


“Covasna Method”

a complex cardiovascular rehabilitation
model

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Cardiovascular disease (CVD) remains the leading cause of death among Europeans and around the world. The Global Burden of Disease study estimated that **29.6% of all deaths worldwide** were caused by CVD in 2010.

In 2009, costs related to CVD amounted to **€106 billion**, representing **~9%** of the total healthcare expenditure across the **European Union** (EU).¹⁴ Thus, CVD represents a considerable economic burden to society and effective preventive measures are necessary. The burden of CVD in Europe remains high overall, and varies dramatically between countries. **More than 4 million Europeans die of CVD every** year, and many more are hospitalized after acute episodes or treated for chronic cardiovascular illness

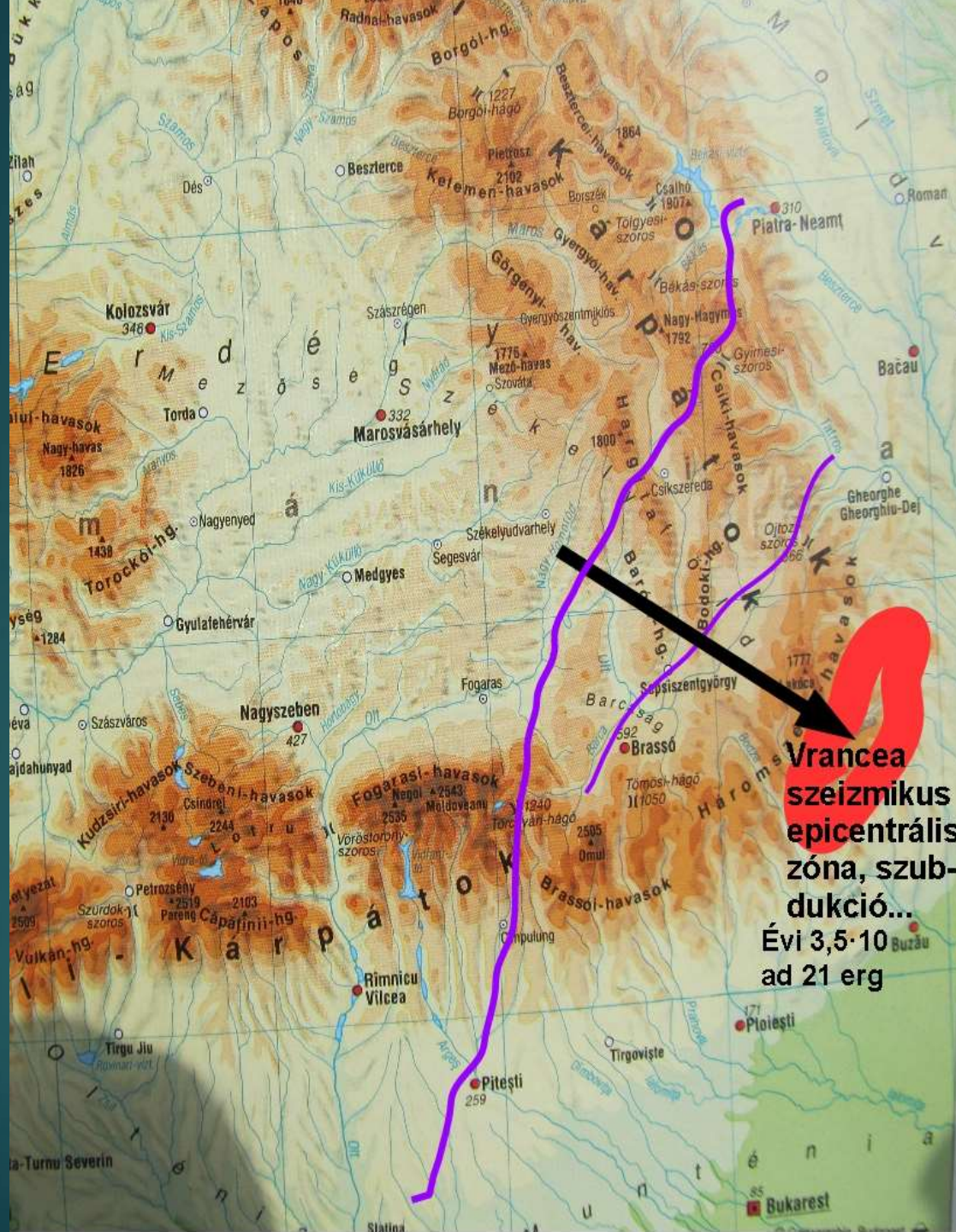


