

Volume 31(2), 2013

中華民國一〇二年 第三十一卷第二期  
十二月出刊 ISSN 1013-7661



*Journal of Taiwan Occupational Therapy Association*

**臺灣職能治療學會出版**

Published by Taiwan Occupational Therapy Association

# 職能治療學會雜誌

民國一〇二年 第三十一卷 第二期

## 目錄

理事長卸任感言

通訊課程文章測驗

31卷第1期的通訊課程文章測驗答案

### 職能科學

由職能科學的角度探究孝道行為

郭昶志

pp.125-144

### 職能治療教育

應用客觀結構式臨床測驗診斷職能治療臨床  
實務能力之研究

洪佳慧、林陳涌

pp.145-173

### 生活品質

中風後上肢關節疼痛與健康相關生活品質  
之關聯

楊書瑜、李雅珍  
吳姿誼、尤菀薈  
楊奇旻、謝清麟

pp.174-192

### 生物力學

年長者坐到站之運動學分析

蔡伊純、呂采穗  
李萬盟、張志仲  
楊育昇

pp.193-208

腿前式踝足矯具在中風患者站立平衡之效應

張心怡、羅世忠  
鄧雅凌、邱敏綺  
陳瓊玲

pp.209-225

手部動作缺損之系列性運動學及功能性評估：  
以粉碎性近位指骨骨折個案接受手部復健  
介入為例

徐秀雲、蘇芳慶  
邱浩遠、林聖哲  
郭立杰

pp.226-244

### 投稿須知

pp.245-251

# Journal of Taiwan Occupational Therapy Association

Volume 31, Number 2, 2013

## Table of Contents

Farewell Letter from the President of the TOTA  
CME Quiz  
CME Quiz Answer Key for Volume 31, Number 1

<b>Occupational Science</b>		
<b>The Occupational Perspective of Filial Piety</b>	<i>Chang-Chih Kuo</i>	<b>pp.125-144</b>
<b>Occupational Therapy Education</b>		
<b>Application of Objective Structured Clinical Examination to Diagnose Clinical Competencies in Occupational Therapy</b>	<i>Chia-Hui Hung Chen-Yung Lin</i>	<b>pp.145-173</b>
<b>Quality of Life</b>		
<b>Relationship Between Post-Stroke Upper Extremity Joint Pain and Health-Related Quality of Life</b>	<i>Shu-Yu Yang Ya-Chen Lee Zi-I Wu Wan-Hui Yu Chi-Min Yang Ching-Lin Hsieh</i>	<b>pp.174-192</b>
<b>Biomechanics</b>		
<b>Kinematic Analysis of Sit-to-Stand Among Elderly Adults</b>	<i>Yi-Chuen Tsai Tsai-Sui Lu Wan-Meng Lee Jyh-Jong Chang Yu-Sheng Yang</i>	<b>pp.193-208</b>
<b>Effects of Anterior Ankle-Foot Orthosis on Standing Balance of Stroke Patients</b>	<i>Hsin-Yi Chang Shu-Zon Lou Ya-Ling Teng Min-Chi Chiu Chiung-Ling Chen</i>	<b>pp.209-225</b>
<b>Serial Kinematic and Functional Assessments for Hand Motion Impairment: A Case Report with Hand Rehabilitation for a Comminuted Proximal Phalangeal Fracture</b>	<i>Hsiu-Yun Hsu Fong-Chin Su Haw-Yen Chiu Sheng-Che Lin Li-Chieh Kuo</i>	<b>pp.226-244</b>
<b>Instructions for Authors</b>		
	119	<b>pp.245-251</b>

## 理事長的話

走在三十周年交接的這一階段，回顧過去三年，學會秉持著三大共識策略：「知識之發展與應用，包含創造、掌握、傳授與推展專業知識」、「突破現實環境中專業發展的限制與阻礙」及「會務推動」，向定調專業服務品質標準與養成標準；和帶領學術與服務領域的研發及推廣之目標推進。

細數第15屆學會(2011-2013)走過的痕跡，在學術發展的範疇中，每年召開架建學校與學會常設聯繫管道之教育高峰會議，協助完成各大學通過WFOT新制最低教育標準之課程審查，推動實習新制，綜效學界及政府資源開辦訓練課程，持續推廣職能科學，與國際組織(WFOT及ADI)合辦學術活動，以及定期的繼續教育。專業品質方面，完成了腦中風職能治療指引，指引內容已融入健保署急性後期照顧試辦計畫中；建立實習機構審查基準；通過成為全國性唯一的職能治療臨床教師認證專業組織。在研究發展，建立研究諮詢輔導平台，學會雜誌線上投審系統開發，並申請TSSCI審查，學術研討會已採用線上投審系統作業，創辦研究通訊及納入研究繼續教育通訊學分，並持續辦理學術研討會與論文獎勵。為強化專業推廣與服務，首度辦理輔具、影片和攝影競賽，推動職能治療師正名，及輔助推動世界職能治療日，並邀請大學系學會幹部參加專業推廣討論。同時，承接多項新興領域專案計畫，建立服務模式，培育新血。

學會資源雖較公會體系短少，但仍在理監事支持下，於衛福政策，與公會分進合擊，在健保、醫院設置標準、教學醫院評鑑、PGY訓練、長照、輔具、社福、早療、職重和新興服務政策規劃、評鑑訪查、教育培訓等積極參與，在鞏固專業自主性議題上斡旋遊說衛福部、健保署、國健署、立法院和監察院，共推治療師三專業五會同盟，展開長期性努力。也因應職能治療服務領域擴充，學會成立了議題小組，廣邀數十位在ICF暨身心障礙福利、兒童政策與福利、長期照顧、健

保、勞政服務、輔具和醫院評鑑及設置標準七大議題專精之職能治療師，扮演智庫角色。於國際事務領域，我國首度主辦全球性職能治療國際會議，2012年3月，世界職能治療師聯盟(WFOT)於台北召開全球理事會，有37個國家學會派代表前來臺灣，目睹我國職能治療、民主經濟、科技醫療與福利福祉發展現況，是最佳的國際外交機會。

學會成立於1982年，三十週年慶祝大會於中台灣中山醫學大學辦理，由第16屆新任陳美香理事長擔任在地合辦統籌，廣邀政府與學術界參加，學會並發行三十周年紀念特刊，細數數十年來的發展歷程，表彰職能治療前輩開創者之功績。

未來新一屆學會將持續面對的挑戰，包括：專業核心能力和基礎技術項目之共識，臨床技能測驗及評定，建立更多臨床指引(骨折、腦傷、心肺疾病、失智症)，非教學醫院之督導與教學，確保我國國際組織地位，專業教育之革新以及共同建置臺灣急性後期和長期照顧體系，並爭取OT之地位及待遇。相信在社會重視生活品質及多元照顧概念的整體趨勢下，臺灣職能治療必有更多揮灑的場域，也相信學會在新一屆領導團隊引領下，會讓我們所期待的美景，一一實現。

理事長 **蔡宜蓉** 謹識

## 31卷第二期 通訊課程測驗

請將答案填寫於對應的空格

應用客觀結構式臨床測驗診斷職能治療臨床實務能力之研究				
1	2	3	4	5

1. 實施客觀結構式臨床測驗 (OSCE)，主要為關注學生之哪一項表現？
  - (A) 臨床實務能力
  - (B) 醫學知識
  - (C) 學業能力
  - (D) 成績
2. 規劃一場OSCE需要考量的因素很多，下列哪一項不是規劃OSCE測驗時的必要條件？
  - (A) 標準病人
  - (B) 真實病人
  - (C) 考官
  - (D) 行為觀察評分表
3. 我國哪一個醫學專門領域，已經最先將OSCE納入國家執照考試的應考條件？
  - (A) 醫師
  - (B) 護理
  - (C) 藥師
  - (D) 心理師
4. 下列哪一項學習成效測驗可以在測得學生的臨床技能，同時可直接觀察醫病互動情形，而且不受病人的疾病狀況影響，不會損及病人的醫療權益？
  - (A) Pancile-paper test
  - (B) OSCE
  - (C) Mini-CEX
  - (D) DOPS
5. 請問，下列哪一項是心理疾病職能治療引用OSCE作為培育專業職能治療師的最合適理由：
  - (A) 透過擬真情境的歷練，將倫理議題在醫療行為裡變成習慣性的思考模式
  - (B) 協助學生發展心理疾病職能治療之相關臨床實務能力
  - (C) 監測學生的學習與能力發展
  - (D) 以上皆是

年長者坐到站之運動學分析				
1	2	3	4	5

- 下面哪一項非老年族群相較於年輕族群所常見的坐到站動作特徵？
  - 過程花費時間較久
  - 在動作開始時軀幹前傾的角度較大
  - 整體動作流暢度較佳
  - 會偏愛採用穩定策略來完成動作
- 研究學者將坐到站過程分為四個主要時期，請問從動作開始時身體會先做出軀幹前傾的動作，是屬於過程中哪一期？
  - 屈曲動量期
  - 動量轉移期
  - 伸直期
  - 穩定期
- 本研究是透過何種方式來確認受測者進行坐到站過程中，離椅起身的時間點？
  - 研究者目視得知
  - 透過測力板讀數得知
  - 受測者主動口頭告知
  - 透過股骨大轉子移動軌跡判斷
- 本研究計算出重心與支持底面積距離間隔，試問該值為負值所代表的含意為何？
  - 重心與支持底面積呈現負相關
  - 重心與支持底面積呈現無相關
  - 重心位置並未落於支持底面積之內
  - 重心位置落於腳跟底部之內
- 本研究結果建議臨床治療師教導病患在進行坐到站時，可採用下面哪些方式協助完成站立動作：(1) 雙腳擺位到較靠近椅子的位置 (2) 在坐正姿勢下，軀幹先向前彎曲直到頭部超過膝蓋為止後，再進行站立動作 (3) 可透過適當的軀幹搖擺動作增加移動動量。
  - 僅1 正確
  - 僅2 正確
  - 僅1、2 正確
  - 1、2、3 皆正確

### 31卷第一期 通訊課程測驗答案

阿茲海默氏症患者之生活功能關聯因子				
1	2	3	4	5
D	A	D	B	A

精神分裂症患者之工作自我效能與功能性生活技能對於就業狀態的影響				
1	2	3	4	5
D	B	B	C	D



## The Occupational Perspective of Filial Piety

OCCUPATIONAL THERAPY

Chang-Chih Kuo

*Keynote presentation at the TOTA Occupational Science Symposium III, 27 November 2010, Taipei, Taiwan*

### Abstract

*The necessity and importance of producing knowledge that addresses aspects of occupation in diverse cultures have been widely discussed and advocated. Hsiao, or filial piety, in Chinese culture is considered to be the strongest influence on human conduct and serves as the foundation of interpersonal relationships. However, most of the research on hsiao has focused on its ethical essence, significance, and place in Chinese history, rather than on how it affected everyday living and engagement in occupation. In this article, studies of hsiao published by Chinese literature, historians, and philosophers are first reviewed. Next, three dimensions of hsiao is described and research questions are replenished focused on these dimensions via the lens of occupational science. In this process, the author deconstructs hsiao in order to identify its multidimensional nature. Second, the author explores the dynamic processes that are involved in doing hsiao and how the attitudes of hsiao affect one's engagement in occupation. Finally, the relationship of hsiao to other phenomena such as quality of life or policy formulation is discussed.*

**Keywords:** *Filial piety, Occupational science, Research framework*

Department of Occupational Therapy,  
College of Health Sciences,  
Kaohsiung Medical University

Received: 25 October 2013  
Accepted: 31 October 2013

\*Correspondence: Chang-Chih Kuo  
Department of Occupational Therapy,  
College of Health Sciences,  
Kaohsiung Medical University,  
100 Shih-Chuan 1st Road,  
Kaohsiung city 807, Taiwan.  
Tel.: 07-3121101 ext. 2655.  
E-mail address: robinkuo@kmu.edu.tw

For over two thousand years, Confucian ideals have profoundly affected Chinese society (Smith, 1986). Generally speaking, it formed the core of Chinese system of ethics. According to Confucius, *hsiao*, filial piety, is the root of all virtue and of the Confucian teachings themselves. Weber (1951) described filial piety as the primary virtue constantly inculcated in Chinese society and noted that in case of conflict, filial piety preceded all other virtues. Hence, Weber considered filial piety by far the strongest influence on the conduct of the average person in Chinese society. Deconstructing the Chinese character of *hsiao* (孝, filial piety), it consists of the graph of old, supported by the graph of son placed underneath indicating the ultimate respect and devotion of the child to the parent. Indeed, Yang and Yeh (1988) stated that in Confucianism, *hsiao* has been woven into virtually every facet of Chinese life. A vivid example of the significance that *hsiao* has played in Chinese society is that not only can one easily find *hsiao* stories broadcasted nationwide on TV or in newspapers in Taiwan but also there is even a national “Grand *Hsiao* Award” hosted by the government each year.

## **1. Relevance of filial piety to occupational science**

Using the definition of occupation that refers to “specific chunks of activity within the ongoing stream of human behavior which are named in the lexicon of the culture, for example, fishing or cooking, or at a more abstract level, playing or working” (Yerxa et al., 1989, p. 5), then children’s practicing filial piety, or doing *hsiao*, can be seen as an occupation. As an occupation, doing *hsiao* is similar to playing poker in a behavioral manner. Although poker games have rules, but there is no one correct way to engage in the activity (or occupation) of playing poker. A particular poker player might consider talking with other players a part of the occupation, while others might not. This notion of occupation applies to doing *hsiao*. Although a whole set of rules and practices are associated with doing *hsiao*, the process of doing it can be envisioned in various ways. One person might even consider a certain occupation as an expression of doing *hsiao* at one time, but not in another, in his or her life. For example, a person might consider that

taking a walk with one's parents in the park is a way of doing *hsiao* because it will make his or her parents happy, while someone else might think of this occupation as simply an everyday chore. Further, the same activity may or may not be considered a way of doing *hsiao*. It might seem to an individual that walking with one's parents in the park is not doing *hsiao* until a parent experiences a stroke and taking a walk with him or her is deemed to be helpful for their recovery.

Doing *hsiao* not only involves the children practicing filial behaviors toward their parents, but also takes the parents' reaction and degree of participation into account (Cheng & Chan, 2006; Li, 1993). In this case, doing *hsiao* is a co-occupation. Ideally, adult children adjust their attitude and their way of doing *hsiao* according to their parents' expectations of filial piety and their parents' reactions, while the parents also adapt their expectations to the filial attitudes and behaviors shown by their children. For example, parents might not expect their children to bathe them as a way of doing *hsiao*, but if a parent experiences a stroke, this expectation may arise due to this functional limitation. Similarly, if a parent is satisfied with his or her children providing this filial behavior, then the parent might try harder to engage in a rehabilitation program in order to lessen the caregiving burden on the children.

In this article, I first reviewed researches of *hsiao*, or filial piety that had been published by Chinese literature, historians, and philosophers. These researches, however, focused on *hsiao*'s ethical essence, significance, and place in Chinese history, rather than focused on how it affected people's everyday living and engagement in occupation. Although there were also researches of *hsiao* being conducted from the perspective of psychology, sociology and nursing, they were not started until recent decades. The main problem of studying *hsiao* was the lack of a theoretical system because the researches were conducted for answering questions within each field.

Secondly, I, therefore, examined three dimensions of *hsiao* and replenished more research questions focused on these dimensions via the lens of occupational science in order to generate a theoretical system of studying *hsiao* from the framework for

Occupational Science. In this process, I deconstructed *hsiao* in order to identify its multidimensional nature, followed by investigating the dynamic processes that were involved in doing *hsiao* and how the attitudes of *hsiao* affected people's engagement in occupation. Finally, the relationship of *hsiao* to other phenomena such as quality of life or policy formulation was discussed.

## **2. Concepts of hisao, or filial piety, in Chinese culture**

As stated earlier, most research on filial piety has been published by scholars of Chinese literature, historians or philosophers (Chao, 1970; Pan, 1967; Si, 1982). These essays and scholarly papers focused on the ethical substance of filial piety and the significance and meaning of filial piety in Chinese history. Without exception, this literature does not address how the ideology of filial piety is incorporated into everyday social practices or how it affects people's engagement in occupation. The sources used for the development of these papers are mainly ancient classics and documents, and therefore the publications do not address agency because in this time social scholarship tended not to take ordinary life into account. Nevertheless, these sources do provide very useful concepts for understanding the philosophic grounding of filial piety in Chinese culture and history. By reviewing these writings, one can understand how the concept of filial piety developed over thousands of years.

Although filial piety is discussed in numerous ancient classics, the root meanings of filial piety can best be extracted from the following five collections of traditional Chinese literature: *The Book of Rites* (Chinese title, *Li Chi*), *Analects of Confucius* (*Lun Yu*), *Work of Mencius* (*Meng Tsu*), *The Teaching of Filial Piety* (*Hsiao Ching*), and *The Twenty Four Stories of Hsiao*. In these collections offspring are directed to recognize the care received from their parents, with instructions for paying respect and reciprocating the care for one's aging parents. The following paragraphs present a brief description of each of these collections, with a characteristic quotation illustrating the tone and content of each volume.

*The Book of Rites or Li Chi* records Confucian teachings on rites of propriety. Here the reader finds the exhortation for offspring to repay their parents for the concern and abundant nurturing they have received, and they should do so without reservations: “Care for parents should not be a tiresome obligation; the filial son and his wife will do it with an appearance of pleasure to make their parents feel at ease” (Vol. 2, Chapter 1).

*The Analects of Confucius, or Lun Yu*, consists of sayings and descriptions of the deeds of Confucius and his disciples on a range of subjects including education and moral cultivation. This work contains Confucius’ admonition regarding respect for one’s parents, which is the basis for the feeling and actions of filial piety: “Filial piety is taken to mean providing nourishment for parents, but even dogs and horses are provided with nourishment. If it is not done with reverence for parents, what’s the difference between men and animals?” (Analects, Book 2, Chapter 7).

*The Works of Mencius, or Meng Tzu*, contains guidelines for the practice of filial piety according to the opinions and conversations of Mencius, the principal disciple of Confucius. For Mencius, respect for elders should be at the core of conduct for humans, whether or not the parents are physically present.

The Teaching of Filial Piety, or *Hsiao Ching*, also contains guidelines for the practice of filial piety. From this book, five duties of a filial son are quoted from Confucius’ teaching.

- (1) He must venerate them in daily life.
- (2) He must try to make them happy in every possible way.
- (3) He must take extra care of them when they are sick.
- (4) He ought to show great sorrow for them when they are dead.
- (5) He must offer sacrifices to his deceased parents with the utmost solemnity.

In addition to these four seminal texts, there is another book on this subject which has been traditionally popular in Chinese culture. It is *The Twenty Four Stories of Hsiao*, a collection selected by Kuo Chu-Ching of the Yuan Dynasty (1227-1367 A. D.). Because its content is readily understandable, generations of Chinese children have been brought up on this book (Lin, 1985). *The Twenty Four Stories of Hsiao* is a beloved

volume of inspirational tales that is as familiar to Chinese children as Aesop's Fables is to children in Europe or North America. All the stories in *The Twenty Four Stories of Hsiao* illustrate the ideal of great sacrifice as a demonstration of filial piety.

After having constructed an extensive review of the literature on the topic of filial piety, Yang and Yeh (1988), Yeh (2009), and Yeh and Bedford (2003) provides the most thorough modern conceptualization of this traditional Chinese ideology when compared to other similar studies. Yang and Yeh (1988) conducted a content analysis of the classics and of research done by scholars of Chinese literature, history and philosophy in order to develop a filial piety measure. Through this process, they identified 15 categories of behavior that demonstrate filial piety: (1) respect parents; (2) obey parents; (3) do not make parents unrighteous; (4) serve parents with Li (propriety); (5) continue family business or fulfill parents' expectation of one's work; (6) honor parents; (7) miss parents; (8) entertain parents; (9) do not make parents worry; (10) accompany parents; (11) take care of parents physically, mentally and financially; (12) take care of oneself for parents' sake; (13) produce offspring to carry on family name; (14) bury deceased parents with Li; (15) worship deceased parents' spirit with Li. Based on Yang and Yeh's work (1988), Yeh (2009), and Yeh and Bedford (2003) developed the dual filial piety model, which included reciprocal and authoritarian filial piety. Reciprocal filial piety encompasses emotionally and spiritually attending to one's parents out of gratitude for their efforts in having raising one, and physical and financial care for one's parents as they age and when they die for the same reason. Authoritarian filial piety entails suppressing one's own wishes and complying with one's parents' wishes, as well as continuing the family lineage and maintaining one's parents' reputation because of the force of role requirements.

### **3. The occupational perspective of filial piety, or *hsiao***

Hocking (2000) proposed a framework of occupational science knowledge and research directions, which would be a good reference to investigate *hsiao* systematically.

There are three categories in this framework Hocking proposed. The first category is the essential elements of occupation. This is to identify the nature, substrates, structure, features or characteristics of occupation, simply speaking, to examine what occupation is. The second category is occupational process as unfolding through time. This is to investigate the subjective experience, process features and outcomes of performing occupations, simply speaking, to explain what happens when people engage in occupation. The third category is the relationship of occupation to other phenomena. This is to explain how occupation relates to other aspects of human life, such as health, quality of life, identity, and policies, and so on.

In the following discussions, given the description of Hocking's framework, I deconstruct *hsiao* in order to identify the multidimensional nature of it first. Then, I examine how the dynamic processes are involved in doing *hsiao* and how the attitudes of *hsiao* might affect people's engagement in occupation. Finally, the relationship of *hsiao* and other phenomena such as quality of life or policy making is elaborated. In the process, as stated earlier, more research questions focused on the dimensions in this framework are replenished via the lens of occupational science in order to generate a theoretical system of studying *hsiao*.

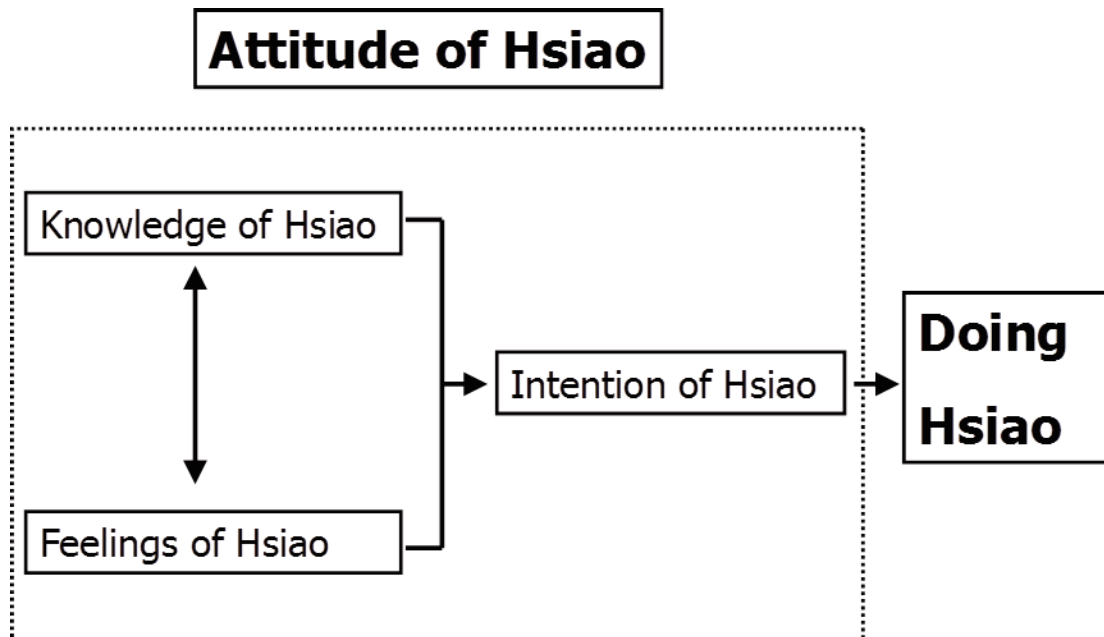
### ***3.1. Essential elements of hsiao***

*Hsiao* could be differentiated between two components: the attitude of *hsiao* (filial attitudes), and the doing of *hsiao* (filial enactments). The relation between attitude and behavior has been an important question inspiring nearly three decades of attitude research, and continues to be a major research focus in social psychology (Chen, Bond, & Tang, 2007).

According to McGuire (1985), attitude is a complicated mental response a person has toward a specific subject. There are three facets under this definition: cognitive, affective, and conative level. Applying these three facets to the attitude of *hsiao*, Yang, Yeh, and Huang (1988) categorized three facets of filial attitude. First, the cognitive

facet of *hsiao* (knowledge of *hsiao*) refers to the understanding and knowledge a son or a daughter has toward the parents and things related to them. Second, the affective facet of *hsiao* (feelings of *hsiao*) refers to the emotion and feeling a son or a daughter has toward the parents and things related to them. Third, the conative facet of *hsiao* (intention of *hsiao*) refers to the behavioral intention and response tendency a son or a daughter has toward the parents and things related to them.

These three facets of the attitude of *hsiao* are not independent; rather, they have causal relationships. Generally speaking, the knowledge and the feeling of *hsiao* may affect each other, and both of them may affect the intention of *hsiao* and then affect the doing of *hsiao*. For example, parents' personalities, behaviors, and ways of education may affect their children's knowledge and feelings of *hsiao*, but at the meantime, the children may also develop their own set of knowledge and feelings of *hsiao* according to their personalities and behavioral characteristics. The children may weigh the balance of the knowledge of *hsiao* and the feelings of *hsiao* to decide their intention of *hsiao*. And their intention of *hsiao* will then influence their way of doing *hsiao*. The model of this causal relationship is in need of empirical evidence at this stage (Figure 1).



**Figure 1**  
Hypothetical model of *hsiao*



According to Clark et al. (1991), occupation is culturally embedded and carries cultural meanings. Therefore, research should be conducted to explore the meaning of each facet of the attitude of *hsiao* and further analyze the relationships between each facet and how they affect the doing of *hsiao* in Chinese society. Besides, due to rapid industrializing, the values that people hold in traditional Chinese society may have changed a lot. What are the meanings of the attitude and the doing of *hsiao* in contemporary time? Taking into account the traditional meaning of *hsiao*, which I briefly described in the prior section, what have changed and what have kept? And is there any new meaning of *hsiao*? Chu (1997), Lan (2002), and Lin's (1985) research are examples of the research directions described above. Chu (1997) analyzed a filial piety questionnaire with 1863 Taiwanese adult respondents. It was found that the importance of passive filial piety, which emphasizes obedience to the authority of parents, had decreased. Lan (2002) interviewed middle class Taiwanese and Hong Kong immigrant families in California and examined how the cultural meaning and social practice of filial care in relation to aging parents had been transformed in the US context. It was found that younger immigrants usually did not cohabit as a three-generation family, but the care and the economic ties were still the same as in Taiwan. Lin (1985) explored the change of Chinese immigrant's way of doing *hsiao* compared to traditional Chinese's and the findings are similar to Lan's study. Lin discovered that the value of *hsiao* still existed but the meanings of it have shifted for better fit into American society.

In addition, filial responsibility is learned through socialization and can be modified continuously throughout an individual's acculturation process (Yang et al., 1988). It would be necessary to conduct a cross-cultural comparison research of filial piety between different cultures such as "*hsiao*" for Chinese, "*kou*" for Japanese, "*hyo*" for Korean, and "filial piety" for American. For example, Dai and Diamond (1998) discovered that in both Chinese and American cultures, filial piety is a socially approved virtue and contains attributes of respecting, caring for and loving the parents. However, there are three main differences. In the aspect of parent-child interaction, autonomy

and independence are valued and confrontation is acceptable in American culture while social orientation and interdependence are valued and obedience is appreciated in Chinese culture. In the aspect of filial responsibility, self-sacrifice and devotion to parent or family are valued in Chinese culture but it is not encouraged in American culture. In the concept of legitimate support to parents, all offerings and service are appreciated and legitimate in Chinese culture versus meeting parents' basic need are expected in American culture. Also, Sung (2001) compared studies in elder respect in East Asian countries, including China, Hong Kong, Japan, Korea, Singapore, Taiwan, Thailand, and Philippines and found that East Asian people still practice most of the modern forms of filial piety. Only two forms, ancestral respect and funeral respect, are not commonly practiced. Laidlaw et al. (2010) conducted a cross-sectional evaluation of expectation for filial piety in three different cultural groups-elderly Chinese immigrants living in the UK, Chinese older adults living in Beijing, and Scottish older adults living in Scotland. They discovered that both Chinese groups remain invested in the concept of filial piety, whereas the UK sample was not.

Moreover, a very important topic of occupational science research in the category of the essential elements of occupation is to study why people engage in occupation. In this regard, it's essential to explore why people engage in doing *hsiao*. Primeau (1996) traced the meanings that work holds for many Western people to Protestant ideals of achieving personal worth through working, which indicated that work, an occupation that is at a more abstract level, encompasses prevailing political and religious ideologies. This perspective can also be seen in Chinese's engagement in doing *hsiao*, an abstract level occupation. Chinese hold the ideology that doing *hsiao* is the basis for future success in every area of life. A person chooses not to do *hsiao* is considered worthless and hence there is no possibility for him/her to succeed (*Hsiao Ching*, *The Analect*, *The Mencius*). In addition, is there any symbolic or spiritual meanings unfolding when engaging in doing *hsiao*? For example, when one chooses to do *hsiao*, is he/she considered it as Karma, do good virtue and receive good reward for life? Last, it is

important to examine how occupation begins because Yerxa (1998, cited in Hocking, 2000) posited that occupation is self-initiated and self-directed. Occupational scientists need to study how the attitude of *hsiao* is formed? Is it through education from parent or school? Or is it through learning from how the children's parents serve their parents? What are the things they do considered doing *hsiao* by themselves?

### **3.2. Occupational process of doing *hsiao***

In this section, what are the dynamic processes involved in doing *hsiao* and how the ideology of *hsiao* affects people's engagement in occupation is discussed.

#### **3.2.1. Dynamic process of doing *hsiao***

In order to understand the dynamic process of doing *hsiao*, we have to explore what factors affect people's engagement in doing *hsiao*. In the discussion of the essential elements of *hsiao*, I illustrated an causal relationship of the interaction among the attitude of *hsiao* (the knowledge, feeling and intention of *hsiao*) and the doing of *hsiao* (Figure1). But the attitude of *hsiao* may not be the only factor that affects people's doing *hsiao*. The faculty of USC department of OT/OS has developed The USC model of Human Subsystem, in which occupation is designated as the output of the interaction of the person, which is seen as an open system including six subsystems, and the environment (Clark et al., 1991). This model provides a good structure for understanding the factors that influence the occupation of doing *hsiao*. The attitude of *hsiao* fits in the personal level in the model, whereas the factors of the environmental level are at no place to be ignored.

In the personal level, we have to investigate how the person learns the knowledge of *hsiao*, what the person's feelings of *hsiao* are and whether not the person has the intention of doing *hsiao*. This is rather complicated. For example, different ways to educate and bring up the children may make them have different attitudes of *hsiao*; however, the same way to educate and bring up the children may not make them to have

the same attitude of *hsiao*. In addition, parents with different personality and behavioral characteristics may affect their children having different attitudes of *hsiao* even they use the same way to educate and bring up the children; and the children with different personality and behavioral characteristics may have different attitude of *hsiao* even the parents use the same way to educate and bring them up. Also, the person's perceptions of social and cultural expectation as well as the person's assessment of the value of doing *hsiao* can both affect the attitude of *hsiao* and further affect the doing of *hsiao*. For instance, the person weighs the gains and losses from personal sacrifice such as time and money contributed in the occupation of doing *hsiao* and the rewards and pressures from doing or not doing *hsiao*.

In the environmental level, other than the personal level, social recognitions, social pressures, gender, class, and the temporal and special environment, etc might be the main factors that affect the occupation of doing *hsiao*. More researches needed to be conducted in order to understand the importance of the factors in the environmental level and their influence on the occupation of doing *hsiao*. The following examples are some of the studies that echo to the aforementioned call for research.

Yang et al. (1988) discovered that social recognitions come along with the ability and willingness to do *hsiao*, and social pressures come from the irresponsibility of doing *hsiao*. Both of them are very important factors that affect people's willingness and their particular ways of doing *hsiao*.

In regard of gender, Kim and Theis (2000), and Chao and Roth (2000) both observed that female members in the family are often the main caregiver for the parents and parents-in-law, but Kim, Kim, and Hurh (1991) indicated that traditionally the eldest son shared a greater portion from his parents and also the major responsibility for the care of his parents. However, Chappell and Kusch's (2007) study revealed the gendered nature of filial piety, which argued that daughters and daughter-in-laws are involved in filial care and, importantly, their involvement increases as more assistance is provided while that from sons decreases, notably in terms of IADL.

Class is another element that affects doing *hsiao* in Chinese society. Li (1993) stated that poor families had too few resources to do *hsiao*. Their whole lives were spent in hard labor in order to survive. The few who lived into old age also had to labor as long as physically possible without being served by their children. And in terms of the inheritance of property, the poor had little material wealth to give to their descendants; consequently, ancestor worship is not as important in poor families as that in rich families. Cheung and Kwan (2009) also found that filial piety and cash payments were lower when the individual was in a city with higher or more advanced modernization, and that the reduction in affirmations of filial piety associated with higher modernization was less among individuals with higher education.

### ***3.2.2. Relationships of ideology of doing hsiao and occupational performance***

In the former section, discussions focused on all the possible factors that affect people's engagement in the occupation of doing *hsiao*. In this section, from another angle, discussions focus on how the ideology of *hsiao* impacts the experience of Chinese's engagement in occupations other than doing *hsiao* such as work or leisure. For example, bringing glory to the parents and the family is one of the meanings of *Hsiao*. In this sense, a possible research direction might be investigating the relationship between the achievement, the achievement motivation, and the attitude of *hsiao* or the doing of *hsiao*. Furthermore, taking care of parents' need physically, mentally, and financially is another content of *hsiao*, however, the main caregiver is mainly female. In the modern Chinese society, more and more women still engage in paid-work after they get married. Research need to explore the subjective experience of how they orchestrate different occupations within different roles such as a worker or a caregiver in their life in order to fulfill the ideology of *hsiao*. In addition, when it comes to the choice of one's career, the ideology of *hsiao* might play an important role on one's decision of whether not to take over the family business instead of one's interested filed. Moreover, the

idea of that the body, the hair and the skin are received from our parents, we dare not injure them is one important ideology of *hsiao*. How does it affect the Chinese people's engagement in leisure activities? What are the subjective experiences when they engage in dangerous leisure activities?

