



12-1-1986

Chronic Injuries in Musical Practice

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Recommended Citation

Tzeng, Sheng-Jye; Chen, Guo-Uei; and Hsu, Tao-Chang (1986) "Chronic Injuries in Musical Practice," *Rehabilitation Practice and Science*: Vol. 14: Iss. 1, Article 6.

DOI: <https://doi.org/10.6315/3005-3846.1696>

Available at: <https://rps.researchcommons.org/journal/vol14/iss1/6>

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音樂演奏者之慢性傷害研究

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本文調查國內 339 位研習古典音樂人士，包括國立師大附中音樂班，國立藝術學院音樂系及其他音樂從業人員，統計及分析長期演練樂器所可能造成之傷害，俾供醫學界及音樂界人士參考，進而重視音樂傷害，發展音樂醫學。結果發現 61% 在其演奏生涯中有過一次以上因演奏而造成之身體不適。且症狀持續達一週以上。其中最常發生之症狀是慢性疼痛 (72%) 最易發生症狀之部位為頸部 (48%)，且以右側居多。最易發生症狀的是鋼琴 (70%)，尤其採用高指位彈法 (89%)。症狀發生與演練年數無正向關係。

前言

音樂最能美化人生，陶冶性情，增進生活的品質，是一種最佳的昇華藝術。近年來國民生活水準大幅提高，學習音樂的人口已大大的增加，但隨著亦發現一些長期演練樂器所帶來的問題。音樂家，過去沒有人會想到他們就是運動家，事實上他們的確是超級運動家。有些人一年要演奏近百場演奏會，加上勤奮的練習，其運動量是相當驚人的。要欣賞音樂是非常舒服、容易，但要演奏出優美且有水準的音樂則必須付出相當的代價。嚴師指導加上自我督促，使音樂家視受傷為自然，必須忍受。這種情形在音樂系走學院派路線者尤為多見。

藝術家 (音樂家、舞蹈家等) 透過多樣的藝術形式和呈現，撫慰受創的心靈，本身卻因長期的演練而受傷。以往醫學界對這些表演藝術傷害 (Performance Injury) 並未給予應有的重視。近來國外興起一門專業醫學，稱為「表演藝術醫學」 (Performance medicine) 其中的「音樂醫學」 (Musical Medicine)，專門處理音樂演奏者的傷害，最有名的是美國麻省總醫院音樂醫學部。國內醫學界則未見開始。鑑於音樂傷害對音樂家之

音樂生涯有鉅大影響，榮總復健部毅然踏出第一步，開展「音樂醫學」。

方法

(一) 本研究採問卷調查 (對 339 位音樂從業人員) 內容包括姓名、性別、年齡、演練樂器種類，已練習年數，每日練習時數，指法技巧派別 (專指鋼琴)，症狀種類及部位，過去醫師診斷及治療。

(二) 特殊病例由家長、教授轉介至榮總復健部門診，自 74 年元月份至 75 年 6 月底，共 32 病例，先作一般理學檢查，再深入探查及治療，最後對各病例進行統計及分析。

結果

各項統計及分析結果如下：

(一) 339 位長期演練樂器的音樂從業人員 (主修鋼琴、小提琴、大提琴，練習年數 9 ~ 18 年，每日練習時數 3 ~ 5 小時) 有 61% 在其演奏生涯中有過一次以上因演奏而造成身體之不適，且症狀持續達一週以上。

(二) 最常發生的症狀是慢性疼痛 (72%)。

(三) 最易發生症狀的部位是頸部 (48%)，其次為手臂，手指 (尤其是小指)，肩部、手

腕，下背部。

(四)症狀發生于右側較多(80%) (表1)

(五)最易造成症狀之演練樂器是鋼琴(70%)，其次為小提琴，大提琴。(表2)

(六)最易發生症狀之鋼琴指法是高指位彈法(89%)，其次為混合指法及自然指法。(表3)

(七)症狀發生與樂器練習年數並無明顯正相關($r = 0.14$) (表4)

