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OPTIMAL DESIGN OF A PNEUMOTACHOGRAPH HEAD WITH RESPECT TO DEAD SPACE AND RESISTANCE.

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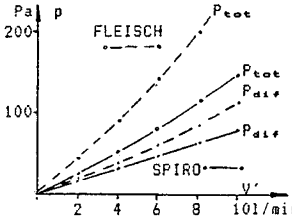
In pneumotachography, the inclusion of a pneumotachograph head in the respiratory pathway increases the apparatus dead space and the resistance to breathing. There is a strong relationship between dead space and total resistance of a pneumotachograph head at given flow and differential pressure (measuring resistance). Low total resistance compared to the measuring resistance leads to a large cross-section and a big volume of the head and vice versa. We developed a mathematical method for the exact dimensioning of a pneumotachograph head (Spirorezeptor) for relevant differential pressures and flows. One fabricated high linearity, small dead space Spirorezeptor for use in infants offers many advantages compared with the Fleisch head NEO from PEDS unit.



The parameters at V'= 8 l/min are:

Type	Pdif Pa	Ptot Pa	Rtot kPas/l	Vd ml	Nonlin %
SPIR	65	115	0.9	0.9	<1
FLEI	90	210	1.5	1.9	10

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FETAL FOOT DEVELOPMENT - THE RELATION TO OTHER ULTRASOUND PARAMETERS.

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In the aim to establish range of norm for fetal foot development, 122 ultrasonographic measurements during consequtive pregnancy weeks had been performed.
Correlation coefficient between fetal foot development and pregnancy duration was found to be 0,93.
The correlation coefficient between fetal length and biparietal diameter was 0,95, head circumference 0,95 and femur length 0,96.
Overall mean developmental velocity was 1 mm per 3 days whereas during the second trimester the value was 1 mm per 2,2 days and 1 mm per 4 days during the last three monthes.
In five cases measurements results were beyond the standard devation although no fetal malformations were observed.

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DENTAL DEVELOPMENT IN LOW BIRTHWEIGHT (LBW) CHILDREN UNTIL SEVEN YEARS OF AGE

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A dental study was incorporated into a follow up study of LBW children (birthweight <2000g). The aim was to compare the prevalence of enamel defects, tooth size and eruption of teeth in LBW children with normal birthweight controls. Dental examinations were performed at 3,5, and 7 years to determine the prevalence of enamel hypoplasia. Dental casts were made at 7 years to measure deciduous tooth size. The deciduous teeth of the LBW children, were significantly ($p<.001$) smaller had significantly more enamel hypoplasia and erupted significantly later than controls. When age was corrected for premuaturity there was no significant difference in eruption times. More hypoplasia occurred in the deciduous teeth of the LBW children who suffered major neonatal problems. The LBW group however did not show an incresed prevalence of hypoplasia in the permanent teeth. It is suggested that as the deciduous teeth calcify both pre and postnatally a systemic upset during the neonatal period disturbs the enamel forming at that time, whereas the permanent teeth do not start to calcify until around birth and, particularly in a premature child, may escape this insult.

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FECAL $\mathcal{L}_1$–ANTITRYPSIN (A–1–AT) AS A MARKER OF INTESTINAL PERMEABILITY

