

believe that such information would be helpful for others who would like to try this technique.

As the authors note, in the presence of persistent air leaks for five consecutive breaths during standard face mask ventilation, they changed its placement to the lower lip by repositioning the caudal end of the face mask above the lower lip. However, the cephalad end of the face mask remained in the same location for both positions.

Our concern is that, if the cephalad end of the face mask is kept at the same location when moving the caudal end of the face mask upward to the site above the lower lip, this action may distort the shape of the face mask and increase its transverse dimension. This action can result in an increased risk of air leaks through the hollow cheeks because of an inadequate external face mask fit.

By comparing the authors' first two figures, one can see that the cephalad end of the face mask is in a different location in these two placements. Therefore, we would like to know in detail the method they use to obtain an adequate seal when the face mask is changed to the lower lip placement and the location of the cephalad end of the face mask is not changed.

In addition to the techniques mentioned by the authors,<sup>1</sup> readers may wish to learn about a method we prefer. For edentulous patients, we apply a large face mask so that the chin fits entirely inside the face mask with the seal on the caudal surface of the chin, the cheeks fit within the face mask, and the sides of the face mask seal along the lateral maxilla and mandible. If an adequate seal cannot be achieved using a large face mask, placing the moistened gauzes with the suitable size at the hollow cheeks can often improve contact between the cheeks and face mask.<sup>2</sup>

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## References

1. Racine SX, Solis A, Hamou NA, Letoumelin P, Hepner DL, Beloucif S, Baillard C: Face mask ventilation in edentulous patients: A comparison of mandibular groove and lower lip placement. *ANESTHESIOLOGY* 2010; 112:1190-3
2. Xue FS, Liao X: Techniques of face mask ventilation, *Modern Airway Management: A Key Technique for Clinical Anesthesia and Critical Care Medicine*. Edited by Xue FS. Zheng-Zhou, China: Zheng-Zhou University, 2002, pp 384-6

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## Another Way to Eliminate an Air Leak during Mask Ventilation in Edentulous Patients

To the Editor:

I read with interest the article by Racine *et al.*<sup>1</sup> that demonstrated that repositioning of the caudal end of the mask above the lower lip resulted in a reduced air leak in edentulous

patients. Another effective technique for a problematic situation is always welcome. However, my concern, based on personal experience and figure 2 from the study by Racine *et al.*, is that, in some patients, pressure may be applied to the eye, risking ocular damage. I have been around situations in which the facemask was moved cephalad to obtain a better seal. On occasion, the facemask would then be in direct contact with the closed eyelid. In addition, I am confused by their statement that the cephalad end of the mask stayed in the same location for both positions. First, a comparison of their figure 1 with their figure 2 would suggest otherwise. Second, how can one end of the facemask be moved without moving the other end?

Because of the potential risk of ocular damage, I would try other methods first. As an alternative, head straps can be used to buttress the cheeks against the facemask in a standard position. There was no mention of using head straps during their study or in any of the background studies discussed. I am unaware of any data that evaluate the efficacy of head strap use in this situation. I have been highly successful in dealing with air leaks in edentulous and bearded patients by inserting an oral airway and using head straps. In a few patients, a variable-sized leak may remain, but it is rare to not be able to achieve adequate ventilation. This avoids the risk of ocular trauma. Although not always necessary for ventilation, the oral airway tends to lessen the magnitude of the positive pressure required for adequate ventilation, thus reducing the tendency for an air leak *via* the facemask-patient interface. By using head straps, usually only one person is needed to manage such an airway. Head straps may be particularly helpful for those practitioners who have small hands, short fingers, or limited hand-finger strength by virtue of fatigue or constitution. A formal evaluation of head strap efficacy would be welcomed.

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## Reference

1. Racine SX, Solis A, Hamou NA, Letoumelin P, Hepner DL, Beloucif S, Baillard C: Face mask ventilation in edentulous patients: A comparison of mandibular groove and lower lip placement. *ANESTHESIOLOGY* 2010; 112:1190-3

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In Reply:

We would like to thank Xue *et al.* for their comments on the placement techniques we recently described<sup>1</sup> for face mask ventilation in edentulous patients. Their concerns focused on the exact position of the cephalad end of the mask.

In our original description, we stated that the cephalad end of the mask stayed in the same location when moving the mask's caudal end above the lower lip. In fact, the cephalad end of the mask may shift upward slightly, as shown in our original figures.

The alternative approach proposed by Xue *et al.*—using a larger face mask to rule out reduced contact with the cheeks—is an interesting one. We would like to see a demonstration of the effectiveness of this proposed technique in reducing air leaks. Why not share our interest in this topic by conducting a multicenter trial?