(八)門診最常見診斷是頸椎症候羣(31%)其次是肌腱炎、肌肉筋膜炎、神經壓迫、腰椎症候群。(表5)

討 論

根據美國麻省總醫院音樂醫學部Dr. Hochberg及Dr. Leffert之報告(1)，造成此種慢性傷害之原因非常複雜，可能因素包括樂器種類、指導教授、特殊教法或學校、練習曲目種類(巴洛克、古典或現代樂派)，特殊技巧之練習(和弦、八度、顫音、琶音)一般身體狀況、左右手使用習慣、姿勢、手指在鍵盤上之位置、演奏練習總量、開演奏會的頻率、平常從事的運動，對音樂練習，音樂生涯及對疼痛的基本態度。

本研究目前無法就上述因素一一作詳細探討，僅就鋼琴的技巧、指法與慢性傷害的關係作初步的分析。鋼琴指法一般可分成高指位彈法(即傳統彈法)、自然指位彈法、混合彈法三種。(4)由於高指位彈法較易引起肌肉群長時間處在高張力的狀態，因而造成肌肉疼痛，通稱為(Pianist's cramp)，但其間關係並不單純，可能與Dr. Hochberg報告之多項因素有關。指法並無絕對錯誤，需視個別狀況而定(隨練習曲的形式、個人的肌力、耐力、柔軟度各有不同的適應差異)不一定會發生症狀。

根據文獻報告鋼琴家易患Pianist's Cramp, Chronic Arthritis, De Quervain's disease, Carpal tunnel

Syndrome, Guyon canal syndrome, (1)(2)(3)(4)(6)，小提琴家易患Violinist's cramp, Digital nerve injury, Pseudo carpal tunnel syndrome 等(7)(8)，音樂家易患的心理疾病包括憂鬱症、轉化症及酒精中毒。(1)

症狀發生與演練年數並無明顯正相關。主要的原因可能在於音樂傷害涉及的層面很廣，慢性疼痛本身也不單純。此外有的演奏者，一旦受傷在早期就退離音樂生涯，有的則身心與技巧功力愈見成熟，症狀因而減輕或消除。因此演練年數愈長，不一定症狀愈多。

總而言之，音樂傷害的原因並不單純，最可能的原因在於練習過量(1)，姿勢不良，指法不當以及選擇不適合生理解剖構造的曲目(如艱深的巴洛克音樂)(3)。此外還有一個重要因素就是當前世界上有許多演奏技巧的著作，卻罕有作者將這些技巧與身體結構整合起來共同討論研究。(1)(4)有關的慢性傷害尚在研究、調查中，希望能提供國內有志於音樂醫學之專家一些參考。

表一

種類	症 狀		總 和
	右 側	左 側	
鋼 琴	120 (82 %)	25	145 位
小 提 琴	40 (78 %)	11	51 位
大 提 琴	6 (54 %)	5	11 位
總 和	166 (80 %)	41	207 位

表二

種類	有 症 狀	無 症 狀	總 和
鋼 琴	145 (70 %)	60	205 位
小 提 琴	51 (50 %)	50	101 位
大 提 琴	11 (33 %)	22	33 位
總 和	207 (61 %)	132	339 位

表三

指法種類	有症狀	無症狀	總和
高位指法	82 (89 %)	10 位	92 位
自然指法	30 (46 %)	35 位	65 位
混合指法	33 (68 %)	15 位	48 位
總和	145 (70 %)	60 位	205 位

表四

練習年數	症狀人數
9	35
11	16
12	74
14	28
15	30
16	17
18	7
r=0.14	

表五

門診 32 位慢性疼痛病人之診斷

診斷	病人數目	%
頸椎症候群	10	31
肌肉筋膜炎	7	21
肌腱炎	5	15
神經壓迫	5	15
腰椎症候群	3	9
無特定診斷	2	6

CHRONIC INJURIES IN MUSICAL PRACTICE

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We describe our experience with 339 musical students in whom occupation related chronic injuries developed. We analyzed and discussed the possibilities of chronic injuries on account of longterm instrument-performing in order to emphasize the importance of musical medicine and to draw attention to musical injuries of musical fields. We found that 61% of the examinees complained of at least one instance of somatic discomforts. These symptoms persisted at least one week and were directly due to instrument-performing. Most commonly found symptom was chronic pain (72%). Most common lesion was in cervical area (48%) with right side predominance. Most symptom-inducing instrument was piano (70%), most especially those using high finger group. There was no obviously positive correlation between chronic injuries and the total number of years practiced.

