Joint Pain in Relation to Body Composition and Sedentary Behaviours Post-Bariatric Surgery

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Introduction

- What's been said…
- Importance of:
  - Body composition
  - Sedentary time

Body Fat and Pain

- Release of cytokines[1]
- Affect joint structure[1]

1 Brady, Mamuaya et al. (2015). Body Composition is Associated With Multisite Lower Body Musculoskeletal Pain in a Community-based Study. Journal of Pain.

Body Fat and Pain

- Related to musculoskeletal pain[1,2]
- Pain improvement with surgery[2]

1Yoo, Cho, Lim, Kim. (2014). Relationships Between Body Mass Index, Fat Mass, Muscle Mass, and Musculoskeletal Pain in Community Residents. ACR.
2 Brady, Mamuaya et al. (2015). Body Composition is Associated With Multisite Lower Body Musculoskeletal Pain in a Community-based Study. Journal of Pain.

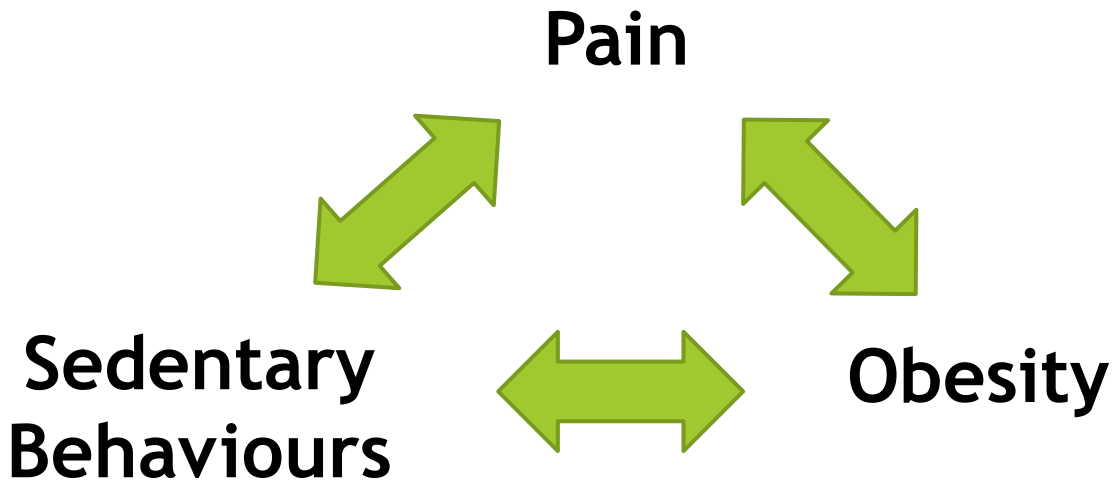
Sedentary Behaviours and Pain

- **Reclined posture, sitting, laying down[1]**
- **Risk factor associated with obesity, type II diabetes[2]**
- **Obese individuals and high amounts of sitting time[2]**

1 Sedentary Behaviour Research Network. Standardized use of the terms ‘sedentary’ and ‘sedentary behaviours’. *Appl Physiol Nutr Metab* 2012; **37**: 540–542
2Herman, K.M., Carver, T.E., Christou, N.V. and Andersen, R.E., 2014. Physical activity and sitting time in bariatric surgery patients 1–16 years post-surgery. *Clinical obesity*, *4*(5), pp.267-276.

