



Case Report

Efficacy of Integrated *Ayurveda* treatment protocol in improving Quality of Life in a Pediatric Case of Duchenne Muscular Dystrophy: A Case Report

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Abstract

Background: Duchenne Muscular Dystrophy (DMD) is a common X linked hereditary neuromuscular disorder, 1:3500 male births caused by Dystrophin gene mutations at Xp21. DMD comparable with *Adibalapravitavyadhi* resulting from *Beejadushti*, where *Vitiated vata*, *Mamsadhatukshaya* and *Dhatwagnimandya* and *Srotorodha* result into progressive muscle wasting and weakness. As Genetic defect cannot be return back, *Ayurveda* management may act as safe and supportive approach to increased functional outcomes and slow down disease progression. **Case Report:** A thirteen years old male complaints of unable to get up from sitting position, walk without support and execute routine daily activities since five years, diagnosed as DMD. Treatment protocol included *Panchakarma therapies* and oral *ayurveda* interventions (*Agnitundivati*, *Gandharvahasthadi Taila*, *Ajamamsa* and *Shilajitrasayana*, *Maharasanadi Kashaya*, *Arvindasava*, *Amruthotharam Kashaya*, *Chyawanprash* and herbal formulations) for five months with four regular follow-ups. **Objectives:** To evaluate the role of *Ayurveda* intervention in improving muscle strength, tone and quality of life. **Result:** Over five months, Barthel Index increased from 20/100 to 55/100 and Waisman Activities of Daily Living (4/34 to 15/34) whereas Serum Creatine Phosphokinase (1217 U/L to 4991 U/L), which indicates improved quality of life after treatment. **Outcome:** Enhanced quality of life, observed progressive improvement in proximal muscle strength, mobility was seen with no side effects. **Conclusion:** Even after irreversible genetic basis of DMD, *Ayurveda* interventions may decreased the clinical features by improving quality of life with slow down the progression of disease.

Keywords: *Ayurveda*, Barthel Index, Duchene Muscular Dystrophy, Integrated treatment, *Panchakarma*, W-ADL score.

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Introduction

Duchenne Muscular Dystrophy (DMD) arising from mutations in the dystrophin gene at Xp21, impacts commonly males. Gene

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carriers show increased serum creatine phosphokinase (Sr. CPK) in 80% of cases. The 2.4 Mb gene with 79 exons generates dystrophin, necessary for the sarcolemma linked protein complex (1). Deletions at Xp21 impaired dystrophin, result into progressive skeletal muscle degeneration, calf pseudohypertrophy, thigh wasting, delayed milestones, Intelligence quotient (IQ) impairment, loss of reflexes, proximal and respiratory weakness, contractures, scoliosis, lumbar lordosis and positive Gower and Valleys signs.

Family history and elevated serum CPK helped diagnosis. Death occurred naturally (*Swabhava*) because of *Panchamahabhuta* imbalance. Lifespan (*Pramana*, *Alpa* or *Madhyamaayu*) directed

management. Emaciated persons with *Upachayalakshana* (proper nourishment) revealed shorter lifespans (2). Reduced strength despite adequate nutrition, signified abnormal tissue metabolism, defective muscles also impaired physical strength.

In *Ayurveda*, DMD is *Adibalapravritha* (inherited), arising from *Shukrashonitadosha* (abnormality of sperm/ovum) & *Bijabhagavayava dushti* (genetic defect) which impaired *Mamsadhatu*, vitiated *vata* leads to defective muscle formation and abnormal *Medadhatu* accumulation in place of muscle (3). Impaired *Mamsadhatu* causes *Mamsakshaya* (muscle loss), *Gasrasadanam* (weakness), *Dhamanishaithilya* (flabbiness), *Akshaglani* (sensory debility), *Sandhivedana* (joint pain) and muscles wasting. Impaired *Dhatawagni* (tissue specific) result in *ama* (metabolic toxins), *Sangastrodushti* (obstructions of channels), *Vata* imbalance, leads to progressive muscle wasting similar to *Paurasadini Jaataharini* (child dies before 16 yrs). CPK used as a biomarker. As DMD has no cure and few reports are available on *ayurveda* exists, also long term use of corticosteroids (prednisolone, deflazacort) causes side effects (weight gain, mood and behavioral changes, growth retardation, delayed puberty, endocrine disturbances, hypertension and cushioned appearance) (4).

