

Intercorrências

- Hipoventilação
- ↓ SpO₂
- Apneia
- Engasgo
- Aspiração
- Secreção brônquica

Complicações

- Atelectasia
- Pneumonia
- Insuficiência respiratória

Fraqueza muscular inspiratória

- Otimização da ventilação pulmonar
- Ventilação não invasiva – BIPAP
 - Interface
 - circuito
- Capacidade de insuflação máxima
- Empilhamento de ar (air stacking)
 - ressuscitador manual “ambú”
 - Máquina de tosse
- Respiração glossofaríngea
- Ventilador mecânico

RESEARCH ARTICLE

Open Access

Noninvasive ventilation reduces energy expenditure in amyotrophic lateral sclerosis

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Table 2 Evaluation of ventilatory variables on noninvasive ventilation

	Spontaneous breathing in room air	Noninvasive ventilation median [1 st -3 rd quartiles]	p-value
VT (ml)	406.8 [289.5-486.8]	535.7 [450.8-578.4]	0.003
RF (/min)	17.6 [14.7-23.9]	15.4 [14.5-18.4]	0.02
Ventilation (l/min)	7.1 [6.5-7.9]	8.3 [7.5-9.9]	<0.001
PaCO ₂ (mmHg) (n = 12)*	47 [43-48]	41.5 [38-44]	0.002
PaO ₂ (mmHg) (n = 12)*	60 [65.7-75.2]	88.5 [70-97.5]	0.005
A-a gradient (mmHg) (n = 12)*	23.1 [16.6-27.6]	9.2 [3.9-29.3]	0.03
VD (ml) (n = 12)*	117.7 [78.2-141.6]	178.9 [152.6-211.8]	0.01
Time spent with SpO ₂ < 90% (% of recording time)	30 [6.2-72]	1 [1-3]	<0.001

Abbreviations: A-a gradient for Alveolar-arterial gradient, PaO₂ arterial oxygen tension, PaCO₂ arterial carbon dioxide tension, RF Respiratory Frequency, SpO₂ transcutaneous pulsed oxygen saturation, VT for tidal volume, VD dead space volume (calculated using Bohr formula, note that non invasive ventilation efficiently corrects PaCO₂ in spite of an increased VD -expected-).

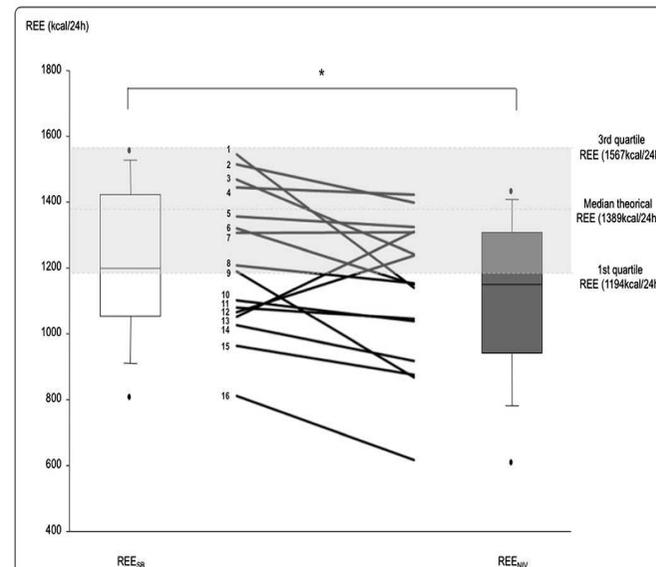


Figure 2 Resting energy expenditure (REE) in the study population (box-and-whiskers) with indication of individual data (solid lines) during spontaneous breathing (REESB) and noninvasive ventilation (REEnv). The limits of the boxes correspond to the 25th and 75th percentiles of the distribution, with indication of the median as the black solid lines within the boxes. The whiskers represent the 10th and 90th percentiles, respectively, and the black dots indicate the extreme values. The gray area corresponds to the interquartile space of REE predicted according to the equation of Harris and Benedict.