“People with cardiovascular disease or who are at high cardiovascular risk (one or more risk factors such as hypertension, diabetes, hyperlipidaemia or already established disease) **need early detection and management** using counselling and medicines, as appropriate.”

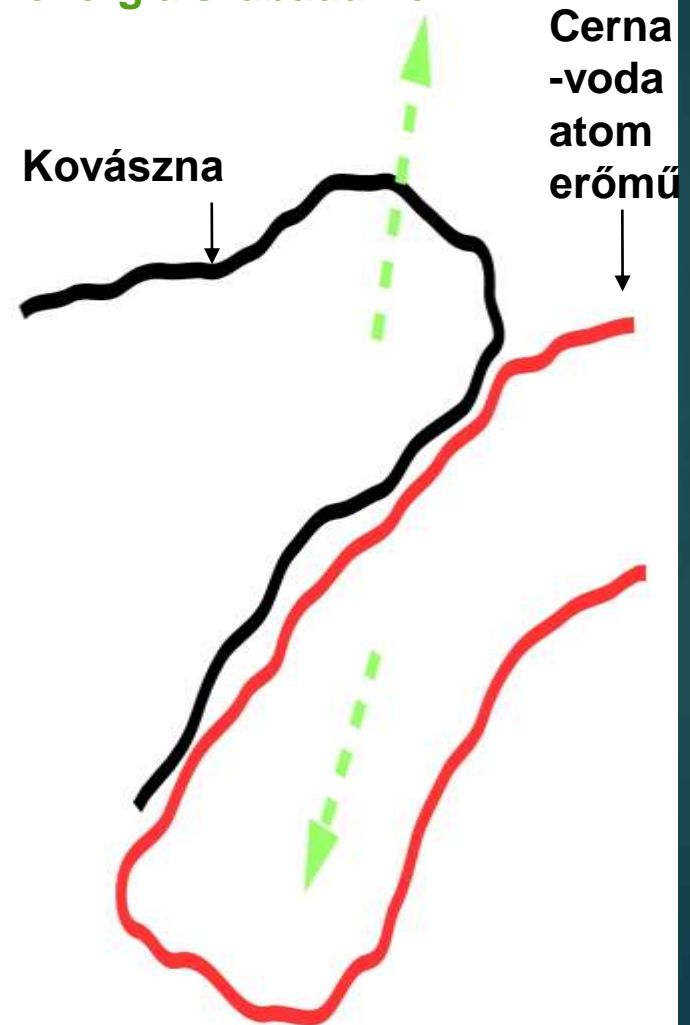
Cardiovascular rehabilitation **comprehensive programme** improve **health-related quality of life** (HRQoL) compared with usual care, and **may reduce mortality longer term.**⁵
(ESC)

Covasna

- ▶ **Covasna is also known as “the resort of the 1000 health springs®”,**
- ▶ **Mofetta and CO₂ mineral waters**
- ▶ 1567 - First mentioned in a document.
- ▶ 1880 - Covasna has flourished as a health resort since the 1880s
- ▶ 1952 - Covasna became a town.
- ▶ 1960-Cardiological Hospital Covasna
- ▶ 1970's - Several hotels and cure centers were built in Covasna.
- ▶ 2000's - Covasna is a nationally important spa town in Romania, famous for cardiovascular treatment.



A geotektonikai trikonfinium (hármes határ) a Világ III. legszeizmikusabb övezete (Gutenberg, Richter 1952.) Évente $\sim 3,5 \cdot 10$ ad 21 erg energia szabadul fel.