In view of *ayurveda* understanding of etiology, pathogenesis, signs and symptoms, management protocol with *Vata-shamana*, *Brimhana*, *Rasayana* therapies and *Panchakarma* procedures was planned to improve muscle strength, slow disease progression and improved quality of life. *Naimittikarasayana* (disease specific rejuvenation) type of *ayurveda therapy* mainly focused on particular diseases. It uses herbs, medicines, diet and lifestyle changes to strengthen the body, kept tissues healthy, slow aging and prevent illness.

Panchakarma procedures mainly helped in pacifying *vata*, muscle nourishment and improvement of mobility, strength and tone of muscle. As the genetic defect is irreversible, this case gives future research and management protocol by providing useful data for evaluating capability of *ayurveda* interventions for *Beejadushti* (5).

Patient information

A thirteen years old male, came by his mother was apparently healthy until eight years of age. After a leg fracture, he progressively developed muscle weakness, difficulty in rising, walking up stairs and doing daily activities. His milestones, speech and IQ was normal.

Birth and Developmental History: Full term, vaginal delivery, cried immediate after birth, birth weight three kg, no neonatal intensive care unit (NICU) stay. Normal milestones until eight years of age followed by motor regression.

Medical History: Accidental trauma eight years back.

Family History: No consanguinity or family history of neuromuscular disorders.

Immunisation: Taken as per schedule.

Personal History: Appetite: Reduced, Bowel: Regular (hard stool), Urine: Normal (5- 6 times daily), Sleep: Disturbed.

Past history: Dexamethasone taken for one year after accident, stopped because no any improvement.

Clinical Examination: PR: 76/min, BP: 100/70 mmHg, Body weight: 36 kg, No signs of clubbing, cyanosis, edema or pallor.

Systemic Examination: Cardiovascular system (CVS): S1S2 +, Central nervous system (CNS): Conscious & Oriented, Respiratory system (RS): AEBE (Air entry bilateral equal) clear-

no added sounds, Per abdomen (PA): Soft/nontender/nondistension.

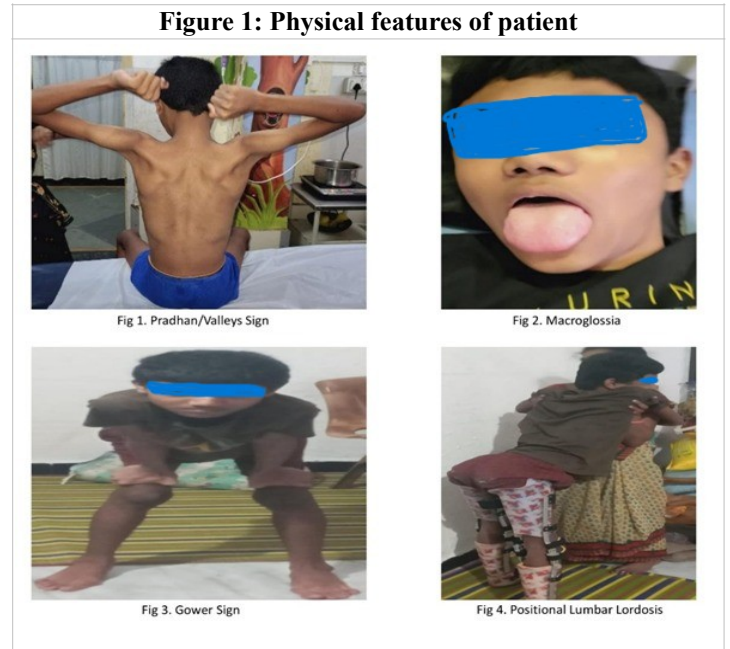


Figure 2: Laboratory Investigation

| Before Treatment | After Treatment |
|--|--|
| <p>Test Description</p> <p>Biochemistry</p> <p>CPK (U/L)</p> <p>Result: 1277</p> <p>Ref Range: 10-200</p> <p>Unit: U/L</p> | <p>Test Description</p> <p>Biochemistry</p> <p>CPK (U/L)</p> <p>Result: 4991</p> <p>Ref Range: 10-200</p> <p>Unit: U/L</p> |

