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# Effect Of Sahacharadi Thaila Using Sarvangdhara Procedure In Pediatric Spastic Cerebral Palsy

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**Abstract**

***Introduction:*** *Spastic cerebral palsy (CP) is primarily characterized by muscle stiffness and impaired motor function, which significantly affects not only the quality of life of individuals but also impacts their families. Ayurvedic panchakarma has been recognised for its potential in managing various neurological disorders.*

***Objectives****: To evaluate the effectiveness of sarvangadhara, a Panchakarma-Ayurvedic treatment modality, in enhancing motor function and alleviating spasticity in children diagnosed with spastic cerebral palsy.*

***Material and methods****: The research was designed as a randomized controlled clinical trial involving participants aged between 2 and 10 years who had a confirmed diagnosis of spastic CP. The Trial group received sarvangadhara panchakarma with Sahacharadi oil for 15 days in combination with standard physiotherapy, while the control group received sarvangadhara panchakarma with edible Sesame oil for 15 days in combination with standard physiotherapy. The motor functions were assessed using muscle power and Gross Motor Milestones. The spasticity was assessed using the Modified Ashworth Scale.*

***Result****: The findings of the study revealed a statistically significant improvement in motor function and a notable reduction in spasticity in the treatment group compared to the control group. Sarvangadhara with Sahacharadi oil exhibited promising neuro-enhancing properties and muscle-relaxing effects, indicating its potential as a valuable adjunct therapy in the management of spastic CP. The study concludes that incorporating Ayurvedic treatments such as sarvangadhara into conventional rehabilitation approaches may enhance therapeutic outcomes, ultimately improving the quality of life for individuals affected by spastic cerebral palsy.*

***Keywords****- Panchakarma, Sarvangdhara, spastic cerebral palsy, sahacharadi thaila.*

## INTRODUCTION

Cerebral palsy (CP) is a group of neurological disorders that affect movement, muscle tone, and motor skills. It is caused by damage to the developing brain, either during pregnancy, childbirth, or shortly after birth. This damage affects the brain's ability to control muscles and coordinate movement, leading to varying degrees of physical disability.

The severity of symptoms of cerebral palsy can vary widely. Some individuals may experience minor motor skill impairments, while others may be significantly affected and require lifelong care. Common signs include spasticity (muscle stiffness), ataxia (lack of muscle coordination), and dyskinesia (involuntary movements). CP can also be associated with other issues such as intellectual disabilities, seizures, and problems with vision, hearing, or speech.

The incidence of cerebral palsy (CP) in India is estimated to be around 3 per 1000 live births. This rate is higher compared to the global average, which is about 2 per 1000 live births.[1]
Children with CP and their caregivers often experience a lower health-related quality of life due to the physical and emotional challenges associated with the condition. Among four types of Cerebral palsies Spastic cerebral palsy (SCP) is the most common form of the condition, affecting about 70-80% of individuals with CP. It is

[1] Chauhan, A., Singh, M., Jaiswal, N. et al. Prevalence of Cerebral Palsy in Indian Children: A Systematic Review and Meta-Analysis. Indian Journal of Pediatrics, **86**, 1124–1130 (2019).

characterised by stiff muscles and awkward movements due to increased muscle tone, making movement difficult and often causing joint deformities over time.[2]

Currently, there is no cure for cerebral palsy (CP), but various treatments and interventions are available to manage symptoms and improve quality of life. Treatment primarily focuses on addressing symptoms and enhancing function through a multidisciplinary approach tailored to each individual's needs. Physical therapy helps strengthen muscles, improve flexibility, and increase mobility, sometimes with the aid of braces or walkers. Occupational therapy aids in developing fine motor skills and performing daily activities independently, often with assistive devices. Medications such as muscle relaxants and Botox injections help control spasticity and pain. But these are short-acting, and hence they have to be given repeatedly. The medicines are also costly, and hence, patients discontinue the treatment. Surgical options, including orthopaedic procedures and selective dorsal rhizotomy, may be necessary to correct deformities and improve mobility. Studies have proven that these surgeries are associated with complications. They are expensive too.

In Ayurvedic medicine, although there is no direct reference to CP, it can be understood in the context of Vatavyadhi. Vatavyadhi refers to disorders caused by the imbalance of the Vata dosha, which is responsible for movement and coordination in the body. The symptoms of SCP, such as increased muscle tone, impaired movement and muscle control, can be correlated with the signs of Vata imbalance described in Ayurvedic texts. Ayurvedic treatments for conditions related to Vata imbalance may include dietary changes, herbal remedies, massage, and other therapies aimed at balancing the doshas and improving overall health and function.[3] Among them sarvangadhara is one of the treatment modalities. Panchakarma therapy is central to Ayurvedic treatment and includes practices such as Abhyanga, a full-body massage with medicated oils to improve muscle tone and reduce spasticity; Basti, medicated enemas to detoxify and balance the Vata dosha, shali shashtik pinda sweda an herbal steam therapy that induces sweating to detoxify the body and relax muscles and believed to be linked to neurological disorders. The present study sheds light on sarvangadhara, which is one of the treatment modalities which pacifies overall vata dosha in the body through sparshanendriya.

Sarvangadhara, also known as Pizhichil in Kerala Ayurveda, is a specialized oil therapy under Panchakarma used in managing neurological and musculoskeletal disorders, including cerebral palsy. This therapy involves the continuous pouring of warm medicated oil over the entire body in a rhythmic manner, combined with gentle massage. The warmth and medicinal properties of the oil help in reducing spasticity, relaxing stiff muscles, and improving joint mobility, which are major concerns in spastic cerebral palsy. It nourishes the nervous system, enhances blood circulation, and supports neuromuscular coordination, promoting better oxygenation of tissues and elimination of metabolic toxins. The procedure involves selecting appropriate medicated oils such as Dhanwantharam Thailam, Sahacharadi Thailam, or Bala Ashwagandhadi Thailam based on the patient's condition. Studies on the effect of sahacharadi taila using sarvangadhara procedure on SCP have not been studied nor published.

## MATERIALS AND METHODS

### Patients

Patients of spastic cerebral palsy(SCP)were acquired and selected from the Outpatient Department (OPD) of Kaumarabhritya BVDUCOA. Written informed consent was obtained from parents for each patient before the study, only after explaining about the project and karma to be availed to be SCP children

### Diagnostic criteria

Children presenting complaints of spasticity and already diagnosed cases of SCP were selected for this study.

### Inclusion criteria

[2] Chauhan, A., Singh, M., Jaiswal, N. et al. Prevalence of Cerebral Palsy in Indian Children: A Systematic Review and Meta-Analysis. Indian Journal of Pediatrics, **86**, 1124–1130 (2019).

[3] Ramanandi, V.H., Shukla, Y.U. Socio-demographic and clinical profile of pediatric patients with cerebral palsy in Gujarat, India. *Bull Fac Phys Ther* **27**, 19 (2022).