ELSEVIER

Bipap improves survival and rate of pulmonary function decline in patients with ALS

Kleopas A. Kleopa^a, Michael Sherman^b, Bettie Neal^c, Gary J. Romano^a, Terry Heiman-Patterson^{a,*}

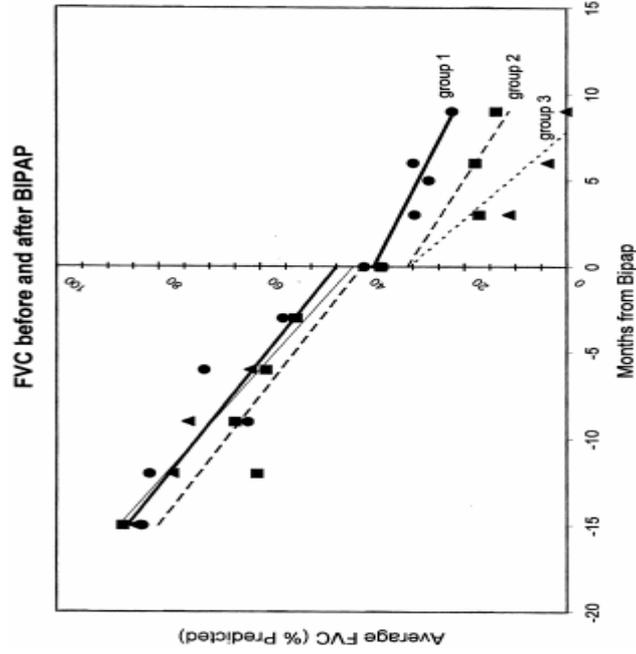
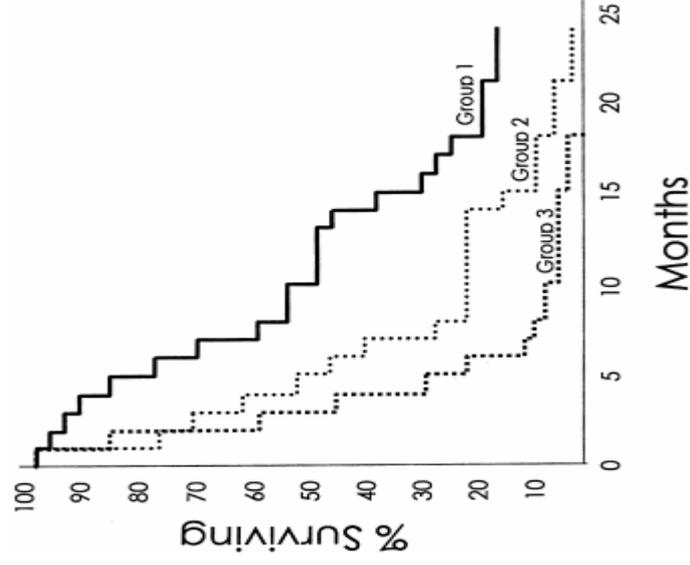


Fig. 4. Average slopes of %FVC decline before and after Bipap introduction in the three groups (●: group 1, ■: group 2, ▲: group 3).

