Professional and Amateur Pitchers' Perspective on UCL injury Risk

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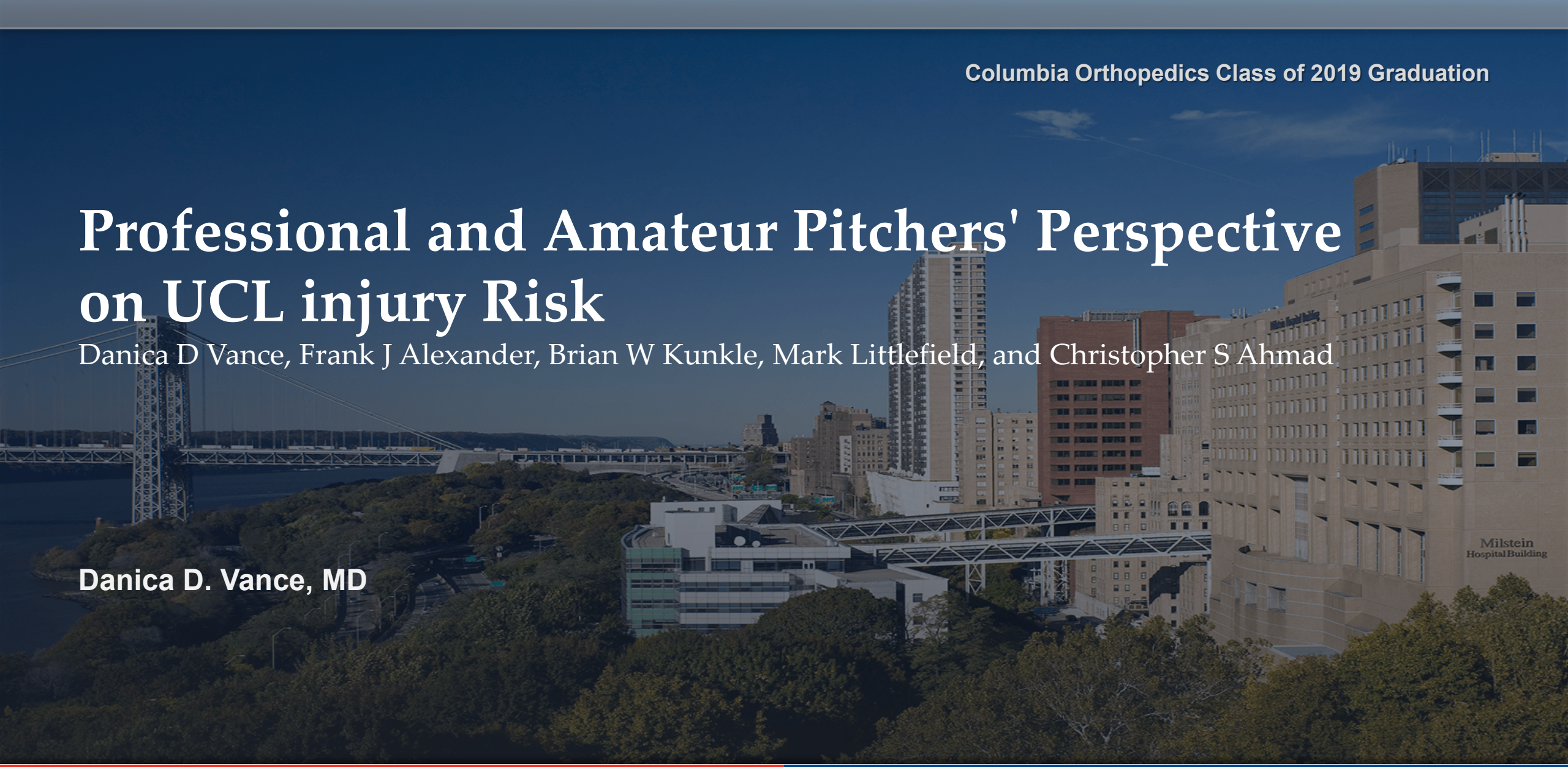