Children with SCP in the age group 2- 10 years.
Parents of SCP children who are willing to give informed consent.

**Exclusion criteria**
1. Children >10 years of age and children < 2 years of age
2. Children with severe infectious diseases such as TB, meningitis,
3. Children with any major congenital malformations, such as Congenital Heart Disease (CHD).
4. Children with, on no other medication or therapy for present complaints (Spastic CP).

**Sample size**
A total of 30 patients were recruited in two groups, namely A and B, comprising a total of 15 patients each.

**Treatment schedule**
A prior detailed case, along with gross, fine motor assessment, and goniometer assessment, was done both before and after treatment.
**Group A**
Patients were treated with Sahacharadi taila. (3 litres for each patient)
**Group B**
Patients were treated with Til taila. (3 litres for each patient)
Patients were allotted groups alternately.

Patients were treated every day for 15 days for 20 minutes daily with sarvangadhara karma with respective taila according to the group allotted. Karma was performed before food or a minimum of 3 hours after taking food.

**Pre-procedure**
Before the sarvangadhara karma, the patient was told to perform udvartana karma with wheat flour for 5 days. The parents were told to cover the patient's whole body with warm clothes before and after karma.

**Main procedure**
Shirotalam with rasnadi choorna was done before sarvanga karma to prevent the vitiation of kapha and vata in the head. The Dhara karma was performed with respective warm oil according to the group on the whole body, excluding the face.

**Post-procedure**
The parents were told to cover the patient's whole body with warm clothes after karma to prevent from breeze.

**Observations and Results**
Here is the Demographic data of the patients enrolled under Trial and Control groups.

**Table 1 :Trial group:**

| SR.NO | GROUP | AGE | SEX | PLACE | DATE | SOCIO-ECONOMIC STATUS |
|---|---|---|---|---|---|---|
| 1. | TRIAL | 2 Years 10 months | Female | Ambegaon | 07/07/23 | Middle |
| 2. | TRIAL | 4 Years 4 months | Male | Saswad | 11/07/23 | Middle |
| 3. | TRIAL | 3 Years 6 months | Male | Datta Nagar | 06/10/23 | Middle |
| 4. | TRIAL | 4 Years 6 months | Female | Kondhwa | 17/11/23 | Middle |
| 5. | TRIAL | 8 Years 7 months | Male | Mundhwa | 15/12/23 | Middle |

| | | | | | | |
|---|---|---|---|---|---|---|
| **6.** | TRIAL | 5 Years<br>8 months | Female | Katraj | 05/02/24 | Middle |
| **7.** | TRIAL | 2 Years<br>8 months | Female | Chinchawad | 08/02/24 | Middle |
| **8.** | TRIAL | 3 Years<br>5 months | Female | Ambegaon | 12/02/24 | Middle |
| **9.** | TRIAL | 7 years<br>4 months | Male | Bibewadi | 01/03/2024 | Middle |
| **10.** | Trial | 7 years<br>6 months | Male | Paud | 20/07/24 | Poor |
| **11.** | Trial | 10 years<br>4 months | Female | Velha | 23/07/24 | Poor |
| **12.** | Trial | 1 years<br>6 months | Female | Warje | 16/07/24 | Middle |
| **13.** | Trial | 15 year<br>7 months | Male | Dhanakawadi | 19/07/24 | Middle |
| **14.** | Trial | 3 years | Female | Thane | 07/08/24 | Poor |
| **15.** | Trial | 7 years | Female | Ambegaon | 20/08/24 | Middle |

**Table 2: Control group**

| **SR.NO** | **GROUP** | **AGE** | **SEX** | **PLACE** | **DATE** | **SOCIO-ECONOMIC STATUS** |
|---|---|---|---|---|---|---|
| **1.** | CONTROL | 9 Years<br>6 months | Male | Dhankawadi | 13/06/23 | Middle |
| **2.** | CONTROL | 6 Years<br>7 months | Male | Narhe | 05/10/23 | Middle |
| **3.** | CONTROL | 7 Years<br>9 months | Male | Lohagaon | 05/10/23 | Middle |
| **4.** | CONTROL | 7 Years<br>10 months | Female | Hadapsar | 16/11/23 | Poor |
| **5.** | CONTROL | 9 Years<br>3 months | Male | Bibewadi | 20/11/23 | Poor |
| **6.** | CONTROL | 5 Years<br>11 months | Male | Wanowari | 08/01/24 | Middle |
| **7.** | CONTROL | 10 Years<br>4 months | Male | Ambegaon | 28/02/24 | Middle |
| **8.** | CONTROL | 3 years<br>6 months | Female | Undri | 18/03/24 | Middle |
| **9.** | CONTROL | 12 years | Male | Jambhulwadi | 29/03/24 | Middle |
| **10.** | CONTROL | 2 years<br>6 months | Male | Hadapsar | 13/04/24 | Poor |
| **11.** | CONTROL | 8 years | Female | Dhankawadi | 25/04/24 | Middle |
| **12.** | CONTROL | 2 years<br>6 months | Male | Solapur | 13/06/24 | Poor |
| **13.** | Control | 12 years<br>7 months | Female | Velha | 31/07/24 | Middle |
| **14.** | Control | 6 years<br>10 months | Female | Wanowrie | 12/08/24 | Middle |

| | | | | | | |
|---|---|---|---|---|---|---|
| **15.** | Control | 7 years | Male | Ambegaon | 20/08/24 | Middle |

**Table 3:Causes Trial group**

| Sr. no. | Antenatal causes | Natal causes | Post-natal causes | Medicines/ Dose |
|---|---|---|---|---|
| 1. | Not any | FTND, no soon cry, resuscitation needed, birth asphyxia, jaundice | Jaundice | Not any |
| 2. | Hyperemesis | Full term LSCS, ABO incompatibility, Jaundice | Jaundice, Otitis media (6th mth) | Not any |
| 3. | Not any | FTND, Not any | Fever on 2nd day, NICU for days | Not any |
| 4. | Stress | Prolonged labour | Not any | Not any |
| 5. | Not any | Preterm, LBW (1.6kg), LSCS | Admitted in NICU for IUGR for 10 days, Convulsion | Syp. Trioptal 5ml BD |
| 6. | Not any | FTND, cried soon, Macrocephaly | H/o Fever then Convulsions | |
| 7. | Not any | FTND, assisted vaccum, | Not any | Not any |
| 8. | Not any | Preterm normal LBW (2.4kg), not cried soon, | NICU for 8 days, Convulsions | T. Frisium<br>T. cefixime |
| 9. | Not any | Full term LSCS, Convulsion | NICU for 12 days Convulsions | Not any |
| 10. | Not any | FT, Caeserian, not cried soon, Meuconium aspiration , hypoxia, Convulsion | NICU for 10 days, respiratory distress, Convulsion | |
| 11. | Not any | FTND, prolonged labour, Convulsion | NICU for 14 days, Poor breast-feed | Not any |
| 12. | Not any | Post term, Normal, LBW (2.0 kg) | NICU for 2 days, Jaundice | Not any |
| 13. | Not any | Preterm normal VLBW (1.2 kg) | NICU for 21 days, Poor breast-feed | Not any |
| 14. | Not any | Preterm normal, LBW (2kg ) | NICU for 5 days to treat severe Jaundice | Not any |
| 15. | Not any | FT, Caesarian, not cried soon, LBW (2.1kg) | Nicu for 3 days, Convulsions | |
| 16. | Not any | FTND, Overweight (3.3 kg) | Not any | Not any |