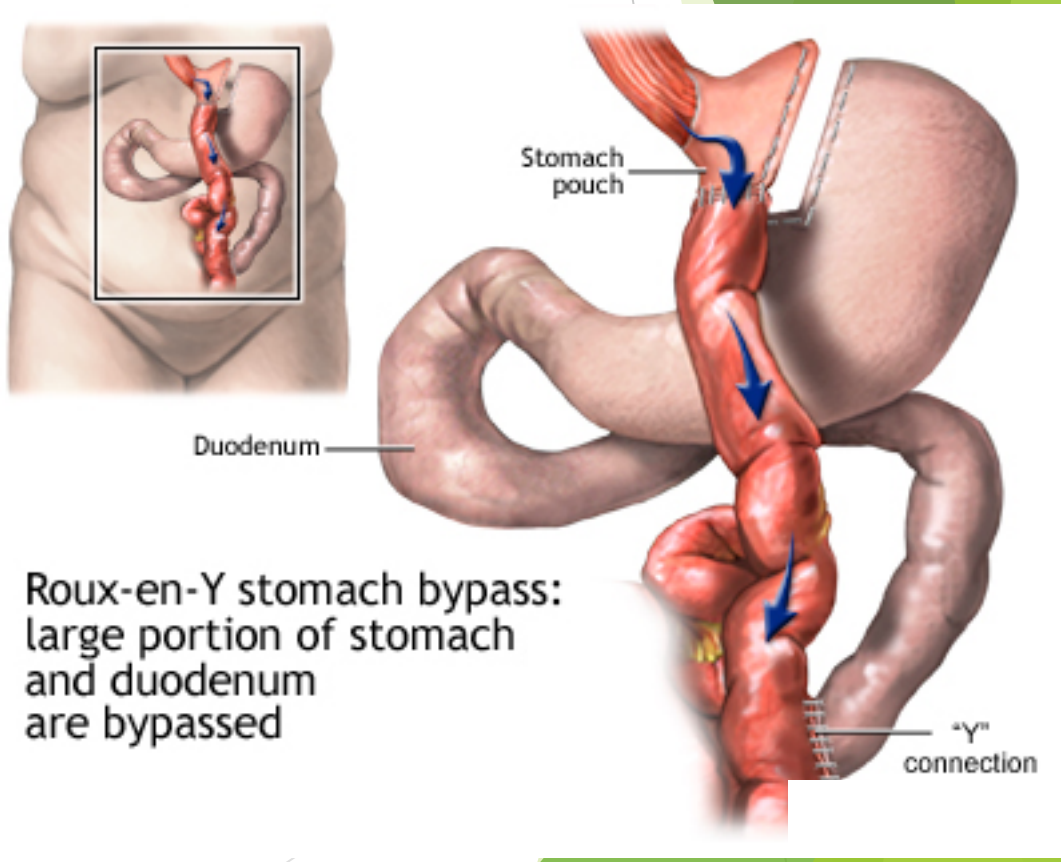
Sedentary Behaviours and Pain

- **Prolonged sitting leads to back pain[1]**



1 Beach TA, Parkinson RJ, Stothart JP, et al. Effects of prolonged sitting on the passive flexion stiffness of the in vivo lumbar spine. Spine J 2005;5:145–54.

Treating Obesity



Bariatric Surgery

- Benefits
  - Physical function[1]
  - Improvements in pain[1,2]

1 King, Chen, Belle et al. (2017). Change in Pain and Physical Function Following Bariatric Surgery for Sever Obesity. JAMA.
2 Groen, van de Graaf, Scholtes et al. (2014). Effects of bariatric surgery for knee complaints in obese adult populations: A systematic review . Obesity Reviews.

Purpose

- To explore how body composition changes, particularly body fat, relates to hip, knee and other joint pain
- To explore how sedentary hours relates to hip, knee and other joint pain

Methods

- Secondary analysis from a convenience sample
- Participants
  - 167 adults (118 females)
  - Underwent bariatric surgery 1-17 years prior

Body Composition

- DXA scan completed at follow-up
  - Body Fat Percentage
  - Lean Tissue Mass
  - Bone Mineral Density

Knee, Hip, and Other Pain*

- Pain prior to surgery
- Pain post surgery
  - Worse
  - Same
  - Better

*low back, feet, etc.

Sedentary Time

- How many hours per day do you spend sitting or lying down, not including sleeping?

