出國報告（出國類別：開會）

第八屆國際顳顎關節跨領域研究會議

服務機關：臺北榮民總醫院口腔醫學部
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摘要

國際顳顎關節跨學科研究會議為顳顎關節症之綜合研討大會，是全球惟一針對顳顎關節有著全面及深入探討之國際會議。本人目前為院內專門診斷及治療顳顎關節症之主治醫師，希望藉由參加此國際顳顎關節跨學科研究會議，加強與國際上顳顎關節症研究學者之交流，並提升院內研究顳顎關節症之風氣。

第八屆國際顳顎關節跨領域研究會議今年於 4 月 21、22 日在美國費城舉行。由費城賓州大學 Professor Peter D. Quinn 發起。今年大會參加人數超過一百人，為歷年之最。今年會議內容涵蓋手術、解剖、生理、病理、分子生物、診斷(人工智能輔助)及組織再生等，內容包羅萬象。

此回首次參加國際顳顎關節跨領域研究會議收獲良多！希望二年後的年會能同榮陽夥伴一起前往，共同營造「顳顎關節跨領域研究團隊」！

關鍵字: 國際顳顎關節跨領域研究會議

目次

一、目的

國際顳顎關節跨學科研究會議為顳顎關節症之綜合研討大會，是全球惟一針對顳顎關節有著全面及深入探討之國際會議。國內顳顎關節症患者與日俱增，每週因顳顎關節症至本院初診就診則多達 20 人。本人目前為院內專門診斷及治療顳顎關節症之主治醫師，承蒙院方及部內老師支持，以及相關科別（如精神科、復健科、神經內科、傳統醫學部等）同仁大力幫忙，已然建構起顳顎關節症跨領域治療，儼然為臺灣治療顳顎關節症之翹楚！近年來更致力於將人工智慧導入顳顎關節症診斷。希望藉由參加此國際顳顎關節跨學科研究會議，加強與國際上顳顎關節症研究學者之交流，並提升院內研究顳顎關節症之風氣。本人目前亦為臺灣顱顎障礙症學會理事長，藉由參與此國際盛會，宣傳臺灣及臺北榮民總醫院。

二、過程

第八屆國際顳顎關節跨領域研究會議今年於 4 月 21、22 日在美國費城舉行。由於是第一次前往費城，路程安排較不熟悉，在會議前一天凌晨四點鐘才抵達下榻飯店。
國際顳顎關節跨領域研究會議起源於 2006 年，由費城賓州大學 Professor Peter D. Quinn 發起。會議每隔二年舉辦一次，這次由於 COVID-19 疫情，延至今年才舉辦。
Professor Peter D. Quinn 是口腔外科醫師，主要是進行顳顎關節手術，特別是顳顎關節置換手術，是這個領域的大師。他能夠在手術處理顳顎關節症之外，召集跨領域專家，針對顳顎關節症有系統的研究。
今年大會參加人數超過一百人，為歷年之最。今年會議共有二天，內容涵蓋手術、解剖、生理、病理、分子生物、診斷(人工智能輔助)及組織再生等，內容包羅萬象，茲分述如下：

1. 顳顎關節手術：首先由 Professor Peter D. Quinn 回顧 TMJ surgery。賓州大學主導了 Biomet TMJ prosthesis 的臨床試驗及後續資料收集。Professor Louis Mercuri 則針對 TMJ prostheses 的損耗進行研究。捷克布拉格 Dr. Vladimir Machon 分享以 3D 列印 instrument guide 來進行精準顳顎關節鏡手術移除 chondromatoses。
2. 顳顎關節解剖及生理：Delaware 大學 Dr. X. Lucas Lu 分析在不同動態力量施加下，顳顎關節軟骨有不同的變化；Oregon 大學的二位講員：Dr. Laura Iwasaki 及 Jeff Nickel 則針對顎骨正顎手術後對於 TMJ、masticatory muscle 和 neuromechanics 的影響。
3. 顳顎關節病理：共同主辦人 Professor Beth Winkelstein 分享多年來對於 TMJ pain 的動物實驗，建立起 models，mechanisms 及 manipulations。其中對於大鼠的客觀疼痛評估真的是有獨到之處。顳顎關節內異位鈣化（Heterotopic Ossification）在本次大會中被三位講員提及，分別就分子生物、動物研究及治療處置來探討。

