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Original Contribution

# Which nostril should be used for nasotracheal intubation: the right or left? A randomized clinical trial☆,☆☆

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**Abstract**

**Study Objective:** To determine which nostril is more suitable for nasotracheal intubation in patients with normal patency of both nostrils.

**Design:** Prospective, randomized clinical trial.

**Setting:** Operating room of a university medical center.

**Patients:** 191 ASA physical status 1 and 2 patients scheduled for elective oral surgery requiring general anesthesia with nasotracheal intubation.

**Interventions:** Patients were randomized to two groups to undergo nasotracheal intubation through the right nostril (Group R; n = 96) or the left nostril (n = 95). Standard traditional nasotracheal intubation was performed using the Macintosh laryngoscope. Tube rotation was attempted for alignment toward the glottis, and Magill forceps were then used to assist intubation, as necessary.

**Measurements:** Epistaxis was inspected in the pharynx after the tube tip was passed through the nasal cavity and 15 minutes after nasotracheal intubation was completed. Intubation time was the interval between when the anesthesiologist opened the patient's mouth with the cross finger maneuver and when the tube was connected to the anesthetic circuit after nasotracheal completion.

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**Main Results:** The frequency of epistaxis was significantly lower in Group R than Group L ($P$ = 0.0006). Although there was no significant difference in nasal passage time between two groups, the intubation time in Group R (24.5 ± 9.4 sec) was shorter than in Group L (30.5 ± 15.6 sec; $P$ = 0.0015). **Conclusion:** Nasal intubation via the right nostril is more safely performed than with the left nostril. Because of less epistaxis and faster intubation.


## 1. Introduction

A significant number of patients undergoing oral maxillofacial surgery require nasotracheal intubation. When performing nasotracheal intubation, practitioners usually select the more patent nostril, on the basis of the patient's symptoms or signs of nasal obstruction, to reduce the time required for nasal passage and epistaxis. However, Smith and Reid have reported that 68% of patients have intranasal abnormalities on endoscopic examination, although these patients have no history of nasal obstruction and both nostrils appear patent [1]. Although fiberoptic nasoendoscopy is reliable in detecting the patent nostril [1-3], this examination is not commonly used because it requires equipment and skill [4]. Therefore, anesthesiologists have to perform nasotracheal intubation without sufficient information regarding the pathway to be selected for the endotracheal tube (ETT).

If a patient has no history of unilateral nasal blockade and patency appears equal on both nostrils, which nostril is more suitable as the pathway for the ETT? Some textbooks advocate that the left nostril be used for nasotracheal intubation because damage to the turbinates from the sharp tube tip is reduced and more room is permitted for the laryngoscope blade and Magill forceps on the right side of the oropharynx [5-8]. On the other hand, other textbooks recommend nasotracheal intubation through the right nostril because the bevel of the tube does not face the turbinates and passes the vocal cords more easily [9-11].

The purpose of the present study was to determine which nostril was more suitable for nasotracheal intubation in patients with presumably normal patency. We investigated the frequency of epistaxis and difficulty with nasotracheal intubation through the right and left nostrils.

## 2. Materials and Methods

Ethical approval for this study was granted by the Institutional Ethical Committee of Osaka University Dental Hospital, Suita, Japan (Chairperson Prof S. Wakisaka) on 7 December 2011; the protocol number is H23-E12 (no. UMIN000009862; http://upload.umin.ac.jp). Patients were advised about the risks and benefits of participation, and written, informed consent was obtained.

### 2.1. Patients

A total of 191 adult patients were enrolled in this study. The patients were scheduled for elective oral surgery requiring general anesthesia with nasotracheal intubation. Inclusion criteria were ASA physical status 1 or 2, age 16 - 60 years, and no history of nasal trauma, surgery, or obstruction. Only patients who stated at the preanesthetic interview that they were able to breathe clearly and equally through both nostrils were included. Exclusion criteria were patient refusal, history of difficult intubation, or anticipated difficult airway, as suggested on physical examination.

Patients were randomized to two groups via computer-generated random numbers list to undergo nasotracheal intubation through the right nostril (Group R, n = 96) or the left nostril (Group L, n = 95) before induction of anesthesia.

### 2.2. Anesthesia protocol

Anesthetics and anesthesia techniques were standardized for all patients. No study patient received premedication. After routine monitoring with electrocardiogram, pulse oximeter, capnogram, and noninvasive arterial blood pressure measurement, anesthesia was induced with 1 to 2 mg/kg of propofol and 0.25 μg/kg/min of remifentanil. Neuromuscular block was obtained with 0.6 mg/kg of rocuronium bromide. Until onset of muscle relaxation, all patients were ventilated by mask with 3% sevoflurane in 100% oxygen. During mask ventilation, the nasal mucosa were carefully cleaned on each side using swabs soaked in 0.1% acrinol without abrasion.

Standard traditional nasotracheal intubation was performed using the Macintosh laryngoscope. Tube rotation was attempted for alignment toward the glottis, and Magill forceps were then used to assist intubation, as necessary. Three expert anesthesiologists with more than 7 years of experience performed all intubations. The nasotracheal tube used in this study was a Portex "Ivory" soft-seal cuffed nasotracheal tube (Smiths Medical Intl., Ltd., Luton, UK) with internal diameters of 6.5 and 7.0 mm. Tube size was determined according to tracheal size on a chest radiograph. The tube was introduced into the selected nostril, and the tip was directed along the floor of the nose. If undue resistance was encountered during insertion, the tube was redirected slightly more caudally in the nasal cavity. If a clear pathway could not be found, then an attempt was made to intubate