1st ECOG and Louis Bonduelle award:

Comprehensive Prevention of Childhood Obesity: Experiences of Past 30 years and New Approaches

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FONDATION LOUIS BONDUELLE

How the obesity / nutrition research at the Paediatric Clinic started

Recognition of early trends (70s last century):

- Rising levels of overweight and obesity among both adults and children
- no common definition of obesity in children and that adult definitions using BMI alone were inadequate.
- concern on children and adolescents that are already developing noncommunicable diseases which were previously typical for adults" such impaired glucose tolerance and type 2 diabetes.

Contribution to the work of ECOG

- 1988 (Organization)
- 1991 (first ECOG Workshop in Brussels – Prevention in Childhood Obesity, together with a Symposium “The Obese Child”)
- 2010 (20. Symposium)

Prof. Dr. Dénes Molnár:

- President of ECOG 1997-2000
- Scientific advisor of ECOG 1994-97; 2007-

How the obesity / nutrition research at the Paediatric Clinic was organized

- Establishing the Childhood Nutrition Research Group
- PhD program: Nutritional research in children and infants
- In-patient care – 1979-
- Starting out-patient care - 1985
- Intervention counselling
- Primary and secondary intervention activities in the community (obesity club, summer camps, swimming for obese children)

The aim of the Nutrition Research Group of the Paediatric Clinic, Pécs

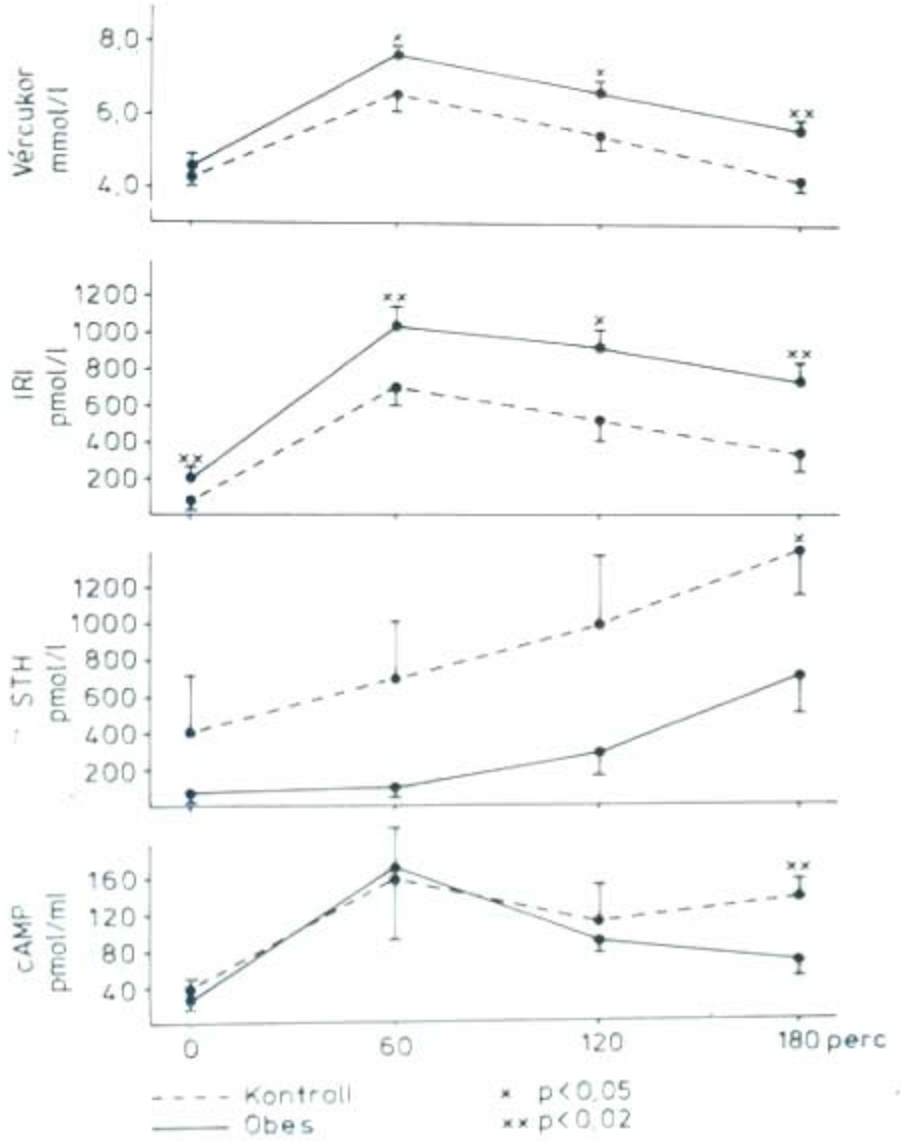
- Contributing to the research of childhood obesity
- Providing evidence-based care for patients
- Introducing intervention activities
- Putting the problem of obesity in broader socioeconomic and environmental context involving the local actors in the intervention efforts
- Monitoring the results of our activity and the obesity-related health status of the child population on the region of attendance of our clinic

