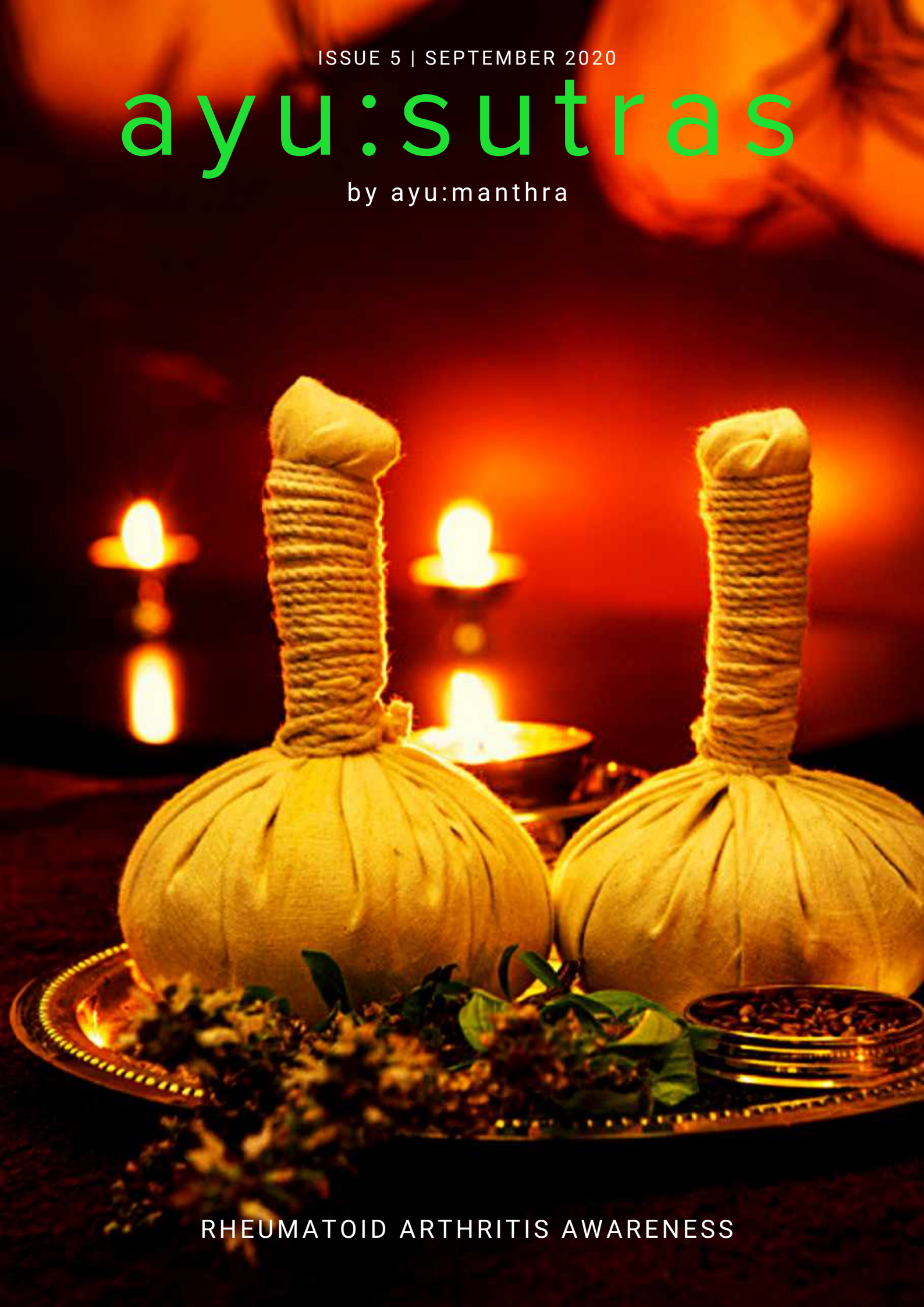
ISSUE 5 | SEPTEMBER 2020

ayu:sutras

by ayu:manthra



RHEUMATOID ARTHRITIS AWARENESS

CONTENTS

WHAT TO EXPECT?

Dr Shanthi Ganga's ayu:manthra

CHIEF EDITOR

Happy Onam to our dear readers. This time ayu:sutras is coming to you in a whole new Avatar. We have brought in Dr Arshath Jyothi to our editorial board who is a Post Graduate scholar, Department of Kayachikitsa, All India Institute of Ayurveda, New Delhi. We are also launching a very new column called The Jewels of Ayurveda Literature.

Dr. Shanthi Ganga

EDITORIAL DESK

Dr Arshath Jyothi

Since the beginning of January 2020, COVID days have been dominated by multifarious changes that had a major bearing on people's professional & personal life. The pandemic brought unimaginable misery around the world. Even though the situation has been classified as a special scenario, we can slow down transmissions, prevent infections and save lives through effective containment strategies; by activating and enhancing emergency response systems; by dramatically increasing testing capacity and care for patients; by readying hospitals, ensuring they have space, supplies and needed personnel; and by developing life-saving medical interventions.