Cardiovascular Rehabilitation Hospital Covasna

FOUNDED 1960

DR.BENEDEK GÉZA

“CLASSIC” CARDIOVASCULAR REHABILITATION+
MOFETTA AND CO₂ MINERALWATERS





Dr. Benedek Géza Cardiovascular Rehabilitation Hospital Covasna

- ▶ 680 beds
- ▶ 13 000-14 000 patients p.a
- ▶ Patients from whole country
- ▶ Cure 16-18 days paid by the National Health Insurance Company
- ▶ Possibility for complex noninvasive cardiovascular checkup
 - ▶ EKG
 - ▶ Echocardiography
 - ▶ HOLTER
 - ▶ AMBP
 - ▶ Exercise testing
 - ▶ Peripheral Doppler
 - ▶ Fotopletimography
 - ▶ labor
- ▶ personalized rehabilitation program :





Natural cure factors

CO2 RICH MINERAL WATERS
MOFETTA





1885 - 2014

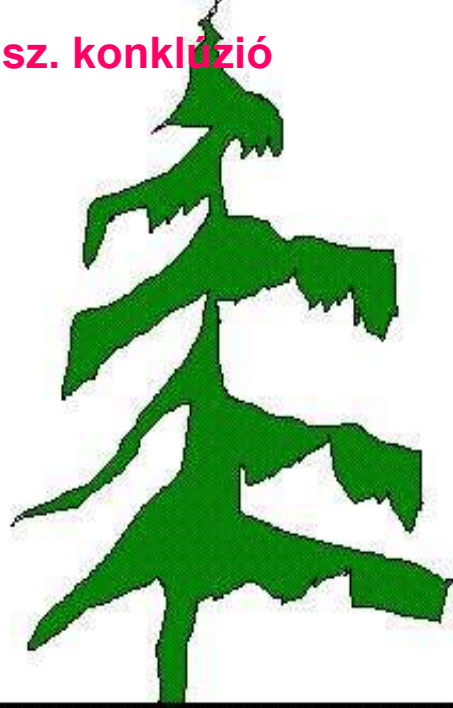


Fúrás,
168 m

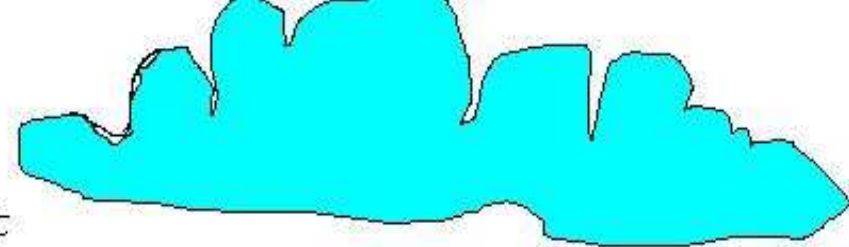




