

科技部補助專題研究計畫成果報告 期末報告

運動處方與人體工學介入對智慧型手機使用者骨骼肌肉系統傷害之療效(A03)

計畫類別：個別型計畫
計畫編號：MOST 103-2629-B-006-002-
執行期間：103年08月01日至104年10月31日
執行單位：國立成功大學物理治療學系

計畫主持人：卓瓊鈺

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報告附件：出席國際會議研究心得報告及發表論文

處理方式：

1. 公開資訊：本計畫涉及專利或其他智慧財產權，2年後可公開查詢
2. 「本研究」是否已有嚴重損及公共利益之發現：否
3. 「本報告」是否建議提供政府單位施政參考：否

中華民國 105 年 01 月 29 日

中文摘要：由於電子資訊的蓬勃發展，可以接受到資訊的媒介也日益更新，除了傳統電腦以外，現代人也使用各種不同的電子資訊處理器來傳送或是接受訊息，而現在最流行的電子資訊產品包括平板電腦和智慧型手機。在美國已有百分之八十五的成年人使用手機傳輸訊息，而在台灣使用智慧型手機的普及率正逐年升高，根據資策會資策會的統計，在2015年智慧型手機普及率達到73.4%。如此高頻率的使用智慧型手機雖然可以帶來生活的方便性，但也可能造成使用者身體的傷害。

一般而言，骨骼肌肉系統症狀之所以會有性別差異，主要的原因可能是因為男女荷爾蒙差異以及女性撫養小孩的辛勞。在另一方面，女性相較於男性也比較沒有時間休閒或運動。這些性別差異，在女性晉升母親這個位置後更加明顯。先天失調加上後天缺乏鍛鍊的結果，使得女性更容易得到骨骼肌肉系統的傷害。

手機族也可能因為不當的姿勢誘發症狀。前人的研究指出，男性手機族容易有比較前伸的肩部姿勢，女性則是容易有較彎曲的手肘。但這篇研究指出大約有一半的手機族使用雙手大拇指打字，這種輸入方式和台灣看到智慧型手機使用者的狀況似乎不同。

到目前為止，很少有研究去大量觀察智慧型手機使用者的習慣與姿勢。也鮮少關注長期使用智慧型手機可能對身體造成的骨骼肌肉系統傷害，而使用習慣可能存在有性別差異，近年也少有研究探討。因此，這篇研究的主要目的乃在；系統性地觀察智慧型手機使用者的慣用姿勢與使用習慣。第二個目的乃在：比較在男女智慧型手機使用者在從事手機作業時是否存在姿勢的差異。

我們總共收集了512位手機使用者的資料，包括238位男性與274位女性。研究結果顯示，手機族容易在頸部(81.2%)、手肘(71.9%)、前臂(62.5%)與手腕(84%)產生較不當的姿勢。在性別差異方面，我們發現女性較男性有較高比例的頸部彎曲($p=0.031$)，手肘彎曲($P=0.019$)。而女性在操作手機時，最喜歡用左手拿右手食指輸入($p=0.005$)，而男性則是雙手拿雙拇指輸入。兩性都最喜歡用手機上網，但男性用手機玩電動次之，女性則是手機打字排名第二。

本篇研究發現智慧型手機使用者發生頸部、手肘的彎曲角度比例相當高。前臂與手腕也容易處在非正中姿勢。女性在頸彎曲與手肘彎曲的比例明顯較男性為高，這意味著她們容易在此兩部位呈現較極端的姿勢。我們的研究結果建議在介入智慧型手機使用者的骨骼肌肉系統症狀時不但要注意他們在使用時的姿勢，同時也要考慮性別差異。

中文關鍵詞：骨骼肌肉系統症狀、智慧型手機、姿勢、性別

英文摘要：Nowadays one of the major changes in the exposure profiles of people is the use of information technology (IT), and the increasing number of devices available. The Institute for Information Industry in Taiwan estimates that the smartphone users increase to 73.4% at the year of 2015. Hence the smartphone technology with touchscreen devices is growing at high speed in Taiwan, and it may possibly affect users' health. Due to differences in muscle strength, anthropometry, and

hormones, females tend to have a higher rate of musculoskeletal symptoms than males. Women also have less opportunity to relax and exercise outside of work, which was exacerbated by parenthood. Therefore, females tend to have a higher incidence of musculoskeletal symptoms, which may be related to the repetitive characters of the job as well as no leisure time.

Mobile phone users may also show gender differences on their postures. Previous study found that male users tend to have a more protracted shoulder and female users have a more flexed elbow. However, due to different culture (English v.s. Chinese typing), those characteristics are not commonly seen on the smartphone users in Taiwan.

