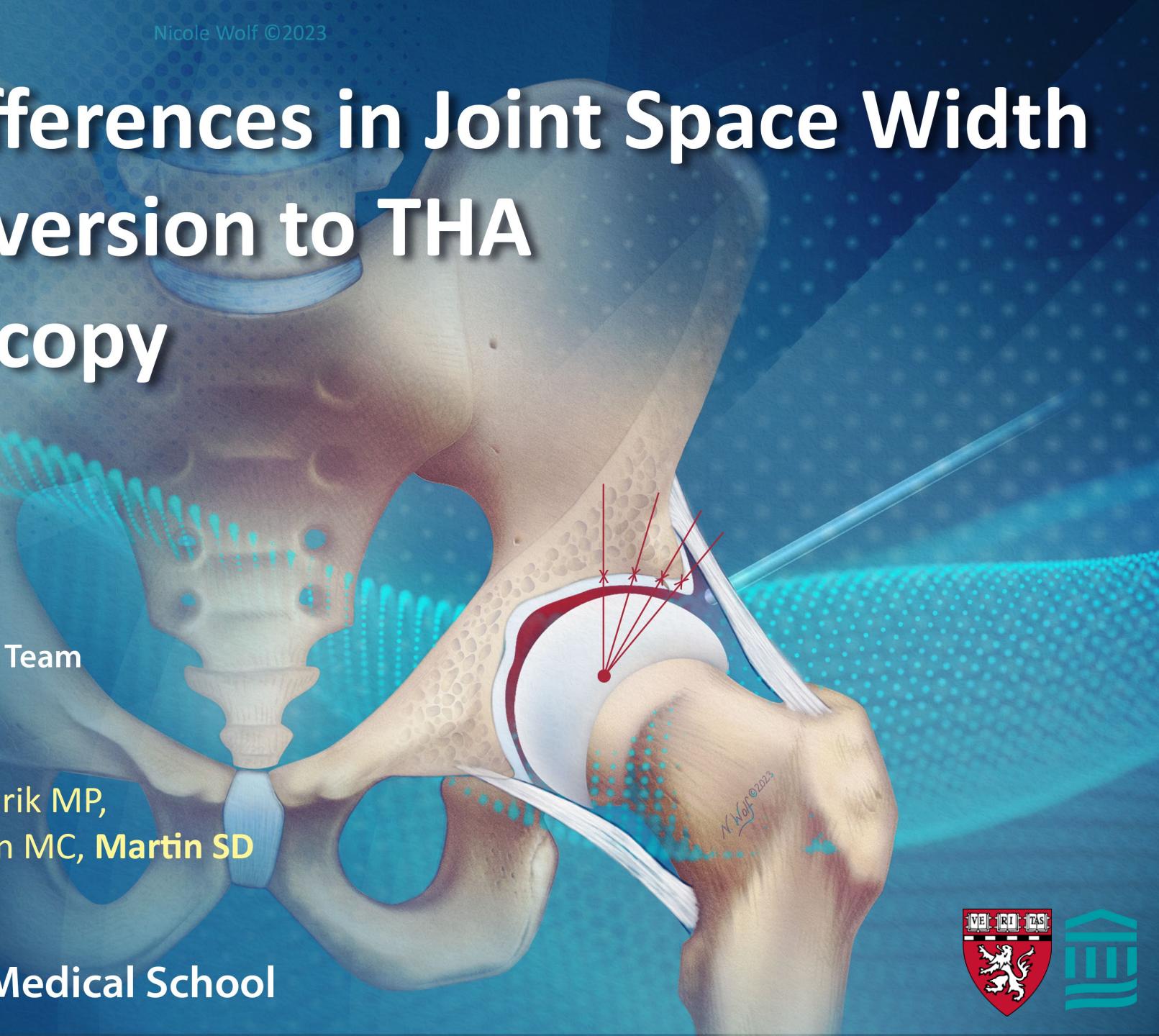
Pre-Operative Differences in Joint Space Width Predict Early Conversion to THA After Hip Arthroscopy



