

## **Pregnancy and lactation have no long-term adverse effects on bone mass: a twin study**

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Pregnancy and lactation place significant stress on maternal calcium homeostasis, and may result in substantial changes in bone mineral density. While bone loss in the period immediately following parturition is well-documented (1), there is not a clear consensus regarding long-term recovery in bone mineral from the effects of either pregnancy or lactation. We retrospectively assessed the number of pregnancies and duration of breast feeding in relation to bone mineral density (BMD) in female twins, using cross-sectional and co-twin model approaches.

Female twins and siblings ( $n = 1354$ ) > 18 years of age who were grouped according to number of pregnancies: never pregnant (NP) ( $n = 426$ ), 1–2, (2P) ( $n = 455$ ) and > 3, (3P) ( $n = 473$ ). Of these subjects 83 twin pairs were identified where one twin within a pair had been pregnant (> 20 weeks) and the other had never been pregnant beyond 20 weeks. Information on pregnancies and breast feeding was obtained by questionnaire and bone density at lumbar spine (LS), total hip (HP), and total body bone mineral content (TBMC) by dual-energy x-ray absorptiometry (Hologic QDR 1000W).

Those who were never pregnant were younger (NP  $33.1 \pm 0.68$  years ( $\pm$  SEM), 2P  $45.1 \pm 0.53$  years and 3P  $49.8 \pm 0.48$  years ( $P < 0.05$  ANOVA)), had a lower BMI (NP  $24.2 \pm 0.22$ , 2P  $25.9 \pm 0.24$  and 3P  $26.4 \pm 0.23$  ( $P < 0.05$ )) and were taller (NP  $163.2 \pm 0.31$ cm, 2P  $162.5 \pm 0.31$ cm and 3P  $161.4 \pm 0.31$ cm ( $P < 0.05$ )). After adjustment for age, lean and fat mass, groups 2P and 3P had 3.8% higher LS BMD compared with NP ( $P < 0.001$ ), and TB BMC was 2.7% higher in 2P and 3.1% higher in 3P compared with NP ( $P < 0.001$ ) and HP BMD was greater in 3P compared to NP by 2% ( $P < 0.01$ ). Of the 928 parous individuals parous women 87% breast-fed (> one month). After adjustment for age, lean, fat mass, TB BMC was higher in those who breast-fed ( $2.30 \pm 0.34$ kg) compared with those who did not ( $2.24 \pm 0.02$  kg) ( $P < 0.01$ ).

71% breast-fed and there were 58 parous twin pairs where one twin breast-fed and the other did not. There were no significant differences in height, weight, BMI, or HP BMD, LS BMD, TB BMC between breast feeding twin and non-breast feeding twin.

In 83 twin pairs (21 monozygotic, 62 dizygotic), mean age 42.2 (15.7) (SD) years, who were discordant for ever being pregnant, the parous twins had a mean of 2.3 (0.13) pregnancies and breast-fed for 8.39 (1.67) months per child. There were no significant differences in height, weight, BMI, or HP BMD, LS BMD, TB BMC between nulliparous and parous twins.

Of the parous women 70% breast-fed and there were 58 parous twin pairs where one twin breast-fed and the other did not. There were no significant differences in height, weight, BMI, or HP BMD, LS BMD, TB BMC between breast feeding twin and non-breast feeding twin.

These results indicate that there is no long-term detrimental effect of pregnancy or breast feeding on bone density. There was and some evidence from the cross sectional analysis to suggest that pregnancy may increase bone density, although no within-pair difference in bone was observed in twin pairs discordant for ever being pregnant. Therefore, although there may be acute reduction in bone mineral density with pregnancy and breast feeding, mothers appear to readily replace the bone lost after a period of time.

1. Sowers MF, Corton G, Shapiro B, Jannaush M, Crutchfield M et al. Bone loss and lactation. JAMA 1993; 269: 3130–3135.