On Examination: Waddling gait, Gowers, Valleys sign positive, Lumbar lordosis (positional) as shown in Figure 1, Speech unaffected, Intellectual Impairment, Bilateral (B/L) calf muscle pseudohypertrophy, Macroglossia, Both limbs proximal muscle weakness, Muscletone: four limbs-hypotonic, Musclepower: Upper limbs 3/5, lower limbs 2/5 bilaterally, Superficial Reflexes: Intact, Deep tendon reflex (DTR): All was absent as shown in Table 4, Cardiac evaluation showed normal as heart rate, rhythm was normal with no clinical cardiac signs (murmur, cyanosis, edema, dyspnea) was seen. Quality of life assessed through Waisman Activities of Daily Living (W-ADL scale) (6) and Barthel Index scoring (7) as shown in Table 4.

Stage: Late ambulatory to wheel chair.

Samprapti: *Nidanasevan* (Causes) → *Raktadhatu* dysfunction → Failure to form proper *Mamsadhatu* → *Ama* production → Faulty *Mamsa* development → Muscular wasting & degeneration → Vitiating of *Pitta*, *Kapha*, *Vata* → *Mamsadhatushaya* → *Uttarottaradhatu* deterioration → DMD progression.

Differential diagnosis as shown in Table 1.

Diagnosis: Duchenne Muscular Dystrophy.

Treatment: Treatment protocol (Table 2,3), was planned by considering *agni*, *dhatu (mamsa)*, *dosha (vata Pradhan)*. Because of *beejadosha* its prognosis considered as *asadhya* (incurable).

Table 1: Timeline of Differential Diagnosis

| Disorder | Diagnostic Feature | Evidence | Remarks / Exclusion |
|--|--|---|---|
| Duchenne Muscular Dystrophy (DMD) | Early progressive proximal muscle weakness | Present; difficulty rising, walking up stairs | Confirmed clinically and by elevated Sr. Total CPK (On baseline was 1217 U/L increased to 4991 U/L on follow up as shown in Table 4 and Figure 2. |
| Becker Muscular Dystrophy (BMD) | Late onset, slower progression | Not observed | Because early onset and rapid progression |
| Spinal Muscular Atrophy (SMA) | Normal CPK, lower motor neuron signs | Sr. Total CPK elevated | elevated CPK |