1. sz. konklúzió



Output
CO₂-
hozam



$$Q_2 = \sum \text{meteorológiai modulációk}$$

$$C = C_0 \cdot e^{-\alpha h}$$

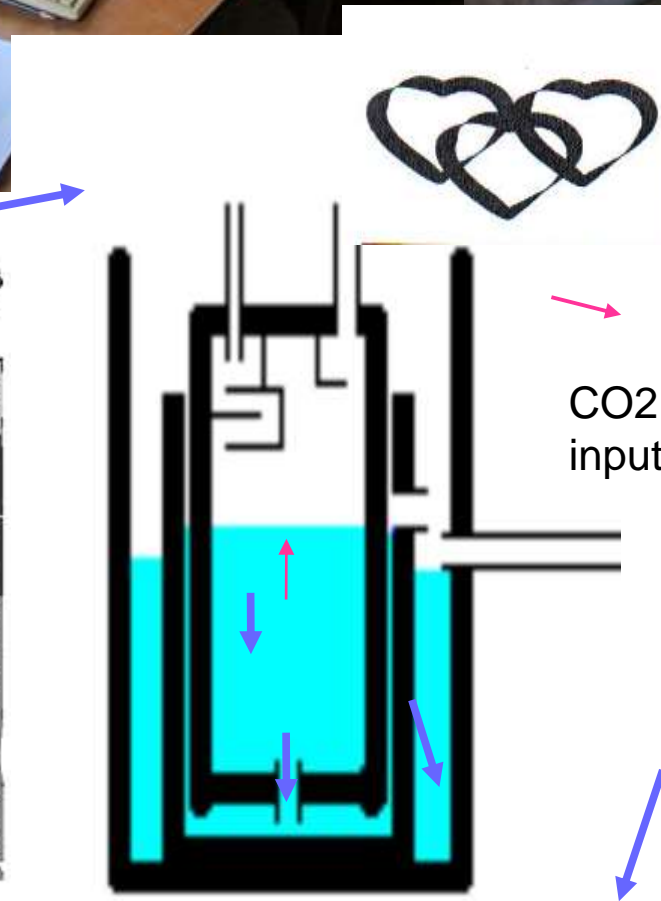
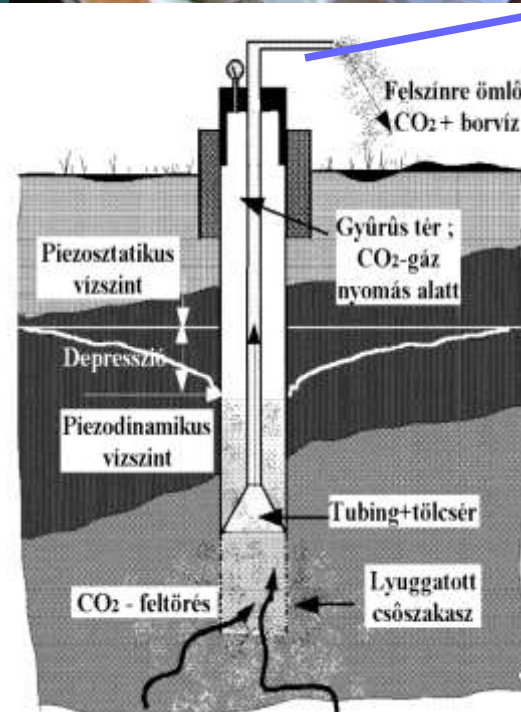
Barometrikus
formula



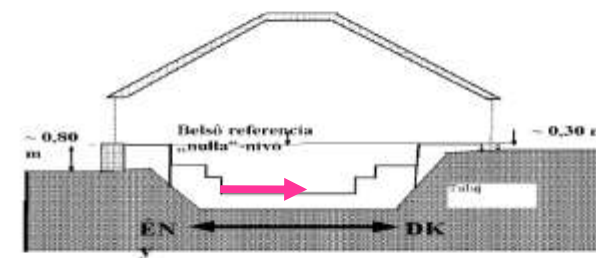
C1- Cn
az oxigén entrációs
felületek

Input
CO₂-
hozam

$$Q_1 = \sum \text{mélyszerkezeti modulációk}$$



Akusztikailag hangolt
periodikus kitörések
 $T = 85 \text{ sec.}$ Ciklusonként
átlagban 6-8 l ásványvizet és
 $\sim 140\text{-}150 \text{ l CO}_2\text{-t}$ termel a
kút, a víz ásványi sótartalma
átlagban 25 000 mg/l.
Radon222 aktivitás
Koncentráció $\sim 4 \text{ kBq/m}^3$



Szénsavas vizek

Forrás neve $\text{CO}_2 \text{ mg/l}$

Kórházfürdő II	2476
Hankó	2049
Horgas	2410
Köztársaság	2472
Closca	2520
Fő-forrás	2846