The above discussions are all focusing on how the ideology of *hsiao* affects the children's engagement in occupation. But there should be research exploring the same issue from the aspect of the expectation of *Hsiao* of the parents. For example, Jang (1995) indicated that Chinese elder patients tend to be more depended and expect families to take care of them. It is necessary to investigate whether this is related to Chinese elder patients' expectations of *hsiao* that their children need to do *hsiao* for them.

### **3.3. The relationship of *hsiao* and other phenomenon**

The last category in the framework of occupational science on research of *hsiao* is the relationship between *hsiao* and other phenomenon such as health, well-beings, identity, quality of life, policies and so on. And the relationships must be studied from both of the perspectives of *hsiao* performers (the children) and *hsiao* receivers (the parents).

For example, from the perspective of *hsiao* performers, in a study of 40 Chinese working-age adults with a spinal cord injury (SCI), Hampton and Qin-Hilliard (2004) discovered that being able to support one's parents financially is an important element of their quality of life. The SCI survivors in Hampton and Qin-Hilliard's study expressed that they felt guilty and uncomfortable of not being able to support their parents financially as not being able to fulfill their filial responsibility. Tzeng (2001), investigating the experiences of suicide attempters' life after attempted suicide, found that they were in pain and blamed themselves for lacking *hsiao* after being rescued, and even though they had conflicts with their families, their sensed of *hsiao* helped to instill new meanings into their life journey.

From the perspective of *hsiao* receivers, Yang and Chandler (1992), examining the intergenerational relationships of elderly Chinese people with their adult children, disclosed the increased gap between expectation and performance of *hsiao* can result in intergenerational conflict, grievance, self-restraint, anger, and frustration, and subsequently can become detrimental to the well-being of elderly parents. In a study of filial piety and psychological well-being in well older Chinese, Cheng and Chan (2006) found that, among 9 filial behaviors, respect from the closest and other children, as well as financial assistance, were both the most important predictors that would raise the well-being of the well older Chinese.

More extensive and systematic studies are in desperate need from the perspective of occupational science in this category though the studies have shed the lights. Take quality of life as an example, the relationship between quality of life, health for the children and children's doing *hsiao* is a research direction to be explored. What's the difference of quality of life for children themselves from doing or not doing *hsiao*? Also, whether and how the expectation of children's doing *hsiao* and the way children do *hsiao* affect the quality of life for the parents.

Another interesting phenomenon is that the ideology of *hsiao* relates to policy making. For example, in the highest level, Article 45 of the 1982 Constitution of the People's Republic of China states that the old "have the right to material assistance from and be supported by their son in their old age" (Chow, 1991). And according to the criminal law of Taiwan, if one commits in physical assault to one's parents, the charge of penalty shall double. Moreover, the government in Taiwan hosts a "Grand *Hsiao* Award" every year to encourage people to enact filial piety. Therefore, research of the filial attitude and the doing of *hsiao* might contribute to the development of a comprehensive social welfare policy for the older adults.

## 4. Conclusion

The review of studies published in relation to *hsiao*, or filial piety, and the discussions of the possible research directions of the ideology of *hsiao* provide important insights into understanding the occupation of doing *hsiao* and advocating systematic research of *hsiao* under Hocking's (2000) framework of occupational science. In the future, any research aspect of *hsiao* under this framework is valuable; however, it should be noted that there is other occupational science model, which might generate knowledge of filial piety in different but equally compelling research directions. Furthermore, due to the finding that most of the researches regarding filial piety focused on the discussion of *hsiao* from the perspective of the children, the filial performer, it is suggested that future researches be conducted to explore how the expectations of *hsiao*, filial piety, of the parents, the filial receivers, affect their engagement in occupations, and what the relationship is between the expectations of *hsiao* and other phenomenon such as their quality of life or well-being. In addition, how do the younger and the elder generations adapt their attitude of *hsiao* and the doing of *hsiao* through the change of time or cultural environment is another essential direction needed to be examined.

## References

- Chao, Z. H. (1970). *A new look of Hsiao literature*. Taipei: Business Press.
- Chao, S. Y., & Roth, P. (2000). The experiences of Taiwanese women caring for parents-in-law. *Journal of Advanced Nursing*, 31, 631-638.
- Chappell, N. L., & Kusch, K. (2007). The gendered nature of filial piety-A study among Chinese Canadians. *Journal of Cross-Cultural Gerontology*, 22, 29-45.
- Chen, S. X., Bond, M. H., & Tang, D. (2007). Docomposing filial piety into filial attitudes and filial enactments. *Asian Journal of Social Psychology*, 10, 213-223.
- Cheng, S. T., & Chan, A. C. M. (2006). Filial piety and psychological well-being in well



- older Chinese. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 61B, 262-269.
- Cheung, C. K., & Kwan, A. (2009). The erosion of filial piety by modernisation in Chinese cities. *Ageing and Society*, 29, 179-198.
- Chow, N. (1991). Does filial piety exist under Chinese communism? *Journal of Aging & Social Policy*, 3, 209-225.
- Chu, R. L. (1997, December). Changes of family ethics in Taiwanese society. Paper presented at the 2nd International Conference of Chinese Psychologists, Hong Kong.
- Clark, F., Parham, D., Carlson, M., Frank, G., Jackson, J., Pierce, D., . . . Zemke, R. (1991). Occupational science: Academic innovation in the service of occupational therapy's future. *American Journal of Occupational Therapy*, 45, 300-310.
- Dai, T. Y., & Diamond, M. F. (1998). A cross-cultural comparison and its implications for the well-being of older parents. *Journal of Gerontological Nursing*, 24, 13-18.
- Hampton, N. Z., & Qin-Hilliard, D. B. (2004). Dimensions of quality of life for Chinese adults with spinal cord injury: A qualitative study. *Disability and Rehabilitation*, 26, 203-212.
- Hocking, C. (2000). Occupational science: A stock take of accumulated insights. *Journal of Occupational Science*, 7, 58-67.
- Jang, J. (1995). Chinese culture and occupational therapy. *British Journal of Occupational Therapy*, 58, 103-106.
- Kim, K. C., Kim, S., & Hurh, W. M. (1991). Filial piety and intergenerational relationship in Korean immigrant families. *International Journal of Aging & Human Development*, 33, 233-245.
- Kim, J. H., & Theis, S. L. (2000). Korean American caregivers: Who are they? *Journal of Transcultural Nursing*, 11, 264-273.

- Laidlaw, K., Wang, D., Coelho, C., & Power, M. (2010). Attitudes to ageing and expectations for filial piety across Chinese and British cultures: A pilot exploratory evaluation. *Aging & Mental Health, 14*, 283-292.
- Lan, P. C. (2002). Subcontracting filial piety: Elder care in ethnic Chinese immigrant families in California. *Journal of Family Issues, 23*, 812-835.
- Li, J. (1993). *The effect of culture change on filial piety of the Chinese Americans at a residence for the Chinese*. Ann Arbor, MI: UMI Dissertation Service.
- Lin, C. (1985). *The intergenerational relationships among Chinese immigrant families: A study of filial piety*. Ann Arbor, MI: UMI Dissertation Service.
- McGuire, W. J. (1985). Attitude and attitude change. In G. Lindzey, & E. Aronson (Eds.), *Handbook of social psychology, 2*, (pp. 233-346). New York, NY: Random House.
- Pan, C. G. (1967). *Confucius's theory of hsiao*. Taipei: Chinese Culture Press.
- Primeau, L. A. (1996). Work and leisure: Transcending the dichotomy. *American Journal of Occupational Therapy, 50*, 569-577.
- Si, J. H. (1982). *The study of Hsiao Tao thoughts in Confucianism*. Taipei: Fu-Ren University Press.
- Smith, H. (1986). *The World's religions: Our great wisdom traditions*. San Francisco, CA: Harper Press.
- Sung K. T. (2001). Elder respect: Exploration of ideals and forms in East Asia. *Journal of Aging Studies, 15*, 13-27.
- Tzeng, W. C. (2001). Being trapped in a circle: Life after a suicide attempt in Taiwan. *Journal of Transcultural Nursing, 12*, 302-309.
- Weber, M. (1951). *The religion of China*. New York, NY: Free Press.
- Yang, H., & Chandler, D. (1992). Intergenerational relations: Grievances of the elderly in rural China. *Journal of Comparative Family Studies, 23*, 431-453.
- Yang, K. S., & Yeh, K. H. (1988). The cognitive structure and development of Chinese filial piety. *Bulletin of the Institute of Ethnology, 65*, 131-169.

- Yang, K. S., Yeh, K. H., & Huang, L. L. (1988). A social attitude analysis of Chinese filial piety: Conceptualization and assessment. *Bulletin of the Institute of Ethnology*, 65, 171-227.
- Yeh, K. H. (2009). The dual filial piety model in Chinese culture: Retrospect and prospects. *Indigenous Psychological Research in Chinese Societies*, 32, 101-148.
- Yeh, K. H., & Bedford, O. (2003). A test of the dual filial piety model. *Asian Journal of Social Psychology*, 6, 215-228.
- Yerxa, E. J., Clark, F., Jackson, J., Parham, D., Stein, C., & Zemke, R. (1989). An introduction to occupational science. A foundation for occupational therapy in the 21st century. *Occupatioanl Therapy in Health Care*, 6, 1-17.

# 由職能科學的角度探究孝道行為

OCCUPATIONAL THERAPY

郭昶志

臺灣職能治療學會第三屆職能科學論壇專題演講

## 摘要

孝，在中華文化中被認為對於人類行為有最深的影響並且也被視為人際關係的基石。孝道行為不僅可以被視為一種抽象的職能活動並且它也是一種對於接受者與提供者來說的共同職能活動 (co-occupation)。雖然闡述多元文化中各種職能活動面向之必須性與重要性已被廣泛的討論與倡導，但是很多有關孝道的研究卻集中在討論孝的倫理本質及其在歷史中的定位與重要性，而非檢視孝如何影響華人日常生活與從事職能活動。本文首先將簡單回顧由文學、歷史、哲學觀點對於孝道所做的研究。接著，由職能科學角度出發探究孝道行為的三個主要領域與相關研究議題。在這過程當中，首先，孝道將被解構以識別孝道的多維度本質；其次將進一步描述在盡孝行為中的各種動態歷程，以及盡孝態度如何影響人們從事日常職能活動；最後，孝道與其他現象的關係，例如健康、安適感或生活品質會被深入討論。

**關鍵字：**孝，職能科學，研究架構

高雄醫學大學職能治療學系

受文日期：民國 102 年 10 月 25 日  
接受刊載：民國 102 年 10 月 31 日

\*通訊作者：郭昶志

高雄市十全一路100號

高雄醫學大學職能治療學系暨研究所

電話：07-3121101分機2655

電子信箱：robinkuo@kmu.edu.tw

# 應用客觀結構式臨床測驗診斷 職能治療臨床實務能力之研究

OCCUPATIONAL THERAPY

洪佳慧<sup>1,2</sup> 林陳涌<sup>1,\*</sup>

## 摘要

客觀結構式臨床測驗 (objective structured clinical examination, OSCE) 常被用以評量重要的臨床實務能力，本文目的為探討心理疾病職能治療執行的OSCE之測驗信效度，並聚焦於學生測驗結果之分析與檢討，以提供課程發展與改進。本研究之OSCE備有5個考站，以實際臨床會談情境與標準病人互動，從而評估學生之臨床實務能力表現。參與者為109位即將進入臨床實習，已修畢相關課程之職能治療五專四年級生。資料分析以項目分析與因素分析檢驗本次OSCE品質與潛在的能力組成。結果顯示經項目分析後剔除未達標準之4項，剩下39個評分項目，整體Cronbach's  $\alpha$ 為 .88。因素分析結果顯示本測驗所包括的七個主題，可解釋的變異量為54.5%，分別為介入安排、諮商技術、需求確認、基準評估、資料收集、醫病關係建立和倫理議題。由學生表現發現，計有32位學生沒有通過(29.4%)，學生在諮商技術、醫病關係以及資料收集等一般臨床實務能力的表現較佳。不過，在需求確認、介入安排，以及基準評估等操作性臨床技術尚待加強，也需在課程中加以關注。建議課程規劃可在教學模式中，嘗試融入情境式的臨床技能操作訓練以提升學生專業能力。此外，針對OSCE，亦提出出題者應兼顧臨床實務與測驗情境下評分項目的適合度，考官應增加客觀考評之能力等建議，以提升測驗效度及OSCE品質。

**關鍵字：**客觀結構式臨床測驗，心理疾病職能治療，臨床實務能力，課程

國立台灣師範大學科學教育研究所<sup>1</sup>  
仁德醫護管理專科學校復健科<sup>2</sup>

受文日期：民國101年12月16日  
接受刊載：民國102年2月22日

\*通訊作者：林陳涌  
臺北市文山區汀州路四段 88 號  
國立台灣師範大學科學教育研究所  
電話：02-77346819  
電子信箱：lcy@ntnu.edu.tw

## 前言

臨床實務能力 (clinical competence) 是健康照護專業教育中重要的培育要素，也是學生在畢業前必須具備之能力 (Harden, Stevenson, Downie, & Wilson, 1975; Nestel, Kneebone, Nolan, Akhtar, & Darzi, 2011)。嫻熟臨床實務能力，可以幫助健康照護人員建立正確的診斷及執行高品質的醫療照護。所以，近年來健康照護領域對於學習成效之評估，已由單純評量基礎醫學知識與臨床醫學專業知識，轉向評量臨床醫療照護能力，也就是臨床技能的表現（高明見，民 99）。許多評量方法被引用來瞭解學生在畢業前所具備的臨床實務能力品質，例如，標準病人 (standard patient, SP)、操作技能直接觀察評估 (direct observational procedural skills, DOPS)、迷你臨床演練評估 (mini-clinical evaluation exercise, Mini-CEX) 與客觀結構式臨床測驗 (objective structured clinical examination, OSCE) 等 (Miller, 1990; Swing, 2007)。這些測驗普遍以模具進行技術測驗 (skill examinations) 或模擬臨床情境測驗 (simulated examinations)，以實作評量的方式讓學生展示怎麼做 (show how) 以評估其能力，其中 OSCE 結合了前述兩種測驗模式，是目前在醫學教育中公認為有效的訓練以及評估學生臨床實務能力的方法 (Harden & Gleeson, 1979; Harden et al., 1975; Reiter, Salvatori, Rosenfeld, Trinh, & Eva, 2006; Walsh, Bailey, & Koren, 2009)。OSCE 用於訓練，能幫助專業教育與迅速變遷的臨床照護模式結合，讓學習者累積健康照護的經驗，提升臨床工作之能力，避免因能力不足而造成真實病人的傷害與不舒服；OSCE 用於測驗，不僅可重複施測而提供精確、普遍與可再現的結果，測驗內容亦可彌補許多傳統測驗只重視知識獲得，無法檢驗臨床實務能力發展的缺失，能確實的評定學生具備之知識、技能以及態度的能力，聯結學習及臨床實作上的問題，幫助學生成為符合社會期待的健康照護人員 (Harden et al., 1975; McCluskey, 2000)。

OSCE 奠基於杜威的實用主義 (pragmatism) 以及情境學習理論 (situated learning theory) 的觀點，主張學習是在與實務工作環境相似的情境裡，藉由觀摩專家問題解決模式，以及實際動手做而獲得經驗，知識會持續受到環境激發與使用而活躍，而且所獲得的知識與專業能力，能應用與展現在實務環境的操作中

(王紅宇譯，民 82；Brown, Collins, & Duguid, 1989; Savin-Baden, 2000)。依定義來說，OSCE是一種有時間限制的測驗，考官依據詳細條列的行為表現標準清單，評量學生在連續數個以模擬情境規劃的測驗站，運用所學過的知識、技能與專業態度進行病史詢問、身體檢查、諮詢或其他關於病人健康管理等的模擬問題處理之表現 (Harden et al., 1975)。OSCE關注的是學習者整體臨床實務能力的表現而非聚焦在成績，所以在教學實務上OSCE提供學生以及教師具體的學習成效回饋，相較之下，可以改善傳統醫學教育評量，如，筆試、口試等，信效度不足，以及測驗公平性受質疑的問題 (Kirton & Kravitz, 2011; Pell, Fuller, Homer, & Roberts, 2010)。

目前OSCE已普遍用於醫學生的形成性評量 (formative evaluation) 提供學習回饋，或是作為總結性評量 (summative evaluation) 以檢視教育成果 (Townsend, McLivenny, Miller, & Dunn, 2001)。此外，OSCE亦可評量學習過程難以被觀察到的醫學人文面向，如醫病溝通及人際互動技巧的學習成效。近年來美國、加拿大、韓國等國家紛紛將OSCE納為醫師國家考試的一環 (劉克明、黃裕勝，民 92)。我國也在2012年醫師國家考試中加入高標準OSCE (high-stakes OSCE) 作為第二試之應考資格，以檢視醫學生在模擬情境中使用知識、技術與態度的能力，是否真能達到成為合格醫生的標準。也就是將以實作為基礎的OSCE用來作為國家執照考試中，為大眾醫療品質把關，篩選合格的醫師的重要評量工具 (劉克明、曾慧敏，民 99)。

為了培育職能治療學生成為具備「精熟與應用專業知識、專業理論與臨床技巧，具備醫學人文的態度與精神，以全人觀點 (whole person approach) 考量個案的職能治療需求」等臨床實務能力，成為能善盡職責之健康照護專業一員，世界職能治療師聯盟 (World Federation of Occupational Therapists) 對全球職能治療專業教育，提出了課程規劃的最低標準 (minimum standards for the education of occupational therapists)，詳盡指出關於職能治療學生在畢業前所應具備的知識、技能與態度，希望能作為課程規劃及評估學習成果之參考 (臺灣職能治療學會，民 96；Crepeau, Cohen, & Schell, 2003)。因此，為實現專業教育所期許之培育具實作能力的職能治療師，課程規劃就要提供充足的機會，讓學生在模擬臨床情境

中獲得第一手的操作經驗，評量時也要由實作面向，瞭解學生成為實務工作者的實踐能力 (Harden, 2002)。讓整個教育歷程能確保學生有相當程度的知識，能以正向的經驗以及態度面對臨床工作，成為稱職的職能治療師 (Provident, 2005; Rodger et al., 2009)。

職能治療在心理疾病照護中扮演重要的角色，治療師所具備的臨床實務能力會影響醫病關係的建立，以及治療的滿意度 (Chan, Lee, & Chen, 2007; Gunnarsson & Eklund, 2009; Krupa, Fossey, Anthon, Brown, & Pitts, 2009)。雖然治療師的臨床技巧一直是被建議應持續加強的部分 (周希津、陳曉言、潘瓊琬、施陳美津，民 94)，不過，目前國內職能治療師國家考試，仍以紙筆測驗為主，缺乏針對臨床核心能力的評估 (高明見，民 99)。因此，職能治療確實應該引用 OSCE 的優點，作為有效的專業能力評量工具，為職能治療的品質把關。

近年來本研究之學校在培育具備實作能力的健康照護人員而努力，職能治療教育課程採分段漸進安排，第一階段著重人文與科學教育課程之學習，第二階段規劃臨床前的職能治療專業課程，第三階段則進入生理疾病、小兒與心理疾病職能治療三大領域的專業臨床實習。本研究於學生完成第一、二階段課程，欲進入臨床實習前，規劃了此次的 OSCE 作為學習成效之檢驗，透過臨床實例命題，評估學生在心理疾病職能治療領域是否有足夠的臨床實務能力，並藉由學生的表現檢視課程。因此，本文目的為分析心理疾病職能治療領域課程 OSCE 之信效度，並以探索性因素分析理解此次 OSCE 潛在的測驗構面與脈絡，繼而分析與檢討本次學生測驗結果，以供職能治療教學單位作為診斷學生學習與課程改進之參考。

## 研究方法

### 一、研究對象

本次 OSCE 之受試對象選自某五專四年級職能治療學生共 109 位。受試學生均已修習完心理疾病職能治療領域的相關課程，在進入臨床實習前參與本次 OSCE。測驗前研究者已詳細告知有關測驗目的、程序與內容，受試學生均同意參與。



學生所參與的心理疾病職能治療領域之臨床前教育課程，包含心理疾病職能治療學、團體動力學、團體輔導、職能治療技術學，職能治療專題特論以及臨床見習等課程。領域課程的規劃以及臨床實務能力的訓練目標，期許經由學習後，學生能：（一）瞭解促進心理健康的基本概念；（二）獲得心理疾病職能治療之執行業務的知識；（三）執行與提升諮商技巧；（四）獲得心理疾病職能治療評估的知識與技巧；（五）獲得資料收集、資料分析之技巧；（六）執行心理疾病職能治療之問題解決與臨床推理；（七）應用心理疾病職能治療於各種診斷、族群之治療處置；（八）有效的執行團隊合作與溝通；（九）瞭解職能治療倫理的基本原則；（十）獲得醫病互動與溝通的技巧。

上述心理疾病職能治療領域課程的目標分配於各課程中，並且於第二階段專業學習之臨床前的職能治療專業課程中養成。之後於學生進入臨床實習前，透過OSCE檢視領域教學目標的達成。

## 二、研究工具

本研究「心理疾病職能治療領域OSCE」試題之編制過程，先以列表方式呈現關於測驗的要素以形成OSCE測驗藍圖 (Harden, 1990; Hodges, 2001)。如表1所示，包含測驗內容 (content) 是以職能治療的核心技巧與過程為橫軸，並以心理疾病職能治療領域處置個案，實踐業務所需之流程為縱軸所形成之二維表格；測驗規格 (format) 為一至四站以模擬情境規劃，由考生與標準病人互動進行測驗，第五站則是技術操作。

每站之名稱與測驗內容（李航茜譯，民 96；Creek & Lougher, 2008），分別敘述如下：

第一站資料收集 (information gathering, IG)，可以考驗學生與個案第一次會面時，能提供自我介紹，展現與個案建立治療關係、建立個案資料庫，收集個案之病史與職能歷史 (occupational history) 之會談技巧。

第二站治療性的使用自己 (therapeutic use of self, TUS)，考驗學生在介入治療以及建立合作關係時，同理、覺察、尊重，以正向態度接受個案，使治療師自身之專業特質與行為成為治療中最具價值的部分。

表1  
心理疾病職能治療OSCE之測驗藍圖架構

站次	實踐業務過程所需之臨床技巧	核心技巧與過程					
		與個案合作	問題解決	評估	賦能	使用活動作為治療工具	個案管理
1. IG	醫病關係 諮商技巧	關係建立 沈默技巧					
2. TUS	治療性的使用自己		自我揭露 敏感性				
3. CR	資料分析 臨床推理 問題的形成			ADLRS COTE 互動推理 自我照顧			
4. IP	目標設立、 治療計畫 有目的的 活動 倫理議題	自主性			活動團體 FOR	主題式團體	
5. RK	病歷紀錄						SOAP

註：IG, 資料收集；TUS, 治療性的使用自己；CR, 臨床推理；IP, 介入計畫；RK, 病歷紀錄；ADLRS-III, Chu's Daily Living Functional Scale-Third Edition; COTE, Comprehensive Occupational Therapy Evaluation; FOR, frame of reference in occupational therapy.

第三站臨床推理 (clinical reasoning, CR)，考驗學生能運用專業知識正確的分析評估資料，解讀個案的診斷，由醫病互動中尋得個案的需求，以形成職能治療問題，並考量各種因素決定最佳介入模式。

第四站治療計畫的設立 (intervention plans, IP)，考驗學生在確認問題、設立目標與瞭解個案治療需求後，能個別化的為個案設置治療活動或治療模式，經由分析後進行活動調適以改善個案問題。其中並規劃學生能以負責的態度處理在治療過程出現的倫理議題，以專業的考量決定處置。

第五站SOAP病歷記錄 (record keeping, RK)，考驗學生將個案會談結果、職能問題、治療計畫與處置，以合適模式書寫，作為治療記錄以及專業溝通。

依據測驗之藍圖，商請心理疾病職能治療領域教師撰寫測驗站之案例劇情，然後依據各站實際在課程內所涉及的臨床實務能力，規劃評分項目。考站內容以擬真臨床案例劇情撰寫，搭配各站評分項目所組成的評分表格 (checklist)，以形成本次OSCE之考題。待考題初稿完成後，邀集三位職能治療教師針對各站案例劇情內容、評分表中各站評分項目的對應，以及文字描述進行實質的專業審閱，對於專家認為需要修改、增加或删除之字句或評分項目，由專家討論之後再行修正定稿為正式考題，使考題具內容效度。經由修正後，本次OSCE總計共有43個評分項目用以評量五個考站中之學生表現，附錄1呈現第一站之評分表格內容。

### 三、研究流程

#### (一) OSCE考站規劃

考站的設計參酌Harden (1990) 的規劃建議，並考量本次試題模擬情境為心理疾病職能治療師與個案之臨床會談，因此，考站以聯結站做規劃，也就是讓第一至五考站的考題是相關且連貫的，每站長度五分鐘，每站無間隔，第五站為長站設計需20分鐘來執行，測驗時間為40分鐘。總的來說，若加入考生於各站測驗前閱讀考生指引的20分鐘，每一位考生總測驗時間為60分鐘。這樣的規劃讓OSCE考題情境更符合實際職能治療會談的實務操作模式與會談時間長度，同時兼顧了測驗進行的順暢性。

#### (二) 招募標準病人與訓練

OSCE屬於實作評量，評量中需有標準病人參與演出，以呈現擬真臨床情境之試題。因此，案例所需之標準病人為出題教師由課堂上招募而來，而未免標準病人與考生熟識而影響測驗結果，招募時已考量並排除可能與受試學生熟識的人員成為標準病人。共計有11位標準病人參與，包含5位男性，6位女性。除第五站外，第一至四站均有標準病人。

每位標準病人均於OSCE進行前兩週，開始接受演出的相關訓練，標準病人訓練師 (SP trainer) 為接受台北榮民總醫院培訓，取得訓練資格之教師。依據文獻

報導，每一個問題的情境訓練大約僅需三小時即可完成標準病人訓練（蔡詩力、楊志偉、葉啟娟、張上淳，民 96）。但為求精確及具標準性，標準病人訓練師依循標準化的訓練流程進行。首先，與標準病人一起閱讀案例，提示劇情內案例演示的重點、特點。接著，由標準病人針對案例內容提問，由訓練師提供問題解答（例如，個案自言自語的內容為何？頻率？）。然後，由標準病人以「說自己故事」方式進行自述、聯想、反思，以形塑個案角色。最後，則是透過與訓練師的問題交相詰問、狀況模擬進行演練。本研究發現，具演出經驗的標準病人的確可在練習三小時完成訓練，生手標準病人則需要較長時間進入角色。當標準病人表現符合案例設計，且與其他標準病人表現一致時，始讓標準病人進入OSCE進行演出，以確保考題演出的一致性。

### （三）考生試前說明

本次OSCE之考生於考前一個月已接受過2個小時關於OSCE實施的說明，包含考試範圍、測驗形式、評分方式、可以/不可以攜帶之物件（例如：需穿白袍、不可攜帶任何紙張）、測驗時間以及換站時間等。同時並告知考場中每站會談室內會有一位標準病人呈現臨床會談考題內容，以及一位考官參與考生臨床實務能力的考評。此外，測驗過程需全程錄影，以利之後由另一位考官交相檢驗學生表現之用。考試當天，考生進入第一站前，有15分鐘閱讀考試規則以及張貼於站外之考生指引（附錄2），進入第五站前則有5分鐘閱讀指引的時間。指引中以整齊條列的方式描述了關於考站的內容，也提供考生關於稍後即將面對的標準病人之情況簡述，以及考生在此模擬情境中需完成的任務，還有提醒學生該考站進行的時間。考試當天由工作人員負責導引進行動線以及計時，以預防考生的不當交流以及確實掌控時間。

## 四、資料收集與分析

資料收集時間為98學年度第2學期末，收集的資料包含考官的評分表、測驗中的錄影帶，以及學生測驗中所使用的試題卷等。為考量客觀性及符合測驗的目的，本次OSCE分數評定分為兩個部分，依據此兩個分數再計算測驗獲得之總分，各分數的計算方式如下：

### (一) 評分表格的計分

考生在各站中每個評分項目表現可區分為三類，分別為「都沒做」(1分)、「部分正確做到」(2分)，以及「有做且時機恰當」(3分)，考官依據考生的真實表現給予適當的評分與記錄。在OSCE評量結束後，由另一位參與研究之教師以觀看錄影帶方式，評量學生的表現，並建立交互評分者信度 (inter-rater reliability)。

評分一致性的統計分析方式，首先，收集兩位考官對於學生評分項目上的表現類別，因為是類別量尺（都沒做、部分正確做到，以及有做且時機恰當），可採用Kappa一致性係數分析。另外，OSCE的評分尺標能將學生的表現區分為依序的三類，雖然評分尺標可能不是等距，但在轉換成分數後 (0, 1, 2)，數個評分項目的得分加總可視為等距資料，能以母數統計方法 (parametric statistics) 進行資料處理 (Norman, 2010)。考生表現轉換為分數後的加總，可以Pearson相關計算兩位考官評分的相關。最後，兩位考官之評分結果可視為對一個測驗上的兩個題目之反應，因此可計算兩題目之Cronbach's  $\alpha$ 係數，以瞭解考官評分結果之概化程度 (Shavelson & Webb, 1991)。

### (二) 整體性評分

在測驗的及格標準設定上，每一站考官依據考生於該站內的整體表現的品質，給予一個整體性評分 (global rating)，以作為學生的整體表現的回饋。整體性評分區分為「通過」、「需要輔導」（邊緣組）、「不通過」三個等級。被歸類為「邊緣組」之考生，為根據考官的專業判斷，考生整體表現水準已高於「不通過」，卻仍不完全符合「通過」，需再進一步評斷才可確認其表現之等級。

### (三) 測驗之總分

本研究以標準參照的測驗原則 (criterion-based assessment) 決定學生是否通過考試 (Pell et al, 2010)，評定標準以邊緣群法 (borderline-group method, BLG) 依據整體表現決定通過分數 (overall pass mark)，這是在較小規模OSCE可提升穩定性的作法 (Boursicot, Roberts, & Pell, 2007; Smee, 2001)。作法依序是，首先，將各站被

評定為邊緣組學生的平均分數，當作通過該考站的及格標準分數 (cut-off scores)。接著，將各考站的及格標準分數加總而形成通過分數。最後，只要考生在五站測驗的成績所形成測驗總分 (overall grade) 高於通過分數即代表通過此次OSCE。

資料分析方面，分為對OSCE信效度之檢討，以及學生測驗表現分析兩部分：

### (一) 測驗信效度之分析

在社會科學研究中，發展評量工具以探究學生的學習成就，需在試題發展後經由預試的過程，確認評量工具的信效度後再進行正式施測。不過在醫學教育的實務上，發展實作評量以檢視學生的學習成效常需許多資源的涉入，尤其是OSCE整個測驗的執行在時間、金錢與人力的耗費上相當可觀，因此在國內外醫學教育上，還是可以先由測驗前縝密的規劃後直接施測，測驗後估算與報導OSCE之信效度與適用性後，再解釋學生測驗之結果，也能獲得很好的成效（蔡淳娟等人，民 95；Hojat et al., 2007）。

為了探究檢視學生臨床實務能力之評分項目的效度，由43個評量分項目所收集的學生表現資料，以測驗平均值偏離、成績分佈偏態、低變異量之考量、遺漏值檢驗、極端值檢驗、同質性考驗、因素負荷等項目分析 (item analysis) 方法進行統計分析。另外，為檢驗OSCE評量表格之底層的組成，利用主成分因素分析 (principle component factor analysis) 以最大變異轉軸法 (varimax)，探索整體評分表格在評量學生表現上所蘊含的構念，以做為未來修訂評分表格內容之參考。

### (二) 學生表現之分析

以人數、最大值、最小值、平均值、標準差及百分比等描述性統計進行分析，以了解學生在本次測驗中之通過率以及在臨床會談之各項能力之表現情形。

## 結果

### 一、OSCE測驗品質的分析

#### (一) 相關係數及信度分析結果

表2所顯示為OSCE測驗各站的相關係數及信度分析 (Cronbach's  $\alpha$ ) 結果，各站相關在 .23 - .59，具低至中度相關，相關性不高可以解釋為各站的同質性低，可用以檢驗不同能力。而整體分數的內部一致性係數為 .79，分站信度係數介於 .45至 .88（如表2對角線所列），顯示這些站確實是在測量同一個特質，意即執行心理疾病職能治療業務的特質。

考官間評分一致性之分析結果如表3所示，Pearson積差相關係數 $r$ 值為高度相關，而評分者間概化程度 $\alpha$ 值達可信程度，表示兩位考官評分結果具有高度相關與一致性。Kappa's  $\kappa$ 值一致性係數的結果顯示已達統計顯著水準，雖 $\kappa$ 值只屬一般程度水準，但綜合三項一致性係數的分析結果，本次OSCE之考官評分可說具有一致性。

表2  
各站之間的皮爾森相關係數與信度係數

站次	資料收集	治療性的 使用自己	臨床推理	介入計畫	病歷紀錄
資料收集	.68				
治療性的使用自己	.54	.69			
臨床推理	.59	.57	.72		
介入計畫	.43	.38	.43	.88	
病歷紀錄	.49	.23	.44	.25	.45

註：斜對角線粗體之數值為信度係數 (Cronbach's  $\alpha$ )。

表3  
OSCE評分的一致性

係數	Kappa's $\kappa$ 值	Pearson's $r$ 值	Cronbach's $\alpha$ 值
考官評分一致性	.273 ( $p = .000$ )	.886 ( $p = .000$ )	.645

## (二) 項目分析結果

以項目分析檢驗各站評分表內評分項目的合適性，檢驗向度包含四部分共七項指標，檢驗值之標準設定（邱皓政，民 89；Pell et al., 2010）包含：第一部份為遺漏值檢驗 (missing data)：本研究資料收集過程，考官評分完整，無遺漏值。第二部分包含：1. 平均值偏離 (mean)：評分表之中間值為2，各項目之平均數介於1.22至2.54則符合檢驗要求，評分表中有22項平均數未達標準。2. 標準差 (standard deviation) 過小：標準差小於 .75的題目有18項。3. 偏態 (skewness) 明顯：偏態係數接近正負1的有9個項目。第三部分為鑑別度 (discrimination)：以受試學生的前27%為高分組與後27%為低分組做比較，*t*檢定*p*值未達 .05為顯著水準，計有第101評分項目（編碼代表第一站第1項個評分項目）( $t = 1.16, p = .25$ ) 等6項未達顯著，顯示這些項目鑑別度稍差。第四部分為同質性考驗，檢驗項目包含：1. 項目間相關 (item-total correlation)：整體評分表內部一致性為 .79，代表評分表內各個項目的一致性具有可靠性，但個別評分項目相關係數低於 .3，計有7項。2. 因素負荷量 (factor loading)：因素負荷量 < .3之項目，表示與全量表之同質性較低共計有5項。

