VITAMIN D DEFICIENCY IS ASSOCIATED WITH WORST OUTCOME IN RECURRENT SHOULDER INSTABILITY SURGERY (#153)

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- **Member of an advisory board or speaker's bureau:**
  - Member of the executive committee of the Canadian Shoulder & Elbow Society
  - Member of the Continuing Medical Education (CME) committee of the Quebec Orthopaedic Association (AOQ)

OBJECTIVES OF THE STUDY

1. DETERMINE THE ROLE OF **VITAMIN D DEFICIENCY** IN A COHORT OF RECURRENT TRAUMATIC SHOULDER INSTABILITY (RTSI)

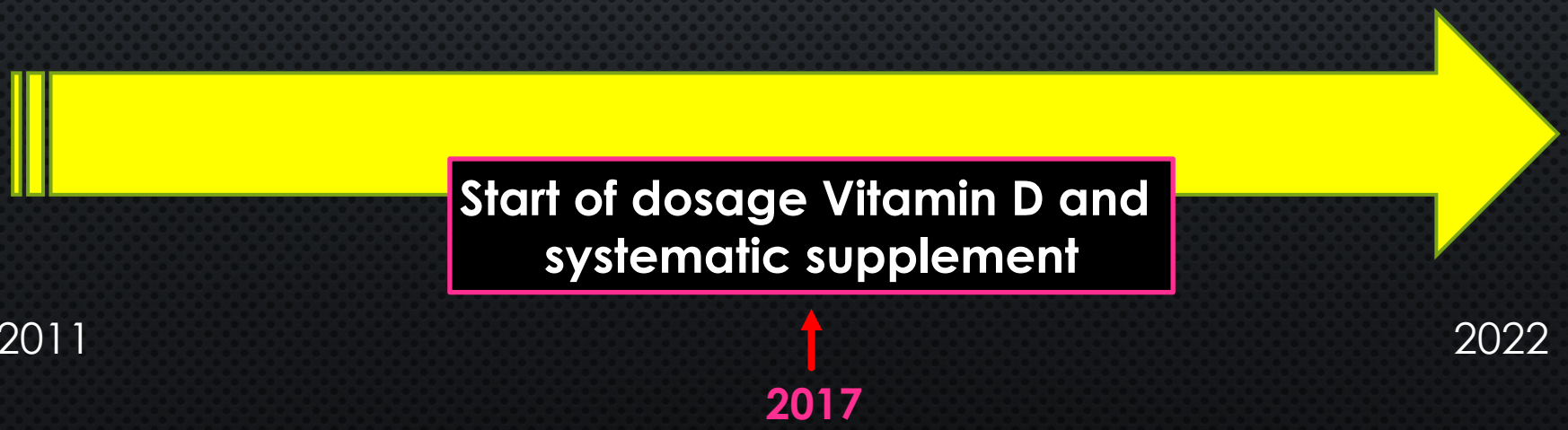
2. WHETHER VITAMIN D DEFICIENCY WOULD BE CORRELATED TO OUTCOME AFTER SHOULDER STABILIZATION SURGERY

MATERIALS AND METHODS

LUXE COHORT STUDY

- ALL SHOULDER STABILISATION SURGERY INCLUDED
- N= 361

WHAT IS THE ROLE OF VITAMIN D IN SHOULDER STABILISATION SURGERY OUTCOME?



LUXE COHORT STUDY

361 patients booked for shoulder instability surgery

130 patients Vitamin D dosage

54 patients <u>excluded</u>:
31 waiting for surgery/CT scan
11 loss to follw-up
12 decided not to have surgery

76 patients
1 year follow up
48= **Arthroscopy**
28= **Latarjet**

2 QUESTIONS

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Vitamin D and Bone quality?

- CT-scan + MRI
  - Bone density (Hounsfield scale)
  - Size of bone defect
    - % of glenoid diameter
      - *Best fit circle method*
      - *Clock Method*
    - Hill-Sachs
      - Glenoid track method

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Vitamin D and outcome?

