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第二十一屆國家新創獎及學生復健工程與輔助科技創新競賽的發明主要用於幫助中風或腦傷後出現舌頭無力，最終導致吞嚥困難或說話不清楚的病人進行復健。研究團隊利用3D列印技術製作出一種矽膠「舌頭拉伸杯」，讓病人可以安全且舒適地將舌頭放入進行訓練。這個裝置可連接振動機或感測器，並結合遊戲化互動系統，讓使用者依畫面指示進行上下、左右、前後等方向的舌頭運動。訓練時，振動頻率與張力強度可依使用者狀況調整，使復健更符合個人需求、同時提升動機與趣味性。為了客觀評估成效，研究團隊結合無線腦波偵測器，即時觀察腦部在訓練中的電氣變化。實驗發現，舌頭運動可改變左顳葉與運動皮質區的腦波活動，顯示此訓練確實刺激與口腔運動有關的神經功能。實際案例中可見一位七十五歲的中風病人原本需鼻胃管灌食，經過兩個月的舌頭振動與遊戲訓練後，說話與吞嚥能力明顯改善，並成功拔除鼻胃管恢復自主進食。



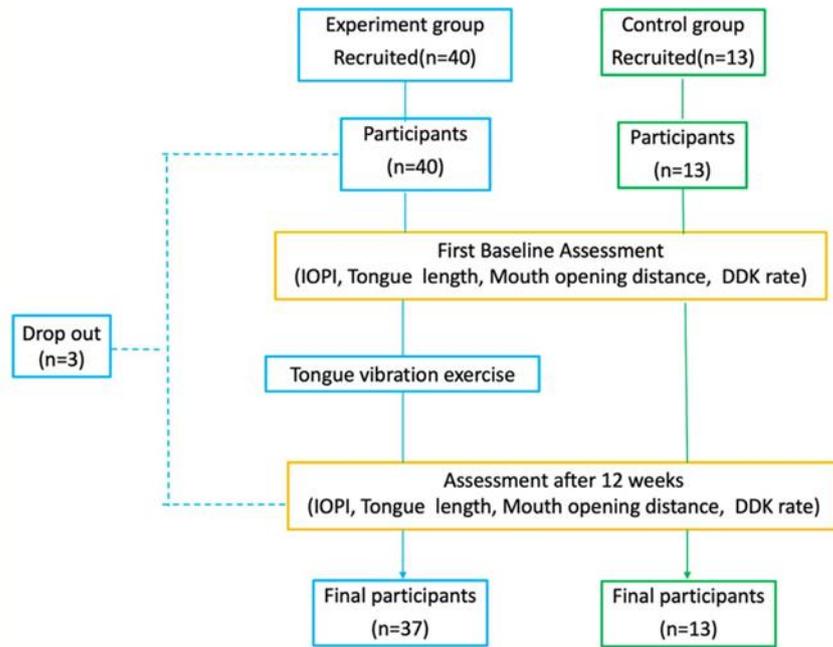


FIGURE 1 | Flow chart of the enrollment of participants in the study.



FIGURE 2 | Tongue suction device that is used to hold the tongue.

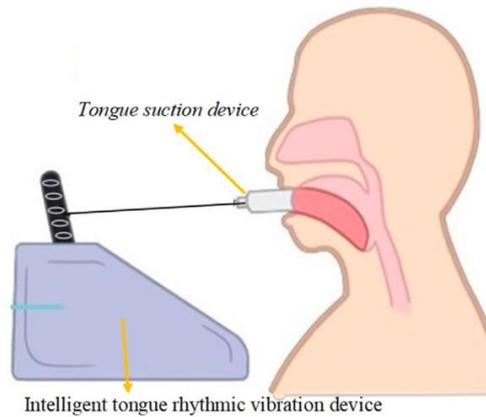


FIGURE 3 | Tongue suction device connected to intelligent tongue rhythmic vibration device to perform tongue vibration exercise.