綜合檢視七項指標之數據，七項指標中有三項不理想者，則考慮刪除（邱皓政，民 89），因此列入考量的評分項目有八項，依測驗項目情況不同，進行不同處理：

### 1. 刪除不合適測驗情境的評分項目

有四項評分標準於檢視後需要刪除，項目207「提供合適的角色扮演」與項目208「提供合適的家庭作業」兩項雖然是治療師能力的重要項目，但本次OSCE中個案與考生為初次見面，在初次會談的醫療場合，會讓考生在醫病關係尚未穩定時，不知從何完成此兩項評分標準的要求，因此應刪除。

項目401「提供的活動與活動團體類型相符」要求考生在為病人設計活動時，可以說出所建議的活動類型（例如：向個案說明使用「主題團體」以促進個案日常生活功能、提供「任務導向團體」以提升個案之自我認識等），在與病人解說治療計畫時提到「活動團體類型」，似乎是太刻意，雖然是重要的技能，但



不符合實際職能治療會談情境，因此均應刪除。上述三個評分項目可以改由在病歷紀錄中提出治療計畫的實作方式達成能力的評估，會甚於面對標準病人時刻意說出要適當。

項目111「沈默的技巧」中，要求考生當病人沈默不回答時可以提供適度時間讓病人保持沈默，直至病人願意打破沈默，但因考試時間僅有5分鐘，考生大多急於收集資料，因此雖知應允許病人有沈默的時間，但大部分考生均會在病人主動開口前打破沈默，此項評分項目並不合適在有時間限制之測驗情境，也應刪除。

## 2. 保留與修正必要的評分項目

最後，共有4項評分項目於專家小組檢視後認為應該保留，以確保測驗概念的完整性。包含評分項目101「跟病患打招呼，確認病患的稱呼方式」、項目102「自我介紹」、項目106「使用開放式問句（並非全部使用封閉型問句）」及項目209「可以發現醫學倫理之自主性議題」，惟在評分過程，前3項考官標準較鬆，但項目209考官則認為考生應明確向病人提出說明，才算確實做到，因為「治療師有告知治療方式之義務，但病人有拒絕醫療的權利」，但此4項均為醫病互動中重要的要素，因此建議保留而重新檢視考官評分標準。整體而言，經項目分析之後，43項評分項目共刪除4項，留下39項評分項目。

### （三）探索性因素分析

本次測驗各考站及評分表內容之設計，係依照課程內容以及職能治療核心技巧及過程所設計，每一考站中包含與考題情境相符之臨床實務能力之行為表現，經由專家教師審查，臨床實務能力之行為表現項目的配置與職能治療處置個案之流程相符且適當，具內容效度。但仍能以心理計量萃取評分項目間存在的構念，以發現整個測驗規劃的潛在特質之因素結構。

首先，由抽樣的適當性之KMO值為.72，Bartlett球型檢定的卡方值為1937.19 ( $p < .05$ )，兩項統計檢定量已達顯著性，可知本研究的資料適合進行因素分析 (Spicer, 2005)。經以陡坡圖與特徵值 (eigenvalue) 大於1，以及因素負荷量大

於 .3 之考量，可萃取出七個因素，累積解釋變異量為 54.48%，如表 4 所示。接著，由因素內所組成之評分項目回溯文獻探討 (Creek & Lougher, 2008)，七個因素可分別命名為因素 1：介入安排 (planning an intervention)；因素 2：諮商技術 (consultation skills)；因素 3：需求確認 (identifying needs)；因素 4：基準評估 (baseline assessment)；因素 5：資料收集 (information gathering)；因素 6：醫病關係建立 (building rapport)；因素 7：倫理議題 (ethics issue)。七個因素中，解釋全體變異量的最主要部分是「介入安排」。

## 二、考生 OSCE 測驗成績之分析

### (一) OSCE 測驗結果

以各站表現來看，本次測驗 5 站全部通過有 12 人 (11%)，全部不通過有 4 人 (3.7%)。以每站滿分 100 分，五站總分為 500 分計算，學生成績全距介於 173.7 至 442.6 分之間，平均成績為 338.56。依據邊緣群法，各站之邊緣組學生的成績，可計算出各別站次之及格標準分數，加總後之分數為 320 分，可作為通過本次測驗的通過分數，或稱為及格標準。依此標準，則本次測驗整體不通過的學生共 32 人 (29.4%)。

### (二) 依因素分析學生表現

全體學生 OSCE 得分依七項因素分析，情形如表 5 所示，將各因素滿分轉為 100 分後，可知七項因素得分全距均介於 33.3 至 100 分之間。其中「諮商技術」( $M = 95.0$ )，為平均最高之因素，而「需求確認」( $M = 46.1$ )，為平均最低之因素，表現不好的還有「介入安排」( $M = 69.0$ )。由分數全距可以發現，全體考生在各因素之表現差距頗大，但是由平均分數來看，學生表現較差之能力仍屬「需求確認」及「介入安排」。

項目分析修正後整體測驗的總信度提升為 .88，各因素與全體測驗的相關在 .34 - .55，可以說明本次測驗試題的設計，整體上的確可以測得心理疾病職能治療不同面向的臨床實務能力。試題刪除後所能提高的信度係數 ( $\alpha$  if)，沒有一因素的

值超過總信度 .88，代表均不用刪除。在共通性 (communality) 中，「介入安排」(20.6%) 對於本次測驗的解釋力最強，其次是「諮商技術」(7.9%)。

表4  
心理疾病職能治療OSCE評分項目之因素分析結果

評分項目	因素一	因素二	因素三	因素四	因素五	因素六	因素七
	介入安排	諮商技術	需求確認	基準評估	資料收集	醫病關係	倫理議題
404.解說計畫	.882						
405.確認瞭解	.857						
403.設置計畫	.824						
402.活動設計	.690						
310.互動推理	.594						
113.結束會談	.395						
112.肢體語言		.738					
210.專業形象		.723					
302.態度親切		.693					
108.積極傾聽		.679					
106.開放問句		.661					
109.耐心回答		.528					
308.解說結果			.889				
309.主要問題			.854				
307.解讀評估			.841				
204.自我袒露			.561				
306.說明治療			.484				
205.摘要會談				.685			
203.同理心				.676			
206.使用理論				.629			
304.社會關係				.466			
110.具體化				.454			
305.關心事項				.439			
301.病識感				.413			
103.過去病史					.712		
104.現在病史					.561		
501.主訴記錄					.486		
504.計畫記錄					.430		
105.現在情況					.428		
503.評估記錄					.338		
101.確認姓名						.706	
107.建立關係						.593	
303.家庭互動						.518	
201.呈現關心						.495	
202.具敏感度						.482	
502.客觀記錄						.332	
209.自主性							.572
102.自我介紹							.482
114.會談位置							.466
特徵值	8.05	3.08	2.69	2.30	2.02	1.73	1.38
變異量百分比	20.64	7.90	6.89	5.90	5.19	4.42	3.54
累計百分比	20.64	28.54	35.42	41.33	46.51	50.94	54.48
Cronbach's $\alpha$	.86	.81	.83	.74	.62	.65	.40

註：因素負荷量大於 .3 的部分保留；評分項目內容僅顯示該項目之關鍵字。

表5  
學生於OSCE之各因素得分之分析 (n = 109)

因素	評分項目 個數	分數		各因素之分析		
		全距	Mean±SD	Item-Total	共通性	α if
1. 介入安排	6	33.3-100.0	69.0±21.2	.52	20.64	.68
2. 諮商技術	6	33.3-100.0	95.0±11.0	.48	7.90	.69
3. 需求確認	5	33.3-100.0	46.1±19.4	.43	6.89	.70
4. 基準評估	7	33.3-100.0	70.1±18.1	.55	5.90	.66
5. 資料收集	6	33.3-100.0	75.5±14.6	.42	5.19	.69
6. 醫病關係	6	33.3-100.0	83.9±13.7	.57	4.42	.66
7. 倫理議題	3	33.3-100.0	76.8± 9.3	.34	3.54	.74

註：分數，轉化為100分之因素分數，分數 = (原始得分/滿分) × 100%；  
Item-Total，修正的項目總相關；共通性，變異量被解釋的比例；α if，該項目刪除後之Cronbach's α值。

## 討論

心理疾病職能治療強調治療者在深入瞭解個案後，提供合適的處置介入計畫以改善個案的問題。治療處置的成功，仰賴治療師與個案的溝通、相處、合作，以及治療師運用本身的特質來疏通 (working through) 個案內在衝突達成治療，才是具職能治療專業的表現 (Krupa et al., 2009; Mosey, 1986)。而OSCE具備良好規劃的測驗目標、測驗情境與行為觀察指標，這是和傳統講述教學的紙筆測驗，強調知識記憶，沒有培養主動思考、分析及臨床問題解決能力有偌大的差異。本研究發現OSCE確實可以用來檢視在職能治療執行業務之過程的範疇，學生已具備的臨床實務能力以及仍需要加強的部分。也就是說，事實上職能治療專業教育中，適合使用OSCE來檢驗學生的學習成效，以及提供學習更好的回饋。不過，分析此次OSCE的品質分析與學生表現的結果，下列關於課程安排以及執行OSCE的議題值得我們關心與討論：

### 一、由測驗的因素結構探討課程內容的規劃

學生對於老師課堂上關於臨床實務的經驗或小故事的分析，總是特別著迷與投入，因為故事中的臨床情境，潤飾了生硬的專業理論，並與實務工作產生聯結。因此，在思忖如何實現課程目標時，可在課程中融入臨床情境之要素，讓擬真的操作活動幫助臨床實務能力提升。

### (一) 課程融入情境策略以提升臨床實務能力

將臨床的情境脈絡融入學習中，可以讓學生因為解決問題的需要，而提取先前知識，使知識具有實用性而不會成為惰性知識，同時也將執業所需的臨床或實務技能在學習過程練習而熟悉。從本研究OSCE測驗潛在因素的角度分析學生表現之結果並回顧課程目標，發現學生在「諮商技術」、「醫病關係」以及「資料收集」等一般臨床實務能力 (general clinical competences) 的表現佳，讓考官感覺滿意，顯示課程目標與教學中融入角色扮演及小組討論等策略是有效的。不過，學生在擬定執行介入計畫的能力，如「需求確認」、「介入安排」、「基準評估」等操作性臨床技術 (instrumental clinical competences) 尚待加強，由於這些能力是在臨床職能治療工作中的重要部分，而且擬定介入計畫常因個案的情況不同而具個別化，因此，需要藉由實際臨床情境進行練習，透過與不同的個案互動以獲取實際動手操作的機會與經驗，才可達到預期的教學目標。雖然在部分的心理疾病職能治療課程教學中，也提供情境增加與臨床實務的擬真程度，例如，職能治療專題特論也融入案例探討、問題導向學習 (problem-based learning, PBL) 等。不過，顯然模擬情境教學模式尚未普遍用於心理疾病職能治療領域課程中，所以學生尚無法熟稔的將操作性臨床技術運用於測驗情境中。

此外，「倫理議題」對考生來說是很難的考評項目，對考官而言也是難以評分的部分。因為即使學生覺察到倫理議題的存在，也很難以合適的表現，展現出具備這項專業能力。而考官要以考生實際表現，評定對於倫理議題處置的合適性，與由紙筆測驗中答案的圈選而決定這項能力的正確性有很大的不同。相似的能力如同理心、醫病關係建立等，都是執行心理疾病職能治療業務時最基本的能力。學生或許早已專精醫學倫理的執行要點，但是否能內化且口語通俗化的應用於醫病互動中，仍須於課程中融入OSCE等以實作表現為導向的訓練及測驗，才可確實洞悉學生的表現是否符合職能治療專業的內涵。

關於情境融入於課程中以提升臨床實務能力之作法，教學實務上可由三方面進行。首先，應依據課程目標，全面性的考量心理疾病職能治療領域課程的規劃及整合，以協助學生發展臨床實務能力；其次，應在課程內融入有效提升能力的教學模式，提供更多的情境模擬、體驗性練習與邏輯思辯性的實作機會，例

如：透過影帶或是深度討論，讓學生能透過實際情境的歷練，將倫理議題在醫療行為裡變成習慣性的思考模式（李錦虹、鄒國英、王志嘉、穆淑琪、邱浩彰，民 98；李錦虹、鄒國英、邱浩彰，民 101；廖淑娟、陳仲達、葉建宏、葉炳強，民 100），或是引用標準病人，進行模擬訓練以精進學習；最後，在評量上亦可搭配情境教學策略，發展相對應之實作評量，例如，OSCE，並將特定需強化之能力的考評標準，明確的規劃入評分表，以確實的監測學生的學習與能力發展。而每次評量後，提供明確的分項能力評分結果與專家的觀察評語，以作為學習回饋之參考 (Swing, 2007)。

## （二）漸進式的融入情境於教學模式中

教學模式以循序漸進的擬真情境做規劃，可以協助學生作為進入臨床的轉銜。首先，進入職能治療專業學習的初始，可以使用案例融入教學中，例如使用PBL，讓學生可以透過案例，瞭解專業知識的運用。接著，更進階的可以使用PBL與其他教學策略結合，例如PBL加上SP技術模擬演練，使學習中的臨床真實性提升。最後，在臨床實習前可以SP演練輔以臨床觀摩或實作，讓學生的模擬演練越擬真於臨床實際工作。漸進式的讓臨床情境融入學習中，將可幫助學生逐步習慣臨床實務，並獲得實務中的技巧。

## （三）使用真實病人或標準病人的考量

當思考於教學中融入臨床情境時，就需考量使用真實病人或者SP之問題。SP是受過專業案例訓練的演出者，雖然不若真實病人具有顯著的真實性，但在疾病表徵呈現、心理建設及各種狀況的應對上皆有一定程度的準備。相對的，真實病人受病痛包圍，雖然是該診斷的病徵最佳代言人，但病人在成為教學實例前沒有受過專業訓練與應對的準備，所以不一定是最佳的教材。於是，在執行操作性臨床技術時，為了避免真實病人的傷害，學生在演練上就有很大的侷限。此外，教育學生必須在臨床實務能力純熟後才可施行在真實病人身上，以免因為疏失而產生醫療問題，也是專業教育的重要目標。因此，在真實練習與醫療疏失的權衡下，選擇使用真實或標準病人融入教學，都需要確實的考量。

## 二、OSCE實施上的議題

本研究以慎重的態度規劃此次OSCE的實施事項，但在測驗成果出爐後，也促發了許多由規劃至執行OSCE的反思。

### (一) 評分項目需符合教學內容、臨床實務以及測驗情境

一個良好的測驗需要審慎的檢驗教學目標與測驗內容的對應以及合適度(Kramer et al., 2003)。本研究經由專家效度的建立以及項目分析之結果，發現部分評分項目雖符合教學目標，但卻因為測驗情境的限制而難以表現學習成果。以情境學習理論的觀點，知識、思考和學習是受到經驗支持與受到情境影響(Brown et al., 1989)，所以學生的表現取決於測驗情境、標準病人，甚至與評分者的互動。當據此來思考OSCE試題規劃時，則試題內容不僅要足夠引發學生表現，同時也要考量實務工作者在醫療現場，當下對問題情境的決策所採取的行動，可能會與理想情境下的表現有所落差(Schön, 1983)。因此，出題者要能考量情境的促發性，也需要透過多次出題經驗與實施OSCE之成效檢視，而提升出題能力。

本研究因素分析後獲得之七項因素與原先利用職能治療核心技巧規劃OSCE有差異，原因為本研究在規劃OSCE時，依據Hodges(2001)的建議，使試題的情境脈絡(context)與職能治療臨床實務接近。於是將會談所需之知識、技能、態度等臨床實務能力，平均分配在每一站。例如，在第四站「治療計畫的設立」中，將放入使用參考架構的考量、規劃活動團體的類型(主題、任務導向、工具性團體等)、選擇活動團體的形式(陶工、皮雕活動等)等能力在同一個考站中評量。而且在試題內容審查時，專家教師亦同意評分項目與考站規劃的情境相符。然而，因素分析為萃取學生在不同考站，表現出的相同能力，因素提出更詳細、具體、可觀察的架構以檢驗學生的能力。例如，原先規劃依核心技巧所規劃的「與個案合作」考站，在因素分析後各評分項目被更細緻的分散在「諮商技術」、「醫病關係建立」、「倫理議題」等面向上，事實上更幫助出題者瞭解當學生通過OSCE所需使用的能力。但若將由執行業務流程的各步驟中萃取而來的因素，形成單獨測驗站次，則可能變成去情境的工具或模具技術測驗，失去了

OSCE使用情境以直接觀察考生展現與個案互動之臨床實務能力的原意。

此外，本次測驗之目標為職能治療師與個案會談以獲取個案資料，之後進行臨床推理並為個案安排合適治療計畫。七項因素符合職能治療人員執行業務需具備的能力，也就是能由醫病關係的建立、使用諮商技巧、進行基準評估、資料收集、確認需求，到介入安排，以及關注倫理議題等，這樣的安排與本研究規劃OSCE之初始理念，也就是以心理疾病職能治療「實踐業務之流程」為考站之規劃不相符。而形成本次OSCE底層的要素，事實上接近本次OSCE藍圖之橫軸（見表1），也就是本次測試的內涵偏向於「職能治療臨床實務之能力」，即會談中的諮商技術以及對於個案情況之臨床推理所做的介入安排等能力。當測驗的目標重著於「實踐業務之流程」時，則可以多增加與流程相關的考站，例如強調目標與治療計畫之設立，就可以在不同能力（臨床推理、介入計畫、病歷紀錄）下設三站考一題組，以增加學生的學習機會，也可更客觀的達成測驗的目標（蔡詩力、陳震寰、方基存、蔡景仁、張上淳，民97）。

## （二）多站的OSCE可提升測驗結果的可信度

以心理計量的觀點來看，五到十站的OSCE可提供較穩定的信度，以及測驗品質，且符合高標準OSCE的要求。不過，若受限於資源、人力及經費之下，只要詳細規劃測驗內容以及測驗時間，每一考站的信度達.6以上，在精神科領域也有在單一課程內，規劃四站OSCE之例子 (Hodges, 2001)。本研究規劃之五站OSCE，是作為實習前學生在心理疾病職能治療領域的臨床實務能力檢驗之用，雖只規劃五站，但一至四站的信度皆符合.6以上的標準，唯第五站「病歷紀錄」的係數較低，可能因評分項目只有四項，項目過少所致，需再增加項目予以提升。此外，病歷紀錄站之任務係以前面四站之臨床會談內容進行書面記錄，事實上和其他四站直接與個案會談之技術層面有些不同，因此，考生會因情境轉換之差異，而對考站測驗內容產生不同的知覺與感受所造成。上述試題相關之內在與外在因素均可作為修正考站之參考，以讓測驗整體更具信度。

在站次數目的規劃上，當OSCE的試題與執行方式在起步發展過程，較多的站次可以提供穩定的測驗品質。相對的，待測驗品質逐步提升，能更有效的評量



學生能力後，雖減少測驗站次仍可提供良好的測驗品質（劉克明、曾慧敏，民 99）。此外，對於較難測驗的能力或指定測驗的能力，例如醫學倫理議題、特殊技巧的使用等，可以增加測驗站數使得到的測驗結果更具可信度（蔡詩力等人，民 97）。

### （三）及格標準的設定

本次測驗為總結性評量，測驗內容注重學生在評量表各項目的表現之符合程度，因此以邊緣群法，總和考生在五站成績形成測驗總分，做為學生是否通過測驗的標準。不過，若希望由專家的專業判斷提供考生整體表現的合適度，則總分計算亦可兼顧兩項成績，例如，以50%評分表分數加上50%整體性評分，比例可以依據測驗目的而調整。邊緣群法的方式可以解決以評分表的絕對分數決定學生表現的疑慮，也可以整體性的考量學生專業表現 (Hodges, 2001)。

OSCE 及格標準的設定尚有安戈夫方法 (Angoff method), 邊緣群法迴歸分析 (borderline regression) 等方法，以專家所判斷的通過標準做為指標，或是納入考官意見以進行統計分析之方式 (Pell et al., 2010)，但何者最適合所規劃的OSCE情境，並產生最佳的信度與效度結果，都有待進一步的研究。

### （四）考官的共識營很重要

OSCE透過考官評分以評定學生表現，這種模式所測量的能力，與傳統紙筆測驗由文字的表達所測量的學生表現有很大的不同。因此，考官對於將學生行為表現量化的豐富經驗、對於評分表格的熟悉，以及考官間評分的一致性，都是確保測驗品質的關鍵（蔡淳娟等人，民 95）。由本次OSCE分析結果發現，雖然測驗進行前已經透過協調溝通建立考官間的共識，但最後部分評分項目仍出現評分差異。因此，成立OSCE專責小組，發展OSCE的執程序，並對成員召開定期會議，以及進行規律的考官與標準病人的訓練，例如透過學生表現的錄影帶的方式，共同檢視評分項目的定義，以及協調考官評分標準以及給分範疇等，都可讓考官去除個人主觀的評分標準與建立共識，能以客觀的標準評定學生表現，建立OSCE品質。

綜合言之，由此次心理疾病職能治療OSCE的經驗，體悟了對臨床工作者來

說，實務操作和理論學習都是缺一不可獲取臨床實務能力的重要學習內容。因此，漸進的提供擬真的臨床情境，可作為改進課程的重要方向。此外，由本次OSCE的檢視也發現，試題內容與測驗情境的合適度、站數規劃、考官品質、及格標準設定等都是影響OSCE品質的關鍵。雖然目前職能治療領域在國考中加入OSCE尚在討論與發展階段，但在課程中使用OSCE作為學生專業能力的訓練，卻是刻不容緩的決定。本研究謹以OSCE執行經驗作分享，期盼在人力、資源與研究的挹注下，能累積更多分享與回饋，以發展職能治療的高標準OSCE，讓OSCE成為培育與檢覈適任職能治療師之有力工具。

## 參考文獻

- 王紅宇（譯）（民82）。後現代課程觀（原作者：W. E. Doll）。臺北市：桂冠書局。（原著出版年：1999）。
- 李航茜（譯）（民96）。職能治療概論（原作者：W. M. Marcil）。臺北市：心理出版社。（原著出版年：2010）。
- 李錦虹、鄒國英、王志嘉、穆淑琪、邱浩彰（民98）。從多元課程評量分析學生對醫學倫理小班教學的期待與成效。醫學教育，**13**，35-48。
- 李錦虹、鄒國英、邱浩彰（民101）。醫學生面對倫理兩難案例時的心理衝突。臺灣醫學，**16**，221-229。
- 周希津、陳曉言、潘瓊琬、施陳美津（民94）。職能治療專業角色與功能：相關專業團隊成員之觀點。醫學教育，**9**，60-70。
- 高明見（民99）。臨床技能測驗成為我國醫師證照考試項目之關鍵問題。國家菁英季刊，**6**，107-126。
- 邱皓政（民89）。量化研究與統計分析：SPSS中文視窗版資料分析範例解析。臺北市：五南書局。
- 廖淑娟、陳仲達、葉建宏、葉炳強（民100）。以客觀結構式臨床考試來評量七年級醫學生的醫病溝通技能。臺灣醫學，**15**，356-363。

- 臺灣職能治療學會（民96）。職能治療師養成教育課程審核標準及作業辦法。臺北市：臺灣職能治療學會。
- 劉克明、黃裕勝（民92）。應用英美醫學生臨床技能測驗模式落實台灣醫學生臨床技能測驗評估。醫學教育，7，15-21。
- 劉克明、曾慧敏（民99）。高階客觀結構式臨床測驗在國家考試的應用與展望。國家菁英季刊，6，111-129。
- 蔡淳娟、林其和、陳琮琳、趙可式、葉宗烈、蔡景仁、張伊凡（民95）。OSCE之測驗結果分析：成功大學醫學院經驗。醫學教育，10，313-323。
- 蔡詩力、陳震寰、方基存、蔡景仁、張上淳（民97）。客觀結構式臨床測驗(OSCE)執行指引。醫學教育，12，118-132。
- 蔡詩力、楊志偉、葉啟娟、張上淳（民96）。標準化病人的招募與訓練：台大醫院的經驗。醫學教育，11，80-87。
- Boursicot, K. A., Roberts, T. E., & Pell, G. (2007). Using borderline methods to compare passing standards for OSCEs at graduation across three medical schools. *Medical Education, 41*, 1024-1031.
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the cultural of learning. *Educational Researcher, 18*, 32-42.
- Chan, H. W., Lee, W. K., & Chen, W. M. (2007). TRIP: A psycho-educational programme in Hong Kong for people with schizophrenia. *Occupational Therapy International, 12*, 89-98.
- Creek, J., & Lougher, L. (2008). *Occupational therapy and mental health*. Philadelphia, PA: Elsevier.
- Crepeau, E. B., Cohen, E. S., & Schell B. A. B. (2003). *Willard and Spackman's occupational therapy* (10th ed.). Philadelphia, PA: Lippincott, Williams & Wilkins.
- Gunnarsson, A. B., & Eklund, M. (2009). The tree theme method as an intervention in psychosocial occupational therapy: Client acceptability and outcomes. *Australian Occupational Therapy Journal, 56*, 167-176.
- Harden, R. (1990). Twelve tips for organizing an objective structure clinical examination (OSCE). *Medical Teacher, 12*, 259-265.

- Harden, R. M. (2002). Developments in outcome-based education. *Medical Teacher, 24*, 117-120.
- Harden, R. M., & Gleeson, F. A. (1979). Assessment of clinical competence using an Objective Structured Clinical Examination (OSCE). *Medical Education, 13*, 41-54.
- Harden, R. M., Stevenson, M., Downie, W. W., & Wilson, G. M. (1975). Assessment of clinical competence using objective structured examination. *British Medical Journal, 1*, 447-451.
- Hodges, B. (2001). Creating, monitoring, and improving a psychiatry OSCE: A guide for faculty. *Academic Psychiatry, 26*, 134-161.
- Hojat, M., Paskin, D. L., Callahan, C. A., Nasca, T. J., Louis, D. Z., Veloski, J., . . . Gonnella, J. S. (2007). Components of postgraduate competence: Analyses of thirty years of longitudinal data. *Medical Education, 41*, 982-989.
- Kirton, S. B., & Kravitz, L. (2011). Objective Structured Clinical Examinations (OSCEs) compared with traditional assessment methods. *American Journal of Pharmaceutical Education, 75*, 1-7.
- Kramer, A., Muijtjens, A., Jansen, K., Düsman, H., Tan, L., & van der Vleuten, C. (2003). Comparison of a rational and an empirical standard setting procedure for an OSCE. *Medical Education, 37*, 132-139.
- Krupa, T., Fossey, E., Anthony, W. A., Brown, C., & Pitts, D. B. (2009). Doing daily life: How occupational therapy can inform psychiatric rehabilitation practice. *Psychiatric Rehabilitation Journal, 32*, 155-161.
- McCluskey, A. (2000). Collaborative curriculum development: Clinicians views on the neurology content of a new occupational therapy course. *Australian Occupational Therapy Journal, 47*, 1-10.
- Miller, G. E. (1990). The assessment of clinical skills/competence/performance. *Academic Medicine, 65*, s63-67.
- Mosey, A. C. (1986). *Psychosocial components of occupational therapy*. New York, NY: Raven Press.

- Nestel, D., Kneebone, R., Nolan, C., Akhtar, K., & Darzi, A. (2011). Formative assessment of procedural skills: Students' responses to the objective structured clinical examination and the integrated performance procedural instrument. *Assessment & Evaluation in Higher Education, 36*, 171-183.
- Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in Health Sciences Education, 15*, 625-632.
- Pell, G., Fuller, R., Homer, M., & Roberts, T. (2010). How to measure the quality of the OSCE: A review of metrics - AMEE guide no. 49. *Medical Teacher, 32*, 802-811.
- Provident, I. M., & Gaguzis, K. (2005). Creating an occupational therapy level II fieldwork experience in a county jail setting. *American Journal of Occupational Therapy, 59*, 101-106.
- Reiter, H. I., Salvatori, P., Rosenfeld, J., Trinh, K., & Eva, K. W. (2006). The effect of defined violations of test security on admissions outcomes using multiple mini-interviews. *Medical Education, 40*, 36-42.
- Rodger, S., Thomas, Y., Holley, S., Springfield, E., Edwards, A., Broadbridge, J., . . . Hawkins, R. (2009). Increasing the occupational therapy mental health workforce through innovative practice education: A pilot project. *Australian Occupational Therapy Journal, 56*, 409-417.
- Savin-Baden, M. (2000). *Problem-based learning in higher education: Untold stories*. Philadelphia, PA: SRHE and Open University Press.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York, NY: Basic Books.
- Shavelson, R. J., & Webb, N. M. (1991). *Generalizability theory: A primer*. Thousand Oaks, CA: Sage.
- Smee, S. (2001). Setting standards for an objective structured clinical examination: The borderline group method gains ground on Angoff. *Medical Education, 35*, 1009-1010.
- Spicer, J. (2005). *Making sense of multivariate data analysis*. Thousand Oaks, CA: Sage.

- Swing, S. R. (2007). The ACGME outcome project: Retrospective and prospective. *Medical Teacher, 29*, 648-654.
- Townsend, A. H., McLivenny, S., Miller, C. J., & Dunn, E. V. (2001). The use of an objective structured clinical examination (OSCE) for formative and summative assessment in a general practice clinical attachment and its relationship to final medical school examination performance. *Medical Education, 35*, 841-846.
- Walsh, M., Bailey, P. H., & Koren, I. (2009). Objective structured clinical evaluation of clinical competence: An integrative review. *Journal of Advanced Nursing, 65*, 1584-1595.

## 附錄 1

OSCE之評分表及評分項目範例：以站次一為例

第一站：會談技巧			
應達成任務：1.醫病關係建立 2.使用合適的會談技巧			
1表示：都沒做 2表示：部分正確做到 3表示：有做且時機恰當			
A.會談技巧	1	2	3
1.跟病患打招呼，確認病患的稱呼方式			
2.進入會談室時可以選擇合適的位置與個案會談			
3.自我介紹			
4.和病患建立信任合作關係			
5.使用開放式問句（並非全部使用封閉型問句）			
6.詢問過去病史			
7.詢問現在病史			
8.詢問現在的情況			
9.表現出積極傾聽，不突然中斷病患的話			
10.耐心的回答個案問題			
11.對描述不清的描述加以具體化			
12.沈默的技巧			
13.與個案會談時使用合適的肢體語言			
14.結束會談			
此站的整體評估	不通過(Clear Fail)	需要再輔導(Borderline)	通過(Clear Pass)
其他建議			

## 附錄 2

### OSCE考生指引範例

#### 考生指引

站名：精神科會談等共4站

地點：精神科會談室

考題情境：您正要進去與一位蕭先生會談。兩週前被強制送至急診室，今日第一次職能治療會談。

#### 病患背景資料

姓名：蕭先生，20歲，未婚，五專五年級學生，無宗教信仰，無業。

入院摘要：99年4月1日因在街上大吼大叫，追逐路人，經強制入院而住進本院。日前經醫生診斷為精神分裂症。

目前生理狀況：血壓：140/90 mmHg，體溫/心跳/呼吸：36°C/72/12。

#### 您的任務：

- 1.與病患建立良好的會談關係，運用溝通技巧引導病患談自己的情況。
- 2.從會談中澄清自己的目前主訴，相關病症、病史及職能治療問題。
- 3.利用臨床推理規劃治療性活動與治療計畫。

測驗時間：一至四站每站5分鐘，總共20分鐘

測驗之目標能力（塗黑項目為該站所欲評估之目標能力）：

- |                                      |                                 |                                 |
|--------------------------------------|---------------------------------|---------------------------------|
| 1. <input type="checkbox"/> 病史詢問     | <input type="checkbox"/> 會談技巧   | <input type="checkbox"/> 醫病關係建立 |
| 2. <input type="checkbox"/> 治療性的使用自己 | <input type="checkbox"/> 問題的確立  | <input type="checkbox"/> 資料分析   |
| 3. <input type="checkbox"/> 臨床推理     | <input type="checkbox"/> 有目的的活動 |                                 |
| 4. <input type="checkbox"/> 計畫的設立    | <input type="checkbox"/> 解說衛教   |                                 |



# Application of Objective Structured Clinical Examination to Diagnose Clinical Competencies in Occupational Therapy

Chia-Hui Hung<sup>a,b</sup>, Chen-Yung Lin<sup>a,\*</sup>

## Abstract

Objective structured clinical examinations (OSCEs) have been used to assess the key clinical competencies of the many health professions, but the experience of occupational therapy is relatively unexplored. This paper studies the validity and reliability of the OSCE in the domain of mental health occupational therapy, and focuses on students' performance in OSCE to improve the curriculum. A five stations OSCE was administered to all 109 students to assess occupational therapy clinical competencies. Assessors completed the clinical competency checklists, then using item analysis and factor analysis to characterize the quality of OSCE and underlying competencies being assessed. Borderline scores were used to derive pass/fail cutoff scores for the examination. The findings suggest that the Cronbach's  $\alpha$  of the OSCE was .88. Item analysis indicated that four checklist items need to be deleted. Factor analysis showed that 7 themes are obtained and the cumulative variance accounted for is 54.5%, they are planning an intervention, consultation skills, identifying needs, baseline assessment, information gathering, building rapport, and ethics issue. According to the borderline scores, there were 11% of the students could perform the tasks correctly and completely; however, 29.5% failed the OSCE. Students have good performance in consultation skills, building rapport, and information gathering, but their skills on identifying needs, planning intervention, and baseline assessment still need to improve. In conclusion, An OSCE is a necessary assessment and training tool that should be continuously applied in occupational therapy education. Based on this study, implications for curriculum development and instructional practice were presented.