We also thank Roth for his comments. Based on his experience, he reports that, in some patients, lower lip face mask placement with the cephalad end of the mask on the eyes may cause ocular damage. Roth recommends using the head straps to improve contact between the mask and cheeks.

In our own experience, we have found that the head straps themselves may promote ocular damage and, therefore, should be used with caution. Also, we are convinced that the problem of air leak at the cheeks is best solved by moving the contact points rather than increasing pressure. However, as airway obstruction contributes to air leak, we fully agree with Roth that the use of an oral airway is one of the keys to improving face mask ventilation in edentulous patients.

Why not conduct a formal comparison among head-strap-adjusted face masks, larger face masks, and lower lip positioning of masks in edentulous patients?

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## Reference

1. Racine SX, Solis A, Hamou NA, Letoumelin P, Hepner DL, Beloucif S, Baillard C: Face mask ventilation in edentulous patients: A comparison of mandibular groove and lower lip placement. *ANESTHESIOLOGY* 2010; 112:1190–3

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## Why Do Similar Studies Conclude Differently When They Are Performed with Nearly the Same Protocol and the Same Skin Conductance Technology and on the Same Population of Patients?

To the Editor:

In the article by Choo *et al.*<sup>1</sup> on skin conductance fluctuations (SCFs) and postoperative pain in children, the conclusions are different compared with those of the article by Hullett *et al.*<sup>2</sup> on skin conductance as a measure of postoperative pain, even though the authors use the same technology on the same population of patients. How come? The SCFs that are studied mirror the bursts in the skin sympathetic nerves. The bursts in the skin sympathetic nerves are

more specific and sensitive for monitoring pain and noxious stimuli than blood pressure and heart rate because they are not influenced by temperature changes or changes in microcirculation and because acetyl choline acts on the muscarinic receptors.<sup>3</sup> It reacts within 1–2 s.<sup>3</sup> Moreover, patients/volunteers without pain/noxious stimuli and other stressors have a low variation between individuals regarding SCFs per second.<sup>3</sup> In awake patients, it is well-known that pain<sup>4,5</sup> and other emotional stressors (*e.g.*, vomiting, nausea, and intellectual tasks, such as explaining and teaching children how a pain score works [used by Choo *et al.*]),<sup>1,6,7</sup> may influence the SCFs per second when monitoring pain. Therefore, correlation tests, such as those that Choo *et al.* have performed, should not be used in the postoperative setting to study pain by SCFs per second if the patients are not controlled for stressors other than pain. Cutoff values to discover the level of pain (*i.e.*, no or mild, moderate, and severe pain) should be used instead.<sup>2,8–11</sup> The cutoff value to discover moderate and severe pain of 0.1 SCFs/s when using a 15-s analyzing window gave a sensitivity to discover moderate and severe pain of 90% and a specificity of approximately 65–70%.<sup>2,9</sup> To use a cutoff value based on optimized sensitivity and specificity, as Choo *et al.* performed in their study, does not make sense as long as the specificity to pain is known to be weak in awake patients. Therefore, it would make more sense to use cutoff values to show whether the skin conductance method can predict no/mild or severe pain with high specificity because moderate pain will most likely be mixed with the other stressors (fig. 3 in the article by Choo *et al.*). Moreover, the analyzing window is important. The nature of postoperative acute pain is often short lasting (*i.e.*, lasting only a few seconds) and occurs during movement. When using pain and anxiety scores, they are often the result of the maximum score in the time window analyzed. If the SCFs per second increase during acute pain, lasting for a few seconds, this increase will be averaged when an analyzing window of 60 s is used. These are exactly the findings from Choo *et al.* (fig. 2 in their article): during no/mild pain (few SCFs per second are expected, left part of the figure), a 15-s analyzing window gave fewer SCFs per second compared with a 60-s analyzing window. Moreover, during severe pain (high SCFs per second are expected, right part of the figure), a 15-s analyzing window gave higher SCFs per second compared with the 60-s analyzing window. Therefore, it is difficult to understand why Choo *et al.* chose and recommended a 60-s analyzing window. Interestingly, Hullett *et al.* used an analyzing window of 15 s and a cutoff value of 0.13 SCFs/s to discover moderate and severe pain in children; the sensitivity for discovering pain was 90%, and the specificity was 64%.<sup>2</sup> The predictive value for discovering no or mild pain, with a cutoff of 0.13 SCFs/s, was 97%.<sup>2</sup> These results indicate how skin conductance technology can be used: physicians and nurses obtain an indication for when to ask patients about their pain status. It is important to know when to ask patients about their pain status, especially in the United States, where it is

Dr Storm is the founder and co-owner of Med-Storm Innovation, Oslo, Norway, the company that has developed the Skin Conductance Algesimeter.