Reference:

- Hochberg F: Hand difficulties among musicians. JAMA. 249; 1869-1872, 1983.
- Henson RA, Ulrich H: Schumann's hand injury. Br Med J. 1; 900-903, 1878.
- Poore GV: Clinical lecture on certain condition of the hand and arm which interfere with the performance of professional acts, especially piano playing. Br Med J 1; 441-448, 1887.
- Ortmann O: The physiological mechanics of piano technique. London, Kegan Paul Trubner and Co Ltd. 1929.
- Critchley M RA: Music and the brain. London, William Heinemann Medical books Ltd, 1977.
- Lettin AWF: CTS in childhood: Report of case. JBJS 47; 556-559, 1979.
- Jablecki C: Unsuspected digit nerve lesion. Arch. Phy Med & Reh. 63; 135-138, 1982.
- Gardner RC: Confirmed case and Dx of pseudo-carpal tunnel syndrom in violinist. N Engl J. Med. 282; 858, 1970.

SEXUAL DYSFUNCTION IN MALE SPINAL CORD INJURIES

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The present study is conducted with a purpose of disclosing the condition of sexual dysfunction in our spinal cord injuries (SCI). Totally 134 cases of SCI who had suffered for at least 6 months and had been admitted to the ward of the department of physical medicine and rehabilitation of NTUH were studied by questionnaire. Fifty five replies were obtained and only 45 data of male cases were analysed. Ten cases were excluded because 2 male cases had perished and the replies of 8 female cases were incomplete. The range of age of these 45 cases is 20 to 57 years old and the average of duration from onset is 5.3 years. It was found that erection was preserved more than ejaculation. Cases with higher cord lesion are more liable to retain erection than those with lower lesions, and the reverse is true of ejaculation. The patients still have chances of delivering progeny. It is suggested that sexual counseling for SCI patients is required and medical treatment for sexual dysfunction should be done without delay.

Key words: Sexual dysfunction, spinal cord injury.

Spinal cord injury is such a devastating disaster that one who suffers from it may be confronted by multi-faceted disabilities. These disabilities include sensory-motor dysfunction (paraplegia or quadriplegia with or without respiratory distress), autonomic dysfunction (neurogenic bladder, neurogenic bowel, sexual dysfunction and autonomic dysreflexia) and some complications (pressure sore, renal failure and respiratory failure). Another frustrating fact is that most of the spinal cord injuries (SCI) are in the golden time of their lives. These numerous factors make the management of spinal cord injury in rehabilitation so difficult that only a team work with good financial support and good rehabilitation facility can render SCI a good service.

In our country, elaborations have been paid to the above disabilities and the results of cares are usually good except sexual dysfunction. Sexual dysfunction is frequently encountered in SCI, especially in male patients. However there is still no good facility of sexual counseling in our country. In addition, there is no report about the general picture of sexual dysfunction in our SCI, although many foreign reports have been published on the subject during past 20

years. Therefore, a survey is urgently needed in order to help us to set up a rehabilitation program for the sexual dysfunction of our SCI patients in future.

MATERIAL AND METHOD

Patients who had suffered from spinal cord injury for at least 6 months and had been admitted to the ward of department of physical medicine and rehabilitation of NTUH were chosen as our study group. Totally 134 cases were enrolled according to the above criteria. The level of injury to the spinal cord and the extent of the lesion were registered from their clinical charts.