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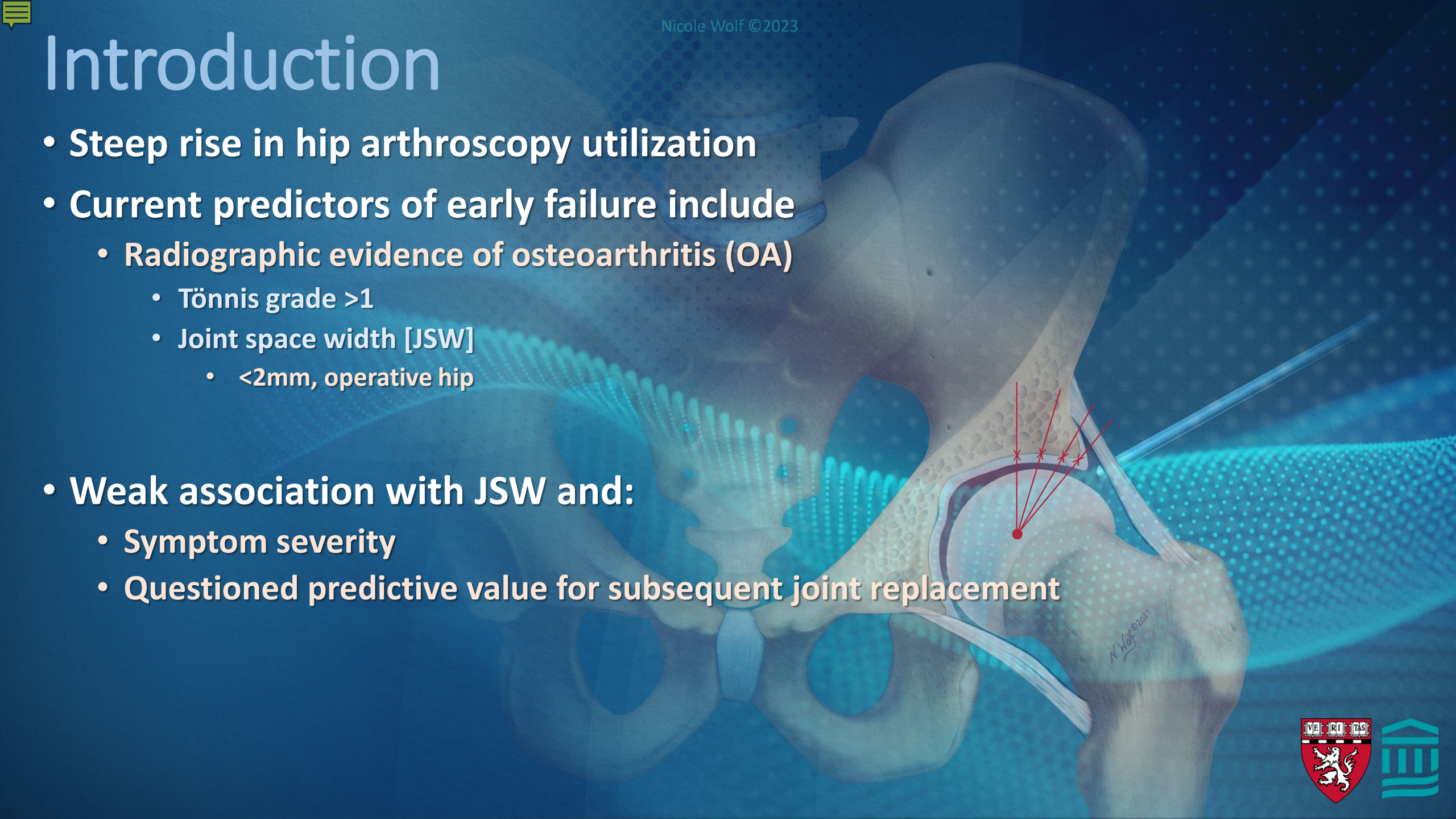
- I (and/or my co-authors) have nothing to disclosed directly related to this talk