The purpose this study was to investigate the characteristics of the smartphone users' posture. Besides, gender difference of postures were compared.

Totally we collected 512 subjects, including 238 males and 274 females. A high percentage of flexed neck(81.2%), non-neutral elbow(71.9%), forearm(62.5%), and wrist postures (84%) were found. Women tend to have a higher percentage of flexed neck than men while they are using smartphones. A greater proportion of females than males were found to have non-neutral elbow, especially on the typing side. Moreover, their favorite typing styles were different. Males like to use both hand hold, both thumb typing strategy (33.6%), but females like to use left hand hold, right index typing (31.6%).

The results of the current study showed a high percentage of non-neutral postures. Besides, females had a higher percentage to have flexed neck and elbow which may indicate they tend to demonstrate more extreme postures in these two regions. When considering the musculoskeletal symptoms among smartphone users, not only we need to focus on their working postures, gender issue cannot be neglected.

英文關鍵詞：musculoskeletal symptoms, smartphone, posture, gender

計畫類別：個別型計畫 整合型計畫

計畫編號：MOST 103-2629-B-006-002-

執行期間：103 年 8 月 1 日至 104 年 10 月 31 日

執行機構及系所：國立成功大學 醫學院 物理治療學系

計畫主持人：卓瓊鈺

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計畫參與人員：張文琳 凌萱

本計畫除繳交成果報告外，另含下列出國報告，共 2 份：

執行國際合作與移地研究心得報告

出席國際學術會議心得報告

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3. 「本報告」是否建議提供政府單位施政參考 否 是，_____（請列舉提供之單位；本部不經審議，依勾選逕予轉送）

中 華 民 國 105 年 1 月 30 日

運動處方與人體工學介入對智慧型手機使用者骨骼肌肉系統傷害之療效(A03)

中文摘要

由於電子資訊的蓬勃發展，可以接受到資訊的媒介也日益更新，除了傳統電腦以外，現代人也使用各種不同的電子資訊處理器來傳送或是接受訊息，而現在最流行的電子資訊產品包括平版電腦和智慧型手機。在美國已有百分之八十五的成年人使用手機傳輸訊息，而在台灣使用智慧型手機的普及率正逐年升高，根據資策會資策會的統計，在 2015 年智慧型手機普及率達到 73.4%。如此高頻率的使用智慧型手機雖然可以帶來生活的方便性，但也可能造成使用者身體的傷害。

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因此，這篇研究的主要目的乃在：系統性地觀察智慧型手機使用者的慣用姿勢與使用習慣。第二個目的乃在：比較在男女智慧型手機使用者在從事手機作業時是否存在姿勢的差異。

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關鍵詞：骨骼肌肉系統症狀、智慧型手機、姿勢、性別

The effect of exercise prescription and ergonomic intervention on musculoskeletal disorders of the smart phone users(A03)

Abstract

Nowadays one of the major changes in the exposure profiles of people is the use of information technology (IT), and the increasing number of devices available. The Institute for Information Industry in Taiwan estimates that the smartphone users increase to 73.4% at the year of 2015. Hence the smartphone technology with touchscreen devices is growing at high speed in Taiwan, and it may possibly affect users' health.

Due to differences in muscle strength, anthropometry, and hormones, females tend to have a higher rate of musculoskeletal symptoms than males. Women also have less opportunity to relax and exercise outside of work, which was exacerbated by parenthood. Therefore, females tend to have a higher incidence of musculoskeletal symptoms, which may be related to the repetitive characters of the job as well as no leisure time.

Mobile phone users may also show gender differences on their postures. Previous study found that male users tend to have a more protracted shoulder and female users have a more flexed elbow. However, due to different culture (English v.s. Chinese typing), those characteristics are not commonly seen on the smartphone users in Taiwan.

The purpose this study was to investigate the characteristics of the smartphone users' posture. Besides, gender difference of postures were compared.

Totally we collected 512 subjects, including 238 males and 274 females. A high percentage of flexed neck(81. 2%), non-neutral elbow(71. 9%), forearm(62. 5%), and wrist postures (84%) were found. Women tend to have a higher percentage of flexed neck than men while they are using smartphones. A greater proportion of females than males were found to have non-neutral elbow, especially on the typing side. Moreover, their favorite typing styles were different. Males like to use both hand hold, both thumb typing strategy (33.6%), but females like to use left hand hold, right index typing (31.6%).

The results of the current study showed a high percentage of non-neutral postures. Besides, females had a higher percentage to have flexed neck and elbow which may indicate they tend to demonstrate more extreme postures in these two regions. When considering the musculoskeletal symptoms among smartphone users, not only we need to focus on their working postures, gender issue cannot be neglected.