It is well known that in Chinese society the concept about sex is much conservative. Hence a frank interview with our patients about their sexual problems will be difficult and the result is expected to be unreliable. So questionnaire was used instead of interview. The questions for male cases were focused on the ability of erection, ejaculation and delivering progeny and that of female cases were menstrual dysfunction and the ability of delivering progeny. The questionnaires were delivered to these 134 cases by mail. Their names need not be registered on the reply sheet so that their privacies would not be disturbed. The answers were added to the collected data of each case for further analysis.

There were 55 replies obtained (41.4%). Among them, 2 male cases had deceased. There were only 8 female cases whose answers were all incomplete. All these 10 cases were excluded from the study. The age of remaining 45 cases ranged from 20 to 57 years old with the average age of 33.9 years old. The duration from the onset of SCI till the date of study ranged from half an year to 14 years with an average of 5.3 years.

Among these 45 male cases 15 had cervical (C) cord lesion (10 were complete and 5 were incomplete), 20 had thoracic (T) cord lesion (15 were complete and 5 were incomplete) and 10 had lumbosacral (LS) cord lesion (7 were complete and 3 were incomplete) (Table 1). Cases who had cervical and thoracic cord lesions are listed to upper motor neuron lesion (UMNL) group and those who had lumbosacral cord lesion are listed to lower motor neuron lesion (LMNL) group. UMNL

group has 35 cases and LMNL group has 10 cases.

RESULT

In general, 33 cases had erection (73.3%), 10 cases had experience of coitus (22.2%), 17 cases had ejaculation (37.8%), and 3 cases delivered progenies (6.7%) (Table 2). Table 3 shows the relationship between the level of injury and erection. Among 15 cases with C-cord lesion, 12 cases had erection (80%). Similarly, 14 cases of 20 T-cord injuries (70%) and 7 cases of 10 LS-cord injuries (70%) had erection. Table 4 shows that the presence of ejaculation among C-cord lesion is 20% (3 cases), that of T-cord is 45% (9 cases) and LS-cord is 50% (5 cases). If the severity of lesion is taken into account, as shown in table 5, 17 cases in UMNL group with complete lesion had erection (68%), 7 cases had ejaculation (28%) and no case delivered progeny (0%). While in cases with incomplete upper motor neuron lesion, 9 cases had erection (90%), 5 cases had ejaculation (50%) and 1 case delivered progeny (10%). In complete LMNL group, 6 cases had erection (85.7%), 3 cases had ejaculation (42.9%) and no case delivered progeny (0%), however, in cases with incomplete lesion, 1 case had erection (33.3%), 2 cases had ejaculation (66.7%) and 2 cases delivered progenies (66.7%). Table 6 shows 23 cases in a total of 32 complete lesion cases had erection (71.9%) and 10 cases had ejaculation (31.3%). In 13 incomplete cases, 10 cases had erection (76.9%) and 7 cases had ejaculation (53.8%).

DISCUSSION

There are three main phenomena consist in male sexual function: erection, ejaculation and orgasm. (1) Erection is achieved by tumescence of the penile corpora through hyperemia. This is mediated by parasympathetic nervous system and, to a lesser extent, the sympathetic nervous system. (2) Ejaculation includes two parts: seminal emission and ejaculation proper. Seminal emission is caused by peristalsis of the smooth muscles of vasa deferentia, seminal vesicles and prostate. This phase is dependent on the sympathetic nervous system. Ejaculation proper is brought about by clonic contraction mainly of bulbospongiosus and ischiocavernosus muscles and also of the muscles of the pelvic floor. This phase is under the control of somatic nervous system. (3) Orgasm is a sensation caused by contraction of the smooth muscles of the internal sexual organs and the striated muscles of the perineum and pelvic floor, coinciding with seminal emission and ejaculation proper. The regulation of these controlling nervous systems is further achieved by many centers located in the central nervous system. The higher centers in the brain are cerebral cortex and