4. 顳顎關節分子生物：此主題在本次大會有最多講員提及。一些先進的技術，如：single cell RNAseq 及 CRISPR，都已經開始應用於 TMJ osteoarthritis 研究。

5. 顳顎關節組織再生：此主題一直都是這個領域的研究者想要突破的研究。硬骨及軟骨共同再生的確是一項艱難的任務。

6. 顳顎關節診斷(人工智能輔助)：本人此次代表榮陽團隊上台報告以人工智能輔助顳顎關節核磁共振影像判讀及臨床症狀分類，獲得在場大多數美方研究人員的肯定。同時 Clemson 大學 Dr. Shuchun Sun 團隊及 Michigan 大學 Dr. Najla Al Turkestani 團隊聚焦在臨床數據人工智能輔助診斷。此項功能，榮陽團隊也在積極達成！

三、心得及建議

此回首次參加國際顳顎關節跨領域研究會議收獲良多！除了時差十二小時的生理時鐘調適相當有難度。希望二年後的年會能同榮陽夥伴一起前往，共同營造「顳顎關節跨領域研究團隊」！

臺北榮總目前專精於顳顎關節手術之主治醫師僅有本人，應盡早訓練年輕後進，一同開啟顳顎關節手術嶄新醫療及相關研究。顳顎關節解剖及生理研究在榮陽團隊近來略有涉獵，然必須牽涉到動物實驗，在年輕一代住院醫師，特別是牙科，皆興趣缺缺！口腔病理成為牙科專科醫師已經多年，然而國內客觀環境不利牙醫系畢業生從事口腔病理研究。臺北榮總醫學研究部有相關的研究能量，將於近日找邱士華部長來討論進一步的合作。顳顎關節組織再生：此主題一直都是這個領域的研究者想要突破的研究。硬骨及軟骨共同再生的確是一項艱難的任務。本人先前在密西根大學曾進行豬的顳顎關節組織再生研究，但成本著實不低，加上國內需求量很少，在研究人員及物資許可下，可進行小量研究。

此次因為三年的 COVID-19 疫情恢復，造成交通費用大漲。申請經費時的經濟艙報價，與在通知經費通過時再購買經濟艙機票時之金額差三倍之多！建議經費補助能夠以經費核可後的經濟艙票價為主，減少代表院方出國報告的經濟負擔。

五、附錄


8TH INTERNATIONAL
TMJ
Interdisciplinary
Research
Meeting
April 21-22, 2023
University of Pennsylvania
Philadelphia, Pennsylvania
www.dental.upenn.edu/ITIRM8
Penn
Dental Medicine
University of Pennsylvania
Penn Medicine
Center for Temporomandibular Joint Disease

8TH INTERNATIONAL

TMJ Interdisciplinary Research Meeting

Welcome

It is our great pleasure to welcome you to Philadelphia, USA, and the University of Pennsylvania campus for the 8th International TMJ Research Meeting (ITIRM8)!

Once again, we have reunited our friends and colleagues for another lively scientific discussion of state-of-the-art research on the TMJ. We are pleased that this meeting continues to be an attractive venue where students as well as junior and senior level biologists, engineers, and clinicians can get together to exchange ideas, learn from one another, develop friendship and establish collaboration.

Consistent with that theme, this year's program focuses on special topics with accompanying keynote speakers such as markers and cell based therapies, in vivo mechanics, pathophysiology of the TMJ, and bioscaffold based functional tissue engineering.

We would especially like to thank the program committee, all of your support is an integral part of maintaining the high quality of this meeting.

Please enjoy the conference!