Key words: musculoskeletal symptoms, smartphone, posture, gender

Nowadays computers are ubiquitous, both at home and in the workplace. Computer activities are characterized by repetitive upper extremity movements and a relatively fixed body position. These characteristics might lead to cumulative trauma disorder (van Boxtel, 2007). High prevalence of cumulative trauma disorder (CTD) has been found among adults with special job requirements, such as computer users and meat processors (Carter and Banister, 1994; McPhee and Lipscomb, 2009).

One of the major changes in the exposure profiles of people in the past few years is the use of information technology (IT), and the increasing number of devices available. In particular, the touch-screen products such as smartphone devices and tablets have become a major fascination around the world. Therefore, more computer activities are engaged. In 2007, 75% of 16- to 24-year-old Swedes used the internet every day, and more than 90% had a computer at home (Statistics Sweden, 2011). In the USA, it has been reported that 85% of American adults own cell phones and 6 in 10 Americans go online wirelessly through using a laptop or mobile phone and African-Americans led the way in use of cell phone applications (Zickuhr, 2011). Among adults, 85% of the adult population in the USA own a cell phone and taking pictures and texting messages are the two most commonly used functions (Smith, 2010). About 38% of teenagers in the USA reported daily text messaging in 2008 and this increased to 54% in 2009. Half of them sent over 50 messages per day and one-third of them over 100 messages per day (Smith, 2010).

In Asian countries, this phenomenon seems to become more overwhelming, and the number of smartphone users is expected to top 347 million by 2015 (Chen, 2011). Hong Kong is among one of the top selling markets in smartphone technology in the world, with an impressive 48% smartphone penetration rate in 2011 and this is double the average purchase rate of smartphones around the world (Chen, 2011). Other Asian cities such as Bangkok in Thailand and Taipei in Taiwan are also experiencing similar phenomena and figures have been reported. In Taiwan, although only 12.9 % of the population are smartphone users but this is already 300 million people (Institute for Information Industry, 2011). According to the first quarter report in Taiwan, the prevalence of smart phone use has reached 51% (Liberty Times, 2013). In Thailand, smartphones account for 20% of the local mobile internet market in 2009 and it is expected to reach 33.2% this year (Digital Media, 2011). Hence the smartphone technology with touchscreen devices is growing at lightning speed in Asia. It is making a tremendous impact on people's lifestyle and may possibly affect their health also.

Musculoskeletal upper extremity symptoms of neck, shoulder and arms, are highly prevalent in the general population especially among computer users in many countries (Wahlstrom, 2005, Waersted, 2010, Eltayeb, 2007, Village, 2005). The

etiology of neck, shoulder and forearm/hands complaints in computer workers is still not completely understood. Several risk factors related to different physical exposures at work and psychosocial conditions have been identified as potential causes for neck, shoulder and forearm/hands complaints. Physical exposure factors can be related to static neck and arm postures, repetitive tasks, workplace design (Wahlstrom, 2005, Waersted, 2010, Eltayeb, 2007) and also psychosocial factors related to job characteristics, high quantitative job demands, lack of job autonomy, and limited support from coworkers or supervisors (Hughes, 2007, Blangsted, 2004). Furthermore, prolonged computer work is recognized as an occupational hazard with risk of shoulder and neck pain (Szeto, 2008).

Computer users with musculoskeletal symptoms were found to have different physical characteristics as compared to non-symptomatic groups. Szeto et al. (2002) found that office workers tend to increase their forward neck flexion compared to their relaxed sitting postures when working with a computer display, and that this phenomenon was more pronounced in the symptomatic group. The same group of researchers conducted another study on a group of female office workers who were required to perform a one-hour typing task. The symptomatic group tended to have greater head–neck flexion angles and a greater range of movements than the control group (Szeto, 2005). Hsieh and Cho also found that individuals with musculoskeletal symptoms of forearm or hand had lower muscle strength than non-symptomatic individuals (Hsieh and Cho, 2008). The design of a new smartphone has become multifunction. Users may hold a phone in a fixed posture for long period of time. We speculate smart phone users may have a different posture and muscle control as compared traditional computer users.

