【校級神經醫學研究中心 110 年 4 月份月會】

會議紀錄

時　　間：110年4月21日(星期三) 12:10-13:30

地　　點：現場會議-醫綜後棟15樓第一會議室

同步視訊會議-Google Meet

主　　席：蔣永孝 主任 (藍亭副主任代理)

TMU Neuroscience Research Center Monthly Meeting Record for April, 2021

Chair: Vice Director Timothy Lane

Recorded by: Professor J. Y. Wang, Secretary C. N. Huang

Host: The Neural Rehabilitation Team

Time: 2021/4/21 (Wednesday) 12:10-13:30

Place: 1st Conference room at 15F, Comprehensive Medical Building (Rear Building), Taipei Medical University (and net meeting via Google Meet held simultaneously).

Meeting Agenda (議程) :

1. Opening by Vice Director Timothy Lane
2. "Effect of Paired Associative Stimulation on Brain and Spinal Cord in SCI Subjects" presented by Muhammad Adeel
3. "Feasibility and Effect of Interactive Telerehabilitation on Balance in Individuals with Chronic Stroke: A Pilot Study" presented by Sheng-Wen Su (蘇聖文) PT. PhD.

1. Opening

This monthly meeting, we invited the Neural Rehabilitation Team which led by Prof. C. H. Lai.
本中心四月份月會邀請到神經復健團隊分享目前研究成果，賴建宏教授為團隊召集人。

2. Forum hosted by the Neural Rehabilitation Team

Prof. Lane introduced the first speaker, Muhammad Adeel. He is from Pakistan and currently is a Ph.D. student at the College of Biomedical Engineering at Taipei Medical University from 2019. He did a bachelor's degree in Doctor of Physiotherapy from King Edward Medical University and in Pakistan, and he worked in Shalimar Institute of Health Sciences as a Lecturer and physiotherapist. After graduation, he came to Taiwan and studied master's degree in Biomedical Engineering from the National Taiwan University of Science and Technology with interests in Human Biomechanics and Sports Physiology. His research is mainly focusing on neurorehabilitation for spinal cord injuries and stroke patients with neurostimulation.

藍亭副主任首先介紹第一位講者- Muhammad Adeel，他來自巴基斯坦，目前就讀於臺北醫學大學醫學工程學院博士班。Adeel 在巴基斯坦 King Edward Medical University 獲得物理治療學士學位，畢業後來台近修，於台灣科技大學就讀醫學工程研究所，並獲得碩士學位。他主要研究為脊髓損傷和中風患者的神經康復神經刺激。

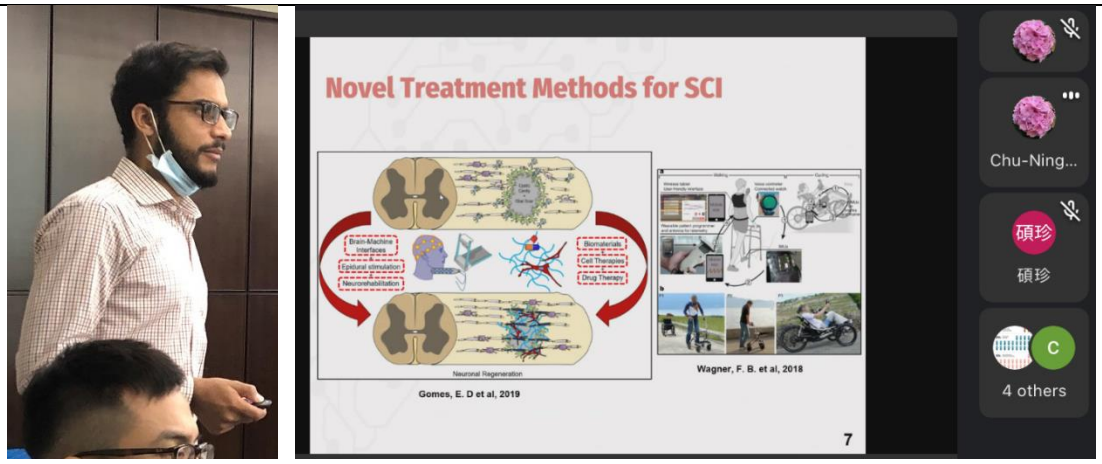
1) Effect of Paired Associative Stimulation on Brain and Spinal Cord in SCI Subjects presented by Muhammad Adeel