- Pre op function
  - Q DASH - WOSI
- 1 y+ outcome
  - Function
  - Complications
  - Recurrence of instability

INCLUDED PATIENTS

- 74 PATIENTS
- 50 MALES / 24 FEMALES
- MEAN AGE AT SURGERY : 30 Y.O., SD=10 (18-52)

- **20 PRE-OP DISLOCATIONS**
- 21% OF HYPERLAXITY
- 22% SMOKING
- FOLLOW UP 3 YEARS (1-8)

VITAMIN D LEVEL CLASSIFICATION:

75 IU = NORMAL

50 IU = DEFICIENCY

30 IU = SEVERE DEFICIENCY

RESULTS

- Vitamin D: 59, SD=31(15-186)
  - ≤ 30 : 12%
  - 31-50: 31%
  - 51-74: 33%
  - **75 + : 24%**

- Surgery:
  - 63% Arthroscopic stabilisation
  - 37% open Latarjet

BONE QUALITY

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- **Bone density**
  - Glenoid metaphyseal: 313 HU ± 82 (161 to 632)
  - Glenoid subcortical: 371 HU ± 100 (201 to 733)
    - 1.7 % low bone density (< 197 HU)
  - Humeral head: 146 ± 59 (35 to 296)
    - 62 % low bone density (< 160HU)

- **Bone defect**
  - 14% of glenoid bone loss 17%+
  - 50% Off-track lesion

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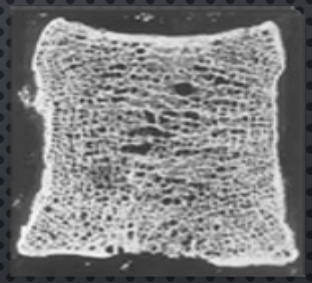
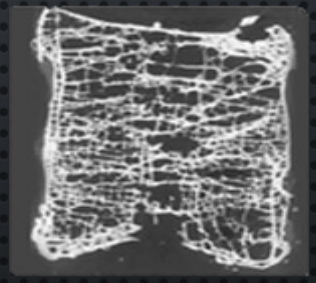
VITAMIN D AND BONE DENSITY

- Vitamin D <50IU vs >50 IU
  - Glenoid Vault 298 HU vs 316 HU
  - Humeral Head 139 HU vs 149 HU
    - p=0.01





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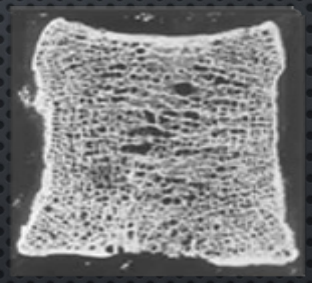
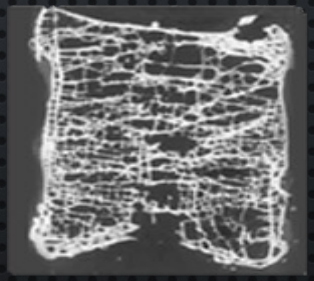
VITAMIN D AND GLENOID BONE DEFECT

VITAMIN D < 75 IU VS NORMAL VITAMIN D

- GLENOID BONE DEFECT 10.36% VS 0%

  P=0.024





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COHORT OUTCOME

- Pre op function
  - QDASH: 32.45 ± 22.04
  - WOSI: 1195.96 ± 467.16
- Post op function/outcome
  - Follow up: 3 y (1-8)
  - QDASH: 13.82 ± 16.46
  - WOSI: 532.67 ± 456.49

- Recurrences
  - 5 Arthroscopic
  - 2 Latarjet
- Reoperations
  - 5 Arthroscopic
  - 1 Latarjet
- Complications
  - 3% Infection
  - 3% Arthrosis
  - 1% Stiffness
  - 1% Non-union Latarjet
  - 1% hardware displacement