Due to differences in muscle strength, anthropometry, and hormones, females tend to have a higher rate of CTD than males (Hales and Bernard 1996; Lassen, 2005). Previous researchers also reported that more women are employed in hand intensive, monotonous jobs and thus have greater risk of CTD (Bernard et al. 1997), which is also known as repetitive strain injury (RSI), overuse syndrome, or regional musculoskeletal syndrome (Cassvan et al., 1997). Cagnie et al. (2007) suggested that women had a two-fold risk of neck and upper extremity pain compared with men (Cagnie et al., 2007). Bjorksten et al. (1996) compared a group of industrial workers and an age matched control group and found that the women in the former group were largely responsible for domestic tasks such as laundry, cleaning and cooking, and thus they had higher prevalence of shoulder and neck ailments. On the contrast, according to a study in Australia (2004), women have less opportunity to relax and exercise outside of work, which was exacerbated by parenthood. Therefore, females tend to have a higher incidence of musculoskeletal symptoms, which may be related

to the repetitive characters of the job as well as no leisure time (Ferry et al., 2000; Gerr et al., 2002).

The use of touchscreen devices (e.g. iPhone, iPad) involves light touch from the fingers but the viewing usually involves some degree of neck flexion, as the device is usually handheld. To perform fine motor

movements necessary to manipulate the controls of the devices, individuals automatically and unconsciously stabilize their trunks and thrust their heads forward in order to read the small screen. According to Gold's observational study (2012), they found the mobile device users tend to have a flexed neck, as well as a non-neutral typing side wrist. Male users tend to have a more protracted shoulder and female users have a more flexed elbow. These static and non-neutral positions could contribute to development of musculoskeletal disorders, pain or repetitive strain injury (Gold, 2012; Gustafsson, 2003).

Past research studies have mainly focused on either prolonged computer use or mobile phone use only, to our knowledge, no study has examined the cumulative exposure of using other IT devices such as smartphone over a long period. Given the current trends with the public fascinated by new developments in smartphone technology, it is very common to find people using desktop computers at work, smartphone and/or iPad during and after work as well as when traveling and in public places. We believe that this factor of daily intensive IT use may contribute significantly to a highly sedentary lifestyle and increased risk of musculoskeletal problems. Besides, since there is a postural difference found between genders in the previous study (Gold, 2012), we speculate there will be a postural difference found among countries due to the typing style difference.

The present study aims to carry out a large-scale survey to observe the postures and typing styles of the smart phone users. The second purpose of this study is to compare the treatment effect of exercise prescription and ergonomic intervention on smart phone users with musculoskeletal symptoms. We also want to compare the gender difference of the typing postures and muscle control patterns.

Method

Part I. Postures, typing strategies, and gender differences for smart phone users (the first year)

A cross-sectional study will be performed in Tainan city. Investigators unobtrusively observe individuals who are using their smart phones. This age range include most of those who are either studying in college/university or in the workforce. A one page mobile device postural assessment tool (Gold, 2012) will be revised and used according our pilot study. We aim to target those people (500

subjects) who are intensive users of mobile phones. Prior to the study, ethical approval will be obtained from NCKU IRB. Different locations such as campus, station, bus, coffee shop and classroom in Tainan area will be selected as the study sites. Since the study will be conducted in public, informed consent is not necessary. However, if the subjects have queries about our observation, one information sheet will be provided as they request.

Purpose: The present study aims to carry out a large-scale survey to observe the postures and typing styles of the smart phone users. The authors would like to compare the gender differences on posture control for the smartphone users.

Results

Totally, 512 subjects were collected, there were 238 men and 274 women included. For the age population, 65.6% of the subjects were between 18~30 years old. The data were collected in the library, MRT station, department store, fast food restaurants, etc.

Table 1 Posture and typing styles for the smartphone users

		n	%
Gender	male	238	46.5
	female	274	53.5
Age	<30 y/o	336	65.6
	30-50	154	30.1
	>50	22	4.3
Posture	symmetry	365	71.3
	asymmetry	147	28.7
View angle	upper	23	4.5
	Mid	70	13.7
	Lower	419	81.8
General position	standing	129	25.2
	Sitting	383	74.8
Neck	neutral	96	18.8
	Mild flexion	205	40.0
	Moderate flexion	211	41.2
Trunk	neutral	288	56.2
	Flexion	150	36.7
	Extension	36	7.0
Shoulder	not-protracted	322	69.9
	Protracted	190	37.1
Upper arm	neutral	316	51.7
	Non-neutral	196	38.3
Elbow	neutral	142	28.1
	Non-neutral	368	71.9
Forearm	neutral	192	37.5
	Supinated	188	36.7
	Pronated	132	25.8
Wrist	neutral	82	16.0
	Non-neutral	430	84.0
Typing style	BH BT	151	29.5
	BH RT	99	19.3
	LH LT	46	9.0
	BH RT	63	12.3
	LH IT	123	24.0
	Others	30	5.9
	Task performing	web surfing	274

Typing	151	29.5
Playing games	75	14.6

BH: both hands hold, BT: both thumbs typing, RT: right thumb typing, LH: left hand hold, LT: left thumb typing, IT: right index typing.