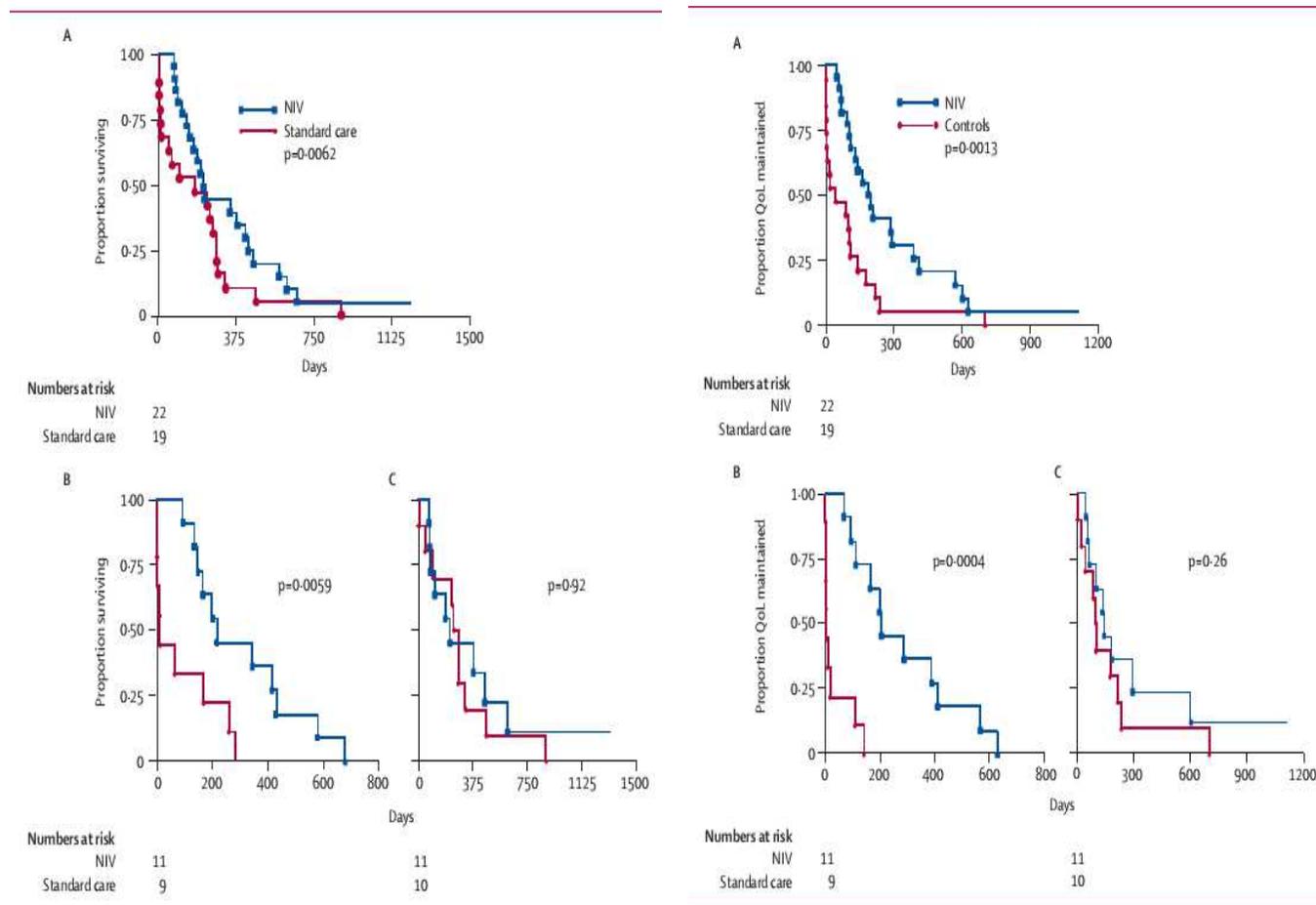




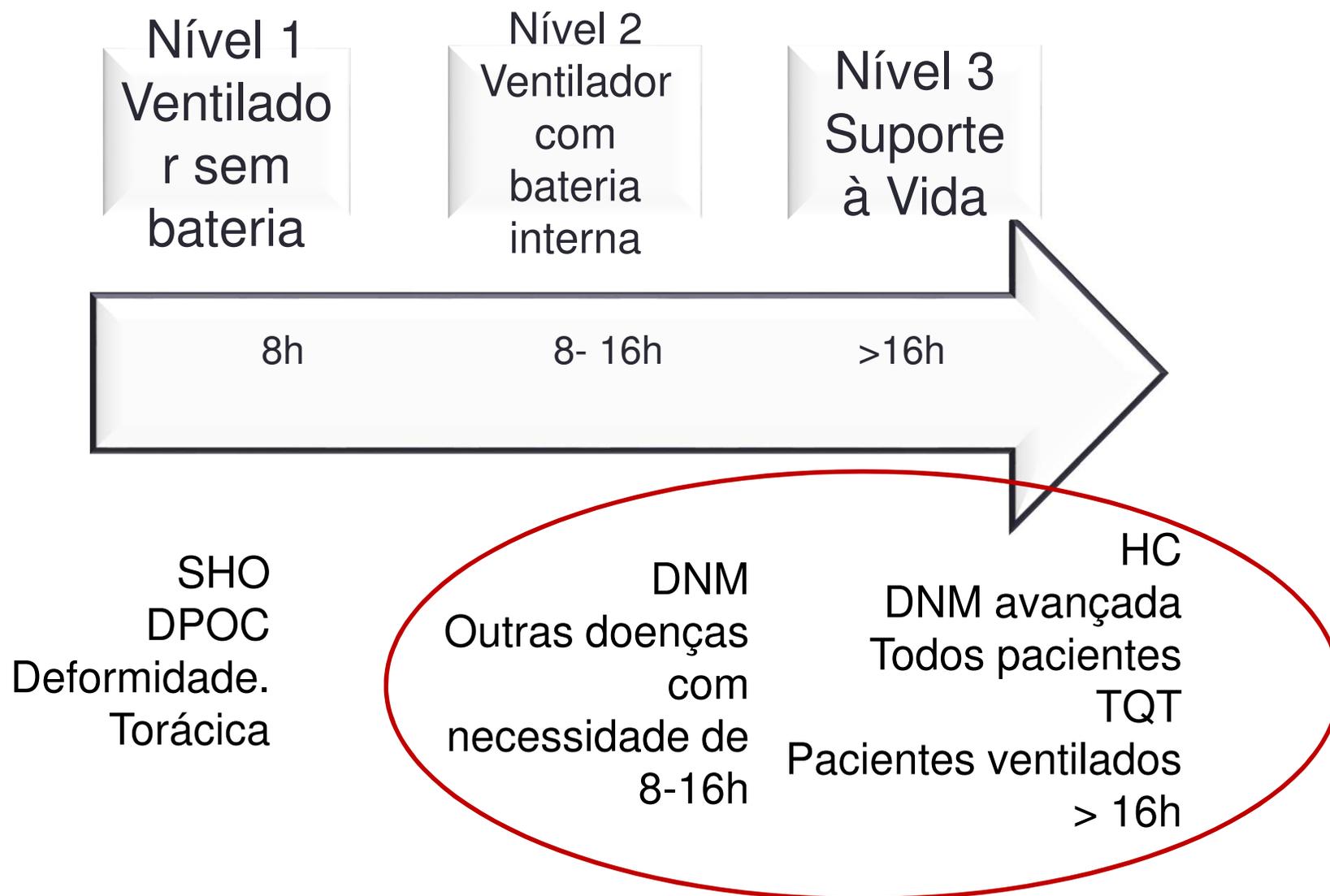
Effects of non-invasive ventilation on survival and quality of life in patients with amyotrophic lateral sclerosis: a randomised controlled trial