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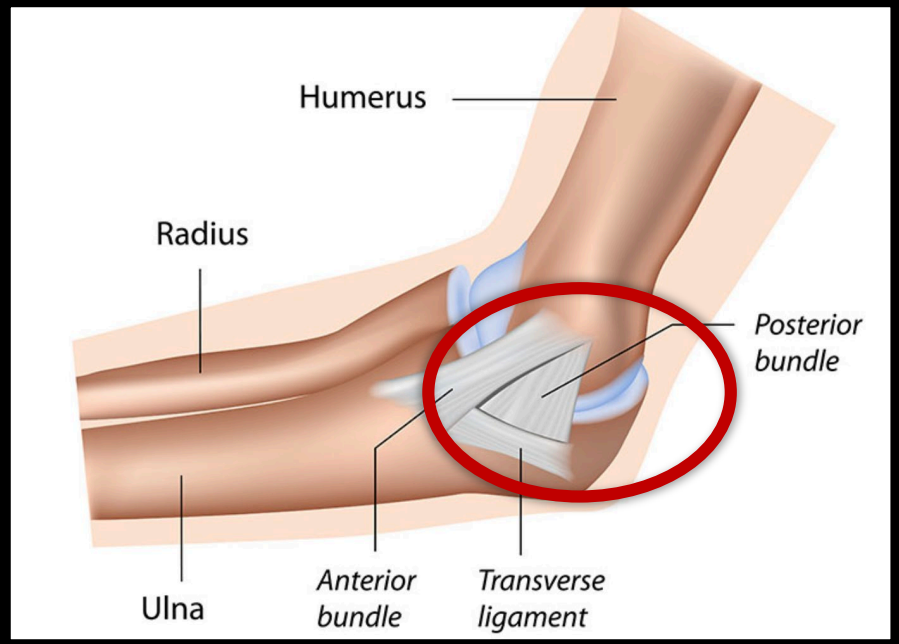
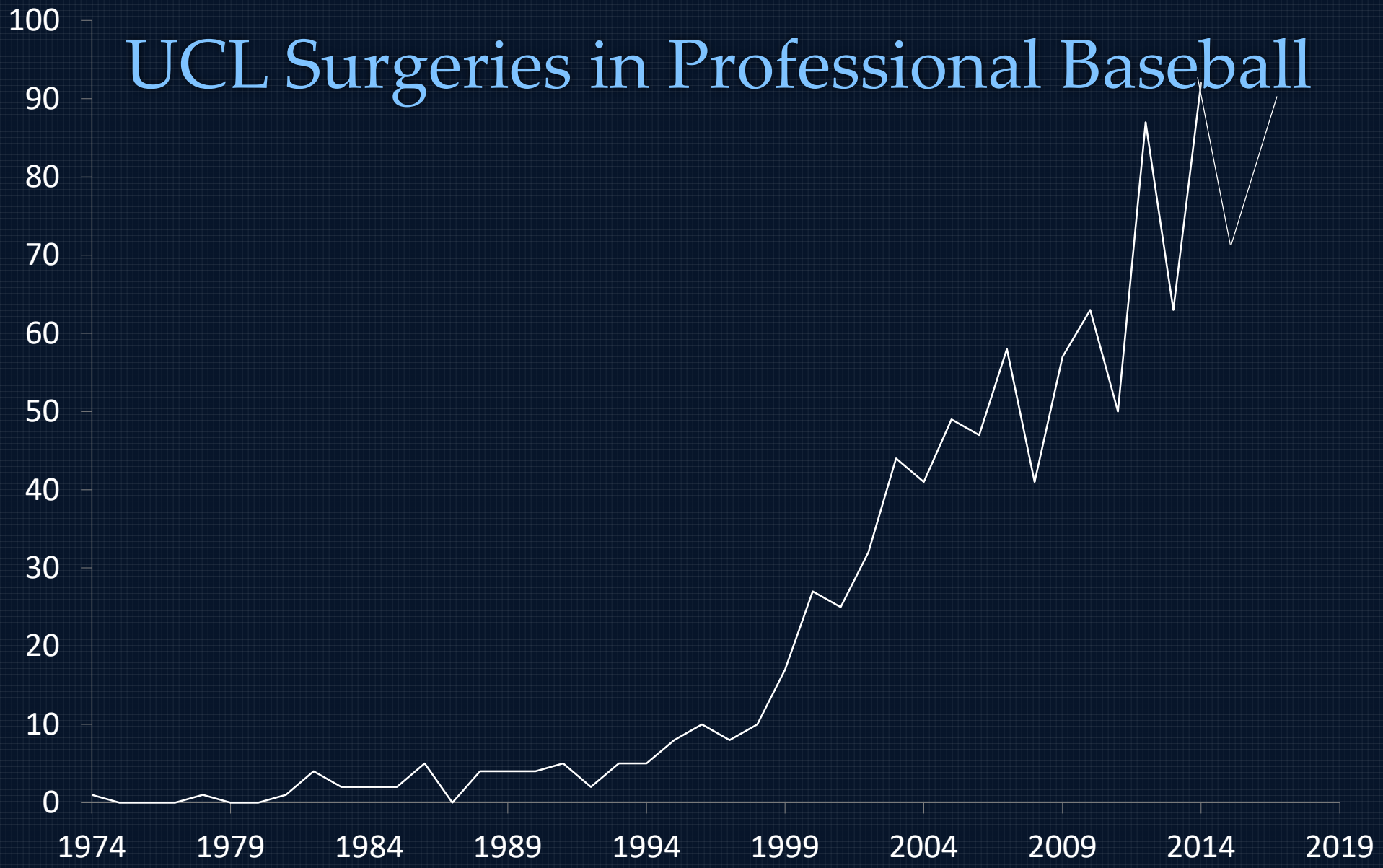
Ulnar collateral ligament (UCL) Injuries