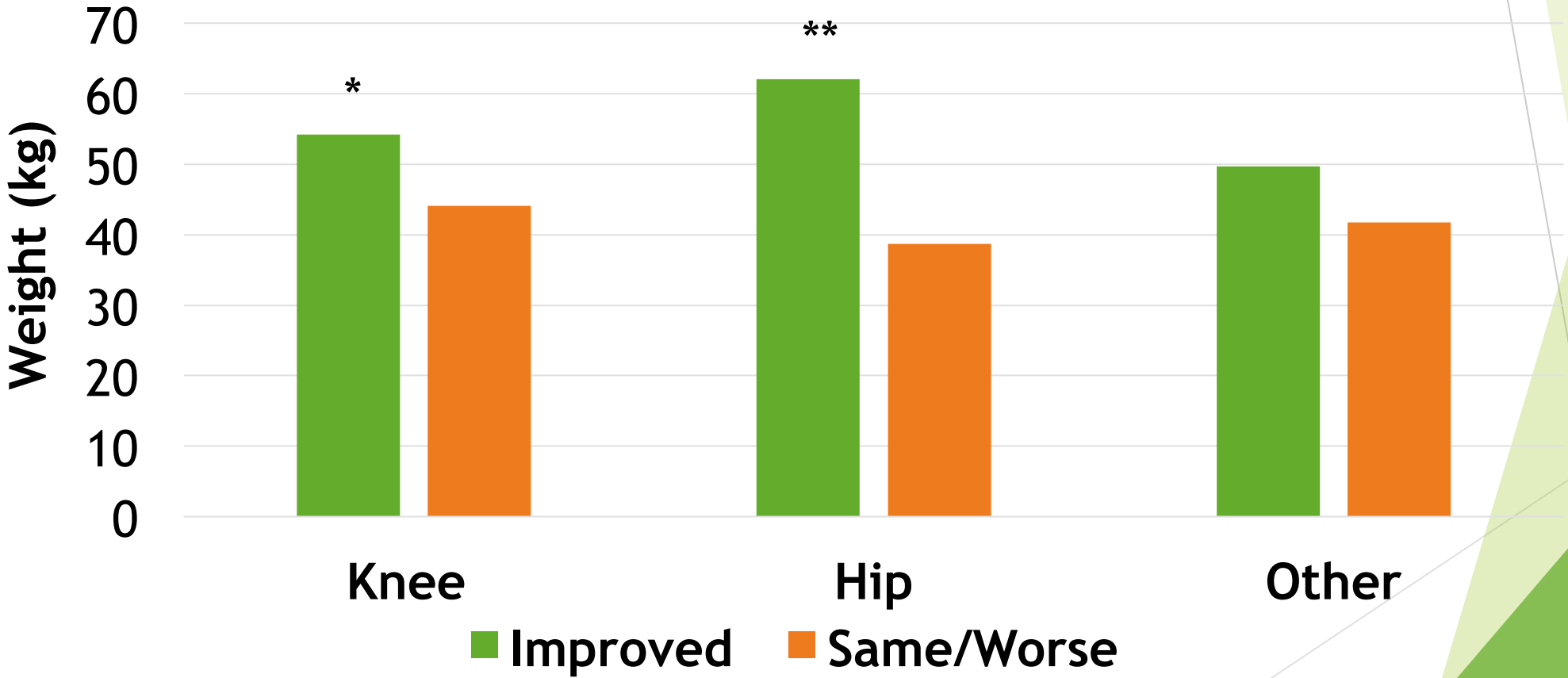
Statistical Analysis

- *t*-tests were used to compare differences in pain (Improved or Same/Worse) in relation to:
  - Weight change
  - % Regain
  - Body Fat %
  - Hours sedentary per day

Participant Characteristics (n=167)

