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# CLINICAL EVALUATION OF IMPROVEMENT OF MOTOR FUNCTIONS AFTER STROKE (HEMIPLEGIA) WITH LINE OF TREATMENT- A CASE STUDY

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## ABSTRACT

Paralysis is complete or partial loss of function especially when involving the motor or sensory function in a part of the body. It mainly categorized according to the affected location of the body including monoplegia, hemiplegia, paraplegia and quadriplegia. Stroke, brain or spinal cord tumors, infections (meningitis, encephalitis, polio) and autoimmune diseases (Guillain-Barré syndrome) are considered as causative factors of paralysis. The aim of this study is to evaluate the improvement of motor function after stroke with relevant treatment protocol. The present case study was a single case study carried out within 47 days and conducted at ward no 15 in National Ayurvedic Teaching Hospital Borella, Sri Lanka. Reported case was a 73-year-old male patient with weakness of both left upper limb and lower limb associated with numbness (Hemiplegia). Motor function assessment according to clinical assessment criteria, and it was used to evaluate the effects of treatments in every two weeks. Within 48 days of treatment, 23 types of preparation of drugs were used as internal and external application including Kashaya, vatee, kalka, churna, gritha and taila. After this treatment, motor function has been improved significantly as percentage of 85. According to analyzed data, study

prove that this treatment protocol has provided better improvement of motor functions subjected to Pakshagata. Further studies using different cases are recommended to conduct to ensure the result of this research.

Key words: Pakshagata, Stroke, Treatment, Motor function

## INTRODUCTION

### Modern Perspective

The nervous system is the most complex part of our body. It is the command system of our body. It comprises the central nervous system and the peripheral nervous system (Pandya, 2021). The central nervous system is made up of the brain and spinal cord, and the peripheral nervous system is made up of the Somatic and the Autonomic nervous systems. It is estimated that more than 30 million people suffer from some kind of nervous system disorder (Sharma, Prasad and Maheswar, 2004). It affects not only the overall health of the patient but also degrades the lifestyle of the patient. (Gourie, 2014)

Stroke is demarcated as sudden onset of neurologic deficit from vascular mechanism; 85% is ischemic and 15% are primary hemorrhages (Prayaga and

Prashanth, 2018). According to the World Health Organization, 15 million people suffer from stroke worldwide each year, of these, 5 million die and another 5 million are permanently disabled (WHO, 2022). Stroke may be an underlying heart or blood vessel disease including hypertension, atherosclerosis and leading to coronary artery disease, dyslipidemia etc. Stroke are classified under two major types including ischemic and hemorrhagic strokes (Jithesh and Faisal, 2019). Ischemic stroke is caused by a blood clot that blocks blood vessel in the brain.

Hemorrhagic Stroke is caused by a blood vessel that breaks and bleeds into the brain. There is one more kind called ‘‘mini strokes’’ or ‘‘Transient ischemic attacks (TIAs)’’. It occurs when the blood supply to the brain is briefly interrupted (Wade et al., 2001). Following table 01 describes causative and risk factors for stroke (Prayaga and Prashanth, 2018).

*Table 01: Causative and risk factors for stroke*

Causes and Risk factors	
Causes	Atherosclerosis Hypertension. Thrombosis Embolism Atrial fibrillation Heart attack Abnormalities of the heart valves traumatic injury to the blood vessels of the neck disorders of blood clotting.
Risk factor for Ischemic stroke	
Non-modifiable risk factors	Age, race, sex, ethnicity history of migraine headaches fibromuscular dysplasia heredity: family history of stroke or transient ischemic attacks.
Modifiable risk factors	hypertension (the most important) diabetes mellitus cardiac disease, hypercholesterolemia carotid stenosis lifestyle issues (excessive alcohol intake, tobacco use, illicit drug use, physical inactivity), obesity, oral contraceptive use/postmenopausal hormone use.
Risk factors for Hemorrhagic stroke	
	Advanced age hypertension (up to 60% of cases) previous history of stroke alcohol abuse use of illicit drugs (cocaine, other sympathomimetic drugs)

## Ayurvedic perspective

### Etiology of Pakshaghata

The Nidana of Vata Vyadhi and Vata Prakopa given in Ayurvedic texts may be classified in following headings. Table 02 describes etiology of Pakshaghata according to Ayurveda.

*Table 02: Etiology of Pakshaghata according to Ayurveda (Dubey, Pandey and Kar, 2015).*

Factors	Etiology
Traits of <i>Vata</i>	<i>Ruksha</i> (ununctuous), <i>Shita</i> (cold) <i>Laghu</i> (light), <i>Katu</i> (bitter) <i>Tikta</i> (Pungent), <i>Kashaya</i> (Astringent) <i>Daruna</i> (Harsh), <i>Khara</i> (Rough) <i>Vishada</i> (Cleaniness)
<i>Aaharaja Nidana</i> (Dietary factors)	<i>Alpa/Pramitanna</i> (less amount of food) <i>Laghu Anna</i> (light food) <i>Langhana</i> (keep fasting) <i>Abhojana/Anashana</i> (No intake of food) <i>Vishamashana</i> (improper intake of food) <i>Adhyshana</i> (intake of food before digestion of previously taken food) <i>Vishtambhi</i> (intake of food that binds the bowel) <i>Shushka Shaka</i> (dry vegetables) <i>Vallura</i> (Shushka Mamsa) (Dry meat) <i>Jaramatigateashite</i> (Intake of food during indigestion)
<i>Viharaja Nidana</i> (Lifestyle factors)	<i>AtiVyavaya</i> (Excessive sexual intercourse) <i>AtiPrajagarana</i> (Excessive awakening in night) <i>Langhana</i> (Activities for lightness in body) <i>Plavana</i> (Hopping), <i>Pratarana</i> (Swimming) <i>AtiAdhva</i> (Excessive walking), <i>AtiVyayama</i> (Excessive exercise), <i>AtiVicheshta</i> (Excessive abnormal activities), <i>Dukha-shaiya</i> (sleeping in uncomfortable postures), <i>Dukha-asana</i> (Sitting in uncomfortable postures), <i>Divaswapna</i> (Day sleep), <i>Atiadyayana</i> (Reading for long time), <i>Pradhavana</i> (Running for long time), <i>Bharaharana</i> (Carrying heavy loads), <i>Vegasandharana</i> (suppression of natural urges), <i>UchchaBhashana</i> (Loud speech), <i>Gaja-aticharya</i> (Riding on the elephant), <i>Turang-aticharya</i> (Riding on horse), <i>Ratha-aticharya</i> (Riding on vehicle), <i>Pada-aticharya</i> (excessive walking), <i>Yaan</i> (excessive riding on vehicle), <i>AtiShrama</i> (excessive physical work), <i>Gadhochchhadana</i> (Covering with heavy cloth), <i>Trushitasana</i> (Taking food while thirsty), <i>Kshudhitambupana</i> (Drinking water when hungry).

