The Playing Posture, Activities and Health of the Table Tennis Player

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Background:
A close observation of a typical table tennis player shows that the posture (while playing) reveals a peculiarity. The peculiar posture might put excessive biomechanical pressure on the waist/hip region of the player's dominant side. Also, it could be observed that the dominant upper limb exhibits relative hypertrophy compared to the non-dominant limb; this might make the dominant limb more predisposed to biomechanical syndromes.
Aim:
To find out the adverse effect(s) (if any), the peculiar playing posture and the high level of shoulder girdle muscle activities of the table tennis player may have on their health (both in and out of play) and suggest ways of reducing such effect(s).
Method:
A study was carried out on some able bodied and challenged players. Questionnaires were given out to all the players, asking for history of unilateral pain on the dominant upper limb, the waist/hip region of same side and how long the athlete had been involved in the game. Measurements of the circumference of the midpoint between the shoulder and the elbow joint of both upper limbs were compared: this was used as a measure of the activity of the dominant upper limb- in each case.
Result:
A significant percentage (25%) of the respondents reported nagging pain on the dominant upper limb. This was made up of challenged amateur and professionals; no able bodied athlete (amateur or professional), reported upper limb pain. 25% of the respondents reported troublesome unilateral hip/waist pain; this was made up of challenged athletes only. No able bodied athlete (amateur or professional) reported unilateral hip pain.
Conclusion:
The study shows that the characteristic posture of the athlete and the high level of physical activities of the dominant limb may predispose the player to special biomechanical changes; this could lead to chronic pain and discomfort. The above applies especially to the challenged athlete.
. The table tennis player may benefit from specially designed physical therapy measures which emphasize the strengthening of rotator cuff muscles of the dominant side. It might also serve some useful purpose if postural correction maneuvers are performed regularly (out of play) by the athlete. This could be done with the assistance of a physical therapist.

The Playing Posture, Activities and Health of the Table Tennis Player

Introduction:

A close observation of a typical table tennis player (while in action), will reveal that the athlete exhibits some characteristic posture which is peculiar to this group of athletes.

The posture may probably affect the normal biomechanics of the athlete, in and out of play and by extension their overall health. In addition, it could also be observed that most athletes show a relative hypertrophy of the dominant (stroking) limb.

In order to evaluate these observations and any harmful effects they may have on the biomechanics of the athlete and their health, a study was carried out of a group of players preparing for the 2008 Beijing Olympics and some others during their routine training.

The Table Tennis Player in Action

A. The characteristic posture of a typical player could be described as follows:

1) Neck deviated towards the dominant limb.
2) Trunk partially flexed with scoliosis concave to the dominant side.
3) Dominant limb in ulnar deviation, vertical abduction of the shoulder with a partially flexed elbow.
4) Lower limb with a partially flexed hip, knee and ankle dorsiflexors.

B. Special Features Observable in Some Table Tennis Players:

1) Relative hypertrophy of the stroking (dominant) limb, especially the shoulder girdle muscles.
2) Some degree of scoliosis (in some athletes).

C. Method of selection of subjects:

Each prospective subject was briefed on the aim of the study and what would be involved in respect of measurement taking. The study group also explained some of the contents of the questionnaires to them. Each of the prospective subjects who consented to taking part in the study was thereafter given a questionnaire to fill. After filling the questionnaire, the relevant measurements were taken on each subject and the values recorded for further analysis.

D Materials and Methods:

The questionnaire sought to know the type of play (professional or amateur), age group, sex, how many years each subject has been playing the game, which side is dominant, history of chronic pain on the dominant upper limb, history of chronic pain in the waist/hip region and whether or not the subject exhibits dexterity for the game on both sides.