**Control group**

| Sr. no. | Antenatal causes | Natal causes | Post-natal causes | Medicines/ Dose |
|---|---|---|---|---|
| 1. | Exposure to typhoid, Rubella | Full term LSCS, LBW(2.4kg), | Not any | |
| 2. | Low Haemoglobin | FTND, not cried soon, Resuscitation needed, Birth asphyxia due to Meuconium aspiration, Prolonged Labour | Birth asphyxia, NICU for 16 days | Not any |
| 3. | Not any | Preterm (1.5kg), resuscitation required, birth asphyxia | Respiratory distress | Not any |
| 4. | H/o PV bleed (3 mth.) | FTND, Not cried soon, Resusitation requires, birth Axphyxia- Cleft palate with cleft lip | Poor Feeding and presence of Cleft palate with cleft lip | Not any |
| 5. | Not any | FTND, , no soon cry, no resuscitation required | Not any | Not any |

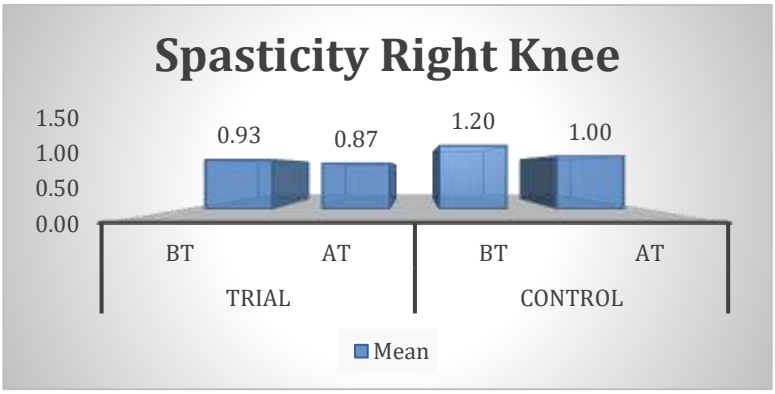
| | | | | |
|---|---|---|---|---|
| 6. | Not any | FTND (vaccum assisted), Prolonged labour, no soon cry, resuscitation required, | Respiratory distress, Seizures | |
| 7. | Not any | FTND, not cried soon, resuscitation required, Fever, convulsions, Overweight (3.5kg) | NICU for 8 days, Convulsions | |
| 8. | Not any | FT, Caeserian, Cord around neck | Jaundice, Williams syndrone | Not any |
| 9. | Not any | Preterm Caeserian, VLBW (1.4 kg), no soon cry, ,Hypoxia | NICU for 8 days, respiratory distress, Poor breast-feed | Not any |
| 10. | Not any | Preterm normal, LBW (1.8 kg), no soon cry, resuscitation required, Hypoxia | NICU for 15 days, respiratory distress, Convulsions, Poor breast-feed | |
| 11. | Not any | FTND, VLBW (1.45 kg) | Not any | Not any |
| 12. | Not any | FT, CS delivery, prolonged labour, no cry soon, Foetal distress due to meuconium aspiration | NICU for 10 days, respiratory distress | Not any |
| 13. | Not any | FTND, LBW (2.25 kg), No soon cry, Breech presentation | NICU for 2 days | Not any |
| 14. | Not any | FTND, No soon cry, Breech presentation, Meuconium aspiration, Convulsion, Hypoxia | NICU for 7 days, Respiratory distress | |
| 15. | Not any | FT, Caeserian, not cried soon, | Nicu for 2 days, Convulsions | |

## STATISTICALA ANALYSIS FOR DHARA

### 1. Spasticity (Knee Rt)

| Spasticity (Knee Rt) | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 0.93 | 1.00 | 1.10 | 0.28 | -1.000[b] | 0.317 | 7.14 | NS |
| | AT | 0.87 | 1.00 | 1.13 | 0.29 | | | | |
| Control | BT | 1.20 | 1.00 | 0.86 | 0.22 | -1.342[c] | 0.180 | 16.67 | NS |
| | AT | 1.00 | 1.00 | 0.85 | 0.22 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.

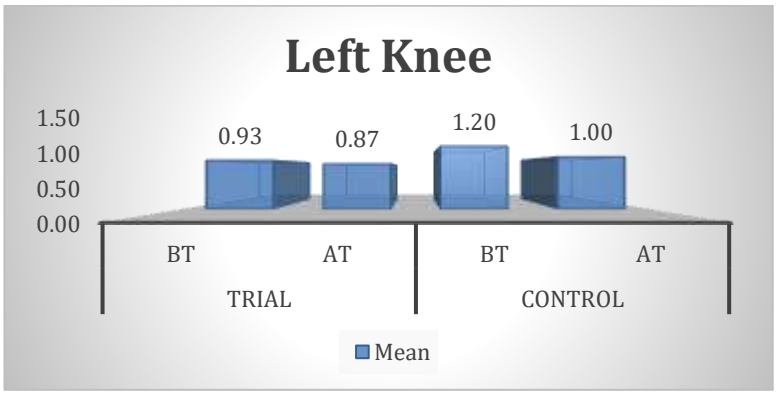



### 2. Knee Left

| Knee Left | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 0.93 | 1.00 | 1.10 | 0.28 | -1.000[b] | 0.317 | 7.14 | NS |
| | AT | 0.87 | 1.00 | 1.13 | 0.29 | | | | |
| Control | BT | 1.20 | 1.00 | 0.86 | 0.22 | -1.342[c] | 0.180 | 16.67 | NS |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | AT | 1.00 | 1.00 | 0.85 | 0.22 | | | | |

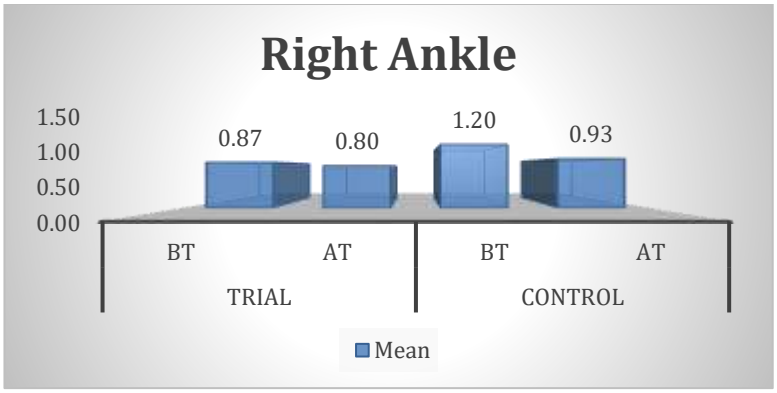
Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.