- I have no conflicts

Introduction

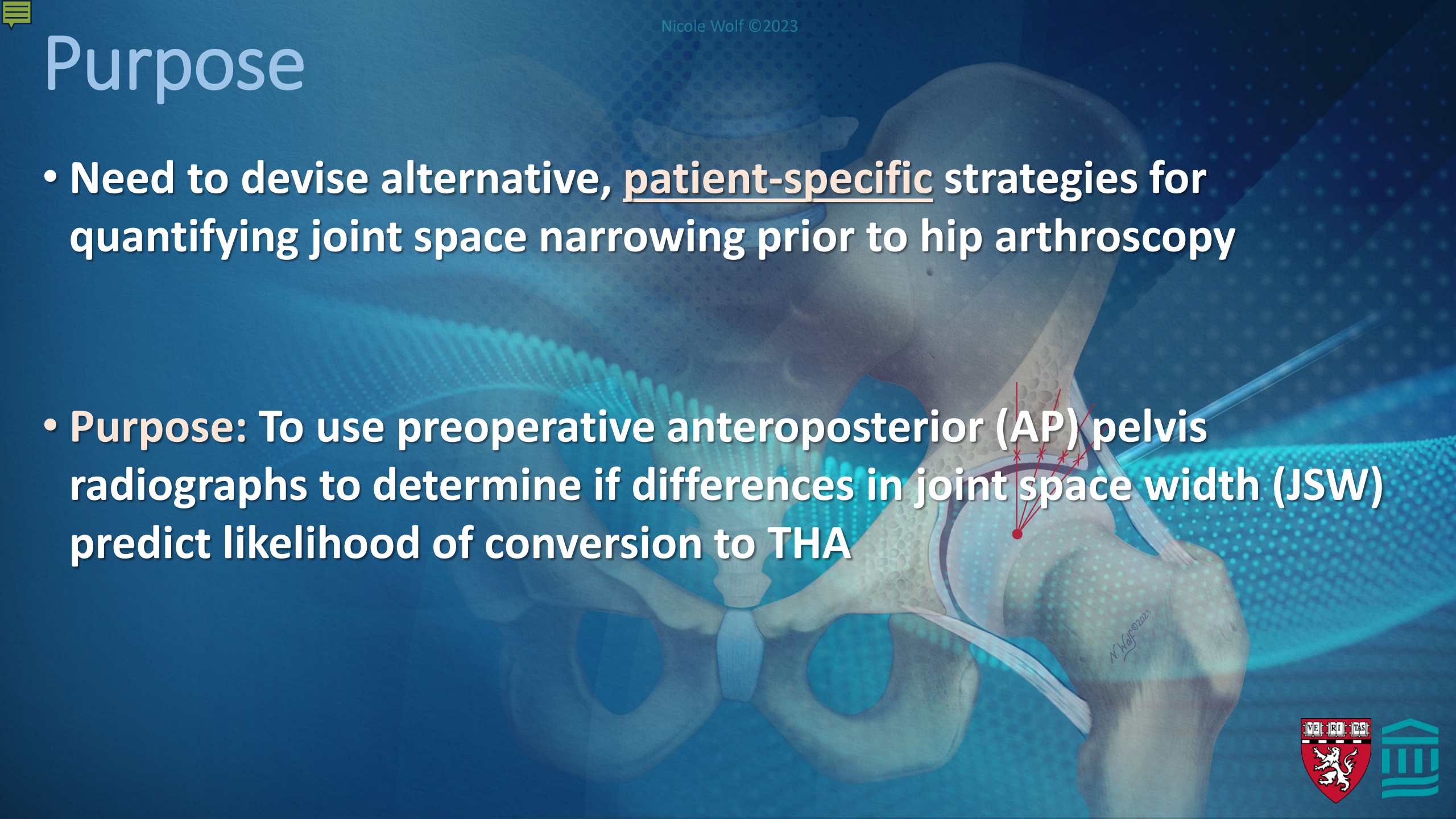
- Steep rise in hip arthroscopy utilization
- Current predictors of early failure include
  - Radiographic evidence of osteoarthritis (OA)
    - Tönnis grade >1
    - Joint space width [JSW]
      - <2mm, operative hip
- Weak association with JSW and:
  - Symptom severity
  - Questioned predictive value for subsequent joint replacement



