Chulalongkorn Vestibular Balance Exercise for Rehabilitation in Persons with Various Types of Vestibular Disorders

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Objective: To study the efficiency of Chulalongkorn vestibular balance exercise for rehabilitation in persons with various types of vestibular disorders.

Material and Method: Fifty-eight patients with various types of vestibular disorder were identified by a retrospective chart review. Thirty of the 58 patients met the inclusion criteria of having dizziness and unsteadiness post vestibular diseases with complete record of neuro-otologic examination; vestibular tests and had been followed-up for at least 3 months. These patients were treated with Chulalongkorn vestibular balance exercise and were evaluated for dizziness symptoms and balance bedside test at the beginning of treatment, one month and three months after the exercise.

Results: The average age of the patients was 50.34±14.04 years. The average of duration of exercise program was 5.6 months. There were 6 cases of vestibular neuronitis; 5 cases of post acoustic neuroma removal; 4 cases of acute cochleovestibular loss; 3 cases of motion sickness; 2 cases of cerebellar atrophy; 3 cases of multisensory dizziness; 4 cases of post meningitis with deafness; and 3 cases of ototoxicity. After the exercise, improvement of dizziness symptoms could be found in all groups of the diseases at one month and three months. The objective of balance bedside test was improved in most cases except motion sickness, multisensory dizziness and cerebellar atrophy. The overall percentage of improvement of dizziness was statistically significant at one month and three months (p = 0.0373 and p<0.001). However, the overall balance bedside test was statistically improved at three months after the exercise (p = 0.034).

Conclusion: Chulalongkorn vestibular balance exercise gave significantly effective results in the treatment of dizziness and unsteadiness from various types of vestibular disorder. This study demonstrated improvement of dizziness symptom post-exercise at one month and three months with statistical significance. The balance bedside test was also statistically significant improved at three months post-exercise.

Keywords: Vestibular balance exercise, Vestibular rehabilitation, Physical therapy

Vestibular balance exercise has been used for treating vestibular impairment since the 1940s(1). The purpose of the exercise is to improve postural stability as well as to decrease the sensation of dizziness and blurred vision.

Uncompensated vestibular impairment results in dizziness, unsteadiness, imbalance and oscillopsia, followed by decrease of social activity and ability to work, and avoidance of movement and travelling(2,3).

In addition, the incidence of fall has increased in vestibular impaired persons, especially in those who have severe or bilateral vestibular dysfunction. The incidence is elevated particularly in the elderly. Many studies(4,5) have demonstrated that the incidence of falls significantly increased in patients with vestibular loss when compared with normal persons at the same age.

To improve gait stability and decrease the symptoms of dizziness, the body needs a mechanism which is called vestibular compensation. Vestibular compensation occurs through three main mechanisms, i.e., adaptation, substitution and habituation(6,7). Adaptation occurs post-vestibular shutdown by neuronal processed mainly of vestibule-ocular reflex. The substitution is created by the central nervous system (CNS) in three major systems, which include vestibular, vision and proprioception. Habituation involves repetitions of movements that aim to lower
the sensitivity and reduce oscillopsia (6-8).

Several attempts facilitate the process of compensation by vestibular rehabilitation (exercise) (9). Recently, several studies tried to demonstrate the benefit of difference types of exercise such as Cawthorn exercise, Norre exercise or custom-made exercise for vestibular impaired patients. However, there is still a lack of study of vestibular exercise on various types of vestibular diseases. Also, specific exercise programs are different in protocol (10). The present study introduces a simple exercise program that provokes vestibular compensation and decreases the symptoms of dizziness as well as enhances the ability to stabilize the gait.

Chulalongkorn vestibular balance exercise (Chulalongkorn exercise) has been developed to stimulate vestibular compensation by many mechanisms. It is designed to address those patients who are complaining about their dizziness and instability due to vestibular loss. Chulalongkorn exercise includes the exercise that habituates symptoms by head movement to provoke dizziness and movement patterns that promote vestibular-ocular reflex, vestibular adaptation and substitution. The exercise also enhances the static and dynamic postural control (11).

The present study reports the efficacy of Chulalongkorn exercise in various types of vestibular diseases such as vestibular neuronitis, acute cochleo-vestibular loss, post acoustic neuroma removal, motion sickness, post meningitis deafness, and ototoxicity.