Lancet Neurol 2006; 5: 140–47

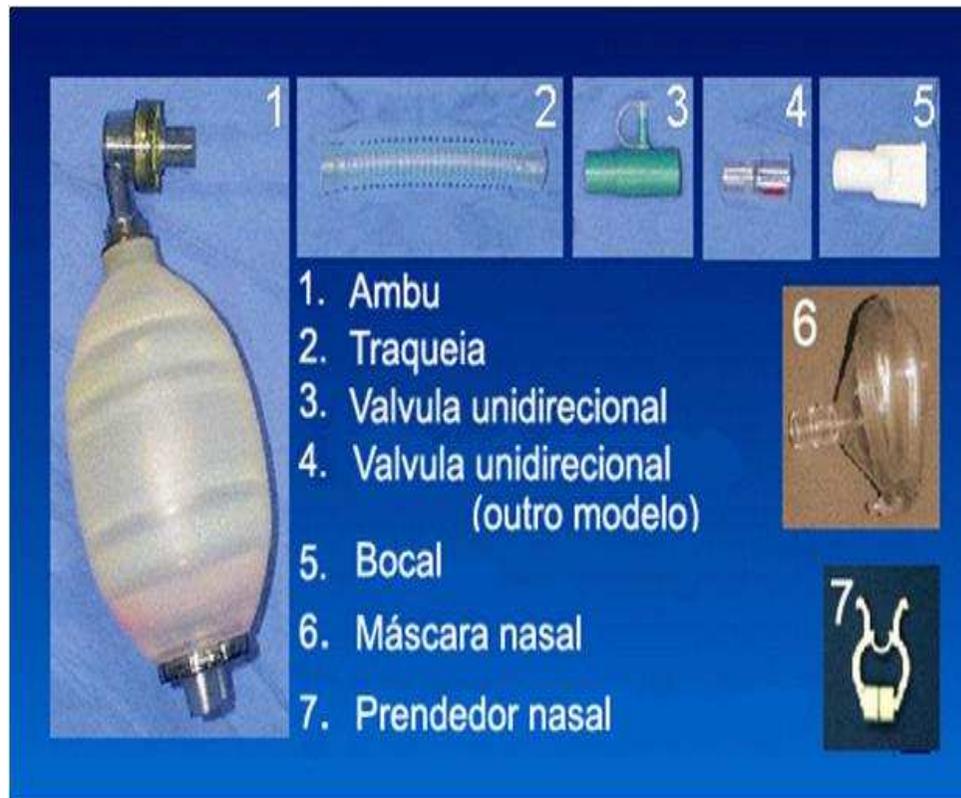
Stephen C Bourke, Mark Tomlinson, Tim L Williams, Robert E Bullock, Pamela J Shaw, G John Gibson



