The diploma thesis deals with the relationship between the level of stress of soft tissues and their pressure pain sensitivity. It aims to find out whether the level of tension in soft tissues, given by the position of neighbouring joints, affects the pressure pain threshold. The thesis assumptions were verified on a model situation with the sensitivity of the tissues of the ventral and dorsal sides of the thigh depending on the angular adjustment of the knee joint flexion. The theoretical part deals with the findings about biomechanical properties of soft tissues in relation to mechanical load and in the sense of tensile and compressive forces. It describes the mechanisms of tissue nociceptor activation and afferent signal transmission for processing by neurvous system. It distinguishes between the concepts of nociception and pain and deals with methods of their quantification, especially pressure algometry. A group of 30 (15 men and 15 women) healthy probands of younger adult age participated in the research. The values of the pressure pain threshold were measured for each person with an algometer from the ventral and dorsal side of the thigh with angular settings of 0°, 45° and 90° flexion of the knee joint, with a constant position of the hip joint. The data set's statistical analysis did not show statistically significant changes in pressure pain threshold values depending on the examined knee joint positions. The work demonstrated that changes in the angle setting in the range of flexion between 0° and 90° do not have a significant effect on the pressure pain sensitivity of the soft tissues of the thigh and thus that the pressure pain threshold of the soft tissues does not change when the joint setting is changed within the neutral zone.