**Introduction.** Frontal knee deformities (genu valgum and genu varum) are common in children. Modern philosophy of the surgical treatment of pathological frontal knee deformities in children is based on the guided growth. This technique relies on asymmetrical growth of the physis after its one-side temporal block using special device. Several devices are currently used for temporal growth plate blocking: Blount staples, and plates with screws. Up to now there isn’t any research devoted to stress-strain state analysis of the epi-metaphyseal part of the pediatric bone with one side growth plate block on it.

**Objective:** To study the stress-strain state of the pediatric proximal tibia model with lateral hemiepiphysiodesis using different types of devices in loading conditions typical to the tibia vara.

**Materials and Methods:** Based on this CT scan data of 10 children 3D model of the proximal tibia with physis was created. Additional 3 models with lateral hemiepiphysiodesis of the proximal physis using three Blount staples (1), locking plate with 2 screws (2) and non-locking plate with 2 screws (3) were created. To simulate loading conditions typical to tibia vara asymmetrical load on medial (60 %) and lateral (40 %) tibial condyles was held. The stress strain state of the proximal tibia was analyzed by finite element method in all 4 models.

**Results.** In the model without fixator increased compressive stress found in the medial part of the proximal tibial growth plate in load conditions typical to tibia vara. Different patterns of stress-strain state of the proximal epi-metaphyseal part of the tibia with lateral hemiepiphysiodesis using different metal fixators were observed. New areas of high stress in the metaphyseal bone below the growth plate were found in all models with lateral hemiepiphysiodesis. The greatest zone of stress in fixators was noted in the contact zone of proximal screw plate, and in the dorsally located staple.

**Conclusion.** According to stress-strain state analysis using created model, tibia vara leads to increased compressive stress in the medial part of the proximal tibial growth plate. Higher compressive stress in the medial part of the proximal tibial growth plate. Lateral hemiepiphysiodesis of the proximal tibial growth plate leads to changes in areas of stress due to load transfer on the screws and plates, and reduce stress in the medial part of the growth plate.