**Keywords:** OSCE, Mental health occupational therapy, Clinical competence, Curriculum

<sup>a</sup>Graduate Institute of Science Education,  
National Taiwan Normal University

<sup>b</sup>Department of Rehabilitation, Jen-Teh Junior College  
of Medicine, Nursing and Management

Received: 16 December 2012

Accepted: 22 February 2013

\*Correspondence: Chen-Yung Lin  
Graduate Institute of Science Education,  
National Taiwan Normal University,  
88 Ting-Jou Road, Sec. 4, Taipei, Taiwan.  
Tel.: 02-77346819.  
E-mail: lcy@ntnu.edu.tw

# 中風後上肢關節疼痛與健康相關生活品質之關聯

OCCUPATIONAL THERAPY

楊書瑜<sup>1</sup> 李雅珍<sup>2</sup> 吳姿誼<sup>2</sup> 尤菀薈<sup>2,\*</sup> 楊奇旻<sup>1</sup> 謝清麟<sup>2</sup>

## 摘要

上肢關節疼痛是中風所造成的後遺症之一，可能影響病患健康相關生活品質 (health-related quality of life, HRQOL)。然而中風後上肢關節疼痛與整體HRQOL (overall HRQOL, O-HRQOL) 及HRQOL特定層面之關係不明確，造成臨床人員難以有效制定治療計畫以提昇病患HRQOL。故本研究之目的為檢驗中風後上肢關節疼痛與O-HRQOL及HRQOL特定層面之關聯程度，並檢驗中風後上肢關節疼痛是否為O-HRQOL及HRQOL特定層面之主要相關因素。66位中風病患接受5個量表的評估，分別為福格邁爾運動量表 (Fugl-Meyer Motor Assessment, FMA)：疼痛次量表上肢項目及上肢動作功能次量表、中風病患專屬生活品質量表 (Stroke-Specific Quality of Life, SSQOL)、巴氏量表 (Barthel Index) 和芙蘭切活動量表 (Frenchay Activities Index)。研究者以Pearson's *r*檢驗個案中風後一年FMA上肢關節疼痛總分與SSQOL總分及12個層面分數之關聯程度，並以逐步迴歸分析檢驗FMA上肢關節疼痛總分，在考量其它變項後，是否為SSQOL總分及12個層面分數之主要相關因素。研究者發現FMA上肢關節疼痛總分與SSQOL總分呈中度相關 ( $r = .40$ )，其與SSQOL12層面分數呈低至中度相關 ( $r = .11 - .43$ )。逐步迴歸分析結果發現FMA上肢關節疼痛總分未被納入SSQOL總分及12個層面分數之最終迴歸模型。以上結果顯示：中風後上肢關節疼痛雖不為O-HRQOL及HRQOL特定層面之主要相關因素，但仍與O-HRQOL及部分HRQOL特定層面具備中度相關。此結果支持臨床人員制定上肢關節疼痛治療計畫以期提昇病患HRQOL。

**關鍵字：**上肢關節疼痛，健康相關生活品質，中風

奇美醫療財團法人奇美醫院<sup>1</sup>  
臺灣大學醫學院職能治療學系<sup>2</sup>

受文日期：民國101年8月11日  
接受刊載：民國102年2月17日

\*通訊作者：尤菀薈  
臺北市徐州路17號4樓  
臺灣大學醫學院職能治療學系  
電話：02-33668165  
電子信箱：patrice\_yu@yahoo.com.tw

## 前言

上肢關節疼痛是中風所造成的後遺症之一 (Price, 2003)。上肢關節疼痛除造成身體不適外，病患可能因為疼痛而避免使用患側手從事各項活動，影響復健意願，造成復健治療困難，因而影響動作及日常生活活動 (activities of daily living, ADL) 功能的恢復，進而影響復健成效 (Lindgren, Jönsson, Norrving, & Lindgren, 2007; Suethanapornkul et al., 2008)。

過去研究指出：中風後的疼痛影響病患之健康相關生活品質 (health-related Quality of Life, HRQOL) (Widar, Ahlstrom, & Ek, 2004)。因上肢關節為中風後疼痛之好發處 (Jönsson, Lindgren, Hallström, Norrving, & Lindgren, 2006)，故中風後上肢關節疼痛可能影響病患之HRQOL。HRQOL為病患對各種健康層面的主觀感受，可幫助臨床或研究人員從病患主觀感受中直接瞭解病患之健康狀態 (Widar et al., 2004)。病患於中風後之生理、心理與社會等健康層面皆可能深受影響 (Alguren, Fridlund, Cieza, Sunnerhagen, & Christensson, 2012)。因此，探索中風後的上肢關節疼痛與HRQOL各層面之關聯，將有助於臨床或研究人員瞭解中風後上肢關節疼痛對病患生理、心理與社會等健康層面所造成之影響，可作為治療介入之參考依據，以利提升病患之HRQOL。

HRQOL問卷常用以測量多層面健康之概念，測量結果分數可分為整體與個別層面二種解釋方式 (Guyatt, Feeny, & Patrick, 1993)。一、整體HRQOL：整體HRQOL (overall HRQOL, O-HRQOL) 為綜合病患個別健康層面，以提供臨床或研究人員瞭解病患整體的健康狀態 (Horner-Johnson, Krahn, Andresen, & Hall, 2009)。二、個別層面之HRQOL：臨床或研究人員剖析病患個別層面之HRQOL，以呈現病患不同層面之健康狀態。例如：中風病患專屬生活品質量表 (Stroke-Specific Quality of Life, SSQOL) 包含12種個別層面 (Williams, Weinberger, Harris, Clark, & Biller, 1999)，SSQOL的總分可代表中風病患之O-HRQOL狀態；若計算個別層面分數，則有利臨床或研究人員掌握病患不同層面之HRQOL。因此，O-HRQOL及個別層面HRQOL之測量結果宜同時呈現，以促進臨床或研究人員完整瞭解病患之HRQOL。

研究指出：中風病患發病一年後仍常深受上肢關節疼痛之困擾 (Appelros, 2006; Lindgren et al., 2007; Lundstrom, Smits, Terent, & Borg, 2009; Pomeroy et al., 2000; Turner-Stokes & Jackson, 2002)。然而，過去驗證中風後上肢關節疼痛與HRQOL二者之關聯性研究有三項不足：一、多數研究只著重肩關節疼痛，而非探討全部上肢關節疼痛與中風病患HRQOL之關聯 (Chae et al., 2007; Lindgren et al., 2007)。研究顯示：約有72%之中風病患有肩關節疼痛之問題，而上肢遠端關節（手肘、手腕及手指關節）疼痛之情形亦發生於38-46%之病患 (Pizzi, Carlucci, Falsini, Verdesca, & Grippo, 2005)。過去研究指出：疼痛與中風病患ADL表現有關聯 (Bakken, Kim, Finset, & Lerdal, 2012)，而病患ADL表現與其HRQOL亦有相關 (de Weerd, Rutgers, Groenier, & van der Meer, 2011)。因此，肩關節疼痛可能使病患無法從事梳頭、清洗背部等以肩關節為主之ADL (Triffitt, 1998)，而手肘、手腕及手指關節疼痛則可能障礙病患從事拿杯子喝水、用湯匙舀湯等與這些關節相關的ADL (Clarkson, 2000)。以上所提ADL執行之限制可能降低病患之HRQOL。此外，值得注意的是，許多ADL（如：刷牙、洗臉、穿衣服）的執行，除須使用肩關節外，還需手肘、手腕及手指關節之配合才能完成 (Davis et al., 1999)。然而過去研究結果無法確認病患全部上肢關節疼痛與病患HRQOL之關聯。二、目前尚無研究探討中風後上肢關節疼痛與O-HRQOL，或中風後上肢關節疼痛與HRQOL中生理、心理及社會等特定層面之相關程度。此現象造成臨床人員無法精確掌握病患問題之所在，不利於病患之動作恢復與復健成效。三、過去研究未使用特定疾病 (disease-specific) HRQOL問卷 (Chae et al., 2007; Lindgren et al., 2007; Widar et al., 2004)。一般性 (generic) HRQOL問卷之測量結果可作為跨族群的比較，例如：比較不同疾病的病患，但無法反映中風病患特別關注之HRQOL，如自我照顧、工作/生產力、社會角色等問題 (Williams et al., 1999)。

鑒於過去研究對於中風後上肢關節疼痛與HRQOL相關程度探討之不足，無法確認中風後上肢關節疼痛與O-HRQOL或HRQOL特定層面是否有關聯，造成臨床人員難以有效制定治療計畫以提升病患之HRQOL。因此本研究之目的為探討中風後上肢關節疼痛與一、O-HRQOL及二、HRQOL特定層面之關聯程度。另外，研究者亦檢驗中風後上肢關節疼痛是否為一、O-HRQOL及二、HRQOL特定層面之主要相關因素。

## 研究方法

### 一、研究對象

樣本選自民國88年12月至民國90年12月連續住進北部某醫學中心復健部，並參與「中風病患生活品質追蹤研究」完成發病後一年追蹤評估之中風病患。該研究之樣本篩選標準如下：（一）中風病患之診斷類別依國際疾病分類 (ICD-9-CM) 為參考依據（中華民國醫院行政協會病例委員會譯，民 82），凡被歸類為ICD-9-CM430（蜘蛛膜下腔出血），431（腦內出血），432（其他未明示之顱內出血），433（腦前動脈阻塞及狹窄），434（腦動脈阻塞），436（診斷欠明之腦血管疾病），或437（其他及診斷欠明之腦血管疾病）皆為本研究之對象；（二）能聽從單步驟之口令 (one-step command) 者；（三）沒有伴隨其它重大疾病（如：惡性腫瘤、截肢等）。符合上述標準之病患皆被告知研究的目的、程序，以充分理解相關訊息。研究由醫學中心之倫理試驗委員會審核通過。在病患同意參與研究的施測並簽署研究計畫同意書後，即成為本研究之個案。

### 二、研究流程

本研究由一位經訓練且熟悉本研究評估量表之職能治療師進行評估。該治療師於個案中風滿一年前一週與個案聯繫並確認評估日期，再至個案家中評估。評估方式如福格邁爾動作量表 (Fugl-Meyer Motor Assessment, FMA) (Fugl-Meyer, Jaasko, Leyman, Olsson, & Steglind, 1975) 疼痛次量表的上肢項目由評估者實際施測項目並口頭訪問個案；中風專屬生活品質量表 (SSQOL) (Williams et al., 1999) 由個案自行填寫；FMA上肢動作功能次量表亦由施測者實際施測並觀察個案之上肢動作表現；巴氏量表 (Barthel Index, BI) (Collin, Wade, Davies, & Horne, 1988) 及芙蘭切活動量表 (Frenchay Activities Index, FAI) (Schuling, de Haan, Limburg, & Groenier, 1993) 皆由評估者口頭訪問個案及家屬。以上所有評估皆於評估當日完成。個案的基本資料（如年齡、性別等）及病情資料（如診斷、發病日期等）由查閱病歷紀錄獲得。

### 三、評估工具

FMA為國內外廣泛使用之中風病患動作控制能力評估量表 (Fugl-Meyer et al., 1975)，包含6個次量表：上、下肢動作功能、關節活動度 (range of motion)、疼痛、感覺缺失及平衡能力。此量表具良好之信度、效度及反應性 (Duncan, Propst, & Nelson, 1983; Roden-Jullig, Britton, Gustafsson, & Fugl-Meyer, 1994; Sanford, Moreland, Swanson, Stratford, & Gowland, 1993)。FMA 6個次量表可各自加總計分，而6個次量表之總分也可進一步相加為1個總分 (Gladstone, Danells, & Black, 2002)。本研究採用自行翻譯之FMA中文版本 (Hsueh et al., 2008)，以疼痛次量表之上肢項目評估病患上肢關節之疼痛程度。評分方式為0-2分，分成三個等級：0分表示在整個被動關節動作中感到疼痛（或在最後關節角度感到明顯疼痛），1分表示有些疼痛，2分表示沒有疼痛。FMA疼痛次量表之上肢項目共有12項，包含4個肩關節 (shoulder) 項目，2個手肘關節 (elbow) 項目，2個前臂關節 (forearm) 項目，2個手腕關節 (wrist) 項目及2個手指關節 (fingers) 項目，總分為0-24分。分數越高代表上肢關節疼痛程度越輕微。

SSQOL為專為中風病患設計且以病患為中心發展之HRQOL問卷 (Williams et al., 1999)。SSQOL共有49個項目，包含生理、心理與社會等12個HRQOL之層面，涵蓋精神體力、家庭角色、語言、行動、心情、個性、自我照顧、社會角色、思考、上肢功能、視力、工作/生產力等。評分方式為1-5分，依評估項目個案回答之選項可分為3種：（一）「完全需要幫忙」至「完全不需要幫忙」，如1分表示病患無法自行上下樓梯，完全需要他人幫忙，5分代表病患能自行上下樓梯，完全不需他人幫忙；（二）「完全無法做到」至「完全沒有困難」，如1分表示病患自覺困難，完全無法獨立行走，5分代表病患自覺完全沒有困難，可獨立行走；（三）「非常同意」至「非常不同意」，如1分表示病患非常同意自己很難專心，5分代表病患非常不同意自己很難專心。本研究計算SSQOL 12個層面分數和總分。SSQOL各層面分數之計算為加總單一層面之所有項目分數後再除此層面的項目數，各層面分數為1-5分。分數越高代表單一層面HRQOL越佳。SSQOL總分之計算為加總12個層面分數 (Hsueh, Jeng, Lee, Sheu, & Hsieh, 2011)，總分範

圍為12-60分。分數越高代表O-HRQOL越佳。

本研究亦採用FMA上肢動作功能次量表，藉以呈現病患上肢動作缺失之嚴重程度。評分方式為0-2分，共三個等級：病患完全無法從事者得0分，能獨立完成者得2分。FMA上肢動作功能次量表共有33個項目，總分為0-66分。分數越高代表上肢動作功能越好。

BI為一國內外常用之基本ADL (basic ADL, BADL) 功能評估量表 (Collin et al., 1988)，主要評估病患10項自我照顧 (self-care) 表現，包含進食、盥洗、如廁、移位、穿衣、行走、輪椅使用、大、小便控制、上下樓梯等。總分範圍為0-20分，分數越高代表BADL功能越獨立。BI應用於中風病患之信度、效度及反應性已被證實為良好 (Hsueh, Lee, & Hsieh, 2001; Hsueh, Lin, Jeng, & Hsieh, 2002)。

FAI為工具性ADL (instrumental ADL, IADL) 功能評估量表 (Schuling et al., 1993)。FAI共有15個項目，可分為三大部分：(一) 家務事；(二) 戶外活動；(三) 休閒與工作。總分範圍為0-45分，分數越高表示IADL功能越佳。FAI量表具備內在一致性及建構效度，適於評量中風病患之IADL (謝清麟，民 86)。

#### 四、資料分析

本研究以SPSS第13版 (SPSS Inc., Chicago, IL, USA) 分析所得資料，其分析如下：(一) 單變項分析 (univariate analysis)：以Pearson's  $r$  檢驗個案中風後一年之FMA上肢關節疼痛總分與SSQOL總分以及SSQOL 12個層面分數之關聯；(二) 多變項分析 (multivariate analysis)：研究者以逐步迴歸分析 (stepwise regression) 檢驗FMA上肢關節疼痛總分，在考量其它變項後，是否為SSQOL總分以及SSQOL 12個層面分數之主要相關因素。除FMA上肢關節疼痛總分外，本研究納入迴歸模型的變項尚包含：人口學變項 (性別、年齡、中風類型、患側) 及其它病情變項 (FMA上肢動作功能總分、BI總分、FAI總分)。選擇上述3項病情變項一同納入迴歸模型的原因為：過去研究分別指出中風後之上肢動作功能、BADL和IADL與HRQOL有顯著相關 (李雅珍、吳姿誼、邱恩琦、涂富籌、謝清麟，民 101; Ones, Yilmaz, Cetinkaya, & Caglar, 2005)。在逐步迴歸分析下，首先納入模型的變項

是與SSQOL總分及SSQOL 12個層面分數相關最高者，後續，於剩餘變項中選取第二個納入的變項（能增加最多解釋力且 $F$ 考驗顯著性大於.05）。此時，模型中已包含二個變項。若第二個變項納入後，原先納入模型之變項的 $F$ 考驗顯著性低於.10時，此變項會被排除於模型外。依循此一原理反覆納入及排除變項，直到沒有任何變項可被選入或排除時，即得最終之迴歸模型（邱皓政，民 99）。研究者之所以使用逐步迴歸分析進行多變項分析，考量變項間可能有高相關而有共線性 (collinearity)，故藉由逐步迴歸分析先將可能之共線性問題予以排除（邱皓政，民 99）。之後研究者亦再進行共線性的檢驗，包含（一）個別變項的共線性檢驗：排除共線性指標 (variance inflation factor, VIF) 大於10的變項 (Kutner, Nachtsheim, Neter, & Li, 2005)；（二）整體迴歸模式的共線性檢驗：排除特徵值 (eigenvalue,  $\lambda$ ) 接近0且條件指數 (conditional index, CI) 大於30的變項 (Belsley, 1991)，以避免變項間之共線性影響迴歸模型的估計結果。

本研究亦以Pearson's  $r$ 進行FMA上肢關節疼痛總分與人口學變項（性別、年齡、中風類型、患側）以及3項病情變項（FMA上肢動作功能總分、BI總分、FAI總分）之單變項分析，以確認變項間互相影響之程度。

## 結果

本研究共有66位中風個案參與。平均年齡約62.6歲，其中52位為男性。FMA上肢關節疼痛總分平均為22.1分，代表個案平均具有輕微的上肢關節疼痛。SSQOL總分平均為47分，顯示個案平均有中等以上之O-HRQOL。FMA上肢動作功能總分平均為57.2分，顯示個案之平均上肢動作功能為中等偏高。BI總分平均為19.1分，代表個案之平均BADL功能為接近完全獨立。個案中風後一年之人口學及病情資料列於表1。



## 一、 FMA上肢關節疼痛總分與SSQOL總分之關聯

單變項分析結果發現FMA上肢關節疼痛總分與SSQOL總分為中度之正相關 ( $r = .40, p = .001$ )。而多變項分析結果發現，FMA上肢關節疼痛總分未被納入SSQOL總分最後的迴歸模型 ( $p \geq .43$ )。FAI總分、患側與FMA上肢動作功能總分為納入SSQOL總分最後迴歸模型之變項 (表2)。經由個別變項和整體迴歸模式之共線性檢驗後，發現上述3個變項皆符合檢驗標準 (個別變項： $VIF \leq 1.23$ ；整體迴歸模式： $\lambda = .03; CI = 11$ )，表示此迴歸模型之共線性影響較小。

## 二、 FMA上肢關節疼痛總分與SSQOL 12個層面分數之關聯

單變項分析結果發現與FMA上肢關節疼痛總分顯著相關之SSQOL 9層面包含：家庭角色、行動、心情、個性、自我照顧、社會角色、上肢功能、視力、工作/生產力 ( $p \leq .047$ )。上述層面中，家庭角色與自我照顧二層面之分數與FMA上肢關節疼痛總分的相關最高，為中度正相關 ( $r = .40 - .43$ )，個性、行動、社會角色、上肢功能與工作/生產力等五層面之分數與FMA上肢關節疼痛總分的相關次之 ( $r = .31 - .37$ )，而心情和視力二層面之分數與FMA上肢關節疼痛總分為低度正相關 ( $r = .25 - .29$ ) (表3)。SSQOL精神體力、語言及思考三層面之分數與FMA上肢關節疼痛總分則未達顯著相關 ( $p \geq .297$ )。而多變項分析結果發現，12個層面分數的最終迴歸模型皆無納入FMA上肢關節疼痛總分 ( $p \geq .078$ )。

## 三、 FMA上肢關節疼痛總分與人口學及病情變項之關聯

在FMA上肢關節疼痛總分與人口學及病情變項間的相關分析結果中，FMA上肢關節疼痛與人口學變項 (性別、年齡、中風類型及患側) 皆無顯著相關 ( $p > .14$ )。而FMA上肢關節疼痛總分與病情變項 (FMA上肢動作功能總分、BI總分及FAI總分) 彼此間為中度至高度相關 ( $r = .42 - .62, p \leq .001$ )。

表1  
個案基本資料 ( $n = 66$ )

人口學及病情變項	<i>n</i>	Min-max	Mean ( <i>SD</i> )
性別			
男	52		
女	14		
年齡 (歲)			62.6 (11.3)
中風類型			
缺血性	47		
出血性	19		
患側			
左	41		
右	25		
發病至評估日期之天數			359.8 (3.5)
中風後一年之分數			
FMA上肢關節疼痛總分 (0-24)		9-24	22.1 (2.8)
FMA上肢動作功能總分 (0-66)		6-66	57.2 (15.2)
BI總分 (0-20)		12-20	19.1 (1.9)
FAI總分 (0-45)		0-39	15.5 (10.6)
SSQOL			
精神體力 (1-5)			3.1 (1.3)
家庭角色 (1-5)			3.3 (1.4)
語言 (1-5)			4.7 (0.4)
行動 (1-5)			4.3 (0.7)
心情 (1-5)			3.7 (1.2)
個性 (1-5)			3.4 (1.1)
自我照顧 (1-5)			4.5 (0.7)
社會角色 (1-5)			3.1 (1.4)
思考 (1-5)			3.7 (1.2)
上肢功能 (1-5)			4.4 (0.7)
視力 (1-5)			4.8 (0.4)
工作/生產力 (1-5)			4.1 (0.9)
總分 (12-60)			47.0 (8.3)

註：FMA, Fugl-Meyer Motor Assessment; BI, Barthel Index; FAI, Frenchay Activities Index; SSQOL, Stroke-Specific Quality of Life.  
括號中的數字為可能之得分範圍。

表2

中風個案發病一年後整體健康相關生活品質主要相關因素之逐步迴歸分析

主要相關因素	B	Beta	t	p	R <sup>2</sup>
FAI	.39	.50	5.0	< .001	.69
患側	4.20	.25	2.6	.010	
FMA上肢動作功能	.13	.25	2.4	.019	

註：FAI, Frenchay Activities Index; FMA, Fugl-Meyer Motor Assessment.

列入分析但效果不顯著之變項包含：FMA上肢關節疼痛總分、BI總分、性別、年齡及中風類型。

表3

FMA上肢關節疼痛總分與中風後一年SSQOL 12個層面之單變項分析

SSQOL 12個層面	FMA上肢關節疼痛總分	
	相關係數 (Pearson's r)	p值
思考	.11	.399
語言	.12	.330
精神體力	.13	.297
視力	.25	.047
心情	.29	.017
個性	.31	.011
上肢功能	.34	.005
社會角色	.37	.003
行動	.37	.002
工作	.37	.003
家庭角色	.40	.001
自我照顧	.43	< .001

註：SSQOL, Stroke-Specific Quality of Life; FMA, Fugl-Meyer Motor Assessment.

## 討論

本研究首度檢驗中風後上肢關節疼痛與HRQOL的相關程度，並且探討中風後上肢關節疼痛是否為HRQOL之主要相關因素。結果發現中風後一年之FMA上肢關節疼痛總分與SSQOL總分有顯著中度相關，但逐步迴歸分析發現FMA上肢關節疼痛總分未被納入SSQOL總分最後的迴歸模型。因SSQOL總分反映中風病患之O-HRQOL，由此可知中風後上肢關節疼痛與中風病患之O-HRQOL雖有顯著中度相關，然而再考慮人口學（性別、年齡、中風類型及患側）與其它病情變項（上肢動作功能、BADL及IADL）之影響後，中風後上肢關節疼痛並非O-HRQOL之

主要相關因素。此結果與過去中風後肩關節及全面性疼痛與HRQOL關係探討之研究發現不同，如 Faria-Fortini、Michaelsen、Cassiano 與 Teixeira-Salmela (2011) 發現慢性中風病患之肩關節疼痛與O-HRQOL有顯著低至中度相關，且為影響病患O-HRQOL之主要相關因素。Naess、Lunde 與 Brogger (2012)則發現慢性中風病患之全面性疼痛與O-HRQOL有顯著中度至高度相關，亦為決定病患O-HRQOL優劣之主要相關因素。而本研究結果未能呼應以上二研究之結果。

造成本研究結果與其它研究不同的可能原因有二：一、探討疼痛部位不同：過去研究較少檢驗中風後上肢關節疼痛與O-HRQOL之關聯程度，多半探究中風後肩關節疼痛（如Faria-Fortini等人之研究）或全面性疼痛（如Naess等人之研究）與O-HRQOL的相關。二、共變項 (covariate) 選擇不同：在過去相關研究中，如Faria-Fortini之研究只納入握力及側邊抓握 (lateral pinch) 之肌力為共變項，而本研究考量人口學（性別、年齡、中風類型及患側）、上肢動作功能、BADL與IADL等共變項，結果發現中風後上肢關節疼痛未被納入最後的迴歸模型。造成此結果之可能原因為：上肢關節疼痛與其它共變項（上肢動作功能、BADL與IADL）彼此間之關聯可能影響上肢關節疼痛在迴歸模型下與O-HRQOL之關聯。由於FMA上肢關節疼痛總分與上述3個病情變項具備顯著中度至高度相關，因此，在排除共同與SSQOL總分相關後，FMA上肢關節疼痛總分與SSQOL總分之剩餘關聯已不顯著，故FMA上肢關節疼痛總分未列入SSQOL總分之最終迴歸模型。綜合以上，本研究結果僅能說明：考量人口學（性別、年齡、中風類型及患側）、上肢動作功能、BADL與IADL等共變項與SSQOL總分關聯後，上肢關節疼痛非為O-HRQOL之主要相關因素。

本研究另發現：中風後一年之FMA上肢關節疼痛總分與SSQOL家庭角色及自我照顧層面分數有顯著中度相關。過去研究支持本研究家庭角色層面HRQOL之結果。研究指出：長期受疼痛困擾之中風病患因為疼痛而較少和家人一同參與活動，而病患自己也常覺得家人陪伴他們的時間不夠長 (Widar et al., 2004)。久而久之，病患參與家庭生活的感受 (feelings) 可能較為負面，即病患家庭角色層面之HRQOL較差。在自我照顧層面HRQOL方面，本研究以病患於日常環境中從事BADL之自覺困難程度（「完全無法做到」-「完全沒有困難」）作為自我照顧層

面HROQL之評量。我們首度發現中風後上肢關節疼痛與病患從事BADL之自覺困難程度有中度之顯著關聯。此結果有助於職能治療臨床人員瞭解上肢關節疼痛對於病患BADL自陳結果 (patient-reported outcome) (如：自覺困難程度) 可能之影響。綜合以上結果，職能治療 (Occupational Therapy, OT) 臨床人員應重視上肢關節疼痛對於病患參與家庭生活感受、從事BADL自覺困難程度之影響，提供適當的治療活動以降低疼痛，進而提升病患家庭角色及自我照顧層面之HRQOL。

本研究之多變項分析結果發現：中風後一年之FMA上肢關節疼痛總分並非SSQOL 12個層面分數之主要相關因素。因為FMA上肢關節疼痛總分與SSQOL 12個層面分數之相關程度只有低度至中度（其中3個層面分數相關未達顯著），而FMA上肢關節疼痛總分與FMA上肢動作功能總分、BI總分、FAI總分有顯著中度至高度相關，故在排除共同對於各層面分數相關後，FMA上肢關節疼痛總分與SSQOL 12個層面分數之相關變得不顯著。如前所言，此結果僅能說明：考量人口學（性別、年齡、中風類型及患側）、上肢動作功能、BADL與IADL等共變項與SSQOL各層面分數之相關後，上肢關節疼痛非為HRQOL特定層面之主要相關因素。

根據以上所有多變項分析結果，研究者認為中風後上肢關節疼痛直接影響的可能是病患之上肢動作功能、BADL和IADL，再進一步影響病患之O-HRQOL及HRQOL特定層面。因此，當病患因上肢動作功能、BADL和IADL不佳而導致其HRQOL較差，OT臨床人員須進一步評估個案是否有上肢關節疼痛狀況，以掌握影響病患HRQOL之確切因素。

雖然本研究之多變項分析結果顯示：中風後上肢關節疼痛非為病患O-HRQOL及HRQOL特定層面之主要相關因素，但這些結果並不影響單變項分析之發現，如上肢關節疼痛與O-HRQOL以及家庭角色與自我照顧層面HRQOL具備顯著中度相關。因為單變項分析的目的在於描述二變項間的線性關係，而多變項迴歸分析的主要目的在於建立一模型以同時納入多個自變項對依變項進行解釋（邱皓政，民 99）。研究者同時並用單變項與多變項分析有助於釐清所研究之變項間的關聯以及建立預測模型。

由於HRQOL近來被視為中風復健之重要成效指標之一 (Hafsteinsdottir,

Kappelle, Grypdonck, & Algra, 2007; Wu, Chen, Tsai, Lin, & Chou, 2007), 且OT所檢視之臨床治療成效亦包含HRQOL (Roley et al., 2008)。因此, 研究者建議OT臨床人員將改善中風病患之上肢關節疼痛列為治療目標之一, 制定上肢關節疼痛處理 (pain management) 計畫, 例如: 給予病患患側上肢適當擺位 (positioning) 及被動關節運動 (passive range of motion exercise) (Gilmore, Spaulding, & Vandervoort, 2004; Gustafsson & McKenna, 2003), 以促進病患之HRQOL。

本研究的限制有四項: 一、本研究之個案皆為發病後一年之慢性中風病患。個案普遍恢復良好, 平均BADL功能為接近完全獨立, 使得樣本代表性不足。二、本研究未分別進行肩關節疼痛、上肢遠端關節疼痛與HRQOL之單變項及多變項分析, 故無法比較上述二項疼痛及全部上肢關節疼痛與病患HRQOL之關聯。三、本研究未納入病患自評的疼痛評量, 如視覺類比量表 (visual analogue scale) (Kelly, 2001) 或簡明疼痛量表 (brief pain inventory) (Cleeland & Ryan, 1994) 之結果, 故無法確定病患自評之上肢關節疼痛與HRQOL之關聯。四、本研究未探討不同種類之中風後疼痛, 如: 肌肉骨骼疼痛 (musculoskeletal pain) 及中樞性中風後疼痛 (central poststroke pain) 與HRQOL之關聯, 故無法深究上述二項疼痛對於病患HRQOL可能之影響。這些限制影響本研究結果之概化。

總結而論, 本研究檢驗中風後上肢關節疼痛與O-HRQOL及HRQOL特定層面之關聯程度。結果發現中風後上肢關節疼痛雖不為O-HRQOL及HRQOL特定層面之主要相關因素, 但仍與O-HRQOL及家庭角色與自我照顧層面HRQOL具備中度相關。此結果支持臨床人員將改善中風病患之上肢關節疼痛列為治療目標, 制定相關治療計畫以期提升病患之HRQOL。

## 參考文獻

- 中華民國醫院行政協會病例委員會 (譯) (民 82)。ICD-9-CM中英對照增訂版。臺北市: 巨流圖書公司。
- 謝清麟 (民 86)。芙蘭切活動量表之信度及效度驗證。慈濟醫學雜誌, 9, 123-130。

- 李雅珍、吳姿誼、邱恩琦、涂富籌、謝清麟（民 101）。中風病患整體健康相關生活品質之關聯因素探討。《職能治療學會雜誌》，30，53-67。
- 邱皓政（民 99）。《量化研究與統計分析：SPSS (PASW) 資料分析範例解析（五版）》。臺北市：五南書局。
- Alguren, B., Fridlund, B., Cieza, A., Sunnerhagen, K. S., & Christensson, L. (2012). Factors associated with health-related quality of life after stroke: A 1-year prospective cohort study. *Neurorehabilitation and Neural Repair*, 26, 266-274.
- Appelros, P. (2006). Prevalence and predictors of pain and fatigue after stroke: A population-based study. *International Journal of Rehabilitation Research*, 29, 329-333.
- Bakken, L. N., Kim, H. S., Finset, A., & Lerdal, A. (2012). Stroke patients' functions in personal activities of daily living in relation to sleep and socio-demographic and clinical variables in the acute phase after first-time stroke and at six months of follow-up. *Journal of Clinical Nursing*, 21, 1886-1895.
- Belsley, D. A. (1991). *Conditioning diagnostics: Collinearity and weak data in regression*. New York, NY: John Wiley.
- Chae, J., Mascarenhas, D., Yu, D. T., Kirsteins, A., Elovic, E. P., Flanagan, S. R., . . . Fang, Z. P. (2007). Poststroke shoulder pain: Its relationship to motor impairment, activity limitation, and quality of life. *Archives of Physical Medicine and Rehabilitation*, 88, 298-301.
- Clarkson, H. M. (2000). *Musculoskeletal assessment: Joint range of motion and manual muscle strength* (2nd ed.). Philadelphia, PA: Lippincott, Williams & Wilkins.
- Cleeland, C. S., & Ryan, K. M. (1994). Pain assessment: Global use of the Brief Pain Inventory. *Annals of the Academy of Medicine, Singapore*, 23, 129-138.
- Collin, C., Wade, D. T., Davies, S., & Horne, V. (1988). The Barthel ADL index: A reliability study. *International Disability Studies*, 10, 61-63.
- Davis, A. M., Beaton, D. E., Hudak, P., Amadio, P., Bombardier, C., Cole, D., . . . Wright, J. G. (1999). Measuring disability of the upper extremity: A rationale

- supporting the use of a regional outcome measure. *Journal of Hand Therapy*, 12, 269-274.
- de Weerd, L., Rutgers, W. A., Groenier, K. H., & van der Meer, K. (2011). Perceived wellbeing of patients one year post stroke in general practice--recommendations for quality aftercare. *BMC Neurology*, 11, 42.
- Duncan, P. W., Propst, M., & Nelson, S. G. (1983). Reliability of the Fugl-Meyer assessment of sensorimotor recovery following cerebrovascular accident. *Physical Therapy*, 63, 1606-1610.
- Faria-Fortini, I., Michaelsen, S. M., Cassiano, J. G., & Teixeira-Salmela, L. F. (2011). Upper extremity function in stroke subjects: Relationships between the international classification of functioning, disability, and health domains. *Journal of Hand Therapy*, 24, 257-264.
- Fugl-Meyer, A. R., Jaasko, L., Leyman, I., Olsson, S., & Steglind, S. (1975). The post-stroke hemiplegic patient: A method for evaluation of physical performance. *Scandinavian Journal of Rehabilitation Medicine*, 7, 13-31.
- Gilmore, P. E., Spaulding, S. J., & Vandervoort, A. A. (2004). Hemiplegic shoulder pain: Implications for occupational therapy treatment. *Canadian Journal of Occupational Therapy*, 71, 36-46.
- Gladstone, D. J., Danells, C. J., & Black, S. E. (2002). The Fugl-Meyer assessment of motor recovery after stroke: A critical review of its measurement properties. *Neurorehabilitation and Neural Repair*, 16, 232-240.
- Gustafsson, L., & McKenna, K. T. (2003). Treatment approaches for clients with a stroke-affected upper limb: Are we following evidence-based practice? *Australian Occupational Therapy Journal*, 50, 205-215.
- Guyatt, G. H., Feeny, D. H., & Patrick, D. L. (1993). Measuring health-related quality of life. *Annals of Internal Medicine*, 118, 622-629.
- Hafsteinsdottir, T. B., Kappelle, J., Grypdonck, M. H., & Algra, A. (2007). Effects of Bobath-based therapy on depression, shoulder pain and health-related quality of life in patients after stroke. *Journal of Rehabilitation Medicine*, 39, 627-632.