<i>Aagantuja</i> <i>Nidana</i> (Traumatic Factors)	<i>Abhighata</i> (Trauma), <i>Marmaghata</i> (Injury to Vital parts), <i>BalvadVigraha</i> (Contesting with strong persons, <i>Prapatana-Gaja</i> , <i>Ushtra</i> , <i>Ashva</i> , <i>Yaana</i> , <i>Taru</i> (Tree) / <i>AtiucchaPatanam</i> (Falling down from elephant, camel, horse, vehicle, tree/ Falling from height), <i>Prapidana/ Prahara/</i> (Dandaadi) (Attack by wooden instruments), <i>Damyagovajigajanigraha</i> (Restraining untamed animals such as bull, horse, elephant), <i>Ashma/Shilaloha/Kashtha-Utkshepa</i> , <i>Vikshepa</i> , <i>Bhramana</i> , <i>Chalana</i> (Throwing heavy stone, boulders, metal, wooden log)
<i>Manasika</i> <i>Nidana</i> (Psychic Factors)	<i>Chinta</i> (Stress), <i>Shoka</i> (Grief), <i>Krodha</i> (Angry), <i>Bhaya</i> (Fear), <i>Kama</i> (Sexual desire), <i>Vegavidharanodeerana</i> (Suppression/premature initiation of natural urges of the body), <i>Utkantha</i> (Emotions)
<i>Kalaja Nidana</i> (seasonal, diurnal, digestion-time based)	<i>Pravata</i> (Exposure to wind), <i>Grishmante</i> (at the end of summer season), <i>Jeernante</i> (at the end of digestion), <i>Ahoratriante</i> (at the end of night), <i>Shishir Ritu</i> (At the end of winter season), <i>Varsha Ritu</i> (Rainy season), <i>Bhukta Ante</i> (At the end of food intake), <i>Shita Kala</i> (Winter season), <i>Prabhata Kala</i> (early morning), <i>Aparahana</i> (After noon), <i>Hima</i> (Cold), <i>Pragvata</i> (Exposure to the wind of north direction).
<i>Nidanarthkara</i> diseases (caused due to other diseases)	<i>Dhatu Kshaya</i> (Diminution in nutritional element of body) <i>Rogati Karshanam</i> (excessive emaciation due to diseases) <i>Ama</i> (Toxic substance) <i>Gadakritaاتمamsakshaya</i> (wastage of muscular mass due to disease) <i>Margasyaavarana</i> (Obstruction in the path)
<i>Vaidyakrita</i> (Iatrogenic)	<i>Vishama Upachara</i> (Improper treatment) <i>AtiDoshaSraavana</i> (excessive loss of body fluids) <i>AtiAsrik</i> (excessive blood letting) <i>Kriyatiyoga / Vamana Virechana Atiyoga</i> (excessive use of treatment procedure)

### Samanya samprapthi of Pakshaghata

According to the Acharya Charaka, various etiological factors are responsible for the vitiated vata dosha and fill up the rikta's in srotas of the body and caused various kind of vata vyadhi.

“Dehe srotaansi riktaani purayithva anilo bhaliz

Karothi vividhaan vyaadhiin sarva anga eka anga sankshayaan”

Vata prakopa occurs due to Dhatukshaya including langhana, laghu ruksha ahara, kashaya rasa, atimaithuna. Kashaya of the dhatus leads to the

formation of Rikta in srotas and getting vata vitiate. Vata prakopa due to margavarana means obstruction of srotas including vegadharana, ama, marmaaghata etc. Obstruction may be complete or partial leading to rikta of the srotas and leads to vata prakopa. Sanga type of sroto dushti occurs in such cases (ed. Kumarasinghe, 2005).

### **Vishistha samprapthi of Pakshaghata**

“Gruhithvardhah thanorvayuh siraah  
snaayurvishishya cha  
Pakshamanyatharan hanthi  
sandhibandhaan vimokshaayn  
Kruthsnordhakaayasthasya  
syaddakarmanyao vichechanan  
Ekaangarogan than kechidyo  
pakshavadhah viduuh  
Sarvaangarogathadvachcha  
sarvakaayaashrithe nileh”

According to Ashtangha Hradya Samhitha; vayu holds half of the body, afflicting/ dries up sira and snayu, loosens sandhi bandha (ligaments of joints) and leaves either half of the body dead and leads to motor as well as sensory loss (ed. Buddhadhasa , 2005).

Dosha: Mainly vata (Pitta or Kapha):  
Dushya: Rasa, Rakta, Mamsa, Medha, Majja

Upadhatu: Sira, Snayu: Srotas:  
Rasavaha, Rakthavaha, Mamsavaha,  
Medavaha, Majjavaha, Manovaha srotas :  
Roga marga: Madhyama

### **METHODOLOGY**

The research study was carried out as primary Observational study and conducted 7 weeks (8th June – 24th July) of time duration. The present case study was a single case study carried out within 48 days and conducted at ward no 15 in National Ayurvedic Teaching Hospital Borella, Sri Lanka. Reported case was a

73-year-old male patient with weakness of both left upper limb and lower limb associated with numbness (Hemiplegia). The investigations and clinical examinations were done by the supervision and guidance under consultant physician who was specialized neurology in National Ayurvedic Teaching Hospital Borella, Sri Lanka. Clinical evaluation of motor functions according to clinical assessment criteria, and it was used to evaluate the effects of treatments in every week. All gathered data was analyzed based on available clinical examinations. Consent was obtained from hospital and patient. Data was recorded in separate sheet and personal information record using special cord system due to privacy. The detailed medical history and physical examination were done weekly wise according to Ayurveda and modern clinical methods. Referred and followed the relevant authentic textbooks and gathered other reliable data from published journals.