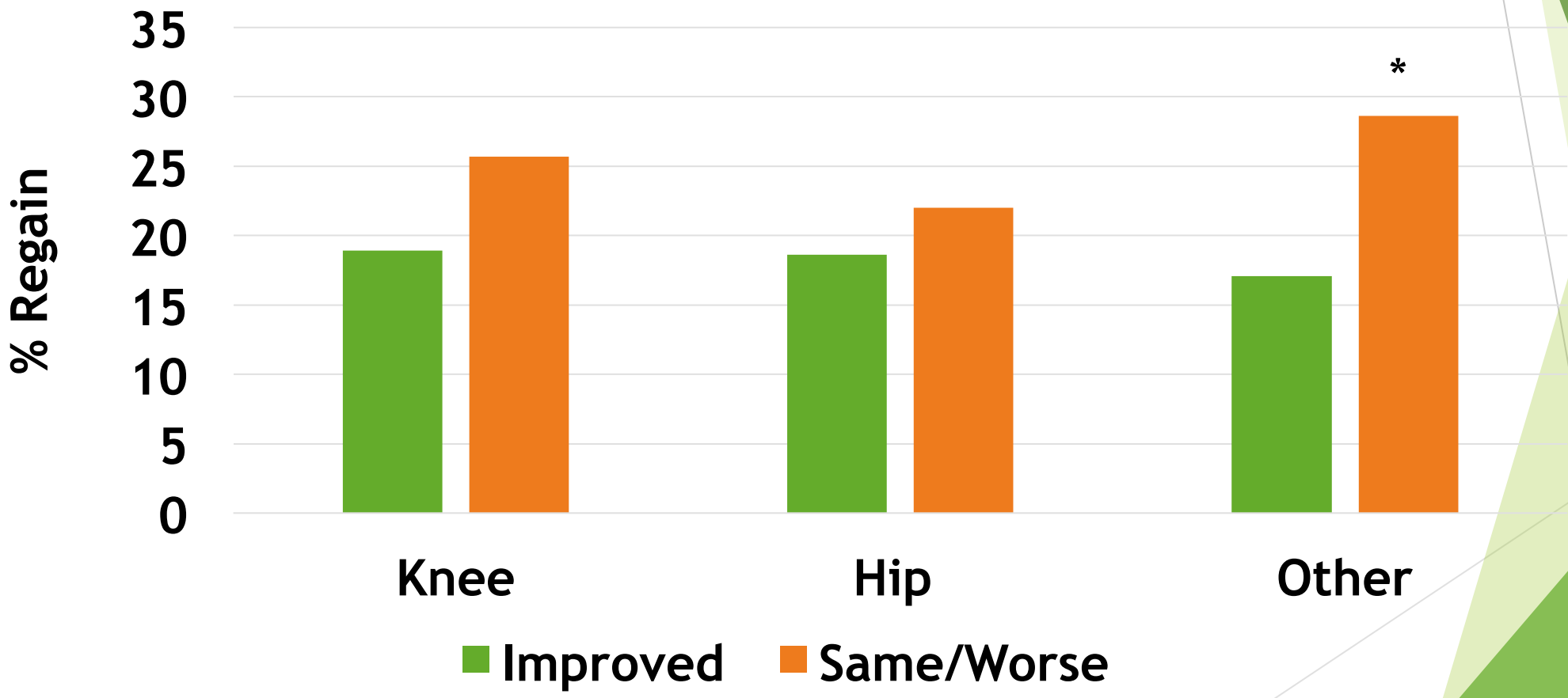
Variable	Mean ± SD
Age	51 ± 10
Follow-up (years)	9 ± 4
Change in Weight (kg)	49.3 ± 29.3
Weight Regain	23%
Knee Pain	46%
Hip Pain	19%
Other Pain	47%
Sedentary Hours per day	7 ± 3

