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JUVENILE IDIOPATHIC ARTHRITIS (JIA) IN ADOLESCENTS: A REVOLUTION IN TREATMENT BY AYURVEDA

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ABSTRACT: Introduction: Juvenile idiopathic arthritis (JIA) is chronic inflammatory arthritis in children and adolescents. The symptoms present in JIA are more comparable with features of Aamavata Vyadhi mentioned in Ayurvedic classics. JIA can be treated by Shodhana and Shaman therapy of Ayurveda which is free from any side effects. The main aim of this article is to elaborate on JIA and its treatment by different modalities of Ayurveda. **Methodology:** This review work was carried out by using a widespread and planned data mining approach. To achieve significant literature author uses the keywords “Juvenile idiopathic arthritis” “Shodhana therapy in JIA” “JIA treatment by Ayurveda” and “herbal medicine for JIA” searched in Google Scholar, web of science, Science direct, Scopus, Medline, and PubMed Central journal literature. **Observation:** Nine publications were included in the final selection after systematic analysis. **Conclusion:** In Ayurveda, Shodhana therapy such as Sarvaanga Abhangya (Full body massage with medicated oil), Nadi swedana (Steam bath), Valuka Swedana (fomentation by sand pack) and Vaitarana Basti (type of medicated enema) is very effective in management of JIA. In Shaman therapy mainly Kaishora Guggulu, Chitrakadi Vati, and Rasnasaptak Kwatha is effective in relieving pain and swelling of joints. Some herbal drugs also have very potent consideration as anti-arthritic activity such as Shallaki (*Boswellia serrate*), Nirgundi (*Vitex negundo*), Turmeric (*Curcuma longa* Linn), Harataki (*Terminalia chebula* Retz.), Methi (*Trigonella foenum-graecum* Linn.) and Pippali (*Piper longum* Linn.), etc.

INTRODUCTION: Rheumatoid diseases are disorders with inflammation and pain in connective tissues and supporting body structure-ligaments, joints, tendons, and muscles¹⁻².

There is a pain in joints, swelling and stiffness (particularly morning stiffness) that lead to a myriad of disabilities with underlying autoimmune dysfunction. The term ‘juvenile’ refers to the onset of symptoms before age 16 years³.

Idiopathic means a condition which has not any clear etiology and arthritis is the inflammation of a joint. The term Juvenile rheumatoid arthritis (JRA), Juvenile chronic arthritis (JCA), Juvenile arthritis (JA) is now used today as Juvenile idiopathic arthritis (JIA)⁴ and it is not contagious.

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The symptoms present in JIA are more comparable with the features of Aamavata Vyadhi mentioned in Ayurvedic classics⁵. Aamavata Vyadhi is not mentioned for Pediatric age but due to its parallel clinical appearance same reference necessitates for Ayurvedic treatment.

In this review article, we will summarize brief description of Juvenile idiopathic arthritis (JIA) in adolescents along with treatment options in Ayurveda, which emphasizing safety as well as the usefulness.

2. Review of Juvenile Idiopathic Arthritis (JIA):

2.1. Definition: JIA is chronic childhood arthritis present with inflammation of joint and stiffness of unknown cause in children and their onset prior to 16 years of age⁶⁻⁷. Common occurrence of this disease is mainly observed from the ages of 7 to 12, but it may also occur in infants⁸. JIA refers to arthritis that remains for over six weeks and involves joint swelling and /or painful joint restricted movements⁹. It has dissimilarity to arthralgia that in which there is joint pain with or without inflammation. JIA affects both sexes equally but more common in females than male-like other rheumatological diseases.

2.2. Prevalence: International prevalence ranges of Juvenile idiopathic arthritis (JIA) is 8 to 150 per 100,000.¹⁰ In another scenario, Juvenile rheumatoid arthritis (JIA) affects about one in 1,000 children in any given year and prevalence of severe JIA 1:10,000¹¹.

2.3. Causes: The main cause of Juvenile idiopathic arthritis (JIA) is idiopathic it means no defined cause and an area of active research¹². However, the disorder is autoimmune¹³. The immune system is aggravated by changes in the environment due to mutations in many associated genes¹⁴.

Types: Rheumatologists identified mainly three types of Juvenile idiopathic arthritis (JIA)-

- i. Oligoarticular (former: Pauciarticular).
- ii. Polyarticular (Rheumatoid factor-positive and Rheumatoid factor-negative).
- iii. Systemic onset (Still disease).¹⁵⁻¹⁶

The international league of association for rheumatology (ILAR) classification for JIA also

includes 3 other types like enthesitis-related JIA, Juvenile psoriatic arthritis, and differentiated arthritis. The evaluation rules out other causes of arthritis including post-infectious arthritis, Lyme arthritis, Septic arthritis, reactive arthritis, and others¹⁷. JIA subtypes can be done with respect to clinical, demographic, and genetic features¹⁸. Systemic JIA is considered an autoinflammatory disease, but other types of JIA are considered autoimmune diseases.