Table 2: Timeline of Management Given

| Dates | Procedures | Dose/ Anupana/ Route | Days |
|--|---|--|--------|
| Baseline (17/08/24) | <i>Agnitundivati</i> | 1 tablet twice a day (BD- morning and evening), oral, beforemeal with lukewarmwater | 3 |
| | <i>Gandharvahasthaditaila</i> | 5ml oral, at bedtime (HS) with milk | 7 |
| | <i>Sarvangaudvartana -Triphalachurna</i> | external application, once daily for first three days. | 3 |
| | <i>Nadisweda-Dashmoolakashaya</i> | externally over body, daily | 11 |
| | <i>Nasya-Sinorexdrop followed by Doompana-Haridravarti</i> | 2 drops/nosril, once daily, first three days. | 3 |
| | <i>Sarvangabhyanga-Sahacharaditaila</i> | external to body application, once daily (morning). | 8 |
| | <i>Yogabasti-1) Niruhabasti- Balaguduchyadi</i> <i>2)Anuwasanbasti-Brihatchagaladyaghrita</i> | 200 ml Per-rectal (PR) beforemeal; 80 ml Per-rectal aftermeal, once per session. (on alternate day) | 3 5 |
| | <i>Veshtana (medicated bandaging)-Sahacharaditaila</i> | External to four extremities application, once daily (morning). | 8 |
| Discharge (27/08/24) | 1) <i>Ajamamsarasayana</i> | 1 teaspoon (tsf) oral, empty stomach, once daily (morning) | 30 |
| | 2) <i>Maharasanadikashaya</i> | 10 ml oral, twice daily, aftermeal with lukewarmwater | 30 |
| Timeline 1st Follow up (FU) (27/09/24) | <i>Agnitundivati</i> | 1 tablet twice a day (BD- morning and evening), oral, beforemeal with lukewarmwater | 3 |
| | <i>Gandharvahasthaditaila</i> | 5ml oral, at bedtime (HS) with milk | 7 |
| | <i>Sarvangaudvartana -Triphalachurna</i> | external application, once daily for first three days. | 3 |
| | <i>Nadisweda-Dashmoolakashaya</i> | externally over body, daily | 3 |
| | <i>Nasya-Sinorexdrops followed by Doompana-Haridravarti</i> | 2 drops/nosril, once daily, first three days. | 3 |
| | <i>Sarvangabhyanga-Sahacharaditaila+ Balashwagandhataila</i> followed by <i>Shashtika shali pinda sweda</i> | External to body, once daily (morning) | 8 |
| | <i>Yogabasti-1) Niruhabasti- Balaguduchyadi</i> <i>2)Anuwasanbasti-Brihatchagaladyaghrita</i> | 200 ml Per-rectal (PR) beforemeal; 80 ml Per-rectal aftermeal, once per session. (on alternate day) | 3 5 |
| | <i>Veshtana-Sahacharaditaila</i> | external to four extremities application, once daily (morning). | 8 |
| Discharge (07/10/24) | 1) <i>Arvindasava</i> | 10 ml oral, twice daily, aftermeal with luke warmwater | 30 |
| | 2) <i>Mahamashataila</i> for bodymassage | Externally to body, once daly | 30 |
| Timeline 2nd Follow up (07/11/24) | <i>Agnitundivati</i> | 1 tablet twice a day (BD- morning and evening), oral, beforemeal with lukewarmwater | 3 |
| | <i>Gandharvahasthaditaila</i> | 5ml oral, at bedtime (HS) with milk | 7 |
| | <i>Sarvangaudvartana -Triphalachurna</i> | external application, once daily for first three days. | 3 |
| | <i>Nadisweda-Dashmoolakashaya</i> | externally over body, daily | 3 |
| | <i>Nasya-Remigendrops followed by Doompana-Haridravarti</i> | 2 drops/nosril, once daily, first three days. | 3 |
| | <i>Sarvangabhyanga-Balashwagandhataila</i> followed by <i>Shashtika shali pinda sweda</i> | External to body, once daily (morning) | 8 |

| | | | |
|-----------------------------|---|---|----------|
| | <i>Yogabasti-1) Niruhabasti- Balaguduchyadi</i> <i>2) Anuwasanbasti-Brihatchagaladyaghrita</i> | 200 ml Per-rectal (PR) beforemeal; 80 ml Per-rectal aftermeal, once per session. (on alternate day) | 3 5 |
| | <i>Veshtana-Sahacharaditaila</i> | external to four extremities application, once daily (morning). | 8 |
| Discharge (17/11/24) | 1) <i>Shilajitrasayana</i> 2) <i>Amruthotharamkashaya</i> | 1 teaspoon oral, on empty stomach, once daily 10 ml oral, twice daily, aftermeal with luke warmwater | 30 30 |