**3. Ankle Rt**

| Ankle Rt | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 0.87 | 1.00 | 0.92 | 0.24 | -1.000[b] | 0.317 | 7.69 | NS |
| | AT | 0.80 | 1.00 | 0.94 | 0.24 | | | | |
| Control | BT | 1.20 | 1.00 | 0.77 | 0.20 | -1.633[c] | 0.102 | 22.22 | NS |
| | AT | 0.93 | 1.00 | 0.80 | 0.21 | | | | |

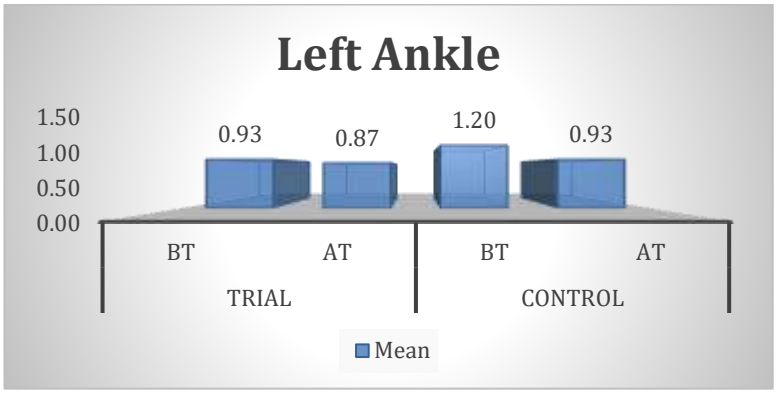
Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.




**4. Ankle Lt**

| Ankle Lt | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 0.93 | 1.00 | 1.03 | 0.27 | -1.000[b] | 0.317 | 7.14 | NS |
| | AT | 0.87 | 1.00 | 1.06 | 0.27 | | | | |
| Control | BT | 1.20 | 1.00 | 0.77 | 0.20 | -1.633[c] | 0.102 | 22.22 | NS |
| | AT | 0.93 | 1.00 | 0.80 | 0.21 | | | | |

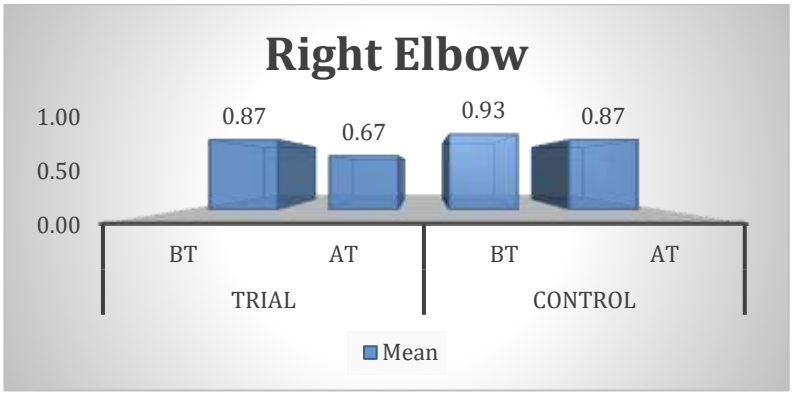
Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.




**5. Elbow Rt**

| Elbow Rt | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 0.87 | 1.00 | 1.13 | 0.29 | -1.342[b] | 0.180 | 23.08 | NS |
| | AT | 0.67 | 0.00 | 0.82 | 0.21 | | | | |
| Control | BT | 0.93 | 1.00 | 0.80 | 0.21 | -.447[c] | 0.655 | 7.14 | NS |
| | AT | 0.87 | 1.00 | 0.74 | 0.19 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.




**6. Elbow Lt**

| Elbow Lt | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 0.87 | 1.00 | 1.13 | 0.29 | -1.342[b] | 0.180 | 23.08 | NS |
| | AT | 0.67 | 0.00 | 0.82 | 0.21 | | | | |
| Control | BT | 0.93 | 1.00 | 0.80 | 0.21 | -.447[c] | 0.655 | 7.14 | NS |
| | AT | 0.87 | 1.00 | 0.74 | 0.19 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.

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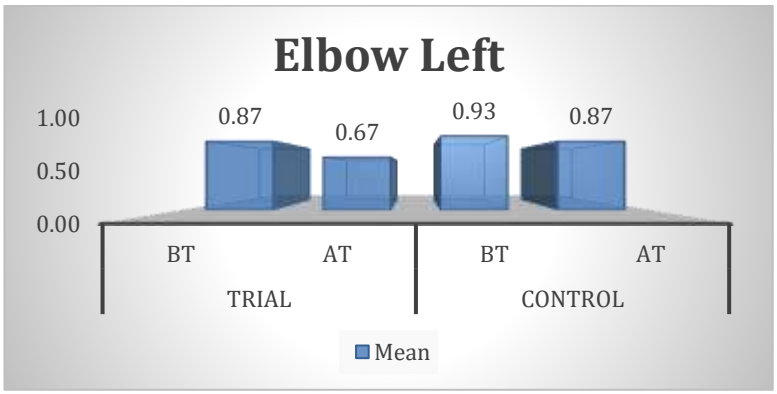
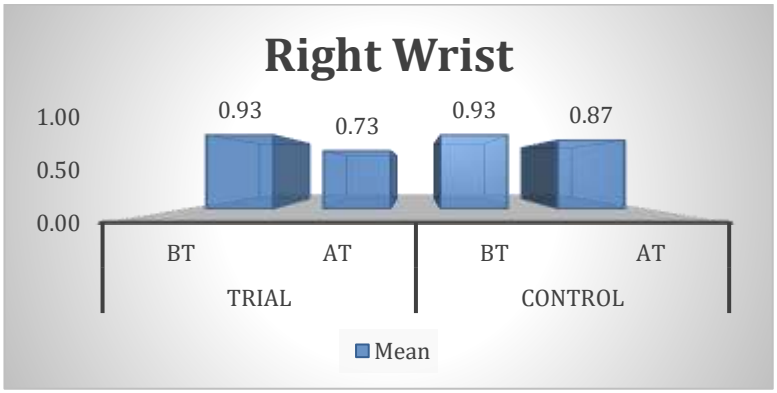



**7. Wrist Rt**

| Wrist Rt | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 0.93 | 1.00 | 1.10 | 0.28 | -1.342[b] | 0.180 | 21.43 | NS |
| | AT | 0.73 | 1.00 | 0.80 | 0.21 | | | | |
| Control | BT | 0.93 | 1.00 | 0.70 | 0.18 | -.577[c] | 0.564 | 7.14 | NS |
| | AT | 0.87 | 1.00 | 0.74 | 0.19 | | | | |

