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Musculo-Skeletal Problems in Fiddlers

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提琴手在骨骼肌肉系統方面的問題

陳曼文　連倚南*

由於拉中、小提琴的特殊姿勢——以左下顎、左肩夾琴，以左姆指、左手持琴，在提琴手間引起不少的骨骼肌肉系統方面的問題，其中又以左邊爲多。據文獻上記載的有：提琴手的頸部、提琴手的痙攣症、頸椎退化性關節炎、滑膜炎及骨性關節炎等。本文擬對提琴手常見的骨骼肌肉系統問題做一調查，以了解症狀的發生與拉提琴之間的關係以及影響的肌肉群是否有其特殊性？

本文以聯合實驗管絃樂團，臺北市立交響樂團、師大及輔大音樂系以及師大附中初、高中音樂班和南門國中音樂班的主、副修中、小提琴手爲對象。據估計，兩個樂團及四個學校的提琴手約160人左右，回收的問卷有72份，包括主修54人，副修18人。本文即以回收的問卷爲依據並找出13位有症狀的人加以進一步的理學檢查，以研究症狀發生的部位及影響的肌肉。

症狀發生率在全部72人中爲80.6％，在54位主修者中爲83.3％。發生率的高低與年齡、幾歲開始學琴、每天練琴時數以及學琴的年數等因素無特別有意義的關係。約30％受查者的症狀只在拉琴時出現；另12.5％的人可因拉琴而加劇原本即有的症狀；還有另外的12.5％人，在拉完琴後才會感到症狀的出現。約35％的受查者，其症狀在拉完琴後3小時內消失，有18.1％的人整天都感到不舒服。多數症狀以痛來表現（佔69％），部位則以左肩爲最多（41.9％），而有54.2％的人以休息，停止練琴來減輕症狀。

由十三位接受理學檢查者中可發現，僧帽肌（trapezius）、提肩岬肌（levator scapulae）以及後上鋸肌（serratus posterior superior）是較常受影響的肌肉。此外還發現二例具有功能性駝背者其症狀較爲嚴重，一位有脊椎間韌帶扭傷及脊椎旁肌肉受傷問題，另一位有肋肩岬症候群（Costoscapular syndrome）。

本調查所得的症狀發生率爲80.6％比過去所發表的研究，如：Fry（大於50％），Hochberg（45％）及曾盛杰（50％）的報告爲高，可能是因爲症狀採取的標準不同。若將在調查中症狀於練琴完3小時內即消失的例數去除，則發生率降爲45.8％，就與其它報告的數據非常接近。

受傷的肌肉群與拉琴的姿勢有密切關係。由解剖及肌肉動力學看，左邊僧帽肌、提肩岬肌及右邊的僧帽肌、後上鋸肌所承受的壓力較大，也較易受傷。此外，具有駝背傾向者，其肌肉負荷較大，症狀亦較厲害。

一般而言，症狀可以以改變練琴方式（由持續的練改成間歇性的練習法），改變拉琴的技巧、改變習慣性的姿勢及藥物和物理治療來改善。

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MUSCULO-SKELETAL PROBLEMS IN FIDDLERS

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According to the questionnaries from 72 subjects of fiddle players, of whom 13 examined, the total rate of musculo-skeletal involvement was 80.6%. There was no obvious different rates between total subjects (including person who played piano or other instruments as a chief one) and the subjects who played violin or viola as a chief instrument.

The symptoms occurred most frequently on left side. The ratio between left and right side was 1.9: 1. The most frequently involved muscles were trapezius, levator scapulae and serratus posterior superior. This was closely related to the posture of playing.

Key works: fiddler, musculo-skeletal problems.

Introduction:

Due to the specific posture for fiddle (violin, viola) playing, holding the instrument one end between left chin and shoulder, the other end between left thumb and side of the left hand (1), the fiddlers suffer more from problems in left hand, arm and neck than pianists whose chief symptoms are in the right hand, forearm and arm (1,2). Fiddler's neck (3), fiddler's cramp (4), synovitis and osteoarthritis of violist (5) were mentioned in the literatures, but few report about the rate of occurrence and the details of muscle involvement among fiddlers. By using questionnaries and physical examination in some of them, the present report is intended to investigate the above questions.

Materials and Methods:

Survey was done to two orchestras and four schools which had special class of music with total estimated numbers of fiddlers around 160 and seventy-two questionnaries were returned of which 13 subjects were examed. Fifty-four subjects played violin or viola as a chief instrument for practice, 18 subjects played piano, harp or other instrument chiefly.