For the general posture, there were 28.7% of the subjects using their smartphone in an asymmetry posture, 74.8 % were observed in their sitting posture.

For the neck and trunk positions, eighty-one percent of the smartphone users were using their phones in a mild to severe neck flexion posture; there were 44.4 % users maintained their trunk in a non-neutral position, such as leaning forward on the tables or legs, or in a flexed position. When comparing the gender difference, it was found that more females (86.8%) tend to have a flexed neck posture than males (74.7%) when they are using their smartphones (p=0.031).

Table 2 Posture and typing styles by gender (n=512)

		Male		Female		p-value
		n	%	n	%	
Gender		238	46.5	274	53.5	
Posture	symmetry	171	71.8	194	70.8	
	asymmetry	67	28.2	80	29.2	
View angle	upper	14	5.9	9	3.3	
	Mid	31	13.0	39	14.2	
	Lower	193	81.1	226	82.5	
General position	standing	57	23.9	72	26.3	
	Sitting	181	76.1	202	73.7	
Neck	neutral	60	25.2	36	13.1	
	Mild flexion	85	35.7	120	43.8	
	Moderate flexion	93	39.1	118	43.1	p=0.031
Trunk	neutral	113	47.5	175	63.8	
	Flexion	105	44.1	83	30.2	
	Extension	20	8.4	16	5.8	
Shoulder	not-protracted	156	65.6	166	60.6	
	Protracted	82	34.4	108	39.4	
Upper arm	neutral	134	56.3	182	66.4	
	Non-neutral	104	43.7	92	33.6	
Elbow	neutral	84	36.2	58	21.2	

Forearm	Non-neutral	152	63.8	216	78.8	p=0.019
	neutral	97	40.8	95	34.7	
	Supinated	99	41.6	89	32.5	
	Pronated	42	17.6	90	32.8	
Wrist	neutral	42	17.6	40	14.6	
	Non-neutral	196	82.4	234	85.4	
Typing style	BH BT	80	33.6	71	25.9	p=0.005
	BH RT	62	26.1	37	13.5	
	LH LT	25	10.5	21	7.7	
	BH RT	24	10.1	39	14.2	
	LH IT	35	14.7	88	32.1	
	Others	12	5.0	18	6.6	
	Task performing	web surfing	129	54.2	145	
	Typing	53	22.2	98	35.8	
	Playing games	53	22.2	22	8.0	

BH: both hands hold, BT: both thumbs typing, RT: right thumb typing, LH: left hand hold, LT: left thumb typing, IT: right index typing.

For the upper extremities, there are 37% of the subjects using their arm in a protracted position. There are 38% of the subjects kept their upper arm in a non neutral position, 72% kept their elbow in a non neutral position, and 63% kept their forearm in a non neutral position. When comparing the gender difference, it was found that more females (78.8%) tend to have an elbow flexed posture than males (63.8%) when they are using their smartphones (p=0.019).

For the typing style, the leading three typing strategies were (1) both hand hold, both thumb typing (29.5%), (2) left hand hold, right index typing (24%), (3) both hand hold, right thumb typing (19%). However, male and female users preferred to use different strategies. Males like to use both hand hold, both thumb typing strategy (33.6%), but females like to use left hand hold, right index typing (31.6%).