A total of 40 athletes responded to the questionnaire.
A measurement of the circumference of the upper arm at the midpoint between the tip of the acromion process and the most prominent part of the lateral epicondyle of the same side was taken for both upper limbs in each subject. The value for the dominant upper limb was designated as C1 in each case, while that of the non-dominant arm was represented by C2; both were measured in centimeter.
The relative activity index of the dominant limb, (hereafter simply referred to as RAI), which is taken as a measure of the activity of the athlete resulting from engagement in the game of table tennis, is obtained by subtracting C2 from C1 i.e. (C1-C2).The results were expressed in centimeters.
A mean RAI was calculated for the various groups in the study i.e. all the professionals, all the amateur, the challenged professionals, the challenged amateur, the able bodied professionals, the able bodied amateur, the female group and the males.
The results of the above are as shown in the table below (Table 1).

Table 1

S/N	Athlete Group	No of athletes	Age Group		Duration Playing game		Limb Pain		Dominant limb		Dexterity	Hip/Waist Pain		Mean C1-C2
			<20yrs	>20yrs	<5yrs	>5yrs	yes	no	right	left	both	yes	no	
1	Amateur(total)	16	6	10	0	16	8	8	14	2	0	2	14	1.1
2	Professional (total)	24	2	22	2	22	2	22	11	5	8	8	16	1.5
3	Challenged Amateur	12	4	8	0	12	8	4	10	2	0	2	10	1.0
4	Normal Amateur	4	2	2	0	4	0	4	4	0	0	0	4	2.0
5	Challenged Professional	14	0	14	2	12	2	12	8	4	2	8	6	2.3
6	Normal Professional	10	2	8	0	10	0	10	3	1	6	0	10	0.3
7	Male (total)	24	2	22	0	24	4	20	17	3	4	4	20	2.0
8	Female (total)	16	6	10	2	14	6	10	8	4	4	6	10	1.0

Questionnaire:

Tick the boxes as applicable.
1 Age □ < 20 years □ > 20 years
2 Sex □ male □ female
3. How long in competitive play □ below 5 years □ above 5 years
4 Type of play □ professional □ amateur
5 Dexterity for the game □ (ambidextrous) both hands □ single hand
6 History of persistent dominant limb (limb used for stroking) pain □ yes □ no
7 Any past history of persistent unilateral back/hip pain on dominant side □ yes □ no.

9 Engagement in another competitive sport aside from table tennis □ yes□ no
10 Which side is dominant □ left □ right?
11 Persistent dominant side neck pain □ yes □ no

Observation/findings:

1. Out of a total of 40 athletes on whom the study was carried out, 4 exhibited negative relative activity indices in the dominant limbs, 14 recorded zero relative activity indices, while 22 had positive values.
2. Those who exhibited zero and negative relative activity indices were from both the professional and amateur classes; also, there was no sex discrimination.
3. Nagging upper limb pain was reported by 10 out of the 40 athletes i.e. 25 % of the respondents.
4. 8 out of all the 16 amateur athletes who responded i.e. 50% reported upper limb pain on the dominant side.
5. Only 2 out all the 24 professional athletes (8 %), claimed to have been experiencing significant limb pain on the dominant side.
6. None of the normal amateur or normal professional reported pain in the dominant limb.. The implication of this is that the pain reported by the amateur (both normal and challenged) and the professionals (both normal and challenged) was solely from the challenged members of each athlete group.
7. Out of a total of 12 challenged amateur athletes, 8, (67%) claimed to have been experiencing limb pain in the dominant upper limb, while only 2 out of 14 challenged professional athletes (14 %) reported pain.
8. Only 4 out of 24 male athletes (18%) reported limb pain on the dominant side, while (37.5%), i.e. 6 out the 16 female athletes agreed that they had pain on the dominant side.
9. Only 10 out of 40 respondents i.e. (25%) reported unilateral hip/waist pain on the dominant side.
10 No able bodied athlete, (professional or amateur) reported unilateral hip/waist pain.

11. While only 2 out of all the 16 amateur athletes i.e. (13%) reported unilateral hip/waist pain, 33 % of all the professionals i.e. 8 out of 24, reported same.

12 In respect of challenged athletes, 2 out of 12 challenged amateur i.e. (17%), reported unilateral hip/waist pain, while 6 out of 14 challenged professionals i.e. 43 % also reported in the affirmative.