**Material and Method**

Fifty-eight patients with various types of vestibular diseases who had dizziness and unsteadiness were identified through a retrospective chart review of patients seen for vestibular rehabilitation from March 2005 to February 2012 at the Neuro-otology Unit, Department of Otolaryngology, King Chulalongkorn Memorial Hospital. Thirty patients met the inclusion criteria, which included complete dizziness questionnaire, neuro-otologic examination, audiogram, vestibular function test (electronystagmography and posturography) and at least completed the follow-up for 3 months.

All patients were instructed to do the vestibular balance rehabilitation called Chulalongkorn vestibular balance exercise (Chulalongkorn exercise) by the author followed by medical assistance staffs. After complete instruction and practicing the exercise, all the patients were given the brochure of exercise as well as the video CD (how to do Chulalongkorn exercise). Initially, the exercise was told to be performed for a brief period of time, approximately 15 minutes in each day, usually before bedtime to avoid fatigue from aggravation of the symptoms. The patients were told that the exercise could worsen the symptom of dizziness during the first few weeks as during the head movement while the vestibulo-ocular reflex was enhanced could trigger the sensation of dizziness and unsteadiness as well as blurred vision. After the second week, the patients could then increase the rate and duration of the exercise to 30 minutes each day. After one month, they were instructed to do exercise more frequently each day.

During the follow-up visits, all patients were asked to report their symptoms of dizziness, which included sensation of dizziness, giddiness, being off balance, nausea, and oscillopsia and whether or not the symptoms had improved, remained the same or got worse. The objective balance bedside test was evaluated by performing at least 10 steps of tandem walking testing when both eyes were open and closed. Objective balance bedside test results were categorized into improve the stability, whether they remained the same or got worse.

Twenty-three of the patients were sent to carry out six conditions of sensory organization test (SOT) of the computerized dynamic posturography. Six sensory conditions were tested during a fixed or movable platform with eyes opened, closed and the visual surroundings were stable or sway-referenced (12). A composite score (CMP) was also recorded for each patient.

**Results**

The demographic data of all subjects were shown in Table 1. The total number of cases was 30. There were twelve men and eighteen women. Their age ranged from 27 to 84 years old, and the mean was 50.34 ± 14.04 years old. The average of duration of exercise program was 5.6 months. Table 1 showed various types of vestibular diseases, which included six cases of vestibular neuronitis, five cases of post-acoustic neuroma removal, four cases of acute cochleo-vestibular loss, three cases of motion sickness, two cases of cerebellar atrophy, three cases of multisensory dizziness, four cases of post meningitis with deafness, and three cases of ototoxicity.

The follow-up time ranged from 4 months to 9 months with the average duration of exercise was 5.6 months. As for the unilateral vestibular diseases, the duration of exercise and follow-up time seemed shorter.
Improvement of dizziness symptoms could be found in all groups of the diseases at one month and at three months. Balance bedside tests were also improved in most of the diseases except motion sickness, multisensory dizziness and cerebellar atrophy. The overall percentage of improvement in dizziness was statistically significant at one month and three months ($p = 0.0373$ and $p < 0.001$, accordingly). As for the balance bedside tests, the statistical significance was only found at three months, post exercise ($p = 0.034$).

Discussion

Our results demonstrated that patients with various types of vestibular disorder were improved in dizziness and balance bedside tests after Chulalongkorn exercises. The percentage of improvement was varied depending on the diseases, i.e. vestibular neuronitis, acute cochleovestibular loss and post acoustic neuroma removal showing faster improvement. All these diseases are unilateral vestibular impairment. These results of improving in the quality of life in unilateral vestibular impairment post rehabilitation were similarly reported by previous studies$^{(13-15)}$. Notwithstanding, most of the reports did not mention in detail each disease as in the present study.

There were four cases of bilateral vestibular impairment from post meningitis with deafness. Two of the cases (50 percent) improved at one month post exercise; however, only one case demonstrated better in bedside balance testing. At three months, the improvement was increased. One case that did not improve from dizziness, and two cases (50 percent) did not get better from bedside tests. Another, bilateral vestibular impairment was from ototoxicity, dizziness and balance bedside testing slowly got better from one month to three months. These results suggested that