### **Case Report**

#### **1. Personal data**

Age : 73 years old  
Address : Morawaka, Nelumdeniya  
Gender : Male  
Religion : Islam  
Marital Status : Married  
Occupation : Labor  
Ward No : 15  
Bed No : 15  
Bed Head Ticket No : 1135/15  
Date of admission : 08.06.2023  
Date of discharge: 25.07.2023

2. Chief Complaint : Weakness of both left upper limb and lower limb associated with numbness.  
Difficulty in speech.

3. Other Complaint : Disturbed sleep after this weakness.

4. History of Chief Complaint: According to the patient suddenly occur this condition on 4th June on 2023.

5. Past Illness:

1. Hypertension : detected
2. Diabetes Mellitus : detected
3. Ischemic Heart Diseases : not detected
4. Hyperlipidemia : not detected
5. Epilepsy : not detected
6. Head Injury : not detected
7. Malignancy : not detected

6. Treatment History: He has taken allopathic treatments for this condition from National Hospital Colombo, then after two days, he has discharged and admitted to National Ayurvedic Teaching Hospital Borella, Sri Lanka.

7. Family History: No family member has this condition.

8. Personal History:

1. Diet: Normal diet
2. Sleep: Continuous sleep for 6 hours.
3. Exercise: excessive heavy working
4. Desha: Sadharana desha
5. Habit and addiction: more likely to take mango fruits.

9. Examination:

1. Ashta vida pariksha
- Nadi – Gathi : 73 bpm
- Yathi : Samantara
- Akrithi : Purna
- Sanhathi : Mrudu
- Muthra : day- 15/ night - 1
- Mala : day- 1/ night - 0
- Jiwha : symmetrical and coated
- Shabda: heart – normal
- lungs - normal
- Druk : normal vision
- Akriti: symmetrical

2. Vital Examination

Temperature - 37 /C

Pulse - 73 bpm

Respiratory rate - 18 / min

Blood Pressure - 150/90 mmHg

Height - 160 cm

Weight - 72 kg

3. General / On examinations (OE)

Physical appearance – normal

Mental state – normal

Nourishment – normal

Abnormal smells – absent

Height – 160 cm

Weight – 72kg

Skin – normal

Hands – left hand function loss and right hand normal

Lymph nodes – normal

Motor system examination according to Motricity Index

Table 03: Motor system examination according to Motricity Index on admission

Date	8 <sup>th</sup> June	
Side Tested		
ARM To be conducted in sitting position		<i>TEST 1 (Pinch grip)</i> <i>0 = No movement</i> <i>11 = Beginnings of prehension</i> <i>19 =Grip cube but unable to hold against weak pull.</i> <i>22=Grip cube, held against gravity but not against weak pull.</i> <i>26=Grip cube against pull but weaker than other/normal side.</i> <i>33=Normal pinch grip.</i>
Pinch grip 2.5cm cube between thumb and forefinger	19	
Elbow flexion From 90°, voluntary contraction/ movement.	14	
Shoulder abduction From against chest	14	
LEG To be conducted in sitting position		
Ankle dorsiflexion From plantar flexed position	14	<i>TESTS 2-6</i> <i>0=No movement</i> <i>9=Palpable contraction in muscle but no movement.</i> <i>14=Movement seen but not full range/not against gravity.</i> <i>19=Full range against gravity, not against resistance.</i> <i>25=Movements against resistance but weaker than other side.</i> <i>33=Normal power</i>
Knee extension From 90°, voluntary contraction/ movement.	14	
Hip flexion. Usually from 90°	14	
ARM SCORE (1+2+3) LEG SCORE (4+5+6) SIDE SCORE (Arm + Leg)/2		
		19+14+14 = 47
		14+14+14 = 42
		89/2 = 44.5
TRUNK CONTROL TEST on the bed		
Rolling to weak side	12	<i>TRUNK CONTROL TEST</i> <i>0=Unable to do on own.</i> <i>12=Able to do but only with non-muscular help (pulling on bedclothes, using arms to steady self when sitting, pulling up on monkey pole etc.)</i> <i>25=Normal</i>
Rolling to strong side	25	
Sitting up from lying down	12	
Balance in sitting position On side of bed	12	
TRUNK SCOREC (7+8+9+10)	12+25+12+12 = 73	



Table 04 describes Internal treatment protocol within 47 days.

Internal Drugs		
Duration	Drugs	Dosage
Kashaya (Decoction)		
8th June – 23rd June	Thrikatukadi kashaya	½ pata BD
24th June – 6th July	Danthimuladi kashaya	½ pata BD
7th July – 16th July	Balaa bilva shunti kashaya	½ pata BD
17th July – 24th July	Maashabaladi kashaya	½ pata BD
Vati (Pill)		
8th June – 23rd June	Seetharama vati	2 BD
24th June – 24th July	Yogaraja vati	2 BD
24th June – 6th July	Chandraprabha vati	2 BD
8th June – 12th June	Ekaveriya vati	1BD
13th June – 22thJune	Somanatha rasa	2 BD
Kalka		
8th June – 23rd June	Chandra kalka + Mahadalu anupanaya	2.5g + 15ml BD
Churna (Fine Powder)		
8th June – 19th June	Triphala churnaya	5g Nocte
20th June – 6th July	Triphala churnaya	5g BD
13th June – 19th June	Sarasvatha churnaya	2.5g BD
23rd June – 6th July	Bhashkara lavana	2.5g BD
7th July – 24th July	Ashvaghandha churnaya	5g BD
Gritha		
20th June – 24th July	Brahmi gritha with Cow's milk	5ml BD

Table 04: Internal treatment protocol within 47 days.

Table 05 describes External oil usage protocol within 47 days.

Table 05: External oil usage protocol within 47 days.

Duration	Name
8 <sup>th</sup> June – 12 <sup>th</sup> June	<i>Triphala thaila</i>
8 <sup>th</sup> June – 22 <sup>th</sup> June	<i>Nirgundi thaila</i>
13 <sup>th</sup> June – 6 <sup>th</sup> July	<i>Kolashleshma thaila</i>
13 <sup>th</sup> June – 19 <sup>th</sup> June	<i>Divyangganadi thaila</i>
20 <sup>th</sup> June – 30 <sup>th</sup> June	<i>Kshirabala thaila</i>
7 <sup>th</sup> July – 24 <sup>th</sup> July	<i>Narayana thaila</i>

#### External Treatments

Table 06 describes External treatment protocol within 47 days. Shirsha abhyanga, Hastha paada abhyanga, Jihva nirlakhana, Shiro pitchu, Shiro dhara, Pinda sweda and Matra vasti were carried out through this protocol.