Alejandro Almarza, PhD, *Chair*
Boaz Arzi, DVM
Michael Detamore, PhD
Eric Granquist, DMD, MD

Penn Dental Medicine
University of Pennsylvania

Penn Medicine
Center for Temporomandibular Joint Disease

AIMS OF ITIRM8

The 8th International TMJ Interdisciplinary Research Meeting provides a forum to discuss state-of-the-art TMJ research. By bringing together leaders as well as budding investigators in our field, we hope to address challenges in the clinical management of TMJ problems affecting function, bring forth an understanding of the embryonic development of the TMJ, start to identify the primary drivers of chronic pain, and set new directions in biomechanical and biological research that hold great potential for future treatments.

CONFERENCE ORGANIZER

Alejandro Almarza
Eric Granquist

PROGRAM COMMITTEE

Alejandro Almarza
Boaz Arzi
Michael Detamore
Eric Granquist

ADVISORY BOARD

Kyriacos Athanasiou
Lou Mercuri

Friday, April 21

Location: Law Auditorium, Jordan Medical Education Center

8:00 am	**Breakfast/Check in**
9:00 am	**Opening Remarks**
9:15 am	**Keynote Presentation** **"Surgery of the TMJ Past,Present and Future"** Peter Quinn, *University of Pennsylvania School of Dental Medicine*
10:15 am	**Break**

TOTAL JOINT PROSTHETICS

10:30 am	**"Wear and Oxidation Analysis of Explanted TMJR Devices"** Louis Mercuri, *Rush Medical Center*
10:45 am	**"Identifying Structure-Function Relationships Toward Tissue-Engineering of the Temporomandibular Joint Disc Complex in the Yucatan Minipig"** Eston G. Kallins, *University of California, Irvine*
11:00 am	**"Chondromatosis of TMJ. The Prague Experiences"** Vladimír Machoň, *Charles University and Faculty Hospital Prague*
11:15 am	**"Massachusetts General Hospital Surgical and Diagnostic Techniques"** Briana Burris, *Massachusetts General Hospital*
11:30 am	**Lunch**

BIOMECHANICS

1:00 pm	**"Orthognathic Surgery Effects on Masticatory Muscle Activities and Neuromechanics"** Laura Iwasaki, *Oregon Health & Science University*
1:15 pm	**"Identifying Temporomandibular Disorder Morphological Risk Factors via Deep Learning and Multiscale Biomechanical Modeling"** Shuchun Sun, *Clemson University*
1:30 pm	**"Mandibular Osteotomy Rotation Effects on TMJ Energy Density"** Jeff Nickel, *Oregon Health & Science University*
1:45 pm	**"Mechanical Response of TMJ Condylar Cartilage under Dynamic Loading"** X. Lucas Lu, *University of Delaware*
2:00 pm	**Break**

MORE ▶

Friday, April 21 cont'd

GENERAL TOPICS

2:30 pm	**"Improving the Accuracy at Triangle Technique in Arthroscopic Procedure Using a 3D Device"** Leonard D. Moreira, *Private Clinic*
2:45 pm	**"A Systematic Review of Animal Models for Temporomandibular Joint Heterotopic Ossification"** Jason Chen, *Massachusetts General Hospital*
3:00 pm	**"Diagnostic Tool for Temporomandibular Joint Implant: Based on Acoustic Emission"** Jacob Eapen, *University of Illinois at Chicago*
3:15 pm	**Break**
3:45 pm	**"Automatic Classification of Temporomandibular Joint Disorders by MRI Images and Convolutional Neural Networks"** Wen-Liang Lo, *Taipei Veterans General Hospital*
4:00 pm	**"EHPN: A Comprehensive Patient-Specific Prediction Model for Temporomandibular Joint Osteoarthritis Progression"** Najla Al Turkestani, *University of Michigan, School of Dentistry*
4:15 pm	**Open Forum**
5:30 pm	**Reception**
6:00 pm	**Dinner**

