



Changes of the retrolingual pharynx during the Muller manoeuvre and during sleep in sleep apnoea



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ARTICLE INFO

Article history:

Paper received 12 January 2014

Accepted 5 June 2014

Available online 13 June 2014

Keywords:

Obstructive sleep apnoea

Sleep endoscopy

Muller manoeuvre

ABSTRACT

Objective: To determine whether the retrolingual pharynx shows the same morphometric modifications during the Muller manoeuvre and during drug-induced sleep endoscopy (DISE) with propofol in patients submitted for maxillomandibular advancement surgery.

Subjects and methods: Eighteen patients submitted for maxillomandibular advancement surgery (MMAS) were evaluated endoscopically before and 6 month after surgery in the region of the retrolingual pharynx while seated and lying in dorsal decubitus (supine) while performing the Muller manoeuvre and during DISE with propofol, to verify and measure if the same morphometric changes occur in the retrolingual pharynx during the Muller manoeuvre and during DISE with propofol. The area, anteroposterior, and laterolateral retrolingual pharynx images were acquired using the Sony Vegas 8.0 software and recorded on a DVD. The Image J software was used to measure and compare these images. **Results:** An increase in the pharyngeal aperture was observed in all measurements after surgery, specifically in area retrolingual pharynx images. When the Muller manoeuvre was performed, a greater gain (113%) in area retrolingual pharynx measurement was observed when the patient was awake and seated. With the patient was in dorsal decubitus during DISE with propofol there was a greater gain in area retrolingual pharynx measurement (201.33%) in the smaller aperture.

Conclusion: The Muller manoeuvre after MMAS does not simulate the dimensions of the pharynx that occur during sleep.

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1. Introduction

The measurement of the volume and location of the site of pharyngeal obstruction in patients with obstructive sleep apnoea syndrome (OSAS) has been traditionally considered as problematic (Moore and Phillips, 2002). The difficulties in properly measuring the pharynx are largely caused by the morphometric changes due to the position, respiration and state of consciousness of the individual (Woodson and Naganuma, 1999).

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Regardless of the evaluation modality used, several studies have tried to identify the sites where a reduction or obstruction of the pharynx may occur, but the data obtained have been inconsistent (Crumley et al., 1987; Chaban et al., 1988; Croft and Pringle, 1991; Aboussouan et al., 1995; Connolly et al., 1994; Woodson and Naganuma, 1999; Higami et al., 2002; Hsu, 2002; Li et al., 2002; Moore and Phillips, 2002; Rama et al., 2002; Hessel and Vries, 2003; Hsu et al., 2004; Mello-Filho et al., 2006; Rabelo et al., 2010).

In 1983 Borowiecki and Sassi introduced nasofibrolaryngoscopy with the Muller manoeuvre and this method has been considered by some authors to be appropriate for the identification of pharyngeal narrowing or obstruction in patients with OSAS (Borowiecki and Sassi, 1983).

Several limitations of the Muller manoeuvre have been described (Thorpy et al., 1985; Katsantonis et al., 1989; Petri et al., 1994; Terris et al., 2000). However, maxillomandibular

advancement surgery (MMAS) has shown good results by producing a significant enlargement of the pharynx, with a reduction or even the disappearance of OSAS (Croft and Pringle, 1991; Rama et al., 2002; Mello-Filho et al., 2012).

Although patients with OSAS are well known to present a narrowed or obstructed pharynx during sleep and during the Muller manoeuvre, the modifications occurring in these patients after MMAS have not been fully established. Does the enlargement of the pharynx with MMAS prevent or improve the narrowed or obstructed pharynx in an identical manner during sleep and during the Muller manoeuvre?

The objective of the present study was to determine, before and after surgery, whether patients with OSAS submitted to MMAS presented the same morphometric changes in the retrolingual pharynx during the Muller manoeuvre and during drug-induced sleep endoscopy (DISE) with propofol.

2. Materials and methods

The study was approved by the Research Ethics Committee of the University Hospital, Faculty of Medicine of Ribeirão Preto, University of São Paulo (HCFMRP-USP) (protocol n° 10326/2008). All patients provided their written informed consent to participate in the study. Eighteen patients with an average age of 47.61 ± 9.01 years, seen at the HCFMRP-USP, including 13 males (72.22%) and 5 females (27.77%) with mild to severe OSAS determined by polysomnography, were studied. All patients received nasofibrolaryngoscopy with the Muller manoeuvre followed by DISE with propofol. The examinations were performed preoperatively and 6 months after surgery.

Patients were excluded from this study when they presented with co-morbidities that would contraindicate surgical intervention, when they could not be submitted to the exams listed in the protocol, when they did not accept to participate in the study, and when they did not execute all the pre- and postoperative exams.