the sympathetic and parasympathetic nuclei of the hypothalamus. In the spinal cord, there are two centers for erection: a parasympathetic center located in S₂ to S₄ segments, known as the reflexly activated center, and a sympathetic center located in T₁₁ to L₂ segments, known as the psychogenically activated center. For seminal emission, there is a sympathetic center extending from T₁₁ to L₂. There is a somatic center, also located in S₂ to S₄ segments, for ejaculation proper. The spinal sympathetic and parasympathetic centers are activated through different ways. When the senses of smelling, hearing, touching, tasting and vision of those sexually exciting things reach the cerebral cortex or when there is a sexual desire, the cerebral cortex send the impulses to the hypothalamic center and further to the spinal sympathetic center. By the way of hypogastric nerve, erection and seminal emission are activated, so the spinal sympathetic center is also called a psychogenically activated center. On the other hand, the spinal parasympathetic center is known as a reflexly activated center, for the reason that when this center receives stimuli from external genitalia through pudendal nerve and pelvic nerve, it cause erection reflexly through pelvic nerve. If the stimuli are strong enough, the somatic center is also activated and ejaculation proper is induced through pudendal nerve.

The result from the damage of spinal cord on male sexual function has long been studied since 1948. Munro, Horne and Paul⁽¹⁾ conducted a study of 84 male patients with traumatic lesions of the spinal cord and found that 74% of those patients were still able to have erection and 7% had ejaculation. In the next year, Talbot⁽²⁾ reported on his study of 200 paraplegic patients and in 1955 on 208 more patients⁽³⁾. He found that more than two thirds of his patients had erection and one third of these were able to be responded by psychic stimuli. In addition, Talbot discovered that in more than three fourths of his patients, the pattern of sexual function was established within six months of injury. These findings were confirmed by Zeitlin, Cottrell and Lloyd in 1959⁽⁴⁾. They reported that 64% of their 100 patients had erection and 3% had ejaculation. In 1960, Bors and Comarr⁽⁵⁾ published a large survey of 529 patients. They divided these patients into 4 groups: complete upper motor neuron (UMN) lesions, incomplete UMN lesions, complete lower motor neuron (LMN) lesions and incomplete LMN lesions. They discovered that erections were more common in patients with UMN lesions than in those with LMN lesions regardless of whether the lesion was complete or incomplete, though it was originally expected that those with incomplete lesions should have better function than those with complete

lesions of the same type. On the contrary, the incidence of ejaculation was higher in LMN lesion group. In 1972, Tarabulcy⁽⁶⁾ made a good review about sexual function in the normal and in paraplegia. He collected 6 series of previous reports comprising 1296 patients (Munro et al, 1948; Kuhn, 1950; Talbot, 1955; Zeitlin et al, 1959; Bors and Comarr, 1960 and Comarr, 1970). He pointed out three major factors that influence the clinical results of spinal cord injury on sexual function. These three factors are:

1. The different vulnerability of various functions. As shown in table 2, Tarabulcy found that erection was preserved seven to eight times as often as ejaculation and that successful coitus was reported in less than half of the patients who had erection. The reasons for this kind of difference are psychological and social factors, muscular disability and, in some cases, short-lived erections.⁽⁶⁾

2. The level of the cord lesion. Table 3 and 4 show the relationship between the level of lesion and erection and ejaculation separately. Erection is more frequently seen in the patients with higher lesions. This is due to the fact that a longer caudal stump means more synapses preserved and presumably greater facilitation. On the contrary, the incidence of ejaculation increases with a descending level of the lesion.⁽⁶⁾ Fitzpatrick postulated that the reason for the lower incidence of ejaculation in patients with higher cord lesions is that when cerebral control is lost, the sacral center is able to inhibit emission of sperm. In normal men, the cerebral impulses are able to facilitate the ejaculation. While in patients with lower cord lesion, the cerebral impulses are still able to reach the thoracolumbar cord where the sympathetic nerve functions are carried out.⁽⁷⁾ This is why Tarabulcy emphasized that in patients with sacral lesions ejaculation is not projectile but dribbling in nature.⁽⁶⁾

3. The extent of the cord lesion. Table 5 and 6 reveal that sexual function is much better with a partial cord lesion than with complete transection. This is true for either group, UMNL or LMNL.