Main results of the Childhood Nutrition Research Group 1. Main scientific results

- Two main lines characterise the research work of the group:
- 1. Infant nutrition
- **2. Childhood obesity and consequences: oxidative stress, cardiovascular neuropathy, changes in hepatic and renal functions. The genetic studies launched 5 years ago investigate the role of genetic polymorphism of candidate genes in the development of cardiovascular risk factors (hyperlipidaemia, hypertension, impaired glucose tolerance, type 2 diabetes mellitus, insulin resistance) and changes of energy metabolism.**

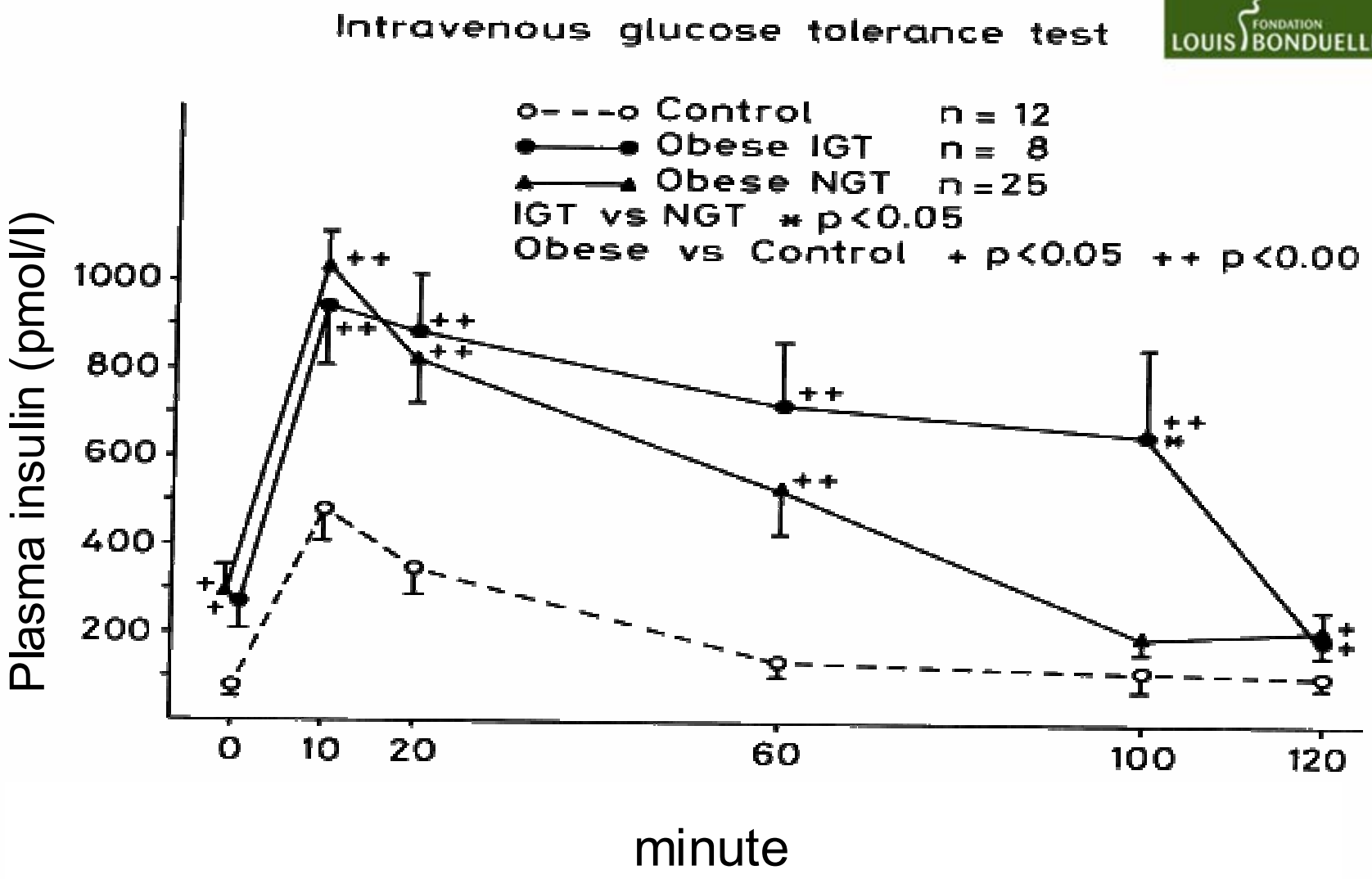
Early results 1

Metabolic effects of glucagon infusion



Molnár D, et al. Effect of glucagon infusion on blood glucose, plasma immunoreactive insulin, growth hormone and adenosine 3' , 5' - monophosphate in obese children. Acta Paediatr Acad Sci Hung 22: 325-329, 1981

Early results 2



Molnár D, et al. Intravenous glucose tolerance test in childhood obesity: Metabolite levels and their relation to glucose utilisation ratio. (KG) Acta Paediatr Acad Sci Hung 23: 127-135, 1982

Early results 3

Postabsorptive plasma IRI, lipid and lipoprotein levels in control and obese children (mean ± SE)

	Control n=79	Obese n=94	p
IRI pmol/l	58.1 ± 6.2	171.4 ± 20.7	< 0.001
Triglyceride mmol/l	1.2 ± 0.04	1.44 ± 0.07	< 0.005
Cholesterol mmol/l	3.75 ± 0.07	4.32 ± 0.12	< 0.001