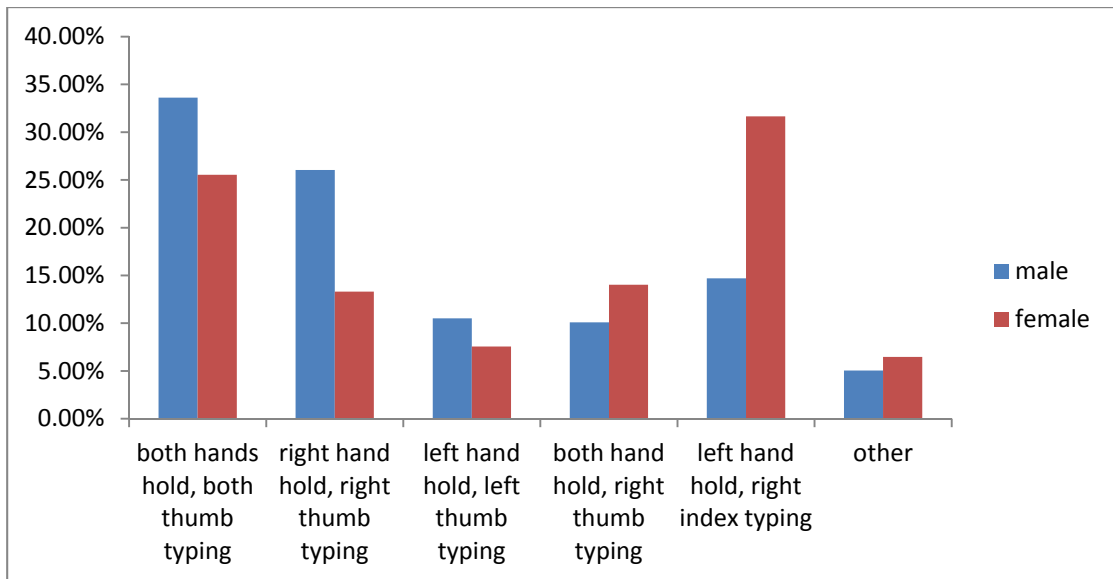


Figure 1. Comparison of typing styles between genders.

For the task performing, most of the users use their smartphones for web surfing (53.5%). When comparing the gender difference, women prefer to use their smartphone to chat (typing task), but men likes typing and games equally.

Discussion

The present study aims to characterize the postures and typing styles of the smart phone users in Taiwan. The author would also like to compare the gender differences on posture control for the smartphone users.

A high percentage of flexed neck, non-neutral elbow, forearm, and wrist postures were found. Women tend to have a higher percentage of flexed neck than men while they are using smartphones. A greater proportion of females than males were found to have non-neutral elbow, especially on the typing side. Moreover, their favorite typing styles were different.

A high percentage of flexed neck, non-neutral elbow, forearm, and wrist postures were found. These percentages are even higher than the musculoskeletal symptoms of the computer users (Cho, 2012). Although the relationship between non-neutral postures and pain are still not clear, high prevalence of the musculoskeletal symptoms among smartphone users needs more attention from medical professionals.

Women tend to have a higher percentage of flexed neck and flexed elbow than men while they are using smartphones. This phenomenon might be due to women generally hold their phones closer to their body which leads to these non-neutral postures.

For the typing style, the leading strategy was: both hands hold, both thumbs typing (29.5%). However, significant differences were found between genders. Males like to use both hand hold, both thumb typing strategy, but females like to use left hand hold, right index typing. This might be due to the preferred task difference between genders. Women likes to chat or use message system, which requires them to hold the phone closer to their body. Men like to plays games and the distance can be farer than typing. Therefore, they can hold their phone in a farer distance. Besides, different hand size may be another factor.

Conclusion

The results of the current study showed a high percentage of flexed neck and elbow postures during smartphone use. They also have a high percentage to keep their forearm and wrists in a non-neutral position. Besides, females had a higher percentage to have flexed neck and elvow which may indicate they tend to

demonstrate more extreme postures in these two regions. When considering the musculoskeletal symptoms among smartphone users, not only we need to focus on their working postures, gender issue cannot be neglected.

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WCPT2015 記事

四年一度的 WCPT 於 5/1 在新加坡開幕，有來自世界 114 個國家的物理治療師前來參加這個盛會。台灣這次共有一百多位 PT 前來，也算是回報多年來理事長 Dr. Moffat 對台灣的愛護。

這一次的大會，對於 104 級碩班同學也特別有意義，因為有七位同學要報告，來新加坡算是他們班的畢業旅行。而到達的第一天晚上，由台灣到新加坡工作的物理治療師們作東，在餐廳宴請老師們。這場宴會在餐廳席開三桌，師生們齊聚一堂，相談勝歡。目前在獅城工作的成大校友有陳源泰、盧建甫(99)、賴忠駿(95)、賴華聖(102)、蔡銘恩(102)、李文中(91)、陳宛蓉(103)等人。對談內容裡談到新城的 PT 們有非常大的自主權，強調以病人為中心的 approach 以及 clinical reasoning 的重要性。物理治療師有相當大的自主權，但 PT 也必須負較大的責任，比如說輪夜班，以及周末都要輪著上班等等。我也和校友們約好，下次回台灣要記得回校給學弟妹演講。

5 月 1 日的開幕在新加坡 Suntec convention center 展開。數千位物理治療師可以一起在演講廳裡看表演、聽演說，算是相當宏偉的場地。現任理事長 Dr. Moffat 強調這是一個難得的機會，讓世界各地的 PT 能夠聚在一起互相學習。新加坡健康部的部長 Dr. Yong 也指出，老化是全世界必須一起面對的議題，我們 PT 必須一起努力，讓我們的銀髮族更加 Healthy & Fit。