The subjects included 24 males, 47 females and one unknown. The age ranged from13 to 52 years old with majority older than 18. The average age was 22.4 years. Among them, 10 were junior high school students with age ranging from 13 to 15 years old, 7 were senior high schools students from 16 to 18 years old, and the rest were university or college students from 19 to 22 years old (29 subjects), or adult fiddlers of orchestra (25 subjects) (Table 1). Th average hour of daily practice was 1.9 hours in total subjects and 2.2 hours in the subjects who played the fiddle chiefly.

Results:

According to the questionnaries, the rate of symptomatic occurence such as pain, stiff, numb, weak sensations was 80.6% of the total subjects and the rate became 83.3% of the subjects who played fiddle chiefly. There was no definite meaning of the different rates among different age group (Table 1), different age for commencing fiddle playing (Table 2), different duration of daily practice hour (Table 3) and different duration of playing (Table 4). The rate between total subjects and the subjects who played fiddle as a chief instrument had no obvious envidence of difference.

As shown in table 5.30% of the symptomatic subjects got rid of symptoms while rest, but the symptoms could be reinduced by playing. Twelve point five percentages of the total subjects felt a little uncomfortable while rest, but the symptom could be aggravated by practice. Pain attack after discontinuance of playing was noted in 12.5% of total subjects also

Progressive stiffness while playing was noted in 8.3% of total subjects. One subjects had stiff sensation which could be relieved after playing. There were 5 subjects (10%) who had weakness feeling while playing. The other miscellanceous conditions accounted to 15.3% of total subjects.

The persistence of the symptom after ceasing playing distributed from less than 1 hour to whole day (Table 6). Thirty-four point seven percentage of total subjects had the duration of symptom less than 3 hours after discontinuance of playing. The symptom persisted for whole day was found in 18.1% of total subjects.

As noted in table 7, the symptom of pain was the most common compain, it accounted for 69.4% of the total subjects. Of which, the sore pain was 66.7% dull pain 22.2% and sharp pain 11.1% of total subjects. Stiffness, the second most complain was 18.1% and weakness 11.1%. The numbness was complained in only 4.2% of the total subjects.

The chief involvement sites of the symptoms were left side. The ratio between left and right side was 1.9: 1. As the questionnaire recordings (Tab. 8), 41.7% of total subjects had problem over left shoulder area. Left neck, left fingers, upper back and left arm were under almost the same rate of 23.6%, 22.2%, 22.2% and and 20.8% of total subjects respectively. The occurrence rate of right shoulder and left chin was 16.7% and 11.1% respectively of total subjects. The datas of other sites were all below 10%.

Most fiddlers (54.2% of total subjects) relieved their symptom by rest and 38.9% by massage (Tab. 9). Tapping, hot packing were used by 22.2% and 18.1% of total subjects respectively. The rates of drugs therapy, acupuncture and herb drug were all less than 5%.

Detail characteristics including site of symptom and the muscle involved of the 13 examinees were showed in table 10. There were 7 subjects with shoulder problems due to the trapezius muscle. Six of them appeared on left side while one on bilateral sides. Levator scapulae muscle was involved in 5 subjects with 3 over left side, one over right side and the other involving bilateral sides. The involvement of serratus posterior superior muscle was noted in 2 subjects over right side.

Tension nuchalgia with splenius and semisplenius cervicis muscle involved was found in one subject. The left deltoid, left pectoralis major, left abductor digiti minimus, right abductor pollicis brevis were all involved only one subject in each muscles. The right adductor pollicis brevis, opponens pollicis brevis and flexor pollicis brevis were involved in one subject who practiced "firm staccato" (a specific technique, to produce interrupted sound with long bow which requires very rapid right finger movement) continously for more than 30 minutes. The complain over right extensor carpi muscle area was noted in 2 subjects which was induced by changing technique for playing in one case and the other one had the symptom more closely relating to the piano playing.

There were 2 subjects with functional kyphosis. One had T7-T8 interspinal ligament sprain, paravertebral muscle and right serratus posterior superior muscle strain. The symptom over the right scapular area was aggravated while playing the down bow (playing the bow downward with the hand moving away the trunk). The other one had bilateral scapulocostal syndrome (chiefly bilateral levator scapulae muscle strain).

Discussion

The total rate of symptom among the total subjects and the subjects who played fiddle as a chief instrument (80.6%; 83.3%) was higher than the datas of others' studies such as Fry's series of overuse syndrome among musicians which occurred chiefly in the age group of 30 to 35 years old at the rate more than 50% (1). In Dr. Tzeng's study in 1986, it found that 50% violists had symptoms also (6). Hochberg's report of 100 musicians revealed 45% of musicians had inflammatory disorders of tendon or joint and 24% of musicians had disorders of poor muscle control (7). The symptoms occurred most frequently in the average age of 31 years.