- Horner-Johnson, W., Krahn, G., Andresen, E., & Hall, T. (2009). Developing summary scores of health-related quality of life for a population-based survey. *Public Health Reports, 124*, 103-110.
- Hsueh, I. P., Hsu, M. J., Sheu, C. F., Lee, S., Hsieh, C. L., & Lin, J. H. (2008). Psychometric comparisons of 2 versions of the Fugl-Meyer Motor Scale and 2 versions of the Stroke Rehabilitation Assessment of Movement. *Neurorehabilitation and Neural Repair, 22*, 737-744.
- Hsueh, I. P., Jeng, J. S., Lee, Y., Sheu, C. F., & Hsieh, C. L. (2011). Construct validity of the stroke-specific quality of life questionnaire in ischemic stroke patients. *Archives of Physical Medicine and Rehabilitation, 92*, 1113-1118.
- Hsueh, I. P., Lee, M. M., & Hsieh, C. L. (2001). Psychometric characteristics of the Barthel activities of daily living index in stroke patients. *Journal of the Formosan Medical Association, 100*, 526-532.
- Hsueh, I. P., Lin, J. H., Jeng, J. S., & Hsieh, C. L. (2002). Comparison of the psychometric characteristics of the functional independence measure, 5 item Barthel index, and 10 item Barthel index in patients with stroke. *Journal of Neurology, Neurosurgery & Psychiatry, 73*, 188-190.
- Jönsson, A. C., Lindgren, I., Hallström, B., Norrving, B., & Lindgren, A. (2006). Prevalence and intensity of pain after stroke: A population based study focusing on patients' perspectives. *Journal of Neurology, Neurosurgery & Psychiatry, 77*, 590-595.
- Kelly, A. M. (2001). The minimum clinically significant difference in visual analogue scale pain score does not differ with severity of pain. *Emergency Medicine Journal, 18*, 205-207.
- Kutner, M. H., Nachtsheim, C. J., Neter, J., & Li, W. (2005). *Applied linear statistical models (McGraw-Hill/Irwin series operations and decision sciences)* (5th ed.). Boston, MA: McGraw-Hill.
- Lindgren, I., Jönsson, A. C., Norrving, B., & Lindgren, A. (2007). Shoulder pain after stroke: A prospective population-based study. *Stroke, 38*, 343-348.

- Lundstrom, E., Smits, A., Terent, A., & Borg, J. (2009). Risk factors for stroke-related pain 1 year after first-ever stroke. *European Journal of Neurology*, *16*, 188-193.
- Naess, H., Lunde, L., & Brogger, J. (2012). The effects of fatigue, pain, and depression on quality of life in ischemic stroke patients: The Bergen Stroke Study. *Vascular Health and Risk Management*, *8*, 407-413.
- Ones, K., Yilmaz, E., Cetinkaya, B., & Caglar, N. (2005). Quality of life for patients poststroke and the factors affecting it. *Journal of Stroke and Cerebrovascular Diseases*, *14*, 261-266.
- Pizzi, A., Carlucci, G., Falsini, C., Verdesca, S., & Grippo, A. (2005). Evaluation of upper-limb spasticity after stroke: A clinical and neurophysiologic study. *Archives of Physical Medicine and Rehabilitation*, *86*, 410-415.
- Pomeroy, V. M., Frames, C., Faragher, E. B., Hesketh, A., Hill, E., Watson, P., & Main, C. J. (2000). Reliability of a measure of post-stroke shoulder pain in patients with and without aphasia and/or unilateral spatial neglect. *Clinical Rehabilitation*, *14*, 584-591.
- Price, C. (2003). Treatment of shoulder and upper limb pain after stroke: An obstacle course for evidence-based practice. *Reviews in Clinical Gerontology*, *13*, 321-333.
- Roden-Jullig, A., Britton, M., Gustafsson, C., & Fugl-Meyer, A. (1994). Validation of four scales for the acute stage of stroke. *Journal of Internal Medicine*, *236*, 125-136.
- Roley, S. S., DeLany, J. V., Barrows, C. J., Brownrigg, S., Honaker, D., Sava, D. I., . . . Youngstrom, M. J. (2008). Occupational therapy practice framework: Domain & practice 2nd edition. *American Journal of Occupational Therapy*, *62*, 625-683.
- Sanford, J., Moreland, J., Swanson, L. R., Stratford, P. W., & Gowland, C. (1993). Reliability of the Fugl-Meyer assessment for testing motor performance in patients following stroke. *Physical Therapy*, *73*, 447-454.
- Schuling, J., de Haan, R., Limburg, M., & Groenier, K. H. (1993). The Frenchay

- Activities Index: Assessment of functional status in stroke patients. *Stroke*, *24*, 1173-1177.
- Suethanapornkul, S., Kuptniratsaikul, P. S., Kuptniratsaikul, V., Uthensut, P., Dajpratha, P., & Wongwisethkarn, J. (2008). Post stroke shoulder subluxation and shoulder pain: A cohort multicenter study. *Journal of the Medical Association of Thailand*, *91*, 1885-1892.
- Triffitt, P. D. (1998). The relationship between motion of the shoulder and the stated ability to perform activities of daily living. *The Journal of Bone and Joint Surgery. American volume*, *80*, 41-46.
- Turner-Stokes, L., & Jackson, D. (2002). Shoulder pain after stroke: A review of the evidence base to inform the development of an integrated care pathway. *Clinical Rehabilitation*, *16*, 276-298.
- Widar, M., Ahlstrom, G., & Ek, A. C. (2004). Health-related quality of life in persons with long-term pain after a stroke. *Journal of Clinical Nursing*, *13*, 497-505.
- Williams, L. S., Weinberger, M., Harris, L. E., Clark, D. O., & Biller, J. (1999). Development of a stroke-specific quality of life scale. *Stroke*, *30*, 1362-1369.
- Wu, C. Y., Chen, C. L., Tsai, W. C., Lin, K. C., & Chou, S. H. (2007). A randomized controlled trial of modified constraint-induced movement therapy for elderly stroke survivors: Changes in motor impairment, daily functioning, and quality of life. *Archives of Physical Medicine and Rehabilitation*, *88*, 273-278.

# Relationship Between Post-Stroke Upper Extremity Joint Pain and Health-Related Quality of Life

OCCUPATIONAL THERAPY

Shu-Yu Yang<sup>a</sup>, Ya-Chen Lee<sup>b</sup>, Zi-I Wu<sup>b</sup>, Wan-Hui Yu<sup>b,\*</sup>,  
Chi-Min Yang<sup>a</sup>, Ching-Lin Hsieh<sup>b</sup>

## Abstract

Upper extremity (UE) joint pain is one of the consequences after stroke; it may affect patients' health-related quality of life (HRQOL). The relationships between post-stroke UE joint pain and overall HRQOL (O-HRQOL)/specific domains of HRQOL are unclear. Thus, clinicians may not be able to set effective treatment plans to improve patients' HRQOL. The purpose of this study was to investigate the relationships between post-stroke UE joint pain and O-HRQOL/specific domains of HRQOL. Furthermore, we examined whether post-stroke UE joint pain was an important factor of O-HRQOL/specific domains of HRQOL. Sixty-six patients with stroke were assessed using the UE items in the pain subscale of the Fugl-Meyer Motor Assessment (FMA), the UE motor subscale of the FMA, the Stroke-Specific Quality of Life (SSQOL), the Barthel Index and Frenchay Activities Index. Pearson's *r* and stepwise regression analysis were used to analyze the data. We found that the FMA UE pain score had moderate correlations with the SSQOL total score ( $r = .40$ ), and weak to moderate correlations with 12 SSQOL domain scores ( $r = .11 - .43$ ). Regression analysis showed that the FMA UE pain score was not included in the final regression models of SSQOL total score and 12 SSQOL domain scores. Although post-stroke UE joint pain was not an important factor of O-HRQOL/specific domains of HRQOL, it was moderately correlated with O-HRQOL and some specific domains of HRQOL. These findings support clinicians to develop UE joint pain-related treatment plans to improve patients' HRQOL.

**Keywords:** Upper extremity joint pain, Health-related quality of life, Stroke

<sup>a</sup>Chi Mei Medical Center

<sup>b</sup>School of Occupational Therapy,  
College of Medicine, National Taiwan University

Received: 11 August 2012

Accepted: 17 February 2013

\*Correspondence: Wan-Hui Yu  
School of Occupational Therapy,  
College of Medicine, National Taiwan  
University, 17 Xuzhou Road, Floor 4,  
Taipei city 100, Taiwan.  
Tel.: 02-33668165.  
E-mail: patrice\_yu@yahoo.com.tw

# 年長者坐到站之運動學分析

OCCUPATIONAL THERAPY

蔡伊純<sup>1</sup> 呂采穗<sup>1</sup> 李萬盟<sup>1</sup> 張志仲<sup>2</sup> 楊育昇<sup>2,\*</sup>

## 摘要

坐到站為日常生活中最常進行的活動，也是關乎移動與行走能力的基礎。穩定的從坐姿轉換成站立是與重心能否順利轉移到站立時支持面的底面積內有關，而老人族群因老化，可能會出現異於年輕族群所採用的動作策略來完成此動作。本研究的主旨是透過分析老年族群與年輕族群在進行坐到站過程中，整體重心轉移的差異，並比較重心與支持底面積間隔距離和頭部與膝蓋間隔距離相關性，以作為日後教導老年族群執行站立的簡單易懂方法。共計26位健康老年受測者與26位健康年輕受測者參與本研究案，受測者被要求進行三次坐到站的活動，研究者透過貼在受測者身上之反光球藉由六台紅外線攝影機之動作分析系統同步收集運動學資料。結果發現在站立初期離開椅面之前，老年人會先進行軀幹向前彎曲，將整體重心透過身體前傾的動作，帶到雙腳的支持底面積之內，以降低起身時平衡能力的干擾，且會利用軀幹前傾所產生的移動動量，來彌補膝關節伸直站立時所需的動量。此一「穩定策略」動作亦和頭部與膝蓋間隔距離變化有明顯的相關性。臨床治療師可透過此相關性來教導自行坐到站有困難的老年族群完成站立的動作，並且能有效地預防跌倒的意外。

**關鍵字：**坐到站，平衡，重心

高雄醫學大學附設中和紀念醫院復健科<sup>1</sup>  
高雄醫學大學職能治療學系暨研究所<sup>2</sup>

受文日期：民國 102 年 3 月 8 日  
接受刊載：民國 102 年 5 月 6 日

\*通訊作者：楊育昇  
高雄市十全一路100號  
高雄醫學大學職能治療學系暨研究所  
電話：07-3121101分機2657  
電子信箱：yusheng@kmu.edu.tw

## 前言

依世界衛生組織的定義滿65歲稱為老人，即所謂的銀髮族，台灣65歲以上老人人口占總人口的比率，於1993年達7%，成為高齡化國家，2010年已提高到10.7%，更預計2018 比率將超過14%，成為高齡社會，2025 比率將再超過20%，成為超高齡社會，台灣人口中將有五分之一是老人，老人人口比率直逼英國、法國及美國等已發展國家人口老化現象（行政院經濟建設委員會，民 101）。而在老化的過程中，不免會對於老年人出現知覺混亂、方位喪失、情緒不穩定、及身體功能逐漸減退。而其中以因老化過程導致下肢肌力不足及平衡感的退化，對於老年人執行日常生活的能力之影響深鉅。這不但會降低老年人自我照顧能力，甚至會造成跌倒機率的提升。綜觀每天日常作息的活動裡，坐到站為日常生活中最常進行的活動，也是關乎移行能力的基礎。坐到站的簡單定義為從有支撐面的低處將重心轉到較狹窄支撐面的高處 (Tung, Yang, Lee, & Wang, 2010)。Doorenbosch、Harlaar、Roebroek 與 Lankhorst (1994) 定義坐到站是從坐姿往上移動身體重心到站姿，而不會失去平衡。而Vander Linden、Brunt 與 McCulloch (1994) 則將坐到站定義為一轉移動作，需要將重心由較低的穩定平面透過下肢伸直到直立姿勢。儘管坐到站看似一個簡單不過的活動，但其中卻牽涉著身體各部位肢體之間共同協同動作，有效地將原先坐姿下的身體重心以水平及垂直的方向 (Pai, Naughton, Chang, & Rogers, 1994)，從一個較大的支持底面積 (base of support, BOS) 轉移到一個較小的支持底面積，即是站立時雙腳所涵蓋的面積。Schenkman、Berger、Riley、Mann 與 Hodge (1990) 將坐到站分為四個主要時期。第一期為「屈曲動量 (flexion momentum)」，動作開始時身體會做出軀幹前傾的動作。第二期為「動量轉移 (momentum transfer)」，此時期中上半身屈曲的動量會轉變成全身的動量，並產生一個繼續向前，且同時開始向上的動作。第三期稱為「伸直期 (extension)」，此階段髖關節與膝關節開始進行伸直動作到完全站立。最後，第四期為「穩定期 (stabilization)」，為站立後完全伸直的穩定期。Millington、Myklebust 與 Shambes (1992) 則分為三個階段：重量移動期 (weight shift)、轉換期 (transition) 與升起期 (lift)。據此，由坐到站有幾個主要的動作特

徵：動作開始時，軀幹向前傾以便將身體重心向前移動，接者再離開椅面起身站立 (seat off) 時伸直下肢與軀幹，將身體重心向上移動，並確保重心位置垂直落於雙腳之間保持平衡，進而完成站立的動作。

過去文獻指出老年族群完成坐到站的動作所花費時間較多 (Gross, Stevenson, Charette, Pyka, & Marcus, 1998; Mourey, Grishin, d'Athis, Pozzo, & Stapley, 2000; Mourey, Pozzo, Rouhier-Marcer, & Didier, 1998)，軀幹前傾的角度變大 (Baer & Ashburn, 1995; Kerr, White, Barr, & Mollan, 1997; Mourey et al., 1998)。Mourey 等人 (1998) 更指出老年人在進行坐到站的過程中，身體軀幹屈曲前傾動作流暢度較年輕族群來的差，且會偏向先利用身體軀幹前傾後，再膝蓋伸直提供垂直站立的動量，換言之即是分段執行站立動作；相反地，年輕族群則會一邊身體前傾，一邊進行膝蓋伸直動作來執行站立的動作；而這導致老年與年輕族群在站立動作上的差異推測可能與重心轉移有關。Pai 等人 (1994) 在研究坐到站動作的穩定度現象，指出越穩定的從坐姿轉換成站立，是與重心能否順利轉往到站立時支持面的底面積內有關。而 Hughes、Weiner、Schenkman、Long 與 Studenski (1994) 透過重心與支持底面積距離間隔 (COM-BOS separation) 之關係，確實觀察到部份老年人會出現分段執行坐到站的動作，當離開椅面起身站立時，重心先會移到支持底面積之下後，再接著完成伸直站立的動作。Hughes 等人稱此坐到站的方法為「穩定策略 (stabilization strategy)」，並認為老年族群之所以會採取該策略極可能是代償老年族群因下肢肌力不足及平衡感的退化現象。Papa 與 Cappozzo (2000) 在比較老年與年輕族群在坐到站立動作策略上差異的研究中，亦發現老年族群在離開椅面起身站立時，會先軀幹向前屈曲讓重心靠近支持底面積，且出現較快的身體重心移動速度來獲取較大的動量轉移。因此，在離開椅面起身站立時，透過縮短重心與支持底面積距離間隔，及以較快重心移動速度，似乎是老年族群所常採用的坐到站起身策略。但此動作策略卻仍缺乏確切實驗證據證明。所以本研究主要目的為：分析老年族群與年輕族群當在離開椅面起身站立時，身體動作策略對於重心轉移所產生之影響，並且進一步分析重心與支持底面積距離、重心速度與加速度的變化，以了解這兩個族群在起身站立的差異性。

此外，過去文獻研究亦發現老年族群是否能獨立自行完成坐到站的動作，是與發生跌倒的機率有息息相關 (Campbell, Borrie, & Spears, 1989; Lipsitz, Jonsson, Kelley, & Koestner, 1991; Nevitt, Cummings, Kidd, & Black, 1989)。所以透過教導重心轉移的方法及適當的訓練，臨床治療師是可幫助老年族群獨立並安全地進行坐到站的活動，並能有效地預防跌倒的意外。但基於人體重心是需透過動作分析儀，加以數據化及計算後才能量化出該點位於人體的位置，對於臨床治療師而言，是無法立即明確告訴老年族群如何去轉移重心。反而臨床治療師會教導在離開椅面起身站立時，個案頭盡可能向前傾，來帶動重心轉移以順利完成坐到站的動作 (吳鑫漢，民 98)。然而此指導技巧一直缺乏實證數據加以佐證，因此本研究次要目的為調查在離開椅面起身站立時，頭部與膝蓋距離間隔及重心與支持底面積距離間隔之相關性。如果兩者有相關性則將有助於做為日後臨床治療師，教導老年族群，透過改變頭部與膝蓋距離間隔為明確的指標來進行重心轉移，進而完成離開椅面起身站立動作。

## 研究方法

### 一、參與者

本研究採用方便取樣，共徵召52位受測者參與實驗 (老年族群26人，年輕族群26人，每一族群男女比例皆為1:1)。就年輕族群而言，受測者需符合下面收案條件使納入為受測者：(一)年紀介於18歲到40歲之間；(二)並無任何神經、肌肉或骨骼系統的疾病影響進行坐到站的活動。就老年族群而言，受測者需符合下面收案條件使納入為受測者：(一)年紀需大於65歲；(二)並無任何神經、肌肉或骨骼系統的疾病影響進行坐到站的活動；(三)有能力遵循並了解動作指令者。此外，若兩組參與者即使符合收案條件，但有下面排除條件亦排除參與實驗：(一)在站立時會出現異常血壓變化或心臟不適等生理問題；(二)站立後無法維持至少10秒鐘的站立平衡者。本研究已經通過高雄醫學大學附設中和醫院人體試驗委員會審核通過，准許實施。受測者皆在充分告知施測流程、本身



的權益與資料保密原則，並簽署受測者同意書後，始得進行施測。

## 二、動作分析系統

六台紅外線動作分析攝影機 (Qualisys Motion Capture System, Gothenburg, Sweden) 分別環繞於實驗室四周架設，採樣頻率設定為120Hz來擷取貼在受測者肢體表面之反光球所產生的訊號，再傳輸該訊號至個人電腦並利用動作分析系統軟體 (Qualisys Track Manager) 取得實際在運動時的空間座標 (global coordination)。本實驗之反光球皆為直徑20mm圓形的球型，分別貼在受測者兩側顳顎關節 (temporo-mandibular joint)、雙上肢肩峰、鷹嘴突、肱骨外上髁、橈骨莖突、尺骨莖突、第三掌骨頭、雙下肢股骨大轉子、下肢股骨之內外髁、腳踝之內外髁、第二腳掌骨頭與腳跟底部 (如圖1所示)。

## 三、進行步驟

受測者在進行實驗前，研究者會首先收集受測者的基本資料，如：年齡、性別、身高、體重、下肢大腿、小腿與足底的長度等。之後，受測者會被要求坐在一無扶手與靠背但可調整坐面高度的座椅上。研究者會根據受測者小腿的長度，進行座椅高度調整，以確保受測者在坐正的姿勢下，髖關節、膝關節皆彎曲90度，腳踝關節背屈90度，及兩腳底分開與肩同寬，平貼地板。姿勢擺好後，受試者不可以再自行移動以確保每次動作起始姿勢一致。根據之前文獻研究指出，一般年輕受測者以自選速度 (self-selected speed) 大約需費時2秒來完成坐到站的動作，而老人則可能需達3~4秒來完成 (Hughes et al., 1994; Kerr et al., 1997; Pai et al., 1994)。所以本實驗測試的時間設定為10秒以完整記錄站立過程。研究者會在動作分析系統已記錄1秒後，下達站立的指令，當受試者聽到指令後開始以自選速度，從椅座上進行坐到站的動作，且站立完成後保持此站立姿勢直到當次實驗測試時間結束。若受試者無法及時在10秒內完成坐到站的測試，該次測試會視為無效並重新再進行。受測者在實驗測試過程中，雙手被要求自然垂放於身體兩側，不得以擺盪動作或置於大腿上協助進行坐到站動作。受測者相同坐到站的實驗測

試過程會重覆進行，以取得三次有效的測試資料，之後加以平均取得平均值。

#### 四、資料分析

本研究坐到站的動作時間參數是利用肢體動作移動軌跡來作為判別標準，當肩峰反光球移動軌跡大於該球在靜止坐姿下（即測試過程中第一秒內的資料）三個標準差時，即定義為坐到站動作的開始；當股骨大轉子反光球垂直移動軌跡大於該球在靜止坐姿下（即測試過程中第一秒內的資料）三個標準差時，則為離椅起身的時間點；而當肩峰反光球移動軌跡在站立平穩後，其軌跡移動變化不再大於後續站立平穩下（即測試過程中第9到10秒內的資料）三個標準差時，即定義為坐到站動作的結束 (Yoshioka, Nagano, Hay, & Fukushima, 2009)。在動作過程中肩峰與股骨大轉子的連線代表軀幹肢段，軀幹前傾 (trunk inclination) 角度為靜止坐姿下軀幹肢段與水平線之夾角（軀幹水平夾角），減去動作過程中軀幹水平夾角求得之（如圖1所示）。在重心移動軌跡部份則採用 Dempster (1955) 之人體肢段參數資料 (Winter, 2005)，該參數資料提供各肢節重量占整個身體重量的比例，帶入個案體重便可計算出各肢節的重量。而重心參數則提供重心位置從肢體遠端關節旋轉中心到近端旋轉中心連線長度所占的比例，透過利用貼在受測者身上的反光球在空間座標系統 (global coordinate systems) 的位置，將身體分成12個肢節：頭部、軀幹、右上臂、右前臂、左上臂、左前臂、右大腿、右小腿、右足部、左大腿、左小腿、左足部，再分別帶入重心位置百分比參數，則可分別計算各肢節重心，而後相加則可推算出身體整體的重心位置 (Winter, 2005)。之後再就重心水平方向與垂直方向的移動軌跡，對時間微分與再微分則可別求得速度及加速度變化。為了要辨認從坐面起身站立時，重心與支持底面積的關係，重心與支持底面積距離間隔亦透過腳跟底部反光球在水平方向的位置減去水平方向的重心移動軌跡得知 (Hughes et al., 1994)，若該數值為負值則代表重心落於腳跟底部之後面，並未落於支持底面積之內。頭部與膝蓋距離間隔則由頭部顛顎關節反光球在水平方向的位置減去下肢股骨外髁水平方向的位置得知。

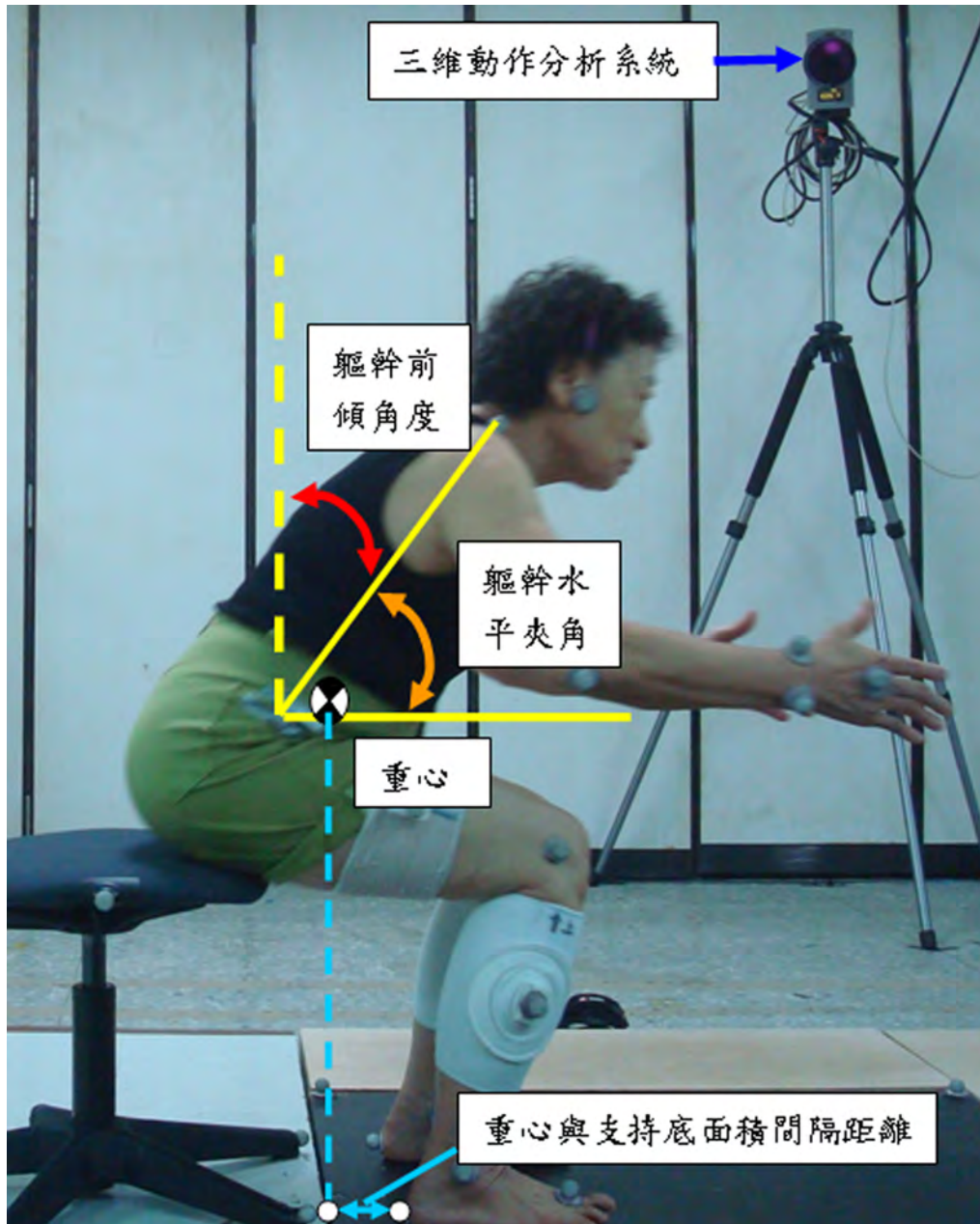


圖1  
坐到站動作分析示意圖。重心與支持底面積間隔距離正值代表重心落於腳跟之前，負值則代表落於腳跟之後。

## 五、統計分析

本研究資料計算利用MATLAB 6.1 版 (MathWorks, Inc., Natick, MA) 進行運算，應用統計軟體SPSS 11.0 版 (SPSS Inc., Chicago, IL, USA) 執行統計分析。老年族群與年輕族群之身高、體重資料以平均值及標準差來表示，並用獨立 $t$  檢定

(independent *t*-test) 來比較兩組之間進行坐到站重心轉移速度與加速度，重心與支持底面積相差距離及離椅起身時的軀幹前傾角度的差異。Pearson相關係數檢定來分析重心與支持底面積間隔距離和頭部與膝蓋間隔距離相關性。本研究採雙尾檢定，顯著水準 $\alpha$ 值設為 .05。

## 結果

老年受測者平均年齡為 $73.3 \pm 5.4$ 歲，平均身高 $159.3 \pm 7.7$ 公分，平均體重 $60.7 \pm 8.7$ 公斤。而年輕受測者平均年齡為 $22.6 \pm 2.9$ 歲，平均身高 $164.1 \pm 7.0$ 公分，平均體重 $60.8 \pm 10.6$ 公斤。其中身高 ( $p = .02$ ) 上，兩組之間有達到顯著的差異，體重上則無差異。雖然老年受測者身高明顯矮於年輕受測者，但測試過程中座椅高度會根據受測者小腿的長度進行調整，所以身高的差異並不會干擾到本研究的結果。

表1為本研究之運動學相關參數分析結果，在整體完成坐到站所需花費的時間上，老年與年輕受測者並無出現明顯統計上的差異 ( $p = .13$ )，皆約可在3秒內完成動作。而從動作開始到離開椅面時所需花費時間亦無出現明顯統計上的差異 ( $p = .08$ )，但由於每位受測者整體完成站立的時間不一，因此再將整體完成站立的時間除以該值，則得到離開椅面的動作時間百分比，可發現老年受測者明顯會較晚開始離開椅面 ( $p < .01$ )。

就重心移動而言，結果發現老年受測者在水平方向的最大重心瞬時速度 ( $p < .01$ ) 及最大瞬時加速度 ( $p = .04$ ) 皆明顯快於年輕受測者，且重心最大瞬時速度的時間百分比 (percentage time to maximal velocity) 亦明顯與年輕受測者有顯著差異 ( $p < .01$ )，代表老年受測者重心在水平方向移動策略與年輕受測者有所不同。在比較瞬間離椅起身的時間百分比後，可發現老年受測者重心最大瞬時速度發生在瞬間離椅起身之前（最大瞬時速度發生於19%，而瞬間離椅起身時間百分比為23%），而年輕受測者則反之（最大瞬時速度發生於22%，而瞬間離椅起身時間百分比為20%）。就重心在垂直方向移動而言，老年受測者無論在垂直方向之最大重心移動速度 ( $p = .76$ )、最大瞬時加速度 ( $p = .18$ )、與最大瞬時速度的時

間百分比 ( $p = .78$ ) 皆與年輕受測者無顯著差異，即代表老年受測者重心在垂直方向移動策略與年輕受測者相似。

在重心與支持底面積關係上，結果發現老年受測者在瞬間離椅起身時，重心會先移入支持底面積，落於腳跟前1.6 cm的位置，與年輕受測者仍落於腳跟後2.4 cm的位置有顯著的不同 ( $p < .01$ )。而同樣的情境亦可透過頭部與膝蓋距離關係觀察，老年受測者在瞬間離椅起身時，頭部會超過膝蓋前方6.1 cm；然年輕受測者頭部則落於膝蓋後方5.4 cm的位置。統計結果亦顯示重心與支持底面積間距離與頭部與膝蓋間距離有很明顯的正相關 ( $r = .63, p < .01$ )。

表1  
年輕與老人族群在坐到站過程中運動學參數之比較

	年輕族群 ( $n = 26$ )	老人族群 ( $n = 26$ )	$p$ 值
坐到站花費時間 (秒)	$2.3 \pm 0.3$	$2.4 \pm 0.2$	.13
離開椅面時間 (秒)	$0.2 \pm 0.04$	$0.2 \pm 0.04$	.08
離椅面時間百分比 (%)	$20.4 \pm 3.5$	$23.4 \pm 3.6$	$< .01^{**}$
水平方向之最大重心 瞬時速度 (cm/sec)	$31.6 \pm 5.6$	$37.9 \pm 6.4$	$< .01^{**}$
水平方向之最大重心 瞬時加速度 (cm/sec <sup>2</sup> )	$73.5 \pm 17.8$	$85.1 \pm 23.5$	.04*
水平方向之最大重心 瞬時速度時間百分比 (%)	$22.2 \pm 3.3$	$19.3 \pm 4.4$	$< .01^{**}$
垂直方向之最大重心 瞬時速度 (cm/sec)	$30.9 \pm 7.8$	$31.5 \pm 5.9$	.76
垂直方向之最大重心 瞬時加速度 (cm/sec <sup>2</sup> )	$108.9 \pm 34.4$	$120.8 \pm 29.3$	.19
重心與支持底面積間距 離 (cm)	$-2.3 \pm 1.4$	$1.6 \pm 1.8$	$< .01^{**}$
頭部與膝蓋間距 離 (cm)	$-5.4 \pm 9.3$	$6.1 \pm 6.5$	$< .01^{**}$
軀幹前傾動作範圍 (度)	$40.7 \pm 10.0$	$46.0 \pm 10.0$	.06
軀幹前傾角度 (度)	$30.2 \pm 8.6$	$40.0 \pm 8.1$	$< .01^{**}$

註：\*  $p < .05$ . \*\*  $p < .01$ .

