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RESPIRATION AND THE AIRWAY

# Teaching airway management to novices: a simulator manikin study comparing the 'sniffing position' and 'win with the chin' analogies

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**Background.** The 'sniffing position' is widely promoted for teaching airway positioning before intubation, but whether this analogy results in novices placing the head and neck appropriately has not been evaluated. We compared performance following the sniffing position instructions with an alternate analogy, 'win with the chin'. We also compared performance following simple anatomic instructions and no instructions.

**Methods.** A randomized controlled study of medical students and PGY1 registrars in Surgery and Internal Medicine was performed. Subjects independently positioned a simulator manikin head and neck based upon their understanding of four written instructions in random order: (i) the 'sniffing position'; (ii) the 'win with the chin' analogy, (iii) anatomic instructions; and (iv) no instructions (control). Digital photographs following each instruction were analysed by two airway experts for (i) adequacy of overall positioning and (ii) the three components of airway positioning.

**Results.** Eighty-one volunteers participated. The positioning was adequate most often (43.2%) following the 'win with the chin' analogy when compared with the other instructions (37.0% anatomic instructions; 19.8% control; 14.8% 'sniffing position' analogy). Positioning following the 'sniffing position' instructions was not different from no instruction ($P$=0.53). The 'win with the chin' and anatomic instructions were significantly better than no instructions ($P$=0.002 and 0.023, respectively).

**Conclusions.** The 'win with the chin' analogy resulted in adequate airway positioning significantly more often than the 'sniffing position' or control. It also maintained atlanto-occipital extension compared with anatomic instructions. Overall, 'win with the chin' was a superior teaching analogy and could replace the 'sniffing position' analogy.

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Airway patency is essential in anaesthesia, and it is often performed by junior trainees under emergency conditions.[1–3] Accordingly, tracheal intubation is one of the first things taught to novices. The recommended position of the head and neck before intubation was first published by Magill in 1936.[4] He suggested approximating a 'sniffing position' or 'as would a person achieve when sniffing the morning air'. This was updated in 1944 by Bannister and MacBeth[5] who outlined three components: flexion of the lower cervical spine; extension of the atlanto-occipital joint; and positioning the ears anterior to, or level with, the sternum. Although some have questioned the usefulness of the 'sniffing position' or 'sniffing the morning air' analogy,[6–8] >60 yr later, it is still recommended for both the straightforward and difficult airways.[6 9–14] However, whether its use actually results in the desired head and neck position has not been

objectively evaluated. This seems inappropriate for something as important as airway positioning.

Our experience with novices has been that the 'sniffing position' analogy does not adequately communicate the recommended position.[2 15] We have found that many interpret it to mean a 'chin tuck': placing the forehead anterior to the chin and ears posterior to the sternum. Furthermore, many trainees were reluctant to place pillows or towels beneath the occiput, neck, or shoulders, in order to flex the lower cervical spine or to raise the ears relative to the sternum. Many also failed to extend the atlanto-occipital joint, which magnetic resonance imaging suggests is the most important component of airway positioning.[6 9] Instead, we ask trainees to 'mimic the head position when running across the finish-line of a closely contested race'. To avoid mistakenly placing the forehead anterior to the chin, we emphasize that the chin should lead. This has led to our alternate analogy: 'win with the chin'.[15] Alternatively, we simply provide anatomic instructions. Regardless, none of these teaching methods has been formally studied.

This randomized controlled study was performed to compare the effectiveness of different instructions to enable novices to achieve adequate head and neck positioning as required before intubation attempts. Our primary question was whether subjects demonstrate optimal positioning of the head, defined as anterior placement of the ears relative to the sternum and the chin relative to the ears, more often when asked to position the head (of a simulator manikin) using the traditional 'sniffing position' analogy compared with a 'win with your chin' analogy. We also examined adequacy of positioning following simple written anatomic instructions and following no instructions.

## Methods

Ethics approval was obtained from the University of Alberta's Health Research Ethics Board and informed written consent was obtained from participants. Medical students and post-graduate year 1 (PGY1) residents in Surgery and Internal Medicine were recruited. Those who had received formal airway instruction, or an anaesthesia rotation, were excluded. In an isolated room, the subjects were asked to position the head and neck of an METI-ECS® full-body medical simulator manikin (Medical Education Technologies Inc., Sarasota, FL, USA) in the position that best approximated their understanding of each of four sets of written instructions. The investigator present stated that pillows and blankets were available, but that the use of these was entirely at their discretion. It was outlined that it was permissible for them to leave the position of the manikin unchanged following subsequent instructions if they thought it appropriate. Furthermore, it was emphasized that the purpose of the study was to determine how the instructions were approximated, rather than to test the individual's skills.

Four instructions were delivered in writing only:

(i) *Sniffing position instruction*: please position the manikin in the best position in order to sniff the morning air, or to sniff for smoke. (The so-called 'sniffing position'.)
(ii) *Win with the chin instruction*: please position the manikin in the best position to win a running race, where the chin wins the race. (The so-called 'win with the chin' position.)
(iii) *Anatomic instruction*: demonstrate the head position achieved by combining lower cervical spine flexion, head extension at the atlanto-occipital joint, and positioning the ears anterior to the sternum.
(iv) *Control instruction*: please position the head of the simulator manikin in what you personally believe to be the optimal position for an attempt at tracheal intubation.

Instructions were in random order to minimize bias. This was performed by selecting arbitrarily from four piles, where each pile represented one instruction. The four pages were then shuffled. Instructions were on separate pages (participants only saw the next instruction once finished with the previous one), and were of equal length (24 words) to avoid more comprehensive descriptors. The participants were asked to indicate when they had positioned the manikin to approximate each instruction, and at this time, a lateral head and neck photograph was taken of the manikin. The participant repeated this process until four pictures (one for each instruction) had been taken. The picture excluded participant identification.

### *Data analysis*

Local experience suggested that ~50% of trainees demonstrate the correct head position when using the 'sniffing position' analogy.[2 15] In order to demonstrate that at least 30% more subjects demonstrate the correct position with the 'win with your chin' analogy (thus 80% *vs* 50% success), and at a statistical power of 80% with a significance level of 0.05, 60 volunteers were deemed necessary (SamplePower, SPSS Inc., Chicago, IL, USA). Eighty-five people volunteered. Of these 81 presented to the study room, and all 81 completed the full study.

The digital photographs were evaluated independently by two experienced, certified, physicians who teach airway management. They were blinded to participant information and the instruction being given. To be deemed 'overall adequate', the photograph needed to depict all three correct components (lower cervical spine flexion; atlanto-occipital extension; ears at least level with the sternum) of the head and neck positioning for successful tracheal intubation. Otherwise, the position was deemed 'inadequate'. Data were also collected on the adequacy of each of the individual components, and whether the head and neck were moved between instructions.