Knowledge transfer

The concept of respiratory decongestion for infants in physiotherapy
Plan

- The health care position
- Simulators in health practice
- Professional case analysis
- Learning methodology applied
- Conceptual approach
- Mechatronic process applied
I. The health care position

- Physiotherapy care is normally not a subject intended for instruction
I. The health care position

- The duration of periods of epidemic limits the number of cases

- Fragility of infants
II. Simulators in health practice

- Training
  - Simulators in health practice
- Health care safety
- Restating the intellectual approach
- Repeat movements
- Positive results for the patient.
II. Simulators in health practice

Simulator’s objective:

To transform a working situation into a forum for learning in physiotherapy
III. Professional case analysis
Modelling from areas of expertise

III. Professional case analysis

- Presciption exogenous
- Problem area
- Presciption endogenous

- Theoretical references
- Professional model
- Clinical reasoning

- Professional references

- Area satisfaction
IV. Learning methodology applied

Learning conditions and cognitive parameters are established by instruction
IV. Learning methodology applied: professional skills

- Autogenous draining technique or slow prolonged exhalation or increased exhalation flow

- Limitation on the increase of flow has been well documented

- The precise details of this limitation inside the lung remain outside the scope of researchers in fluid mechanics.
B. Mauroy et coll. have modelled the draining-off of mucus and recommend approaches for better understanding the movements of secretions within the digitized bronchial system.
IV. Learning methodology applied: Scientific knowledge

7th generation bronchus obstructed 75% of the air velocity in the trachea: 5m/S
IV. Learning methodology applied: Scientific knowledge

7th generation bronchus obstructed 75% of the air velocity in the trachea: 10m/S
Below a certain threshold the airflow is insufficient to mobilize secretions
IV. Learning methodology applied:

- Instructive learning in physiotherapy consists of writing research references in order to build a common knowledge base.

- It doesn’t mean that everyone necessarily agrees.
V. Conceptual Approach: clarification

« After taking into account all aspects of a complex and diverse subject matter, the aim is to extract all the relevant facts and figures from the case being treated »
V. Conceptual Approach : Relevant factors

- Research into dynamic space
- Localisation of secretions and clinical efficiency of the mobilisation of secretions.
- Tolerance threshold of bronchial compression
- Infant safety
V. Conceptual approach: Dynamic examination of the system

<table>
<thead>
<tr>
<th>Four invariables</th>
<th>Two indicators:</th>
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<tbody>
<tr>
<td>➢ Research space allowed</td>
<td>➢ Sounds</td>
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<tr>
<td>➢ Localisation and clinical efficiency of mobilisation of secretions</td>
<td>➢ Haptic senses</td>
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**Four invariables**

- Research space allowed
- Localisation and clinical efficiency of mobilisation of secretions
- Tolerance threshold of bronchial compression
- Infant safety

**Two indicators:**

- Sounds
- Haptic senses
V. Conceptual Approach : Knowledge transfer

- Concept of invariables
- Management of their relationships
- Focal point of the training
- Core physiotherapy knowledge in this discipline
### V. Conceptual Approach

#### Physiotherapy: Clinical situation:
**Pharynx clearance and Lower Airways clearance**

<table>
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<th>Clinical group</th>
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<tr>
<td><strong>Input</strong></td>
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<tr>
<td>- Obstruction of upper airways secretions</td>
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<tr>
<td><strong>Location</strong></td>
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<tr>
<td>- Inhalation noises</td>
</tr>
<tr>
<td><strong>Invariables</strong></td>
</tr>
</tbody>
</table>
| - Localisation
  - Mobilisation
  - Thoracic and bronchial structure | Sputum |
| **Output**     |
| - Upper airways clearance | Exhalation noises VC-VRE; airflow maintained; few or no secretions; interrupted airflow |
| | Vibrations, Increase in wet noises or no change: appropriate medication |
| **Safety group** |
| - Exhalation flow increase small airways |

**Internal Notes:**
- Vibrations, Increase in wet noises or no change: appropriate medication.
VI. Mechatronic process applied: First prototype

- Natural breathing generation system
- Pressure measurement

[Images of a baby mannequin and a detailed view of the system]
VI. Mechatronic process applied: Tests

➢ Final tests by expert physiotherapists
VI. Mechatronic process applied: Torso simulator

Torso simulator

Application of a simulator could facilitate this process
VI. Mechatronic process applied:

The Health Authority states:

This is an important methodology for use in future programs of Continuous Professional Development
References


Mauroy B, Fausser C, Pelca D, Merckx J and Flaud P, Toward the modeling of mucus draining from the human lung: role of the geometry of the airway tree