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VITAMIN D AND OUTCOME

- Correlation between Vitamin D and pre-op QoL
  - WOSI initial: p=0.422
  - Q-DASH: p= 0.562
- Correlation between Vitamin D and 1 year
  - **WOSI 1 year post-op: r: 0.292 p=0.074**
  - Q-DASH: p= 0.207
- Correlation between Vitamin D and last follow-up
  - **WOSI r: 0.148 p= 0.088**
  - Q-DASH p= 0.11

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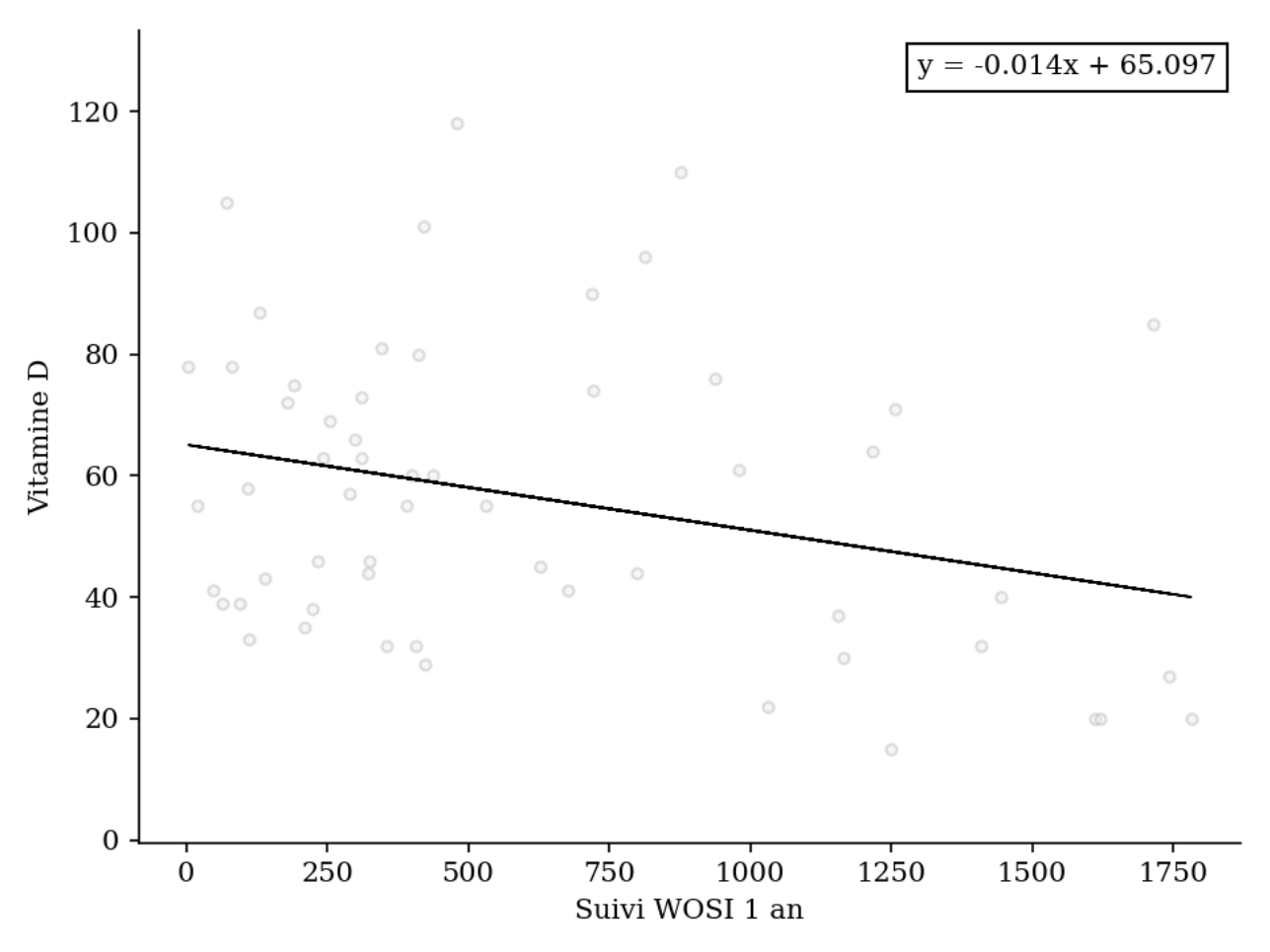
Pre op vitamin D Level and 1 year post op WOSI