Table 06: External treatment protocol within 47 days.

Duration	Name	Ingredients	Site
8 <sup>th</sup> June – 12 <sup>th</sup> June	<i>Shirsha abhyanga</i>	<i>Triphala thaila</i>	Head
8 <sup>th</sup> June – 22 <sup>nd</sup> June	<i>Hastha paada abhyanga</i>	<i>Nirgundi thaila</i>	Upper limbs & Lower limbs
13 <sup>th</sup> June – 6 <sup>th</sup> July	<i>Jihva nirlakhana</i>	<i>Kolashleshma thaila</i>	Tongue
13 <sup>th</sup> June – 19 <sup>th</sup> July	<i>Shiro pitchu</i>	<i>Divyangganadi thaila</i>	Head
20 <sup>th</sup> June – 6 <sup>th</sup> July	<i>Shiro dhara</i>	<i>Kshirabala thaila</i>	Head
7 <sup>th</sup> June – 24 <sup>th</sup> July	<i>Pinda sweda</i>	<i>Narayana thaila, Bebila kashaya</i>	Upper limbs & Lower limbs
17 <sup>th</sup> June – 24 <sup>th</sup> July	<i>Matra vasti</i>	<i>Narayana thaila</i>	Anal region

## RESULT & DISCUSSION

In clinical examination all the observations of results of physical examination were done and especially motor function assessment evaluate according to the Motricity Index and Trunk control test criteria. Within 47 days of total treatment protocol examination done weekly and motor function

examination listed following table and other general examination (OE) results were as follows. Physical appearance and mental health were normal and other systemic examinations were normal state.

Analysis of Motor system examination according to Motricity Index

Following table 07 describes Motor system examination according to Motricity Index by weekly.

Table 07: Motor system examination according to Motricity Index by weekly

Date	8 <sup>th</sup> June- 14 <sup>th</sup> June	15 <sup>th</sup> June- 21 <sup>st</sup> June	22 <sup>nd</sup> June- 28 <sup>th</sup> June	29 <sup>th</sup> June- 5 <sup>th</sup> July	6 <sup>th</sup> July – 12 <sup>th</sup> July	13 <sup>th</sup> July - 19 <sup>th</sup> July	20 <sup>th</sup> July - 24 <sup>th</sup> July
Side Tested							
ARM To be conducted in sitting position							
Pinch grip 2.5cm cube between thumb and forefinger	19	19	22	22	26	33	33
Elbow flexion From 90°, voluntary contraction/ movement.	14	19	19	19	25	33	33
Shoulder abduction From against chest	14	19	19	19	25	25	33
LEG To be conducted in sitting position							
Ankle dorsiflexion From plantar flexed position	14	19	19	19	25	25	33
Knee extension From 90°, voluntary contraction/ movement.	14	19	19	25	25	25	33
Hip flexion Usually from 90°	14	19	19	25	25	33	33
ARM SCORE (1+2+3)	47	57	60	60	76	91	99
LEG SCORE (4+5+6)	42	57	57	69	75	83	99
SIDE SCORE (Arm + Leg)/2	44.5	57	58.5	70.5	75.5	91	99
TRUNK CONTROL TEST on the bed							
Rolling to weak side	12	12	12	25	25	25	25
Rolling to strong side	25	25	25	25	25	25	25
Sitting up from lying down	12	12	12	25	25	25	25
Balance in sitting position On side of bed	12	12	12	12	25	25	25
TRUNK SCOREC (7+8+9+10)	73	61	61	87	100	100	100

### TEST 1 (Pinch grip)

0 = No movement

11 = Beginnings of prehension

19 =Grip cube but unable to hold against weak pull.

22=Grip cube, held against gravity but not against weak pull.

26=Grip cube against pull but weaker than other/normal side.

33=Normal pinch grip.

### TESTS 2-6

0=No movement

9=Palpable contraction in muscle but no movement.

14=Movement seen but not full range/not against gravity.

19=Full range against gravity, not against resistance.

25=Movements against resistance but weaker than other side.

33=Normal power

### TRUNK CONTROL TEST

0=Unable to do on own.

12=Able to do but only with non-muscular help (pulling on bedclothes, using arms to steady self when sitting, pulling up on monkey pole etc.)

25=Normal

*Table 08: Summarization of upper limb motor function examination*

Duration	8th June-14th June	15th June-21st June	22nd June-28th June	29th June-5th July	6th July – 12th July	13th July - 19th July	20th July -24th July
Pinch grip	19	19	22	22	26	33	33
Elbow flexion	14	19	19	19	25	33	33
Shoulder abduction	14	19	19	19	25	25	33

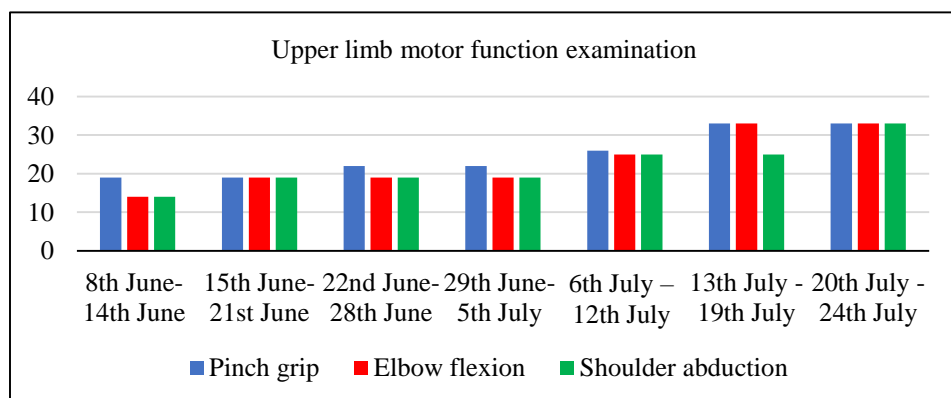


Figure 01: Summarization of upper limb motor function examination.

