

Thesis Title	Physical Activity and Development of Skeletal Mass in Thai Children
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### ABSTRACT

Maximizing peak bone mass during growth is thought to be important in the prevention of osteoporotic fracture in elderly. Although it is generally accepted that physical activities increase bone mineral density (BMD), there have been only few reports on the effect of different modes of exercise on peak BMD especially in children. This study was conducted to assess the effect of exercise on BMD and its interaction with polymorphisms of the vitamin D receptor (VDR) gene which have been reported to associate with bone density. One hundred and eighteen students of both sexes aged between 10 to 17 years in Sport School of Supanburi and the nearby primary and secondary schools were recruited. Athletes were divided into weight bearing (WB) and non-weight bearing (SW) groups, students from other schools served as sedentary control (SC). They were matched for age, body weight and stage of puberty. BMD of the lumbar spine and the proximal femur including femoral neck, Ward's triangle and femoral trochanter were measured by dual-energy X-ray absorptiometry (DEXA). The VDR genotypes were determined by polymerase chain reaction (PCR) and designated according to the presence (b) or the absence (B) of the restriction enzyme cutting site. It was found that chronological age, body weight, fat-free mass

and pubertal stage were highly correlated with BMD. Areal BMD of WB were significantly higher than those of SW and SC at both lumbar spine and femur in the males but only at the femur in the females. On the other hand, volume bone density at lumbar spine of WB were significantly higher only in the males. In the present study, the frequency of BsmI polymorphisms of VDR gene were 2%, 16% and 82% for BB, Bb and bb, respectively which was similar to the previous reports in other Asian populations. There were no relationships between the polymorphisms of VDR gene and BMD at any skeletal site. When the type of sport training was considered there was a trend for swimmers who had the "B" genotype to have greater BMD than the "b" genotype. However, the difference was not statistically significant. It appears from these results that weight bearing activities are more beneficial for bone accretion than non-weight bearing activities like swimming, and the polymorphisms of VDR gene are not related to peak bone mass at any skeletal sites. Moreover, the relationship between exercise and BMD are not determined by the VDR genotypes.