HDL - chol. mmol/l	1.26 ± 0.04	0.99 ± 0.03	< 0.001
(VLDL + LDL) - chol. mmol/l	2.48 ± 0.07	3.31 ± 0.12	< 0.001

Molnár D, et al. Fasting biochemical parameters and their relationship with antropometric measurements in childhoold obesity. Acta Paediatr Acad Sci Hung 22: 313-324, 1981

Early results 4

Clustering of cardiovascular risk factors in obese and control children

	Obese		Control	
	N	%	N	%
No risk factor	26	**14.4***	189	**79.1**
+ 1 risk factor	60	**33.3***	40	**16.7**
+2 risk factors	51	**28.3***	9	**3.8**
+ 3 risk factors	27	**15.0***	1	**0.4**
+ 4 risk factors	16	**8.9**	-	**-**
Total	180	**100**	239	**100**

Csábi et al. Eur J Pediatr 159: 91-4, 2000

Main results of the Childhood Nutrition Research Group 1. Main scientific results

- Role of obesity in the development of the metabolic syndrome
- Cardiovascular risk factors (e.g. hypertension, plasma lipids) strongly correlate with the obesity
- Impaired antioxidant status in obesity
- Shift of T2DM to younger, even prepubertal age group
- Psychosocial and psychological problems due to rejection, social isolation
- Impaired academic performance which may lead to decreased socio-economic status in adulthood

Main results of the Childhood Nutrition Research Group 2. Publications

- The group has published over 300 original papers in peer-reviewed journals, with more than 1300 citations.

