



## *From Rudi Klimek's Desk*

The use in obstetrics of quantum theory as well as modern technology to decrease the morbidity and mortality of newborns and mothers during iatrogenic induced delivery

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### ***Introduction***

Modern medical devices such as ultrasonographic devices, cardiotocographs or neonatological incubators, from the technical point of view, stem from the greatest advances of science from the beginning of the twentieth century, i.e. quantum theory and the theory of relativity. Unfortunately, their use in obstetrics paradoxically leads to iatrogenic morbidity and mortality due to lack of understanding of time-spatial fetal maturation and the relativity of calendar pregnancy duration. Nonetheless, it suffices to understand technical quantization in order to bring down the high percentage of prematurity and iatrogenic instrumental labors with the use of the same devices. One cannot use devices constructed in accordance with Einstein's ideas and at the same time understand obstetrical phenomena of Newton, great but belonging to his own époque, with his absolute time and self-dependent space.

### ***Quantized maturity***

Pregnancy – just as every natural phenomenon (structure or process) – is an individual time-spatial event whose most important element is fetal maturation of a human being, first to the level of viability, and then to full maturity to self-dependent life. The maturity level can be evaluated immediately after labor through obligatory assessment of just six of the many possible newborn features: position of the limbs, elbow angle, its mobility, breast nipple, plantar creases and lanugo. For each of those features one can allocate from 0 to 2 points, which maximally gives 12 technical points of full maturity (Fig.1).

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Technical quantization differs from the physical one by the fact that the scale of examined parameters is set on a macro level in such a way as to make them multiples of a selected measure (quantum), in our case – points. After all, in the same manner – though not always consciously – we quantize mass in grams and height in centimeters although these features are also founded on atomic structure, i.e. a domain of physical quantization, while weight and height are only multiples of atomic measure. Physicians' errors consist in the fact that in spite of the proven simplicity of maturity quantization and its expression in point scale, doctors attempt to measure it on the scale of grams or centimeters or – even worse – of gestational days or weeks. According to Newton, time and space exist beyond matter, and that two healthy and normal twins with the same pregnancy duration time would always have to have the same maturity, weight and length. Yet, we know that maturity which determines its viability is not equivalent to the extent and direction of structural differences between them. Maturity as a time-spatial process has its own time, called imaginary time inseparable from the child's structure (body).

### ***Relativity of pregnancy duration***

Fetal maturation can and has to be compared with the postnatal sexual maturation, in which menarche can be collated to the labor term as the end of observed pregnancy. Nobody thinks of menarche induction before the sixteenth year of extrauterine life, and everyone knows that according to auxology laws girls with early and usually shorter pubertal spurt have lower target height than their calendar peers who mature later or more slowly. The same phenomenon occurs during pregnancy. If we consider 100 healthy women with the same beginning and physiologic pregnancy course, three of them will deliver in the first and three in the last week of the six-week range of the occurrence of spontaneous human labors ( $36^0/7$ – $43^2/7$  weeks after the last menstrual period), and 30 in each of the two middle weeks. According to laws of auxology newborns with gestational ages of 37 and 38 weeks have lower values of examined parameters than the other ones, which in addition from the 41st week more often have values above than under one standard deviation from average for the corresponding week. It concerns

both mass and maturity. Obstetricians make a blatant error not only by negating laws of auxology but most of all by treating all fetuses with the same calendar age (i.e. the same calendar Newtonian time) in the same way. Out of the said 100 pregnant women with the calendar age of  $37^0/7$ – $37^6/7$  weeks, in only 3, is the process of fetal maturation completed. Out of the remaining 97, only 15 will have it completed in 38th week and about twice as many in the 39th week. When examining these women in the 40th week, we have to realize that only approximately 30 out of their 51 fetuses are mature for labor and the other ones will deliver – unless pregnancy is iatrogenically terminated – after the 287th day of physiologic pregnancy ( $41^0/7$  week). How can one predict in the observed individual pregnant women, in which of the 6 weeks, the labor has to occur?

It needs to be stressed that ultrasonographic measurements of selected fetal parameters by means of existing devices are exact and precise; it is only their interpretation that is false. When making physical measurement of one of 100 fetuses in the 37th week of pregnancy, even by means of the best and unfortunately common percentile scales, one cannot conclude if the fetus has to be delivered in days or weeks.

