“Covasna Method”

a complex cardiovascular rehabilitation model

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CARDIOLOGIST

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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). 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.\textsuperscript{5} (ESC)
Covasna

- Covasna is also known as "the resort of the 1000 health springs®",
- Mofetta and CO$_2$ 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 (hármas határ) a Világ III. legszeizmikusabb övezete (Gutenberg, Richter 1952.) Évente ~ 3,5·10 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
  - Fotopletomography
  - labor

personalized rehabilitation program:
Natural cure factors

CO2 RICH MINERAL WATERS
MOFETTA
First mentioned in a document.

Covasna has flourished as a health resort since the 1880s.

Covasna became a town.

Several hotels and cure centers were built in Covasna.

Covasna is a nationally important spa town in Romania, famous for cardiovascular treatments.
\[ C = C_0 \cdot e^{-\alpha h} \]
Akusztikailag hangolt periodikus kitörések
T = 85 sec. Ciklusonként átlagban 6-8 l ásványvizet és ~ 140-150 l CO2-t termel a kút, a víz ásványi sótartalma átlagban 25 000 mg/l.
Radon222 aktivitás
Koncentráció ~ 4 kBq/m3
## Szénsavas vizek

<table>
<thead>
<tr>
<th>Forrás neve</th>
<th>CO₂ mg/l</th>
</tr>
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<tbody>
<tr>
<td>Kórházfürdő II</td>
<td>2476</td>
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<tr>
<td>Hankó</td>
<td>2049</td>
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<tr>
<td>Horgas</td>
<td>2410</td>
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<td>Köztársaság</td>
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<td>Closca</td>
<td>2520</td>
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<td>Fő-forrás</td>
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</table>

## Mofetták

<table>
<thead>
<tr>
<th>Forrás neve</th>
<th>CO₂%</th>
<th>²²²Rn kBq/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kórház Új mofetta</td>
<td>85,6</td>
<td>3,27</td>
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<tr>
<td>Bardócz mofetta</td>
<td>96,0</td>
<td>11,24</td>
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<tr>
<td>Hankó mélyfúrás</td>
<td>97,0</td>
<td>16,78</td>
</tr>
</tbody>
</table>
Mofetta gas

- Széndioxid (CO$_2$): 87%
- Oxigén (O$_2$): 1,1%
- Nitrogén (N$_2$): 12,9%
- Kénhidrogén (H$_2$S): 13 ppm
- Vízgőz (H$_2$O): 46,04 g/m$^3$
- Radon($_{222}$Rn): 188,0 pCi/liter
- Rádium A ($_{218}$Po): 110,4 pCi/liter
- Rádium B ($_{212}$Pb): 51,9 pCi/liter
- Rádium C ($_{214}$Bi): 27,73 pCi/liter
Kovászna, Szívkórház, Mofetta, -1,2 méteren a helyiség padlószintjétől mérve

222Rn, [kBqm⁻³]
Kovászna, Szivkórház, Mofetta, -1,2 méteren a helyiség padlószintjétől mérve
Átlagos napi változás hétköznapokon

\[
\begin{array}{c|c|c|c|c|c}
\text{RH, [%]} & 70 & 71 & 72 & 73 & 74 & 75 \\
\text{T, [°C]} & 1.6 & 1.7 & 1.8 & 1.9 & 2.0 & 2.1 \\
\text{P, [hPa]} & 945.0 & 945.5 & 946.0 & 946.5 & 947.0 & 947.5 \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c}
\text{Idő, [ óra]} & 0 & 3 & 6 & 9 & 12 & 15 & 18 & 21 & 24 \\
\hline
\text{222Rn, [kBqm}^{-3}] & 1.6 & 1.7 & 1.8 & 1.9 & 2.0 & 2.1 & 2.2 & 2.3 & 2.4 \\
\end{array}
\]
Mofetta is not only a dry CO$_2$ 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 techniquic
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 PERIPHERIAL 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 factors:
    • Special microclimat
    • CO$_2$ 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
- Multiple cardiovascular 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
DR. BENEDEK GÉZA
1916 - 2010

MEDEC PRIMAR DIRECTOR
FONDATORUL SPITALULUI

NORVÁZULATISU
UGAZDATO NÖVÖCS

Pılețui
Veni Anulul 2016
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!