A. Oligoarticular JIA: Children with Oligoarticular JIA are at increased risk of developing uveitis (chronic eye inflammation), which is gradual, insidious, and often only found when especially looked for an eye examination. Sometimes, the adolescents will present with overt eye symptoms such as eye redness, pain, photophobia and change in vision. Children with a positive test for antinuclear antibody (ANA) are at highest risk of developing eye inflammation.

B. Polyarticular JIA: In polyarticular JIA, the joint swelling is found in five or more joints especially small joints of hands along with weight-bearing joint, and disease onset should be six months of age. Polyarticular JIA has two classic age ranges: 1-6 years of age and 6-11 years of age. Polyarthritis can be rheumatoid factor-positive or negative. Rheumatoid factor-positive polyarticular, JIA directly resembles adult rheumatoid arthritis and can be a more severe disease than the RF-negative patients.

C. Systemic JIA: Systemic JIA, there is arthritis in one or more joints that develops or is preceded by high-grade fever with high spikes of two weeks or more duration, which is classically daily for three days or more¹⁹. Other possible presentation of systemic JIA inflammation of the heart, lungs and enlarged lymph nodes, liver or spleen.

D. Juvenile Psoriatic Arthritis: Juvenile psoriatic arthritis commonly associated with a skin disorder called psoriasis. Psoriasis may begin many years earlier than arthritis. Juvenile psoriatic arthritis gives symptoms of both arthritis and psoriasis. Arthritis symptoms include pain, swelling in joints, and symptoms of psoriasis include a scaling red rash behind the ears, on the eyelids, elbows, and knees.

E. Enthesitis-related JIA: This is characterized by tenderness where the bone meets a tendon, ligament or other connective tissue. Enthesitis-related arthritis is more common in boys and onset between the ages of 8 and 15. This is genetic and affected children will have a positive test for the HLA-B27 gene.

F. Undifferentiated Arthritis: The term undifferentiated arthritis is used when they give symptoms of two or more subtypes.

2.5. Diagnosis: Diagnosis of JIA based on complete history taking, complete clinical examination and appropriate diagnostic tests¹⁹⁻²⁹.

2.6. Clinical Examination: Main clinical features of JIA is -

- Pain and swelling on single or multiple joints.
- Pyrexia (fever) for at least 10 days and associated with transient erythematous rash.
- Joint warmth.
- Decreased body movement.
- Effusion on joint.

2.7. Diagnostic Test: Important investigation for JIA is -

- Erythrocyte sedimentation rate (ESR) or C reactive protein (CRP).
- CBC (Complete blood count).
- Rh factor.
- ANA (Anti-nuclear antibody).
- HLA (Human leukocyte antigen) B27 and plain radiographs.
- 2D Echo.

ESR and CRP indicate an inflammatory process these markers are frequently raised in JIA but may be normal²¹. Rh factor is positive in only few JIA patients but the level of Rh factor may indicate the poor prognosis of diseases. Complete blood count (CBC) provides detail information for anemia. Plain X-rays have been investigated for erosions of joints and serial X-rays provide information about disease progression or improvement status²².

2.8. Assessment of Improvement: Assessment is an improvement can be conducted by using parameters of American College of Rheumatology (formerly the ARA) score²³. This score is based on

grading of pain severity, swelling, tenderness, grip strength and functional score.

2.9. Complication: Possible complication of JIA is inhibition of growth with shorted height, bony overgrowth, contractures, spinal cord compression, cervical spine and chronic eye diseases²⁴. Eye complication includes cataract, secondary glaucoma, vision compromise and even death²⁵. Macrophage-activation syndrome (MAS) is also a common complication in systemic JIA.

2.10. Treatment: the Main approach of JIA treatment is based on minimization of joint pain and inflammation, control of systemic complications and provides quality of life to patients. In Modern sciences non-steroidal anti-inflammatory drugs (NSAIDs) is first-line drug for control pain and inflammation in JIA but it has many side effects in adolescents such as increased sleep disturbance and non-specific abdominal pain. The antiplatelet effect of the NSAIDs predisposes to excessive bruising in particularly active children²⁶. Aspirin is not recommended in children because of its common complication in children such as Reye syndrome²⁷. Other drugs used in JIA are corticosteroid injections and Methotrexate, disease-modifying antirheumatic drugs (DMARD), which helps hold back joint inflammation in JIA patients with polyarthritis. All modern medicine drugs have high risk of severe side effects such as renal toxicity, gastrointestinal ulcers, cardiovascular complications, hematologic toxicity, pulmonary toxicity, hepatic fibrosis, cirrhosis, diarrhea, immune reactions, and local injection-site reactions.

3. METHODOLOGY: This review work was carried out by using a wide-ranging and organized data mining approach. To achieve significant literature author uses the keywords “Juvenile idiopathic arthritis (JIA)” and “plants, herbal medicine for JIA, Anti-arthritis effect, Ayurveda” were parallel searched in Google Scholar, web of science, Science direct, Scopus, Medline and PubMed Central journal literature.

4. OBSERVATION: A total of nine publications were included in the final selection after systematic analysis for treatment of JIA by different Ayurvedic modalities.

