

CHEST TREATMENT OF THE HEAD INJURED PATIENT REQUIRING INTERMITTENT POSITIVE PRESSURE VENTILATION (I.P.P.V.)[†]

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Van die pasiënte met hoofbeserings wat gedurende 1975 in Grootte Schuur-hospitaal toegelaat is, het ongeveer 16% endotracheale buise of 'n trageostomie benodig en 45% van die pasiënte met trageostomies het intermitterende positiewe druk-ventilasie benodig.

Dit blyk dus wenslik, selfs essensieel, te wees dat die fisioterapeut wat in 'n neurochirurgiese eenheid werk, veral as dit ook 'n intensiewe sorgeenheid het, haar moet bekwaam sover doeltreffende respiratoriese fisio-terapie aanbetref. Die fisio-terapie-prosedures word bespreek.

Of the recorded admissions of head-injured patients at Grootte Schuur Hospital during 1975, approximately 16% required endotracheal intubation or a tracheostomy, and approximately 42% of these intubated or tracheostomised patients required intermittent positive pressure ventilation.

It seems desirable, if not essential, for a physiotherapist working on a neurosurgery unit, containing an Intensive Care Unit, to be competent in the performance of effective chest physiotherapy.

First Aid Measures

Today, improvement in resuscitation and intensive care techniques ensures the survival of patients who, in former times, would not have been with us to necessitate discussion of the head-injured patient requiring intermittent positive pressure ventilation.

Any head-injured patient who has some degree of loss of consciousness needs a patent airway and adequate ventilation as first aid measures. These can be achieved with positioning, suction of the nasopharynx, insertion of a mouth airway, endotracheal or tracheostomy tube and, if spontaneous ventilation is still inadequate, some form of artificial ventilation.

Causes of respiratory distress in the head-injured patient

Respiratory distress in the head-injured patient may be due to one of several causes, or a combination of these.

1. Airways obstruction due to:—
 - (a) the tongue falling back and occluding the airway when the patient is in the supine position;
 - (b) inhalation of nasal secretions, vomitus or blood from fractures of base of skull, jaw and facial bones or from facial lacerations.
2. Depression of brain-stem function leading to:—
 - (a) loss of control of rate and depth of respiration;
 - (b) depression or loss of normal cough reflex;
 - (c) inability to swallow mucus, vomitus and blood.
3. Associated injuries.

Approximately one third of all head-injured patients have associated injuries.¹ These may require the physiotherapist to modify her treatment and may include:

- (a) chest injuries involving chest wall, pleurae, lungs;
- (b) cervical cord lesions resulting in paralysis of respiratory muscles;
- (c) limb fractures;
- (d) visceral damage.

If the head-injured patient requires an anaesthetic for any reason the magnitude of the physiotherapist's task is increased.

Importance of preventing respiratory inadequacy

A restricted airway or hampered respiration due to any of the above causes can cause carbon dioxide retention. A raised PCO₂ causes vasodilatation. Vasodilatation within the skull causes a raised intracranial pressure which, directed down and centrally towards the brain stem, can cause irreversible brain damage or death.

Aims of treatment of the head-injured patient on I.P.P.V.

The physiotherapist's role in the treatment of the patient's chest during the period of assisted or artificial ventilation may be a life-maintaining, and a life-saving one. The aims of treatment are:—

1. To keep the patient's chest clear and to prevent atelectasis.
2. To be aware of, to treat and to stimulate the whole patient at all times.

It is always essential to appreciate the nursing routine in the Intensive Care Unit. It is necessary to work closely with nursing staff, e.g. when turning and positioning the patient and when treating his chest and pressure areas. Total care of the patient is the outcome of good teamwork in the Intensive Care Unit.

Means of treatment:—

1. Postural drainage

Is tipping, even turning, the head-injured patient permissible? Yes, if the neurosurgeon and/or anaesthetist, the patient's condition and other injuries (e.g. chest injuries and limb fractures) permit it. The outcome of inadequate treatment of a serious chest condition may outweigh the dangers of a possible raised intracranial pressure with postural drainage. The neurosurgeon may consider the raised intracranial pressure of little significance if the patient is tipped for the duration of physiotherapy treatment only. Always position the patient securely, replace restraints (if any) and be in a position to observe the patient constantly during the period of postural drainage.