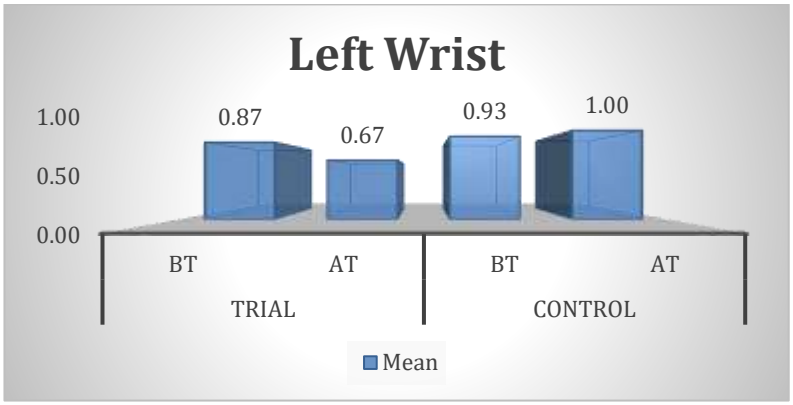
Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.




**8. Wrist LT**

| Wrist LT | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 0.87 | 1.00 | 1.13 | 0.29 | -1.342[b] | 0.180 | 23.08 | NS |
| | AT | 0.67 | 0.00 | 0.82 | 0.21 | | | | |
| Control | BT | 0.93 | 1.00 | 0.70 | 0.18 | -.577[d] | 0.564 | 7.14 | NS |
| | AT | 1.00 | 1.00 | 0.76 | 0.20 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.

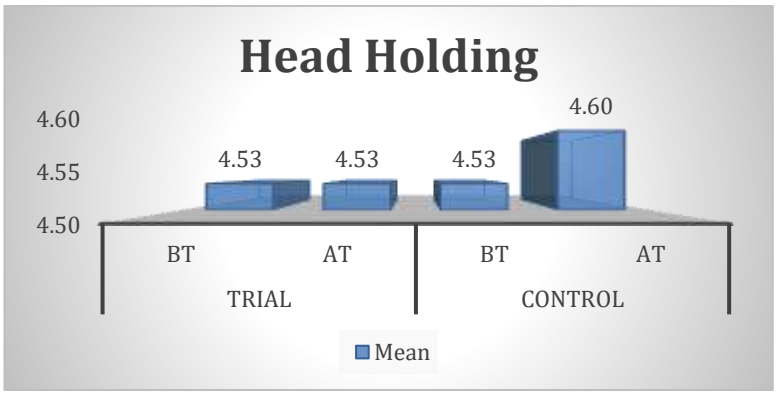



**GROSS MOTOR MILE STONES**

**1. Head Holding**

| Head Holding | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 4.53 | 5.00 | 1.06 | 0.27 | .000[d] | 1.000 | 0.00 | NS |
| | AT | 4.53 | 5.00 | 1.06 | 0.27 | | | | |
| Control | BT | 4.53 | 5.00 | 1.06 | 0.27 | -1.000[d] | 0.317 | 1.47 | NS |
| | AT | 4.60 | 5.00 | 1.06 | 0.27 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.

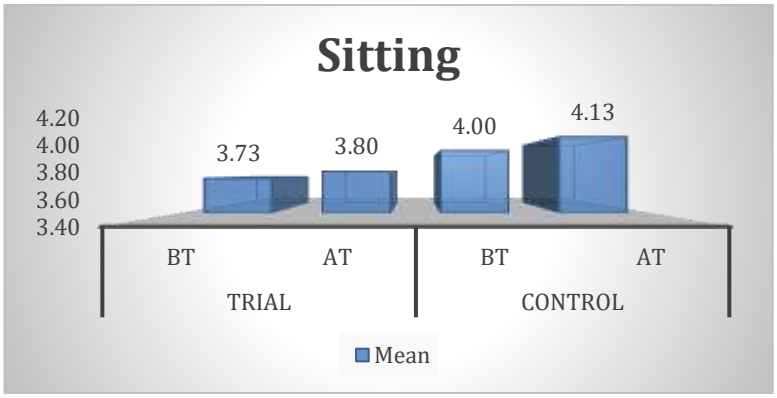



**2. Sitting**

| Sitting | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 3.73 | 4.00 | 1.39 | 0.36 | -1.000[c] | 0.317 | 1.79 | NS |
| | AT | 3.80 | 4.00 | 1.42 | 0.37 | | | | |
| Control | BT | 4.00 | 5.00 | 1.56 | 0.40 | -1.414[d] | 0.157 | 3.33 | NS |
| | AT | 4.13 | 5.00 | 1.46 | 0.38 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is

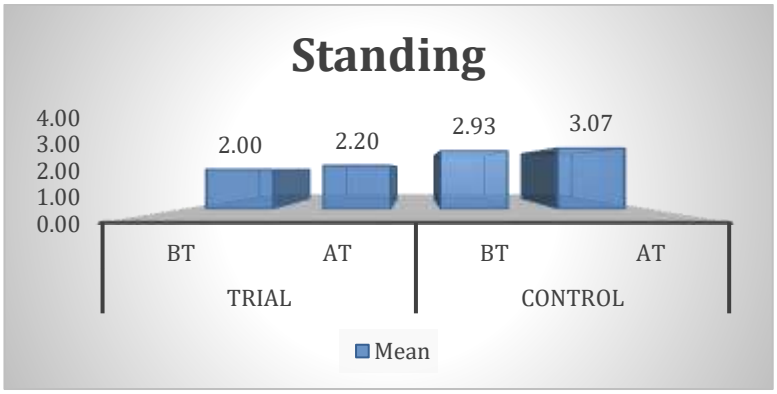
greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.




**3. Standing**

| Standing | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 2.00 | 1.00 | 2.17 | 0.56 | -1.732[c] | 0.083 | 10.00 | NS |
| | AT | 2.20 | 2.00 | 2.08 | 0.54 | | | | |
| Control | BT | 2.93 | 5.00 | 2.37 | 0.61 | -1.414[d] | 0.157 | 4.55 | NS |
| | AT | 3.07 | 5.00 | 2.22 | 0.57 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.