Classificação - 2012



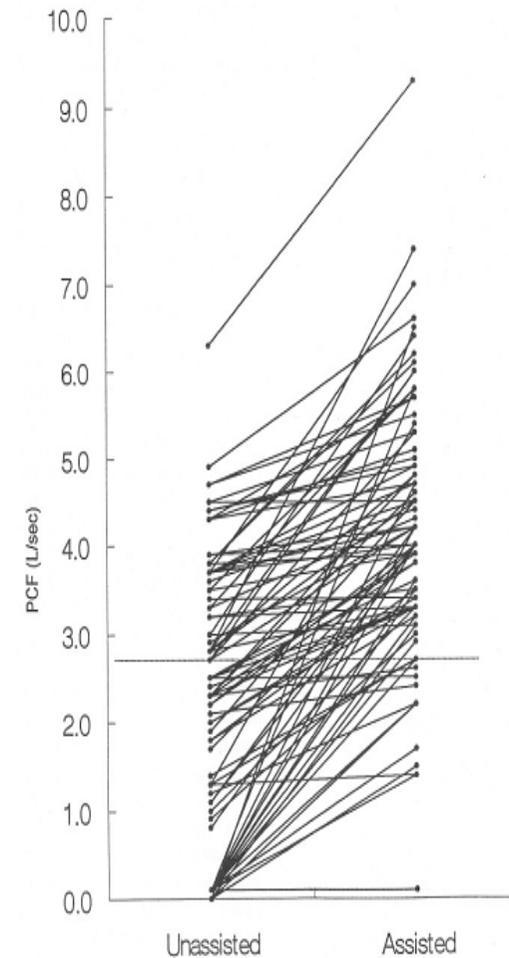
Capacidade de Insuflação Máxima



Exercícios de expansão pulmonar

Capacidade de insuflação máxima - ambú

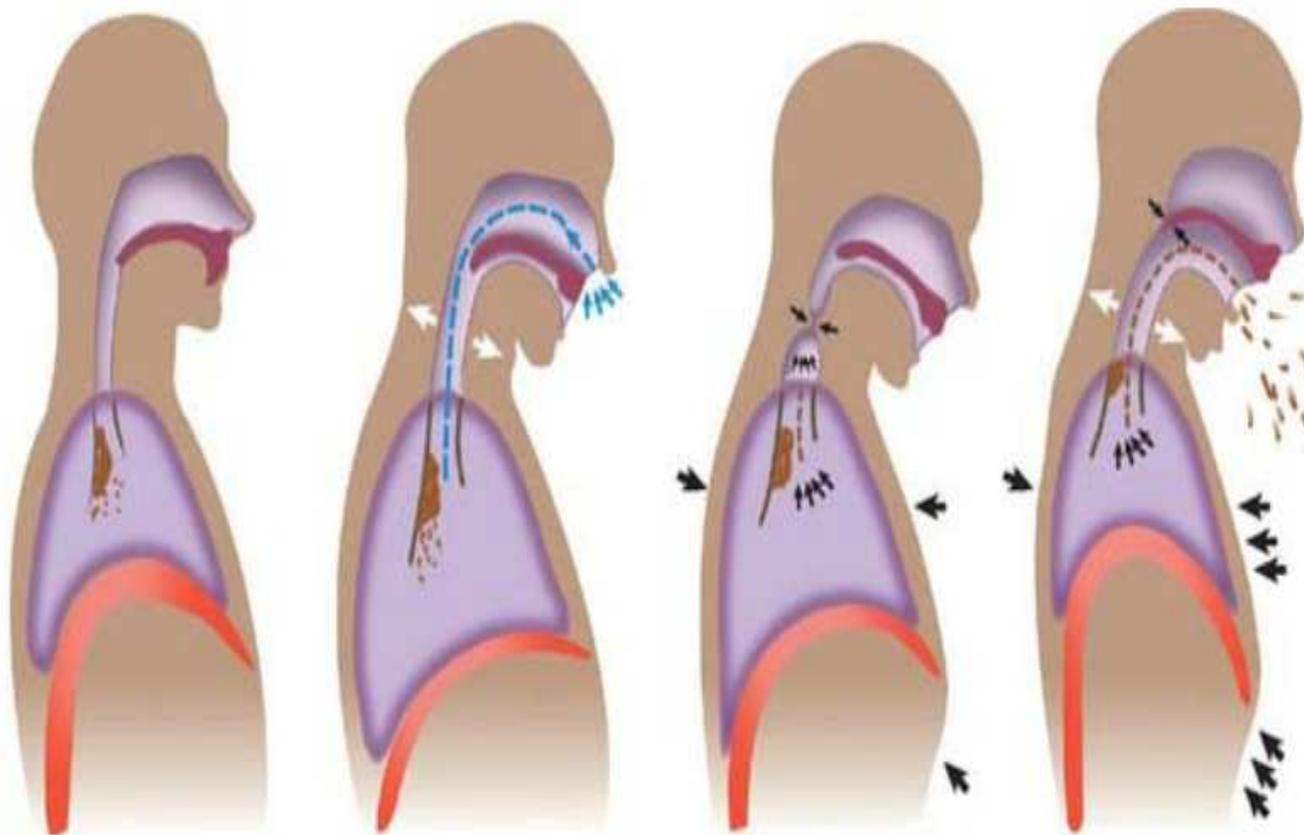
- Melhorar a efetividade da tosse
- Manutenção da complacência pulmonar e torácica
- Prevenir atelectasia
- Infecção das VAS
- Redução da hospitalização
- Aumento da sobrevida