<table>
<thead>
<tr>
<th>Diseases</th>
<th>No.</th>
<th>Age (yrs) (range/mean)</th>
<th>M/F</th>
<th>Duration of exercise (mos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number</td>
<td>30</td>
<td>27-84/50.1</td>
<td>12/18</td>
<td>5.6</td>
</tr>
<tr>
<td>1) Vestibular neuronitis</td>
<td>6</td>
<td>27-70/47.3</td>
<td>2/4</td>
<td>4</td>
</tr>
<tr>
<td>2) Post acoustic neuroma removal</td>
<td>5</td>
<td>42-57/51</td>
<td>3/2</td>
<td>4.8</td>
</tr>
<tr>
<td>3) Acute cochleovestibular loss</td>
<td>4</td>
<td>28-60/48.5</td>
<td>2/2</td>
<td>5.2</td>
</tr>
<tr>
<td>4) Motion sickness</td>
<td>3</td>
<td>32-51/41.7</td>
<td>1/2</td>
<td>6.3</td>
</tr>
<tr>
<td>5) Cerebellar atrophy</td>
<td>2</td>
<td>32-65/48.5</td>
<td>-/2</td>
<td>9</td>
</tr>
<tr>
<td>6) Multisensory dizziness</td>
<td>3</td>
<td>66-84/74</td>
<td>-/3</td>
<td>7</td>
</tr>
<tr>
<td>7) Post meningitis with deaf</td>
<td>4</td>
<td>37-60/46.5</td>
<td>2/2</td>
<td>5.5</td>
</tr>
<tr>
<td>8) Ototoxicity</td>
<td>3</td>
<td>39-52/46.3</td>
<td>2/1</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 1. Demographic data of all the patients in the study, according to each specific disease

than those with severe vestibular disorder such as cerebellar atrophy, multisensory dizziness, post meningitis and ototoxicity.

Age distribution, sex, caloric weakness, audiometric type and sensory organization test (SOT) pattern with composite score (CMP) were demonstrated in Table 2 for each disease.

The caloric test results of the vestibular neuronitis group varied from 36% weakness to 88% weakness depending on how long the test was done after the attack of the disease. In the group of post acoustic neuroma removal and acute cochleovestibular loss, the caloric results were mainly 100% weakness or very close to this. The caloric test results showed hyperresponsiveness in all patients in the motion sickness group.

Bilateral caloric weakness (hypofunction) could be identified in the group of cerebellar atrophy, multisensory dizziness, post meningitis with deaf and ototoxicity.

The audiogram type in each category was also recorded in Table 2. One could expect normal audiometric pattern in patients with vestibular neuronitis and severe to profound hearing impairment in post acoustic neuroma removal and acute cochleovestibular loss, post meningitis and ototoxicity.

Table 3 demonstrated the pattern of sensory organization test (SOT) and composite score (CMP). The average of CMP in each group of diseases were compared and found significant differences in CPM average ($p = 0.002$).

The results of Chulalongkorn exercises at one month and three month were listed by dizziness symptoms and balance bedside tests in Table 4. The percentages of improving, same or worse, classified by the diseases, were calculated as percentages and compared with the results using Chi-square test ($z$-test). Improvement of dizziness symptoms could be found in all groups of the diseases at one month and at three months. Balance bedside tests were also improved in most of the diseases except motion sickness, multisensory dizziness and cerebellar atrophy. The overall percentage of improvement in dizziness was statistically significant at one month and three months ($p = 0.0373$ and $p < 0.001$, accordingly). As for the balance bedside tests, the statistical significance was only found at three months, post exercise ($p = 0.034$).
### Table 2. Descriptive data of subjects’ characteristics

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Caloric weakness</th>
<th>Audiogram</th>
<th>SOT</th>
<th>CMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>F</td>
<td>36%</td>
<td>Normal</td>
<td>VEST</td>
<td>68</td>
</tr>
<tr>
<td>31</td>
<td>M</td>
<td>88%</td>
<td>Normal</td>
<td>VEST</td>
<td>64</td>
</tr>
<tr>
<td>27</td>
<td>F</td>
<td>72%</td>
<td>Normal</td>
<td>VEST</td>
<td>62</td>
</tr>
<tr>
<td>61</td>
<td>F</td>
<td>52%</td>
<td>Normal</td>
<td>VEST</td>
<td>52</td>
</tr>
<tr>
<td>70</td>
<td>M</td>
<td>50%</td>
<td>Normal</td>
<td>VEST</td>
<td>58</td>
</tr>
<tr>
<td>42</td>
<td>F</td>
<td>76%</td>
<td>Normal</td>
<td>VEST</td>
<td>60</td>
</tr>
</tbody>
</table>

1) Vestibular neuronitis (6)
- No. 1: 57 M 100% Severe SNHL VEST 48
- No. 2: 42 F 100% Deaf VEST 55
- No. 3: 56 M 100% Deaf VIS/VEST/PREF 58
- No. 4: 52 F 100% Severe SNHL VIS/VEST 40
- No. 5: 48 M 100% Profound SNHL VEST 60