13. While only 4 out of 24 males i.e. 17% reported unilateral hip/waist pain, 6 out of 16 females i.e. 38%, reported same.

14. The mean relative activity index (MRAI) was found to be (2. 0) in the males while it was 1.0 in the females.

15. The mean relative activity index in professionals was 1.5, while it was 1.1 in the amateur group.

16. The MRAI in challenged professionals was 2.3 while the challenged amateur had a value of 1.0

17. While able bodied professionals had a MRAI of 0.3, the able bodied amateur recorded 2.0

Analysis:

From the above findings, we could infer as follows:

1. The fact that only a small percentage (8%) of the professionals (compared to the amateur class (50%), reported nagging pain in the dominant upper limb showed that the more intensive the activities of an athlete is, the more the ability to adapt to pain.

2. The observation that none of the able bodied athletes (both professional & amateur), reported upper limb pain in the dominant limb probably indicates that the able bodied athletes are able to adapt to pain (in the upper limb) better than the challenged athletes.

3. The finding that a high percentage of the professionals -mainly the challenged- (33% compared to 13% in the amateur group) reported unilateral hip pain may probably be due to the fact that more biomechanical changes are involved in an average professional compared to a challenged amateur.

4. The ability of the challenged to adapt to pain is probably not as good as that of the able bodied.

5. A comparison of 1 and 3 above shows that the ability to adapt to pain (in the waist/hip region), may not increase with increased intensity of physical activities in the athlete as it's the case in the upper limb.

6. The fact that the MRAI of males (2.0) was higher than that of females (1.0) may be due to the fact that the former are naturally more muscular than the latter; therefore their activities are likely to lead to a higher increase in muscle mass for similar activities.

7. The higher figure for MRAI in the challenged professional (2.3), compared to the challenged amateur (1.0), may be due to the likely higher activity level of the former under similar situations.

8. The shoulder pain reported in about 25% of the athletes was probably a result of chronic arthritis or rotator cuff impingement.

9. The playing posture of the athlete probably has some harmful effect on the back and hip- as 25% reported low back/hip pain on the dominant side.

10.The higher MRAI in the able bodied amateur players compared to the able bodied professionals is difficult to explain as one would have expected the professionals to have a higher value.
However, this might have been due to poor nutritional state in majority of the able bodied professionals, leading to muscle bulk loss.

Limitation of Study:

1. The postures of the athletes prior to commencing the game could not be ascertained.

2. Observer error e.g. the difficulty in accurately locating the tip of the acromion process in very muscular athletes.

3. The reliability of information gathered from subjects.

Discussion and Suggestions:

The likely health implication of findings:

Hypertrophy of the upper limb and shoulder girdle muscles could lead to 'the rotator cuff impingement syndrome'. In this study, about 25% of the subjects reported troublesome upper limb pain.

Scoliosis (concave) to the dominant side, with pelvic tilt, may lead to early degenerative ligament and disc changes in the lumbosacral region- with the attendant morbidity.

The pelvic tilt on the hip and knee of the dominant side may lead to accelerated degenerative changes on the dominant side.

Suggested Preventive Measures:

As the playing postures cannot be avoided, there is a limit to the preventive measures that could be adopted. Below are some measures that might reduce the harmful effects of the peculiar posture on the athlete:

a) The medical team, especially the physical therapist, should encourage/device specific exercises to correct the scoliosis arising from play. This should be done whenever the athlete is not engaged in sporting activities.
b) The challenged athletes would definitely need special attention as the study shows that they are less able to adapt to pain.
c) The medical team should encourage athletes to use both limbs for stroking whenever this is practicable.
d) The physical therapist attached to the team should encourage rotator cuff muscles strengthening on the stroking side.

e) Conclusion**:**

From the above study, it could be said that the posture of a typical table tennis player- while in action- may affect the normal biomechanics of the dominant side; this will obviously have health implications for the athlete while in active play and probably after retiring,

However, if the above preventive measures are adopted, healthy living -during both active playing life and retirement- may be guaranteed for athletes.

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