The role of physical therapy in medical rehabilitation

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Physiotherapy

physis (nature)

therapy (cure)

Physiotherapy (natural energy)

Physical therapy (physical energy only)

Put energy to use:

- Hydrotherapy
- Electrotherapy
- Mechanotherapy
- Phototherapy
- Thermotherapy
- Climatetherapy
- Balneotherapy
- Inhalation
- Diet
History

caveman: sun, water, herb, rest, moving, cold, warm
Hippocrates: five basic principles of cure
1. Special diet
2. Cold & warm water use
3. Massage
4. Sport
5. Change the wrong way of live

Roman bath:

Galenus: inhalation with sea air for respiratory patients
Emperor Claudius: electrical fish into the bath of paralytic children, for headaches, for insane
(electric catfish, eel, stingray)
Vincent Priessnitz (1799-1851)
Gräfenberg – German – cold compress with spring water, first public baths with special cure

Sebastian Kneipp (1820-1897)
Bavarian catholic parson: water, air, diet, herb, ointment, life style
What do physiotherapy methods effect?

- Locomotor system (bone- & muscular system)
- Circulatory system (heart-, blood vessel- & lymphatic system)
- Viscera (digestion, respiration, secretion of urine, sexual organs)
- Nervous system & organ of sense
The kinds of energy we can use from nature

- **Electric**: natural forms: (lightning, electrical fishes)
- **Thermal**: natural forms: (sunshine, water)
- **Mechanical**: natural forms: (moving, massage)
- **Magnet**: natural forms: (magnet of the Earth)
- **Nuclear**: natural forms: (radioactive thermal water)
- **Chemical**: natural forms: (thermal water, medical mud)
Electrical energy

• 1800’s electric current was used first for cure
  • Little- (under 1000 Hz) & middle frequency (between 1 000 - 100,000 Hz)
    - Galvanic current - ions are flown
    - Hydro galvanic (electrodes are put into the water)
    - Iontophoresis - medication is admitted to the body
    - broken galvanic current - stimulation of the muscle
    - Selective muscle stimulation - can be used the degenerate muscle only
    - TENS (Transcutan Electric Neurostimulation Electroneuroanasthesia)
Thermo energy

• Treatment with external energy
  (cold- & warm)
• Thermal bath, medical mud, paraffin compress, sauna

• Treatment with internal energy:
  (big frequency current - above 100.000 Hz - microwave, decimetrewave & shortwave)
Magnetic energy

- Restore the metabolism of the cells
- There are two different types of devices commonly used in magnetic therapy: pulsed magnets that emit intermittent electromagnetic fields and permanent magnets that generate static fields of fixed strength and duration
Chemical energy

- thermal water, medical mud
  - radium water (rheumatologic complaint)
  - calcium water (calcium of the bone)
  - carbonate water (improve circulatory system)
  - sulphur (cartilage of the joints)
  - salt (gynaecology problems)
  - iodine (arthritis)
Mechanical energy

- Massage, moving

The basic of all specific functional impulse: contraction in muscles, load in bones and stretching in tendons

No movement ->
  lack of sufficient impulse ->
  atrophy and degeneration of structures
I move a lot all day... why should I do exercises!?

What is the difference between the exercises of everyday activities and physical therapy?

<table>
<thead>
<tr>
<th>Everyday exercises</th>
<th>Physical therapy</th>
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<tbody>
<tr>
<td>Aim is to fulfill the task</td>
<td>Specially defined and set aim</td>
</tr>
<tr>
<td>only the start and result are conscious</td>
<td>The set aim determines the of the movement</td>
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<tr>
<td>Often overburden the joint</td>
<td>Painless and it guarantees muscle activity even in the case of complaints</td>
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Physical therapy

It’s a special movement therapy where exercises are performed in order to restore functions of unhealthy organs or body parts always taking the whole body into considerations.
Physiology of movement

Places of possible errors in the kinetic movement

1. motor center
   » brain
   » motor pathways
2. moving organs
   » muscle
   » joint
   » bone
3. sensory feedback mechanism
   » proprioceptív system
Good effect of movement

• 3000 BC the good benefit of thermal baths were known, movement exercises were carried out

• 2698 BC China physical therapy exercises of Emperor Huan Ti - breathing and free exercises

• Hippocrates - teaches the effect of massage and movements. „Scamnum Hyppocratis“ exercise beam for correction of deformities pf the spine.
Johann Christian Friedrich Gutsmuths (1759-1839) German

Climbing exercises in Gutsmuths' Gymnastics for the Young in 1793

- Gutsmuths took his exercises mainly from Greek gymnastics
- The climbing frame was the model for the climbing apparatus
Per Henrik Ling

(1776–1839) Swedish medical-gymnastic practitioner

He elaborated a system of gymnastics, divided it into four branches:

(1) pedagogical,
(2) medical,
(3) military,
(4) aesthetic, which carried out his theories
Gustav Zander

- doctor from Stockholm
- The Zander machines represent a revolution in physical therapy.
- 67 db medico - mechanic apparat
Hungary

• 18th century: national body exercises club with a gymnastic master from abroad for children

• 1868 National Gymnastics Association - first training: teachers of PE => independent of the German school
• 1862 first ladies’ gymnastics specialist book: „Woman educational exercises“

• 1883 first monthly journal: „Case of the gymnastics“
The **physiotherapy** with the therapeutic gymnastics began to develop in the **19th century**.

At first the **orthopedic doctors** used physiotherapy. They were the first who applied **gymnastics**.

Orthopedic doctors used
- gym hall (wall bars, gymnastic desk, etc.)
- body moving machine (Gustav Zander)
- bathing pool (bathing therapy and moving in water)
Madzsar Alice

The founder of the Hungarian physiotherapy

Teacher’s College of the Functional Gymnastics private school

Budapest, 1912 -1937

Alice Jászi 1885 - 1935

- Artist of movement choreographer,
- dancing instructor
Aims in the physical therapy

I. Rehabilitation of the damaged segments

II. The implementation of corrected segments
  - Overcome pain
  - Decrease the limitation of movement
  - Development of muscle strength
  - Decrease os circulatory system
  - Teaching correct breathing
Methods

1. Individual physical exercise (isometric, active with help, active, resistant subaqual)
2. Group physical exercise (gym, subaqual)
3. Passive techniques
   - Different positions
   - Passive motions
   - Supplementary treatments
     - massage
     - Hydro-, balneo-, thermotherapy
     - Electrotherapy
     - Special treatments (stretching, relaxation, PNF)
Single physical exercise

- Primary aim: rehabilitation of function (re-education)
- Decrease of function:
  - Qualitative (decreased ROM)
  - Quantitative - big loss of function
Subaqual exercises

- Effects of the water
  (physical, chemical, psycho)
- Optimal expectations
  (temperature, cleanliness)
- Ability and condition of the patients
- Implied individually or in group work
Group physical exercises

- Damaged body parts
- Functional condition
- Optimal circumstances (instruments and devices)
- Cooperation of the patient
- Ideal group number (10-15 people)
- Time (15-30 minutes)
Passive techniques

Passive motion - used only in special cases

- Degenerated body parts, lack of active muscle function, free joints
- Mustn't be used for treatment of contractures

Mustn't causes any paint!!
Movement is a natural function restoring method which cannot be replaced by any other treatment!