Table 09: Summarization of lower limb motor function examination.

Duration	8th June-14th June	15th June-21st June	22nd June-28th June	29th June-5th July	6th July – 12th July	13th July - 19th July	20th July - 24th July
Ankle dorsiflexion	14	19	19	19	25	25	33
Knee extension	14	19	19	25	25	25	33
Hip flexion	14	19	19	25	25	33	33

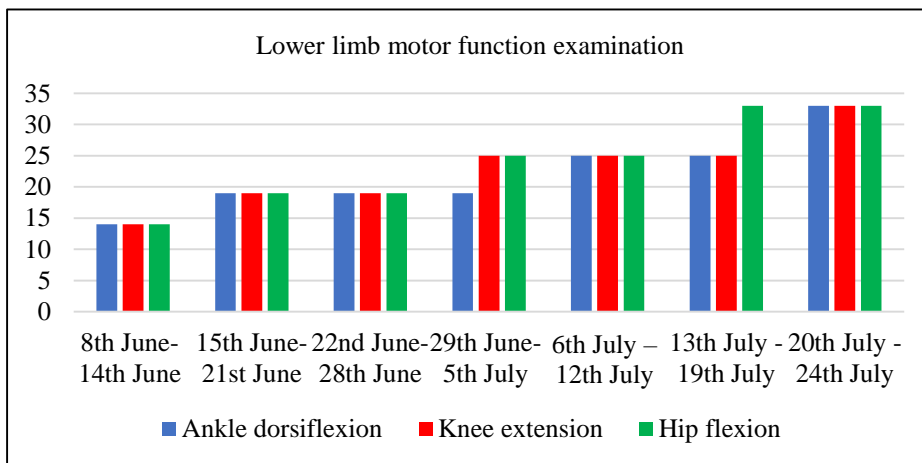
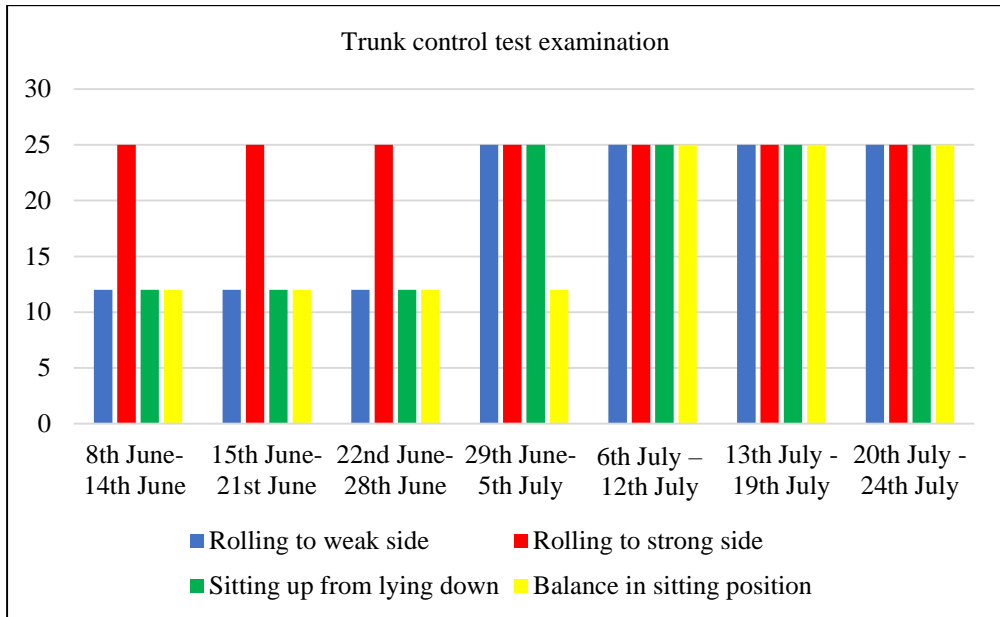


Figure 02: Summarization of lower limb motor function examination.

Table 10: Summarization of trunk control test examination.

Duration	8th June-14th June	15th June-21st June	22nd June-28th June	29th June-5th July	6th July – 12th July	13th July - 19th July	20th July - 24th July
Rolling to weak side	12	12	12	25	25	25	25
Rolling to strong side	25	25	25	25	25	25	25
Sitting up from lying down	12	12	12	25	25	25	25
Balance in sitting position	12	12	12	12	25	25	25



*Figure 03: Summarization of trunk control test examination.*

*Table 11: Final analysis of motor function examination.*

Duration	8th June-14th June	15th June-21st June	22nd June-28th June	29th June-5th July	6th July - 12th July	13th July - 19th July	20th July - 24th July
Arm score	47	57	60	60	76	91	99
Leg score	42	57	57	69	75	83	99
Side score	44.5	57	58.5	70.5	75.5	91	99

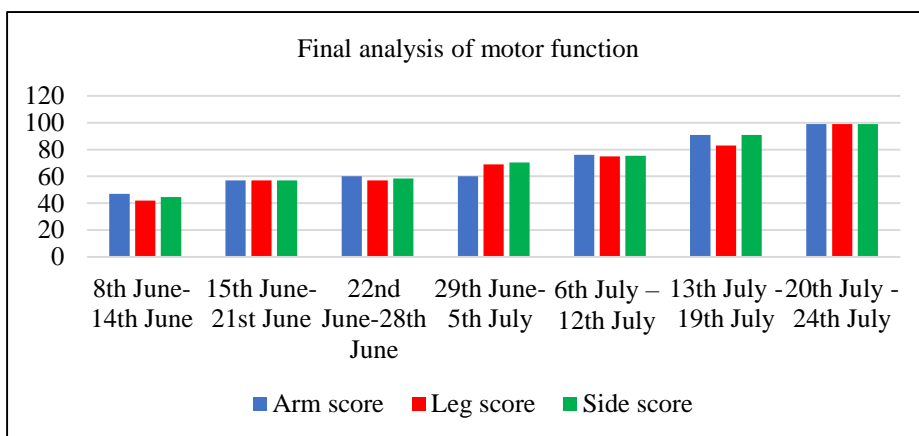


Figure 04: Final analysis of motor function examination

#### Analysis of Drug application

Within 47 days duration of treatment, 17 types of preparation of drugs were used as internal application including Kashaya (decoctions), vatee (Pill), kalka (Paste), Anupana (Bottled medicine), churna (Powder) and gritha (Ghee, liquid preparation). These all types of drugs listed and analyzed according to the

weekly and types of drugs. Further calculated of total amount of drugs and total days of drugs were used.