2) Post Acoustic Neuroma removal (5)
- No. 1: 60 F 100% Severe SNHL - -
- No. 2: 28 M 100% Severe SNHL VEST 57
- No. 3: 48 F 80% Profound SNHL VEST 66
- No. 4: 58 M 72% Profound SNHL - -

3) Acute cochleovestibular loss (4)
- No. 1: 60 F 100% Severe SNHL - -
- No. 2: 28 M 100% Severe SNHL VEST 57
- No. 3: 48 F 80% Profound SNHL VEST 66
- No. 4: 58 M 72% Profound SNHL - -

4) Motion sickness (3)
- No. 1: 32 F Hyper-responsive Normal Normal 72
- No. 2: 42 M Hyper-responsive Normal Normal 72
- No. 3: 51 F Hyper-responsive Normal PREF 68

5) Cerebellar atrophy (2)
- No. 1: 32 F Bilateral hyperfunction Bilateral mild high frequency SNHL VEST, VEST, PREF 62
- No. 2: 65 F Bilateral hyperfunction Bilateral mild high frequency SNHL VEST, VEST, PREF 54

6) Multisensory dizziness (3)
- No. 1: 72 F Bilateral hyperfunction Severe SNHL VIS/VEST 58
- No. 2: 84 F Bilateral hyperfunction Mild SNHL VIS/VEST 56
- No. 3: 66 F Bilateral hyperfunction Normal VIS/VEST, PREF/COM 52

7) Post Meningitis with deaf (4)
- No. 1: 44 M Bilateral hyperfunction Deaf VEST/SOM 52
- No. 2: 45 F Bilateral hyperfunction Deaf VIS/VEST/PREF 43
- No. 3: 37 F Bilateral hyperfunction Deaf VIS/VEST/PREF 42
- No. 4: 60 M Bilateral hyperfunction Profound SNHL VIS/VEST 38

8) Ototoxicity (3)
- No. 1: 48 M Bilateral hyperfunction Mild to mod. SNHL VEST -
- No. 2: 39 M Bilateral hyperfunction Mod. SNHL VEST -
- No. 3: 52 F Bilateral hyperfunction Severe SNHL VIS/VEST/SOM 48
Table 3. SOT pattern and CMP classified by diseases

<table>
<thead>
<tr>
<th>Factor</th>
<th>SOT-CMP</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Diseases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vestibular neuronitis</td>
<td>60.67</td>
<td>5.47</td>
</tr>
<tr>
<td>Post acoustic neuroma removal</td>
<td>52.20</td>
<td>8.20</td>
</tr>
<tr>
<td>Acute cochleovestibular loss</td>
<td>61.50</td>
<td>6.36</td>
</tr>
<tr>
<td>Motion sickness</td>
<td>70.00</td>
<td>2.83</td>
</tr>
<tr>
<td>Cerebellar atrophy</td>
<td>57.00</td>
<td>4.24</td>
</tr>
<tr>
<td>Multisensory dizziness</td>
<td>55.33</td>
<td>3.06</td>
</tr>
<tr>
<td>Post meningitis with deaf</td>
<td>43.75</td>
<td>5.91</td>
</tr>
<tr>
<td>Ototoxicity</td>
<td>48.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 4. Testing of improving of dizziness and balance bedside test classified by diseases

