

AbstractID: 2847 Title: Guided breathing for aperture maneuver with controlled breath (AMC)

Purpose: The effectiveness of a breathing guide system by means of a visual signal with audio stimulus was evaluated for regulating patient's breathing.

Method and Materials: A system for breathing guide by means of a visual signal with audio stimulus has been designed. It consists of a chromel–alumel thermocouple, which detects the temperature changes due to patient's breathing, and a mask, in which the thermocouple is installed. Patients were instructed to regulate their breathing by the guide of a visual signal with audio stimulus, as watching a display showing patients' current breathing pattern and visual signals (a guiding curve and limit lines) and listening audio stimulus (breathe in/out). Free breathing of five healthy volunteers was monitored. Then, they practiced regulating their breathing with our system and their guided breathing was recorded for an analysis.

Results: With five-minute direction and thirty-minute practice, four patients out of five could regulate their breathing through this system without difficulty. While breathing was guided, the differences of displacement between patients' actual breathing and guiding curves were less than ± 0.3 cm and those of cycle between the two were less than 0.1 s. After practicing, patients could continue guided breathing for up to 70 s.

Conclusion: This study reveals that a visual signal with audio stimulus is practical to guide patients' breathing to be regular. Therefore, when an aperture maneuver with controlled breath (AMC) technique, which adapts radiation fields continuously to a moving target, is applied with guided breathing, positional uncertainties of targets due to respiration can be reduced by 73 % compared to free breathing, so target margins can be reduced significantly.

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