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A–1–AT fecal clearance and random fecal A–1–AT were measured in children with symptoms of protein loosing enteropathy (PLE) and in normal subjects.
Material and methods: 44 children with PLE at the age (1/12 – 18 yr) were examined. In 8 children – clearance A–1–AT (Bernier J. and co., Lancet II, 763, 1978) was done, in 36 children – random A–1–AT (Crossley and Elliot, Br Med J 1977, 428). Control group 18 healthy children at the same age.
Results: In 6 healthy controls A–1–AT clearance: x ± SD = 5.58 ± 1.76 ml/24 h. A–1–AT clearance was elevated in children with PLE: intestinal lymphangiectasia (n = 4, 65.2 – 236 ml/24h) Crohn's disease (n =1, 114.6 ml/24h), Barret's disease (n = 1, 14.3 ml/24h), protracted diarrhea (n = 1, 19.1 ml/24h), pericarditis constrictiva (n = 1, 800 ml/24h).
Mean random A–1–AT concentration in 12 healthy controls was: x ± SD = 1.37 ± 0.32.
In children with PLE random A–1–AT were elevated: intestinal lymphangiectasia (n = 4, 8.69 ± 1.39 mg/1g), Crohn's disease (n = 7, 11.18 ± 3.67 mg/1g) ulcerative colitis (n = 4, 6.13 ± 4.06 mg/1g), hypogammaglobulinemia (n = 3, 6.21 ± 2.97 mg/1g), Viskott–Aldrich (n = 1, 6.75 mg/1g), protracted diarrhea (n = 9, 3.69 ± 0.79 mg/1g), hepatitis neonatale (n = 1, 4.33 mg/1g), cystic fibrosis (n = 2, 2.34; 6.36 mg/1g), coeliac disease (n = 4, 2.79 ± 0.81 mg/1g), uncompensated heart failure (n = 1, 29.51 mg/1g).
A signifficant correlation between random A–1–AT concentration and A–1–AT clearance was found ($n = 13$, $r = 0.997$, $p < 0.001$).
Conclusions: 1) A–1–AT is a reliable endogenous marker for intestinal protein loss. 2) In gastrointestinal disorders A–1–AT excretion is an indicator of the disease activity and severity of the intestinal damage. 3) Random A–1–AT concentration is a valuable and simple screening test for PLE.

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PULMONARY FUNCTION AND RESPIRATORY MORBIDITY IN SCHOOL-AGED, PREMATURELY-BORN CHILDREN VENTILATED FOR NEONATAL RESPIRATORY INSUFFICIENCY.

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To evaluate the effects of neonatal ventilatory treatment and prematurity on later lung function and respiratory morbidity, we examined 42 preterms and 30 fullterm controls at the age of 6-9 years. The preterm group consisted of children with bronchopulmonary dysplasia (BPD) (N=10), children with neonatal respirator care but without BPD (N=19) and of children without severe neonatal respiratory problems (N=13). All fullterm controls had uneventful neonatal history. Lung function test were done with a pneumotachograph (Medikro Ltd., Kuopio) and a whole-body pletysmograph (2800-Autobox). The BPD group had markedly decreased specific airway conductance and increased residual volume but no significant differences in spirometric measures when compared with non- ventilated preterms and fullterm controls. Ventilator-treated non-BPD group had comparable airway conductance but, instead, larger lung volumes than non-ventilated controls. No differences were found between non-ventilated preterm group and fullterm controls. BPD group had highest respiratory morbidity during the first years of life. The present data show that BPD patients and other ventilator treated preterms (but not non-ventilated preterms) need pulmonary follow-up.

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DECISION MAKING IN CARE OF NEWBORNS.

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Cultural influences on physicians involved in care of severely handicapped newborns were studied. 261 responses (52% of sample) to a structured survey were analyzed by country of birth and medical training, religious practice and medical specialty. 95% of responders indicated that all newborns had a right to live; 85% felt that a preterm's rights were equal to a full term's; 37% felt that weight and gestational age were determinant factors and 28% felt that severely handicapped had less rights. Poor prognosis or poor quality of life were less significant factors in decision-making by physicians educated in the U.S. or Europe as opposed to Israel. Israeli educated physicians were more inclined to accept parental desires as to care even when contrary to their own, while European trained physicians were more likely to turn to the courts to override parental wishes. Religious physicians were less inclined to authorize experimental procedures, were more inclined to approve surgical procedures in severely handicapped infants, ignore parental wishes, or involve the courts in overriding parental desires. Results indicate that individual cultural experiences and practices influence in a major fashion the attitudes and decision-making processes in the care of the handicapped newborn, in contrast to care systems where ethical practices are systematically formulated and transmitted.