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Month</th>
<th>Dizziness</th>
<th>Balance bedside test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Improve</td>
<td>Same</td>
</tr>
<tr>
<td>Vestibular neuronitis (n = 6)</td>
<td>Month 1</td>
<td>66.67</td>
<td>33.33</td>
</tr>
<tr>
<td></td>
<td>Month 3</td>
<td>100.00</td>
<td>0</td>
</tr>
<tr>
<td>Post acoustic neuroma removal (n = 5)</td>
<td>Month 1</td>
<td>80.00</td>
<td>20.00</td>
</tr>
<tr>
<td></td>
<td>Month 3</td>
<td>80.00</td>
<td>20.00</td>
</tr>
<tr>
<td>Acute cochleovestibular loss (n = 4)</td>
<td>Month 1</td>
<td>75.00</td>
<td>25.00</td>
</tr>
<tr>
<td></td>
<td>Month 3</td>
<td>100.00</td>
<td>0</td>
</tr>
<tr>
<td>Motion sickness (n = 3)</td>
<td>Month 1</td>
<td>33.33</td>
<td>33.33</td>
</tr>
<tr>
<td></td>
<td>Month 3</td>
<td>100.00</td>
<td>0</td>
</tr>
<tr>
<td>Cerebellar atrophy (n = 2)</td>
<td>Month 1</td>
<td>50.00</td>
<td>50.00</td>
</tr>
<tr>
<td></td>
<td>Month 3</td>
<td>100.00</td>
<td>0</td>
</tr>
<tr>
<td>Multisensory dizziness (n = 3)</td>
<td>Month 1</td>
<td>0</td>
<td>66.67</td>
</tr>
<tr>
<td></td>
<td>Month 3</td>
<td>66.67</td>
<td>33.33</td>
</tr>
<tr>
<td>Post meningitis with deaf (n = 4)</td>
<td>Month 1</td>
<td>50.00</td>
<td>25.00</td>
</tr>
<tr>
<td></td>
<td>Month 3</td>
<td>75.00</td>
<td>25.00</td>
</tr>
<tr>
<td>Ototoxicity (n = 3)</td>
<td>Month 1</td>
<td>33.33</td>
<td>66.67</td>
</tr>
<tr>
<td></td>
<td>Month 3</td>
<td>66.67</td>
<td>33.33</td>
</tr>
</tbody>
</table>

For total (30 cases):

Month 1: p-value of improving = 0.0373
Month 3: p-value of improving <0.001**

Vestibular compensation in bilateral vestibular impairment took more time to compensate.

Not surprisingly, at one month patients with cerebellar atrophy did not demonstrate very good results following the exercise. Vestibular compensation needs an adaptation and substitution process, which mainly occurs in the central nervous system. Patients with cerebellar atrophy would need more time to compensate. However, the present study still showed the benefit of exercise programs in this group.

Regarding the motion sickness group, all patients improved in dizziness during daily activity, especially when they were travelling in a car, bus or boat. The exercise helped relieve the symptoms of maximum dizziness when they performed the exercises for approximately 3 minutes or more. In this group the balance bedside test did not improve because two cases of patients had a normal bedside balance test before the exercise program. Therefore, the balance test was still normal after the exercise.

The poorest results were that of the patients in multisensory dizziness group. This group was defined by old age, poor function of vestibular, visual and somatosensory. The patients showed improvement at 66% at three months, post exercise by symptoms but not for the balance bedside test. Similarly, some studies...
demonstrated that the group of aging patients experiencing dizziness and easily prone to fall post vestibular deficits were slow to compensate\[16,17\].

**Conclusion**

Chulalongkorn vestibular balance exercise demonstrated the improvement of dizziness with statistical significance at one month and three months post treatment. As for the balance bedside test, it gave statistically significant improvement at three months after the exercise. Vestibular rehabilitations were beneficial in improving both subjective and objective measurements in various types of vestibular disorders.

**What is already known on this topic?**

To overcome the dizziness and imbalance post vestibular loss, the body needs mechanism called vestibular compensation. Vestibular balance exercises have been used to facilitate this process. It is beneficial for vestibular impaired-persons to practice the vestibular exercise. Various types of vestibular exercise has been introduced without reporting the efficacy in each disease group.

**What this study adds?**

The effectiveness of vestibular exercise was demonstrated in various types of vestibular diseases. The study shows percentage of improvement in clinical symptoms as well as objective balance testing. In addition, this study introduces the simple exercise pattern (Chulalongkorn exercises) which can be used in persons with various types of vestibular disorders.

**Potential conflicts of interest**

None.