- Prof. Denes Molnar:
- 134 original papers in peer-reviewed journals
- Cumulative IF 145 (without abstracts and letters)
- Independent citation: 659

Main results of the Childhood Nutrition Research Group 3. PhD thesis **related to obesity**

- Dr. Györgyi Csábi: „Appearance of cardiorespiratory risk factors and psychosomatic consequences in childhood obesity”, 2000
- Dr. Éva Erhardt: „Childhood obesity: causes and consequences”, 2008
- Dr. Szilvia Bokor: „Obesity and related metabolic disorders: influence of genetic variability and nutritional factors” 2009

Main results of outpatient care 1. Patient turnover

- New referrals (hereby counting only the obese patients): 150-200/year
- All (new & follow-up) visits of obese patients: 600-700/year
- Dropout rate: 30% in the first year, 50% after second year
- Active follow-up cases: 650

Main results of outpatient care 2. Patient' medical benefits

	Relative body weight	
	Decreased[1]	Increased or no change
Δ Relative Bwt (%)	- 9.4 ± 1.9	5,2 ± 3.1*
Δ Fasting insulin (pmol/l)	- 38.2 ± 23	45.6 ±34*
Δ Se triglyceride (mmol/l)	- 0.5 ± 0.4	0.6 ± 0.1*
Δ HDL-cholesterol (mmol/l)	0.4 ± 0.09	-0.03 ± 0.02
Δ Fasting blood glucose (mmol/l)	- 0.5 ± 0.3	- 0.2 ± 0.15

Values are expressed as mean ± SD;

[1]Relative body weight decreased with 5% or more after 2 years of follow-up;

* p< 0.05.

Main results of outpatient care 3. Non-medical intervention activities

- Swimming courses specialized for obese children in cooperation with the Faculty of Sport Sciences of Pecs University)
- Summer weight loss camps in cooperation with the Red Cross and the State Public Health Service
- Providing specialized dietary nutrition in the Educational Centre (the largest educational institution of Pecs).
- Training courses for physical education teachers for intensifying the PE lessons;
- Nutritional games for children

Goals and new perspectives

- Targeting only certain risk populations cannot be maintained in long-term
- The isolated and temporary intervention activities may not lead to sustainable changes either in the environment or in behavioural factors
- There is a growing need of support for establishing healthier lifestyle habits

„The future of peadiatrics lies in the prevention"

Some data from our **recent** research: Children's consumption of „Big Four" *

Total occassions of consumption 'Big Four' compared to all recalled food items	**10,5%**
• sweetened breakfast cereals	**• 1,9%**
• soft-drinks	**• 5,2%**
• confectionary snacks	**• 3,1%**
• savoury snacks	**• 0,3%**
fruits	**5,0 %**

* Hastings, G et al: The Extent, Nature and Effects of Food Promotion to Children: A Review of the Evidence. Technical Paper prepared for the World Health Organization. WHO, 2006.

Some data from our research: Results of Food Frequency Qestionnaire

IDEFICS

- Eating raw vegetable at least once a day: 15,6%
- Eating raw fruit at least once a day: 50,2%
- Eating raw vegetable and fruit at least three times a day: 2,9%