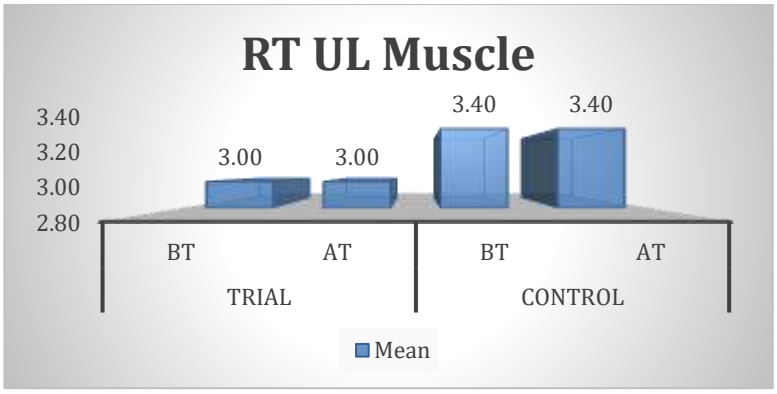

**MUSCLE POWER:**

**1. RT UL**

| RT UL Muscle | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 3.00 | 3.00 | 1.20 | 0.31 | .000[d] | 1.000 | 0.00 | NS |
| | AT | 3.00 | 3.00 | 1.20 | 0.31 | | | | |
| Control | BT | 3.40 | 4.00 | 0.99 | 0.25 | .000[b] | 1.000 | 0.00 | NS |
| | AT | 3.40 | 4.00 | 0.99 | 0.25 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is

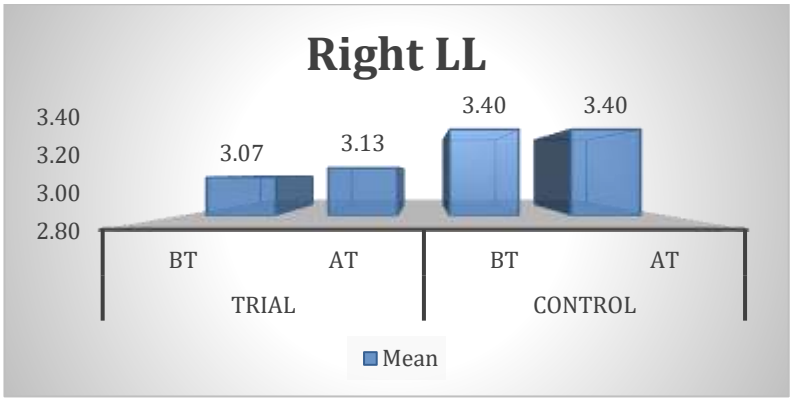
greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.




**2. Rt LL**

| Rt LL | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 3.07 | 3.00 | 1.33 | 0.34 | -1.000[c] | 0.317 | 2.17 | NS |
| | AT | 3.13 | 3.00 | 1.30 | 0.34 | | | | |
| Control | BT | 3.40 | 4.00 | 0.99 | 0.25 | .000[b] | 1.000 | 0.00 | NS |
| | AT | 3.40 | 4.00 | 0.99 | 0.25 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.

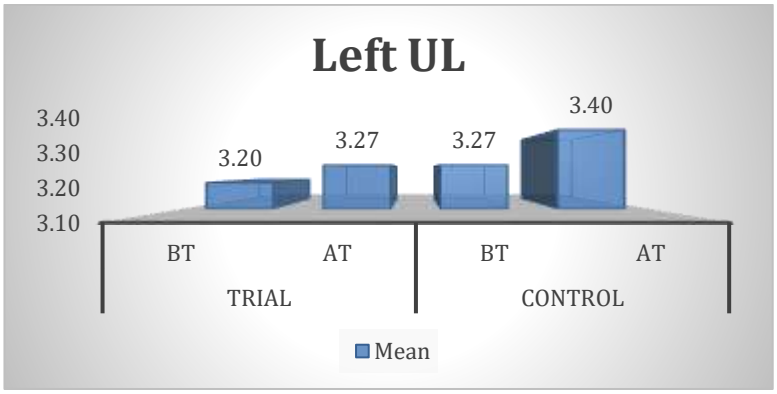



**3. LT UL**

| LT UL | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 3.20 | 3.00 | 1.08 | 0.28 | -1.000[c] | 0.317 | 2.08 | NS |
| | AT | 3.27 | 3.00 | 1.16 | 0.30 | | | | |
| Control | BT | 3.27 | 4.00 | 1.16 | 0.30 | -1.414[d] | 0.157 | 4.08 | NS |
| | AT | 3.40 | 4.00 | 0.99 | 0.25 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is

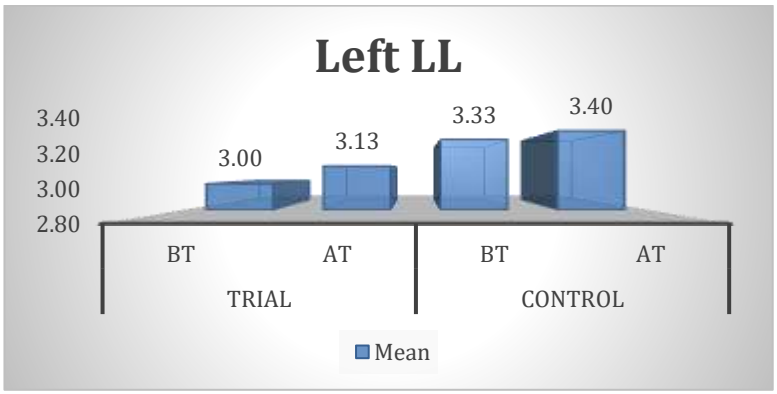
greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.




**4. LT LL**

| LT LL | | Mean | Median | SD | SE | Wilcoxon W | P-Value | % Effect | Result |
|---|---|---|---|---|---|---|---|---|---|
| Trial | BT | 3.00 | 3.00 | 1.25 | 0.32 | -1.414[c] | 0.157 | 4.44 | NS |
| | AT | 3.13 | 3.00 | 1.30 | 0.34 | | | | |
| Control | BT | 3.33 | 4.00 | 1.05 | 0.27 | -1.000[d] | 0.317 | 2.00 | NS |
| | AT | 3.40 | 4.00 | 0.99 | 0.25 | | | | |

Since observations are on ordinal scale, Wilcoxon Signed Rank Test is carried out to test efficacy in Trial Group and Control Group. From above table we can observe that, P-Value for Trial Group and Control Group is greater than 0.05. Hence, we can conclude that, there is no significant change observed in Trial Group and Control Group.




## DISCUSSION

**1. Demographic data**

The study demographic data consists of two distinct groups: Trial and Control, with individuals categorized by various demographic characteristics, including age, sex, place, date, and socio-economic status. The trial group, which includes children of varying ages from 1 year to 15 years, predominantly consists of individuals from middle-class backgrounds, with a few from poorer socio-economic categories.

The children in this group are from different locations, including Ambegaon, Saswad, Kondhwa, and others, reflecting the diverse geographical spread of the participants. . Similarly, the control group, with children aged between 2 years and 10years, is also made up of individuals mostly from middle-class backgrounds, with some from poorer households. Their locations are equally varied, including Dhankawadi, Narhe, Wanowari, and others. Overall, the socio-economic distribution within both groups indicates a fairly equal representation of middle and lower socio-economic status, with age, sex, and geographical location offering further diversity in the

sample. These details suggest a broad, balanced selection of participants from different backgrounds for both trial and control groups, providing a well-rounded foundation for the study's conclusions.

