

## Novel diagnostic procedure

# Novel diagnostic device for oral and pharyngeal examinations of children: Folding-scope for the oral and pharyngeal cavities

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## Summary

Although children may dislike and/or resist oral and pharyngeal examination with a tongue depressor, they enjoy lollipops on sticks, eating with spoons, forks, and chopsticks, and brushing their teeth. Many reports have noted this apparent contradiction, since paediatric patients are often treated after toothbrushes or chopsticks penetrate the pharyngeal wall.

We therefore developed a novel device to observe the inside of the mouth without using a flashlight, tongue depressor or head mirror.

We previously developed the AWS for tracheal intubation through the mouth for anaesthesia and emergency situations, along with a new device to observe the inside of the oral cavity simultaneously. We have developed a new attachment to the AWS for observations inside the oral cavity and pharynx.

Our newly developed oral and pharyngeal examination system is a useful tool for diagnostic examinations and may also enable treatment without causing discomfort or distress to patients and their families.

## BACKGROUND

We developed a novel device to observe the inside of the mouth without using a flashlight, tongue depressor or head mirror. Our newly system is a useful tool for diagnostic examinations and may also enable treatment without gag-reflex and without causing discomfort or distress to patients and their families.

## CASE PRESENTATION

Although children may dislike and/or resist oral and pharyngeal examination with a tongue depressor, they enjoy lollipops on sticks, eating with spoons, forks, and chopsticks, and brushing their teeth. Many reports have noted this apparent contradiction, since paediatric patients are often treated after toothbrushes or chopsticks penetrate the pharyngeal wall.<sup>1-2</sup> It can be surmised from these critical reports that it is important to consider psychological factors when examining the oral cavity and pharynx.

## INVESTIGATIONS

We therefore developed a novel device to observe the inside of the mouth without using a flashlight, tongue depressor or head mirror. The Pentax-AWS (AWS, PENTAX, Japan) is a new video laryngoscope for tracheal intubation, with built-in 2.4-inch colour CCD monitor paired with a disposable blade.<sup>3-5</sup> We have developed a new attachment to the AWS which replaces the disposable blade for observations inside the oral cavity and pharynx (figure 1). The attachment provides a rigid channel to guide and protect the flexible

endoscope. Its base functions as a tongue depressor and is shaped like one. The channel is enclosed within a circularly domed top which is narrower than the base, so that the upper surface of the attachment resembles the Greek uppercase character omega in cross section. The top and its enclosed channel are 3–5 mm shorter than the base, which prevents the view from being obscured by the part of the tongue not depressed.

## OUTCOME AND FOLLOW-UP

Examinations were performed on 10 healthy paediatric volunteers and all felt comfortable during the examinations, since the attachment is inserted into the mouth like a spoon, fork, chopsticks or toothbrush. Physicians can observe the inside of the oral cavity on a monitor linked to an output terminal for an external video monitor. No healthy volunteer has experienced gag reflex, allowing thorough examination of the oral cavity and pharynx while patients remain calm and comfortable.

## DISCUSSION

Our newly developed oral and pharyngeal examination system is a useful tool for diagnostic examinations and may also enable treatment without causing discomfort or distress to patients and their families. In addition, if the parents of paediatric patients permit, the tip of the attachment can be dipped into juice or flavoured water (orange, apple, chocolate, etc) immediately before examination. Children will not only accept but also may enjoy oral and pharyngeal examinations.



**Figure 1** Left: Observing the uvula and right tonsil with our new device in an 8-year-old girl. (Healthy volunteer) She can hold it by herself comfortably. Middle: AWS and new attachment. Right: Cut-away tip of the attachment.

### Learning points

- ▶ The oral and pharyngeal examination system is a useful tool not only for diagnostic examinations but potentially also for treatment without causing discomfort or distress to patients and their families.
- ▶ Nobody has experienced the gag reflex, allowing thorough examination of the oral cavity and pharynx while patients remain calm and comfortable.
- ▶ Children will not only accept but also may enjoy oral and pharyngeal examinations.

**Video 1** Actual dynamic view in 5 years-old-boy. Video is also available in [http://www.kankakuki.go.jp/lab\\_d-development.html#video3](http://www.kankakuki.go.jp/lab_d-development.html#video3). 10.1136/bcr.06.2008.0309v1

**Competing interests** None.

**Patient consent** Obtained.

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