HELENA

- Eating raw vegetable more than once a day, each day: 2,8%

Work in progress based on the Bonduelle/ECOG award

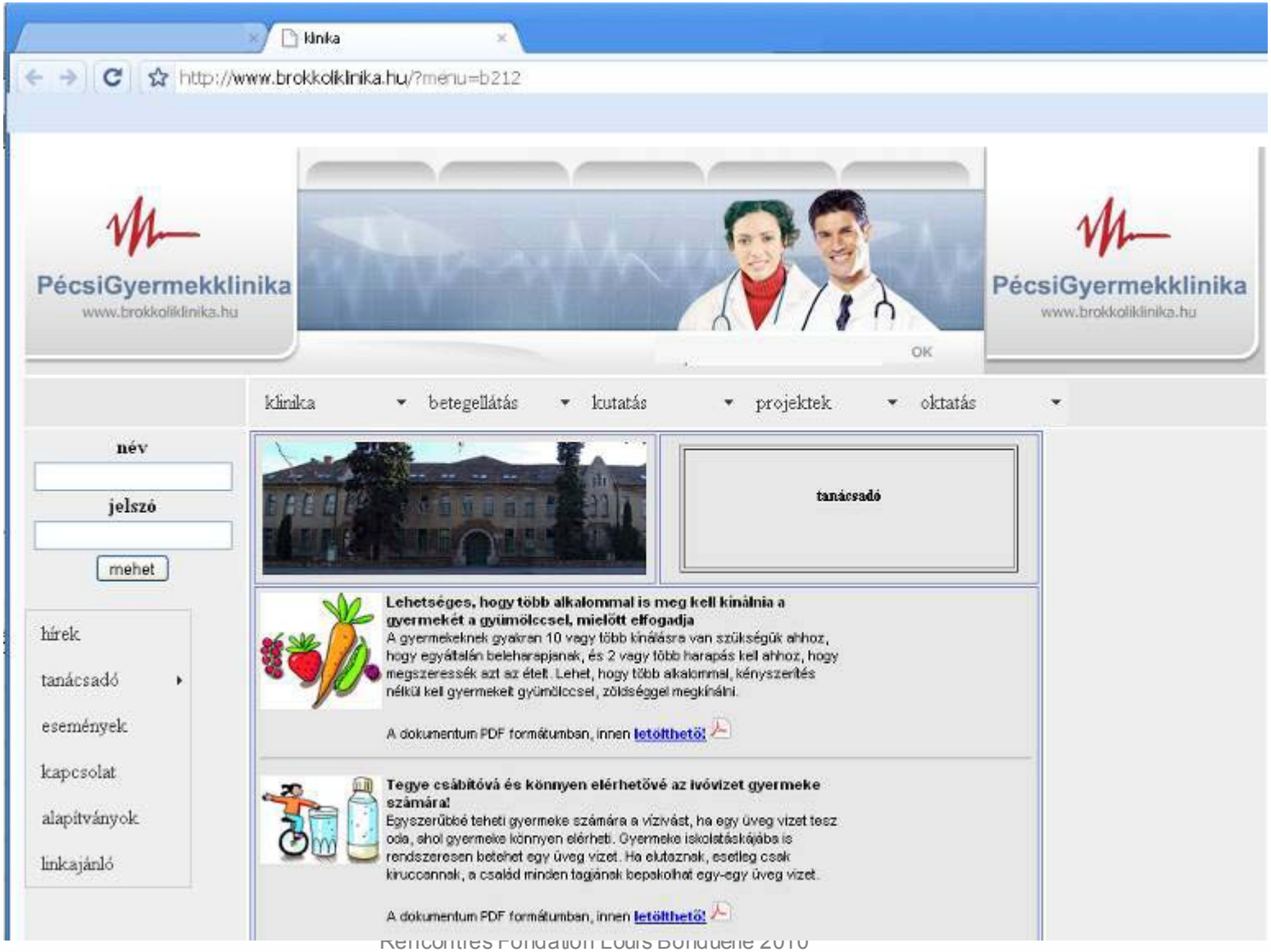
- Development of the website „Broccoli Clinic”

(www.brokkoliklinika.hu)

- Peer education in nutrition

- Cardivascular risk assessment in children

Website „Broccoli Clinic”



Peer education in nutrition: results of focus groups 1. Eating habits

- Reasons for eating: hunger, boredom, stress, examples of peers; desire induced by ads, posters, shopwindows; TV viewing, loneliness, bad mood
- Snacking is viewed as unavoidable: „if I don't snack on a day, that day is wasted", no day passes without snacking"
- Typical snacks: chocolates and sweets (salty is less preferred)
- Fruits are not labeled as snacks (not even dried fruits; hazelnut and sunflower corn was mentioned once)
- Vegetables play marginal part in their nutrition as part of main dishes prepared by parents; but in no case their own choice
- Accepted vegetables: tomato, pepper and salad in sandwiches

Peer education in nutrition: results of focus groups 2. Accepted ways of intervention

- Occasions of free tasting in such an environment which is accepted by teens
- „Why can't vegetables be made in a form of snack?"
- Internet-based entertainment-styled intervention with games and individual approaches
- SMS-based messages as reminders on having the daily fruit/vegetable in a funny style
- Most disadvantaged groups: the only attractive if something is distributed for free; but in general they aren't interested / don't believe in any improvement in nutrition and/or lifestyle

Cardivascular risk assessment in children

- Aim: elaborating and validating a cluster of parameters which is appropriate for screening cardiovascular risk status in childhood in the sense of medical value, practical feasibility and cost-efficiency.

Attempt for CVD risk assessment in childhood:

- 1. fix elements: permanent baseline risk status

and

- 2. moving score about actual risks, which can be targeted by intervention;

- Follow-up as evaluation of score cut-off and of the success of intervention

Thank you for supporting our work!