

## Hip Anatomical Variations of Montenegrin Military Members Among Different Age Groups

Variaciones Anatómicas de la Cadera de Militares Montenegrinos entre Diferentes Grupos de Edad

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Dear Editor -In-Chief

During childhood and young adulthood our bones grow in both length and width. Bone widens by periosteal apposition, a process which slows during aging (Balena *et al.*, 1992). When we are talking about pelvis and hips, it was shown that the greatest effect on stopping their growth has the cessation of sex hormone secretion which has effect on the ductility of pelvic ligaments (Stojanovic, 1987). One of the rare studies (Berger *et al.*, 2011) which has shown that the process of pelvic and heads of femur dilatation continues even after the maturity of skeleton and the cessation of growth in length, has given certain predictions of the cause for the stated changes. Still, the stated limitations of the study, did not allow giving concise scientific principal explanations. However, there are numerous studies which state that anatomical variations in hip joint together with the risk factors (age, muscle weakness, joint decentralization, obesity, too much physical stress and stress of body segments) can lead to multifactorial diseases marked as hip osteoarthritis and sacroiliac syndrome (Ganz *et al.*, 2003). Bearing in mind that the military organization is a specific system of functioning which produces the effect of many factors during the process of training and performing specific purpose military tasks (Banjevic, 2021), the aim of this study related to determining the existence of eventual anatomical variations of the hip joint with soldiers of different age groups.

The sample of 240 soldiers covered by the analysis, is divided into eight age groups with 30 examinees in each group: I (18-21 yrs.), II (22-26 yrs.), III (27-31 yrs.), IV (32-36 yrs.), V (37-41 yrs.), VI (42-46 yrs.), VII (47-51 yrs.)

and VIII (52-57 yrs.). The measures of hip width (hw) and hip circumference (hc) have been taken in accordance with the Protocol for anthropometric tests of soldiers (Jukic *et al.*, 2008). When calculating mean values of the stated measures, descriptive statistics has been used. The following results have been obtained: I (hw=31.7; hc=85.9); II (hw=32.9; hc=90.6); III (hw=33.1; hc=92.5); IV (hw=33.5; hc=94.3); V (hw=33.6; hc=95.6); VI (hw=33.8; hc=95.7); VII (hw=34.2; hc=97.3); VIII (hw=34.5; hc=98.2). Permanently linear growing values of hip width and circumference were stated from the category of military recruits up to older soldiers who are at the very end of their service life. Comparing the changes of hip width with general population (Berger *et al.*, 2011) with the equivalent in this study, significantly higher and more dynamic changes were stated with the army members. Namely, with people outside of the military organization, the changes of 0.33 mm annually were determined, i.e. 20 mm in total for the period of 60 years. The annual increase of hip width for 0.71 mm, i.e. the total 28 mm for the period of 39 years of age is detected with soldiers. It is clear that the results indicate very dynamic changes on the pelvic ring and hip joint of soldiers which can be the cause of certain conditions, the systematic smooth functioning of which probably leads to a more serious damage to their health condition. During every day professional activities, by performing moves (flexion, adduction and internal rotation) under stress in the hip joint, anatomical variations happen which with time can cause the premature continuous contact of proximal femur and acetabulum. This kind of contact leads to damage of

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acetabular labrum, which represents the introduction to the hip osteoarthritis (Andjelkovic, 2015). It is known that the soldiers almost all of their movements with the body in the process of military training and task performing, make with increased stress, first of all in the part of head and torso (helmet, arms and ammunition with the accompanying equipment, combat vest, protective mask, modular backpack etc.). In that sense we could talk about great stress of the spinal column, which possibly contributes to sacroiliac syndrome and pain in the lumbar back, and they are in the majority of cases the main cause of absence from work in the Army of Montenegro.

We can conclude that during the service life of soldiers, the dynamic changes happen in the hip joint, and indirectly also on the pelvic ring. These changes can cause certain conditions which would lead with their progression to the damage of the health condition of soldiers and the reduction of their working capabilities. The recommendation to realize further studies would relate to the need of applying radiographic diagnostic methods to recognize morphological deviations in the part of pelvic ring of soldiers in order to prevent and slow the development of certain illnesses.

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