The fertility rate of male SCI is only around 5%, as a result of decreased successful coitus, loss of ejaculation, impaired spermatogenesis, and scarring and blockage of the seminal passages.⁽⁶⁾ However, it is worth emphasizing that male SCI still have a chance to make their sex partner fertilized.

In comparison with the results of Tarabulcy's review, the results of the present study have the same tendency in every aspect except some differences, such as more erection incidence in our complete LMNL group than in incomplete one and higher rate of progeny in incomplete LMNL group, probably due to small sampling size.

The study of Hanson and Franklin⁽⁸⁾ had showed that paraplegics rated the sexual dysfunction as the least of their major functional loss resulting from the injuries: 52% of the patients thought the loss of the use of their legs the most important, 35% of the patients thought the loss of control over bowel or bladder the most important, while only 13% of the patients most concerned of the loss of sexual functioning. However, our male SCI patients still need helps in counseling of their sexual dysfunction, especially when the other aspects of physical dysfunctions have been rehabilitated.

REFERENCES

1. Munro D, Horne HW Jr, Paull DP: Effect of injury to spinal cord and cauda equina on sexual potency of men. *N Engl J Med* 239; 903-911, 1948.
2. Talbot HS: Report on sexual function in paraplegics. *J Urol* 61; 265-270, 1949.
3. Talbot HS: Sexual function in paraplegia. *J Urol* 73; 91-100, 1955.
4. Zeitlin AB, Cottrell TL, Lloyd FA: Sexuology of paraplegic male. *Fertil steril* 8; 337-344, 1957.
5. Bors E, Comarr AE: Neurological disturbances of sexual function with special reference to 529 patients with spinal cord injury. *Urol survey* 10; 191-222, 1960.
6. Tarabulcy E: Sexual function in the normal and in paraplegia. *Paraplegia* 10; 201-208, 1972.
7. Fitzpatrick WF: Sexual function in the paraplegic patients. *Arch Phys Med Rehabil* 55; 221-227, 1974.
8. Hanson RW, Franklin MR: Sexual loss in relation to other functional losses for spinal cord injured males. *Arch Phys Med Rehabil* 57; 291-293, 1976.

Table 1. The level and extent of lesions in 45 SCI patients

	Complete	Incomplete	Total
UMNL			
Cervical	10	5	15
Thoracic	15	5	20
LMNL			
Lumbo-sacral	7	3	10
Total	32	13	45

UMNL: upper motor neuron lesion
LMNL: lower motor neuron lesion

Table 2. Sexual function in male spinal cord injuries

	Tarabulcy (%) (N=1296)	Chen et al (%) (N=45)
Erection	77	73.3
Coitus	35	22.2
Ejaculation	10	37.8
Progeny	3.4	6.7

Table 3. The relationship between the level of lesion and erection

	Tarabulcy (%) (N=808)	Chen et al (%) (N=45)
Cervical	93	80
Thoracic	74	70
Lumbar	63	70
Sacral	55	

Table 4. The relationship between the level of lesion and ejaculation

	Tarabulcy (%) (N=209)	Chen et al (%) (N=45)
Cervical	3	20
Thoracic	6	45
Lumbar	14	50
Sacral	14.3 *	

* Dribbling

Table 5. Sexual function with various types of spinal cord injury

		Erection (%)		Ejaculation (%)		Progeny (%)	
		T*	Ch**	T	Ch	T	Ch
UMNL	Complete	93	68	5	28	1	0
	Incomplete	99	90	32	50	6	10
LMNL	Complete	26	35.7	18	42.9	5	0
	Incomplete	90	33.3	70	66.7	10	66.7

*T:Tarabulcy **Ch:Chen et al

Table 6. The relationship between sexual function and the extent of lesion

		Erection (%)	Ejaculation (%)
Complete	N=32	71.9	31.3
Incomplete	N=13	76.9	53.8