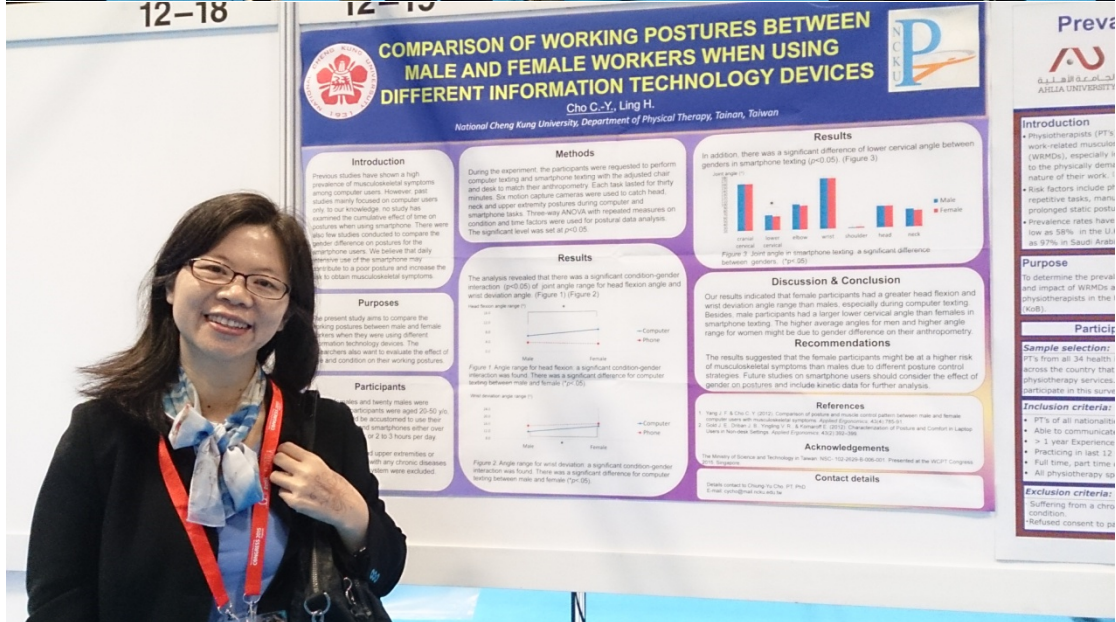
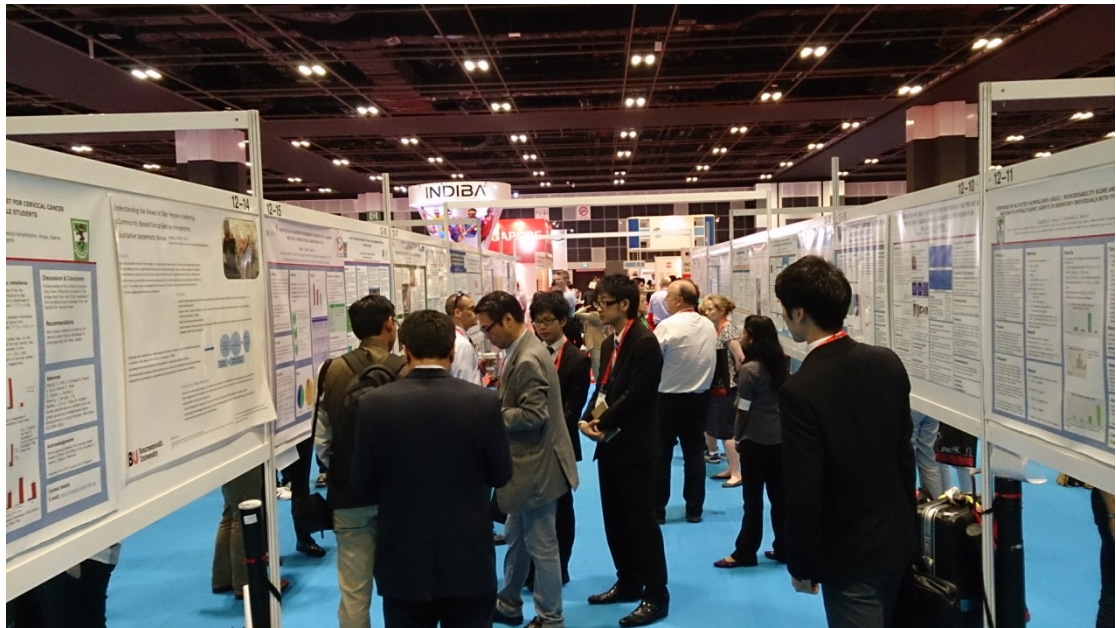
大會第二天我選擇參與聽講的議題是慢性疼痛的議題與中風的復健。慢性疼痛患者的復健學者們提到可以利用 Intervention Buffet 提供給 chronic pain 的病人，可以提升治療的效果 self-efficacy。而學生中午的海報報告也相當順利。