【具體成果】

- 獲獎

1. 第二十一屆國家新創獎-臨床新創獎
2. 全球學生復健工程與輔助科技創新競賽-台灣選拔賽第二名
3. 全球學生復健工程與輔助科技創新競賽-全球賽gold award

- 專利

舌部訓練裝置，專利號：I813376，衛部醫器製壹字-010048

- 114 年度代表性論文

Chen, Y. J., Chueh, C. H., Chiang, T. H., Lee, C. L., Lin, K. L., & Chen, C. H. (2025). The Effect of Tongue Vibration Exercise Combined With Oromotor Training on Tongue Function in Older Adults. *Journal of oral rehabilitation*, 10.1111/joor.70063. Advance online publication. <https://doi.org/10.1111/joor.70063>



【研究團隊】

團隊成員：[陳嘉炘](#)、[陳怡嬪](#)、洪齊佑、鄭育佳、林正哲、楊子萱、陳寬諺

團隊簡介：高雄醫學大學後醫學系培育具臨床思維與研究能力的醫師，課程結合基礎醫學與臨床訓練，強調跨領域整合與全人照護。在復健相關領域，學生可接觸神經復健、肌肉骨骼醫學及功能重建等課程，並於附設醫院參與復健臨床實習，培養評估與治療身心功能障礙患者的能力。

研究聯繫 Email：chchen@kmu.edu.tw



The invention awarded in the 21st National Innovation Award and the international Student Rehabilitation Engineering and Assistive Technology Innovation Competition is primarily designed to aid patients who experience tongue weakness after a stroke or brain injury, leading to swallowing difficulties or unclear speech. We used 3D printing technology to create a silicone tongue stretching cup, allowing patients to place their tongue inside for safe and comfortable training.

This device can be connected to a vibrator motor and integrated with an interactive, game-based system. Users perform tongue movements in multi- directions, according to the instructions. During training, vibration frequency and tension intensity can be adjusted based on the user's clinical condition, making rehabilitation more personalized while enhancing motivation and engagement.

To objectively evaluate its effectiveness, our team incorporated a wireless EEG detector to monitor real-time changes of electric signal during training. Experimental results showed that tongue exercises altered the activity in the left temporal and motor cortical areas, indicating the training effectively stimulated neural functions related to oral movement.

In a real case, a 75-year-old stroke patient who initially required nasogastric tube feeding showed significant improvement

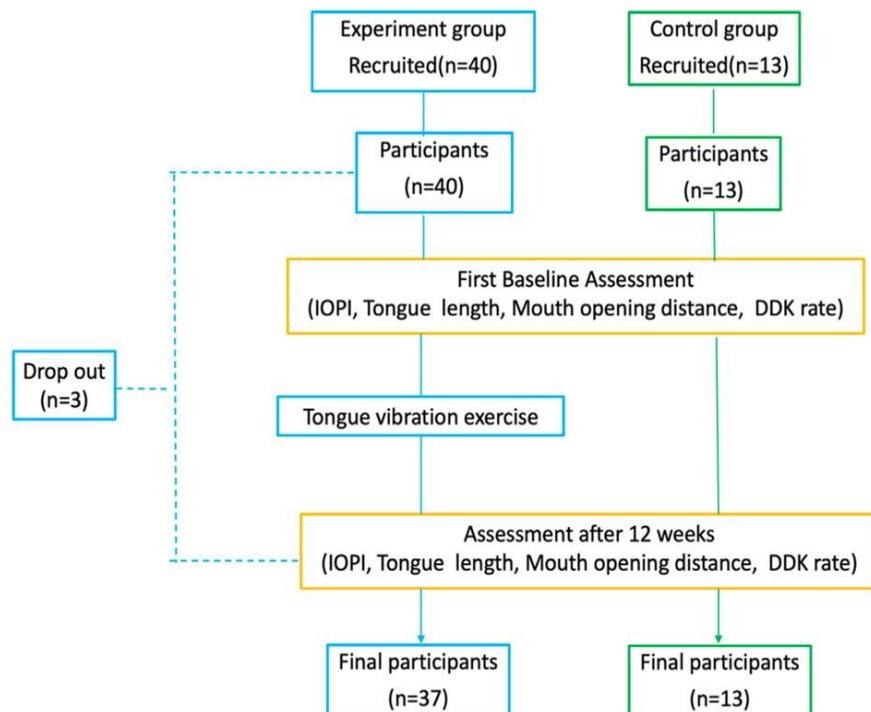


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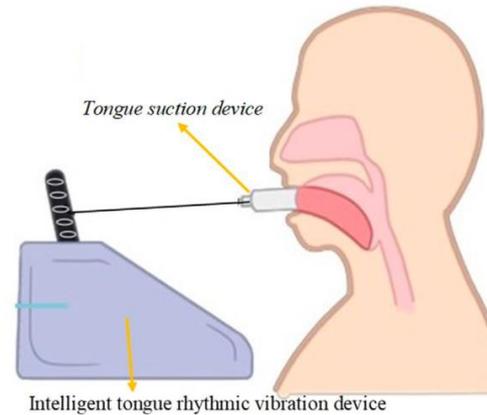