- First two weeks: 8th June – 21st June

Table 12 describes Analysis of treatment protocol of first two weeks including external and internal treatments.

Table 12: Analysis of treatment protocol of first two weeks

Duration of drug administration	Total Days of administration of drugs	Route of Administration	Type of Preparation of drugs	Name of preparations of drugs	Dosage	Total amount of used
8 <sup>th</sup> June – 21 <sup>st</sup> June	14	Oral	Decoction	<i>Thrikatukadi kashaya</i>	½ cup bd (120ml)	3360 ml
8 <sup>th</sup> June – 21 <sup>st</sup> June	14	Oral	Pill	<i>Seetharama vati</i>	2 bd	56
8 <sup>th</sup> June – 12 <sup>th</sup> June	5	Oral	Pill	<i>Ekaveriya vati</i>	1bd	10
13 <sup>th</sup> June – 21 <sup>st</sup> June	9	Oral	Pill	<i>Somanatha rasa vati</i>	2bd	36
8 <sup>th</sup> June – 21 <sup>st</sup> June	14	Oral	Paste	<i>Chandra kalkaya</i>	2.5g bd	70g
8 <sup>th</sup> June – 21 <sup>st</sup> June	14	Oral	Bottled medicine	<i>Mahadalu anupanaya</i>	15ml bd	420ml
8 <sup>th</sup> June – 19 <sup>th</sup> June	12	Oral	Powder	<i>Triphala choornaya</i>	5g nocte	60g
20 <sup>th</sup> June – 21 <sup>st</sup> June	2	Oral	Powder	<i>Triphala choornaya</i>	5g bd	20g
13 <sup>th</sup> June – 19 <sup>th</sup> June	7	Oral	Powder	<i>Sarasvatha choornaya</i>	2.5g bd	35g
8 <sup>th</sup> June – 12 <sup>th</sup> June	5	External application	Oil	<i>Triphala taila (Shirsha abhyanga)</i>	-	-
13 <sup>th</sup> June – 21 <sup>st</sup> June	9	External application	Oil	<i>Nirgundi taila (Hastha paada abhyanga)</i>	45ml	405ml

13 <sup>th</sup> June – 21 <sup>st</sup> June	9	Tongue application	Oil	<i>Kolashleshma taila (Tongue application)</i>	5ml	45ml
20 <sup>th</sup> June – 21 <sup>st</sup> June	2	External application	Oil	<i>Kshirabala thaila (shirodhara)</i>	-	-

- Second two weeks: 22nd June – 5th July

*Table 13 describes Analysis of treatment protocol of second two weeks including external and internal treatments.*

*Table 13: Analysis of treatment protocol of second two weeks*

Duration of drug administration	Total Days of administration of drugs	Route of Administration	Type of Preparation of drugs	Name of preparations of drugs	Dosage	Total amount of used
22 <sup>nd</sup> June – 23 <sup>rd</sup> June	02	Oral	Decoction	<i>Thrikatukadi kashaya</i>	½ cup bd (120ml)	480ml
24 <sup>th</sup> June – 5 <sup>th</sup> July	12	Oral	Decoction	<i>Danthimuladi kashaya</i>	½ cup b(120ml)	3360 ml
22 <sup>nd</sup> June – 23 <sup>rd</sup> June	02	Oral	Pill	<i>Seetharama vati</i>	2 bd	8
22 <sup>nd</sup> June	01	Oral	Pill	<i>Somanatha rasa vati</i>	2bd	4
24 <sup>th</sup> June – 5 <sup>th</sup> July	12	Oral	Pill	<i>Yogaraja vati</i>	1bd	24
24 <sup>th</sup> June – 5 <sup>th</sup> July	12	Oral	Pill	<i>Chandraprabha vati</i>	1bd	24
22 <sup>nd</sup> June – 23 <sup>rd</sup> June	02	Oral	Paste	<i>Chandra kalkaya</i>	2.5g bd	10
22 <sup>nd</sup> June – 23 <sup>rd</sup> June	02	Oral	Bottled medicine	<i>Mahadalu anupanaya</i>	15ml bd	60ml
22 <sup>nd</sup> June – 5 <sup>th</sup> July	14	Oral	Powder	<i>Triphala churnaya</i>	5g bd	140g
23 <sup>rd</sup> June - 5 <sup>th</sup> July	13	Oral	Powder	<i>Bhashkara lavana</i>	2.5g bd	65g



22 <sup>nd</sup> June - 5 <sup>th</sup> July	14	Oral	Liquid	<i>Brahmi gritha with Cow's milk</i>	5ml bd	140ml
22 <sup>nd</sup> June	01	External application	Oil	<i>Nirgundi taila (Hastha paada abhyanga)</i>	45ml	45ml
22 <sup>nd</sup> June - 5 <sup>th</sup> July	14	Tongue application	Oil	<i>Kolashleshma taila (Tongue application)</i>	5ml	70ml
22 <sup>nd</sup> June - 5 <sup>th</sup> July	14	External application	Oil	<i>Kshirabala thaila (shirodhara)</i>	-	-

• Third two weeks: 6th July – 19th July

Table 14 describes Analysis of treatment protocol of third two weeks including external and internal treatments.

Table 14: Analysis of treatment protocol of third two weeks.

