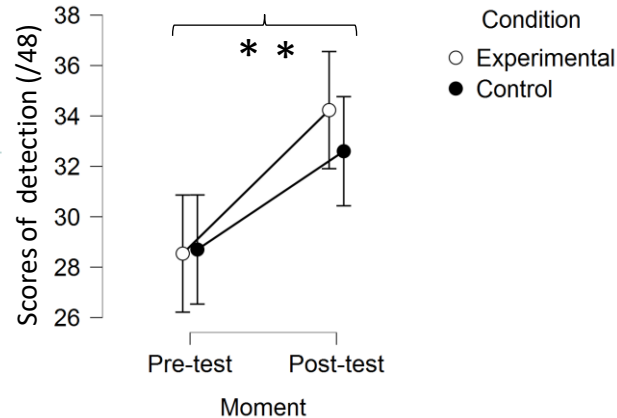
Recognition



TUG



Detection



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Discussion

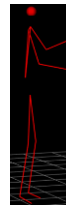
The addition of PLD observation seems improve the fonctionnal capacities of patients with total knee arthroplasty.

Limitations

- No visual control condition



- Use of macroscopic tests

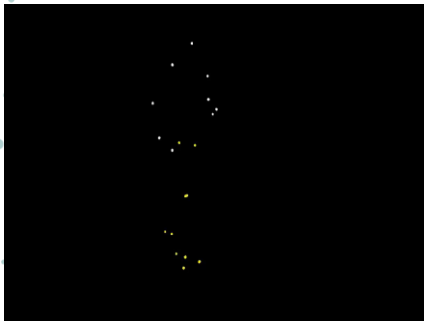


Effet top-down
(Bellelli et al., 2010)

Perspectives



Studying the parameters which affect the efficacy of PLD (Buccino et al. 2008)



The use of personalised PLD
->development of a morphing tool
based on biomechanical optimization



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Thank you for your attention



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