Table 3: Timeline of Management

| | | | |
|---|--|--|--------|
| Timeline 3rd Follow up (18/12/24) | <i>Agnitundivati</i> | 1 tablet twice a day (BD- morning and evening), oral, beforemeal with lukewarmwater | 3 |
| | <i>Gandharvahasthaditaila</i> | 5ml oral, at bedtime (HS) with milk | 7 |
| | <i>Sarvangadvartana -Triphalachurna</i> | external application, once daily for first three days. | 3 |
| | <i>Nadisweda-Dashmoolakashaya</i> | externally over body, daily | 3 |
| | <i>Nasya-Sinorexdrops followed by Doompana-Haridravarti</i> | 2 drops/nostril, once daily, first three days. | 3 |
| | <i>Sarvangabhyanga-Sahacharaditaila+ Balashwagandhataila followed by Shashtika shali pinda sweda</i> | External to body, once daily (morning) | 8 |
| | <i>Yogabasti-1) Niruhabasti- Balaguduchyadi</i> <i>2) Anuwasanbasti-Brihatchagaladyaghrita</i> | 200 ml Per-rectal (PR) beforemeal; 80 ml Per-rectal aftermeal, once per session. (on alternate day) | 3 5 |
| | <i>Veshtana-Sahacharaditaila</i> | external to four extremities application, once daily (morning). | 8 |
| Discharge (28/12/24) | 1) <i>Chyawanprash</i> 2) <i>Kapikachhu churna+Bala+Ashwagandha+Vi dari+Shatavarichurna.</i> | 1 teaspoon, oral, once daily, on empty stomach (morning) 1 teaspoon, oral, twice daily, aftermeal (morning and evening) | 30 |
| Timeline 4th Follow up (28/01/25) | <i>Agnitundivati</i> | 1 tablet twice a day (BD- morning and evening), oral, beforemeal with lukewarmwater | 1 |
| | <i>Gandharvahasthaditaila</i> | 5ml oral, at bedtime (HS) with milk | 7 |
| | <i>Sarvangadvartana-Triphalachurna</i> | external application, once daily for first three days. | 3 |
| | <i>Nadisweda-Dashmoolakashaya</i> | externally over body, daily | 11 |
| | <i>Nasya-Remigendrops followed by Doompana-Haridravarti</i> | 2 drops/nostril, once daily, first three days. | 1 |
| | <i>Sarvangabhyanga-Mahamashataila</i> | External to body, once daily (morning) | 8 |
| | <i>Matrabasti-Brihatchagaladyahrita</i> | 40 ml Perrectal, once daily, morning, aftermeal. | 8 |
| | 1) <i>Veshtana-Mahamashataila-Morning</i> 2) <i>Godhumadiupnaha-Night</i> | external to four extremities application, twice daily | 8 |
| Discharge (07/02/25) | 1) <i>Ajamamsarasayana</i> | 1 teaspoon oral, empty stomach, once daily. | 30 |

Along with this Physiotherapy was conducted for twenty five to thirty minutes (min), eight to ten minutes of passive and active range-of-motion (ROM) exercises, five minutes of gentle calf and hamstring stretching and seven to ten minutes of low intensity strengthening to maintain joint mobility and muscle strength. Transcutaneous electrical nerve stimulation (TENS) (ten to fifteen minutes) enhanced local blood circulation and decreased discomfort, afterwards twenty minutes of *yoga (Tadasana, Vrikshasana, Bhujangasana, Setu Bandhasana)*, breathing exercises (*Anulom Vilom* five min, *Bhramari* three min), and three to five minutes of *Shavasana* calm phase.

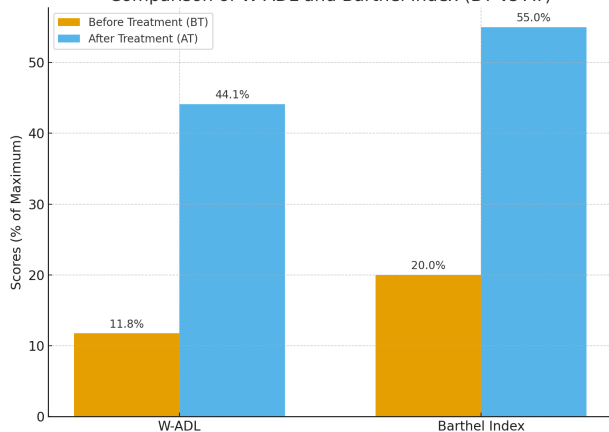
Table 4: Shows Investigation's, Muscle (tone, power), Reflexes, Waisman Activities of Daily Living (W-ADL scale) and Barthel Index

| Investigations | Before treatment | After treatment |
|---------------------|------------------|-----------------|
| CPK Total | 1217 U/L | 4991 U/L |
| Muscle Tone | | |
| UL | B/L: 0 | B/L: 1+ |
| LL | B/L: 0 | B/L: 1+ |
| Muscle Power | | |
| UL | B/L: 3/5 | B/L: 4/5 |
| LL | B/L: 2/5 | B/L: 3/5 |