The anatomical and functional characteristics of the pharynx were evaluated before and 6 months after MMAS in order to determine whether the same morphometric modifications of the retrolingual pharynx occurred during the Muller manoeuvre and during DISE with propofol. An emphasis was placed on the level of the tongue base (retrolingual), with images being acquired for area, linear anteroposterior and laterolateral measurements of the pharynx (see Fig. 1). The clinical history of the patients was obtained both before and after surgery, and the subjects were submitted to physical examination, polysomnography and

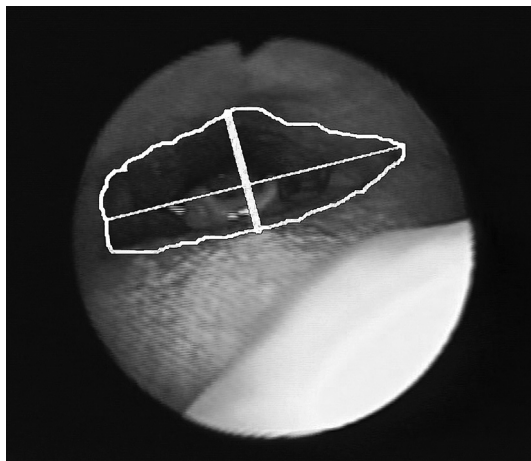


Fig. 1. Measurements of the pharynx obtained: area (circle), linear anteroposterior measurement (thick line) and linear laterolateral measurement (thin line).

nasofibrolaryngoscopy while awake with the use of the Muller manoeuvre and during DISE with propofol.

All nasofibrolaryngoscopy procedures were performed by the same examiner. The patients were evaluated while awake, seated and in dorsal decubitus (supine) and during DISE with propofol. The results were compared in order to determine whether the morphological patterns of patients with OSAS submitted to MMAS showed the same morphometric modifications of the retrolingual pharynx during the Muller manoeuvre and during DISE with propofol.

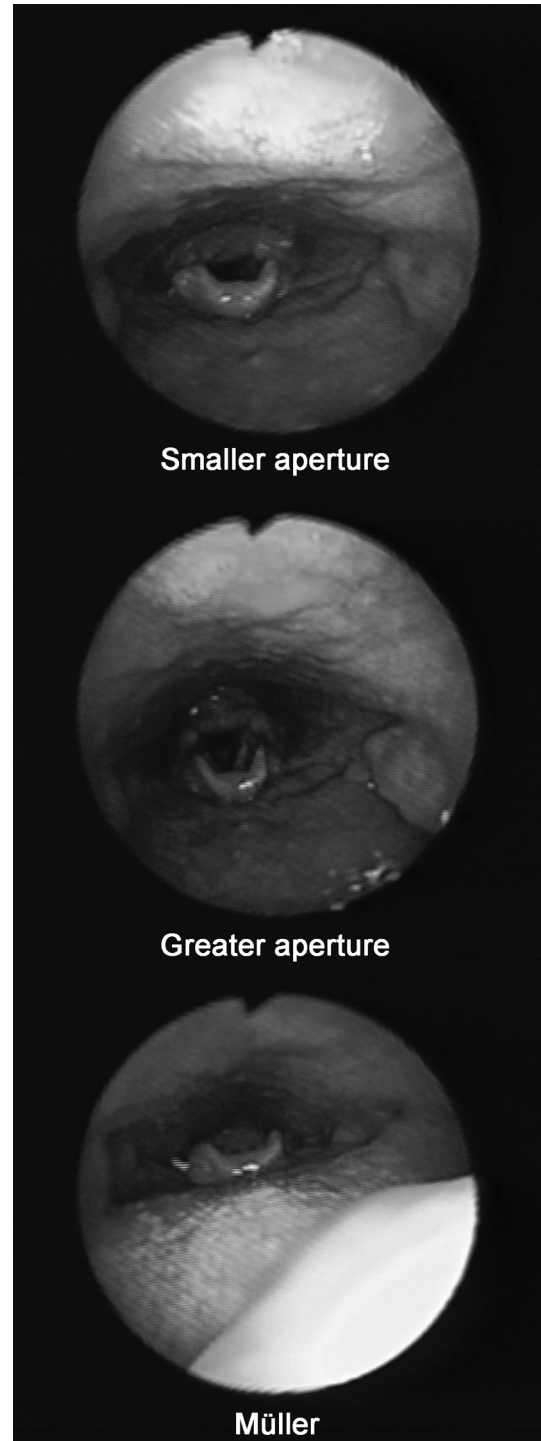


Fig. 2. Acquired images. Preoperative evaluation and nasofibrolaryngoscopy with the patient awake and in the dorsal decubitus position.

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