EP07.05 - 4D examinations of the fetal behavior: where are we now?  
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4D Ultrasound

Revolution in examination of fetal neurological development. Possibility of morphological and functional fetal visualization. We can simultaneously visualized embryo/fetus with all cardinal movements. Those observations are important for neuroanatomical and neurophysiologic development of fetal CNS.

- **Neurological fetal development**
  The most important goal in perinatal medicine. Possibility of early diagnosis of cerebral palsy. Spontaneous fetal activity in preterm and term fetuses could be indicator of neurological dysfunction in early fetal development. Cardinal fetal movements CFM are the most important, complex and are measure of fetal neurological maturation.

  - **Fetal behavior definition is detected fetal activity like the measure of neurological and pathological fetal development**
  - **Goal:** Basic examinations, detect the groups with different fetal neurological maturation in the presence of the maternal chronic diseases, cases of pPROM, presence of the neurological defect in those groups
  - **First trimester**
    Detection of the early embryo/fetal motility and movements, detection of the first reflexes, detection of the FHR – first reflex of the fetal vegetative nervous system, determine the incidence of fetal movements, fetal cerebral circulation.
  - **Second trimester**
    Presence of the grasp reflex: incidence like in the first trimester, distribution of CFM: same like in the first trimester with low incidence, two groups of movements: big movements and facial expressions, eyes opening: 20 weeks, suckling reflex: 17 weeks.
  - **Third trimester**
    Reflexes: grasp reflex, suckling reflex and eyes opening present, CFM: arm to head, mouth, eye, face; Head movements: isolated retroflexion and rotation, Facial expressions: eye blinking, suckling, swallowing; Neurological score.

Examination of the high risk pregnancies

Epilepsy, pPROM, Diabetes Mellitus, Fetuses with the presence of lower incidence of fetal movements and nonreactive stress test-postdated pregnancy

- **Methodology:**
  Examination group: pregnancies 28-40, groups IUGR, PIH diabetes mellitus, epilepsy Control group: normal pregnancies 28-40ng
  Examinations 2D: biometric parameters, Doppler examinations ACM I AUMB
  4D US: neurological score

- **Epilepsy and fetal behavior:**
  Dependent of the antiepileptic therapy. First trimester: genesis of the fetal movements late for every fetal movement for the 7,4 days. Second trimester: lower incidence of the fetal movements. Third trimester: facial movements with higher incidence – hand to head movement in pregnancies with two antiepileptic.

- **Fetal behavior in pPROM:**
  Gestational age: 25-33 weeks, Analysis of infection parameters, US biometric parameters, Doppler examinations of UPC and FPC in order to detect fetal distress S/D ratio. Neurological score. Reduction of CFM, extremities, reflexes from the first trimester MUST BE PRESENT

- **Fetal behavior in Diabetes Mellitus**
  Glucose plasma levels, Polyhydramnion higher incidence fetal facial expressions and CFM, Glucose stress test. Presence of the reflexes.

- **Conditions with reduced fetal movements**
  OLIGOAMNION ,IUGR, intraamnial infection; Postdated pregnancies; Analyses of the fetal behavior in correlation with nonreactive stress test; Analysis of FPC: ACM , ductus venosus , a.umbilicalis; Chronical fetal hypoxia – substrate for the cerebral palsy especially with the presence of intraamnial infection.