Brief summary of Adeel's speech:

Paired associative nerve stimulation (PANS) was proposed as a potential nerve rehabilitation treatment strategy. However, few relevant documents are available regarding the strategy, and only a few clinical studies have involved healthy people. To determine the feasibility of the neurorehabilitation treatment and to estimate the effect of PANS on nerve plasticity for individuals with incomplete spinal cord injury (iSCI), a design combining repetitive transcranial magnetic stimulation (rTMS) with trans-spinal electrical stimulation was developed for treating individuals with iSCI in this pilot cases study.

First, a novel PANS system with multiple stimulation modes was designed and verified with resistors and a metal coil as load. Then, the system was applied to an individual with iSCI. Recruited subjects with an SCI underwent three treatment interventions in random order for 4~20 minutes with followed by 30 min ofutes bicycling (control, repetitive transcranial magnetic stimulation (TMS; rTMS)- at 20 Hz (rTMS) with transspinal direct current stimulation (tsDCS), and intermittent theta burst stimulation (iTBS) with transspinal direct current stimulation (tsDCS) with one a 1-week gap period. A transcranial magnetic stimulation (TMS) method was employed to record a the resting motor threshold (RMT), whose the 90% values of which was used as the stimulation intensity, and the Hoffman reflex (H)-reflex) was measured by stimulating the tibial nerve in the popliteal fossa. Paired sample t-test for The RMT, motor evoked potential (MEP) latency, MEP peak peak-to to-peak amplitude, and H-reflex latency as primary variables while and lower extremity motor scale (LEMS) and modified Modified Ashworth Spasticity scale Scale (MAS) as secondary variables were analyzed before and after the interventions were analyzed by paired-sample t-tests.

The paired stimulation with rTMS-iTBS and /tsDCS together can only mildly changed the MEP and H-reflex but it significantly improved the RMT and LEMS score than compared to other interventions in a single trial experiment. This Results of this study will implicatecan be used in the future to design a paired stimulation with appropriate parameters that can improve functioning of central nervous system lesions.



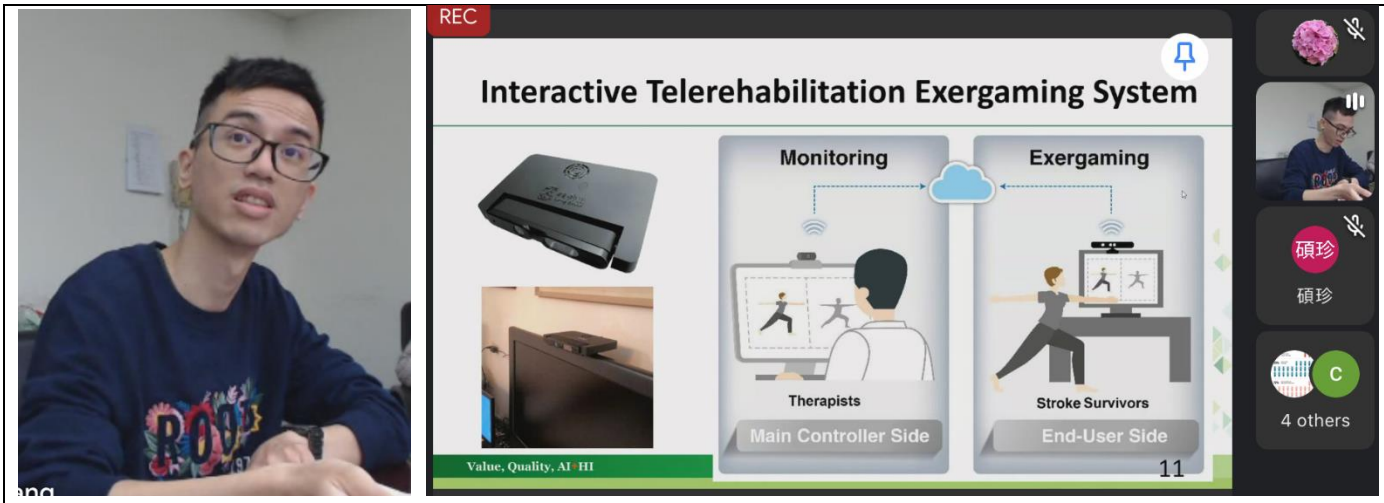
Effect of Paired Associative Stimulation on Brain and Spinal Cord in SCI Subjects presented by Muhammad Adeel (4/21, 2021)