| | | |
|-----------------------------|--------|----------------|
| Superficial Reflexes | Intact | Intact |
| Deep Tendon Reflexes | | |
| Biceps | B/L: - | B/L: + |
| Triceps | B/L: - | RT: - LT: + |
| Kneejerk | B/L: - | RT: + LT: - |
| Anklejerk | B/L: - | RT: + Lt: - |
| Supinator | B/L: - | B/L: + |
| W-ADL Scores | 4/34 | 15/34 |
| Barthel Index | 20/100 | 55/100 |
| 1. Feeding | 0 | 5 |
| 2. Bathing | 0 | 5 |
| 3. Grooming | 0 | 5 |
| 4. Dressing | 0 | 5 |
| 5. Bowels | 5 | 5 |
| 6. Bladder | 5 | 10 |
| 7. Toilet use | 0 | 5 |
| 8. Transfers (bed chair) | 0 | 5 |
| 9. Mobility | 10 | 10 |
| 10. Stairs | 0 | 0 |

Chart 1: Assessment Criteria

Comparison of W-ADL and Barthel Index (BT vs AT)



Outcome

After five months of *Ayurveda* management, showed improved muscle tone, limb power, and greater independence in routine activities. Barthel Index increased from baseline 20/100 to end of treatment 55/100 & W-ADL from 4/34 to 15/34. Sr. CPK increased but indicates higher muscle activity, while overall quality of life improved.

Discussion

In *Ayurveda*, DMD was *Adibalapravrittavyadhi* (genetic) generated from *Beeja* (gene) and *Avayavadushti* (tissue deformities). Progressive *dhatu* degeneration increased *Vata*, reduced *Mamsa* and *Medadhatu*, resulting functional impairment (*Karmakshaya*) and reduced strength (*Balahani*). Treatment protocol targeted on *Brimhana* (nourishing), *Blaya* (strength), *Vrishya* (fertility), *Rasayana* (restorative), balancing *agni* (digestive fire) and enhanced quality of life. *Naimittikarasayana* (disease specific) reduced disease progression, increased mobility and focused genetic defects and tissue degeneration.

Barthel and W-ADL index jumps from low to high scoring as (Table 4), indicates weakness decreases at some level and

improvement in mobility, transpers, selfcare, still there is need for caregiver support.

Agnitundivati increased digestive fire, gastrointestinal motility and supplied nutrient absorption, helped in *dhatu poshana* (tissue nourishment) (8). *Gandharvahasthaditaila* has *vata anulomaka* (mild laxative) properties which relieved constipation by improving gut motility and supports for proper digestion (9). *Maharasanadikashaya* has anti-inflammatory and analgesic effects by which it decreased muscle stiffness, enhanced local blood circulation, reduced pain, helps to increased muscle function and mobility (10). *Dashmoolakashaya* has anti-inflammatory and analgesic properties that decreased muscle stiffness, pain, improved local blood circulation, muscle relax and neuromuscular fuctions by sudation therapy (11). *Amruthotharamkashaya* (contain *Tinospora cordifolia*) extracts adjusts pro-inflammatory cytokines and decreased inflammation in muscle atrophy also slow down progressive muscle degeneration (12). *Brihatchagaladyaghrita* followed *mansanemansavridhi* (same element increase same) hence increased bala (strength) decreased *ama* enhanced local blood circulation, tissue nourishment (13). Patient received *Anuwasanbasti* with *Brihatchagaladyaghrita* for five months (eight enemas per session) to regulate *kleda*. *Arvindasava* may increased digestion and nutrient absorption by enhancing bioavailability of herbal ingredients via fermentation (14). *Ajamamsarasayan* gives highly purified protein and micronutrients that helped muscle repair and its antioxidant compounds decreased oxidative stress linked with muscle degeneration (15). *Shilajitarasayana* has fulvic acid and bioactive minerals that enhanced mitochondrial energy production and supports to decreased oxidative stress and muscle function (16). *Chyawanprash* supplied antioxidant, immunomodulatory and adaptogenic effects that helped to reduced oxidative stress and increased metabolism (17). *Kapikacchu* (*Mucuna pruriens*), *Bala* (*Sida cordifolia*), *Ashwagandha* (*Withania somnifera*), *Vidari* (*Pueraria tuberosa*) and *Shatavari* (*Asparagus racemosus*) churna supplied adaptogenic, anabolic and anti-inflammatory effects that helped to increased muscle strength, neuromuscular function, decreased oxidative stress (18).

