Characterizing Accelerated Knee Osteoarthritis

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I have no professional or financial affiliations that would bias this work.

Osteoarthritis Initiative

- Prospective cohort
- 4 Centers + coordinating center
  - Memorial Hospital of Rhode Island
  - University of Pittsburgh
  - The Ohio State University
  - John Hopkins/University of Maryland-Baltimore
  - University of California, San Francisco
- Coming soon: 96-month data/images
- A small subset will be followed further

Osteoarthritis Initiative

- 4,796 participants
  - At risk for symptomatic knee OA
  - Prevalent symptomatic knee OA
  - Non-exposed controls
- Not representative of the US population
- Extensive clinical data set (PROs, physical performance measures, imaging, etc)

AKOA

- Accelerated Knee Osteoarthritis (AKOA)
  - No radiographic OA to KL = 3 or 4 in ≤ 4 years
  - ~ 3.5% incidence rate over 4 years
  - ~ 65% progressed within 12 months

Driban et al., 2014

AKOA

	No KOA (n = 1325) n (%) or mean (SD)	Typical KOA (n = 187) n (%) or mean (SD)	Accelerated KOA (n = 54) n (%) or mean (SD)	Univariate Analyses p-value
Females	759 (57%)	122 (65%)	34 (63%)	0.093
Age (years)	59.2 (9.2)	58.0 (8.3)	61.8 (8.6)	0.023
BMI (kg/m^2)	27.1 (4.4)	27.8 (4.5)	28.9 (4.7)	0.002

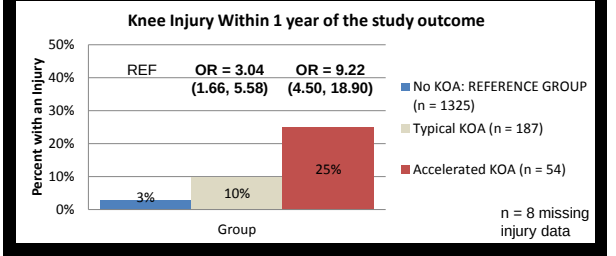
Driban et al., 2014 (AC&R)

AKOA

- Injuries are a key risk factor, particularly in the year prior to the study outcome

Driban et al., 2014 (AC&R)

AKOA & Knee Injuries



Within 1 Year of the Study Outcome: Accelerated Knee O

OAI Visit	0 month	12 month	24 month	36 month	48 month
KL Grade	KL = 0	KL = 0	KL = 0	KL = 3	KL = 3

Driban et al., 2014

So, what are the key injuries?

- Despite KL = 0/1 most knees had degenerative changes

Incident Findings

- **No KOA** (n = 10): 1/10 knees: MCL sprain
- **Common KOA** (n = 10)
  - 3/10 knees: medial meniscal pathology w/ no-mild extrusion
  - 1/10 knees: MCL sprain
- **Accelerated KOA** (n = 18)
  - 13/18 (72%) knees: medial meniscal pathology w/ extrusion
  - 3/18 knees: meniscal pathology without extrusion
    - 2/3 knees were lateral meniscal tears
  - 4/18 knees: subchondral fractures
  - 1/18 knees: possible post-traumatic AVN

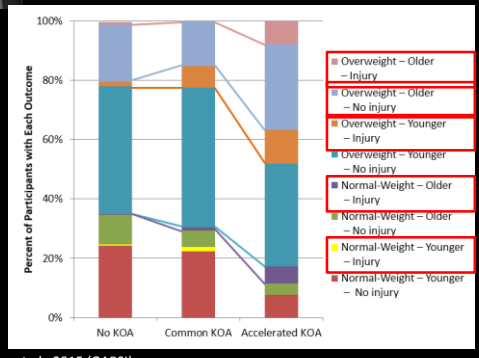
Driban et al., 2015 (Clinical Anatomy)

Possible Interaction

	Adjusted Odds Ratio	
	Common KOA	**Accelerated KOA**
Normal-Weight – Younger – No injury	Reference	Reference
Normal-Weight – Younger – Injury	**6.6 (1.5, 29.3)**	n/a
Normal-Weight – Older – No injury	0.8 (0.4, 1.6)	1.1 (0.2, 6.4)
Normal-Weight – Older – Injury	3.5 (0.3, 35.1)	**76.0 (11, 504)**
Overweight – Younger – No injury	1.6 (1.0, 2.4)	2.5 (0.8, 7.6)
Overweight – Younger – Injury	**6.0 (2.7, 13.4)**	**22.8 (5.9, 88.2)**
Overweight – Older – No injury	1.1 (0.6, 2.0)	**4.5 (1.4, 14.3)**
Overweight – Older– Injury	n/a	**25.9 (5.6, 119.9)**

Driban et al., 2015 (OARSI)

Possible Interaction



Driban et al., 2015 (OARSI)

Vicious Cycle?

- Despite focusing on injury → accelerated OA
- We could not rule out accelerated OA → injury
- Could be a vicious cycle

Driban et al., 2014 (AC&R)

Knee Injuries

- Why are older, mostly sedentary adults getting injured?

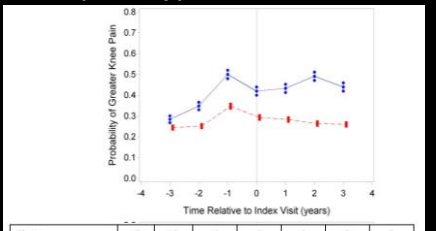
Table 2. *Frequent Knee Pain* and History of Injury Predict a New Knee Injury within 12 Months

	Frequency of Injuries/ Total Observations	Adjusted Odds Ratio for Injury
Full Osteoarthritis Initiative (4,435 participants, 875 injuries)		
No Frequent Ipsilateral Knee Pain	422/21312 (2.0%)	Reference
Frequent Ipsilateral Knee Pain	453/10118 (4.5%)	**1.84 (1.57, 2.16)**
No Frequent Contralateral Knee Pain	502/21311 (2.4%)	Reference
Frequent Contralateral Knee Pain	373/10119 (3.7%)	1.02 (0.87, 1.20)
No History of Ipsilateral Knee Injury	443/22275 (2.0%)	Reference
History of Ipsilateral Knee Injury	432/9155 (4.7%)	**1.80 (1.56, 2.09)**
No History of Contralateral Knee Injury	518/22275 (2.3%)	Reference
History of Contralateral Knee Injury	357/9155 (3.9%)	**1.43 (1.23, 1.66)**

Driban et al., 2015 (J Rheum)

So what?

- Does the phenotype matter?



Time	-3	-2	-1	0	1	2	3
AKOA ●●●	n=30	n=40	n=54	n=52	n=47	n=50	n=50
Common KOA ■■■	n=53	n=93	n=187	n=185	n=183	n=183	n=181

Driban et al., 2015 (OARSI, under review)

Thank You

NIH National Institute of Arthritis and Musculoskeletal and Skin Diseases

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OAI