The different rate was dependent on the different standard for evaluation. If the cases with very mild symptom were excluded as shown in table 6, the occurrence rate became 65.3% of total subjects and 68.5% of the subjects who played fiddle chiefly. If both very mild and mild groups were excluded, the rate of the total subject was 45.8% and 55.6% of the subjects who played fiddle chiefly. The rates were more close to the rates of other reports.

Another reason of the higher occurrence rate in this study was probably due to uneven distribution of the subjects with the person who had the symptom having stronger desire for answering the questionnarie.

Whether the symptom was due to overuse with or without inflammatory change or was due to poor muscle control, it annoyed musicians very much. They had to cease playing for certain periods, ortherwise, the effect of practice would be reduced. So, it's really a field should not be neglected.

From the view point of anatomy and kinesiology, the posture for holding the instrument between left chin-neck-shoulder area with left arm flexed for about 60°and abducted for about 60°needs the actions of left trapezius, anterior deltoid, coractobrachialis and supraspinatus muscles. The scapula is displaced anteriorly and laterally with the scapular muscles, such as levator scapulae muscle stretched. If one dones some action of addution instead of abduction, the left pectoralis major will be used.

According to the results (Table 8), the left shoulder-neck area was involved in 47% of total subjects (shoulder: 41.7%, neck: 23.6%). In 13 subjects examined (Tabel 10), 7 subjects had left trapezius involved, 4 had left leavtor scapulae involved. It was suggested that muscle fatigue, muscle strain after long static muscle contracture may induce the symptoms (8). The findings are compatible with the anatomy and kinesiology of fiddle playing.

While playing the bow, the right arm was abducted 10° to 110°and flexed 33°to 100°which depending on which strings being played and which part of bow being used. The scapula was rotated maxillary to 30° with inferior angle toward lateral side and it displaced foreward also (Fig. 1). The scapular muscles, especially of lower part, such as rhomboid and serratus posterior superior were streched which were easily injured after muscle fatique.

There were 16.7% of total subjects with right shoulder problem and 6.9% with neck problem. In 13

subjects examed, one with bilateral trapezius, two right levator scpulae (1 right; 1 bilateral) and two right serratus posterior superior muscles involvement were noted. The cause of symptom relates to the mechanism for bow playing as mentioned above. The other reason is probably due to unconsciously elevation of right shoulder secondly to the action of left shoulder (holding the instrument).

In kyphoid posture, the glenoid fossa faces downward instead of upward as in erect posture (9). Due to gravity, the humeral bone has a tendency to slip out. The capsular lost the tension and the rotator cuff is under great stress. The scapular bone is rotated with inferior angle toward medial part. Then, the levator scapular muscle is streched (10) because the upper medial area is deviated to more lateral and inferior part (Fig. 2). So, in kyphotic person, the scapular muscle is under greater stress than in erect posture which makes the symptom of kyphotic person more severe.

The symptoms could be relieved by changing the habit of practice such as to have trunk erected, changing from continously practice to intermittent practice, doing muscle relaxant exercise or to improve the technique of playing. In addition, receiving physical therapy such as heat or cold, drugs therapy such as analgesics, anti-inflammatory drugs or steroid injection in the acute stage, all could be considered.

No cervical spondylosis, no acute synovitis, no osteoartheritis is noted in this study. It was probably due to the young age of the subjects. If we follow longer, the symptom may be discovered.

References:

1. Fry HJH: Overuse syndrome in musician: prevention and management. Lancet 1986 Sep 27, 2 (8512): 728-731.
2. Fisher-Willims M:Music clinics. Lancet 1985 Jul 20; 2 (8447): 147-8.
3. Ian P: Stress and the musician. Lancet 1985 Jul 6; 2 (8445): 53.
4. Terra Z:Pianist's cramp to stage fright: the medicial side of music-making. JAMA 1984; 252 (8):985-9.
5. Beighton. Grahame. Brid: Hypermobility of joints. 1st ed. Springer-Verlag, Berlin Heiderberg, N.Y. 1983:108-115.
6. Tzeng SJ, Chen GU, Hsu TC: Crhonic injuries in musical practice. J. of Reh. Med. 1986; No. 14: 51-3, in Chinese.
7. Hochberg FH, Robert DL, Heller MD, Merriman L: Hand difficulties among musicians. JAMA 1983; 249 (14):1869-72.
8. Vaughan PS: Hand difficulties among musician: JAMA Dec. 6 1983, Vol. 250, No. 23, p. 3163.
9. Randolph MK, Danlene H: Management of common musculoskeletal disorder. 1st ed. Harper and Row, 1983: 285-6.
10. Rene C.: Pain series: Shoulder pain. 2ed. Nan-Sun Tong, 1985:95-100.