- **Medial ulnar collateral ligament (UCL) injury is an increasingly prevalent injury among professional pitchers.**
  - primary stabilizer to valgus force
    - Significant stress during pitching
- **In 1974, Dr. Frank W Jobe developed the UCL reconstruction or "Tommy John Surgery"**
  - gold standard of treatment

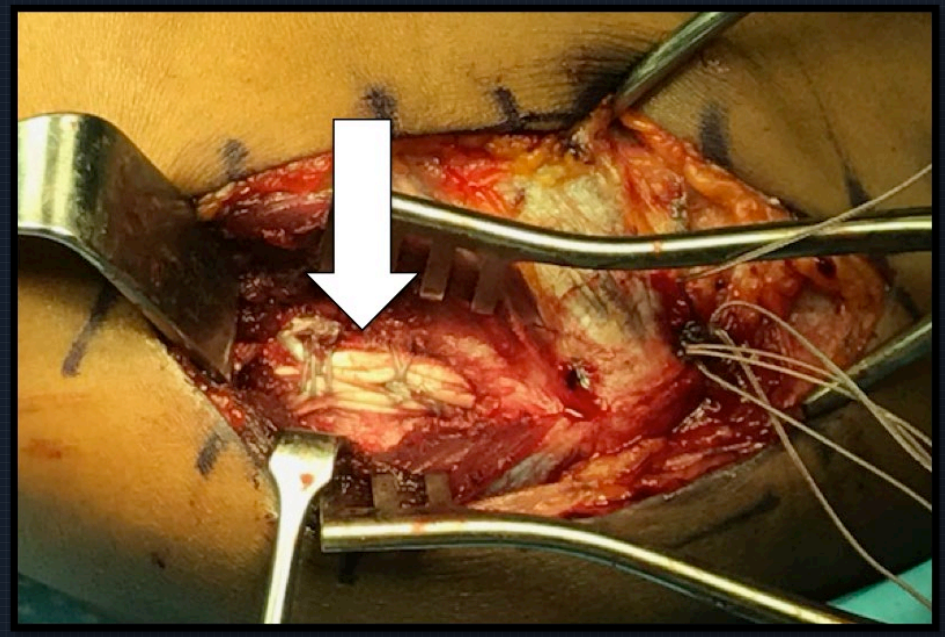


Epidemic ?