在軀幹動作上，研究結果顯示老年受測者在整體坐到店過程中，軀幹前傾動作範圍 (range of motion) 較年輕受測者大但未達統計上的顯著差異 ( $p = .06$ )，但在瞬間離椅起身時，老年受測者則明顯出現較大軀幹前傾角度 ( $p < .01$ )，代表在此時，老年受測者軀幹會有較多的前傾，進而將重心移入支持底面積，符合上述重心與支持底面積關係發現。

## 討論

本研究結果發現老年族群相對年輕族群而言會採取不同的站立策略。在站立的初期離開椅面之前，老年受測者會以較快的重心移動速度與加速度，做軀幹前傾彎曲動作，已便獲取較大的向前移動動量，而這向前移動動量可隨著後續膝關節伸直站立動作，順勢來轉移成身體站立的動量，進行完成整體站立的動作。Schenkman 等人 (1990) 曾提出這向前移動的動量極可能是為了代償因老化因素而導致下肢肌力不足，無法提供足夠的站立動量所致。Fujimoto 與 Chou (2012) 亦提出相似的結論，如同本研究的結果，他們也發現在離開椅面起身站立之前，老年人會出現軀幹向前彎曲，而帶動較快的重心向前移動的現象，且他們亦測得老年受測者膝蓋伸直的力量，是明顯小於年輕受測者。因此，藉由軀幹向前彎曲的動作所產生的動量，確實是可彌補下肢肌力不足之處，來補足身體站立時所需的動量。這也可印證在臨床上為何部份中風個案或老年人，在離椅起身站立之前，會透過軀幹或搭配雙手的前後搖擺動作，來獲取較大的移動動量協助完成站立的動作。然而過大的前後搖擺動作，雖可協助啟動站立的動作，但所產生過多的向前移動動量，極可能會讓重心在伸直站立後，仍持續向前移動跑出雙腳底支持面積之外，而導致即使能站立但無法保持平衡。所以，在離椅起身站立之前，軀幹以適當速度進行前傾的動作，是可協助執行站立動作，但過快的動作有可能導致站立不穩的情況，臨床治療師在應用本研究結論時需留意此點。

Hughes 等人 (1994) 指出在進行坐到店的動作時，個體可能會採取不同的策略：動量轉移策略或是穩定策略。當從椅面離開進行伸直站立的瞬間，身體是可能處於在一個極度不平衡的狀態，整體重心是有可能落在腳後跟之後，超過腳底

能提供的支持底面積之外。然而透過朝向腳底方向的動量轉移動作，卻能夠順利完成坐到站的任務而不致於跌倒，此策略即是動量轉移策略，但動量轉移策略是需要高度動作控制 (fine postural control) 能力。另一穩定策略則是在離開椅面之前，先將整體重心透過身體前傾的動作，帶到雙腳的支持底面積之內，以降低起身時平衡能力的干擾。由於穩定起身策略事先已經將整體重心轉移到新的支持底面積之下，因此它相對動量轉移策略而言較穩定，對於平衡控制能力要求相對減少，個體本身若平衡能力較差者，則會採用此策略進行坐到站的動作。本研究的結果發現老年族群會採穩定策略來完成坐到站的動作，在瞬間離椅起身時，老年受測者會先軀幹前傾，將重心移入支持底面積後，再進行站立動作。相對而言，年輕受測者則會採用動量轉移策略，儘管在瞬間離椅起身時，重心位置仍落於支持底面積之外（腳跟後2.4 cm的位置），但藉由下肢較強膝蓋伸直力量所產生的動量，仍足以讓重心朝向支持底面積（腳底方向）移動，進而完成坐到站。這也可以解釋為何年輕受測者重心最大瞬時速度發生在瞬間離椅起身之後（如表1所示，重心最大瞬時速度時間百分比為22%，而瞬間離椅起身時間百分比為20%），因為此時重心從原來三點的支持底面積（屁股與雙腳底），尚未進入新的兩點支持底面積（雙腳底），極需要快速移動到新支持底面積下。

總結上述結果，在站立初期離開椅面之前，老年人會先進行軀幹向前彎曲，將整體重心透過身體前傾的動作，帶到雙腳的支持底面積之內，縮短重心與支持底面積間隔距離，以降低起身時平衡能力的干擾，且會利用軀幹前傾所產生的移動動量，來彌補膝關節伸直站立時所需的動量。但在臨床上除了要瞭解這重心移轉對於坐在站表現的差異之外，對於無法順利執行坐到站的病患應該如何訓練，或是利用一個明顯易懂執行站起來的方法，提昇他們獨立生活的能力更是重要的課題。根據上述的內容，我們進一步分析頭部與膝蓋間隔距離與重心與支持底面積間隔距離關係，結果發現二者之間有顯著正相關存在，代表透過頭部與膝蓋間隔距離的改變，可反應出重心與支持底面積間隔距離的變異。此外，過去文獻亦發現離椅起身之前，雙腳底的位置若越靠近椅子，會越容易進行坐到站立動作且降低下肢所需要伸直力矩 (Kawagoe, Tajima, & Chosa, 2000; Khemlani, Carr, & Crosbie, 1999; Shepherd & Koh, 1996)。這事先在坐姿下將雙腳底位置向後移的擺

位動作，與本研究所發現縮短重心與支持底面積間隔距離有異曲同工之處。前者是將站立時的支持底面積預先靠近坐姿時的重心位置，而後者則是在不移動支持底面積前提下（離椅前仍維持膝踝關節彎曲90度的姿勢），透過軀幹前傾動作將重心靠近支持底面積。據此，臨床治療師可教導病患在進行坐到站時，事先將雙腳擺位到較靠近椅子的位置，或者在坐正的姿勢下（膝踝關節皆彎曲90度），採用穩定策略協助完成動作，即是離椅起身之前，軀幹先向前彎曲直到頭部超過膝蓋為止，以訓練重心轉移到雙腳支持底面積後再進行站立動作。此外，病患亦可透過自身的視覺回饋，檢視頭部超過膝蓋與否，來確認重心轉移是否足以從原來支持底面積，進入站立所需的兩點支持底面積。但若已事先將雙腳向後擺位者，則不建議再加上給予頭部一定要超過膝蓋之口令，因為重心與支持底面積間隔距離已縮短，若過度的前傾動作可能讓重心向前移出支持底面積之外，有導致站立時向前摔倒之虞，臨床治療師在應用本研究結論時需留意此點。

在本研究中，雖然量化重心位置、速度與加速度的變化，用於說明老年與年輕族群在坐到站所採用的動作策略不同處，然而在代償下肢力量的推論上，並沒有直接資料數據來支持，未來研究上應可整合動作分析儀與力板同步進行更進一步的探討，從力板擷取的資料經過逆向動力學 (inverse dynamics) 的計算後，便能求得之下肢各關節力矩，再配合動作分析儀所提供之重心移轉運動學參數，即可有更深入的研究討論。另外，本研究的受試者均為健康老年與年輕人，且受試者本身在從事坐到站活動中並無任何困難，然而若要將本研究結果推論到其他有站立困難的老年人或病人（如：中風患者）身上，則要留意是否有其他代償性的動作，如擺動雙手，或雙腳擺放較後方靠近身體，以利完成站立。未來研究亦可針對於站立困難的族群進行調查，來探討為何無法順利完成站立的可能原因。

## 誌謝

本研究獲高雄醫學大學附設中和紀念醫院專題研究經費補助 (KMUH100-0M37) 謹此致謝



## 參考文獻

- 行政院經濟建設委員會（民 101）。中華民國2012年至2060年人口推計。臺北市：行政院經濟建設委員會。
- 吳鑫漢（民 98）。偏癱病人運動控制問題與處理。臺北縣：吳道玄。
- Baer, G. D., & Ashburn, A. M. (1995). Trunk movements in older subjects during sit-to-stand. *Archives of Physical Medicine and Rehabilitation*, 76, 844-849.
- Campbell, A. J., Borrie, M. J., & Spears, G. F. (1989). Risk factors for falls in a community-based prospective study of people 70 years and older. *Journals of Gerontology*, 44, M112-117.
- Dempster, W.T., 1955. Space requirements of the seated operator. (WADC Technical Report TR-55-159). Ohio: Wright-Patterson Air Force Base.
- Doorenbosch, C. A., Harlaar, J., Roebroek, M. E., & Lankhorst, G. J. (1994). Two strategies of transferring from sit-to-stand; The activation of monoarticular and biarticular muscles. *Journal of Biomechanics*, 27, 1299-1307.
- Fujimoto, M., & Chou, L. S. (2012). Dynamic balance control during sit-to-stand movement: An examination with the center of mass acceleration. *Journal of Biomechanics*, 45, 543-548.
- Gross, M. M., Stevenson, P. J., Charette, S. L., Pyka, G., & Marcus, R. (1998). Effect of muscle strength and movement speed on the biomechanics of rising from a chair in healthy elderly and young women. *Gait and Posture*, 8, 175-185.
- Hughes, M. A., Weiner, D. K., Schenkman, M. L., Long, R. M., & Studenski, S. A. (1994). Chair rise strategies in the elderly. *Clinical Biomechanics*, 9, 187-192.
- Kawagoe, S., Tajima, N., & Chosa, E. (2000). Biomechanical analysis of effects of foot placement with varying chair height on the motion of standing up. *Journal of Orthopaedic Science*, 5, 124-133.
- Kerr, K. M., White, J. A., Barr, D. A., & Mollan, R. A. (1997). Analysis of the sit-stand-sit movement cycle in normal subjects. *Clinical Biomechanics*, 12, 236-245.

- Khemlani, M. M., Carr, J. H., & Crosbie, W. J. (1999). Muscle synergies and joint linkages in sit-to-stand under two initial foot positions. *Clinical Biomechanics*, *14*, 236-246.
- Lipsitz, L. A., Jonsson, P. V., Kelley, M. M., & Koestner, J. S. (1991). Causes and correlates of recurrent falls in ambulatory frail elderly. *Journals of Gerontology*, *46*, M114-122.
- Millington, P. J., Myklebust, B. M., & Shambes, G. M. (1992). Biomechanical analysis of the sit-to-stand motion in elderly persons. *Archives of Physical Medicine and Rehabilitation*, *73*, 609-617.
- Mourey, F., Grishin, A., d'Athis, P., Pozzo, T., & Stapley, P. (2000). Standing up from a chair as a dynamic equilibrium task: A comparison between young and elderly subjects. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences*, *55*, B425-431.
- Mourey, F., Pozzo, T., Rouhier-Marcer, I., & Didier, J. P. (1998). A kinematic comparison between elderly and young subjects standing up from and sitting down in a chair. *Age Ageing*, *27*, 137-146.
- Nevitt, M. C., Cummings, S. R., Kidd, S., & Black, D. (1989). Risk factors for recurrent nonsyncopal falls. A prospective study. *Journal of the American Medical Association*, *261*, 2663-2668.
- Pai, Y. C., Naughton, B. J., Chang, R. W., & Rogers, M. W. (1994). Control of body centre of mass momentum during sit-to-stand among young and elderly adults. *Gait and Posture*, *2*, 109-116.
- Papa, E., & Cappozzo, A. (2000). Sit-to-stand motor strategies investigated in able-bodied young and elderly subjects. *Journal of Biomechanics*, *33*, 1113-1122.
- Schenkman, M., Berger, R. A., Riley, P. O., Mann, R. W., & Hodge, W. A. (1990). Whole-body movements during rising to standing from sitting. *Physical Therapy*, *70*, 638-648.

- Shepherd, R. B., & Koh, H. P. (1996). Some biomechanical consequences of varying foot placement in sit-to-stand in young women. *Scandinavian Journal of Rehabilitation Medicine*, 28, 79-88
- Tung, F. L., Yang, Y. R., Lee, C. C., & Wang, R. Y. (2010). Balance outcomes after additional sit-to-stand training in subjects with stroke: A randomized controlled trial. *Clinical Rehabilitation*, 24, 533-542.
- Vander Linden, D. W., Brunt, D., & McCulloch, M. U. (1994). Variant and invariant characteristics of the sit-to-stand task in healthy elderly adults. *Archives of Physical Medicine and Rehabilitation*, 75, 653-660.
- Winter, D. A. (2005). *Biomechanics and motor control of human movement* (3rd ed.). Hoboken, NJ: John Wiley & Sons.
- Yoshioka, S., Nagano, A., Hay, D. C., & Fukashiro, S. (2009). Biomechanical analysis of the relation between movement time and joint moment development during a sit-to-stand task. *BioMedical Engineering OnLine*, 8, 27.

## Kinematic Analysis of Sit-to-Stand Among Elderly Adults

Yi-Chuen Tsai<sup>a</sup>, Tsai-Sui Lu<sup>a</sup>, Wan-Meng Lee<sup>a</sup>, Jyh-Jong Chang<sup>b</sup>,  
Yu-Sheng Yang<sup>b,\*</sup>

### Abstract

*Sit-to-stand (STS) movement is the most common activity of daily living. It also is related to the foundation of mobility and stability. Successful transitional movement from a sitting position to the upright posture is related to the motion of the center of mass (COM) fell within the area of base of support (BOS). However, the elderly due to aging process may appear different strategies of the STS movement in comparison with young people. Therefore, the purpose of this study was to analyze the differences of COM movement between the elder and young people during STS, and compare the relationship between the COM-BOS separation distance and head-knee separation distance. Twenty-six healthy old people and twenty-six healthy young people participated in this study. Subjects were asked to perform a STS movement for three times. Researchers recorded the kinematic variables from the reflective markers attached on the subject's body and a six infra-red camera motion analysis system was used to record kinematic data synchronically. The results indicated that during the beginning of STS, elderly people forward flexed their trunk to bring their COM within the region of BOS with less balance disturbance prior to seat off. With this trunk forward movement, elderly people gained this additional forward momentum to compensate the knee extension moment to initiate a standing. This stability strategy had significant correlation with the head-knee separation distance. Clinical therapists could use this relationship as a guideline to teach the elderly people who might have difficulty performing STS, and prevent fall accidents effectively.*

**Keywords:** *Sit-to-stand, Balance, Center of mass*

<sup>a</sup>Department of Rehabilitation Medicine, Kaohsiung Medical University Chung-Ho Memorial Hospital

<sup>b</sup>Department of Occupational Therapy, College of Health Sciences, Kaohsiung Medical University

Received: 8 March 2013

Accepted: 6 May 2013

\*Correspondence: Yu-Sheng Yang

Department of Occupational Therapy,  
College of Health Sciences, Kaohsiung Medical  
University, 100 Shieh-Chuan 1st Road,  
Kaohsiung city 807, Taiwan.

Tel.: 07-3121101 ext. 2657.

E-mail: yusheng@kmu.edu.tw

# 腿前式踝足矯具在中風患者站立平衡之效應

OCCUPATIONAL THERAPY

張心怡<sup>1,2</sup> 羅世忠<sup>3,4</sup> 鄧雅凌<sup>3,4</sup> 邱敏綺<sup>3,4</sup> 陳瓊玲<sup>3,4,\*</sup>

## 摘要

本研究目的為檢視腿前式踝足矯具 (anterior ankle-foot orthosis, AAFO) 在中風患者站立之靜態及動態平衡的效果，以平衡儀 (Balance Master) 的感覺組合測驗 (Sensory Organization Test) 及穩定限度測驗 (Limit of Stability Test) 作為研究工具，使用壓力中心數據計算靜態站立穩定度、對稱性、重心轉移最大移動範圍及重心轉移後最大患側承重比率。本研究採重複量測之實驗設計，共24位中風患者參與研究，評量穿戴及不穿戴AAFO在感覺組合及穩定限度測驗之表現，使用配對t檢定比較有無穿戴AAFO在上述測驗之差異情形。結果顯示中風患者穿戴AAFO在穩定限度測驗中，身體重心轉移至患側斜前方 ( $p < .001$ ) 及患側 ( $p = .002$ ) 之最大移動範圍顯著增加。此外，中風患者穿戴AAFO重心轉移至患側 ( $p = .003$ ) 及患側斜後方 ( $p < .001$ ) 後之最大患側承重比率顯著增加。但中風患者穿戴AAFO於感覺組合測驗評量之站立穩定度及站立對稱性無顯著差異 ( $p > .01$ )。本研究發現中風患者穿戴腿前式踝足矯具能夠改善重心轉移至患側時之患側方向穩定限度範圍與承重。因此，建議中風患者可穿戴AAFO來執行重心轉移之活動以增進其動態平衡表現。

**關鍵字：**腿前式踝足矯具，靜態平衡，感覺組合測驗，動態平衡，穩定限度

中山醫學大學醫學檢驗暨生物技術學系  
碩士班<sup>1</sup>  
衛生福利部旗山醫院復健科職能治療<sup>2</sup>  
中山醫學大學職能治療學系<sup>3</sup>  
中山醫學大學附設醫院職能治療室<sup>4</sup>

受文日期：民國 102 年 6 月 26 日  
接受刊載：民國 102 年 9 月 16 日

\*通訊作者：陳瓊玲  
台中市南區建國北路一段110號  
中山醫學大學職能治療學系暨  
中山醫學大學附設醫院職能治療室  
電話：04-24730022分機12400  
電子信箱：joelin@csmu.edu.tw

## 前言

中風常造成平衡能力損傷進而影響許多層面，像是維持坐姿、伸手取物、操弄物體、功能性活動及行走，以致日常生活受限，進而影響社會參與 (Hamzat & Kobiri, 2008; Sivan & Bhakta, 2008)，導致生活品質降低。靜態平衡是身體靜止狀態下維持姿勢穩定的能力，通常評量在不同情境下維持直立姿勢的能力，如閉眼、支持面 (base of support) 改變、預期或不預期干擾下維持直立的能力。動態平衡是在身體動作下保持姿勢穩定的能力，包含重心轉移，通常評量在自主動作時或在動作過程中給予外在干擾其維持平衡的能力 (Winter, Patla, & Frank, 1990)。有關中風患者靜態及動態平衡能力的改變，包括中風患者比同年齡健康成人在靜態站立時，晃動程度較大 (Peurala, Könönen, Pitkänen, Sivenius, & Tarkka, 2007)、壓力中心 (center of pressure, COP) 總移動軌跡長度較長及振幅較大 (Corriveau, Hebert, Raiche, & Prince, 2004)。站立下執行重心轉移時，患側下肢承重比率皆比健側下肢少，導致不對稱承重 (Eng & Chu, 2002; Goldie, Matyas, Evans, Galea, & Bach, 1996)。往患側與後側之重心轉移壓力中心位移量明顯減少，整體的穩定限度範圍也減少 (Turnbull, Charteris, & Wall, 1996)。

文獻中，有關踝足矯具對中風患者之靜態及動態平衡效應的研究，多以腿後式踝足矯具為主 (Mojica et al., 1988; Simons, van Asseldonk, van der Kooij, Geurts, & Buurke, 2009; Wang et al., 2005)。在台灣，職能治療師常製作腿前式踝足矯具 (anterior ankle-foot orthosis, AAFO) 讓中風患者穿戴以增進或改善平衡及移動能力。過去文獻檢視中風患者穿戴AAFO是否改善靜態及動態平衡能力效果的研究，包括Chen、Yeung、Wang、Chu 與Yeh (1999) 使用Computer Posturo Graphy Program (Computer Dyno Graphy system, Infotronic, Netherlands) 評估AAFO在靜態平衡 (身體搖晃程度) 和動態平衡 (前後、左右重心轉移) 的效果，結果呈現腿前式踝足矯具沒有顯著改善姿勢晃動程度、站立對稱性以及前後方向最大距離，而在側邊重心轉移及患側承重有顯著改善。Chen等人 (2008) 使用平衡儀 (Balance Master, NeuroCom International Inc., Clackamas, OR, USA) 之感覺組合測驗 (Sensory Organization Test) 檢視靜態平衡能力的效果，結果顯示在6個感覺情境下 (情境

一：正確的視覺及本體覺輸入。情境二：缺乏視覺輸入及正確的本體覺輸入。情境三：錯誤的視覺輸入及正確的本體覺輸入。情境四：正確的視覺輸入及錯誤的本體覺輸入。情境五：缺乏視覺輸入及錯誤的本體覺輸入。情境六：錯誤的視覺及本體覺輸入），穿戴AAFO在相對挑戰的情境（情境三、情境四及情境五）下有較顯著的改善姿勢穩定度。然而對於沒有感覺衝突的情境（情境一及情境二）以及最困難的情況（情境六）下效果並不明顯。在此篇使用平衡儀的研究中僅探討靜態平衡，未檢驗AAFO對中風患者重心轉移之效應。總結來說，腿前式踝足矯具在靜態平衡之效果有不一致的情況，動態平衡的效應研究結果呈現AAFO能改善側邊重心轉移，但AAFO對於中風患者往患側多方向重心轉移（包括患側斜前方及患側斜後方）之效應的研究仍然不足。

過去研究探討穿戴與不穿戴踝足矯具在靜態及動態平衡能力差異時，研究設備多使用力板 (force plate) 收集中風患者的壓力中心來評量平衡能力。然而，Chaudhry、Bukiet、Ji 與 Findley (2011) 研究指出力板僅能評量睜眼及閉眼等正常視覺輸入及視覺遮蔽之靜態站立平衡，但於日常生活中所遭遇挑戰平衡能力的情境，包括突然的上下斜坡、階梯、地面平滑度的改變或衝突的視覺刺激如在擁擠的購物商場及移動的公車中。平衡儀的感覺組合測驗考量這些狀況，提供不同的感覺情境，所以平衡儀相較於只用力板更能評估與日常生活相關的平衡能力。爰此，本研究採用平衡儀來評量靜態及動態平衡能力。過去使用平衡儀作為研究工具之文獻皆採用該平衡儀之軟體計算的參數：平衡分數 (equilibrium score) 代表穩定度，其僅以兩個極端值估計晃動角度計算平衡分數。本研究更精確的將平衡儀之力板測量的每一點COP數值納入計算，以晃動途徑 (sway path) 與晃動指數 (sway index) 作為研究參數，探討穿戴AAFO在中風患者之靜態及動態平衡的效果。

## 方法

### 一、 研究對象

本研究以中風患者作為研究對象，研究內容通過中山醫學大學附設醫院人體試驗委員會審核。研究對象從中山醫學大學附設醫院大慶院區及中興院區復健科職能治療室徵召，經由臨床職能治療師轉介合適之中風患者，選案標準如下：(一) 能遵從簡單口語指令的單側中風偏癱患者；(二) 不穿戴AAFO時能獨自站立並能執行前後左右重心轉移。

本研究對象之排除標準為中風患者具有以下問題則不納入：(一) 臨床重要視覺缺陷，(二) 單側忽略，(三) 威氏型失語症 (Wernick's aphasia)，(四) 全面型失語症 (global aphasia)，(五) 推者症候群 (pusher syndrome) 及 (六) 其他影響平衡能力之系統性或局部問題，如帕金森氏症，曾有下肢骨科病史等。

### 二、 研究工具

本研究使用SMART平衡儀及 8.2 版軟體 (NeuroCom International, Clackamas, OR) 作為評估工具，此平衡儀包含一個可搖動的支持平面 (力板) 及視覺屏幕，預防跌倒的安全吊帶及可提供視覺回饋的電腦螢幕。研究指出此評估工具具備良好的信效度 (Liston & Brouwer, 1996; Newstead, Hinman, & Tomberlin, 2005)。在本研究中，採用其中的2種測驗，詳述如下：

#### (一) 感覺組合測驗

此測驗包含6個情境分別為：1. 睜眼、支持平面固定；2. 閉眼、支持平面固定；3. 視覺屏幕搖動、支持平面固定；4. 睜眼、支持平面搖動；5. 閉眼、支持平面搖動及6. 視覺屏幕搖動、支持平面搖動。支持平面及視覺屏幕的固定與搖動是預先設定，當設定為搖動時，其搖動方向與大小是參考中風患者本身前後搖動的方向及大小 (sway-referenced)，亦即當身體搖動時若是支持面跟著搖動，則會保持踝關節90度而提供錯誤的本體感覺輸入；身體搖動時若是視覺屏幕跟著搖動，



則會保持眼睛與屏幕固定距離而提供錯誤的視覺輸入。6個測試的感覺情境中前庭覺輸入皆不予控制，即正確的前庭覺輸入，隨著張眼、閉眼、視覺屏幕及支持平面的固定與搖動而提供正確的、移除的與錯誤的視覺輸入及正確的與錯誤的本體覺輸入。此測驗測試6個情境，每個情境施測3次，每次試驗持續20秒。每個情境測驗之前，僅告知眼睛開或閉、支持平面及視覺屏幕搖動與否，中風患者只需要盡可能保持站直，此測驗共費時10-15分鐘。

## (二) 穩定限度測驗

此測驗評估動態平衡能力，測驗包含八個方向：前、左斜前、左、左斜後、後、右斜後、右、右斜前之最大距離，每一個方向試驗時間為8秒鐘。考量本研究對象為偏癱之中風患者，往健側方向（包括健側斜前方及健側斜後方）重心轉移相較於患側方向（包括患側斜前方及患側斜後方）重心轉移較為簡單，且患側腳有無穿戴AAFO應不影響往健側方向重心轉移，故本研究僅採用三個方向比較，分別為中風患者的患側斜前方、患側及患側斜後方。每一方向在正式蒐集實驗數據之前會讓受試者練習一次，讓受試者了解如何移動後再正式進行施測。考量受試者疲勞問題，各方向僅施測一次，此測驗共費時5-10分鐘。

## 三、 研究流程

在實驗進行前，研究者先向符合篩選條件之受試者說明研究目的及所有研究流程，使受試者能理解整個實驗，取得受試者同意參與並簽署同意書。透過訪談收集中風患者基本資料，如性別、年齡、中風種類、中風位置、中風時間、使用腿前式踝足矯具時間，並以改良式艾許沃斯氏量表 (Modified Ashworth Scale) 評量內翻或蹠屈肌肉痙攣程度。本身已擁有其治療師製作之AAFO之受試者使用該AAFO進行測驗，若受試者本身沒有穿戴AAFO則新製一個，由該受試者之臨床治療師製作。

受試者需完成感覺組合測驗及穩定限度測驗，在測驗過程中受試者需眼看前方，雙腳與肩同寬站在支持平面上，雙手自然垂放於身體兩側。所有受試者皆穿

戴安全吊帶，在測驗中將有一人站在受試者後方以防跌倒。所有受試者穿戴、不穿戴腿前式踝足矯具的順序及測驗項目之量測順序是隨機分派 (random order)。兩項測驗（感覺組合測驗及穩定限度測驗）間隔依據患者狀態給予適度休息，測驗間隔休息約5分鐘到10分鐘，總測驗時間共花費約30分鐘。

#### 四、資料分析

感覺組合測驗中每個情境執行三次，取得下列各數據之平均值來分析，資料收集頻率為100Hz。本研究擷取出平衡儀之力板所收集有關於壓力中心的數據後再自行加以計算每一情境之試驗的晃動途徑及晃動指數代表靜態站立穩定度，晃動途徑為COP總移動軌跡長（如公式1），晃動指數為每點COP與平均COP距離的總合（如公式2），晃動途徑與晃動指數越小代表越穩定 (Chaudhry et al., 2011)。利用力板資料計算每一情境之試驗中患側腳平均之承重比率（如公式3）代表靜態站立對稱性，患側承重比率越接近0.5代表越對稱。

穩定限度測驗中各方向重心轉移僅測量一次，採用單次的資料進行分析，資料收集頻率為100Hz。擷取出平衡儀之力板所收集有關於壓力中心的數據後再自行加以計算每一個方向之最大COP移動範圍（如公式4）及最大患側承重比率（如公式3）。最大COP移動範圍代表重心轉移至該方向之最大移動範圍，數值越大重心轉移能力越好。患側承重比率為在試驗過程中重心轉移後最大患側承重比率，比率越大代表患側承重能力越好。

公式 1：

$$L_{\text{COP}} = \sum_{i=1}^n \sqrt{(\text{COP}_{x_i} - \text{COP}_{x_{i-1}})^2 + (\text{COP}_{y_i} - \text{COP}_{y_{i-1}})^2}$$

公式 2：

$$S = \sum_{i=1}^n \sqrt{(\text{COP}_{x_i} - \overline{\text{COP}}_x)^2 + (\text{COP}_{y_i} - \overline{\text{COP}}_y)^2}$$

公式 3：

$$W = \left( \frac{\text{affected side sensor}}{\text{affected side sensor} + \text{sound side sensor}} \right)$$

公式4：

患側方向—

$$M_{\text{affected}} = \text{Max}(\text{COP}_x) - \text{Min}(\text{COP}_x)$$

患側斜前方及患側斜後方—

$$M_{\text{affected-diagonal}} = \sqrt{(\text{Max}(\text{COP}_x) - \text{Min}(\text{COP}_x))^2 + (\text{Max}(\text{COP}_y) - \text{Min}(\text{COP}_y))^2}$$

註： $n = 2000$ ， $n$ 為20秒所蒐集之資料總數。

$L_{\text{cop}}$ ：COP總移動軌跡長（單位：cm）。

$\text{COP}_x$ ：壓力中心在左右方向（x軸）的位置。

$\text{COP}_y$ ：壓力中心在前後方向（y軸）的位置。

$S$ ：晃動指數。

$\overline{\text{COP}_x}$ ：壓力中心在左右方向（x軸）的平均值。

$\overline{\text{COP}_y}$ ：壓力中心在前後方向（y軸）的平均值。

$W$ ：偏癱者之患側承重比率。

$M_{\text{affected}}$ ：往患側重心轉移之最大COP移動範圍（單位：cm）。

$M_{\text{affected-diagonal}}$ ：往患側斜前方及患側斜後方重心轉移之最大COP移動範圍（單位：cm）。

## 五、統計分析

使用配對 $t$ 檢定檢驗有無穿戴腿前式踝足矯具在感覺組合及穩定限度測驗項目之差異情形。由於多次統計比較有無腿前式踝足矯具之差異情形，故設顯著水準 $\alpha = .01$ ， $p \leq .01$ 為可接受最小統計顯著性。以統計軟體SPSS第16版進行分析。分析時成對排除無法完成該測驗及離群值之受試者，感覺組合測驗流失人數1人，穩定限度測驗流失人數4人，原因皆為離群值。

## 結果

總共24位中風患者參與研究，其中13位男性，11位女性；右側偏癱13位（7男，6女）及左側偏癱11位（6男，5女）。平均年齡為57.1歲（標準差為12.07歲）；平均中風27.1個月（標準差31.4個月，範圍2-108個月）。受試者之中風類型為16位栓塞、7位出血以及1位栓塞合併出血。改良式艾許沃斯氏量表測量蹠屈/內翻痙攣程度，結果為0分（沒有痙攣）有11位，1分（輕微痙攣，在活動範圍末端角度只有一點阻力）有6位，1分（輕微痙攣，在活動範圍角度後1/2出現阻力）有3位，2分（明顯痙攣，整個活動過程皆有阻力）有4位，3分以上（嚴重痙攣）有0位。全部受試者本身已擁有治療師所製作之AAFO，其中17位常規使用（每日全天穿戴）AAFO，4位只在外出時使用AAFO，3位平日及外出皆不使用AAFO。

### 一、穿戴AAFO在靜態平衡之結果

感覺組合測驗從情境1到情境6挑戰性越來越高，本研究對象之晃動途徑及晃動指數之平均值從情境1到情境6越來越大，代表姿勢晃動 (postural sway) 隨著挑戰情境漸增，亦即靜態站立穩定度越差，此結果符合預期。圖1為一位代表性的受試者穿戴與不穿戴AAFO在感覺組合測驗實際移動軌跡的情形，由配對 $t$ 檢定結果顯示6種情境下穿戴AAFO相較不穿戴AAFO靜態站立穩定度皆未達顯著差異，詳見表1。

靜態站立對稱性方面，無論中風患者有無穿戴AAFO，6個情境的站立對稱性平均值差異不大。由描述性統計可以看出中風患者在穿戴AAFO患側腳承重比率增加，亦即站立對稱性有改善的趨勢，但由配對 $t$ 檢定結果顯示6種情境下中風患者穿戴AAFO相較不穿戴AAFO靜態站立對稱性未達顯著差異，詳見表2。

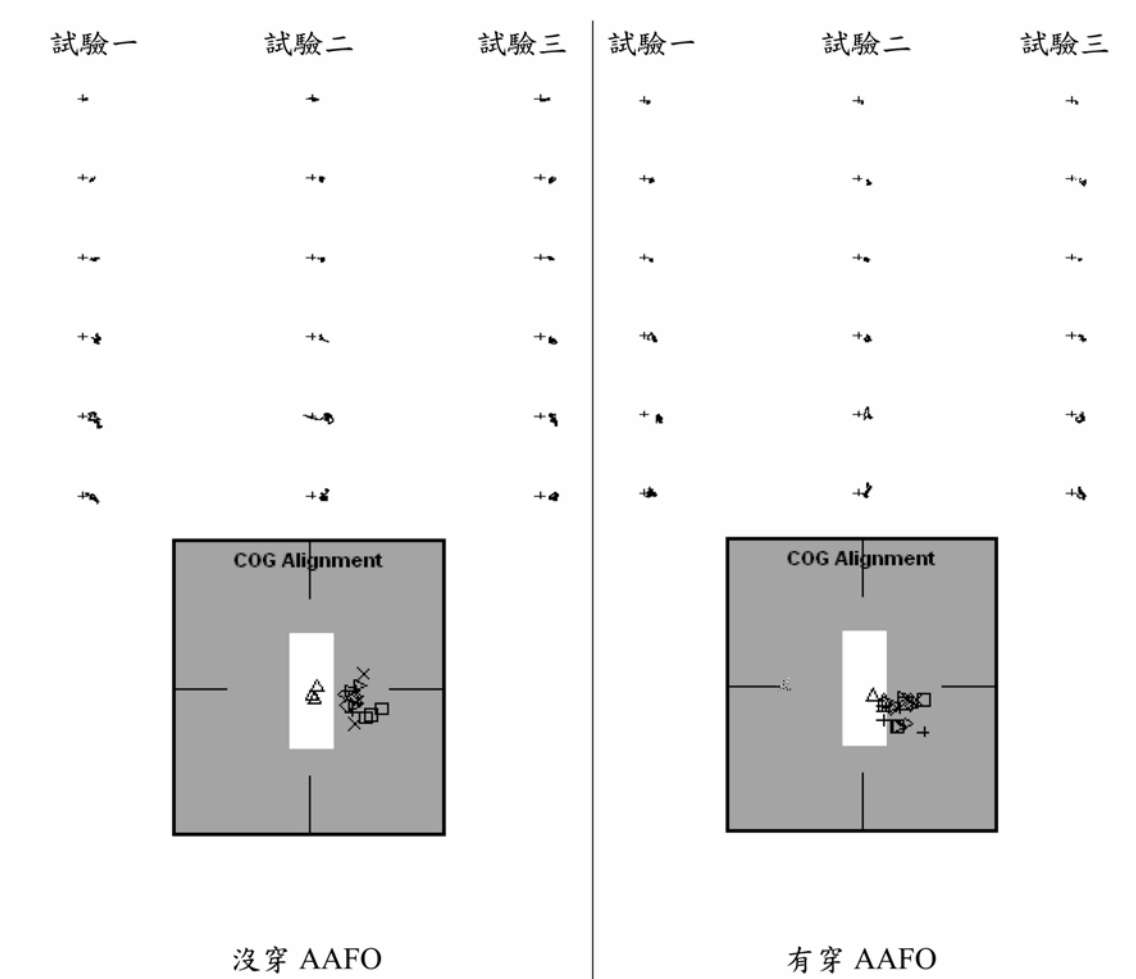


圖1  
一位左偏癱受試者於感覺組合測驗結果。

## 二、 穿戴AAFO在動態平衡之結果

圖2為一位代表性的受試者穿戴與不穿戴AAFO在穩定限度測驗實際移動情形，顯示中風患者穿戴AAFO能增加向患側斜前方及患側方移動範圍。在穩定限度測驗中，中風患者穿戴AAFO時最大移動範圍平均值最大者為重心轉移至患側，其次為患側斜前方，患側斜後方最小，顯示中風患者穿戴AAFO往側邊方向重心轉移比斜向容易。配對t檢定的結果顯示中風患者穿戴AAFO比不穿戴AAFO重心轉移至患側斜前方 ( $p < .001$ ) 及患側 ( $p = .002$ ) 之最大移動範圍顯著增加，詳見表3。

表1  
有無穿戴AAFO靜態站立穩定度比較

晃動途徑 (cm)	無AAFO平均數 (標準差)	穿AAFO平均數 (標準差)	p值
情境一	103.7 (32.2)	102.1 (38.7)	.84
情境二	114.7 (29.7)	112.2 (38.9)	.76
情境三	121.4 (29.8)	125.0 (40.9)	.64
情境四	141.5 (43.9)	136.2 (42.4)	.59
情境五	153.1 (64.3)	154.6 (64.8)	.89
情境六	162.8 (68.2)	156.4 (64.4)	.55
晃動指數	無AAFO平均數 (標準差)	穿AAFO平均數 (標準差)	p值
情境一	0.6 (0.3)	0.6 (0.4)	.45
情境二	0.8 (0.4)	0.8 (0.4)	.11
情境三	1.0 (0.7)	0.9 (0.5)	.33
情境四	1.4 (0.7)	1.4 (0.7)	.88
情境五	2.5 (0.8)	2.4 (0.8)	.28
情境六	2.5 (0.8)	2.5 (0.9)	.60

註：AAFO, anterior foot-ankle orthosis.