4.1. Treatment of JIA by Ayurveda: Treatment algorithms in Ayurveda are based on non-linear dynamics of biological systems. Ayurveda treats diseases by using two different methods:-

- A. Shodhana therapy (Purificatory)
- B. Shaman therapy (Pacifactory)

Shodhana therapy means detoxification of the body by expelling the deranged Doshas (morbid materials inside the body causing various diseases) and this is done by Panchkarma therapy. Shamana therapy is appeasement of symptoms without eliminating the morbid doshas and this is done by herbal or herbo-mineral drugs.

Typically, all treatment protocols begin with shodhana therapy, followed by shaman therapy for better results²⁸.

TABLE 1: TREATMENT OF JIA IN AYURVEDA

Shodhana therapy	Shamana therapy	
	Ayurvedic Compound	Single Herbal Drugs
Sarvanga	Kaishora Guggulu	Shallaki
Abhyanga		(<i>Boswellia serrate</i>)
Nadi	Chitrakadi Vati	Nirgundi
Swedana		(<i>Vitex negundo</i>)
Valuka	Rasnasaptak	Turmeric
Swedana	Kwatha	(<i>Curcuma longa</i> Linn)
Vaitarana		Harataki
Basti		(<i>Terminalia chebula</i> Retz.)
		Pippali
		(<i>Piper longum</i> Linn.)
		Methi
		(<i>Trigonella foenum-graecum</i> Linn.)

Role of Shodhana Therapy in Juvenile Idiopathic Arthritis (JIA): In Shodhana therapy mainly 4 procedures are very effective in the treatment of Juvenile idiopathic arthritis (JIA) -

- Sarvanga Snehana or Abhyanga (Full body massage with medicated oil).
- Nadi Swedana (Steam bath).
- Valuka Swedana (fomentation by sand pack).
- Vaitarana Basti (a type of medicated enema).

Sarvanga Abhyanga (Full Body Massage with Medicated Oil): The application of oil to the skin followed by massage in specific directions and postures is called Abhyanga. The importance of

Abhyanga and its benefits are clearly described in Ayurveda classics.

Material Required: Sarvanga Abhyanga (massage) of the body including limbs, is done by:

- Mahanarayana oil.
- Bala oil.

A. Mahanarayana Oil: Ayurveda is the plant-based native system of medicine practiced in India since ancient times. Now there is need for scientific evidence for the effectiveness of various Ayurvedic formulations. Mahanarayana oil is a classical formulation which has been used for hypertonic condition, relieving joint and muscular pains. Kesar (*Crocus sativus* Linn), Haldi (*Curcuma longa*) Bhringraj (*Eclipta alba* Hassk), Kantakari (*Solanum xanthocarpum*), etc. are key ingredients and well-reported anti-inflammatory and anti-arthritic properties.

B. Bala Taila: Bala Taila is indicated especially for the treatment of Vata vyadhi in Gada Nigraha. Bala Taila is best in all types of Vatavyadhi, Shosha, Apasmara, etc. It gives longevity, luster, and fertility.

Medicated oil can be select according to Prakriti of the child:

TABLE 2: MEDICATED OIL

Prakriti of Child	Medicated oil
Vata Prakriti	Ksheerabala Taila
	Balaguduchyadi Taila
Pitta Prakriti	Bhringamlakadi Taila
	Manjishtadi Taila
	Kayyanyadi Taila.
Kapha Prakriti	Eladi Taila
	Marichadi Taila

Method of Procedure: Sarvanga Abhyanga (massage) of the body mainly upper and lower limb is done by Anuloma method *i.e.* massage should be done in direction of hairs (Anuloma) starting from the origin end of hairs towards the free ends of hairs.

Time Duration: This procedure should carry out at-least for 20 min; 10 min in supine position and rest of the 10 min given for the massage in prone position. Time duration can be increase or decrease according to capacity of children. Use all standard seven positions were not possible in children

because of inability of the patients to maintain the specified other positions as well as their noncooperation during the Abhyanga process. Thus, two positions *i.e.* supine and prone positions can be for this purpose.

Post-Procedure: After *Abhyanga* (massage) of the body mainly upper and lower limb Patient should allow taking rest at the place where having no direct air contact and then to take bath with warm water.

Mode of Action: *Abhyanga* provides nourishment due to its snigdha (unctuous), mridu (soft) and picchila (sticky) qualities. Vayu resides in sparsanendriya (skin) and massage is said to be good for the skin. *Abhyanga* (Massage) directly works on vata to bring it back to normalcy. *Abhyanga* along with *Swedana* and *Vasti* removes *Aavarana* and *Srotorodha* (obstruction of channels). *Abhyanga* and *swedana* together divert the dosha's from shakha to koshta. Then dosha's can be managed by *Vasti* or other panchakarma procedures. *Abhyanga* reduces hypertonic conditions, improves muscle bulk and power in CP cases²¹. *Abhyanga*, along with *Swedana* might work directly on Vata dosha to bring it back to normalcy, which relief in pain. *Abhyanga* (massage) of the body by *Vishagarbha Taila*, *Mahanarayana Taila* and *Bala Taila* is very effective in JIA. Massage should be done in direction of hairs (*Anuloma*) starting from the origin end of hairs towards the free ends of hairs. Daily 30 min of whole-body massage is very effective and it provides strong and smooth skin. The regular application of *Abhyanga* comes under Trans-dermal purification. *Abhyanga* restores the balance of the *Doshas* and enhances well-being and longevity²⁹⁻³⁰⁻³¹⁻³². Results of many studies show that massage by medicated oil could relax the tight junctions between endothelial cells in the CNS vessels and facilitate the entry of solutes and other components into the CNS. *Abhyanga* (massage) is associated with release of melatonin causes calming effects in brain and drained out by the exertion of physical pressure on peripheral nerve ending.