Mofetták

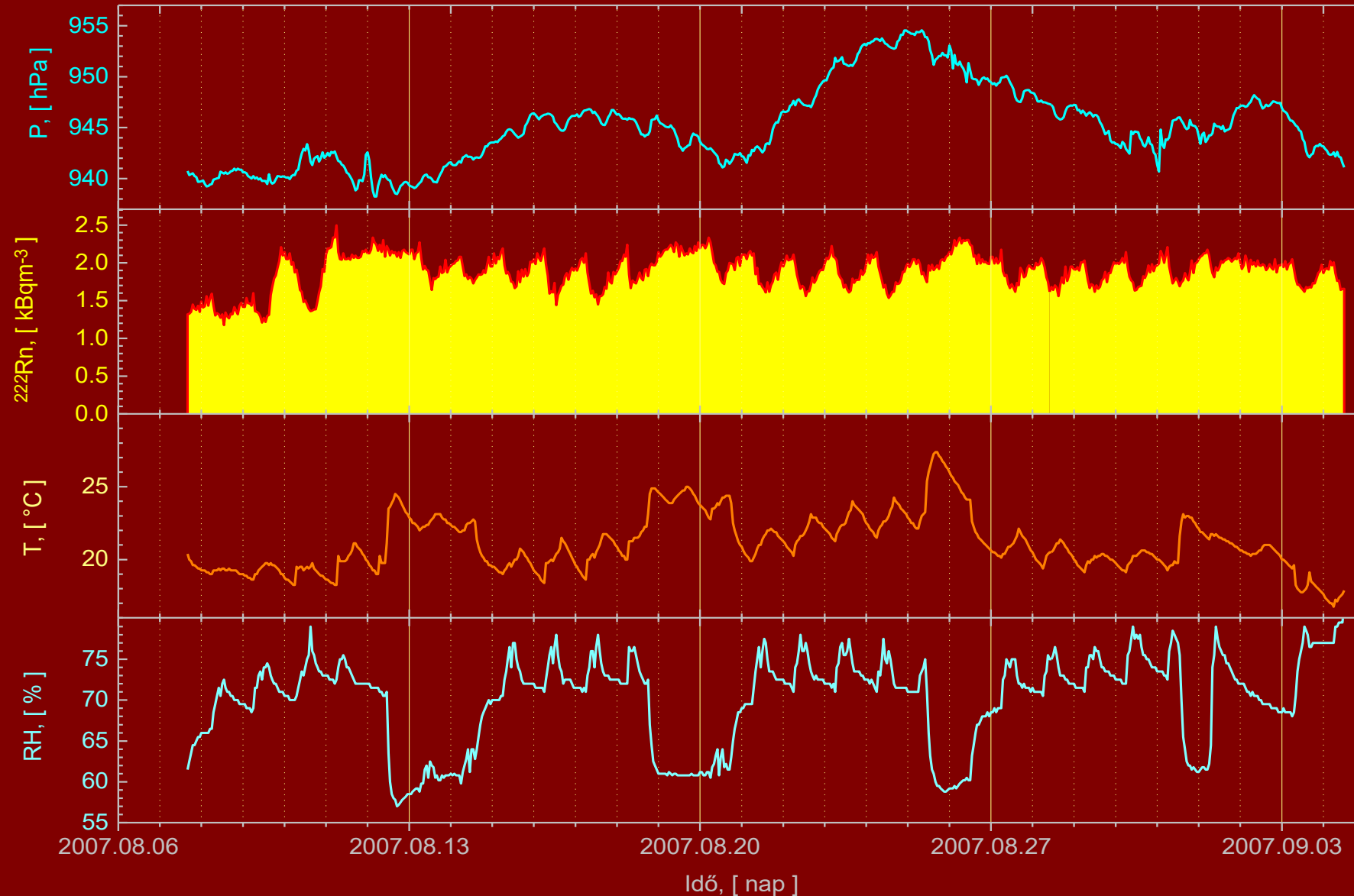
<i>Forrás neve</i>	$\text{CO}_2 \%$	$^{222}\text{Rn} \text{ kBq/m}^3$
Kórház Új mofetta	85,6	3,27
Bardócz mofetta	96,0	11,24
Hankó mélyfúrás	97,0	16,78

Mofetta gas

- Széndioxid (CO_2): 87%
- Oxigén (O_2): 1,1%
- Nitrogén (N_2): 12,9%
- Kénhidrogén (H_2S): 13 ppm
- Vízgőz (H_2O): 46,04 g/m³
- Radon(²²²Rn): 188,0 pCi/liter
- Rádium A (²¹⁸Po): 110,4 pCi/liter
- Rádium B (²¹²Pb): 51,9 pCi/liter
- Rádium C (²¹⁴Bi): 27,73 pCi/liter

