CORRELATION OF SCLEROSTIN LEVELS WITH BONE METABOLISM MARKERS AND BONE MINERAL DENSITY IN CHILDREN AND ADOLESCENTS WITH TYPE 1 DIABETES MELLITUS (T1DM)

[1]Tsentidis Charalampos, [2]Gourgiotis Dimitrios, [1]Kossiva Lydia, [2]Marmarinos Antonios, [3]Doulgeraki Artemis, [1]Karavanaki Kyriaki

[1]Diabetic Clinic*, [2]Biochemistry Laboratory*, *Second Pediatric Department University of Athens, "P&A Kyriakou" Children's Hospital, Athens, Greece.
[3]Department of Bone and Mineral Metabolism, Institute of Child Health, "Aghia Sophia" Children's Hospital, Athens, Greece.

Background: Sclerostin is an inhibitor of the Wnt/b-catenin bone metabolic pathway. Increased Sclerostin levels and reduced Bone Mineral Density (BMD) have been documented in adult patients with Diabetes Mellitus (DM), predominantly in those with T2DM. No relevant data exist on childhood T1DM.

Objective and hypotheses: Our aim was to study plasma Sclerostin concentration in children and adolescents with T1DM and controls and to correlate Sclerostin levels with metabolic bone markers and BMD

Methods: Forty children and adolescents with T1DM were evaluated (mean±SD age:13.04±3.53years, T1DM duration:5.15±3.33years), along with 40 healthy matched controls (mean±SD age 12.99±3.3years). Sclerostin, Osteocalcin, C-telopeptide crosslinks-CTX, electrolytes, PTH, total 25(OH) D and total body BMD were measured.

Results: Sclerostin levels demonstrated a Gaussian distribution (Shapiro-Wilk z=-1.685, p=0.95, kurtosis= 2.77, skewness= 0.13), with no significant difference between patients and controls (51.56±12.05 vs 50.98±13.55 pmol/L, p=0.84).(Figure 1.)