C. Nadi Swedana (Steam Bath): Sweating is induced by means of steam coming from the fluid which may contain many Vata shamak herbs.

The *Swedana* (sudation) karma is considered as the main treatment of Vata roga; due to its Ushna guna overcomes the sheeta guna of Vata. *Swedana* (sudation) karma relieved in Sheeta (cold), Shoola (pain), and Sthamba (stiffness) in JIA³³. *Nadi Swedana* with *Abhyanga* facilitates in removal of *Aavarana* and *Srotorodha*. *Nadi Swedana* is very helpful in JIA by relieves spasticity, improves joint mobility or range of motion (ROM)³⁴.

D. Valuka Swedana: This is typical *Ruksha Swedana* in which bolus of sand is used. In *Valuka Swedana* sand can be fried in *dhanyamula* along with *Saindhava lavana*. *Valuka Swedana* is very effective in relieving the signs and symptoms of *Amavata*. *Sukshma* and *Tikshna* properties of *Saindhava lavana* helps to pass the drug molecule in systemic circulation through the mucosa. *Valuka Swedana* helps the *Vasti Dravya* to reach up to the molecular level³⁵. Much care should be focus mainly on heat of the bolus, mainly moderate heat should be taken.

E. Vaitarana Basti (Type of Medicated Enema): *Vaitarana Basti* is a specific type of *Basti* that is manlily indicated in the treatment of *Amavata*. *Vaitarana Basti* has very dominant cleansing action³⁶. *Vaitarana Basti* done cleansing therapy which can cleanse the closed channels and renovate its normal function. It is a kind of *Niruha basti* and it got its name due to the specific ability to cure disease³⁷.

According to modern sciences, the rectum has a rich supply of blood and lymph vessels. Drugs can cross the rectal mucosa like other lipid membranes and entering in general blood circulation so effect of *Basti* seen on whole body.

4.2 Shaman Therapy (Pacifactory): *Kaishora Guggulu*, *Chitrakadi Vati*, *Rasnasaptaka Kwatha* and some single herbal drugs like *Shallaki* (*Boswellia serrate*), *Nirgundi* (*Vitex Negundo*), *Turmeric* (*Curcuma longa* Linn), *Harataki* (*Terminalia chebula* Retz.), *Methi* (*Trigonella foenum-graecum* Linn.) and *Pippali* (*Piper longum* Linn.) *etc.* are main drug which are used in Shaman therapy of JIA. The mainline of treatment for Juvenile idiopathic arthritis (JIA) to bring *Agni* (digestive power) in normal state to digest *Ama* and do away with vitiated Vata and *Ama*.

Because Ama is precursor to inflammation which further changes in Juvenile idiopathic arthritis (JIA).

A. Kaishora Guggulu: It has a function to reduce joint pain and swelling. Kaishora Guggulu has antioxidant, immune-modulator and analgesic property which can help to reduce inflammation and to restore joint. The main ingredients of Kaishora Guggulu are Guggulu (*Commiphora mukul*), Triphala (*Haritaki-Terminalia chebula Retz*, *Bibhitaki - Terminalia bellerica*, *Amalaki-Emblica officinalis*) and Guduchi (*Tinospora cordifolia*)³⁸. Guggulu have Sroto Shuhdhikaraka and Rasayanas actions. Triphala is recognized for its Rookshana and Kapha Medo Hara effects. Kaishora guggulu is very effective in managing the edema and improvement in the walking ability in JIA. Kaishora Guggulu has antioxidant, hepatoprotective, immuno-modulatory, digestive stimulant, carminative and analgesic property which helps to subside the inflammation in JIA and help to restore joint healthy³⁹.

B. Chitrakadi vati: Chitrakadi Vati is given in 2nd line of treatment to improve digestive power because decreased Agni or metabolic fire is most important in the pathogenesis of JIA/Aamavata of adolescents. Due to lack of *Agni*, alteration of bacterial flora of the gut occurs that result in dysfunction of the macro and microchannels of transport or Srotash. Chitrakadi Vati increases the digestive and metabolic fires (*Agni*) in JIA patients by its Deepan, Pachan (enhance proper digestion) property. Chitrakadi Vati also helps to avoid indigestion during course of Panchakarma procedure. Main Ingredients of Chitrakadi Vati is Chitraka (*Plumbago zeylanica*), Pippali Mool (*Piper longum*), Sarjikakshar (Sodium carbonate), Yavakshar (Potassium carbonate) and *Pancha lavana* (Five salts), etc. Agnitundi vati can also be given for increases the digestive and metabolic fires (*Agni*) in JIA patients.