Fraqueza muscular expiratória

- Assistência à tosse
 - Manual
 - Mecânica – máquina da tosse

Tosse



Irritação

Inspiração

Compressão

Expulsão

Avaliação da tosse

- pressão expiratória máxima
- pico de fluxo expiratório
- **pico do fluxo da tosse**

faixas de risco para tosse:

> 270 l/min → bom

160 - 270 l/min → moderado

< 160 l/min → ruim

*Am J Phys Med Rehabil. 2000;
79: 222–227.*

Otimização tosse

PFT < 270 L/min

Tosse manual

Capacidade de Insuflação Máxima
(CIM)

PFT < 245 L/min

Tosse manual + Capacidade de
Insuflação Máxima

PFT < 155 L/min

Máquina da tosse

Chatwin, M (2009) Mechanical aids for secretion clearance., International Journal Of Respiratory Care Autumn/Winter, p50-53.

Máquina da tosse

the
COF-FLATOR[®]
PORTABLE COUGH MACHINE



"... exsufflation with negative pressure
to remove secretions from the
respiratory tract."

O-E-M CORPORATION

EAST HAVEN, CONN.

FIGURE 4 1952 Cof-flator manufacturer's manual.

Woman campaigns to have 'cough' machine on market

By NANCY JAEKLE
The Daily Journal

A portable cough machine, no longer manufactured today, once saved Florence Lunde's life.

And now she has launched a one-woman campaign to return the device to the market.

"I was alone in the house and I was eating an apple and I choked on the fluid and the pulp and I could do nothing. Somehow, I managed to get to the machine and it saved my life," the Bronx resident said.

The inability to cough threatens the lives of about 500,000 people nationwide. Because they are unable to cough on their own, these people must rely on artificial methods to rid themselves of unwanted secretions.

Known as the Coflator, the portable cough machine overcomes bronchial non-drainage, caused by abnormalities of natural mechanisms, by means of exsufflation. It creates a suction effect which triggers a cough in the patient.

There are approximately 50,000 people with neuromuscular problems such as muscular dystrophy, multiple sclerosis and myasthenia gravis. Geriatrics also have weak coughs.

About 10,000 people use ventilators of all types; however, there are just 200 Coflators in the country.

"The Coflator was originally made in 1945 for polio patients. But thanks to the Salk vaccine, polio has been eliminated. Therefore the companies stopped making these machines. Until now, Life-Care, which is the vendor for the respiratory equipment has



KATHERINE FREDRICH THE DAILY JOURNAL

Florence Lunde, who suffers with respiratory post polio, demonstrates the use of a Cof-flator.

been repairing it, but they have stopped," Lunde said.

Lunde said the company claims it is not a profit-making venture.

As of 1988, Life-Care has given Coflator units to patients without responsibility for repairs or parts.

