

Axis-keeping shortening technique for colonic intubation

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Fast and successful colonic intubation is of paramount importance in achieving high-level diagnostic success and patient satisfaction. Moreover, during the current COVID-19 pandemic, adequate colonic intubation techniques are even more important to reduce examination times and sedation. Nevertheless, colonic intubation is still sometimes challenging in clinical practice, although various helpful strategies have been demonstrated in recent years.^{1,2}

The axis-keeping shortening technique (AKS) was first developed by Professor Shin-ei Kudo and has been widely recognized among endoscopists in Japan as the most ideal colonic intubation method.^{3,4} Knowledge of this

technique, however, remains limited outside of Japan. Therefore, we aimed to demonstrate the principles of the AKS technique in the supplemental video ([Video 1](#), available online at www.VideoGIE.org). The focus of the method is how to reach the descending colon without extending the rectum and sigmoid colon. In other words, if the descending colon is intubated with the AKS technique, the rest of the large bowel will be more easily accessible by continuing with use of the AKS technique. Thus, we focus on how to perform AKS from the rectum to the sigmoid-descending (SD) junction.

Any colonoscopic examination is appropriate for AKS intubation. No specific contraindications for the method

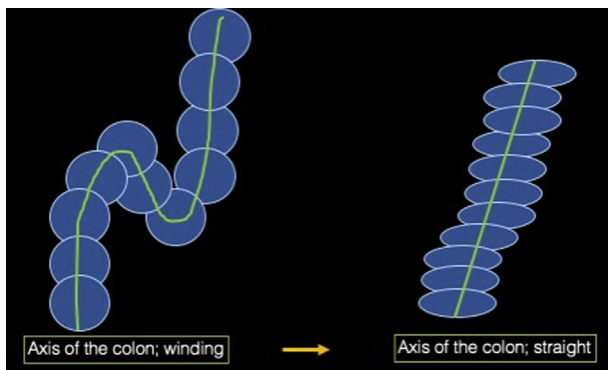


Figure 1. The principle of the axis-keeping shortening method.

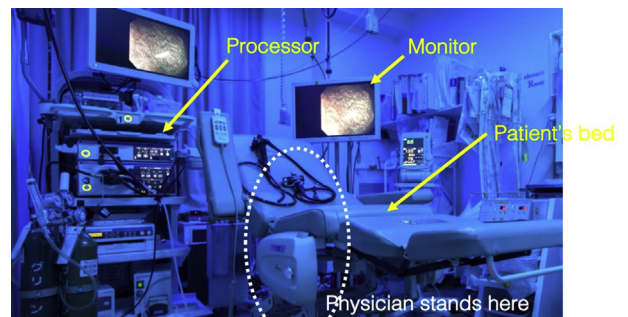


Figure 3. Appropriate position of the processor.

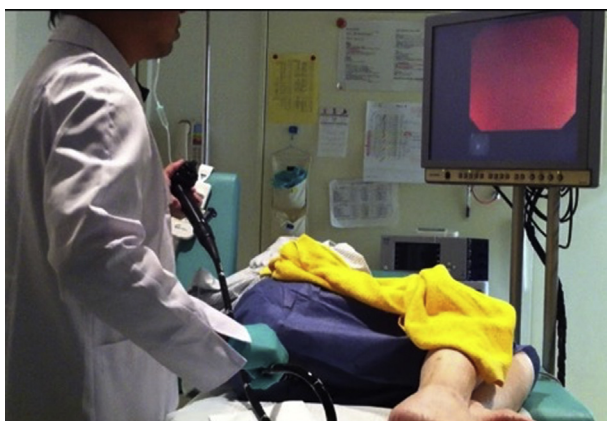


Figure 2. Appropriate position of the physician, endoscope, and bed.



Figure 4. Appropriate position of the right hand.