Table 1. Incidence Rate of Symptoms in the Different Age Groups of Fiddlers

Age (yrs)	Total No. V+O	Total No. V	No. with sym. V+O	No. with sym. V	% V+O	% V
13 ~ 15	10	4	8	4	80	100
16 ~ 18	7	6	4	4	57.1	66.7
19 ~ 22	29	19	27	19	93.1	100
> 22	25	25	18	18	72	72
unknown	1	0	1	0	100	0
Total	72	54	58	45	80.6	83.3

V = the chief instrument for playing of the subject was violin.
O = the chief instrument for playing was piano, harp or others.

Table 2. Age of Commencing Playing of Fiddle

Age (yrs)	Total No. (V + O = 72)	(V = 54)	No. with Sym. (V + O = 58)	(V = 45)	% (V + O)	(V)
⩽ 6	12	8	11	8	91.7	100
7 ~ 12	40	31	29	24	72.5	77.4
> 12	13	10	12	9	92.3	90
Unknown	7	5	6	4	85.8	80

Table 3. Daily Practice Hour in Relation to the Occurrence of Symptom

Duration of daily practice (hr)	Total No. (V + O = 72)	(V = 54)	No. with Sym (V + O = 58)	(V = 45)	% (V + O)	(V)
⩽ 1	18	5	13	3	75.2	75
1 ~ 2	24	20	19	17	79	85
> 2	23	23	19	19	82.6	82.6
Unknown	7	6	7	6	100	100

Table 4. Duration of Fiddle Playing in Relation to the Occurrence of Symptom

Years	Total No. V + O (N = 72)	V (N = 54)	No. with Sym. V + O (N = 58)	V (N = 45)	% V + O	V
⩽ 5	9	3	7	3	77.8	100
6 ~ 10	25	19	20	16	80	84.2
> 10	30	26	24	21	80	80.8
Unknown	8	6	7	5	87.5	83.3

Table 5. The Occurrence of Symptoms During or After the Fiddle Playing

Symptoms relating to playing	No. (V + O = 72)	No. (V = 54)	% (V + O)	(V)
pain induced only by playing	21	16	29.2	29.6
slight pain while rest, aggravated by playing	9	4	12.5	7.4
pain appears after discontinuance of playing	9	8	12.5	14.8
stiffness,tightness aggravated by playing	6	4	8.3	7.4
weakness sensation while playing	5	3	6.9	5.6
persisted pain day and night without relation to playing	3	3	4.2	5.6
stiffness relieved by playing	1	1	1.4	1.9
others	11	10	15.3	18.5

Table 6. The Duration of Symptom Persisted after Ceasing the Practice

Duration (hr)	Grade	No. (V + O = 72)	(V = 54)	% (V + O)	(V)
⩽ 1	very mild	11	8	15.3	14.8
> 1 ~ ⩽3	mild	14	12	19.4	22.2
> 3 ~ ⩽12	moderate	9	6	12.4	11.2
⩽24	profound	5	3	6.9	5.6
>24	severe	13	11	18.1	20.4
unknown		6	5	8.3	9.3

Table 7. Rate of Different Symptoms in the Fiddlers

Symptoms	No (V + O = 72)	No (V = 54)	% (V + O)	% (V)
Pain	50	41	69.4	76.0
sore pain	48	38	66.7	70.4
dull pain	16	12	22.2	22.2
sharp pain	8	5	11.1	9.3
Stiffness	13	10	18.1	18.5
Weakness	8	5	11.1	9.3
Numbness	3	2	4.2	3.7
Others	3	2	4.2	3.7

Table 8. The Sites of Symptoms in the Fiddle Players

Sites	No. (V + P + U = 72)	No. (V = 54)	% (V + P + U)	% (V)
L. shoulder	30	21	41.7	38.9
L. neck	17	12	23.6	22.2
L. finghers	16	12	22.2	22.2
Upper Back	16	14	22.2	25.9
L. arm	15	10	20.8	18.5
R. shoulder	12	9	16.7	16.7
L. chin	8	6	11.1	11.1
R. fingers	7	7	9.7	13.0
L. forearm	6	4	8.3	7.4
L. wrist	6	4	8.3	7.4
R. forearm	5	4	6.9	7.4
R. neck	5	5	6.9	9.3
L. elbow	4	4	5.6	7.4
R. elbow	4	3	5.6	5.6
R. arm	4	2	5.6	3.7
Lumbar area	4	2	5.6	3.7
R. wrist	3	2	4.2	3.7
feet	1	1	1.4	1.9