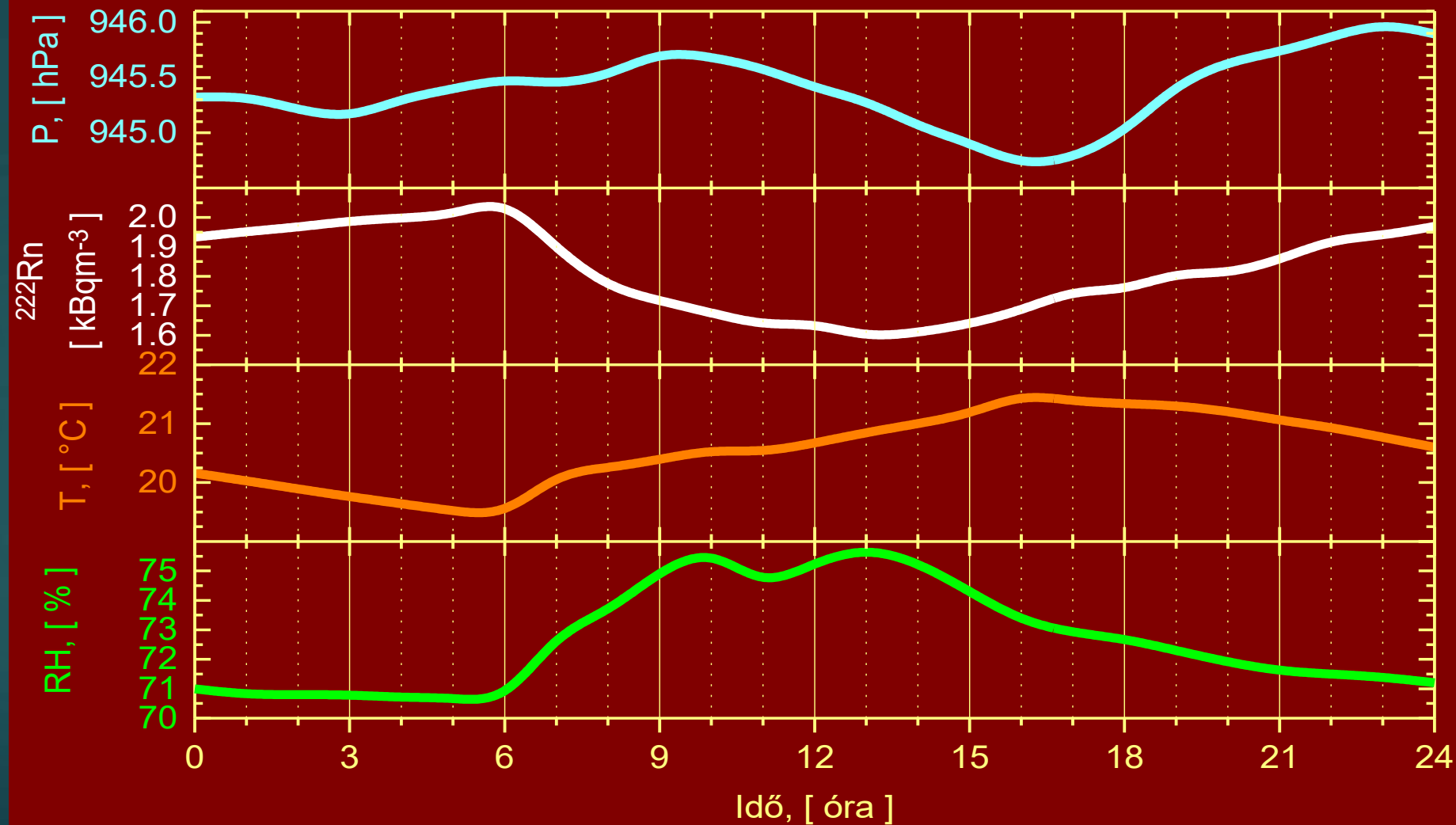


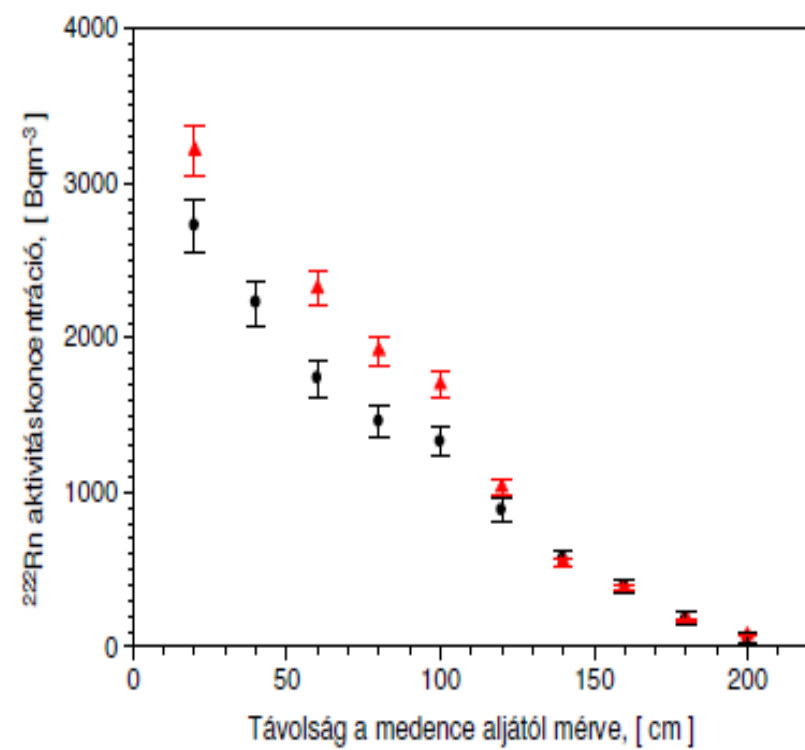
Kovászna, Szívkórház, Mofetta, -1,2 méteren a helyiség padlószintjétől mérve





Kovászna, Szívkórház, Mofetta, -1,2 méteren a helyiség padlószintjétől mérve
Átlagos napi változás hétköznapokon





Mofetta is not only a dry CO₂ bath !

- ▶ Special microclimate in mofetta
- ▶ Ra activity
- ▶ High negative ion concentration
- ▶ Some mofetta high sulphur concentration



Medical research

- ▶ Peripheral arterial disease
- ▶ Hypertensive patients
- ▶ Atherosclerotic coronary heart disease