Purpose

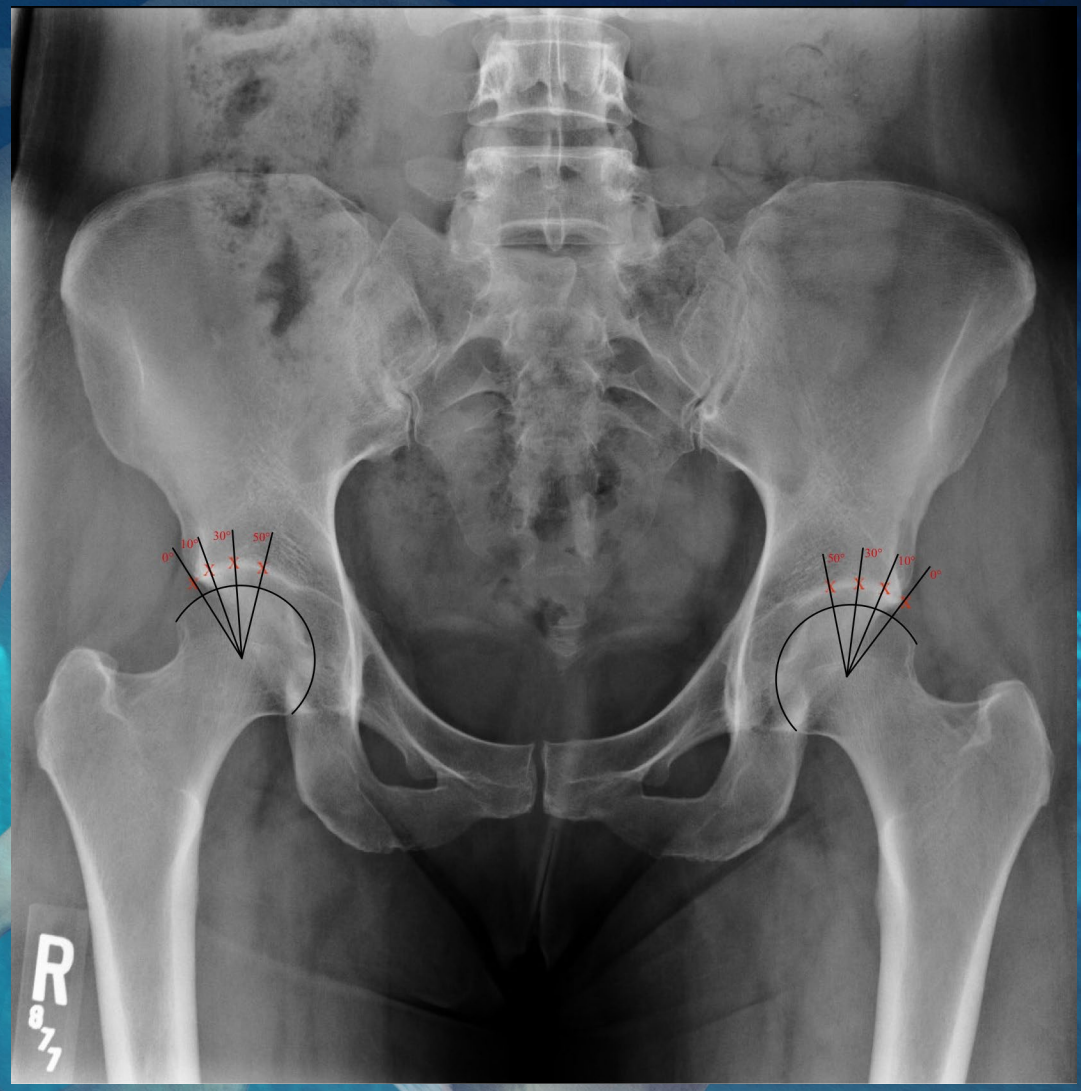
- Need to devise alternative, patient-specific strategies for quantifying joint space narrowing prior to hip arthroscopy

