

# Performance Comparison Between Hounsfield Units and DXA in Predicting Interbody Cage Subsidence after Circumferential Lumbar Fusion

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## BACKGROUND

- Preop BMD assessment is essential
- DXA often overestimates BMD
- OBJECTIVES:**
  - To determine if HU<135 is associated with subsidence in the lumbar spine
  - To compare the subsidence predictive performance between HU and DXA

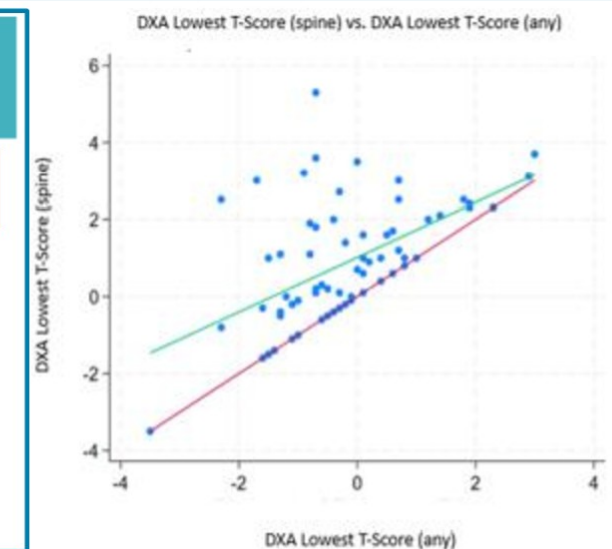
## METHODS

- Retrospective observational study
- 360° L-fusion, x-rays, DXA, CT, 1-yr f/u
- DXA lowest T-scores categorized as: **normal**  $\geq -1$  > **osteopenia** > **-2.5**  $\geq$  **osteoporosis**
- L1 CTHU categorized: **HU<135** or **HU $\geq$ 135**
- Subsidence  $\geq 2$ mm loss of disc space height on postop x-rays using computer vision algorithmic software

## RESULTS

| Characteristic<br>N=127                | Value<br>N (%) |
|----------------------------------------|----------------|
| Male Sex                               | 58 (45.7)      |
| Age (years, median (IQR))              | 60 (51-69)     |
| Age Categories (years)                 |                |
| ≤ 59                                   | 60 (47.2)      |
| 60-69                                  | 37 (29.1)      |
| ≤ 70                                   | 30 (23.6)      |
| Nicotine Users                         | 41 (32.3)      |
| DXA Lowest T-Score (any region)        |                |
| Normal ( $\geq -1.0$ )                 | 72 (57.6)      |
| Osteopenia ( $< -1.0, > -2.5$ )        | 50 (40.0)      |
| Osteoporosis ( $\leq -2.5$ )           | 3 (2.4)        |
| Hounsfield Units (L1 HU)               |                |
| $\geq 135$                             | 71 (55.9)      |
| $< 135$                                | 56 (44.1)      |
| Subsidence                             |                |
| No                                     | 110 (86.6)     |
| Yes                                    | 17 (13.4)      |
| Primary Diagnosis                      |                |
| Degenerative                           | 105 (82.7)     |
| Deformity                              | 18 (14.2)      |
| Revision                               | 4 (3.2)        |
| Interbody Fusion Levels (median (IQR)) | 2 (1-2)        |

| Predictor                       | Crude OR       | p-value | Adjusted OR    | p-value |
|---------------------------------|----------------|---------|----------------|---------|
| HU<135                          | 5.1 (1.5-16.6) | 0.007   | 4.0 (1.2-13.9) | 0.029   |
| Osteopenia ( $< -1.0, > -2.5$ ) | 1.8 (0.6-4.9)  | 0.284   | -              | -       |
| Age $\geq 70$                   | 3.8 (0.8-17.1) | 0.082   | -              | -       |
| Female Sex                      | 0.4 (0.1-1.2)  | 0.098   | 0.6 (0.2-1.8)  | 0.325   |
| CCI $\geq 2$                    | 2.6 (0.8-8.6)  | 0.106   | 1.8 (0.5-6.6)  | 0.37    |
| Current/Quit Nicotine           | 2.1 (0.7-5.8)  | 0.168   | 1.9 (0.6-5.8)  | 0.264   |



## CASE EXAMPLE



DXA and FRAX (**normal**):  
Lowest T-score = -0.8  
Major fracture risk = 4.8%  
Hip fracture risk = 0.3%

HU (**abnormal**): HU = 76

## CONCLUSIONS

- ✓ **HU<135** was associated with interbody subsidence
- ✓ **4.0 times** greater risk of subsidence if HU<135 in the lumbar spine
- ✓ **HU outperformed** DXA in the lumbar spine
- ✓ DXA may **not accurately** represent BMD in the degenerative lumbar spine