BONE MINERAL DENSITY OF ESTONIAN TRAUMATIC SPINAL CORD INJURED PERSONS

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INTRODUCTION

Immobilisation after spinal cord injury (SCI) together with other factors lead to a reduction in bone mineral density (BMD) and this, in turn, increases the risk of fractures. It is important to measure and monitor the BMD of SCI patients to get information about bone health. It is estimated that several factors may influence BMD after SCI. The aim of the current study was to assess BMD in SCI individuals and find if there is a correlation to time post-injury, level of injury, SCI type according to AIS, and gender.

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METHODS

57 subjects with tetraparesis or tetraplegia (n=41) and paraparesis or paraplegia (n=16) underwent dual-energy x-ray absorptiometry (DXA) as part of their medical evaluation to determine BMD in the femoral neck. Among 57 subjects analysed, 8 were women (14%) and 49 men (86%), mean age 42.4±15.2 years. The average time from injury was 60.8±64.1 months. Data were collected retrospectively and standard statistical methods were used for analysis.

RESULTS

The mean femoral neck T-score was -1.79±1.19 on the right and -1.83±1.11 on the left femur **(Figure 1)**. 18 individuals (31.6%) had osteoporosis and 25 individuals (43.9%) osteopenia. We found correlation ($p<0.01$) between BMD and time post-injury **(Figure 2)**. There was no significant relationship between level of injury, SCI type according to AIS, gender and BMD. We also analysed the BMD of acute SCI individuals (≤ 12 months post-injury) and the change in these parameters **(Tabel 1)**. Femoral neck T-score values were significantly different ($p<0.01$) between the first and second assessment. The mean femoral neck T-score after the first assessment was -0.93±1.30 on the right and -0.97±1.12 on the left femur, after the second assessment -1.56±1.28 on the right and -1.62±1.17 on the left femur, the period between two measurements was 7.2±2.4 months.

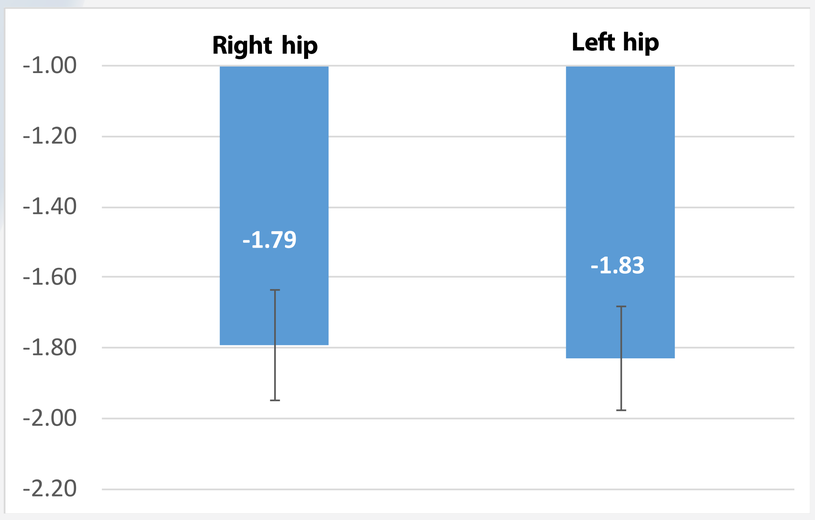

Figure1. Femoral neck T-score of SCI individuals

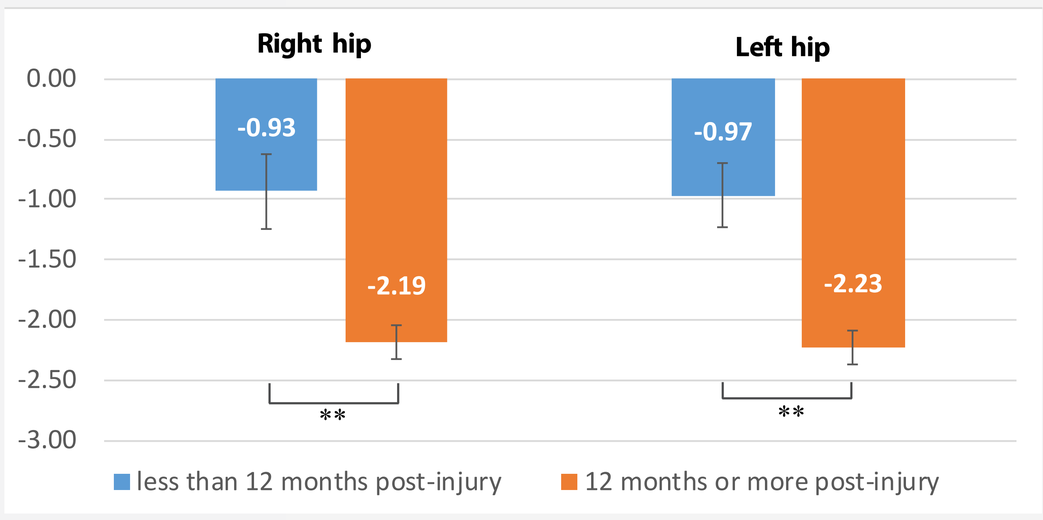

Figure 2. Femoral neck T-score and time post-injury in SCI subjects

		Mean femoral neck T-score			
	N	Right hip - 1st assessment	Right hip - 2nd assessment	Left hip - 1st assessment	Left hip - 2nd assessment
Time: ≤ 12 months post-injury	18	-0.93	-1.56	-0.97	-1.62
Tetraparesis/tetraplegia	11	-1.24	-1.80	-1.29	-1.83
Paraparesis/paraplegia	7	-0.44	-1.19	-0.46	-1.30
AIS A, AIS B	13	-1.21	-1.82	-1.22	-1.95
AIS C, AIS D	5	-0.22	-0.90	-0.30	-0.78
Male	16	-0.74	-1.40	-0.80	-1.46
Female	2	-2.45	-2.85	-2.30	-2.90

Table 1. Mean femoral neck T-score of acute SCI individuals between first and second measurement (period between two measurements was 7.2±2.4 months).

CONCLUSIONS

Our study supports the evidence that bone demineralisation occurs in individuals after traumatic SCI. The results of our study also confirm that significant decrease of BMD occurs already during the first year after SCI. We believe that systematic measurement of BMD following SCI is important. In future research individual lifestyle factors (physical activity, standing, vitamin D and calcium intake) should be also considered.

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