

# Novel Oral Care Strategy for Dysphagic Stroke: Preliminary Evaluation of a Multichanneled Irrigator

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## Objectives

- Stroke patients requiring nasogastric (NG) tube feeding are vulnerable to oral bacterial overgrowth and aspiration-related complications. Conventional oral care is often inadequate and may increase aspiration risk. Oral hygiene is a critical factor in preventing aspiration pneumonia in stroke patients with dysphagia. However, conventional oral care methods (e.g., manual brushing, foam swabs) often carry a risk of aspiration due to the inability to effectively manage fluids during the procedure. This study evaluated the safety and clinical effectiveness of a multi-channeled oral irrigation system with integrated suction (COMORAL®) in dysphagic stroke patients dependent on tube feeding.

## Methods

- In this prospective study, twenty stroke patients receiving NG tube feeding were randomly allocated to either the multi-channeled oral irrigation (MCOI) group (n=10) or a control group receiving routine oral care (n=10). The MCOI device consists of a 60-channel irrigation system with simultaneous suction to reduce aspiration risk. Primary outcomes were lip and tongue strength and endurance. Secondary outcomes included tongue coating, turbidity, oral dryness, and salivary secretion. Safety was assessed by monitoring for aspiration events. Within-group changes were analyzed using the Wilcoxon signed-rank test and between-group differences using the Mann-Whitney U test. Data are presented as mean  $\pm$  SEM.



Figure 1. Composition of the multi-channeled oral irrigation device (COMORAL®)

## Results

- The MCOI group showed significant improvement in lip endurance (T0:12.7 $\pm$ 20.6s, T1: 18.1 $\pm$ 22.7s; p=0.001), whereas the control group showed deterioration (T0:8.6 $\pm$ 8.6s, T1: 3.8 $\pm$ 6.6s; p=0.027).
- The between-group difference was significant (p<0.001; d=2.17). Lip strength increased in the MCOI group (T0:16.9 $\pm$ 8.8, T1: 19.4  $\pm$ 7.8 kPa; d=1.75), and tongue strength improved modestly (T0:30.2 $\pm$ 12.7, T1: 31.1 $\pm$ 12.4kPa; p=0.015; d=0.80). Significant reductions in tongue coating (9.9 $\pm$ 2.2 to 3.4 $\pm$ 2.5) and turbidity (3.0 $\pm$ 0.5 to 1.5 $\pm$ 0.5) were observed in the MCOI group compared with controls (both p<0.01). Participants reported decreased oral dryness and increased salivary secretion. No aspiration events occurred.

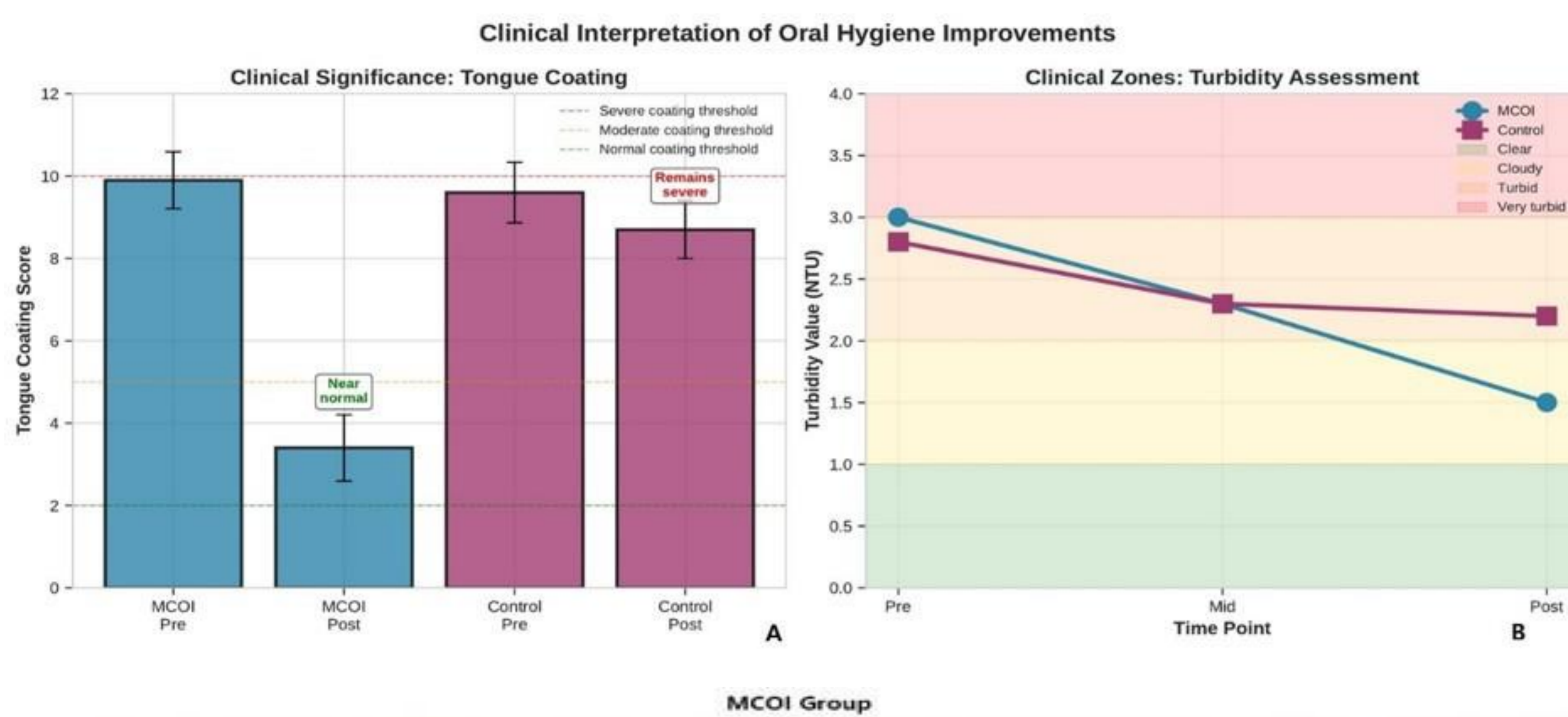


Figure 2. Tongue coating scores and water turbidity by intervention group

(A) Tongue coating scores Pre/Post intervention. MCOI: significant reduction to near-normal levels. Control: minimal improvement, remains severe.

(B) Turbidity across time points. MCOI: greater reduction reaching near clear zone. Control: minimal change, remains turbid. Color zones indicate clinical thresholds



Figure 3. Representative images demonstrating the cleansing efficacy of the multi-channeled oral irrigation device (COMORAL®) compared with usual care. Upper panel shows clinical photographs of tongue appearance before (Pre) and after (Post) intervention. The MCOI group demonstrated marked reduction in tongue coating, whereas minimal change was observed in the usual care group. Lower panel shows representative samples of collected cleansing water. Post-intervention turbidity was visibly reduced in the MCOI group, while the usual care group showed persistent particulate matter and foam, indicating inferior debris removal.

## Conclusion

- The multi-channeled oral irrigation system demonstrated safety and clinical efficacy in improving oral motor function and hygiene in tube-fed stroke patients with dysphagia. These preliminary findings support the potential clinical utility of COMORAL® as a safe oral care strategy for high-risk dysphagic patients.