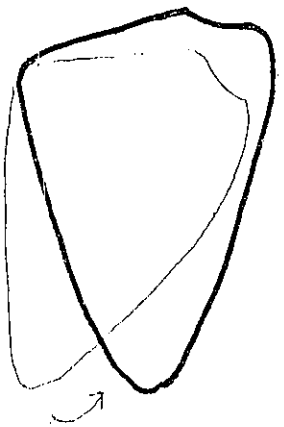
Table 9. Managements Done among Fiddlers for the Symptoms

Methods	No. (V + O = 58)	No. (V = 45)	% (V + O)	% (V)
rest	39	30	67.2	66.7
massage	28	24	48.3	53.3
tapping	16	10	27.6	22.2
hot packing	13	11	22.4	24.4
drugs, injection	3	2	5.2	4.4
acupunctur	3	2	5.2	4.4
herb drug	2	0	3.4	0
others	9	5	15.5	11.1

Table 10. The Detail Chracteristics of the 13 Subjects who were examinated

Name	Age	Sex	C	A	D	Hr	Site (s)	Muscle Involved
Chen	27	F	V	6	21	5	R. scapular, L. schoulder, Back, L. Fingers.	R. SPS, L. Tar, T7-8 ISL, PVM, Ky, FT.
You	27	F	V	15	21	3	L. neck, shoulder, 5th fin. R. forearm, R. scapula.	L. Tra, L. ADM, R. SPS, R. EC.
Chen	30	F	V	10	18	2	L. neck, shoulder, R. thumb.	L. Tra, R. APB.
Pong	21	F	P	5	13	1	L. shoulder	L. Tra.
Lin	21	F	V	17	4	1	L. arm	L. Deltoid.
Wu	21	F	V	?	?	1	L. shoulder	L. LSC.
Huang	26	M	V	?	?	3	R. thumb	R. FPB, OPB, APB
Gie	22	F	V	14	8	2	L. shoulder	L. Tra, L. LSC.
Tsai	28	F	V	10	18	2	R. scapular and upper back	R. LSC SCS
Liang	32	F	V	12	17	2.5	neck, upper back	tension nuchal – gia, post. neck m.
Wong	19	F	H	8	11	2	bilateral shoulder, upper back	bil. SCS, bil. LSC & Tra, Ky
Chang	20	F	P	17	4	1.2	L. shoulder, scapular R. forearm	L. LSC, L. Tra R. EC.
anonymous		19	F	P	?	?	L. arm	L. PM

C: chief instrument for playing.
A: age of commencing playing.
D: duration of playing.
Hr: hour(s)/day for practice.
V: violin or viola.
P: piano H: halp
PSS: serratus posrerior superior
Tra: trapezins PVM: paravertebral m.
ISL: interspinal ligment
LSC: levator scapulae FT: finger tips
EC: extensor carpi.
SCS: scapulocostal syndrome
FPB: flexor pollicis brevis
OPB: opponens pollicis brevis.
APB: abductor pollicis brevis
ADM: abductor digiti minimus
PM: pectoralis major
Ky: kyphosis.



rhomboid muscle, serratus posterior superior

Fig. 1. The Movement of the Scapula While Abduction of Arm
While abduction, the scapula rotates laterally with inferrior angle deviating to the lateral side, the upper medial area movement being less. In this condition, the rhombiid and serratus posterior superior are streched frequently.

levator scapulae

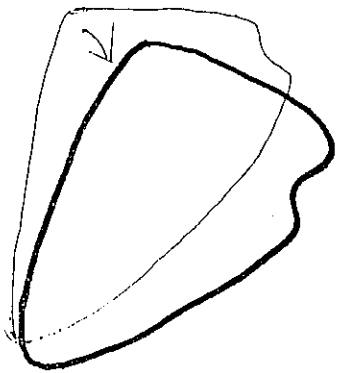


Fig. 2. The Displacement of the Scapula in Kyphotic Posture
While in the kyphotic posture, the scapula displaces downward passively with the inferior angle towad medial side and upper medial area toward inferior and lateral side.
So, the levator scapulae is streched. Besids, the glenoid fossa faces downward instead up-ward in the kyphotic condition which increases the loading of the rotator cuff muscles.