Saturday, April 22

Location: Rubenstein Auditorium, Smilow Center for Translational Research

8:00 am Breakfast/Check-in

9:00 am Keynote Presentation
"TMJ Pain: Models, Mechanisms and Manipulations"
Beth Winkelstein, *University of Pennsylvania School of Engineering and Applied Science*

9:30 am Break

MOLECULAR BIOLOGY AND ANIMAL MODELS

10:00 am "Evaluation of Condylar Remodeling and MMPs from Patient with Temporomandibular Osteoarthritis"
Eric Granquist, *University of Pennsylvania School of Dental Medicine*

10:15 am "NG2/CSPG4 Potentiates Endochondral Ossification in Mandibular Condylar Cartilage"
David Reed, *University of Illinois Chicago*

10:30 am "TBD"
Sumit Yadav, *University of Nebraska*

10:45 am "Signaling Interplays of CD11c+-Myeloid Dendritic Cell-Derived Osteoclast Precursor and Environment/Cytokine-Milieu onto Osteoclastogenesis vs. Bone Remodeling"
Andy Yen-Tung Teng, *Kaohsiung Medical University (KMU) & KMU-Hospital*

11:00 am "Single Cell RNAseq of Rat TMJ"
Sara Trbojevic, *University of Pittsburgh*

11:15 am Break

11:30 am Open Forum

12:00 pm Lunch

TREATMENTS

1:30 pm "Heterotopic Ossification Following TMJ Replacement With Alloplastic Reconstruction: Retrospective Analysis of Zimmer Biomet and TMJ Concepts"
Alexander Li, *University of Pennsylvania School of Dental Medicine*

1:45 pm "Regenerative Engineering of a Biphasic Patient-Fitted Temporomandibular Joint Prosthesis"
David S. Nedrelow, *University of Oklahoma*

2:00 pm "CRISPR to Modulate Inflammation"
Joshua Stover, *University of Pittsburgh*

2:15 pm "Developing a Minimally Invasive Therapy for Restoring Cartilage Homeostasis and Chondrocyte Identity"
Millie Embree, *Columbia University*

2:30 pm Closing Remarks

Peter D. Quinn, DMD, MD

Peter D. Quinn is the Schoenleber Professor of Oral & Maxillofacial Surgery/Pharmacology at Penn Dental Medicine. Dr. Quinn served as Chair of the Department of Oral & Maxillofacial Surgery/Pharmacology at Penn Dental Medicine from 1986 to 2008. His primary research interests are in the alloplastic reconstruction of the temporomandibular joint and vascular malformations of the maxillofacial skeleton maxillofacial skeleton. He was a principal investigator in a ten-year clinical trial for the development of the only FDA-approved stock prosthesis for reconstruction of the temporomandibular joint. Dr. Quinn has completed a surgical atlas for temporomandibular joint surgery, which has been published by Elsevier.

Beth A. Winkelstein, PhD

Beth A. Winkelstein's pioneering research focuses on the mechanisms of bodily injury — especially injuries from sports, automobile accidents or degenerative diseases that produce persistent pain in the neck and spine — and has been supported by the National Institutes of Health, the National Science Foundation and the Department of Defense, among many others, including a Presidential Early Career Award from the NSF.

The author of Orthopaedic Biomechanics (2012) and more than a hundred papers and book chapters, she serves as editor of the Journal of Biomechanical Engineering and is a Fellow of the Biomedical Engineering Society, American Institute for Medical and Biological Engineering and American Society of Mechanical Engineers, which awarded her its Y.C. Fung Young Investigator Award in 2006.

At Penn, she served as associate dean for undergraduate education in the Schoo of Engineering and Applied Science and before that as chair of the Graduate Group in Bioengineering and as a Penn Fellow, the cross-University program for select faculty members to develop leadership skills, build alliances across disciplines and gain deeper knowledge of University governance. In partnership with Dean Dennis DeTurck of the College of Arts and Sciences, she led Penn's multi-year grant from the American Association of Universities to improve the quality of teaching in science, technology, engineering and mathematics, especially through new techniques of active in-class learning.