- Purpose: To use preoperative anteroposterior (AP) pelvis radiographs to determine if differences in joint space width (JSW) predict likelihood of conversion to THA



Methods

- Retrospective cohort study
  - Patients undergoing arthroscopic labral repair
  - Single surgeon (SDM – senior author)
    - 2008-2016
    - ≥18 years old
    - Minimum 5-year follow up
      - or conversion to THA
    - Preserved joint space
      - ≥2mm; operative hip
    - Exclusion
      - Underwent labral debridement
      - Bilateral hip symptoms
- Stratified into cohorts
  - Based on subsequent THA or not

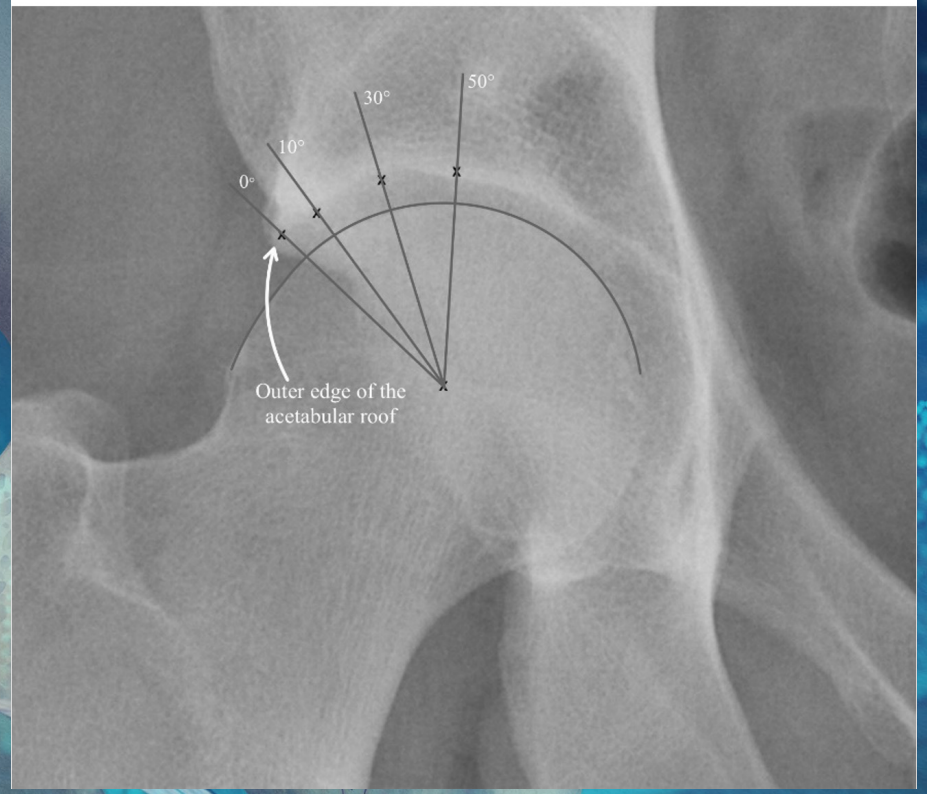


Quantitative JSW Measurements

- **Preoperative, AP pelvic radiographs**
  - **Semi-automated, quantitative JSW measurements**
  - **3 predefined fixed locations per hip**
    - **10°, 30°, and 50° in a polar coordinate system**
      - **Intra-Class Correlation > 0.8**
      - **Obtained by an independent assessor**
        - **blinded to other radiographic/clinical information**

- **JSW difference (mm) calculated by subtracting:**
  - **Non-operative hip JSW - Operative hip JSW**
    - **JSW differences calculated for each location**

Figure 1: Quantitative Joint Space Width Measurements at Predefined Locations (10°, 30°, & 50°)



Results

- **Total Patients: 106**
  - Subsequent THA: 21 (19.8%)
  - No Subsequent THA: 85 (80.2%)
- **Preoperative variables associated with conversion to THA**
  - Age (years)
  - Increased BMI (kg/m^2)
  - Higher Tönnis grades
  - Greater JSW differences

Table 1. Baseline Characteristics for Patients Undergoing Arthroscopic Labral Repair