↑ weight loss = ↓ pain

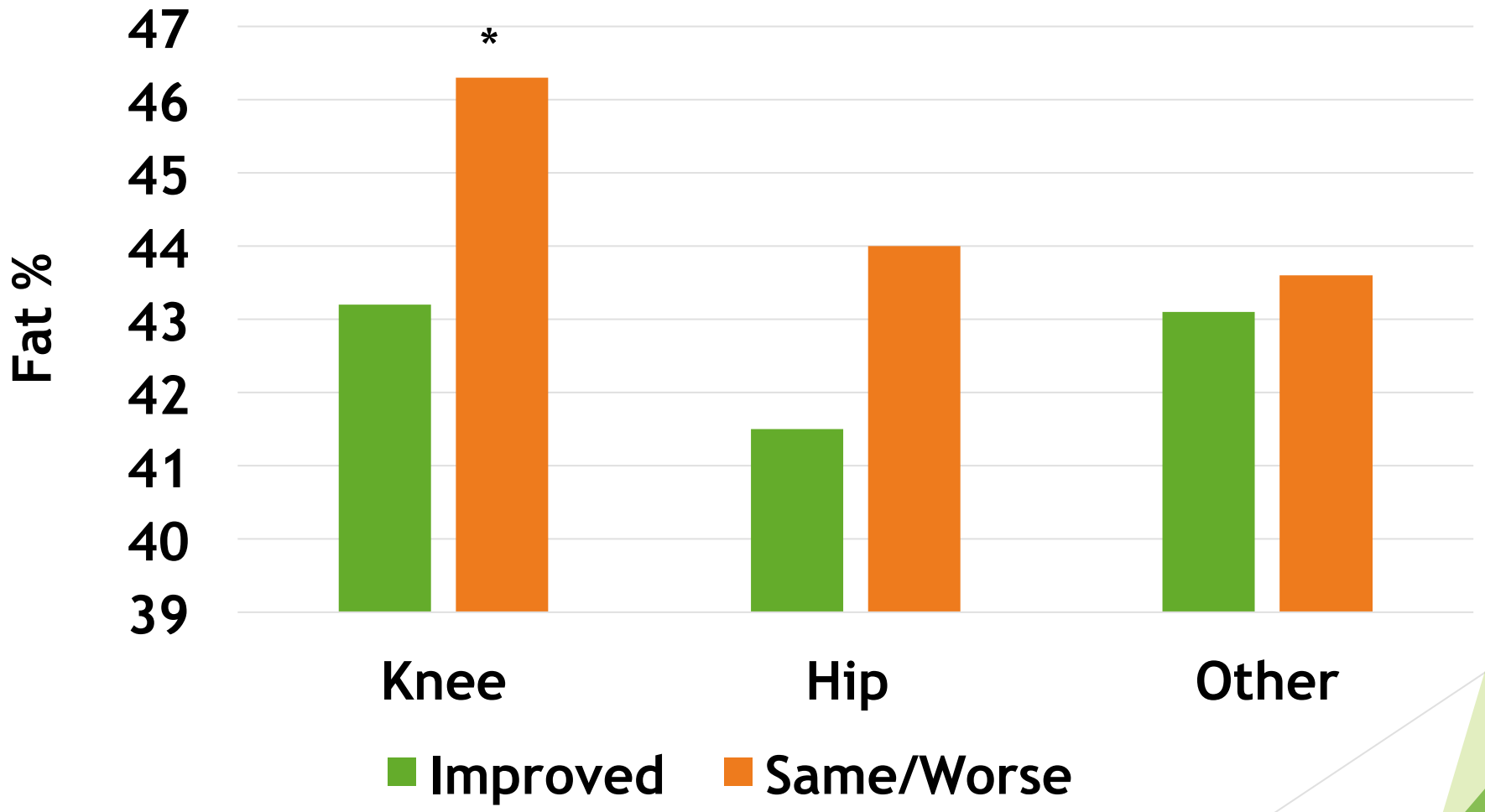


**p = .08

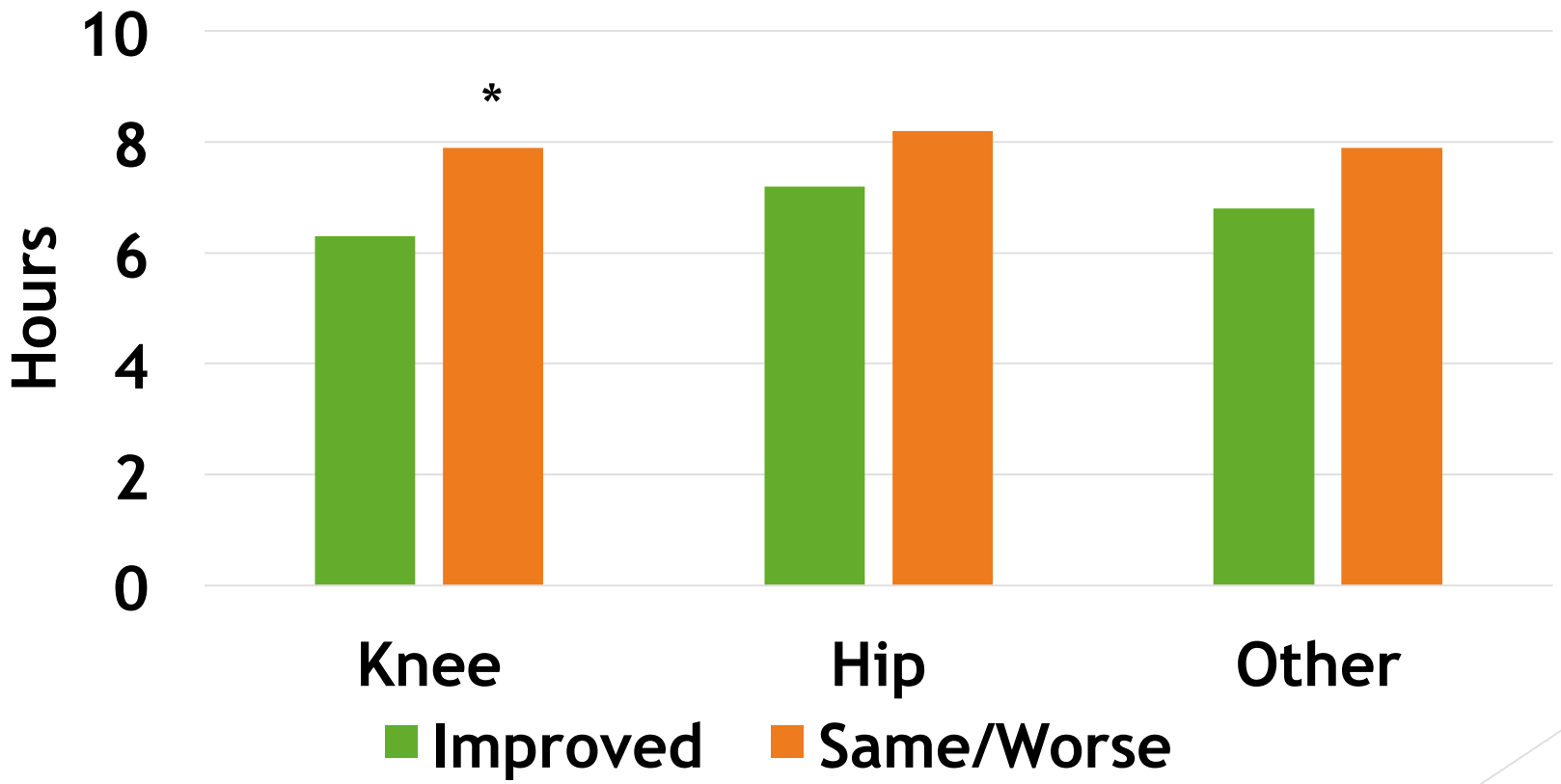
↓ regain = ↓ pain



↓ body fat = ↓ pain



↓ sedentary hours = ↓ pain



Strengths and Limitations

- Strengths
  - DXA Scan
  - Sample size
- Limitations
  - Differentiate joint pain
  - Self-report

Conclusions

- Body composition and sitting time both relate to joint pain
- Improved joint pain related to:
  - greater reductions in weight
  - less weight regained
  - lower body fat
  - less sedentary hours

Clinical Implications

- Both weight loss and reducing sedentary time may help improve joint pain symptoms

Acknowledgements

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HEALTH & FITNESS PROMOTION LAB

" Promoting Fitness and Healthy Lifestyles "

Questions

	Improved	Same/Worse	Mean Difference (95% CI)	P value
Hip (n=31)	n=15 (48%)	n=16 (52%)		
Pre-Surgical Weight (kg)	156.6 (35.6)	137.7 (27.3)	18.9 (-4.3, 42.1)	.11