C: Rasnasaptak Kwatha: Rasnasaptak Kwatha is Ayurvedic polyherbal decoction prescribed as Vata Shamak property and can be used for pain relief in Juvenile idiopathic arthritis (JIA). Main Ingredients of Rasnasaptak Kwatha is Rasna (*Pluchea lanceolata*), Erandamoola (*Ricinus cumminis*), Gokshura (*Tribulus terrestris*), Punarnava

(*Boerhaavia diffusa*), Amrita (*Tinospora cordifolia*), Aragwadha (*Cassia fistula*), etc. Rasnasaptak Kwatha responds on all cardinal symptoms of arthritis such as inflammation, pain, stiffness etc. it works as an immunosuppressive and antioxidants action for the management of JIA symptoms by countering at cellular and biomolecular level.

4.3 Single Herbal Drugs: According to the world health organization (WHO) 80% of world's population depends on herbal drugs for their primary health care⁴⁰. Various of the herbal drugs have potent anti-arthritis activity without any side effects.

A. Shallaki (*Boswellia serrate*): Shallaki has an anti-inflammatory⁴¹, analgesics⁴², immune-modulatory⁴³ osteoarthritis, and hypoglycemic activities⁴⁴. The anti-arthritis activity is mainly done by decreasing the activity of membrane marker enzymes and prevention of leucocytes migration in the inflamed area. Shallaki possesses a considerable anti-arthritis activity on male albino rats⁴⁵.

B. Nirgundi (*Vitex negundo*): Nirgundi has different pharmacological actions including anti-inflammatory, analgesic⁴⁶, antioxidant and anti-rheumatic⁴⁷. Nirgundi decreased the elevated levels of ESR, and subside many inflammatory mediators hence, it can be concluded that the Nirgundi have an anti-arthritis activity⁴⁸.

C. Turmeric (*Curcuma longa* Linn): Turmeric has a significant role in reduction of disability and pain⁴⁹. The turmeric plant is reported to be highly anti-inflammatory value and antibacterial activity⁵⁰. Turmeric essential oil also has activities of anti-inflammatory and anti-arthritis activities⁵¹.

D. Harataki (*Terminalia chebula* Retz.): Harataki extract have role in significant reduction in the inflammatory mediators and have potent anti-arthritis activity⁵².

E. Methi (*Trigonella foenum-graecum* Linn.): Methi extract has anti-inflammatory and anti-rheumatic activities⁵³. Methi seeds have role in anti-arthritis activity by decreasing the oxidative stress, cell influx and release of mediators associated with arthritis⁵⁴.

F. Pippali (*Piper longum* Linn.): Major constituents of Pippali are piperine, piperlongumine and piperlonguminine, it has anti-inflammatory along with immune-modulatory activities⁵⁵. The aqueous extracts of Pippali possess anti-arthritis activity by inhibiting inflammatory mediators⁵⁶.

G. Sunthi (*Zingiber officinale*): Sunthi has active Constituents such as phenolic compounds and essential oils. It has anti-inflammatory activity⁵⁷, analgesic activity⁵⁸ and antioxidant activity⁵⁹.

H. Gokshura (*Tribulus terrestris*): The main active constituents of Gokshura are phytosterol, saponins, steroidal, flavonoids, and alkaloids⁶⁰. In preclinical studies, methanolic extract of *Tribulus terrestris* fruit has anti-arthritis⁶¹⁻⁶² and analgesic activity⁶³⁻⁶⁴.

I. Guduchi (*Tinospora cardifolia*): Guduchi is also known as “Amrita” which means “divine nectar” and it is used in detoxifying and cleansing the whole system of the human body. Mechanism of action of Guduchi on basis of preclinical studies is immune-modulatory activity⁶⁵, anti-inflammatory activity (aqueous extract)⁶⁶ and antioxidant activity⁶⁷.

J. Punarnava (*Boerhavia diffusa*): Literally meaning of Punarnava is “drug which renews the old body”. On the basis of preclinical studies, its aqueous extract shows anti-arthritis⁶⁸, analgesic⁶⁹ and antioxidant activity⁷⁰.

Pathya Ahara: The diet used in Juvenile idiopathic arthritis (JIA) should be Laghu (easily digestible) and Agni vardhaka. High Agni is manifested by more appetite and low Agni by loss of appetite and heaviness feeling in the abdomen. Agni is high around noon time due to Pitta dominance so morning diet and evening diet should be light, and lunch should be heavy in Juvenile idiopathic arthritis (JIA).

CONCLUSION: JIA is the umbrella term for a group of chronic childhood arthritis present with inflammation of joint and stiffness of unknown cause in children and their onset prior to 16 years of age. The symptoms present in JIA are more comparable with features of Aamavata Vyadhi mentioned in Ayurvedic classics. In Juvenile idiopathic arthritis (JIA) mainly vitiated Vata

associated with Ama (undigested toxic substance) and produce particular symptoms affecting the bony joints and systemic system. In contemporary treatment of JIA many drugs are used, which associate with major side effects such as hepatic, pulmonary, renal and bone marrow abnormalities; and minor effects such as malaise, nausea, and diarrhea.