Figure 1. Sclerostin values in patients and controls

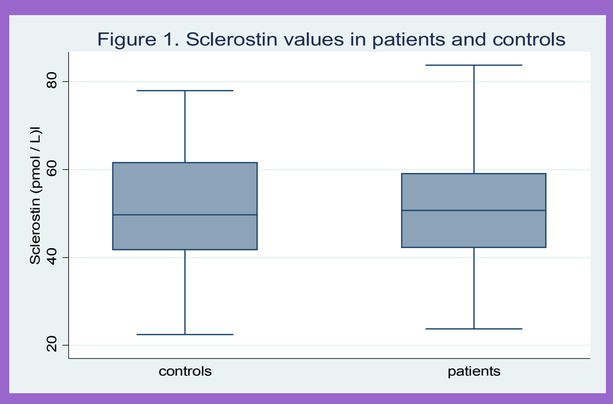


Figure 2. Sclerostin values by gender

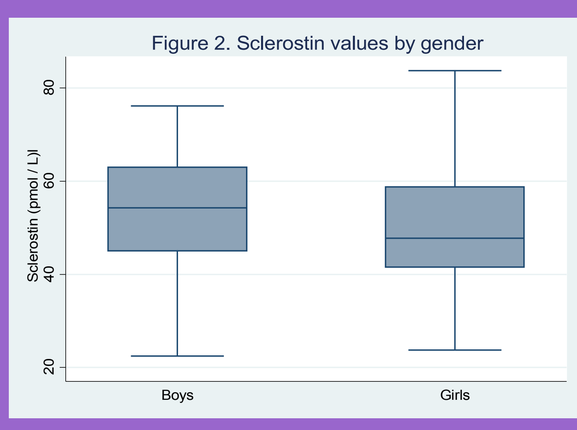
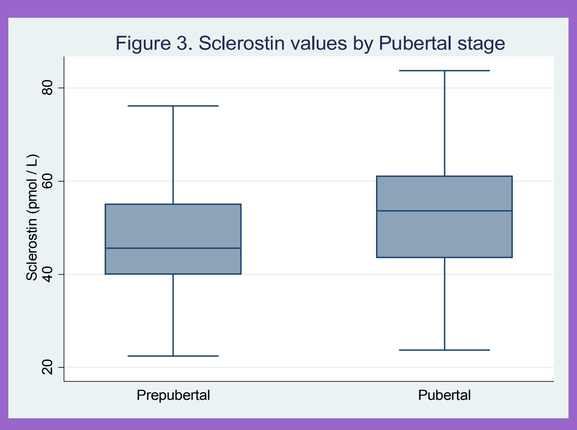
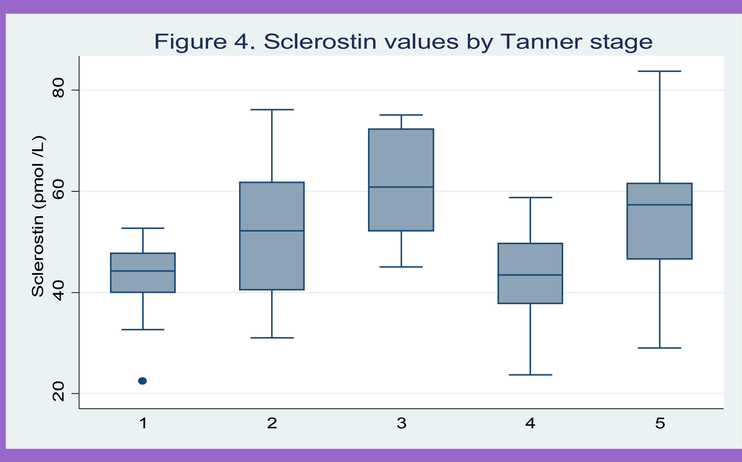


Figure 3. Sclerostin values by Pubertal stage



Lower values were found in girls (49.1±12.7 vs 53.9±12.3 pmol/L, p=0.05) (Figure 2.) and in pre-pubertal children (47.3±11.6 vs 53.3±12.9 pmol/L p=0.02). (Figure 3.)

Figure 4. Sclerostin values by Tanner stage



Sclerostin values significantly and gradually increased in children through pubertal Tanner stages 1 to 3, then reduced in stage 4 adolescents and increased again in pubertal stage 5 adolescents (ANOVA F=4.56, p=0.0024). (Figure 4.)

Figure 5. Sclerostin correlation with logCTX

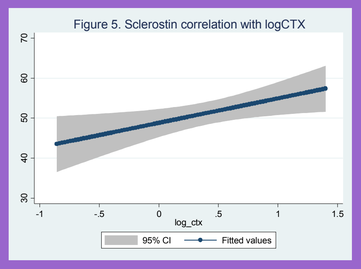
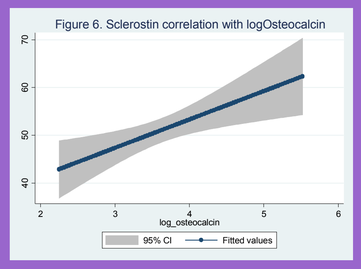


Figure 6. Sclerostin correlation with logOsteocalcin



Sclerostin levels were positively correlated with logCTX (r =0.41, p<0.001), logOsteocalcin (r =0.33, p=0.004), total body BMD (r=0.34, p=0.0018) and BMD Z-score (r=0.27, p=0.015). (Figures 5, 6, 7, 8 respectively)

Figure 7. Sclerostin correlation with BMD mass

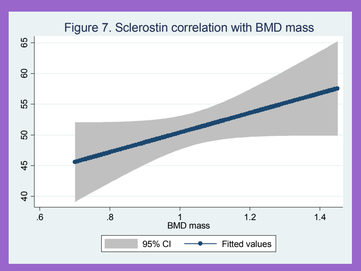
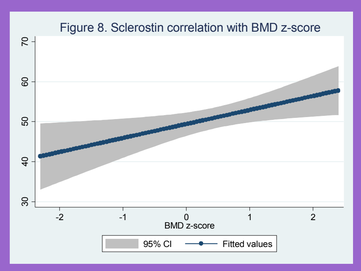


Figure 8. Sclerostin correlation with BMD z-score



Conclusions: T1DM children and adolescents had similar levels of Sclerostin with controls. Sclerostin was correlated with both resorption and formation markers and also with bone mass indices, gender and pubertal stage. The decrease in sclerostin values observed in pubertal stage 4 adolescents coincides with the concurrent growth spurt, and is consistent with sclerostin physiology as an inhibiting signal of bone formation.