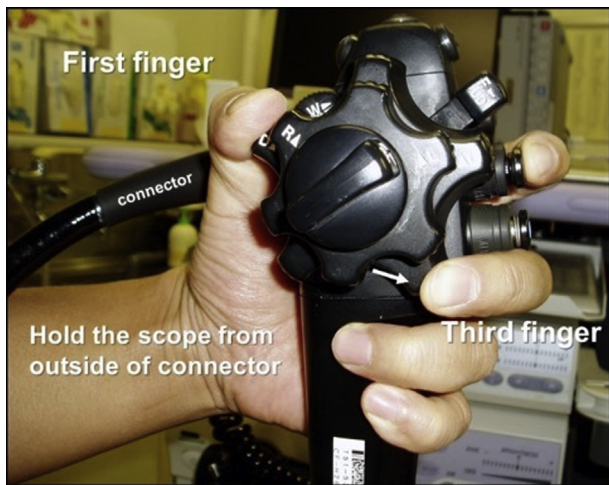


Figure 5. How to hold the steering part with the left hand.

exist, although it might become difficult to apply in cases of poor bowel preparation.

All types of colonoscopes can be used for the AKS technique; however, we recommend using an intermediate-length (135-cm) colonoscope. Stiffness-adjuster functions, which are available in endoscopes from Fujifilm (Tokyo, Japan) and Olympus (Tokyo, Japan), are useful for preventing extension of the more mobile parts of the large bowel. We usually start with the softest setting and gradually increase the endoscope stiffness during intubation (especially within the transverse colon). The investigation should begin with the patient in the left-lateral position. Position changes during insertion are unnecessary in more than half of cases when proper AKS is performed. However, when it is difficult to prevent extension of the colon or to proceed without pain, changing the patient's position should be considered without delay.

Where available, it is also recommended to use a clear distal cap attachment from the beginning. The distal cap helps to maintain distance between the tip of the endoscope and the wall of the bowel, aiding in identification of the lumen past the current fold. Because we are aware

Continuous right turn shortening

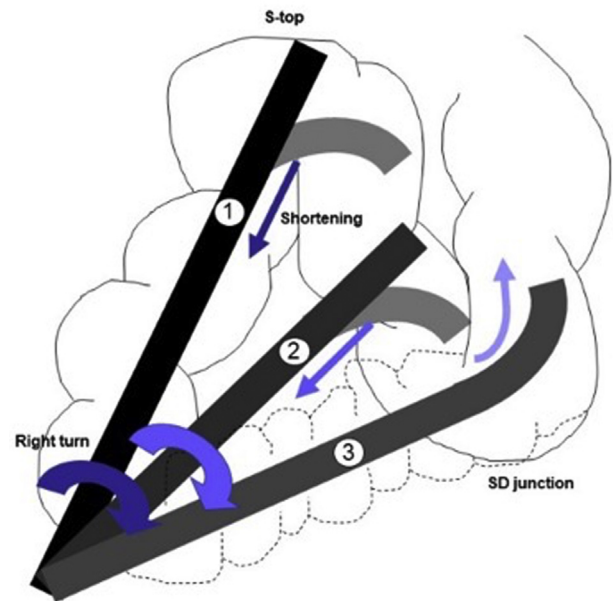


Figure 7. Right-turn shortening in the sigmoid colon.

that distal caps are not routinely used for diagnostic procedures in most centers in the United States and Europe, it is worth mentioning that the AKS technique can be performed even without the cap.

The principle of AKS is to control the tip and the shaft of the colonoscope for propulsion as it straightens the axis of the bowel by shortening the lumen through intubation (Fig. 1). The following 5 practical points are the key to success:

1. The position and the posture of the physician is very important when implementing AKS. The monitor should be in front of or diagonally in front of the physician (Fig. 2). The processor of the endoscope should be positioned next to the patient's head so that the physician can control the endoscope without any risk



Figure 6. Appropriate position of the left arm.