The selected Ayurvedic treatment is very effective in relieving the symptoms of JIA patients and no side effect on any systems. In Ayurveda, Shodhna therapy, such as Sarvaanga Snehana (Full body massage with medicated oil), Nadi swedana (Steam bath), Valuka Swedana (fomentation by sand pack) and Vaitarana Basti (type of medicated enema) is very effective in management of JIA.

In Shaman therapy mainly Kaishora Guggulu, Chitrakadi Vati, and Rasnasaptak Kwatha is effective in relieving pain and swelling of joints. Some herbal drugs also have very potent consideration as anti-arthritis activity such as Shallaki (*Boswellia serrate*), Nirgundi (*Vitex negundo*), Turmeric (*Curcuma longa* Linn), Harataki (*Terminalia chebula* Retz.), Methi (*Trigonella foenum-graecum* Linn.) and Pippali (*Piper longum* Linn.). This option is effective in improves quality of life (QOL), swelling, pain, and restriction of movement (ROM) in JIA patients. It has positive and hopeful effect; it is revolution in treatment by Ayurveda.

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REFERENCES:

1. Moore MD: Rheumatoid diseases in essential adolescent medicine, greydanus DE, Patel DR, Pratt HD (Eds.), Mc Graw Hill Med: New York (USA) 2006: 201-34.
2. Klippel JH, Crofford LJ, Stone JH, Weyand CM (Eds.), Primer on the rheumatic disease edition 12th, Arthritis foundation, Atlanta: GA, 2001.
3. Mehta J and Pessler F: Juvenile Idiopathic Arthritis (JIA): Joint Disorders. Merck Manual Professional. Retrieved 2008-12-15.