Weight Change (Kg)	-62.1 (36.1)	-38.7 (23.5)	23.4 (-45.7, -1.2)	.04
% Regain	18.6 (14.5)	22.0 (17.3)	-3.3 (-15.1, 8.4)	.57
Current % Fat	41.5 (8.3)	44.0 (8.3%)	-2.5 (-8.6, 3.6)	.42
Hours sitting per day	7.2 (2.8)	8.2 (3.7)	-1.0 (-3.7, 1.6)	.43
Knee (n=77)	n=42 (55%)	n=35 (45%)		
Pre-Surgical Weight (kg)	145.7 (33.4)	143.2 (31.2)	2.6 (-12.2, 17.4)	.73
Weight Change (Kg)	-54.2 (2.7)	-44.1 (20.2)	-10.1 (-21.3, 1.1)	.08
% Regain	18.9 (13.2)	25.7 (22.6)	-6.8 (-15.1, 1.4)	.12
Current % Fat	43.2 (8.6)	46.3 (8.1)	-3.2 (-7.0, 0.7)	.10
Hours sitting per day	6.3 (3.3)	7.9 (3.0)	-1.6 (-3.1, -0.0)	.04
Back/Other Joints (n=79)	n=42 (53%)	n=37 (57%)		
I Pre-Surgical Weight (kg)	137.5 (29.0)	137.1 (22.2)	0.4 (-11.3, 12.1)	.95
Weight Change (Kg)	-49.7 (26.6)	-41.7 (21.6)	-8.0 (-19.0, 3.0)	.15
% Regain	17.1 (12.9)	28.6 (27.2)	-11.5 (-20.9, -2.1)	.02
Current % Fat	43.1 (8.2)	43.6 (8.7)	-0.5 (-4.3, 3.3)	.80
Hours sitting per day	6.8 (3.7)	7.9 (3.7)	-1.1 (-2.8, 0.7)	.24