表2  
有無穿戴AAFO靜態站立對稱性比較

患側承重比率	無AAFO平均數 (標準差)	穿AAFO平均數 (標準差)	p值
情境一	0.4 (0.1)	0.4(0.1)	.18
情境二	0.4 (0.1)	0.4(0.1)	.32
*情境三	0.4 (0.1)	0.4(0.1)	.25
*情境四	0.4 (0.1)	0.4(0.1)	.11
情境五	0.4 (0.2)	0.4(0.1)	.37
情境六	0.4 (0.1)	0.4(0.1)	.55

註：AAFO, anterior foot-ankle orthosis.

\*情境三實際分析人數22人，情境四實際分析人數21人，流失原因為離群值。

患側承重比率方面，中風患者穿戴AAFO往三個方向之患側最大承重比率差異不大。配對t檢定結果顯示中風患者穿戴AAFO重心轉移後，往患側 ( $p = .003$ ) 及患側斜後方 ( $p < .001$ ) 之最大患側承重比率顯著增加，詳見表4。

表3  
有無穿戴AAFO最大重心轉移移動範圍比較

最大COP移動範圍 (cm)	無AAFO平均數 (標準差)	穿AAFO平均數 (標準差)	p值
患側斜前方	8.6 (2.5)	9.6 (2.4)	< .001
患側	8.9 (2.4)	10.3 (1.9)	.002
患側斜後方	9.0 (2.5)	7.8 (2.0)	.06

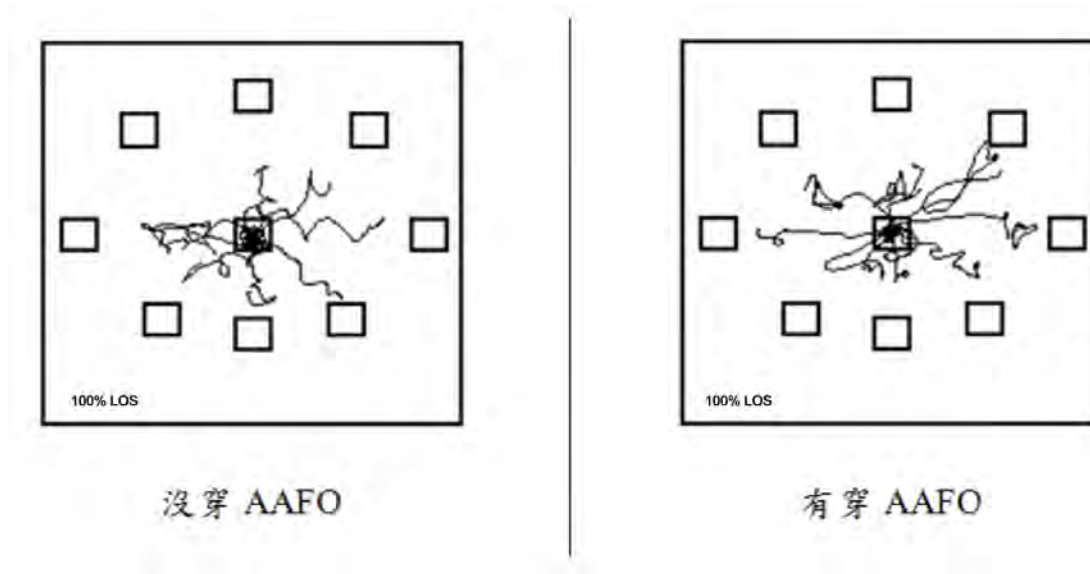


圖2  
一位左偏癱受試者於穩定限度測驗結果。

表4  
有無穿戴AAFO重心轉移後最大患側承重比率比較

患側承重	無AAFO平均數(標準差)	穿AAFO平均數(標準差)	p值
患側斜前方	0.6 (0.2)	0.6 (0.2)	.78
患側	0.6 (0.2)	0.6 (0.3)	.003*
患側斜後方	0.5 (0.1)	0.6 (0.2)	<.001*

## 討論

本研究以Matlab軟體(7.6.0版本)自行利用COP數據計算，計算的參數(靜態站立穩定度)比平衡儀軟體計算出的參數(平衡分數)更為精確。因本研究計算的晃動途徑與晃動指數都是將每一點COP數值納入計算，而以平衡儀軟體算出之平衡分數僅以兩個極端值估計晃動角度計算平衡分數。其公式為： $ES = 100 \times \{12.5 - [\theta_{\max}(\text{ant}) - \theta_{\max}(\text{post})]\} / 12.5$ ，其中， $\theta_{\max}(\text{ant})$ 是最大向前晃動角度(sway angle)， $\theta_{\max}(\text{post})$ 是最大向後晃動角度，12.5是正常個案在矢狀面之晃動極限(limit of sway)角度(Balance Master, 2001, PO-5, Appendix, 6)。此外，本研究

並擷取出平衡儀之力板所收集有關於壓力中心的數據後再自行加以計算平衡儀軟體未計算的參數（靜態站立對稱性、重心轉移後患側下肢承重比率）提供更多不同層面的訊息。

## 一、 穿戴腿前式踝足矯具對靜態平衡能力之影響

本研究結果顯示中風患者穿戴AAFO比不穿戴AAFO在靜態站立穩定度及站立對稱性皆有改善趨勢，但未達顯著差異。本研究結果與Chen 等人 (1999) 的研究結果一致：中風患者穿戴腿前式踝足矯具沒有顯著改善姿勢晃動程度（靜態站立穩定度），僅呈現改善的趨勢。Chen 等人 (2008) 研究結果為中風患者穿戴AAFO在情境3、4、5等較挑戰的情境下明顯改善站立穩定度，但於沒有感覺衝突情境（情境1及2）及最具挑戰的情境6無顯著效果。其研究結果與本研究結果不一致的情況可能是因受試者族群特性不同，在Chen等人 (2008) 的研究中受試者為新發急性的中風患者，由於急性中風患者動作模式尚未建立一個習慣模式 (shallow-well attractors)，穿戴AAFO較能夠顯著影響表現。然而本研究族群以慢性中風患者居多，慢性中風患者隨著時間會出現關節角度受限及肌肉攣縮 (Ryerson, 2001) 並且已建立一個偏好的動作模式 (deep-well attractors) (Kamm, Thelen, & Jensen, 1990)，呈現已有習慣的姿勢排列（不對稱站姿），所以即使慢性中風患者穿戴AAFO靜態站立時仍然不會自發性的轉移重心產生對稱站立。Wang等人 (2005) 研究短期中風患者穿戴腿後式踝足矯具，結果呈現睜眼和閉眼下站在海綿上身體晃動程度顯著改善，但這些效果在長期中風患者也未觀察到。所以我們推論AAFO對慢性中風患者在站立穩定與對稱性的靜態平衡上沒有顯著的效應。

## 二、 穿戴腿前式踝足矯具對動態平衡能力之影響

先前的研究不管是針對腿前式或腿後式踝足矯具皆顯示：中風患者穿戴踝足矯具後，前後重心轉移能力並沒有改善 (Chen et al., 1999 ; Wang et al., 2005 )，



所以本研究沒有探討腿前式踝足矯具對前、後方向重心轉移之效應。在穩定限度測驗中，本研究結果顯示中風患者穿戴AAFO重心轉移至患側之最大移動範圍達顯著增加。中風患者穿戴AAFO往患側重心轉移後患側最大承重比率有顯著增加。本研究結果與Chen等人(1999)的研究結果一致：中風患者穿戴AAFO之後移向患側之最大移動範圍及患側承重比率增加。研究指出中風患者在執行重心轉移時其穩定範圍較正常人小，且重心轉移的缺失為多方向的，包括前後及側向(Dettmann, Linder, & Sepic, 1987; Goldie, Evans, & Matyas, 1996)。Turnbull等人(1996)發現即使行走功能良好之偏癱者的重心轉移能力仍明顯受限及重心轉移範圍降低，若患側下肢能承受更多重量時，重心轉移的距離能夠增加。最大移動範圍受限包含實際生理距離受限（由於關節攣縮、無力、肌肉縮短或增加的肌肉張力）或察覺的距離受限（沒有經驗、怕或察覺困難），中風患者穿戴AAFO後增加的最大移動範圍可能是因為改善實際的（增加關節穩定度）及察覺的（增加安全感）限制(Wang et al., 2005)。

本研究之中風患者穿戴AAFO往患側斜後方之最大重心轉移範圍沒有顯著增加，其平均值卻有下降的趨勢，但患側承重反而顯著增加，推測中風患者在執行患側斜後方重心轉移時可能偏向往患側而非斜後方，偏差方向的重心轉移使得穿戴AAFO比不穿戴AAFO往患側斜後方之最大重心轉移範圍變小，而重心轉移後之患側最大承重比率顯著增加。

本研究的限制包括（一）因考量到受試者接受測驗所需的體力及時間問題，穩定限度測驗僅施測一次，可能造成實驗誤差。（二）穿戴及脫下AAFO即施測測驗，未給予受試者調適穿戴及脫下習慣AAFO的時間，或許會因剛穿戴或脫下不習慣而影響測驗表現。未來建議包括未來研究時（一）應在一周內分次進行測驗，每測驗施測三次，取平均值以降低誤差。（二）將考量受試者調適穿戴及脫下習慣AAFO的時間，待受試者習慣之後再施測測驗。

本研究結果顯示慢性中風患者穿戴AAFO能顯著改善患側最大重心轉移範圍及承重比率之動態平衡。另外也有改善站立穩定及對稱性之靜態平衡的趨勢，卻未達顯著的效果。故建議臨床治療師可提供AAFO給予慢性中風患者在執行動態平衡活動時穿戴，以增進功能性表現。

## 誌謝

本研究的完成要感謝所有參與研究的治療師及中風患者。

## 參考文獻

- Balance Master Operator's Manual. (2001). Clackamas, OR: NeuroCom International.
- Chaudhry, H., Bukiet, B., Ji, Z., & Findley, T. (2011). Measurement of balance in computer posturography: Comparison of methods -- A brief review. *Journal of Bodywork and Movement Therapies*, 15, 82-91.
- Chen, C. K., Hong, W. H., Chu, N. K., Lau, Y. C., Lew, H. L., & Tang, S. F. T. (2008). Effects of an anterior ankle-foot orthosis on postural stability in stroke patients with hemiplegia. *American Journal of Physical Medicine and Rehabilitation*, 87, 815-820.
- Chen, C. L., Yeung, K. T., Wang, C. H., Chu, H. T., & Yeh, C. Y. (1999). Anterior ankle-foot orthosis effects on postural stability in hemiplegic patients. *Archives of Physical Medicine and Rehabilitation*, 80, 1587-1592.
- Corriveau, H., Hebert, R., Raiche, M., & Prince. (2004). Evaluation of postural stability in the elderly with stroke. *Archives of Physical Medicine and Rehabilitation*, 85, 1095-1101.
- Dettmann, M. A., Linder, M. T., & Sepic, S. B. (1987). Relationships among walking performance, postural stability, and functional assessments of the hemiplegic patient. *American Journal of Physical Medicine*, 66, 77-90.
- Eng, J. J., & Chu, K. S. (2002). Reliability and comparison of weight-bearing ability during standing tasks for individuals with chronic stroke. *Archives of Physical Medicine and Rehabilitation*, 83, 1138-1144.
- Goldie, P. A., Evans, O., & Matyas, T. (1996). Performance in the stability limits test during rehabilitation following stroke. *Gait and Posture*, 4, 315-322.

- Goldie, P. A., Matyas, T. A., Evans, O. M., Galea, M., & Bach, T. M. (1996). Maximum voluntary weight-bearing by the affected and unaffected legs in standing following stroke. *Clinical Biomechanics, 11*, 333-342.
- Hamzat, T. K., & Kobiri, A. (2008). Effects of walking with a cane on balance and social participation among community-dwelling post-stroke individuals. *European Journal of Physical and Rehabilitation Medicine, 44*, 121-126.
- Kamm, K., Thelen, E., & Jensen, J. L. (1990). A dynamical systems approach to motor development. *Physical Therapy, 70*, 763-775.
- Liston, R. A. L., & Brouwer, B. (1996). Reliability and validity of measures obtained from stroke patients using the Balance Master. *Archives of Physical Medicine and Rehabilitation, 77*, 425-430.
- Mojica, J. A. P., Nakamura, R., Kobayashi, T., Handa, T., Morohashi, I., & Watanabe, S. (1988). Effect of ankle-foot orthosis (AFO) on body sway and walking capacity of hemiparetic stroke patients. *Tohoku Journal of Experimental Medicine, 156*, 395-401.
- Newstead, A. H., Hinman, M. R., & Tomberlin, J. A. (2005). Reliability of the Berg Balance Scale and Balance Master Limits of Stability Tests for individuals with brain injury. *Journal of Neurological Physical Therapy, 29*, 18-23.
- Peurala, S. H., Könönen, P., Pitkänen, K., Sivenius, J., & Tarkka, I. M. (2007). Postural instability in patients with chronic stroke. *Restorative Neurology and Neuroscience, 25*, 101-108.
- Ryerson, S. D. (2001). Hemiplegia. In D. A. Umphred (Ed.), *Neurological rehabilitation* (4th ed., pp.750, 758-759). New York, NY: Mosby.
- Simons, C. D. M., van Asseldonk, E. H. F., van der Kooij, H., Geurts, A. C. H., & Buurke, J. H. (2009). Ankle-foot orthoses in stroke: Effects on functional balance, weight-bearing asymmetry and the contribution of each lower limb to balance control. *Clinical Biomechanics, 24*, 769-775.
- Sivan, M., & Bhakta, B. (2008). Restoring mobility theories, technologies and effective treatments. *Clinical Medicine, 8*, 596-600.

- Turnbull, G. I., Charteris, J., & Wall, J. C. (1996). Deficiencies in standing weight shifts by ambulant hemiplegic subjects. *Archives of Physical Medicine and Rehabilitation, 77*, 356-362.
- Wang, R. Y., Yen, L. L., Lee, C. C., Lin, P. Y., Wang, M. F., & Yang, Y. R. (2005). Effects of an ankle-foot orthosis on balance performance in patients with hemiparesis of different durations. *Clinical Rehabilitation, 19*, 37-44.
- Winter, D. A., Patla, A., & Frank, J. (1990). Assessment of balance control in humans. *Medical Progress through Technology, 16*, 31-51.

## Effects of Anterior Ankle-Foot Orthosis on Standing Balance of Stroke Patients

Hsin-Yi Chang<sup>a,b</sup>, Shu-Zon Lou<sup>c,d</sup>, Ya-Ling Teng<sup>c,d</sup>, Min-Chi, Chiu<sup>c,d</sup>,  
Chiung-Ling Chen<sup>c,d,\*</sup>

### Abstract

The objective of this study was to examine the effects of anterior ankle-foot orthosis (AAFO) on the static and dynamic balance of standing in stroke patients. Static and dynamic balance were measured by the Sensory Organization Test (SOT) and the Limit of Stability (LOS) test of the SMART Balance Master. Stance stability, stance symmetry, maximal weight-shifting distance and maximal affected side weight-bearing percentage were calculated from center of pressure (COP) measures. Twenty-four stroke subjects participated in a repeated measures study. The static and dynamic balance of the subjects were measured with and without an AAFO. Paired *t*-tests were used to determine the difference between balance performance with and without an AAFO. The results show that stance stability and stance symmetry measured by the SOT did not improve when the subjects wore an AAFO ( $p < .01$ ). There were significant increases in the maximal distance of weight shifting toward the affected-forward ( $p < .001$ ) and the affected side ( $p = .002$ ) during the LOS test. There were also significant increases in the maximal affected weight-bearing percentage after weight shifting toward the affected side ( $p = .003$ ) and the affected-backward side ( $p < .001$ ) during the LOS test. This study revealed that the stroke subjects wearing an AAFO could improve the maximal distance of the limit of stability and the percentage of weight bearing of the affected side during weight shifting toward the affected side. Therefore, we suggest stroke patients should wear an AAFO to improve dynamic balance performance during weight-shifting activities.

**Keywords:** Anterior ankle-foot orthosis, Static balance, Sensory organization test, Dynamic balance, Limit of stability

<sup>a</sup>School of Medical Laboratory and Biotechnology, Chung-Shan Medical University

<sup>b</sup>Room of Occupational Therapy, Department of Rehabilitation, Cishan Hospital

<sup>c</sup>School of Occupational Therapy, Chung-Shan Medical University

<sup>d</sup>Room of Occupational Therapy, Chung-Shan Medical University Hospital

\*Correspondence: Chiung-Ling Chen  
School of Occupational Therapy, Chung-Shan Medical University & Room of Occupational Therapy, Chung-Shan Medical University Hospital, 110 Jianguo N. Road, Sec. 1, Taichung city 40201, Taiwan.  
Tel.: 04-24730022 ext. 12400.  
E-mail address: joelin@csmu.edu.tw

## Serial Kinematic and Functional Assessments for Hand Motion Impairment: A Case Report with Hand Rehabilitation for a Comminuted Proximal Phalangeal Fracture

Hsiu-Yun Hsu<sup>a, b</sup>, Fong-Chin Su<sup>a</sup>, Haw-Yen Chiu<sup>c</sup>, Sheng-Che Lin<sup>c</sup>,  
Li-Chieh Kuo<sup>d,\*</sup>

### Abstract

*Kinematical representation of joint motion can objectively provide spatial and temporal assessment rather than static indication using conventional goniometric measurements. From clinical perspectives, serial kinematic assessments are reliable methods of quantifying treatment outcomes. Although this technique has already been adopted over a span of years, limited literatures and actual clinical practices regarding this conception can be found. In this study, serial functional evaluations based on kinematic analysis in this study were performed as an example to confirm the effectiveness of dynamic traction splint and hand rehabilitation for a comminuted phalangeal fracture. We reported a case with comminuted spiral proximal phalangeal fracture of the right middle finger, which was treated using a dynamic traction splint with an out-trigger and an elastic band to pull the K-wire for periosteotaxis based on Schenck's method in order to avoid bony shortening and instability. A designed rehabilitation protocol was applied to this case. Follow-up motor function assessments were measured using an electromagnetic tracking system and strength measurement tools. Serial assessments of maximal fingertip workspace and joint range of motion of the injured finger were improved after intervention. Angular kinematics of the finger showed evidence of joint motion smoothness. The sequential movement performance was also improved. Follow-up assessments of both grasp and pinch power showed satisfactory improvement. This method allows clinicians to determine impairments of injured sites or movement deficiencies using dynamically temporal and spatial kinematics, whether in real-time or off-line movement examinations. This work establishes a consulting room measurement system conveniently providing clinicians to objectively assess patients' conditions for each visit.*

**Keywords:** *Motion analysis, Kinematics, Dynamic traction splint, Phalangeal fracture*

<sup>a</sup>Department of Biomedical Engineering,  
National Cheng Kung University

<sup>b</sup>Department of Physical Medicine and  
Rehabilitation, National Cheng Kung  
University Hospital

<sup>c</sup>Section of Plastic Surgery, Department of  
Surgery, National Cheng Kung University

<sup>d</sup>Department of Occupational Therapy,  
National Cheng Kung University

\*Correspondence: Li-Chieh Kuo

Department of Occupational Therapy,  
Institute of Allied Health Sciences,  
National Cheng Kung University,  
1 University Road, Tainan city 701, Taiwan.  
Tel.: 06-2353535 ext. 5908.  
E-mail address: jkkuo@mail.ncku.edu.tw

## **1. Introduction**

The use of maximal workspace and joint kinematics to evaluate ranges of movement based on objective computer-aided motion analysis techniques could represent functional capacity of finger and thumb segment (Chiu, Lin, Su, Wang, & Hsu, 2000; Chiu & Su, 1996; Chiu, Su, & Wang, 1998; Chiu, Su, Wang, & Hsu, 1998; Su, Kuo, Chiu, & Chen-Sea, 2003). The kinematical representation can objectively provide spatial and temporal assessment rather than the static indication using conventional goniometric measurements. From a clinical perspective, serial kinematic assessments are a reliable method of quantifying results of treatment. In addition, some researchers recently suggested that using an electromagnetic tracking system, which could be performed in a consulting room, is a convenient method with clinical validity to assess the kinematic data of the surgical outcome (Kuo, Su, Tung, Lai, & Jou, 2009). Although the motion analysis technique has already been adopted over a span of more than ten years, literatures and actual clinical practices addressing the applications regarding this conception are limited.

Phalangeal bone fracture is a common human hand injury because the hand is a primary organ exposed to various environments (Freeland & Orbay, 2006). Fractures of the proximal phalanges are especially difficult to treat due to the complex anatomical system of dynamic and static structures, including joint and muscle-tendon unit (Moran, 1989). Preservation of the proximal interphalangeal (PIP) joint motion is the most notable problem in the management of proximal phalangeal fracture (Hunter, 1990). Therefore, clinicians continue to establish new and effective techniques to treat this fracture for the better restoration of hand function. A dynamic traction device has recently developed and has obtained optimal functional results in intra-articular fracture cases (Dennys, Hurst, & Cox, 1992; Kadelbach, 2006; Morgan, Gordon, Klug, Perry, & Barre, 1995; Schenck, 1994). Many hand surgeons and therapists have made efforts in assuring bony healing and functional recovery based on this dynamic traction protocol. Schenck (1994) originally reported the dynamic skeletal traction splint, consisting of a

thermoplastic splint-base and an attached hoop. This splint uses the combing principle of ligamentotaxis and early motion. The concept of ligamentotaxis, using a continuous distraction force to make the fracture fragments closer, help maintain bone length and keep exact digital alignment. In addition, the concept of early motion, encouraging active range of motion for the injured finger, help reduce adhesion and promote tendon excursion (Saunders, 1989). Indeed, the patients with comminuted intra-articular fracture who received treatment with dynamic traction splint have been proved to have less restriction in joint motion and good bony structure (Morgan et al., 1995; Schenck, 1994).

The use of objective measures for patients with hand injury is important for the clinicians to understand the impairment of the hands. To display the hand performance comprehensively, electromagnetic tracking systems objectively provide both spatial and temporal assessment rather than the only static representations of joint condition via the conventional goniometric measurements (Kuo et al., 2009). Through the position data collected from the electromagnetic sensors with time and the differentiation procedures, fingertip trajectory, sequencing order and timing of segments, angular velocity and acceleration could be acquired. Consequently, the purpose of this study was to develop a convenient kinematic method to understand the motion properties of a fracture finger. In addition, the changes in kinematics and functional components of the hand would be investigated after rehabilitation treatment. This report describes a case with comminuted spiral proximal phalangeal fracture, who was treated with closed reduction treatments followed by the application of a dynamic traction splint and a course of rehabilitation program for 14 weeks, as an example to illustrate the strength of using new outcome presentations based on dynamic perspectives in describing the case's recovery.



## **2. Methods**

### **2.1. *Participants***

A thirty-nine year old patient was involved in a violent fight. Afterward the patient was unable to make a fist with the right hand after injury. Clinical examinations in the emergency room found painful motion and swelling of the right middle finger. A Roentgenogram examination showed a comminuted proximal phalangeal fracture of the right middle finger (Figure 1A). The patient received a closed reduction with a transverse Kirschner-wire inserted into the middle phalangeal bone in the operation room, due to the tendency of bony shortening and instability. The patient was afterwards referred to the rehabilitation clinic for a traction splint fabrication and a succession hand rehabilitation program.

### **2.2. *Splint fabrication and rehabilitation protocol***

The authors constructed a modified dynamic traction splint with a semi-circle out-trigger set up on a thermoplastic-based static splint, keeping the wrist and metacarpophalangeal (MP) joints in 30° extension and 80° flexion, respectively, to prevent collateral ligament contracture of the MP joint. An elastic band with a 350 gm force was placed on a designed splint hook to pull the transverse K-wire inserted into the middle phalangeal bone for periosteotaxis based on Schenck's method (Figure 2) (Schenck, 1994).

Our hand rehabilitation programs for this case (Appendix 1) was modified from Morgan's hand therapy protocol (Morgan et al., 1995) and initiated a pain-free passive range of motion for adjacent joints for eight times per day on the first day. The subject was instructed to move the PIP joint actively within limited ranges on day two to five. The patient during this phase was encouraged to elevate the injured hand and arm frequently to reduce edema occurrences. A second Roentgenogram examination (Figure 1B) rechecked bone healing after six weeks. Once there was sufficient callus formation between the bone fragments, the hand surgeon removed the dynamic traction splint and

substituted a static extension splint for wearing at night to prevent flexion contracture development. In the daytime, no protective splint was applied for the appropriate fragment healing and the patient was encouraged to perform aggressive hand therapy beginning from the seventh week after injury. The primary goal during this phase is to increase PIP joint passive range of motion, to enhance tendon gliding to prevent adhesion, and to encourage daily light activities by stretch, massage and functional training. This treatment also performed extensor tendon gliding exercise at the PIP joint by blocking the MP joint in flexion position to prevent PIP joint extension lag. The treatment emphasized muscle power strengthening and work hardening during the chronic phase between the ninth and fourteenth week. To facilitate the optimum use of the affected hand, home programs were also suggested for the client in addition to the regular treatment programs in hospital setting. The prescribed home exercises during weeks 7 and 8 consisted of the passive finger flexion and extension. At the end of 8<sup>th</sup> week, the patient was permitted to execute light resistive activities with the affected hand at home.

### **2.3. Assessments**

We informed the patient of the study aim and procedures and then asked him to sign a consent form approved by the Institutional Reviewed Board prior to his participation. Initial assessment was performed at 14 weeks after injury when this patient was referred to rehabilitation clinic. The follow-up assessments were scheduled at 18 and 22 weeks after injury. A miniBird<sup>TM</sup> electromagnetic tracking system (Ascension Technology Corporation, Burlington, VT, USA) incorporated with the MotionMonitor<sup>TM</sup> Version 6 (Innovative Sports Training, Inc, Chicago, IL, USA) was used to evaluate joint kinematics (Figure 2A). The tracking system consists of an electronic unit, a transmitter, and sensors. Four sensors with size of 8 mm \*8 mm \*12 mm were attached to the dorsal aspect of the distal phalanx, the middle phalanx, the proximal phalanx, and the metacarpal bone of the injured and the corresponding finger of the intact hand with adhesive tape (Figure 3B).

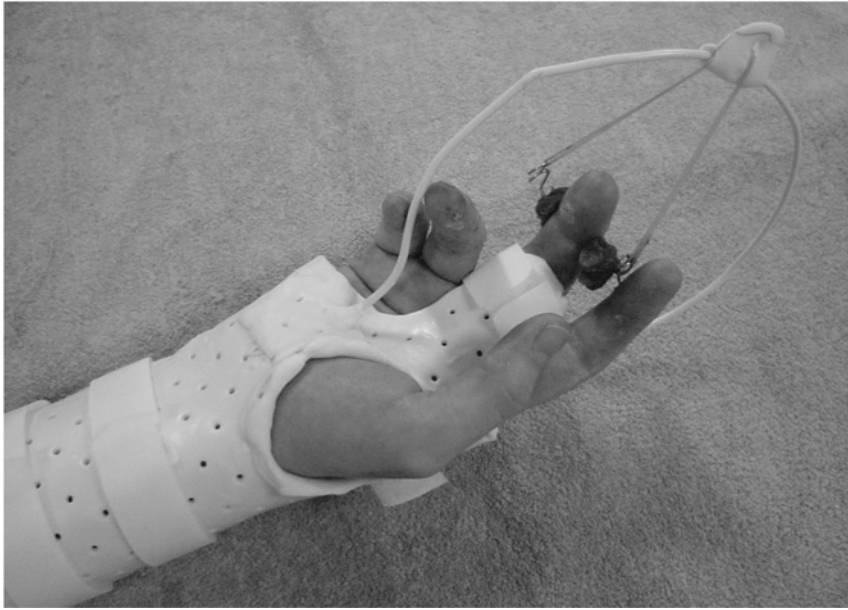


**Figure 1**

(A) Radiograph showing comminuted fracture of the proximal phalanx shaft of the right middle finger before treatment; (B) six weeks with a dynamic traction splint; and (C) 14 weeks postoperative results showing bone union following management with dynamic traction splint and hand therapy applications.

The patient was asked to actively perform five sequential postures (similar to a tendon gliding exercise) combining maximum flexion and extension movements of the MP, PIP, and distal interphalangeal (DIP) joints described by Chiu (1995) to obtain maximal fingertip workspace for maximal movement capacity of each joint. Both the injured and intact middle finger movements were recorded. Each motion data collection persisted for eighty seconds at 100 Hz sampling rates.

The strength of grasp, palmar pinch and three jaw chuck of the subject were assessed as measures of functional performance of the hand using an adjustable dynamometer and pinch meter (Jamar Hand Evaluation Kit, Sammons Preston Inc., Bolingbrook, IL, USA).

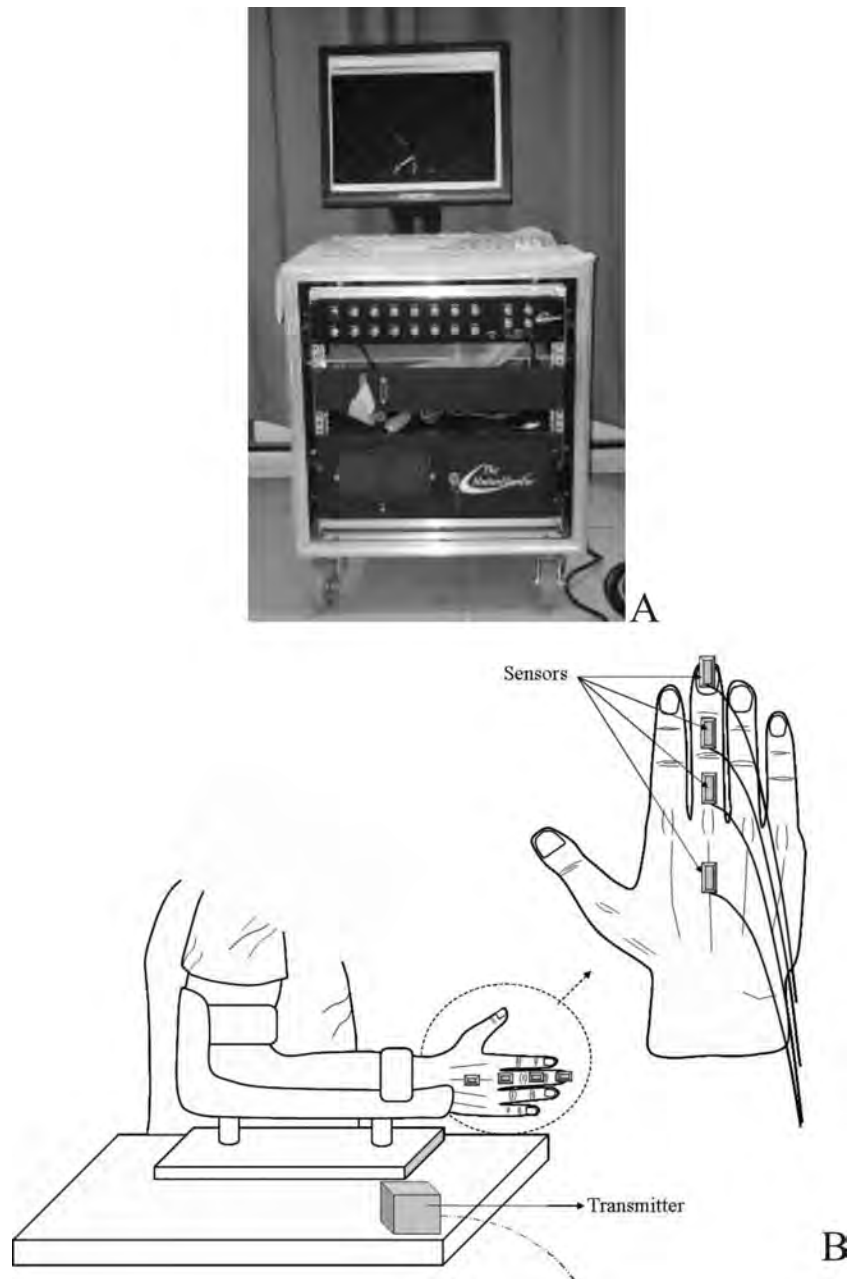


**Figure 2**

Photograph shows the application of a dynamic traction splint on the case's injured finger and hand.

#### ***2.4. Data analysis***

Custom-made MATLAB (R2007b, MathWorks Ltd., Natick, MA, USA) programs were used to compute maximal workspace of the injured and intact fingers and to calculate the kinematical relationship between two sensors. Joint kinematics, such as joint angle as well as angular acceleration, which indicated joint flexibility and movement smoothness were calculated using the MotionMonitor™ Version 6 and MATLAB programs. The following outcome parameters were obtained from five repetitions of finger movements; in addition, the average value of each parameter throughout the five trials was used for analyses.



**Figure 3**

(A) The electromagnetic apparatus for assessing segmental movements in our clinic; (B) Schematic display of the experimental setup.