By means of an ultrasonographic device we take a measurement of a biophysical event such as fetal maturation which is a subject to be quantized. Thus, we have to relate the results to the individual time of examined fetus; this is done on the Y axis together with the mass and height instead of calendar horizontal scale (X axis). It suffices to compare a measurement made in the 37th or later week to any previous examination  $\geq 28$ th week. Then even the same absolute increase in an examined parameter during 2–3 weeks enables dividing fetuses into fast (predicted labor in 37th–38th week), regular (predicted labor in 39th–40th week) and slowly maturing (predicted labor  $\geq 41$ st week).

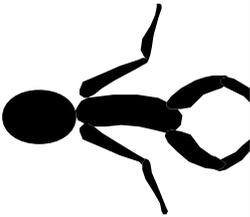
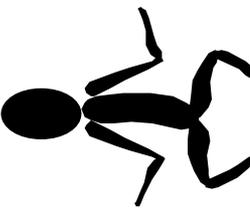
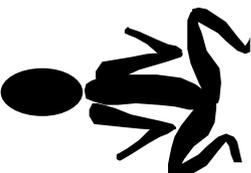
On the day of delivery newborns have the same number of maturity quanta (according to the above maturity scale:  $9 \pm 1.5$  points). It is only the appearance of new quanta that occurs in shorter intervals in fast-maturing fetuses and in longer intervals in the slowly-maturing ones. What is important is not the absolute increase, but its rate (increase is tangent of  $\alpha$  angle). In the computer-aided method one compares values of these angles according to different examined parameters and by comparing with the

computer data bank of human population fetal development, one can not only predict the birth term with the accuracy of days but – most importantly – predict target maturity, body weight and length of the newborn. There is very high positive correlation ( $r \geq 0.79$ ) between predicted values of maturity and its real indices calculated by means of R.Klimek's method.

### **Frequency of preterm births**

Both fetus and mother in the last 3–4 days of pregnancy undergo rapid pre-labor changes necessary to

delivery and sudden child's adaptation to extrauterine life. The rate and result of this adaptation is measured by the Apgar scale, but at present it is also necessary to assess the simple K maturity index. Labor which starts before its own individual term (preterm) as well as delayed due to disturbance of its initiation (postponed pregnancy) is possible in the large six-week range. In the beginning of the period of the norm, the increase in morbidity and mortality is caused not only by labors of multifetal pregnancies, but mainly by lack of help necessary for undiagnosed true preterm births. Reversely, at the end of the period of the norm ( $\geq 41$ st week), premature induc-

Points	0	1	2
Posture			
Angle forearm to arm	 100°–180°	 90°–100°	 < 90°
Pulling an elbow to the body			
Lanugo	Thinning	single bald areas	mostly bald
Plantar creases	Only on anterior sole	on anterior 2/3 sole	cover entire sole
Breast	stippled areola bud < 3 mm	raised areola bud 3–4 mm	full areola bud > 4mm

**Fig. 1.** Scoring system for clinical assessment of Klimek's maturation index in newborn infants

tion in over ten percent of labors causes iatrogenic prematurity because of statistical, not individual, postdatism. Our own prospective studies of tens of thousands of labors are consistent with the above data both with regard to gestational age and weight of babies, and – in 3 600 cases – to obstetrical maturity evaluated by means of the K index.

Obstetricians cannot equally relate to the same calendar week of very late pregnancy those fetuses, which will indeed be born during this period (e.g. 38th week) and those who are still maturing and will be born in one of the following weeks (e.g. 41st or 43rd week). Thus, a preterm birth can occur even at 42nd week just as a postterm birth is possible even at 38th week owing to failed feto-maternal mechanism of labor initiation.

According to prospective observations of 50 000 deliveries, there are at least 3% of preterm births beyond 37<sup>0</sup>/<sub>7</sub> gestational calendar week. This percentage is doubled owing to induction of labor only because the observed pregnancy has reached its 287th or 294th day, which unfortunately is the case in many countries where postdatism creates iatrogenic “prematurity”. Therefore obstetricians should encourage performing birth-date prediction, which is nowadays possible with an accuracy of several days instead of weeks.

### **Conclusion**

Maturation of the fetus is a biological, time-spatial process, where time and changing structures of the baby have to be considered according to the present state of science. Quantum mechanics and computer science ultimately changed the obstetrical procedures, but the antiquated predilection for absolute time and space unfortunately remained. In spite of the progress in medical technology, this legacy successfully obstructs the reduction of an excessively high percentage of preterm, induced and instrumental deliveries.

The reason is simply that the six-week period of birth occurrence in a human being is too large for obstetrical management to be determined by statistical methods. An increase in instrumental deliveries and lack of progress in lowering the number of premature births associated with increased fetal morbidity and mortality are the consequences of this approach.

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