A 20-year comparison of sex-specific fracture incidence between Type 1 and Type 2 diabetics and non-diabetics in Denmark

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Methods: Mice stayed on a vibrating plate (2g/45Hz), 15 min/day for 6 weeks (plate kept still for CT). Bones were collected for micro-tomography, histomorphometry, RT-qPCR.

Results: Vibration reduced trabecular volume in OPN$^{-/-}$ mice (vertebra BV/TV: -18%, $p<0.05$) with increased osteoclast surfaces (Oc.S/BS: +72%, $p<0.01$). OPN$^{-/-}$ lost femoral cortical bone (Ct.Th: -9%, $p<0.01$) under increased resorption (Ec.Oc.S/B.S: +95%, $p<0.05$). Strikingly, VB BSP$^{-/-}$ mice gained cortical bone (Ct.Th: +7%, $p<0.01$), with significant increase in formation, less osteoclasts (Ps.Oc.S/B.S: -68%, $p<0.05$) and lower RANKL and CathK expression. Sequential fluorochrome labeling (Figure 1) documented increased formation in VB BSP$^{-/-}$ cortex (Figure 2). No effect was observed in other genotypes.

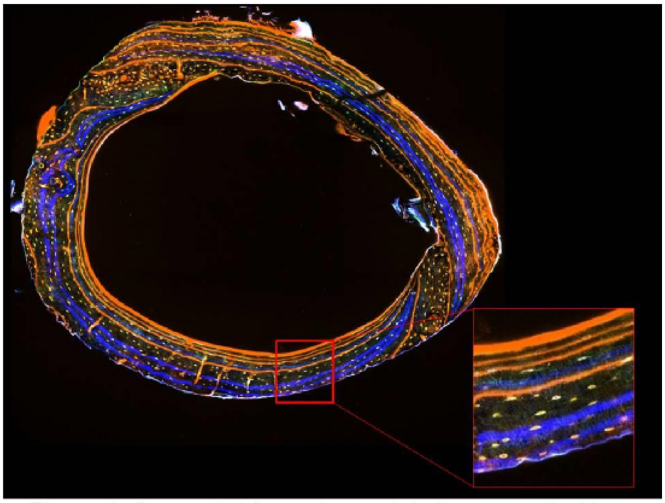

Figure 1: Sequential fluorochrome labeling on cortical bone using alizarin complexone (orange) and calcein blue (blue). VB BSP$^{-/-}$ mouse.

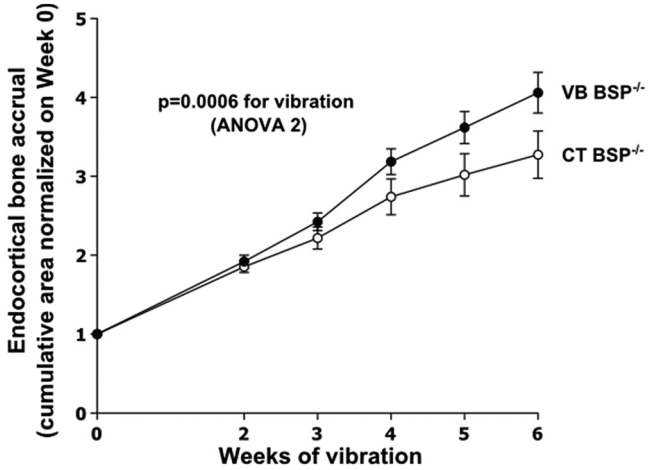

Figure 2: Endocortical bone accrual in CT (empty circles) and VB (black circles) BSP$^{-/-}$ mice. Values are mean ± SEM of 6 mice.

Conclusion(s): BSP and OPN thus play crucial and opposite roles in bone response to mechanical stimulation. Because BSP-/- mice overexpress OPN, and DKO mice showed no effect, interaction between these two factors seems required for a proper skeletal response to mechanical challenges.

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Plenary Oral Presentations 2: Novel Aspects of Osteoporosis and Treatments

PLO07

A 20-year comparison of sex-specific fracture incidence between Type 1 and Type 2 diabetics and non-diabetics in Denmark

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Background/Introduction: Major osteoporotic fractures have declined in Nordic and western countries over the last two decades, despite an aging society of the general population. However, little is known if the decreasing trend of fractures is similar in patients with diabetes.

Purpose: To investigate the incidence rate (IR) of fractures in adult (age 18+) patients in Denmark between 1997-2017 with Type 1 Diabetes (T1D) and Type 2 Diabetes (T2D) compared to non-diabetics, stratified by sex.

Methods: All patients aged 18+ with a bone fracture (excluding skull and facial) between 1997 and 2017 were identified from the Danish National Health Service Register and linked to the Danish Medicines Agency Register of Medicinal Products Statistics (RMPS). Gender-specific IRs of fractures per 10,000 person years (PYs) were estimated. All analyses were stratified by diabetes diagnosis, defined as T1D, T2D, and non-diabetic.

Results: Overall, we identified a 25% decline in the IRs of fractures among T1D (from 571.6 to 427.0), a 58% decline among T2D (from 840.1 to 250.6), and a 10% decline among non-diabetics (from 179.2 to 161.5), between 1997 and 2017, respectively. Among males, the IRs declined 35% among T1D (from 499.3 to 322.9), 67% among T2D (from 786.9 to 263.8), and 10% among non-diabetics (from 191.8 to 186.9). Similarly, among women, we observed a 12% decline among T1D (from 666.3 to 586.3), a 49% decline among T2D (from 896.0 to 455.5), and 3% in non-diabetics (from 191.8 to 186.9).

Conclusion(s): In this 20-year population-based observation period, we identified a declining trend of fractures among diabetic patients, particularly among those with T2D. However, despite decreasing incidence, the IR of fractures in 2017 among patients with T1D or T2D was substantially higher than non-diabetics in Denmark, particularly among women, thereby highlighting the need to improve fracture management in these patients.

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PLO08

Risk of fracture in patients with glucocorticoid requiring diseases

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Background/Introduction: Glucocorticoid-Induced Osteoporosis (GIOP) is the most common form of secondary osteoporosis. Nevertheless, the independent role of GCs and GC requiring diseases on fracture risk is still unclear.