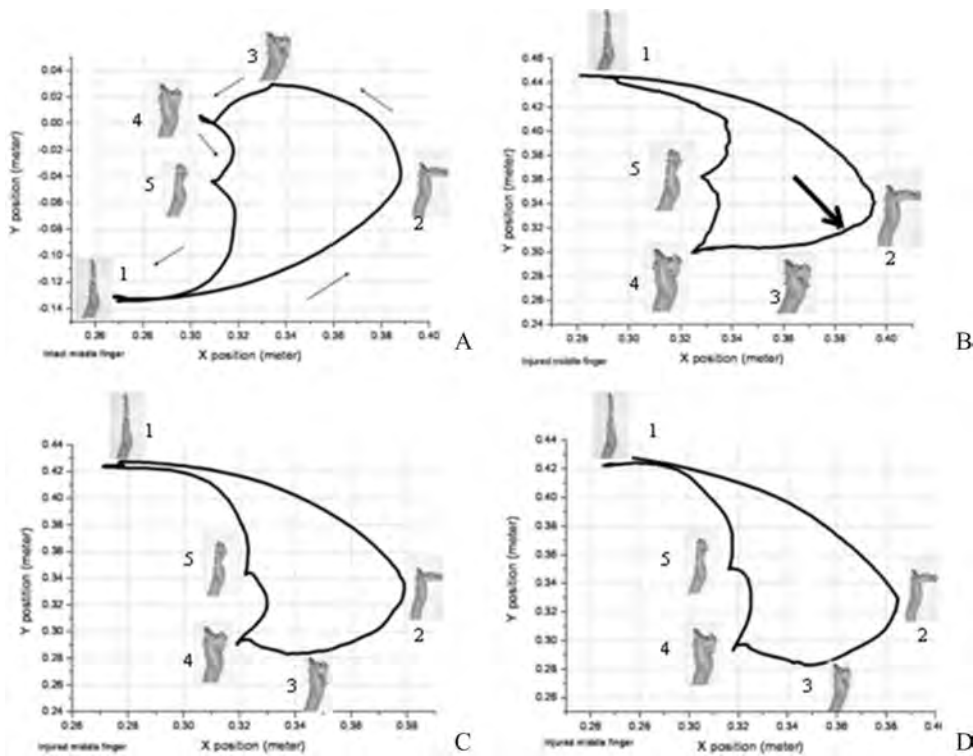
*2.4.1. Maximal workspace.* The maximal fingertip workspace was obtained by calculating the closed region formed by the fingertip trajectory. It determined the ROM created by extreme movements of the finger joints that combined maximal flexion and extension movements of the MP, PIP, and DIP joints with sequential finger movements (Figure 4).

*2.4.2. Dynamic goniometry.* The relative 3D position of the phalanx with time series was recorded to estimate the extent of joint flexibility impairment.

*2.4.3. Angular acceleration.* The angular acceleration was derived from a second differentiation of the angular goniometry while performing the above-mentioned “dynamic movement”. The parameter could be referred to velocity change during the finger movements. Amplitude and numbers of zero-crossing (an acceleration-deceleration transition) of the angular acceleration are used as the indexes of movement smoothness in this report. For the adhesion between bone callus and tendons was commonly seen after a phalangeal fracture; therefore, it is difficult to restore smooth motion in hand. That is, the subjects should do much effort to conquer to restrictive adhesion to move finger joints. The higher zero-crossing numbers and amplitude of angular acceleration indicate the increment of muscle force to overcome restrictive adhesion when the subject performed serial joints motion.

### **3. Results**

Figure 4 demonstrates the normal maximal fingertip workspace in the normal left middle finger (Figure 4A) and fractured finger at 14 weeks (Figure 4B, initial assessment), 18 weeks (Figure 4C), and 22 weeks (Figure 4D) after injury. The maximal fingertip workspace of the intact and injured fingers (initial assessment at 14 weeks after injury) was 89 cm<sup>2</sup> and 60 cm<sup>2</sup> respectively. The follow-up assessments at 18 and 22 weeks after injury showed improvement to 78 and 80 cm<sup>2</sup> respectively (Figures 4 C & D).



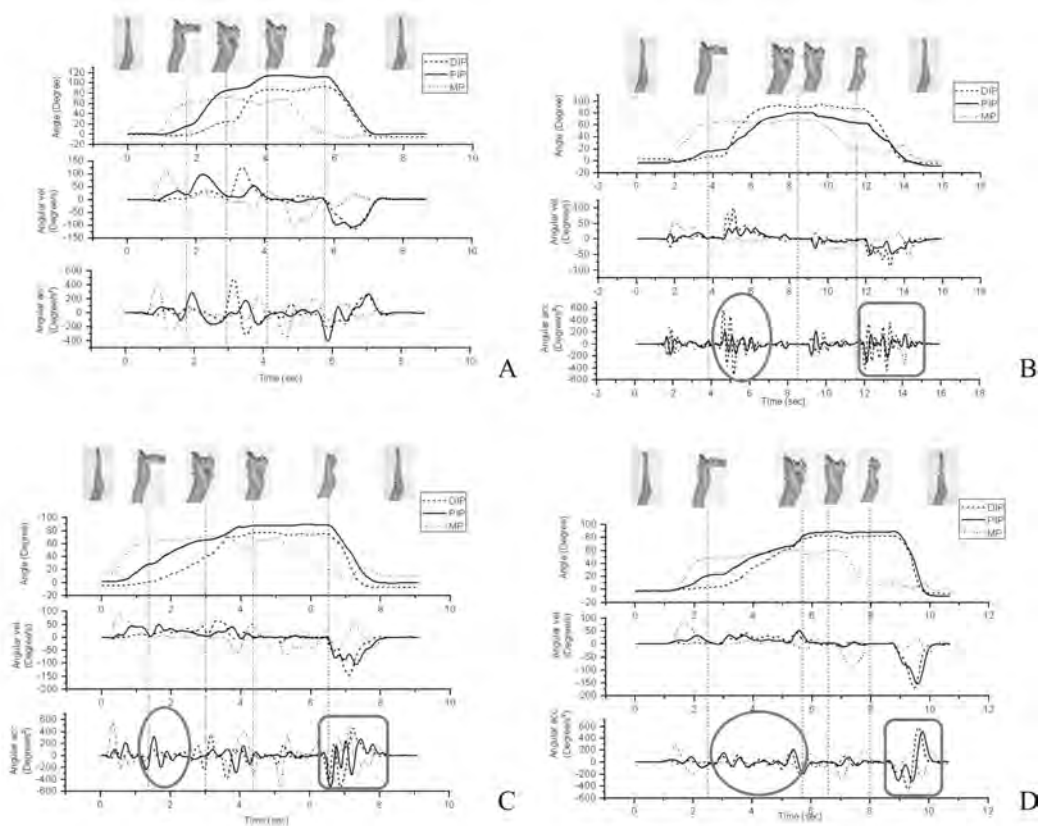
**Figure 4**

(A) The fingertip workspace of the intact middle finger forming by five sequential joint movements; (B) The fingertip workspace of the injured middle finger at week 14; (C) week 18; and (D) week 22 after treatments. The arrow in Figure 4B indicates a sharper angle was noted when the PIP joint starts to flex with the MP joint held in full flexion position. Tendon adhesion might cause simultaneous MP joint extension during the path from movement 2 (intrinsic plus) to movement 3 (straight fist) and then create a sharper angle. The different orientation of movement sequences depicting in Figure 4A and Figures 4B-D was based on the same determination of local coordinate system for both right and left hands.

The joint kinematics of the DIP, PIP, and MP joints of the normal finger (Figure 5A) and fractured finger at 14 weeks (Figure 5B, initial assessment), 18 weeks (Figure 5C), and 22 weeks (Figure 5D) after injury are shown in Figure 5. The PIP joint angular range of motion improved from 79.1° to 101.8°. Angular acceleration, the parameter of movement smoothness, of the injured finger decreased significantly during a sequential movement performance following treatment (Figure 5). The subject at 22 weeks compared to 14 weeks did joint motion via a lessen muscle force to overcome restrictive adhesion which indicates a much smoother phenomenon occurred in the finger motion,

especially from “intrinsic positive” to “straight fist” position (Figure 5).

Muscle strength was another indicator depicting movement function, despite joint flexibility, and assessed using a Jamar dynamometer and a pinch meter. Assessments included grasp power, palmar pinch (the thumb with the long finger), and three-jaw chuck type with standard procedures. Grasp and pinch power results in the injured hand showed satisfactory improvement through a series of follow-up assessments (Table 1).



**Figure 5**

(A) The joint kinematics of the DIP, PIP, and MP joints of the intact middle finger; (the injured middle finger at week 14; (C) week 18; and (D) week 22 after treatments. The circle in figure B indicates the higher zero-crossing numbers and amplitude of angular acceleration during the path from movement 2 (intrinsic plus) to movement 3 (straight fist) at week 14 than at week 18 and 22. The square marking in the in Figures 5B and 5C showed the higher zero-crossing numbers of angular acceleration during the movement paths from intrinsic minus to maximum extension at week 14 and 18 than week 22.



**Table 1**  
**The results of grasp and pinch power of both hands**

Date	Muscle strength			
		Week 14 after injury	Week 18 after injury	Week 22 after injury
		Intact hand	Injured hand	Injured hand
Grasp power		39 kg	6 kg	25 kg
Grip type	Palmar pinch	4 kg	1 kg	3.5 kg
	Three-jaw chuck	8 kg	1.5 kg	6 kg

#### 4. Discussion

This report investigated the feasibility of a convenient kinematical method to evaluate motion properties of a fracture finger to demonstrate the efficacy of intensive rehabilitation intervention. Using maximal workspace and goniometry by computer-aided motion analysis techniques have been reported to evaluate ranges of movement of finger and thumb segments (Chiu et al., 2000; Chiu et al., 1998; Chiu et al., 1998; Chiu & Su, 1996; Su et al., 2003). This method allows clinicians to determine impairments of injured sites or movement deficiencies using temporal and spatial kinematics data, whether in real-time or off-line movement examinations. This work establishes a consulting room measurement system conveniently providing clinicians to assess patients' conditions for each visit. Each complete examination, including data analysis and report, of kinematics and force assessment is accomplished within approximately fifteen minutes. Several studies report treatment outcomes of unstable or comminuted intra- or extra-articular phalangeal fractures, however the indicators in most evaluations for determining outcomes are static goniometric measures of range of active motion and hand strength. The conventional goniometric measurement is well known for its simple and convenient use; however, the inter-rater reliability showed a large variation (Pandya et al., 1985). Static representation cannot provide dynamic information (spatial and temporal factors, and even compensatory strategies) of joint performance. The objective maximal workspace and joint goniometric analysis in the current case report reveals that the joint flexibility in this case improves in accordance with bony congruency restoration

from radiographic follow-up examinations. Computation and graphic displays of the maximal fingertip workspace provide virtues while revealing individual and synergistic movements of the three digital joints in performing hand movements, which indicate different anatomical meanings in each movement.

Joint kinematics improvement is easily observed through the following movement analysis measurements. We can easily compare a series of morphologic and motion area changes of the maximal workspace of the injured hand with the intact one (Figure 4). Motion path observations between movement 2 (intrinsic plus) and movement 4 (full fist) in the serial follow-up examinations indicate a more curved path because the larger ranges of PIP and DIP joint motion performance (Figures 4B, C and D). The motion path obtaining obvious improvements between movement 2 (intrinsic plus) and movement 3 (straight fist) indicates better excursion of the superficialis digitorum tendon. If the tendon adhesion existed, the PIP joint flexes with the MP joint in full flexion position may induce simultaneous MP joint extension to create a sharper angle (arrow in Figure 4B) than the normal smooth flexion curve (Figure 4A) due to insufficient tendon excursion. The temporal factor should also be taken into consideration for hand fractural rehabilitation. Motion path and joint goniometric outcomes support that the case regained optimal motion at the scar maturation phase. Scar and tissue adhesions potentially restrain tendon excursions during joint flexion and extension movements. This condition may also lead to decreasing movement smoothness. A previous study reports that finger tendons need to overcome gliding resistance between the tendons and sheath in order to move the finger joints (Zhao, Amadio, Berglund, Zobitz, & An, 2003). Adhesion formations increase resistive forces throughout the movement after tissue reconstruction. For the flexor tendon zone 2 encompasses the proximal phalanx; thus, comminuted phalangeal fractures containing more exposed risks of adhesion formations owing to complicated anatomical structures. The angular acceleration amplitude of movements from intrinsic plus to straight fist at the week 14 after injury (the mark in Figure 5B) was larger than at the week 18 (the circle in Figure 5C) and week 22 (the

circle in Figure 5D). This amplitude reveals that the patient exerted a larger force to overcome adhesive resistance of the injured finger. A number of movement units (MUs), a phase containing an acceleration-deceleration transition, adopted to represent movement smoothness level (Wu, Trombly, Lin, & Tickle-Degnen, 2000) are obviously much more than MUs of the normal hand at the week 18 and 22 after injury (the MUs are 5 for the affected digit at both the week 18 and week 22 after injury and are 2 for the contralateral digit). This movement level indicates that the case requires adjusting movement force frequently to contend against adhesive resistances and to achieve arc motions of joints. In addition, higher MUs were also observed during the movement path from intrinsic minus to full extension at week 14 and 18 (the square in Figures 5B and 5C, respectively) than week 22 (the square in Figure 5D). The results provide an explanation of scar remodeling and callus maturation reaching a plateau phase around three to four months after injury (Figure 1C).

In this report, the traction and motion are the principles we used in the management of a comminuted proximal phalangeal fracture. The longitudinal distraction force could help mold the fracture bone and have the efficacy in bone fragment healing (Schenck, 1994). In addition, the early mobilization could help decrease adhesion and improve tendon excursion (Kamath, Harshvardhan, Naik, & Bansal, 2011). The goals of treatment for phalangeal fracture include restoration of bony structure, functional capacity and joint motion (Dabezies & Schutte, 1986). Consequently, in addition to the kinematic parameters, the changes in anatomical structure and grasp power were also included as the outcome measurements in this report. The results of radiography revealed that the patient has maintained bony length, alignment and union (Figure 1). Grip strength measurements (Table 1), as an index of hand function, provide other evidences revealing that apparent improvement shows at the 18 weeks evaluation after injury. According to the obtained results, the treatment with combining concept of early mobilization and traction is an effective method in managing fractures of the phalangeal bone.

## **Acknowledgement**

This study was supported by National Science Council grant NSC 94-2213-E-006-136, TAIWAN. The authors thank Prof. Chang-Zern Hong, MD, for his review, scientific advises and English edition.

## **References**

- Chiu, H. Y. (1995). A method of two-dimensional measurement for evaluating finger motion impairment. A description of the method and comparison with angular measurement. *Journal of Hand Surgery, 20B*, 691-695.
- Chiu, H. Y., Lin, S. C., Su, F. C., Wang, S. T., & Hsu, H. Y. (2000). The use of the motion analysis system for evaluation of loss of movement in the finger. *Journal of Hand Surgery, 25B*, 195-199.
- Chiu, H. Y., & Su, F. C. (1996). The motion analysis system and the maximal area of fingertip motion. A preliminary report. *Journal of Hand Surgery, 21B*, 604-608.
- Chiu, H. Y., Su, F. C., & Wang, S. T. (1998). The motion analysis system and the fingertip motion area. Normal values in young adults. *Journal of Hand Surgery, 23B*, 53-56.
- Chiu, H. Y., Su, F. C., Wang, S. T., & Hsu, H. Y. (1998). The motion analysis system and goniometry of the finger joints. *Journal of Hand Surgery, 23B*, 788-791.
- Dabezies, E. J., & Schutte, J. P. (1986). Fixation of metacarpal and phalangeal fractures with miniature plates and screws. *Journal of Hand Surgery, 11A*, 283-288.
- Dennys, L. J., Hurst, L. N., & Cox, J. (1992). Management of proximal interphalangeal joint fractures using a new dynamic traction splint and early active movement. *Journal of Hand Therapy, 1*, 16-24.

- Freeland, A. E., & Orbay, J. L. (2006). Extraarticular hand fractures in adults: A review of new developments. *Clinical Orthopaedics and Related Research*, 445, 133-145.
- Hunter, J. M., Schneider, L. H., Mackin, E. J., & Callahan, A. D. (1990). Rehabilitation of the hand: Surgery and therapy. (3rd ed., pp.295-303). St Louis, MO: CV Mosby.
- Kadelbach, D. (2006). Swing design dynamic traction splinting for the treatment of intra-articular fractures of the digits. *Journal of Hand Therapy*, 19, 39-42.
- Kamath, J. B., Harshvardhan, Naik, D. M., & Bansal, A. (2011). Current concepts in managing fractures of metacarpal and phalanges. *Indian Journal of Plastic Surgery*, 44, 203-211.
- Kuo, L. C., Su, F. C., Tung, W. L., Lai, K. Y., & Jou, I. M. (2009). Kinematical and functional improvements of trigger digits after sonographically assisted percutaneous release of the A1 pulley. *Journal of Orthopaedic Research*, 27, 891-896.
- Moran, C. A. (1989). Anatomy of the hand. *Physical Therapy*, 69, 1007-1103.
- Morgan, J. P., Gordon, D. A., Klug, M. S., Perry, P. E., & Barre, P. S. (1995). Dynamic digital traction for unstable comminuted intra-articular fracture-dislocations of the proximal interphalangeal joint. *Journal of Hand Surgery*, 20A, 565-573.
- Pandya, S., Florence, J. M., King, W. M., Robison, J. D., Oxman, M., & Province, M. A. (1985). Reliability of goniometric measurements in patients with Duchenne muscular dystrophy. *Physical Therapy*, 65, 1339-1342.
- Saunders, S. R. (1989). Physical therapy management of hand fractures. *Physical Therapy*, 69, 1065-1076.
- Schenck, R. R. (1994). The dynamic traction method. Combining movement and traction for intra-articular fractures of the phalanges. *Hand Clinics*, 10, 187-198.

Su, F. C., Kuo, L. C., Chiu, H. Y., & Chen-Sea, M. J. (2003). Video-computer quantitative evaluation of thumb function using workspace of the thumb. *Journal of Biomechanics*, *36*, 937-942.

Wu, C., Trombly, C. A., Lin, K., & Tickle-Degnen, L. (2000). A kinematic study of contextual effects on reaching performance in persons with and without stroke: Influences of object availability. *Archives of Physical Medicine and Rehabilitation*, *81*, 95-101.

Zhao, C., Amadio, P. C., Berglund, L., Zobitz, M. E., & An, K. N. (2003). A new testing device for measuring gliding resistance and work of flexion in a digit. *Journal of Biomechanics*, *36*, 295-299.

## Appendix 1

Rehabilitation program guidelines for comminuted fracture of the proximal phalanx shaft treating with dynamic traction splint in National Cheng Kung University Hospital

Phase	Goal	Treatment program
Day 1-Week 6	Splint fabrication	Dynamic traction splint fabrication
	Edema control	1. Elevation 2. Gentle active motion
	Maintain pain-free range of motion (ROM)	Passive and active ROM within marked range at least 8 times/day
Week 7-Week 8	Increase of passive ROM of PIP joint	1. Gutter splint 2. Passive stretch exercise
	Reduce adhesion	1. Massage 2. Tendon gliding exercise 3. Blocking exercise
	Promote hand function	1. Light resistive exercise, putty exercise, pinch and release 2. Light daily activities: feeding and hygiene
Week 9-Week 14	Improve muscle power	1. Hand gripper 2. Sanding activity 3. Resistive pinch exerciser
	Promote work capacity	1. Simulated work activities 2. Restore physical and vocational functions

# 手部動作缺損之系列性運動學及功能性評估：以粉碎性近位指骨骨折個案接受手部復健介入為例

OCCUPATIONAL THERAPY

徐秀雲<sup>1,2</sup> 蘇芳慶<sup>1</sup> 邱浩遠<sup>3</sup> 林聖哲<sup>3</sup> 郭立杰<sup>4,\*</sup>

## 摘要

運用運動學分析方法呈現關節動作表現較傳統之靜態角度量測更可客觀地提供空間及時間參數的表現，從臨床觀點而言，用系列性之運動學評估法可視為是一可信之量化治療成效之工具。然，這方法雖已早被提出，但卻顯少有文獻及臨床實務之報告呈現。本篇研究即以一粉碎性近端指骨骨折個案接受動態牽引副木及手部復健介入為例，欲凸顯使用系列性運動學及功能性評估在手臂動作缺損上肢評估應用，透過電磁場動作分析系統及手部力量量測工具在系列性的追蹤評估中得知，個案之受傷手指指尖最大動作空間及動態關節活動度表現在介入後有明顯改善，另在關節動作的平滑度上，在系列性之追蹤評估中亦有所改善，個案之手部握力及指捏力亦隨復原之進展而有所進步。故本篇個案報告顯示此一系性運動學及功能性評估可協助臨床人員透過即時或事後的檢查中，由所提供之動態時序及空間參數了解動作缺損之所在，除可提供診斷有利之依據外亦可對治療活動訂定之試且與否有更客觀之了解。

**關鍵字：**動作分析，運動學，動態牽引副木，指骨骨折

國立成功大學生物醫學工程學系<sup>1</sup>  
國立成大醫院復健部<sup>2</sup>  
國立成功大學醫學系外科學科<sup>3</sup>  
國立成功大學職能治療學系<sup>4</sup>

受文日期：民國 102 年 2 月 19 日  
接受刊載：民國 102 年 5 月 30 日

\*通訊作者：郭立杰  
臺南市大學路一號  
國立成功大學職能治療學系暨  
國立成功大學健康照護科學研究所  
電話 06-2353535分機5908  
Email: jkkuo@mail.ncku.edu.tw



## 投稿須知

- 一、『職能治療學會雜誌』為台灣職能治療學會所發行一年兩期的專業學術期刊。本雜誌設有嚴謹的同儕審查制度，凡與職能治療有關之學術論述，且未曾發表於其他刊物，皆為本雜誌刊載之對象。本雜誌亦收錄由台灣職能治療學會主辦的學術研討會所發表的論文摘要以及學會各委員會執行學會或政府機構委辦之研究計畫結案報告。
- 二、來稿以中文或英文格式撰寫均可。投稿類型包括原著(original articles)、個案報告(case reports)、專題(special reports)、文獻評論(review articles)、簡報(brief reports)與致編者函(letters to the editor)。
- 三、**原著**：係指實證性研究論述。中文稿件字數(含參考文獻與圖表)以不超過15,000字為原則。英文稿件字數以不超過5,000字(不含參考文獻與圖表)為原則。  
**個案報告**：中文稿件字數(含參考文獻與圖表)以不超過6,000字為原則。英文稿件字數以不超過2,000字(不含參考文獻與圖表)為原則。  
**專題**：職能治療領域值得深入探討的特別邀請專題。中文稿件字數(含參考文獻與圖表)以不超過15,000字為原則。英文稿件字數以不超過5,000字(不含參考文獻與圖表)為原則。  
**文獻評論**：針對特定主題作完整之文獻回顧與客觀討論。中文稿件字數(含參考文獻與圖表)以不超過15,000字為原則。英文稿件字數以不超過5,000字(不含參考文獻與圖表)為原則。  
**簡報**：指初步的研究結果或臨床上、技術上的精簡論述。中文稿件字數以不超過5,000字為原則(含參考文獻與圖表)。英文稿件字數以不超過1,500字(不含參考文獻與圖表)為原則。  
**致編者函**：中文稿件字數以不超過1,000字為原則；英文稿件字數以600~800字為原則。中英文稿的文獻以10筆為上限，圖或表至多1個。
- 四、惠稿請附上「申請投稿聲明書」(自行選擇由通訊作者代表簽名或全體作者簽名)，並將稿件以電子郵件方式寄至 [cysu@cc.kmu.edu.tw](mailto:cysu@cc.kmu.edu.tw)；信件主旨請註明「職能治療學會雜誌投稿」。請依本刊撰稿體例投稿，**格式不符與字數超過者將逕予退回修正。**

### 五、審稿程序

- 1.預審：主編依據是否符合本刊之性質以及文章的嚴謹程度決定是否送初審。
- 2.初審：稿件將聘請兩名文章所屬領域的專家學者進行雙向匿名審查。凡審稿者建議「修正後再送審查」之文稿，作者需將修改後之稿件(以紅色標示修改處)，連同「審查意見回應表」以電郵方式寄回本刊交由原審查者進行複審。初審結果將於收到稿件四週內完成並通知作者。
- 3.複審：凡審稿者建議「修正後再送審查」之文稿，作者需將修改後之稿件(以紅色標示修改處)，連同「審查意見回應表」以電郵方式寄回本刊交由原審查者進行複審。複審結果將於收到稿件三週內完成並通知作者。
- 4.若需延期交稿者，需以書面通知本刊並說明原因。未能於規定期限內修改寄回者將視同撤稿。

六、被接受的稿件由執行編輯小組負責一校，作者收到校正稿後需於收件日起三日內完成二校，再以電郵方式寄回。

七、在本雜誌刊登之著作，其著作權屬於本會，除商得本會書面同意外，不得轉載於其他雜誌或媒體。

八、經刊登之論文，本雜誌將贈送每位作者當期期刊一本及論文之PDF電子檔，如需抽印本可自費印刷。

九、中英文稿件原則：

1. 稿件格式：採用《美國心理協會出版手冊》第六版 (Publication Manual of the American Psychological Association, 6th ed., 2009) 格式。中英文部份略作修改，未及規範之處，以該手冊第六版為依據。

(1)稿件應隔行打字於A4紙上，每頁上、下、左、右至少留白2.54公分。

(2)字型：中文請統一用標楷體；英文請統一用Times New Roman。字體大小請採12級字，每頁列有重新編碼之行號，以利排版及審稿。

(3)行距：統一為兩倍行高。

2. 作者如超過六人，請註明個別作者在文章的貢獻部分。

3. 稿件內容架構：封面頁、中英文摘要、本文、誌謝、參考文獻、表格與圖。

4. 稿件應按下列順序分頁書寫，並請編頁碼於稿紙右上方，整理後提出。

**封面頁**：含作者姓名、執行該研究時服務單位，通訊者姓名、地址、電話及電子信箱（上半頁列中文資料，下半頁列英文資料，如為英文稿件則相反）。著者屬不同機構或單位，其中文書寫形式如下列：

羅鈞令<sup>1</sup> 楊國德<sup>2,\*</sup>

臺灣大學醫學院職能治療學系<sup>1</sup> 中山醫學大學職能治療學系<sup>2</sup>

英文書寫型式如下例：

Jin-Ling Lo<sup>a</sup>, Kuo-Te Yang<sup>b,\*</sup>

<sup>a</sup>School of Occupational Therapy, College of Medicine, National Taiwan University, Taiwan

<sup>b</sup>School of Occupational Therapy, Chung Shan Medical University, Taiwan

**第一頁**：中英文題目（英文題目中，除了小於4個字母的連接詞、冠詞和介系詞外之第一個字母請大寫）及中文20個字（或英文40個字母）以內的逐頁標題（running title）。

**第二頁**：中文摘要不超過五百字及至多5個中文關鍵詞。各關鍵詞之間以「，」區隔，句末不加「。」。請在頁末註明字數。

**第三頁**：英文摘要不超過250字及至多5個英文關鍵詞。請在頁末註明字數。

**第四頁以後**：本文、誌謝、參考文獻及圖表。

**本文**：稿件應包括前言 (Introduction)、研究方法 (Materials and methods)、結果 (Results)與討論 (Discussion)。請在討論部分的末頁註明字數。中文稿件的第一階標題請使用16pt標楷體，粗體，置中；第一階標題編碼請使用國字壹、貳、參等，如壹、前言。第一及第二階標題與前段內文間均請空一行，第三階標題則不需空行。第二階標題請使用14pt標楷體，粗體，靠左對齊。第二階標題編碼請使用國字一、二、三等。第三階標題請使用12pt標楷體，粗體，靠左對齊。第三階標題編碼請使用有括弧的國字(一)、(二)、(三)等。英文稿件的第一階標題請使用16pt Times New Roman，粗體靠左對齊。第一階標題編碼請使用1, 2, 3

等，如**1. Introduction**。第一及第二階標題與前段內文間均請空一行，第三階標題則不需空行。第二階標題請使用 14pt Times New Roman，斜體靠左對齊。第二階標題編碼請使用 1.1., 2.1., 3.1. 等。第三階標題編碼請使用 12pt Times New Roman，斜體靠左對齊。第三階標題編碼請使用 1.1.1., 2.1.1., 3.1.1. 等。

5. 統計符號請以斜體字標示，如：t-檢定。度量衡單位採用國際單位系統符號。
6. 圖表：圖表數目請儘量精簡。每一圖或表應分別繕打於稿紙上。圖片應為黑白光面照片、黑白正片或以黑色筆繪製。圖片下方應註明圖號與圖名，表格上方應註明表號及表名，中文手稿應以中文說明為主（格式請參考美國心理協會出版手冊第六版）。
7. 本文引證格式：中文文獻作者為一人時，註明為姓名(民年代) 或 (姓名，民年代)。當所引證文獻的作者為兩人時，兩人之姓名每次引證均需全部列出，中間以「與」字連接（見例一）；若為圓括弧中引證則以頓號（、）來連接（見例二）。若作者為三至五人，第一次引證時所有作者姓名須悉數列上，嗣後再引證時則只列第一作者姓名，後加「等」字代替其他作者。若作者為六人以上（含六人）時，則第一次和後續引證都只需列出第一作者，其後以「等」字表示。英文寫法請參見例四。在文末所附之參考書目中亦僅列出前六位作者。外文文獻格式請依據美國心理協會出版手冊第六版。  
範例：◎ 例一：張彧與李文淑（民 83）提到……  
◎ 例二：教育局支持在數個國小進行感覺統合療效研究計畫（羅鈞令、姚開屏，民 75）  
◎ 例三：美國心理協會（1994，1997）規定論文寫作……  
註：閱讀的是中譯本，1994是原著出刊年，1997是譯本之出版年。  
◎ 例四：Kosslyn et al. (1992)… 或 (Kosslyn et al., 1992)  
註：當第二次以上引用三至五位作者文獻，或該為六人以上。
8. 參考文獻：文獻應以文內實際提及之原始文獻者為限。中文文獻列於前，依姓氏筆劃遞增排列，筆劃相同依姓名第二字筆劃，以此類推；外文文獻列於後，依姓氏字母順序排列。外文請依美國心理協會出版手冊第六版格式繕寫，中文請參考以下範例。  
◎ 期刊— 作者姓名（年份）。篇名。期刊全稱，期別，頁碼。  
◎ 書籍— 章節作者姓名（年份）。篇名。編者姓名，書名（第x版，頁xxx-xxx）。出版地：出版社。  
◎ 其他刊物、電子媒體等，請參考手冊。

#### 學會特刊的論文：

李建賢（民 73）。對於我國緊急醫療系統的省思與建旨。急救加護醫學會特刊，5，7-9。

#### 學會會報的論文摘要：

張彧、李文淑（民 83）。台灣生理疾患職能治療從業人員媒介使用之探討。中華民國職能治療學會第十四次學術研討會會報，10。

#### 單行本：

陳宗瀛、姜必寧（1993）。臨床心電圖學，頁1-26。台北：華榮。

Mitchell, T. R., & Larson, J. R. Jr. (1987). *People in organizations: An introduction to organizational behavior* (3rd ed.). New York, NY: McGraw-Hill.

**編著書籍的一章：**

陳楷模（民65）。腹部急症。載於陳秋江、許書劍（主編），*外科急症*（頁5-13）。台北：當代醫學雜誌社。

**期刊文章：**

顏秀紅（民73）。簡介美國幾家醫院職能治療之近況。*職能治療學會雜誌*，2，79-82。

Shalev, L., & Tsal, Y. (2006). The wide attentional window: A major deficit of children with attention difficulties. *Journal of Learning Disabilities*, 36, 517-527.

**翻譯圖書：**

美國心理協會(American Psychological Association)(1997)。美國心理協會出版手冊第四版（中譯二版）(Publication manual of the American Psychological Association, 4th ed.)（王明傑、陳玉玲譯）。台北：雙葉。(1994)  
(註：1997是譯本之出版年；1994為原著出版年。)

**會議及座談會之會議紀錄：**

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation: Vol. 38. Perspectives on Motivation* (pp. 237-288). Lincoln, NE: University of Nebraska Press.

**七位以上作者：**

Clark F., Azen, S. P., Zemke, R., Jackson, J., Carlson, M., Mandel, D., ... Heaton, R.K. (1997). Occupational therapy for independent-living older adults. *Journal of American Medical Association*, 278, 1321-1326.

**叢書中一卷的一章：**

Maccoby, E. E., & Murtin, J. (1983). Socialization in the context of the family: Parent-child interaction. In P. H. Mussen (Series Ed.) & E. M. Hetherington (Vol. Ed.), *Handbook of child psychology: Vol. 4. Socialization, personality, and social development* (4th ed., pp. 1-101). New York: Wiley.

**排印中期刊文章：**

Zuckerman, M., & Kieffer, S. C. (in press). Race differences in fascism: Does facial prominence imply dominance? *Journal of Personality and Social Psychology*.

## 職能治療學會雜誌申請投稿聲明書

一、本人（等）擬以以下題目，申請投稿於職能治療學會雜誌。  
題目：

「

」

投稿類型為：研究論文    文獻評論    簡報    個案報告  
專題    致編者函，

二、本篇過去未曾發表於其他雜誌，且同意在貴刊接受審查期間及接受刊登後，  
三、本篇刊名之作者接實際參與研究及撰述，並能負責修改、校對及與審查者討論之工作；投稿前所有簽名者均仔細閱讀，並同意論文之內容及結論。

特此聲明

通訊作者代表簽章

服務單位

日期

\_\_\_\_\_  
註：如需英文格式，請依本表格自行撰寫。謝謝！

## 職能治療學會雜誌申請投稿聲明書

一、本人（等）擬以以下題目，申請投稿於職能治療學會雜誌。

題目：

「

」

投稿類型為：研究論文    文獻評論    簡報    個案報告

專題    致編者函，

二、本篇過去未曾發表於其他雜誌，且同意在貴刊接受審查期間及接受刊登後，不投刊其他雜誌，同時遵守貴刊投稿規則。

三、本篇刊名之作者接實際參與研究及撰述，並能負責修改、校對及與審查者討論之工作；投稿前所有簽名者均仔細閱讀，並同意論文之內容及結論。

特此聲明

作者簽章

服務單位

日期

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

註：如需英文格式，請依本表格自行撰寫。謝謝！

# 職能治療學會雜誌

Journal of Taiwan Occupational Therapy Association

中華民國一〇二年十二月出刊

第三十一卷第二期 Volume 31, Number 2 (December 2013) ISSN 1013-7661

發行人：蔡宜蓉

主 編：蘇純瑩

編輯委員：吳菁宜、林克忠、施陳美津、郭立杰、陳瓊玲、潘瓊琬 (依姓名筆劃排列)

執行編輯：李雅珍、邱恩琦

民國七十二年十一月創刊

發行所：台灣職能治療學會 地址：100 台北市博愛路9號5樓之3

電話：02-23820103 傳真：02-23826496 劃撥帳號：07463332

訂閱辦法：每本工本費新台幣參佰元整，請匯入郵政劃撥帳號

印刷者：廣多麗廣告企業行 地址：高雄市前鎮區永豐路94號

電話：07-7276973 傳真：07-7272461

刊登著作之版權屬於本會，未商得本會書面同意，不得轉載其他雜誌書刊。