	THA (n = 21)	No THA (n = 85)	P-value
Age	40.4 ± 13.1	32.9 ± 9.0	0.006*
Body mass index	27.2 ± 3.9	25.0 ± 4.1	0.016*
Sex			0.182
Male	11 (52.4)	31 (36.5)	
Female	10 (47.6)	54 (63.5)	
Laterality			0.211
Right	15 (71.4)	48 (56.5)	
Left	6 (28.6)	37 (43.5)	
Center-edge angle, deg	34.5 ± 7.0	34.6 ± 5.8	0.951
α angle, deg	69.7 ± 13.0	63.0 ± 14.0	0.050
Tönnis angle, deg	5.9 ± 4.7	3.1 ± 4.3	0.016*
Type of FAI			0.411
None	3 (14.3)	10 (11.8)	
Isolated Pincer	7 (33.3)	35 (41.2)	
Isolated Cam	3 (14.3)	4 (4.7)	
Combined	8 (38.1)	36 (42.3)	
Tönnis Grade			<0.001*
Grade 0	2 (9.5)	23 (27.1)	
Grade 1	9 (42.9)	54 (63.5)	
Grade 2	7 (33.3)	8 (9.4)	*
Grade 3	3 (14.3)	0 (0.0)	*
JSW difference			
10° location, mm	0.494 ± 0.985	-0.064 ± 0.609	0.009*
30° location, mm	0.779 ± 0.839	0.029 ± 0.507	<0.001*
50° location, mm	0.358 ± 0.832	-0.044 ± 0.527	0.045*

Data are reported as mean ± SD or No. of hips (%). THA, Total Hip Arthroplasty; SD, Standard Deviation; JSW, Joint Space Width.

*Statistically Significant ($P < 0.05$ or adjusted standardized residual > 2).

Results

- No significant differences in
  - Technique
    - Labral repair or capsular management
  - Arthroscopic procedures performed
- Intraoperative variables associated with conversion to THA
  - Higher grade chondral defects
    - Based on Outerbridge Classification

Table 2. Intraoperative Characteristics for Patients Undergoing Arthroscopic Labral Repair

	THA (n = 21)	No THA (n = 85)	P-value
Outerbridge Classification			0.012*
Grade 0	0 (0.0)	3 (3.5)	
Grade 1	0 (0.0)	4 (4.7)	
Grade 2	2 (9.5)	24 (28.3)	
Grade 3	11 (52.4)	47 (55.3)	
Grade 4	8 (38.1)	7 (8.2)	*
Beck Labrum Classification			0.283
Stage 0	3 (14.3)	11 (12.9)	
Stage 1	4 (19.0)	34 (40.0)	
Stage 2	4 (19.0)	12 (14.1)	
Stage 3	3 (14.3)	5 (5.9)	
Stage 4	7 (33.4)	23 (27.1)	
FAI Procedures			0.241
None	3 (14.3)	11 (12.9)	
Acetabuloplasty	6 (28.6)	35 (41.2)	
Femoroplasty	3 (14.3)	3 (3.5)	
Femoroacetabuloplasty	9 (42.8)	36 (42.4)	
Other Procedures			
Microfracture	1 (4.8)	7 (8.2)	1.000
Abrasion Chondroplasty	2 (9.5)	2 (2.4)	0.175
Os acetabuli removal/fixation	2 (9.5)	3 (3.5)	0.257
Chondral Flap Present	6 (28.6)	21 (24.7)	0.716

Data are reported as No. of hips (%). THA, Total Hip Arthroplasty.
*Statistically Significant (P < 0.05 or adjusted standardized residual > 2).

