



REVIEW

Open circuit mouthpiece ventilation: Concise clinical review



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Abstract In 2013 new “mouthpiece ventilation” modes are being introduced to commercially available portable ventilators. Despite this, there is little knowledge of how to use noninvasive intermittent positive pressure ventilation (NIV) as opposed to bi-level positive airway pressure (PAP) and both have almost exclusively been reported to have been used via nasal or oro-nasal interfaces rather than via a simple mouthpiece.

Non-invasive ventilation is often reported as failing because of airway secretion encumbrance, because of hypercapnia due to inadequate bi-level PAP settings, or poor interface tolerance. The latter can be caused by factors such as excessive pressure on the face from poor fit, excessive oral air leak, anxiety, claustrophobia, and patient-ventilator dys-synchrony. Thus, the interface plays a crucial role in tolerance and effectiveness. Interfaces that cover the nose and/or nose and mouth (oro-nasal) are the most commonly used but are more likely to cause skin breakdown and claustrophobia. Most associated drawbacks can be avoided by using mouthpiece NIV. Open-circuit mouthpiece NIV is being used by large populations in some centers for daytime ventilatory support and complements nocturnal NIV via “mask” interfaces for nocturnal ventilatory support. Mouthpiece NIV is also being used for sleep with the mouthpiece fixed in place by a lip-covering flange. Small 15 and 22 mm angled mouthpieces and straw-type mouthpieces are the most commonly used.

NIV via mouthpiece is being used as an effective alternative to ventilatory support via tracheostomy tube (TMV) and is associated with a reduced risk of pneumonias and other respiratory complications. Its use facilitates “air-stacking” to improve cough, speech, and pulmonary

Abbreviations: ARF, acute respiratory failure; PAP, positive airway pressure ventilation; COPD, chronic obstructive pulmonary disease; DMD, Duchenne muscular dystrophy; (C)NIV, (continuous) non-invasive ventilation; (C)TMV, (continuous) tracheostomy mechanical ventilation.

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PALAVRAS-CHAVE

Ventilação não invasiva;
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Parâmetros do ventilador

compliance, all of which better maintain quality of life for patients with neuromuscular diseases (NMDs) than the invasive alternatives. Considering these benefits and the new availability of mouthpiece ventilator modes, wider knowledge of this technique is now warranted. This review highlights the indications, techniques, advantages and disadvantages of mouthpiece NIV.

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Ventilação de circuito aberto por peça bucal

Resumo Em 2013, foram introduzidos novos modos de «ventilação por peça bucal», para ventiladores portáteis disponíveis comercialmente. Apesar disto, há pouco conhecimento sobre como usar a ventilação não invasiva por pressão positiva intermitente (NIV) em oposição à pressão positiva bi-nível (PAP) e ambas têm sido referidas, quase exclusivamente, como sendo utilizadas através de interfaces nasais ou oro-nasais, em vez de através de uma simples peça bucal.

É referido com frequência a falência da ventilação não invasiva, devido à acumulação de secreções nas vias respiratórias, devido à hipercapnia por deficiente ajuste dos parâmetros da PAP ou devido a uma reduzida tolerância à interface. Esta última pode ser causada por fatores como pressão excessiva na face devido a um ajuste defeituoso, fuga excessiva de ar pela boca, ansiedade, claustrofobia e falta de sincronia entre o doente e o ventilador. Deste modo, a interface tem um papel crucial na tolerância e eficácia. Interfaces que cobrem o nariz e/ou a boca (oro-nasal) são as mais habitualmente usadas, mas são as que apresentam maior propensão a provocarem lesões na pele e claustrofobia. A maioria dos inconvenientes associados pode ser evitada usando VNI por bucal. A VNI de circuito aberto por peça bucal está a ser usada por um número significativo de doentes em alguns centros, na assistência ventilatória diurna e como complemento da VNI noturna através de «máscara». A VNI por peça bucal é igualmente utilizada durante o sono com o bucal fixo na posição, através de uma orla de cobertura do lábio. As peças bucais mais utilizadas são as pequenas anguladas de 15 e 22 mm e as de tipo «palhinha».

A VNI através de de peça bucal é usada por um número significativo de doentes como uma alternativa eficaz à ventilação assistida através de tubo de traqueostomia (VTM) e está associada à redução do risco de pneumonias e outras complicações respiratórias. A sua utilização facilita a «acumulação de ar» que aumenta a eficácia da tosse, o discurso e a compliance pulmonar, melhorando a qualidade de vida dos doentes com doenças neuromusculares (DNM) em comparação as alternativas invasivas. Considerando estes benefícios e a disponibilização de modos ventilatórios NIV por peça bucal, é agora garantido um maior conhecimento desta técnica. Esta revisão destaca as indicações, técnicas, vantagens e desvantagens do VNI por peça bucal.

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Introduction

In 1953 Dr. John Affeldt pointed out at a Round Table Conference on Poliomyelitis Equipment, Roosevelt Hotel, New York City, "you can simply attach this (mouthpiece), hang it by the patient, he grips it by his lips, and thus it allows for the excess to blow off which he doesn't want. It works very well. We even had one patient who has no breathing ability who has fallen asleep and been adequately ventilated by this procedure, so that it appears to work very well, and I think does away with a lot of complications of difficulty of using (invasive) positive pressure. You just hang it by the patients and they grip it with their lips, when they want it, and when they don't want it, they let go of it." Thus, intermittent positive pressure ventilation (NIV) via a mouthpiece was used as an alternative to tracheostomy ventilation

(TMV) for patients requiring continuous ventilatory support over 60 years ago. Noninvasive ventilation reduces or eliminates the work of breathing (WOB), improves gas exchange, relieves dyspnea, rests inspiratory muscles, and when using mouthpiece interfaces can provide total ventilator support¹ and avert endotracheal intubation for some patients during acute exacerbations of chronic obstructive pulmonary disease (COPD),^{2,3} cardiogenic edema,⁴ or neuromuscular respiratory muscle failure.⁵ It can prolong life and preserve quality of life as many patients become continuous NIV (CNIV) dependent without hospitalization.^{2,5-9} The noninvasive interface, however, must be comfortable and reasonably air tight.^{10,11} Fortunately, there are now over 100 to choose from. Reports of "NIV" failing and resulting in intubation for as many as 77% of patients are usually caused by inadequate

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