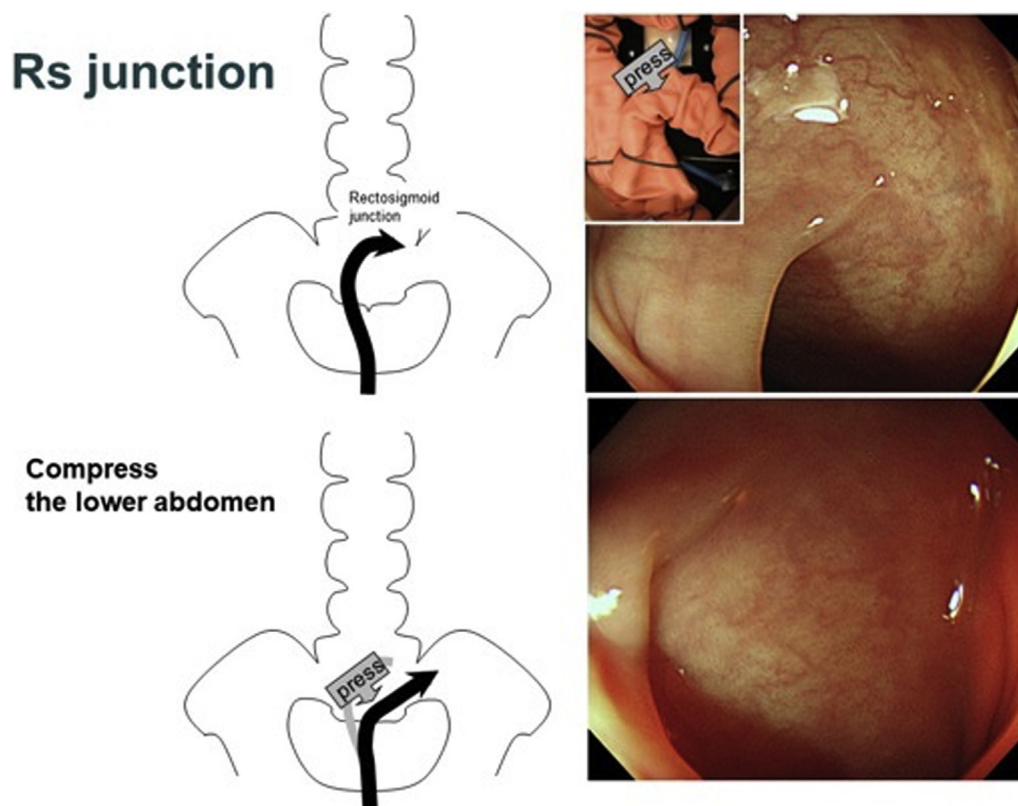


Figure 8. How to press the junction.

- of the connector being stressed while moving the endoscope (Fig. 3). The bed should not be too high, and the physician's left hand should not be close to the body to secure the working space to manipulate the endoscope. The shaft of the endoscope should be on the bed instead of hanging off of the bed to allow for effective control of the torque of the endoscope. For AKS, it is necessary to hold the endoscope 20 to 30 cm away from the anus (Fig. 4).
- It is important to hold the steering part of the endoscope with the left hand in the appropriate manner. The left hand should grab the endoscope from outside of the connecting tube (Figs. 5 and 6). The endoscope should be held using the base of the thumb and the fourth and fifth finger. The tips of the thumb and the third finger (or the fourth finger) should be able to control both wheels (up/down and left/right). The second finger (or in conjunction with the third finger) controls the buttons for suction and inflation.
 - During intubation, torque control is essential to prevent undesirable extension and to form and maintain the bowel in a straight axis. Torque control can be effectively achieved not by twisting the right wrist alone but by rotating the shaft of the endoscope through harmonic control with both the right and left arm. Before implementing this control, the axis of the endoscope needs to be straight so that the

handling can be effectively transmitted to the tip of the endoscope.

- To pass the rectosigmoidal junction without extension, the physician should hook the fold by angling the tip upward and retracting the endoscope back to remove the loop of the junction. This will straighten the junction, allowing more efficient propulsion of the endoscope in the further intubation. Efficient shortening of the bowel can be achieved by a combination of air control, hooking of the fold, and right-turn shortening of the bowel (Fig. 7). Sometimes additional assists such as external abdominal pressure or changing the patient's position are needed (Fig. 8).
- After passing the sigmoid colon, the physician needs to pay attention to preventing extension of the sigmoid colon to efficiently proceed with the intubation. The stiffness adjuster is effective for this purpose. We pass the junction and then bend with soft settings; for the straight sections, we prefer to use more rigid settings. When the AKS is properly performed and continued during further intubation, the bowel is shortened and the axis of the colon is straightened (Fig. 1).

Known adverse events related to colonoscopy such as bleeding and perforation rarely occur with this method because forcibly pushing the endoscope is avoided.

In conclusion, the key learning points for the AKS method are proper holding of the equipment, maximum

utilization of torque with the shaft of the endoscope, and continuous shortening of the colon. This method offers 2 major benefits: It is less painful for patients, thereby requiring less sedation, and it is less likely to disturb endoscopic interventions after the insertion.

DISCLOSURE

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Abbreviation: AKS, axis-keeping shortening technique.

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