Duration of drug administration	Total Days of administration of drugs	Route of Administration	Type of Preparation of drugs	Name of preparations of drugs	Dosage	Total amount of used
6 <sup>th</sup> July	01	Oral	Decoction	<i>Danthimuladi kashaya</i>	½ cup bd (120 ml)	240ml
7 <sup>th</sup> July – 16 <sup>th</sup> July	10	Oral	Decoction	<i>Balaa bilva shunti kashaya</i>	½ cup bd (120ml)	2400 ml
17 <sup>th</sup> July – 19 <sup>th</sup> July	03	Oral	Decoction	<i>Maashabaladi kashaya</i>	½ cup bd (120ml)	
6 <sup>th</sup> July – 19 <sup>th</sup> July	14	Oral	Pill	<i>Yogaraja vati</i>	1bd	28
6 <sup>th</sup> July	01	Oral	Pill	<i>Chandraprabha vati</i>	1bd	2
6 <sup>th</sup> July	01	Oral	Powder	<i>Triphala churnaya</i>	5g bd	10g

6 <sup>th</sup> July	01	Oral	Powder	<i>Bhashkara lavana</i>	2.5g bd	5g
7 <sup>th</sup> July – 19 <sup>th</sup> July	10	Oral	Powder	<i>Ashvaghandha churnaya</i>	5g bd	100g
6 <sup>th</sup> July – 19 <sup>th</sup> July	11	Oral	Liquid	<i>Brahmi gritha with Cow's milk</i>	5ml bd	110ml
6 <sup>th</sup> July	01	External application	Oil	<i>Kolashleshma tail (Tongue application)</i>	5ml	5ml
6 <sup>th</sup> July	01	External application	Oil	<i>Kshirabala thaila (Shirodhara)</i>	-	-
7 <sup>th</sup> July - 19 <sup>th</sup> July	10	External application	Oil	<i>Naarayana tail (Pinda sweda)</i>	45ml	450ml
7 <sup>th</sup> July - 19 <sup>th</sup> July	10	-	-	-	Physiotherapy	-

• Last five days: 20th July – 24th July

Following Table 15 shows analysis of treatment protocol of last five days including external and internal treatments.

Table 15: Analysis of treatment protocol of last five days.

Duration of drug administration	Total Days of administration of drugs	Route of Administration	Type of Preparation of drugs	Name of preparations of	Dosage	Total amount of used
20 <sup>th</sup> July – 24 <sup>th</sup> July	5	Oral	Decoction	<i>Maashabaladi kashaya</i>	½ cup bd (120ml)	1200 ml
20 <sup>th</sup> July – 24 <sup>th</sup> July	5	Oral	Pill	<i>Yogaraja vati</i>	1 bd	10
20 <sup>th</sup> July – 24 <sup>th</sup> July	5	Oral	Powder	<i>Ashvaghandha churnaya</i>	5g bd	50g
20 <sup>th</sup> July – 24 <sup>th</sup> July	5	Oral	Liquid	<i>Brahmi gritha with Cow's milk</i>	5 ml bd	50ml
20 <sup>th</sup> July – 24 <sup>th</sup> July	5	External application	Oil	<i>Naarayana taila (Pinda sweda)</i>	45ml	225ml

20 <sup>th</sup> July – 24 <sup>th</sup> July	5	External application	Oil	<i>Naarayana taila (Matra vasti)</i>	45ml	225ml
20 <sup>th</sup> July – 24 <sup>th</sup> July	5	-	-	-	Physiotherapy	-

Table 16 describes Analysis of Kashaya administration within 47 days. This analysis based during the 47 days. Firstly, used Kashaya was the Thrikatukadi Kashaya, secondly used one was the

Danthimuladi Kashaya, thirdly used kashaya was the Balaa bilva shunti and last one was the Maashabaladi Kashaya. According to analysis Thrikatukadi Kashaya was the mostly used and amount was 3840ml within 16 days.

*Table 16: Analysis of Kashaya administration within 47 days*

Duration of drug administration	Total Days of Administration of drugs	Drugs	Dosage	Total amount of used
8 <sup>th</sup> June – 23 <sup>rd</sup> June	16	<i>Thrikatukadi kashaya</i>	½ pata BD	3840ml
24 <sup>th</sup> June – 6 <sup>th</sup> July	13	<i>Danthimuladi kashaya</i>	½ pata BD	3120ml
7 <sup>th</sup> July – 16 <sup>th</sup> July	10	<i>Balaa bilva shunti kashaya</i>	½ pata BD	2400ml
17 <sup>th</sup> July – 24 <sup>th</sup> July	08	<i>Maashabaladi kashaya</i>	½ pata BD	1920ml

Table 17 describes Analysis of Vati administration within 47 days. This analysis based during the 47 days. Yogaraja vati was the mostly used pill type within 31 days.

*Table 17: Analysis of Vati administration within 47 days*

Duration of drug administration	Total Days of administration of drugs	Drugs	Dosage	Total amount of used
8 <sup>th</sup> June – 23 <sup>rd</sup> June	16	<i>Seetharama vati</i>	2 BD	64
24 <sup>th</sup> June – 24 <sup>th</sup> July	31	<i>Yogaraja vati</i>	2 BD	124
24 <sup>th</sup> June – 6 <sup>th</sup> July	13	<i>Chandraprabha vati</i>	2 BD	52
8 <sup>th</sup> June – 12 <sup>th</sup> June	05	<i>Ekaveriya vati</i>	1BD	05
13 <sup>th</sup> June – 22 <sup>th</sup> June	10	<i>Somanatha rasa</i>	2 BD	40

Table 18 describe Analysis of Kalka administration within 47 days. This analysis based during the 47 days.

*Table 18: Analysis of Kalka administration within 47 days*

Duration of drug administration	Total Days of administration of drugs	Drugs	Dosage	Total amount of used
8 <sup>th</sup> June – 23 <sup>rd</sup> June	16	<i>Chandra kalkaya</i>	2.5g BD	80g

Table 19 describes Analysis of Anupana administration within 47 days. This analysis based during the 47 days. Mahadalu anupanaya was administrated associated with Chandra kalka.

*Table 19: Analysis of Anupana administration within 47 days*

Duration of drug administration	Total Days of administration of drugs	Drugs	Dosage	Total amount of used
8 <sup>th</sup> June – 23 <sup>rd</sup> June	16	<i>Mahadalu anupanaya</i>	15ml BD	480ml

Table 20 describes analysis of Choorna administration within 47 days. This analysis based during the 47 days and mostly used Choorna type was the Ashvaghandha; total amount was 180g.