**2. Causes**

The data presents detailed information on both the trial and control groups, focusing on various causes and treatments related to antenatal, natal, and postnatal conditions. In the trial group, several children were born with complications such as birth asphyxia, jaundice, convulsions, low birth weight (LBW), or preterm birth, with many requiring NICU care after birth. For some, the complications involved specific medical interventions, such as the use of medications like Syrup. Trioptal.The trial group includes children with diverse issues, including respiratory distress, poor feeding, and severe jaundice, with treatments adjusted to each condition's severity.

In the control group, the children also faced various birth-related challenges, including low birth weight, birth asphyxia, or infections. However, the causes in this group were sometimes related to infections such as typhoid or rubella, with some cases requiring resuscitation after birth or dealing with specific complications like cleft lip and palate. The presence of conditions like hypoxia and poor breastfeeding was also noted, with many needing extended NICU care.

Both groups show a wide range of conditions, with various treatments provided according to the specific issues faced by the children. The data also reflects the challenges faced by infants born with complications, requiring tailored medical intervention for both immediate and long-term care. These treatments suggest that the infants are being closely monitored and cared for based on their unique health situations.

**3. Type of CP**

In both groups, the majority of cases are diplegic or quadriplegic spastic cerebral palsy, with a few hemiplegic and monoplegic instances.

In the trial group, the majority of CP cases are associated with imbalances in the doshas, specifically Vata (air and movement) and Kapha (water and structure), though other doshic imbalances like Pitta (fire and transformation) are also noted. These doshas impact different body tissues (dhatu), with most cases affecting Rasa (lymph), Rakta (blood), Mamsa (muscles), and Snayu (nerves), among others. The pathways of disease (rogamarga) often involve Bahya(external), Abhyantar (internal), and Madhyam (middle), indicating different approaches for treatment or intervention depending on the condition's nature and severity.

The control group also presents similar findings, with a majority of SCP cases exhibiting imbalances in Vata and Kapha doshas. The affected dhatus are also similar, with many cases involving Rasa, Rakta, Mamsa, and Snayu. However, the control group includes more instances of Pitta dosha imbalances in some cases, such as hemiplegic spastic cerebral palsy, where Pitta plays a role alongside Vata. Additionally, the control group shows a variety of combinations of doshas like Vata-Pitta and Pitta-Kapha, indicating varied underlying imbalances contributing to the SCP conditions.

Both groups reflect the complexity of cerebral palsy from an Ayurvedic perspective, where doshic imbalances, tissue involvement, and disease pathways are considered crucial for determining treatment strategies. Each CP type, whether in the trial or control group, highlights the intricate relationship between the body's energies and the manifestation of the condition.

**ASHWORTH SCALE- SPASTICITY**

**1. Knee Rt**

For Spasticity (Knee Rt) in the Trial Group, the mean decreased slightly from 0.93 (BT) to 0.87 (AT), showing a 7.14% reduction, but this change was not statistically significant (P-value = 0.317). In the Control Group, the mean decreased from 1.20 (BT) to 1.00 (AT), reflecting a 16.67% reduction, but this change was also not statistically significant (P-value = 0.180). These results indicate that both groups showed a reduction in spasticity. The decrease in the values of the trial group was seen due to anti-muscle stiffness and rigidity properties, vatapittaghna, and the Muscular relaxant properties of sahacharadi oil.

**2.Knee Left**

For Spasticity (Knee Left) in the Trial Group, the mean decreased slightly from 0.93 (BT) to 0.87 (AT), reflecting a 7.14% reduction, but this change was not statistically significant (P-value = 0.317). In the Control Group, the mean decreased from 1.20 (BT) to 1.00 (AT), showing a 16.67% reduction, but this change was also not statistically significant (P-value = 0.180). Although both groups exhibited a reduction in spasticity, the lack of statistical significance suggests that the observed changes could be due to variability in individual responses, sample size limitations, or the duration of treatment. The decrease in the values of the trial group was seen due to the stiffness-relieving and anti-spastic, vatapittaghna and the Muscular relaxant properties of sahacharadi oil.

**3. Ankle Rt.**

For Spasticity (Ankle Rt.) in the Trial Group, the mean decreased slightly from 0.87 (BT) to 0.80 (AT), reflecting a 7.69% reduction, but this change was not statistically significant (P-value = 0.317). In the Control Group, the mean decreased from 1.20 (BT) to 0.93 (AT), showing a 22.22% reduction, but this change was also not statistically significant (P-value = 0.102). While both groups showed a reduction in spasticity, observed changes may be due to variability in individual responses, sample size limitations, and the duration of treatment. The decrease in the values of the trial group was seen due to the stiffness-relieving and anti-spastic, vatapittaghna and the Muscular relaxant properties of sahacharadi oil.

**4. Ankle Lt**

For Spasticity (Ankle Lt.), the Trial Group showed a slight decrease in mean from 0.93 (BT) to 0.87 (AT), reflecting a 7.14% reduction, but this change was not statistically significant (P-value = 0.317). In the Control Group, the mean decreased from 1.20 (BT) to 0.93 (AT), showing a 22.22% reduction, but this change was also not statistically significant (P-value = 0.102).there was positive change in results of both groups but changes were not significant may be due to sample size limitations and duration of treatment. The decrease in the values of the trial group was seen due to the stiffness-relieving and anti-spastic, vatapittaghna and the Muscular relaxant properties of sahacharadi oil.

**5. Elbow Rt**

For spasticity in the right elbow, the trial group showed a decrease in mean from 0.87 before treatment to 0.67 after treatment, reflecting a 23.08% reduction. However, this change was not statistically significant (P-value = 0.180). In the control group, the mean slightly decreased from 0.93 before treatment to 0.87 after treatment, showing a 7.14% reduction, but this change was also not statistically significant (P-value = 0.655). Although the trial group exhibited a greater percentage reduction in spasticity, neither group's change reached statistical significance. The reduction in the values of the trial group was seen due to the stiffness-relieving and anti-spastic, vatapittaghna and the Muscular relaxant properties of sahacharadi oil.

**6. Elbow Lt**

For spasticity in the left elbow, the trial group showed a decrease in mean from 0.87 before treatment to 0.67 after treatment, reflecting a 23.08% reduction. However, this change was not statistically significant (P-value = 0.180). In the control group, the mean slightly decreased from 0.93 before treatment to 0.87 after treatment, showing a 7.14% reduction, but this change was also not statistically significant (P-value = 0.655). The trial group exhibited a greater percentage reduction in spasticity, the lack of statistical significance in both groups is visible through analysis. The decrease in the values of the trial group was seen due to anti-muscular stiffness and rigidity, Vatapittaghna, and the Muscular relaxant properties of sahacharadi oil.