2. "Sighing"

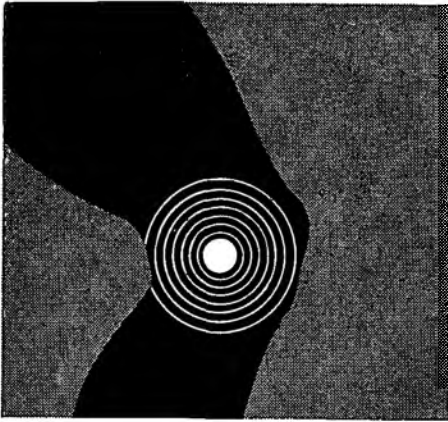
This procedure may be performed to compensate for the loss of the deep sigh mechanism. The patient's condition may not permit "sighing", e.g. if he has a pneumothorax or low blood pressure.

3. Manual techniques

These include passive mobilization of trunk and

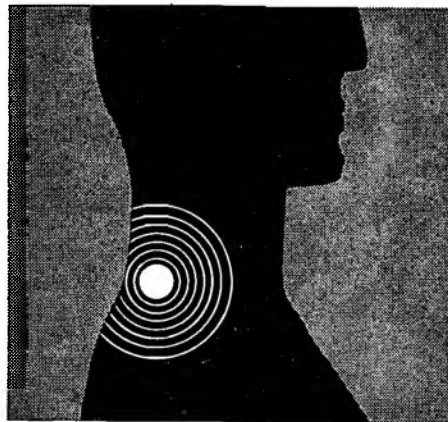
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[†] Adapted from a paper delivered at a post graduate course on "Early Treatment of the Head-Injured Patient" held at the university of Cape Town, July 1976.



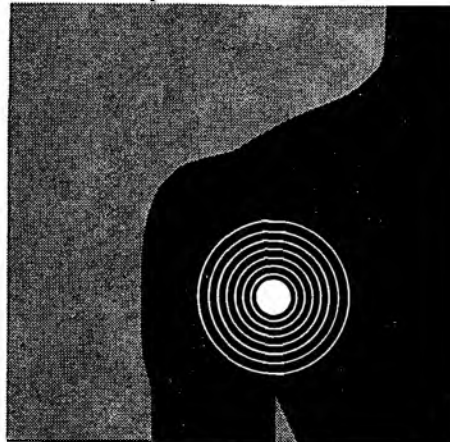
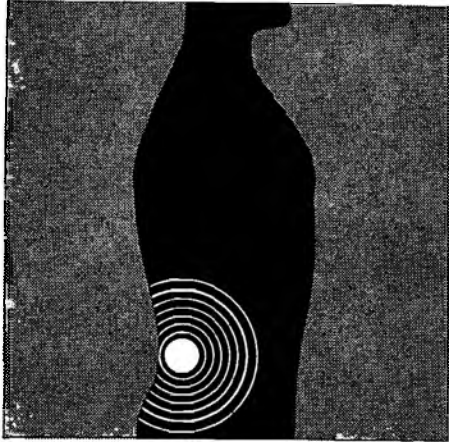
1. Rheumatic pains in joints and muscles

3. Muscle cramps and stiffness



2. Fibrositis

4. Other local pains and aches



S1

Formula:
Diethylamine
Salicylate 10 g
Nopoxamine 1 g
Excipient q.s.ad. 100 g

pain is our scene...

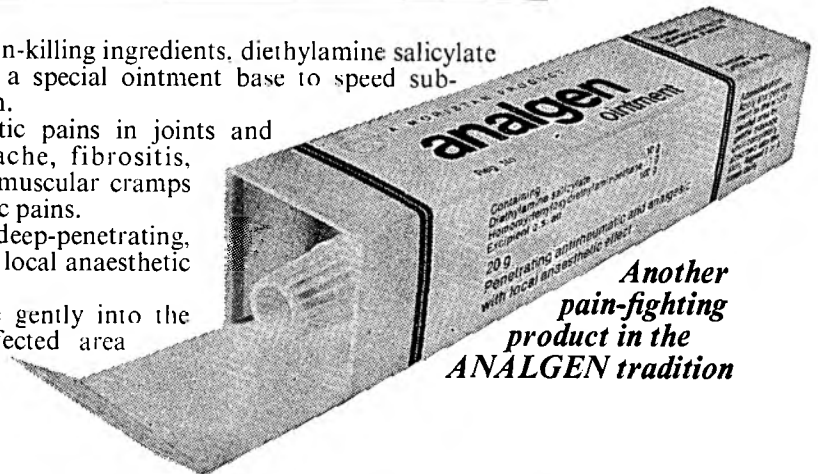
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Formulation: Two pain-killing ingredients, diethylamine salicylate and nopoxamine, in a special ointment base to speed sub-cutaneous penetration.