Sahacharaditaila was the best medicine to balance the *vata* dosha, *shosha* (emaciation) condition (19) also has anti-inflammatory property along with this it reduced muscle stiffness, improved blood circulation and helped for nourishment and neuromuscular functions. *Balaashwagandhataila* increased *bala* (strength) along with it was also said as a *pushtikara* (nourishing), it balances *vata* also it reduced muscle stiffness and pain by anti-inflammatory and analgesic property (20). *Mahamashataila* for external used to enhanced neuromuscular works, tissue perfusion and decreased spasticity in muscles and skeletal (21).

Sarvang udwartana (dry powder massage) with *triphala churna* by its *rukshata* and rubbing action, opens pores of skin, improves circulation, reduces excess *kapha-medas*, clears blockages, controls *vata*, muscle tone (22). *Nadi Sweda* with *Dashamoola Kashaya* gives sudation and *Vata-Kapha* pacifying result, which help decreased muscle stiffness, enhance blood circulation and helps in muscle relaxation and mobility (23). *Nasya* with Remigin/Sinorex (*ayurveda* formulation) neuroprotective, antioxidant and *vata* pacifying ingredients may enhance neuromuscular transmission, reduce oxidative stress, support muscle strength (24). *Dhoomapana* with *Haridra Varti* may help to reduce oxidative stress, support neuromuscular and respiratory function in degenerative disorders (25). *Sarvang Abhyanga* (therapeutic massage) and external therapies stimulates nerves, improve circulation, pacify *vata*, enhance muscle nourishment through transcutaneous absorption of oil leading to improved nourishment toxicity and strength, prevent stiffness and support depleted *Mamsa* and *Medadhatu*.

Shashtika shali pinda sweda gives local heat and nutritive stimulation relaxes muscles, improves circulation and oxygen supply by dialating capillaries and overall body strength by nutrient supply to muscle (26). *Basti* (medicated enema) best for *vata* which controls *vata* dosha as well improved enterocolon absorption indirectly nourishes *dhatu*, rebuild muscles and *Mamsarasa* in *Niruhabasti* (enema) provides *Tarpana* effect, *Anuvasana* (27) and *Matra basti* mainly acts thorough oleation which moistens intestinal mucosa and nourishes deeper tissues including nerves and muscles. *Upanaha* with *godhuma* (poultice therapy) applied over all four extremities provides warm (medicated paste) to improve circulation and relax muscles, while *Veshtana* with oleation (bandage wrapping) compresses and supports hypotonic muscles, enhancing blood flow, preventing contractures and improving mobility (28). No adverse effects were observed during *Panchakarma* and oral medications.

Strength

In this case report use of assessment scale (Barthel and W-ADL) as objectively verified the patient's daily routine living activities during each follow up. This enhanced in recording assessable clinical improvement in physical capacity and provided supportive documentation for the impact of the *ayurveda* intervention.

Limitation

This is single case study with variation in diet, lifestyle and patient compliance during treatment period.

Take away lesson: As genetic defect cannot be treated. Hence, *ayurveda* interventions helps to improve muscle strength, tone, slow down the disease progression also improved quality of life.

Conclusion

Integrated *Ayurveda* interventions, including *Panchakarma* (five therapeutic procedures), *Rasayana* (rejuvenation) therapy, *yoga*, and physiotherapy, led to notable improvements in muscle

strength, tone, functional abilities, and overall quality of life in a child with DMD. Overall treatment protocol improved the gut health & improving the nourishment and balances the destruction of *mamsadhatu* by regenerating it. The treatment was safe and well tolerated, indicating its potential as an adjunctive strategy in pediatric DMD treatment.

Patient Perspective

At first the parents were worried about DMD, but as the child's strength, movements and daily activities improved with safe treatment, family felt more confident.

Informed consent

The authors declare that patient consent was obtained to use images, videos and clinical details for publication, with efforts to protect identity.

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