Clinical studies

Pletiszmography

Reflexography

Infrared thermophotography

Radionuclide technique

Tissue Doppler

Farmako-kliniko-balneológiai studies

EKG,

fonocarotidogram

TA

Puls

Labor/-lactic acid



**MEDICAL RESEARCH DEMONSTRATE THE POSITIVE EFFECT OF CO₂
BATH AND MOFETTA IN PERIPHERAL ARTERIAL DISEASE**

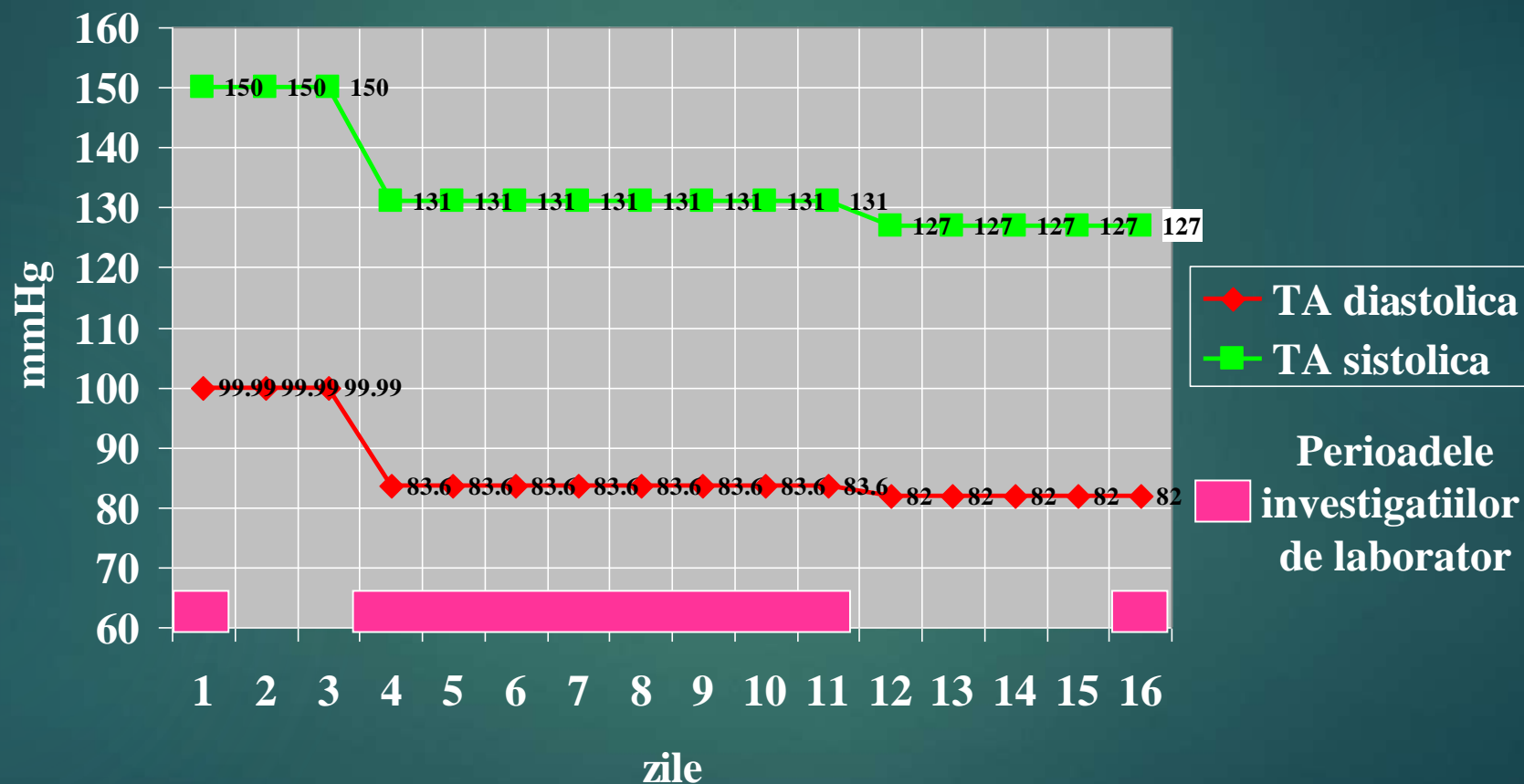
**AS RESULT OF MOFETTA THERAPIE NOT ONLY THE CIRCULATION OF
THE SKIN BUT THE ARTERIAL CIRCULATION IN THE MUSCLE IMPROVE**

IN HTA BOTH SYSTOLIC AND DIASTOLIC PRESSURE DECREASE

**IN PATIENT WITH CORONARY HEART DISEASE: PROLONGATION OF
PEP WITHOUT ANY CHANGE IN LVET**

REDUCTION OF HEART RATE

Evolution of blood pressure during the cure



“Covasna method” in cardiovascular rehabilitation

- **Nonpharmacological treatment:**
 - Natural cure factori:
 - Special microclimat
 - CO₂ bath
 - Mofetta
 - Supervised Physical training
 - Psychotherapie
 - Counselling for lifestyle change-smoking quitting
 - Diet
- **Pharmacological treatment**

Major medical recommendation

- ▶ Peripheral arterial diseases
- ▶ Hypertension
- ▶ Raynoud disease
- ▶ Microangiopathy
- ▶ Algodystrophy
- ▶ Mutiple cardoivascular risk factors

Stable atherosclerotic heart disease

- ▶ Angina pectoris
- ▶ After myocardial infarction
- ▶ After PTCA

Contra-indications

- ▶ Unstable angina pectoris
- ▶ Malignant cardiac arrhythmias
- ▶ HF st III-IV
- ▶ General contraindications:
 - ▶ Cancer
 - ▶ All acute illnesses
 - ▶ Serious psychiatric diseases
 - ▶ pregnancy



Covasna important health resort

- ▶ 1970's - Several hotels and cure centers were built in Covasna.
- ▶ 12 -mofetta open for the public
- ▶ Covasna become famous for cardiovascular treatment.



Thank You for
Your attention!