"As of last summer there was a commitment to make the Coflator. The first prototype was unsatisfactory. The second prototype was satisfactory. However, there is difficulty because of the stringent rules of the Food and Drug Administration to develop this product due to cost and time consumption," said Dr. August Alha of the New York University Medical Center's Goldwater Hospital for long-term

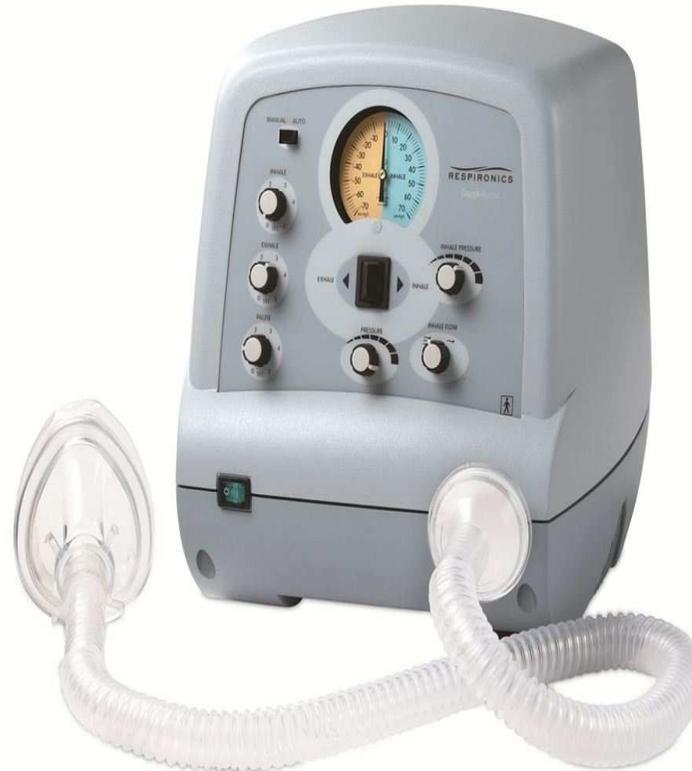
care. The Coflator keeps Jimmy Starita alive. Jimmy, now 19, has Bruchname's muscular dystrophy and was not expected to live past 15.

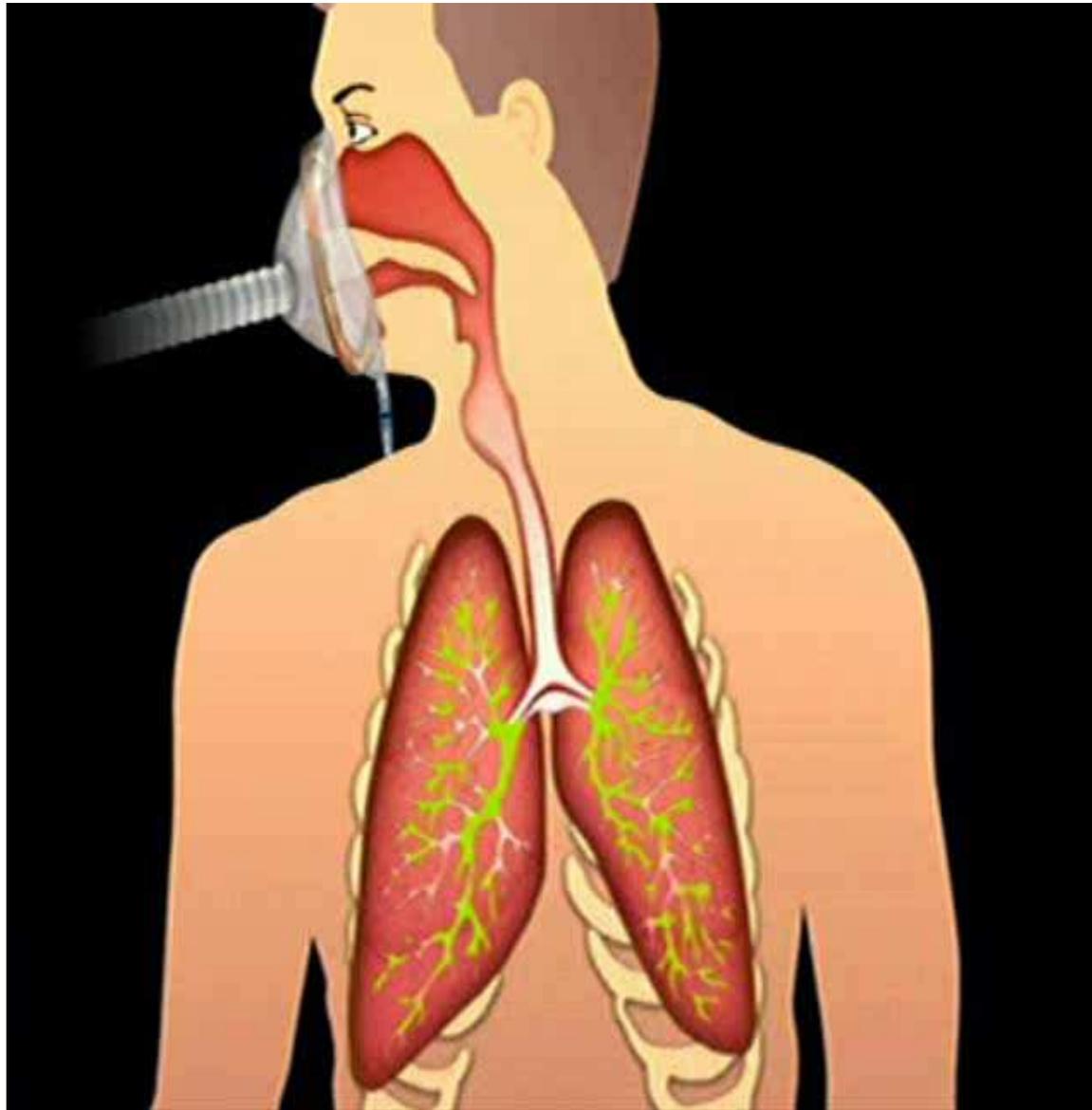
"I'm fortunate because I have this machine in my house now. But if someone needs the Coflator I must take it to where it is needed. Therefore, it puts my son's life in jeopardy because it is no longer in our house," said Nicholas Starita, Jimmy's father and the executive director of United Cerebral of Hudson County.