Indications: Rheumatic pains in joints and muscles, low backache, fibrositis, sprains and bruises, muscular cramps and stiffness, neuralgic pains.

Action: Soothing, deep-penetrating, rapid pain-relief with local anaesthetic effect.

Application: Massage gently into the skin around the affected area until completely absorbed. Apply as often as required.



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shoulder girdle, percussion, shaking, rib springing and vibrations. If the patient has chest injuries, carefully applied vibrations may be the only safe technique.

4. **Suctioning**

The physiotherapist aims to reach, with the suction catheter, the secretions she has mobilised by means of postural drainage, "sighing" and manual techniques, and, if possible, to stimulate a cough reflex. The physiotherapist must keep her technique as sterile as possible and suction as quickly but as effectively as possible. Suction of the nose and mouth must be performed if the patient cannot swallow. If the patient has a fracture of the base of the skull with a cerebrospinal fluid leak, as a clear colourless rhinorrhea or with bleeding via the nose, nasal suctioning must be omitted.

5. **Communication**

Most important of all the unconscious patient leads a very lonely life, so talk to him.² Speak to the patient in his own language if you can. Call the patient by his Christian name. Tell the patient what you are doing, what you are going to do, why you want to do it, and how you want him to try to help you.

The level of consciousness of the patient will determine how active a part he plays in his treatment, but he must be given the benefit of the doubt, and every encouragement.

Do not be silent during treatment. Do not shout at the patient. Do not exclude the patient from your conversation with colleagues. *Never* pass discouraging remarks about the patient's condition and prognosis within possible hearing of even the apparently deeply unconscious patient. The patient who recovers consciousness and is maintained on assisted ventilation because of chest injuries needs limitless reassurance.

Frequency of treatment

The patient must be treated as often as his condition demands and circumstances permit, remembering that physiotherapy must be combined with the nursing programme, e.g. the normal turning, feeding and observation routines.

CONCLUSION

It is a sobering thought and a clear injunction to the conscientious physiotherapist when one realizes that inadequate ventilation of the head-injured patient, and that includes the consequences of ineffective chest physiotherapy, may make an otherwise recoverable brain injury, irrecoverable.

References

1. Jennet, W. Bryan. *An Introduction to Neurosurgery*,

3rd Ed. William Heineman Medical Books Ltd., London, 1973.

2. McGuire, J. The Early Treatment of the Head-injured patient, *S. Afr. Jnl. of Physiother.*, 29, 1, 3, 1973.
3. Proctor, H. Head Injuries, *Physiother. Jnl. of Char. Soc.*, 59, 12, 385, 1973.

FILMS

FILMS TO BE ADDED TO REVISED CATALOGUE — N.B. Most have not been reviewed but are taken from the new Catalogues.

PAEDIATRICS

1. Developmental tests in the early diagnosis of Cerebral Palsy (1964) (33), 16 mns, B/W, So. Beautifully made film presenting 10 simple tests for Cerebral Palsy.
2. Child Development — The Twelve Months Examination (6) Cat. No. 50 231 B — 13 mns.
3. Child Development — The Two Year Examination (8) Cat. No. 50 360 B — 15½ mns.

GENERAL MEDICINE AND SURGERY

1. Clinical Leprosy (8) — Cat. No. UA/859 C

ORTHOPAEDICS

1. Tendon free grafting demonstrated on a case of Leprosy of the Hand (6) C. So. 20 mns.
2. Total Hip Replacement (18) 22 mns, C. So.
3. Total Knee Replacement (18) 41 mns, C. So. Shows 4 different types of total knee replacement procedures.

CARDIO-THORACIC

1. Auscultation of the Heart — Mitral Stenosis (18) 20 mns, C. So. Shows technique of auscultation and its use in diagnosis of Mitral Stenosis.
2. Surgical treatment of Coronary Heart Disease (18) 22 mns, C. So.
3. Transaortic repair of Ventricular Septal Defect (18) 18 mns C. So.
4. The Cough — Diagnosis, Management, Research (18) 26 mns, C. So. Illustrates mechanism, function, diagnosis and management of the Cough.

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