Dr. Lai introduced the second speaker, Dr. Sheng-Wen Su (蘇聖文). Dr. Su is a physical therapist in Taipei Medical University Hospital. He has a doctoral degree in the field of physical therapy and assistive technology. His primary research interests focus on long-term care, assistive technology, and rehabilitation for neurological disease.
賴建宏醫師介紹第二位講者-蘇聖文博士。蘇博士為北醫大附設醫院的物理治療師，他擁有物理治療和輔助技術領域的博士學位。他的主要研究興趣集中在長期護理、輔助技術和神經系統疾病的康復上。

2) Feasibility and Effect of Interactive Telerehabilitation on Balance in Individuals with Chronic Stroke: A Pilot Study presented by Dr. Sheng-Wen Su

Brief summary of Dr. Su's speech:
Stroke survivors need continuing exercise intervention to maintain functional status. This study assessed the feasibility and efficacy of an interactive telerehabilitation exergaming system to improve balance in individuals with chronic stroke, compared to conventional one-on-one rehabilitation.

In this prospective case-control pilot study, 30 Taiwanese individuals with chronic stroke were enrolled and randomly allocated to an experimental group and a control group. All participants received intervention 3 times per week for 4 weeks in the study hospital. The experiment group underwent telerehabilitation using a Kinect camera-based interactive telerehabilitation system in an independent room to simulate home environment. In contrast, the control group received conventional one-on-one physiotherapy in a dedicated rehabilitation area. The effectiveness of interactive telerehabilitation in improving balance in stroke survivors was evaluated by comparing outcomes between the two groups. The primary outcome was Berg Balance Scale (BBS) scores. Secondary outcomes were performance of the Timed Up and Go (TUG) test, Modified Falls Efficacy Scale, Motricity Index, and Functional Ambulation Category.



Feasibility and effect of interactive telerehabilitation on balance in individuals with chronic stroke: a pilot study presented by Sheng-Wen Su. (4/21, 2021)