UCL Surgeries in Professional Baseball
100
90
80
70
60
50
40
30
20
10
0
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019

UCL Injury Epidemic

- 25% of MLB pitchers undergo TJ surgery
- ***Hot Topic* within baseball medicine**
  - Research dedicated to both the biomechanics and epidemiology of UCL injury
    - Identified risk factors ; pitching mechanics, fatigue, pitch type, velocity
  - Pitch limits for young athletes
  - Concern/Misconceptions among the public



Importance of Players' Perspective

- **>150 publications on PubMed over last 10 years.**
- **Opinions from physicians, scientists, coaches, baseball writers on why the UCL fails…**
- **However, the players that experience the injury, may be the best to ask..**

What do professional pitchers think?

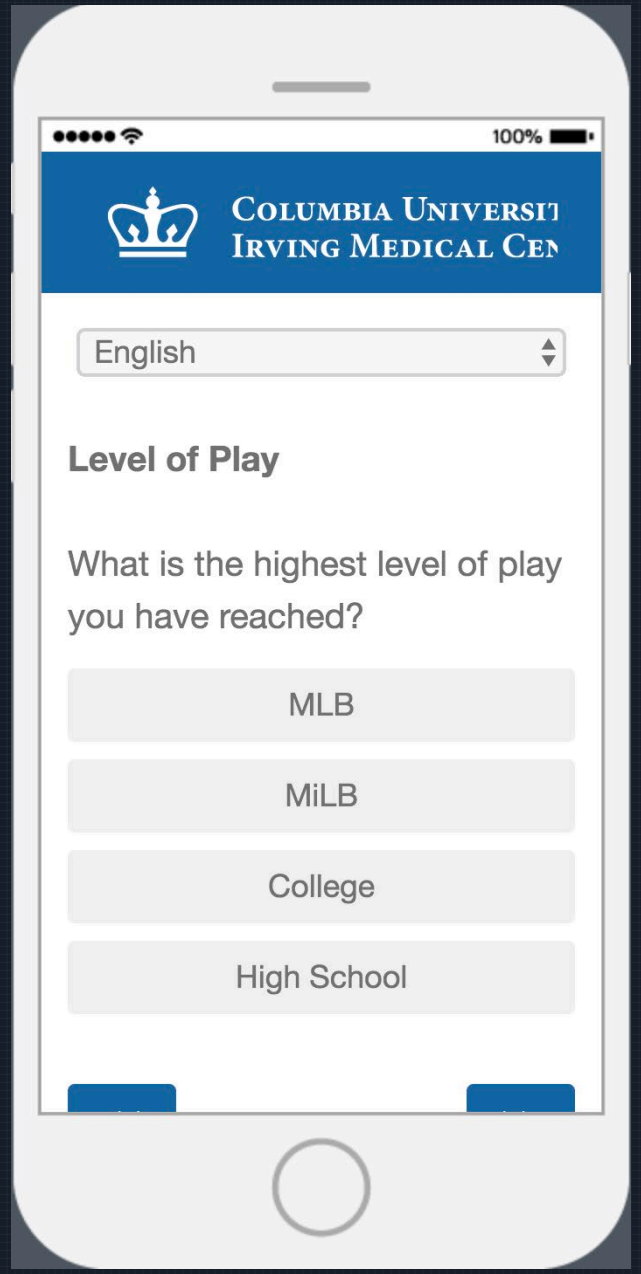
- Causes?
- Risks?
- Preventions?

Study Objective

"Evaluate the opinions of UCL injury regarding risk factors and prevention among pitchers, including professional athletes."