4. Ringold S, Burke A and Glass R: JAMA patient page. Juvenile idiopathic arthritis. JAMA 2005; 294(13): 1722.
5. Madhavkar, Madhav nidana, Amavat Nidana 25/6-10, Hindi Commentary by Pandit Shri Brahasankar Sastri, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint-2012
6. Petty RE, Southwood TR, Manners P, Baum J, Glass DN, Goldenberg J, He X, Maldonado-Cocco J, Orozco-Alcala J, Prieur AM, Suarez-Almazor ME and Woo P: International League of Associations for Rheumatology classification of juvenile idiopathic arthritis: second revision, Edmonton, 2001. J Rheumatol 2004; 31(2): 390-92.
7. Patel DR and Moore MD: Concept of rheumatology. In: Handbook of clinical pediatrics: An update for the Ambulatory pediatrician. Greydanus DE, et al. (eds.), world scientific: New Jersey 2010; 25: 697-13.
8. https://en.wikipedia.org/wiki/Juvenile_idiopathic_arthritis, cited on 23-7-2015
9. Prakken B, Albanni S and Martini A: Juvenile idiopathic arthritis. Lancet 2011; 377(9783): 2138-49.
10. Hoffart C and Sherry DD: Early identification of juvenile idiopathic arthritis. Journal of Musculoskeletal Medicine 2010; 247.
11. Shiel WC: Juvenile Rheumatoid Arthritis". Medicine Net. p. 1. Retrieved 21 December 2012.
12. Phelan JD and Thompson SD: Genomic progress in pediatric arthritis: recent work and future goals. Current Opinion in Rheumatology 2006; 18(5): 482-9.
13. Prahalad S and Glass DN: Is juvenile rheumatoid arthritis/ juvenile idiopathic arthritis different from rheumatoid arthritis? Arthritis Research 2002; 4(S3): 303-10.
14. Hinks A, Cobb J, Marion MC, Prahalad S, Sudman M and Bowes J: Dense genotyping of immune-related disease regions identifies 14 new susceptibility loci for juvenile idiopathic arthritis. Nature Genetics 2013; 45(6): 664-9
15. Bader-Meunier B, Wouters C, Job-Deslandre, Cimaz R, Hofer M and Pillet P: Guidelines for diagnosis and treatment of Oligoarticular and polyarticular juvenile idiopathic arthritis. Arch Pediatr 2010; 17(7): 1085-9.
16. Baresford MW: Juvenile idiopathic arthritis: new insights into classification, measures of outcome and pharmacotherapy. Pediatrics Drugs 2011; 13(3): 161-73.
17. Martini A and Lovell DJ: Juvenile idiopathic arthritis: state of the art and future perspective. Ann Rheum Dis 2010; 69(7): 1260-3.
18. Cron RQ, Weiser P and Beukelman T: Juvenile idiopathic arthritis. In Clinical Immunology: Principles and Practice (4th edition). Edited by Rich RR, Fleisher TA, Shearer WT, Schroeder II HW, Frew AJ, and Weyand CM. London, England: Elsevier 2013: 637-47.
19. Wallace C: Juvenile idiopathic arthritis: Critical elements of care. 4th edn. Seattle, WA, USA: The Centre for Children with Special Needs 2006.
20. Davidson J: Juvenile idiopathic arthritis: A clinical overview. Eur J Radiology 2000; 33: 128-34.
21. Petty R, Southwood T and Manners P: International League of Associations for Rheumatology classification of juvenile idiopathic arthritis. 2nd revision. J Rheumatol 2004; 31(2): 390-2.
22. Australian Government Department of Ageing. BAOC initiative newsletter. Canberra: DOHA, 2007.
23. Lather A: An Ayurvedic polyherbal formulation Kaishore guggulu: a review, International Journal of Pharmaceutical & Biological Archives 2011; 2(1): 497-03.
24. Hashkes PJ and Laxer RM: Medical treatment of juvenile idiopathic arthritis. JAMA, 2005; 294(13): 1671-84.
25. Padeh S, Pinhas-Hamiel O, Zimmermann-Sloutskis D and Berkun Y: Children with oligoarticular juvenile idiopathic arthritis are at considerable risk for growth retardation. Journal of Pediatrics 2011; 159(5): 832-7.
26. National Prescribing Service. Prescribing Practice Reviews and NPS News. Canberra: NPS, 2006.
27. Beggs S: Pediatric analgesia. Aust Prescr 2008; 31: 63-5.
28. Vinjamury SP, Vinjamury M, Sucharitakul S and Ziegler I: Panchakarma: Ayurvedic Detoxification and Allied Therapies-Is There Any Evidence? In: Rastogi S (Eds), Evidence-Based Practice in Complementary and Alternative Medicine. Springer, Berlin 2012.
29. Halpern M: Healing your life-lessons on the path of ayurveda-the healing rhythms of daily life. Lotus Press 2011; 14: 169-88.
30. Bredesen DE and Rao RV: Ayurvedic profiling of alzheimer's disease Altern Ther Health Med 2017; 23(3): 46-50
31. Rao RV, Descamps O, John V and Bredesen DE: Ayurvedic medicinal plants for Alzheimer's disease: a review Alzheimers Res Ther 2012; 4: 22.
32. Rao RV: Ayurvedic approach to Alzheimer's disease Ayurveda J Health, XI 2012; 3-13.
33. Agnivesha, Charaka Samhita with Ayurveda Deepika Commentary of Chakrapanidatta, Chikistasthana, Chapter 28, verse 32, published by Chaukhambha Sanskrit Samsthan; Varanasi; 2004.
34. Niraj SK and Varsha S: A Case Study on the Ayurvedic Management of Spastic Cerebral Palsy Due to Birth Asphyxia, Journal of Natural Remedies | Vol 19 (3) | July 2019.
35. Pooja BA, Kumar S, Bhatted and Bhojani MK: Role of Valuka swedana and Vaitarana basti in the management of Amavata (Rheumatoid arthritis). Int J Res Ayurveda Pharm 2013; 4(5): 712-14.
36. Wetal VR and Huperikar R: Study of effect of Vaitarana Basti in Amavata: A clinical trail. Int J Ayu Pharm Chem 2016; 4(2): 38-45.
37. Wanole MR and Clothe DS: Vaitarana Basti in Amavata -a pilot study. EJPMR 2016; 3(11): 379-82.
38. Shaha B: 2nd ed. Varanasi: Chaukhamba bharati Academy; Nigantu Adarsha, Purvardha 1999; 614.
39. Lather A: An Ayurvedic polyherbal formulation kaishore guggulu: a review, International Journal of Pharmaceutical & Biological Archives 2011; 2(1): 497-03.
40. Sudha K and Mathanghi SK: Traditional underutilized green leafy vegetables and its curative properties. Int J Pharm 2012; 2: 786-93.
41. Gupta OP, Sharma N and Chand D: A sensitive and relevant model for evaluating anti-inflammatory activity-papaya latex-induced rat paw inflammation. J Pharmacol Toxicol Methods 1992; 28: 15-9.
42. Menon MK and Kar A: Analgesic and psychopharmacological effects of the gum resin of *Boswellia serrata*. Planta Med 1971; 19: 333-41.
43. Pungle P, Banavalikar M, Suthar A, Biyani M and Mengi S: Immunomodulatory activity of boswellic acids of *B. serrata* Roxb. Indian J Exp Biol 2003; 41: 1460 2.
44. Al-Awadi F, Fatania H and Shamte U: The effect of a plants mixture extract on liver gluconeogenesis in streptozotocin-induced diabetic rats. Diabetes Res. 1991; 18: 163-8.
45. Mishra NK, Bstia S, Mishra G, Chowdary AK and Patra S: Anti-arthritis activity of *Glycyrrhiza glabra*, *Boswellia serrata* and their synergistic activity in combined formulation studied in freund's adjuvant induced arthritic rats. J Pharm Educ Res 2011; 2: 92-8.
46. Tandon V and Gupta RK: Effect of *Vitex negundo* on oxidative stress. Indian J Pharmacol 2005; 37: 38-40.