台灣物理治療學會理事長與成大師生合影

第三天的日程主要安排去聽學生報告以及 Dr. Szeto 的演講，Szeto 的 presentation 主要是強調 ergometer training in posture。除了用改善人因的方式來治療職場傷害的病患，她還用 EMG Biofeedback 來訓練病患學習自我改善姿勢，是相當有趣的介入。

最後一天我選擇參加的是 Physical Therapy Journal Chief Editor Dr. Craik 的 Poster walk 和 Dementia 病患之 exercise Intervention。Dr. Craik 以豐富的經驗帶領讀者導讀每一篇海報。在後者，作者 Mia Conradsson 則強調 High Intensity Functional Exercise 對 Non-AD type 的男性臨床效果比較有效。而中午的報告也相當順利，還認識了來自澳洲的學者 Jenny Legge，希望以後有機會邀他來台演講。



除了開會也不忘參觀獅城的風景名勝。新加坡是個擁有多元種族的國家，包括馬來人、華人、印度人等等。著名的景點是魚尾獅，克拉碼頭，金沙酒店等。跟著學生白天開會，晚上走路跑行程，年紀漸長的我每天都累到必須將雙腳抬高，但卻收穫滿滿。新加坡的大學物理治療教育雖然不及我們，但臨床有來自世界各地的物理治療師，提供多元文化的學習機會，因此較台灣的臨床更加先進，希望以後成大的同學有機會到獅城的醫院實習。

科技部補助計畫衍生研發成果推廣資料表

日期:2016/01/29

科技部補助計畫	計畫名稱: 運動處方與人體工學介入對智慧型手機使用者骨骼肌肉系統傷害之療效(A03)
	計畫主持人: 卓瓊鈺
	計畫編號: 103-2629-B-006-002- 學門領域: 性別主流科技計畫
無研發成果推廣資料	

103年度專題研究計畫研究成果彙整表

計畫主持人：卓瓊鈺		計畫編號：103-2629-B-006-002-					
計畫名稱：運動處方與人體工學介入對智慧型手機使用者骨骼肌肉系統傷害之療效(A03)							
成果項目		量化			單位	備註（質化說明： 如數個計畫共同成果、成果列為該期刊之封面故事...等）	
		實際已達成數（被接受或已發表）	預期總達成數（含實際已達成數）	本計畫實際貢獻百分比			
國內	論文著作	期刊論文	0	0	100%	篇	writing in process.
		研究報告/技術報告	0	0	100%		
		研討會論文	2	2	100%		related conference papers
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	4	2	200%	人次	
		博士生	0	0	100%		
博士後研究員		0	0	100%			
專任助理		1	1	100%			
國外	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
博士後研究員		0	0	100%			
專任助理		0	0	100%			
其他成果 （無法以量化表達之 成果如辦理學術活動、 獲得獎項、重要國際 合作、研究成果國際 影響力及其他協助		none					

產業技術發展之具體效益事項等，請以文字敘述填列。）			
	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與(閱聽)人數	0	

科技部補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

達成目標

未達成目標（請說明，以100字為限）

實驗失敗

因故實驗中斷

其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文： 已發表 未發表之文稿 撰寫中 無

專利： 已獲得 申請中 無

技轉： 已技轉 洽談中 無

其他：（以100字為限）

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以500字為限）

我們總共收集了512位手機使用者的資料，包括238位男性與274位女性。研究結果顯示，手機族容易在頸部(81.2%)、手肘(71.9%)、前臂(62.5%)與手腕(84%)產生較不當的姿勢。在性別差異方面，我們發現女性較男性有較高比例的頸部彎曲($p=0.031$)，手肘彎曲($P=0.019$)。而女性在操作手機時，最喜歡用左手拿右手食指輸入($p=0.005$)，而男性則是雙手拿雙拇指輸入。兩性都最喜歡用手機上網，但男性用手機玩電動次之，女性則是手機打字排名第二。本篇研究發現智慧型手機使用者發生頸部、手肘過多彎曲角度的比例相當高。前臂與手腕也容易處在非正中姿勢。這些都是造成後續頸部痠痛，手部手腕隧道症候群的危險因子。女性在頸彎曲與手肘彎曲的比例明顯較男性為高，這意味著她們容易在此兩部位呈現較極端的姿勢，後續也可能造成此兩部位的骨骼肌肉系統症狀。我們的研究結果建議在介入智慧型手機使用者的骨骼肌肉系統症狀時不但要注意他們在使用時的姿勢，同時也要考慮性別差異。研究結果可提供手機設計部門與醫療相關人員做參考。