Project Design

- **Collaboration with New York Yankees**
- **Created an online survey *(Qualtrics; https://www.qualtrics.com)***
  - 52 questions; multiple choice, list selection, open ended
    - Likert scale
    - Evaluate pitchers' knowledge of UCL injuries and their opinions of associated risks and preventions
    - Available in Spanish and English
  - Survey completed either on an iPad during MLB training camp or during doctor office visits.



Questionnaire: 6 Sections

Demographics/ Medical Hx

Highest level, position, handedness.

Childhood elbow injury , UCL injury, TJ surgery

Frequency of pitching through pain, stiffness, looseness.

UCL Injuries

Knowledge of elbow anatomy

Single throw vs Multiple

Can we avoid UCL injury?

Individual Variables

Height, weight, age, previous shoulder injury

Average pitch velocity

Pitching Variables

Pitch type

New pitch development

Pitching mechanics

Throwing Fatigue

innings pitched, Inadequate rest

Preventative measures: ↑ # of pitchers, 6-man starting rotation

Rest “DL”

Surgical Variables/Outcomes

Is TJ surgery a positive/negative?

Does velocity increase after TJ?

Do players return to preinjury level of play?

Data Analysis

- **Statistical Analysis System (SAS) Software**
- **Frequency of selection of each answer option was measured**
- **Chi-squared tests to compare**
  - (1) responses between professional and nonprofessional pitchers
  - (2) responses between pitchers with and without a previous UCL injury

Results: *Data Demographics*

- **214 participants**
  - **45 high school/college pitchers**
  - **169 Minor/Major League pitchers**
- **51/209 (24%) pitchers reported a previous UCL injury**
  - 3/13 MLB (23%)
  - 35/154 MiLB (23%)
  - 12/42 high school/college (31%)

Highest Level of Play	Players	Percent
College	25	11.7
High School	20	9.4
MiLB	155	6.5
MLB	14	72.4
Total	214	100
Current Position	Players	Percent
Reliever	76	38.6
Starter	113	57.4
Starter,Reliever	8	4
Total	197	100
Throwing Arm	Players	Percent
Right-handed	177	84.3
Left-handed	33	15.7
Total	210	100
Previous UCL injury	Players	Percent
Yes	51	24.4
No	158	75.6
Total	209	100

Key Results

- Only 42% of pitchers think UCL injuries are avoidable in the MLB
- Individual variable do not increase risk (height, weight)
- Curve ball (41%) puts a pitcher at highest risk for tearing their UCL
- 72% think that throwing fatigue during the season and inadequate off season rest (62 %) increase risk of UCL injury
- 59% believe expanding to a 6-man starting roster will decrease UCL injury

Key Results: Group Comparisons

Professional vs. Non-Professional pitchers (NP)

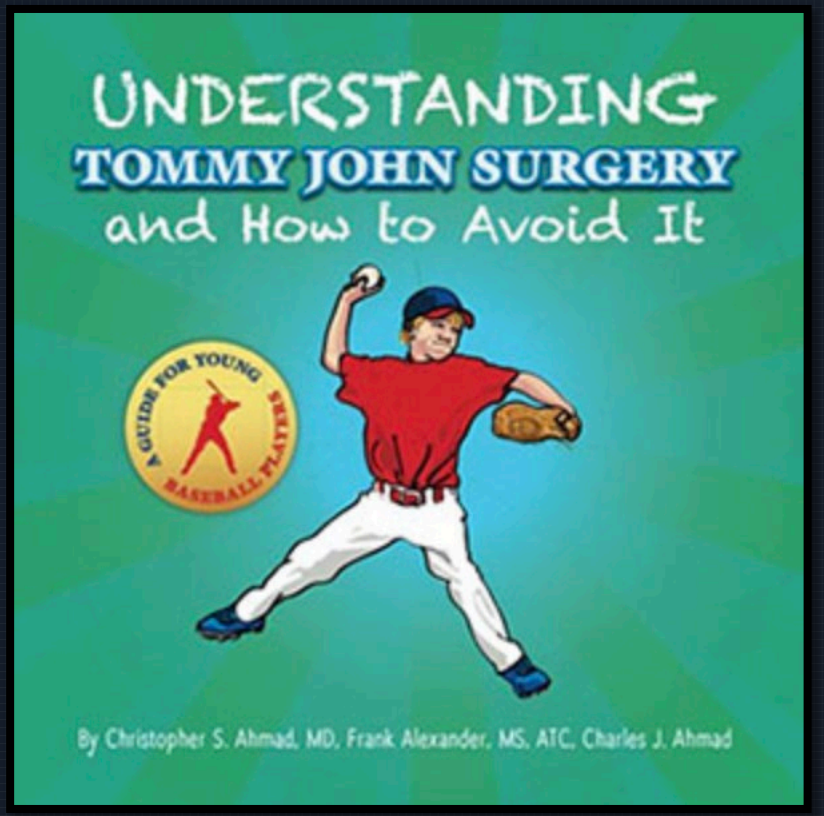
- **NP thinks sliders are highest risk for UCL injury (p = 0.005)**
- **NP think managers/coach overuse influences UCL injury (p= <0.001)**