**7. Wrist Rt**

For spasticity in the right wrist, the trial group showed a decrease in mean from 0.93 before treatment to 0.73 after treatment, reflecting a 21.43% reduction. However, this change was not statistically significant (P-value = 0.180). In the control group, the mean slightly decreased from 0.93 before treatment to 0.87 after treatment, showing a 7.14% reduction, but this change was also not statistically significant (P-value = 0.564). Here the trial group demonstrated a greater reduction in spasticity, but results from both groups are not statistically significant.

The decrease in the values of the trial group was seen due to the stiffness-relieving and anti-spastic, vatapittaghna and the Muscular relaxant properties of sahacharadi oil.

**8. Wrist Lt.**

For spasticity in the left wrist, the trial group showed a decrease in mean from 0.87 before treatment to 0.67 after treatment, reflecting a 23.08% reduction. However, this change was not statistically significant (P-value = 0.180). In the control group, the mean slightly increased from 0.93 before treatment to 1.00 after treatment, showing a 7.14% increase, but this change was also not statistically significant (P-value = 0.564). Although the trial group showed a greater reduction in spasticity, but statistically results are not significant. The decrease in the values of the trial group was seen due to the stiffness-relieving and anti-spastic, vatapittaghna and the Muscular relaxant properties of sahacharadi oil.

**GROSS MOTOR**

**1. Head Holding**

The evaluation of head-holding ability showed no statistically significant improvement in either the trial or control group. In the trial group, the mean remained unchanged at 4.53 before and after the intervention, with a P-value of 1.000, indicating no significant difference. In the control group, the mean increased slightly from 4.53 to 4.60, reflecting a 1.47% effect. However, the P-value of 0.317 suggests that this change was not statistically significant. The Wilcoxon Signed Rank Test results further confirm the absence of statistically significant differences. The decline in values in the trial group was due to the stiffness-reducing, anti-spastic, Vata-Pitta pacifying, and muscle-relaxing effects of Sahacharadi oil.

2. Sitting

The assessment of sitting ability showed no statistically significant improvement in either the trial or control group. In the trial group, the mean increased slightly from 3.73 to 3.80, reflecting a minimal effect of 1.79%, with a P-value of 0.317, indicating no significant change. Similarly, in the control group, the mean increased from 4.00 to 4.13, representing a 3.33% effect. However, the P-value of 0.157 suggests that this change was not statistically significant. The Wilcoxon Signed Rank Test results further confirm that the observed differences were not significant. The decline in values in the trial group was due to the stiffness-reducing, anti-spastic, Vata-Pitta pacifying, and muscle-relaxing effects of Sahacharadi oil.

3. Standing

The evaluation of standing ability showed no statistically significant improvement in either the trial or control group. In the trial group, the mean increased from 2.00 to 2.20, reflecting a 10.00% effect, but the P-value of 0.083 indicates that this change was not statistically significant. Similarly, in the control group, the mean increased from 2.93 to 3.07, with a 4.55% effect, but the P-value of 0.157 suggests no significant improvement. The Wilcoxon Signed Rank Test results confirm that these differences were not statistically significant. The decline in values in the trial group was due to the stiffness-reducing, anti-spastic, Vata-Pitta pacifying, and muscle-relaxing effects of Sahacharadi oil.

**Muscle grading**

1. Right Upper Limb (RT UL)

The evaluation of right upper limb (RT UL) muscle strength showed no significant improvement in either the trial or control groups. In the trial group, the mean remained constant at 3.00 before and after treatment, with a P-value of 1.000, indicating no statistical significance. Similarly, in the control group, the mean stayed at 3.40, with a P-value of 1.000, suggesting no meaningful change. The Wilcoxon Signed Rank Test confirmed that there were no statistically significant differences in muscle strength before and after treatment. The decrease in values observed in the trial group resulted from the stiffness-relieving, anti-spasmodic, Vata-Pitta balancing, and muscle-relaxing properties of Sahacharadi oil.

2. Right Lower Limb (Rt LL Muscle)

The evaluation of right lower limb (Rt LL) muscle strength in both the trial and control groups showed no statistically significant improvement. In the trial group, the mean value slightly increased from 3.07 to 3.13, but with a P-value of 0.317, this change was not statistically significant, reflecting only a 2.17% improvement. Similarly, in the control group, the mean value remained unchanged at 3.40, with a P-value of 1.000, indicating no notable difference. The results of the Wilcoxon Signed Rank Test suggest that neither group exhibited a meaningful improvement in right lower limb muscle strength following the intervention. The decrease in values observed in the trial group resulted from the stiffness-relieving, anti-spasmodic, Vata-Pitta balancing, and muscle-relaxing properties of Sahacharadi oil.

3. Left upper limb (LT UL)

The assessment of left upper limb (LT UL) muscle strength in both the trial and control groups revealed no statistically significant improvement. In the trial group, the mean value increased slightly from 3.20 to 3.27, with a P-value of 0.317, indicating a 2.08% effect, which was not significant. Similarly, in the control group, the mean value improved from 3.27 to 3.40, but with a P-value of 0.157, the change was also not statistically significant, showing a 4.08% effect. The results of the Wilcoxon Signed Rank Test suggest that neither group exhibited a meaningful enhancement in left upper limb muscle strength following the intervention. The decrease in values observed in the trial group resulted from the stiffness-relieving, anti-spasmodic, Vata-Pitta balancing, and muscle-relaxing properties of Sahacharadi oil.

4. Left Lower Limb(LT LL)

The evaluation of left lower limb (LT LL) muscle strength in both the trial and control groups showed no statistically significant improvement. In the trial group, the mean value increased from 3.00 to 3.13, with a P-value of 0.157, indicating a 4.44% effect, which was not significant. Similarly, in the control group, the mean value rose from 3.33 to 3.40, but with a P-value of 0.317, the change was also not statistically significant, reflecting a 2.00% effect. The Wilcoxon Signed Rank Test results indicate that neither group experienced a notable enhancement in left lower limb muscle strength post-intervention. The decrease in values observed in the trial group resulted from the stiffness-relieving, anti-spasmodic, Vata-Pitta balancing, and muscle-relaxing properties of Sahacharadi oil.

## CONCLUSIONS

This study demonstrates the potential of Ayurvedic Panchakarma, specifically Sarvangadhara with Sahacharadi oil, in improving motor function and reducing spasticity in children with spastic cerebral palsy. The findings were not statistically significant, which may be due to less sample size, less duration of study, variability in responses of patients, however findings suggest that sarvangadhara with Sahacharadi oil may offer neuro-enhancing and muscle-relaxing benefits, making it a promising adjunct to conventional physiotherapy in managing spastic CP. Integrating Ayurvedic treatments like sarvangadhara into standard rehabilitation practices could enhance therapeutic outcomes, ultimately improving the overall quality of life for children with spastic cerebral palsy.

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