Results

- After controlling for JSW differences at all locations, adjusted analysis revealed
  - JSW differences at 30° were predictive of conversion to THA

- Independent predictors of early conversion to THA
  - Increased BMI
  - Higher Tönnis Grades
  - Larger JSW difference at 30° location

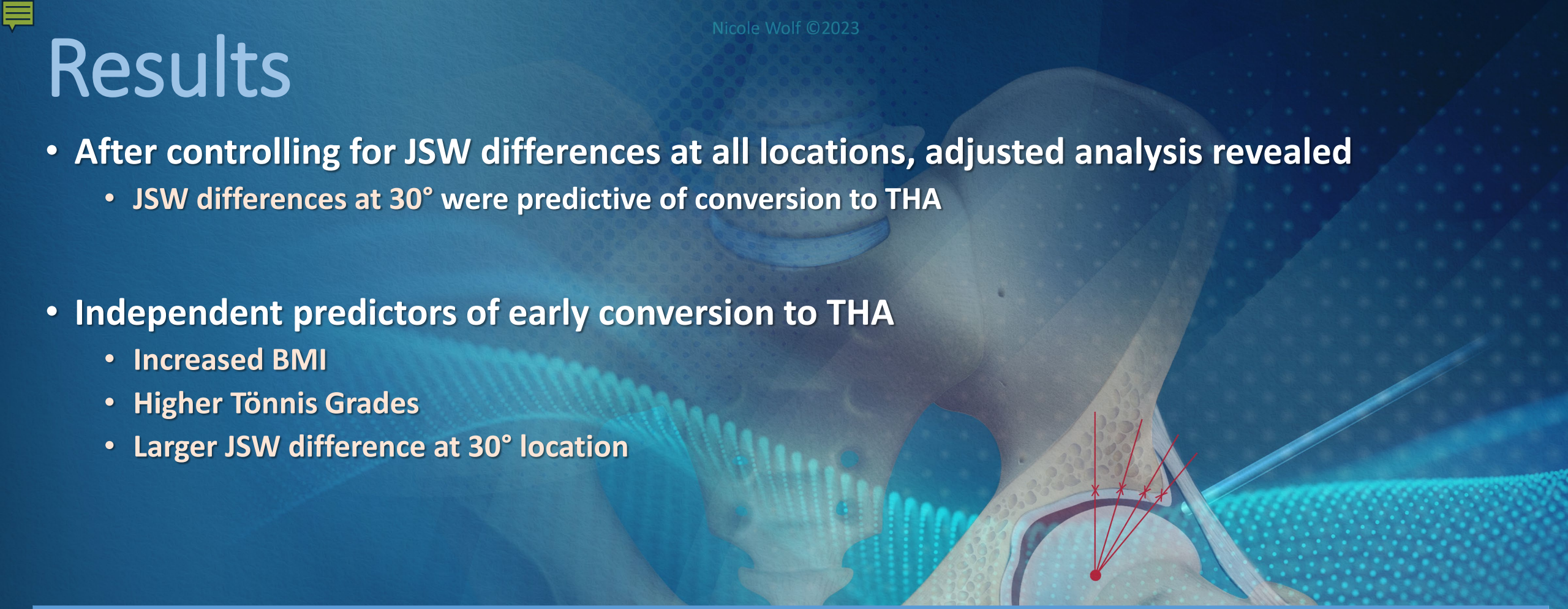


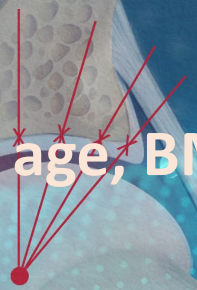
Table 3. Results of Multivariable Regression

	AORs	95% CI	P-value
Age	0.99	0.92-1.06	0.726
Body mass index	1.28	1.07-1.52	0.008*
Tönnis Grade	16.56	3.32-82.53	<0.001*
JSW difference at 30° location	16.64	3.18-87.05	<0.001*

AOR, Adjusted Odds Ratio; CI, Confidence Interval; JSW, Joint Space Width. Tonnis grade was categorized into low (grades 0-1) versus high (grades 2-3).
*Statistically Significant ($P < 0.05$).

Conclusion

- **In patients with preserved joint spaces (≥2mm)**
  - **Large JSW differences at 30° *significantly more likely to convert to THA* following arthroscopic labral repair**
- **Comparing joint space widths between the symptomatic and asymptomatic hips**
  - **Has clinical utility in stratifying risk of subsequent THA**
  - **Augments other predictors of poor outcomes (increased age, BMI, and Tönnis grade)**



Thank You