UCL injury vs non-UCL injury

- **Significantly higher rates (p = <0.001) of childhood elbow injury in UCL group**
  - **54% of pitchers with a UCL injury had a history of an elbow injury as an adolescent/child compared** to 17.6% of the non-injured group.

Adolescent elbow pain and UCL injury

- **With increasing early sports specialization, and baseball competitiveness more and more young athletes are experiencing elbow pain**
  - ”little league elbow”
  - Pressure to play through the pain
  - Pain resolves, high pitching levels resume.
- Our data suggest, that these injuries may lead to a more serious injury (UCL) down the road
  - Start early Preventative Medicine
  - Help prevent injury in these young pitchers



Acknowledgements

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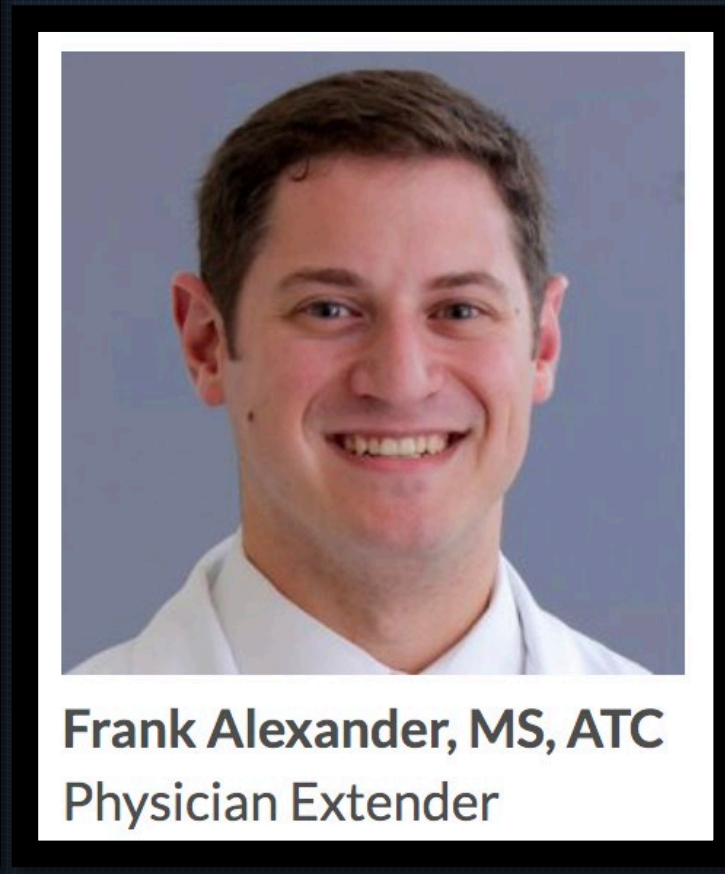

Thank you