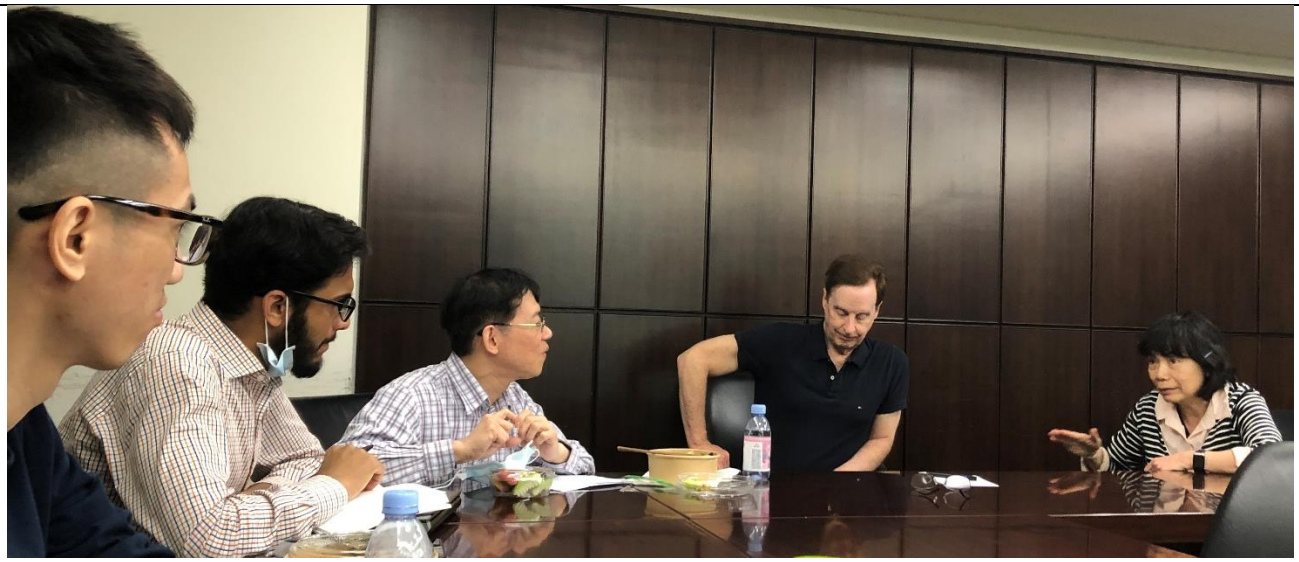
Comparison of outcomes between experimental and control groups revealed no significant differences between groups at baseline and post-intervention for all outcome measures. However, BBS scores improved significantly in both groups (control group: p = 0.01, effect size = 0.49; experimental group: p = 0.01, effect size = 0.70). Completion times of TUG tests also improved significantly in the experimental group (p = 0.005, effect size = 0.70).

The Kinect camera-based interactive telerehabilitation system demonstrates superior or equal efficacy compared to conventional one-on-one physiotherapy for improving balance in individuals with chronic stroke.

3) Discussion

Prof. Land and Prof. Wang discussed the effects of rTMS and tsDCS with Dr. Lai and Adeel. Dr. Lai thought that rTMS and rsDCS might be synergetic. Prof. Wand suggested Dr. Lai they could test combine the treatment with of lower intensity of rTMS and rsDCS to find if the result will be greater than single one treatment to prove these two treatments are synergetic. Dr. Lai also said they want to detect what happen in the spinal cord in transic way but it' s difficult to detect. Therefore, if anyone know how to do the similar experiment, please contact Dr. Lai.

藍亭教授、王家儀執行長與賴建宏醫師一同討論 rTMS 及 tsDCS 的治療效果，賴醫師目前推測這兩種治療方法有協同作用，王家儀執行長進一步建議若想要測試是否有協同作用，可以測試低強度的混合治療處理，看治療結果是否比單一治療方式效果好。賴醫師也說他們想測試脊髓內情形，但因為目前沒有測量技術，因此若有成員知道如何測量，歡迎與賴醫師聯絡。



Members discussed with speakers. (4/21, 2021)

3. 大學社會責任：

因應校方推動實踐大學社會責任，定期調查各團隊相關研究進度：

復健團隊：目前擴增實境(Augmented Reality；AR)平衡能力和日常生活訓練系統的兩項專利獲得科技部補助以創新營運模式進行產學合作，現已完成系統雛形，正在洽談技轉，預計今年會推出完整產品。另一項專利技術-高密度經顱電刺激(high-definition transcranial electrical stimulation;