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VITAMIN D DEFICIENCY AND WOSI

- **PRE-OP WOSI**

Vitamine D level	Mean ± SD	Min	Max
0 to 30	1357,67 ± 212,47	1100,5	1752
31 and more	1172,48 ± 490	192,5	1997
p= 0.062			

- **1YEAR WOSI**

Vitamine D level	Mean ± SD	Min	Max
0 to 30	1339,79 ± 495,74	242	1782
31 and more	500 ± 428,9	4	1715,5
p= <0.001			

- **LAST WOSI**

Vitamine D level	Mean ± SD	Min	Max
0 to 30	1109,11 ± 626,79	130	1750
31 and more	452,85 ± 367,94	0	1355,5
p= 0.002			

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VITAMIN D DEFICIENCY AND PROM

- Vitamin D level < 50 IU vs >50 IU
  - Last follow- up outcome:
    - WOSI 609 vs 564, p=0.001
    - Q-DASH 17.47 vs 14.65, p=0.003

VITAMIN D AND OUTCOME
-ARTHROSCOPIC STABILISATION- N=48

- Vitamin D mean: 57,81 ± 24,6 (20 to 118)
- Vitamin D classification

  0 to 30: 6 (12,5%)

  31 to 50: 16 (33,33%)

  51 à 74: 13 (27,08%)

  over 75 : 13 (27,08%)

- 5 re-dislocations /5 re-operation

- **Mean Outcome Scores**

➢ WOSI pre-op: 1162,96 ± 462,97 – Q-DASH pre-op: 33,87 ± 21,16

➢ WOSI 1year: 632,45 ± 542,18 –Q-DASH 1year: 17,04 ± 19,79

➢ Last WOSI: 570,23 ± 495,36 – Last Q-DASH : 14,26 ± 16,72

VITAMIN D AND OUTCOME
-OPEN LATARJET- N=28

- VITAMIN D MEAN: 62,36 ± 40,7 (15 TO 186)
- VITAMIN D CLASSIFICATION

  0 TO 30: 4 (14,29%)

  31 TO 50: 9 (32,14%)

  51 À 74: 9 (32,14%)

  over 75: 6 (21,43%)

- 2 RE-DISLOCATIONS / 1 RE-OPERATION

- **MEAN OUTCOME SCORES**

➢ WOSI PRE-OP: 1256,68 ± 478,26 – Q-DASH PRE-OP: 29,98 ± 23,69

➢ WOSI 1YEAR: 550,98 ± 466,88 – Q-DASH 1YEAR: 14,94 ± 17,77

➢ LAST WOSI: 467,28 ± 379,42 – LAST Q-DASH : 13,05 ± 16,28

CONCLUSIONS

- Vitamin D is a key nutriment in general health
- Vitamin D levels of **50IU or less** = worst outcomes
- Shoulder instability is part of the numerous pathologies affected by Vitamin D deficiency:
  1. Lower Bone density, larger bone defect
  2. Worst mid term functional outcome

Significance of the Findings

- Future studies should consider:
  - Dosing Vitamin D after an initial shoulder dislocation
  - Evaluating if a more aggressive supplementation of Vitamin D affects outcome
  - Why long term outcomes are affected despite supplementation?
    - Due to permanent impact of chronic vitamin D deficiency?
  - How Vitamin D deficiency will be compared to other predicting outcome factors after shoulder surgery ?