Readers should contact Starita at (201) 962-0090 for further information.

FIGURE 7 The Daily Journal 1988 article soliciting remanufacture of the Cof-flator.

Máquina da tosse





Disfunção bulbar

- Gastrostomia
- **Ventilação não invasiva**
- Traqueostomia
- Ventilação invasiva

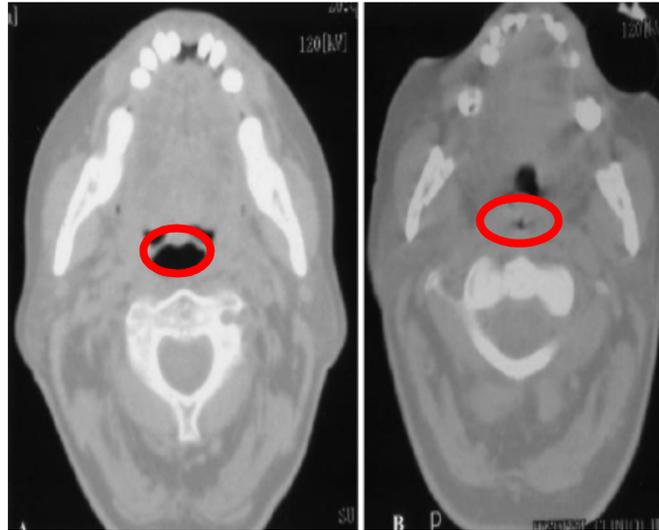


In-Exsuflação mecânica – máquina da tosse

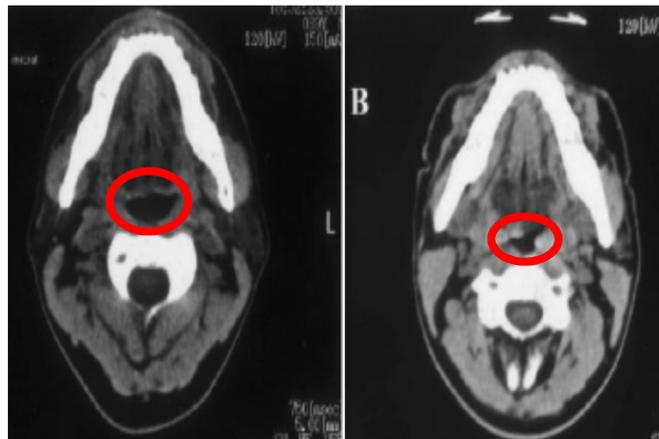
Insuflação

Exsuflação

Bulbar



Não bulbar



Chest 2004; 125: 1400-1405.

Resumo

- Pulmões normais – troca gasosa normal

- **Oxigênio NÃO**

- Ventilação pulmonar

Ventilação não-invasiva – BIPAP

- Medidas de expansão pulmonar

Exercícios com ambú

Respiração glossofaríngea

Máquina da tosse

Medidas de higiene brônquica

Tosse assistida manual

- Disfunção bulbar

Gastrostomia - PEG

Traqueostomia