HD-tCES)，已完成一套經顱直流電系統雛型機，目前正在進行募資，預計今年將成立新創公司。

會議結束時間為 13:20。

【神經醫學研究中心 110 年 4 月份月會】

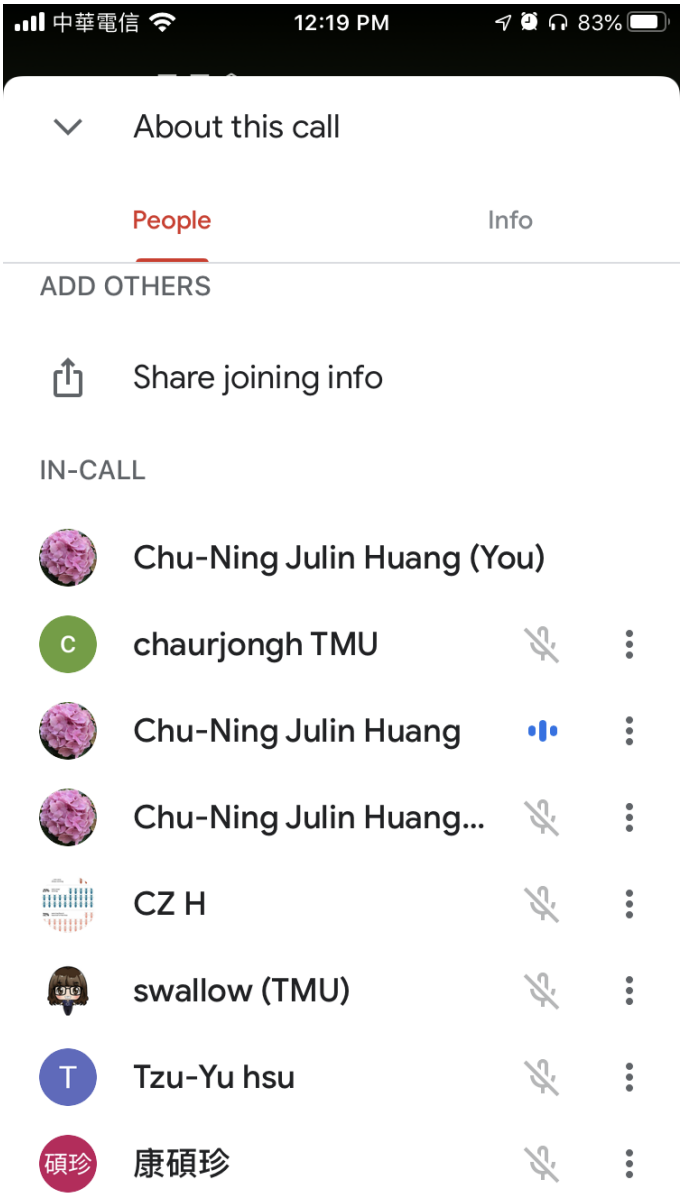
簽到單

時　　間：110年4月21日(星期三) 12:10-13:40

地　　點：本次會議改以視訊會議主持，只有報告團隊及工作人員在現場協助(醫綜後棟15樓第一會議室)

主　　席：蔣永孝 主任

中心團隊 TEAM	姓名	簽到
神經醫學研究中心	蔣永孝 主任	
神經醫學研究中心	藍亭(Timothy Lane) 副主任	1 TimLane
神經醫學研究中心	王家儀 執行長	2 王家儀
神經復健 Neural Rehabilitation	賴建宏 副教授	3 賴建宏
神經復健 Neural Rehabilitation	Zhao Zhang	
神經復健 Neural Rehabilitation	Dr. Sheng-Wen Su	4 蘇聖文
College of Biomedical Eng	Adeel	5 Adeel
	林瑗晴	6 林瑗晴
		7 黃筑舟


中華電信
12:19 PM
83%
About this call
People
Info
ADD OTHERS
Share joining info
IN-CALL
Chu-Ning Julin Huang (You)
chaurjongh TMU
Chu-Ning Julin Huang
Chu-Ning Julin Huang...
CZ H
swallow (TMU)
Tzu-Yu hsu
康碩珍