**References**

ผลการรักษาผู้ป่วยโรคภูมิคุ้มกันต่างๆ ด้วยกายบริการจุลภาพแสงกรด

สาระ otrกอ, ภาณี อาร์ทูร์พุธ, เพ็ญทิพย์ อนิชิตศิลป์

วัสดุและวิธีการ: เพื่อศึกษาประสิทธิภาพของกายบริการจุลภาพแสงกรดในการรักษาโรคภูมิคุ้มกันต่างๆ ผู้ป่วยโรคเชื้อไวรัส เสียหายในคลินิก โดยเปรียบเทียบ โรงพยาบาลจุลแสงกรดผู้ป่วย 30 รายจากเวรทะเบียน 58 ราย ได้รับการตัดเลือกหลักเกณฑ์ เพื่อให้เข้าในกลุ่มการรักษาผู้ป่วยโรคภูมิคุ้มกันต่างๆ ผู้ป่วยทุกรายได้รับกายบริการจุลภาพแสงกรดและได้รับการตรวจพิเศษทางระบบมีการติดตามผลอย่างน้อย 3 เดือน
ผลการศึกษา: ค่าเฉลี่ยอายุของประชากรที่ศึกษามี 50.3±14.04 ปี ค่าเฉลี่ยระยะเวลาในการทำกายบริการต่อ 5.6 เดือนในประชากรที่ศึกษามี заболевันที่ทำให้เกิดการบริเวณอยู่ในช่วง vestibular neuritis 6 ราย หลอดหูเสียงผิดปกติ 5 ราย, acute cochleovestibular loss 4 ราย, เวชภูมิคุ้มกันในช่วงแรก 3 ราย, โรคกลิดกลิ้ง 2 ราย, multisensory dizziness 3 ราย, หูบอดิศัยหลักซึ่งมีผู้เสียชีวิตเป็น 4 ราย และ 3รายจากการให้ยาสารพัด (medications) หลังจากศึกษาการรักษาจุลแสงกรดพบว่าผู้ป่วยมีภาวะเวชภูมิคุ้มกันทดสอบมีการทรงตัวดีขึ้นในช่วง 1 เดือนแรก ดังที่เจริญที่ 1 และเดือนที่ 3 สำหรับการตรวจทางตรง (balance bedside test) พบว่าผู้ป่วยมีการทรงตัวดีขึ้นในช่วง 1 เดือนแรก ดังที่เจริญที่ 1 และเดือนที่ 3 หลังพวกเขาบริการ (p = 0.0373 และ p<0.001) สำหรับการทดสอบการทรงตัวโดยใช้ balance bedside test พบการทรงตัวดีขึ้นอย่างมีนัยสำคัญทางสถิติในเดือนที่ 3 หลังการทำกายบริการ (p = 0.034)

สรุป: การรักษาผู้ป่วยโรคภูมิคุ้มกันผ่านการใช้กายบริการจุลภาพแสงกรดในการรักษาโรคภูมิคุ้มกันต่างๆ การศึกษาเหล่านี้ยังพบว่าการเวชภูมิคุ้มกันมีการทรงตัวดีขึ้นหลังจากทำการรักษาจุลแสงกรดที่มีนัยสำคัญทางสถิติในเดือนที่ 1 และเดือนที่ 3 หลังกายบริการ สำหรับการทรงตัวของ balance bedside ทำให้มีการมีนัยสำคัญทางสถิติในเดือนที่ 3 หลังกายบริการจุลแสงกรด

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กายบริการจูพาสังกรีน (Chulalongkorn Vestibular Balance Exercise)

ขั้นตอนที่ 1 การบริการศีรษะ
- ทาที่ 1 กับศีรษะจากด้านหนึ่งไปยังด้านหนึ่ง สะบัดไปมาได้ตามท่าที (ตัวอย่าง 5-10 ครั้ง)
- ทาที่ 2 กับศีรษะให้กลับมาที่ด้านเดิม แล้วเสร็จจะเล่นท่าที่ 1 แล้วต่อไปที่เดิม (ทำวนละ 5-10 ครั้ง)

ขั้นตอนที่ 2 การบริการศีรษะรวมกับขา (ภาพ)
- ทาที่ 1 เข้าใจหรือถือหัวเชื่อมต่อกับขาหรือไม่ ในระยะทาง 2-4 ซุ้ม
- ทาที่ 2 ในขณะเดินที่กระทำการรุกในท่านี้ ให้หันด้านข้างที่ช้าไปด้านหลังแล้วหมุนกลับไปด้านข้างเดิม สะบัดไปมาในระยะทาง 3-10 ครั้ง
- ทาที่ 3 ในขณะเดินที่กระทำการรุกในท่านี้ ให้ยกด้านข้างเดิมที่เหนี่ยวอยู่ในระยะทาง 5-10 ครั้ง

ขั้นตอนที่ 3 การบริการศีรษะรวมกับขา คัมภีร์
- ทาที่ 1 หัวเข้าใจหรือถือหัวเชื่อมต่อกับขา ห่างจากก้นประมาณ 1 ซุ้ม
- ทาที่ 2 เดินไปจากข้างหนึ่งไปข้างหนึ่งในระยะทาง 3-10 ครั้ง

ขั้นตอนที่ 4 การบริการกรรไกร (เข็ม)
- ทาที่ 1 อันดับรองใต้ทับ กอดครับ

ขั้นตอนที่ 5 การบริการกรรไกร (เข็ม)
- ทาที่ 1 ลิ้นผ่า โขงичноที่เข็มไปมาตลอดครั้งละ 1 ครั้ง