*Table 20: Analysis of Choorna administration within 47 days*

Duration of drug administration	Total Days of administration of drugs	Drugs	Dosage	Total amount of used
8 <sup>th</sup> June – 19 <sup>th</sup> June	12	<i>Triphala choornaya</i>	5g Nocte	60g
20 <sup>th</sup> June – 6 <sup>th</sup> July	17	<i>Triphala choornaya</i>	5g BD	170g
13 <sup>th</sup> June – 19 <sup>th</sup> June	07	<i>Sarasvatha choornaya</i>	2.5g BD	35g
23 <sup>rd</sup> June – 6 <sup>th</sup> July	14	<i>Bhashkara lavana</i>	2.5g BD	70g
7 <sup>th</sup> July – 24 <sup>th</sup> July	18	<i>Ashvaghandha choornaya</i>	5g BD	180g

Table 21 describes analysis of Gritha administration within 47 days. This analysis based during the 47 days. Brahmi gritha was started to use from 20th June.

*Table 21: Analysis of Gritha administration within 47 days*

Duration of drug administration	Total Days of administration of drugs	Drugs	Dosage	Total amount of used
20 <sup>th</sup> June – 24 <sup>th</sup> July	35	<i>Brahmi gritha</i> with Cow's milk	5ml BD	350ml

Following table 22 shows detailed classification of different types of used preparations of drugs within 47days. This analysis was done within every two weeks of period.

*Table 22: Detailed classification of different types of used preparations of drugs within 47days*

Name of preparations of drugs	Usage of drugs (days) within two months				Total Days of administration of drugs
Duration	1 <sup>st</sup> two weeks	2 <sup>nd</sup> two weeks	3 <sup>rd</sup> two weeks	Last 5 days	
<i>Thrikatukadi kashaya</i>	14	02	00	00	16
<i>Danthimuladi kashaya</i>	00	12	01	00	13
<i>Balaa bilva shunti kashaya</i>	00	00	10	00	10
<i>Maashabaladi kashaya</i>	00	00	03	05	18
<i>Seetharama vati</i>	14	02	00	00	16
<i>Yogaraja vati</i>	00	12	14	05	31
<i>Chandraprabha vati</i>	00	12	01	00	13
<i>Ekaveriya vati</i>	05	00	00	00	05
<i>Somanatha rasa</i>	09	01	00	00	10
<i>Chandra kalka</i>	14	02	00	00	16
<i>Mahadalu anupanaya</i>	14	02	00	00	16

<i>Triphala churnaya</i>	12	00	00	00	12
<i>Triphala churnaya</i>	02	14	01	00	17
<i>Sarasvatha churnaya</i>	07	00	00	00	07
<i>Bhashkara lavana</i>	00	13	01	00	14
<i>Ashvaghandha churnaya</i>	00	00	10	05	18
<i>Brahmi gritha</i> with Cow's milk	00	14	11	05	35

Table 23 describes classification of different types of used preparation of drugs within 47 days. According to this analyzed mostly used decoction and secondly most used one is the pills and powders.

*Table 23: Classification of different types of used preparation of drugs within 47 days*

Types of preparation of drugs	Number of used types of preparation of drugs	Percentage of used types of preparation of drugs %
<i>Kashaya</i> (Decoction)	4	17.39%
<i>Vati</i> (Pill)	5	21.39%
<i>Choorna</i> (Powder)	5	21.39%
<i>Kalka</i> (Paste)	1	4.34%
<i>Anupana</i> (Bottled medicine)	1	4.34%
<i>Gritha</i> (Liquid)	1	4.34%
<i>Thaila</i> (Oil) - External	6	26.08%

Following figure 05 describes percentage (%) of used types of preparation of drugs

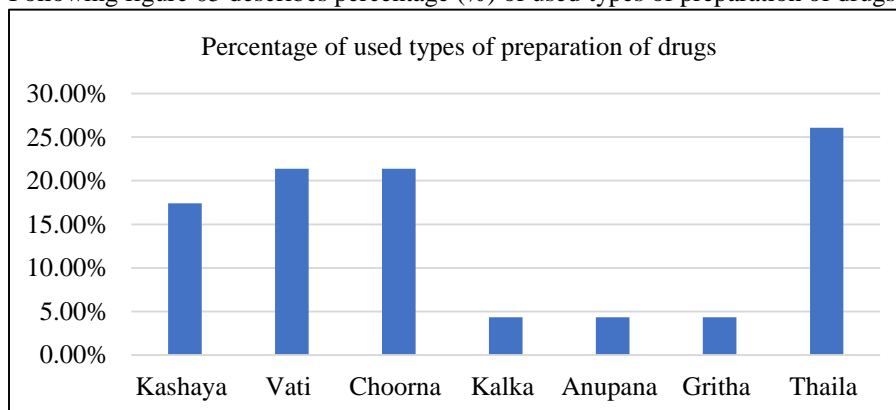


Figure 05: Percentage (%) of used types of preparation of drugs.

## CONCLUSION

Pakshaghata is based of two words including Paksha and Aghata. Paksha means; half part of body and Aghata means loss of function. Ayurveda literature is complete of documentary references where Pakshaghata is described broadly. Pakshaghata is considered as Vata Dosha predominant disease condition. Patient usually presents with loss of function of a half of body or weakness of one half. Face may or may not be involved. Prognosis is depended on several factors including Vaya (Age), Bala(Strength), Dosha involvement (Vata, Pitta, kapha) and Chatushpaada. Chatushpaada is four factors are mutually depends on each other including Bhishag (physician), Upasthayaka (Medical Attendant), Rogi (patient) and Dravya (medicine). According to modern science brain is the superior responsible organ for control all the motor activities. Cerebrovascular accidents are principally responsible for loss of function in body.

According to analyzed data, study prove that this treatment protocol has provided better improvement of motor functions subjected to Pakshagata. Within 47 days of treatment, 23 types of preparation of drugs were used as internal and external application including Kashaya (decoctions), vatee (Pill), kalka (Paste), churna (Powder), gritha (Ghee, liquid preparation) and taila (Oil). Externally carried out the 7 types of treatment procedures including Shirsha abhyanga using Triphala thaila, Hastha paada abhyanga using Nirgundi thaila, Jihva nirlakhana using Kolashleshma thaila, Shiro pitchu using Divyanganadi thaila, Shiro dhara using Kshirabala thaila, Pinda sweda using Narayana thaila with Bebila Kashaya and Matra vasti using Narayana thaila. Associated with these treatment procedures physiotherapy to be continued respectively. After this treatment, motor function has been improved significantly and it is clinically proven through this case

study. Further studies using different cases are recommended to conduct to ensure the result of this research.

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