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【Concrete Results】

● Awards

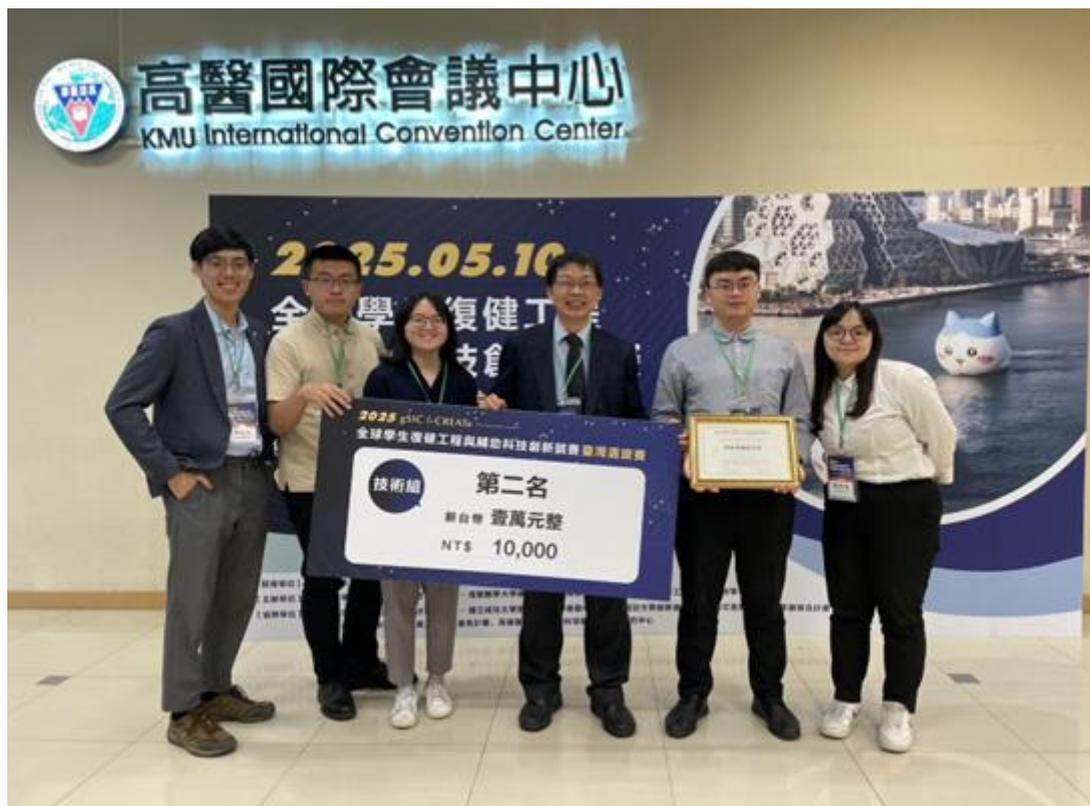
1. The 21st National Innovation Award: Clinical Innovation Award
2. 2025 gSIC i-CREATe, Taiwan challenge: Silver award
3. 2025 gSIC i-CREATe, Global challenge: Gold award

● Patent

Tongue Training Device: Patent I813376 (MOHW Medical Device Manufacturing No. 010048)

● Representative Publications in Recent 1 Year

Chen, Y. J., Chueh, C. H., Chiang, T. H., Lee, C. L., Lin, K. L., & Chen, C. H. (2025). The Effect of Tongue Vibration Exercise Combined With Oromotor Training on Tongue Function in Older Adults. *Journal of oral rehabilitation*, 10.1111/joor.70063.



【Research Team】

Team Member: [Chia-Hsin Chen](#), [Yi-Jen Chen](#), Chi-Yu Hung, Yu-Chia Cheng, Tzu-Hsuan Yang, Jeng-Jer Lin, Kuan-Yen Chen

Overview: The School of Post-Baccalaureate Medicine at Kaohsiung Medical University trains physicians with strong clinical reasoning and research abilities. Its curriculum integrates basic medical sciences with clinical training, emphasizing interdisciplinary collaboration and holistic care. In the field of rehabilitation, students are exposed to courses in neurorehabilitation, musculoskeletal medicine, and functional restoration. They also participate in clinical internships at the university-affiliated hospital, where they develop skills in assessing and treating patients with physical and psychological functional impairments.

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