47. Tandon VR: Medical uses and biological activities of *Vitex negundo*. Nat Prod Radiance 2005; 4: 162-5.
48. Pandey A, Bani S, Satti NK, Gupta BD and Suri KA: Anti-arthritis activity of agnuside mediated through the down-regulation of inflammatory mediators and cytokines. Inflamm Res 2012; 61: 293-04.
49. Mukhopadhyay A, Basu N, Ghatak N and Gujral PK: Anti-inflammatory and irritant activities of curcumin analogues in rats. Agents Actions 1982; 12: 508-15.
50. Shankar TNB and Murthy VS: Effect of turmeric (*Curcuma longa*) fractions on the growth of some intestinal & pathogenic bacteria *in-vitro*. Indian J Exp Biol 1979; 17: 1363-6.
51. Funk JL, Frye JB, Oyarzo JN, Zhang H and Timmermann BN: Anti-arthritis effects and toxicity of the essential oils of turmeric (*Curcuma longa* L.) J Agric Food Chem 2010; 58: 842-9.
52. Pandian RS, Anuradha CV and Viswanathan P: Gastroprotective effect of fenugreek seeds (*Trigonella foenum graecum*) on experimental gastric ulcer in rats. J Ethnopharmacol 2002; 81: 393-7.
53. Sindhu G, Ratheesh M, Shyni GL, Nambisan B and Helen A: Anti-inflammatory and antioxidative effects of mucilage of *Trigonella foenum graecum* (Fenugreek) on adjuvant induced arthritic rats. Int Immunopharmacol. 2012; 12: 205-11.
54. Sharma A and Singh R: Screening of anti-inflammatory activity of certain indigenous drugs on carragenin induced hind paw oedema in rats. Bull Med Ethn Res 1980; 2: 262
55. Mananvalan G and Singh J: Chemical and some pharmacological studies on leaves of *P. longum* Linn. Indian J Pharm Sci 1979; 41: 190.
56. Yende SR, Sannapuri VD, Vyawahare SN and Harle UN: Anti-rheumatoid activity of aqueous extract of *Piper longum* on freund's adjuvant-induced arthritis in rats. Int J Pharm Sci Res 2010; 1: 129-33.
57. Sabnis VM: Chemistry and Pharmacology of Ayurvedic Medicinal Plants. 1st ed. Varanasi: Chaukhamba Amara Bharati Prakshan.2006; 394.
58. Raji Y, Udoh US, Oluwadara OO, Akinsomisoye OS, Awobajo O and Adeshoga K: Anti-inflammatory and analgesic properties of the rhizome extract of *Zingiber officinale*. African Journal of Biomedical Research 2002; 5(3): 121-24.
59. Sabnis VM: Chemistry and Pharmacology of Ayurvedic Medicinal Plants.1st ed. Varanasi: Chaukhamba Amara Bharati Prakshan 2006; 392.
60. Pole S: Ayurvedic medicine: The Principles of Traditional Practice. 1st ed. London: Churchill Livingstone Publishers; 2006; 185.
61. Mukund S. Chemistry and Pharmacology of Ayurvedic Medicinal Plants. 1st ed. Varanasi: Chaukhamba AmaraBharati Prakshan 2006; 345.
62. Mishra NK, Biswal GS, Chowdary KA and Mishra G: Antiarthritic activity of *Tribulus terrestris* studied in Freund's adjuvant induced arthritic rats. Journal of Pharmaceutical Education and Research 2013; 4(1): 41-44.
63. Heidari MR: The analgesic effect of *Tribulus terrestris* extract and comparison of gastric ulcerogenicity of the extract with indomethacine in animal experiments. Annals of the New York Academy of Sciences 2007; 1095(1): 418-27.
64. Nagarkar BH: Comparative evaluation of anti-inflammatory potential of medicinally important plants. Int J Pharm Pharm Sci 2013; 5(3): 239-43.
65. Upadhyaya R, Pandey RP, Sharma V and Verma AK: Assessment of the multifaceted immunomodulatory potential of the aqueous extract of *Tinospora cordifolia*. Research Journal of Chemical Sciences 2011; 1(6): 71-9.
66. Patgiri B, Umretia BL, Vaishnav PU, Prajapati PK, Shukla VJ and Ravishankar B: Anti-inflammatory activity of Guduchi Ghana (aqueous extract of *Tinospora cordifolia* Miers.) Ayu 2014; 35(1): 108.
67. Sabnis VM: Chemistry and Pharmacology of Ayurvedic Medicinal Plants. 1st ed. Varanasi: Chaukhamba Amara Bharati Prakshan 2002; 340.
68. Annonymus, Indian Medicinal Plant. Vol.4, Medicinal Plants unit: Indian Council of Medical Research, New Delhi, 2008; 617-30.
69. Oladele GM, Ode OJ and Ogunbodede MA: Evaluation of anti-inflammatory and membrane stabilizing effects of aqueous root extract of *Boerhavia diffusa* Linn. in rats. International Journal of Applied Biology and Pharmaceutical Technology 2011; 2(3): 84-8.
70. Rajpoot K and Mishra RN: *Boerhavia diffusa* Roots (Punarnava mool) - Review as rasayan (rejuvenator/antiaging). International Journal of Pharmaceutical and Biomedical Research 2011; 2(4): 1451-60.

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