It is evident that even in pandemic times we have to address other diseases too. In this edition team ayu:sutra highlights Arthritis and related diseases to raise awareness during "World Arthritis Day". Rheumatic or musculoskeletal conditions comprise of over 150 diseases and syndromes, which are usually progressive and associated with pain. They can broadly be categorized as joint diseases, physical disability, spinal disorders, and conditions resulting from trauma. Musculoskeletal conditions are leading causes of morbidity and disability, giving rise to enormous healthcare expenditures and loss of work. Ayurvedic approach to sandhi roga is different and it can significantly improve one's quality of life. Introducing another edition to you with thought-provoking views from our authors

अस्थ्याश्रयाणां व्याधीनां पञ्चकर्माणि भेषजम्‌। बस्त्यः क्षीरसर्पींषि तिक्तकोपहितानि च॥२७॥

KNOW YOUR HERBAL GARDEN

DRYNARIA QUERCIFOLIA / **OAKLEAF FERN / ASWAKATRI / THUDINTHAPAALA**

FAMILY: POLYPODIACEAE

Ferns appeared on the earth 360 million years ago. They come under pteridophytes which produce neither flowers nor seeds. They propagate through spores. Ferns are used from the ancient period as a food source, biofertilizer, ornamental plants and medicine. Oakleaf fern is one among them which has great medicinal values. The main indication of this fern is in arthritis. Folklore uses of its rhizome are recorded in various ethnobotanical surveys. A special preparation called aattukkaal soup made up of this rhizome is useful in osteoarthritis. It helps to increase bone density, prevents osteoporosis and promotes healing of injured ligaments.

About the plant

- Seen throughout India, commonly seen in Kerala
- An epiphyte with densely scaly rhizome
- Grows on trees, walls and rocks.

Cultivation

- The rhizome can be separated from the fern using a knife.
- Wash it properly to get rid of soil and other debris.
- Remove the brown scales from rhizome using a knife It can be used in fresh and dried form.
- For future use, sun-dried pieces of rhizome can be powdered
- Keep it stored in a clean airtight container.

Home Remedies

- Aattukkaal soup is prepared out of its rhizome.
- Fresh rhizome cleaned as mentioned above cut into small pieces.
- Mix it in an earthen pot and add the proper quantity of water.
- Add salt, onions, garlic, pepper, dried chillies, curry leaves and boil.
- Serve hot.

Home Remedies

- A decoction prepared out of rhizome is used in fever
- Rhizome paste along with coconut oil is applied over the head to induce sleep and calm the mind.
- Rhizome paste is used topically for stimulating hair growth and to cure headache.
- The poultice is made up of rhizome and applied over swollen joints to reduce pain and inflammation
- Rhizome with sugar is used for urinary disorders

Features

Perennial herb with elongated leafy stem and horizontal tuberous rhizome.

Major chemical constituents

Alkaloids, proteins, xanthoproteins, coumarins, saponins, catechins, flavonoids, steroids, triterpenes, beta-amyrin, beta-stisterol, aglycone naringinin.

Researches

Antimicrobial, Antioxidant, Anti-inflammatory, Hepatoprotective, Thrombolytic, Analgesic, wound healing etc activities are proven through various researches

Formulations

- Ellum nishaadi yogam indicated in Vataraktha , mentioned in Keraleeya chikitsa textbook called Chikitsa Manjari.

Therapeutic uses

- Jwara (Fever)
- Dushta Vrana
- Sandhi Sopha
- Suryavartha Swasa

Dr. Niya T Sivan

Churna Pinda Sweda or Herbal Powder Poultice: A highly effective therapy in arthritis to relieve pain and stiffness. Medicinal powders made into a poultice is heated and rubbed against the body either directly or after applying oil. The poultice is also done by dipping in oil or decoction according to the condition.

INTERVIEW WITH
DR BHASWATI BATTACHARYA

Q: AYURVEDA IS CONSIDERED AS A PSEUDOSCIENCE IN MANY PARTS OF THE WORLD INCLUDING INDIA. WHAT IS YOUR TAKE ON THIS?

The best way to invalidate something is to pretend it does not exist. The west has expended a lot of energy successfully to disclude Ayurveda from the conversation about health and medicine. They took our black pepper, and they took our turmeric, and they certainly got medical benefits. There is no doubt that Ayurvedic granthas, the classic ancient medical texts, were on the ships that travelled to Egypt and Greece and made their way into the 4 greek humours of the body, that are obviously related to Susruta's vata, pitta, kapha, rakta. While the west claims Hippocrates came up with them, there is no evidence for his derivation, while there is proof that Ctesias wrote On Indika and transmitted knowledge of Ayurveda to Greece.

After cleverly benefitting from our spices and conquering the Malabar coast and Goa to get them, the westerners then made trade laws and phytopharma laws that allowed them to take all the economic benefit without having to credit any of the original sources. When they reap health benefits from the sroto-sodhana quality of maricha or the kashaya cleansing of shampoo or the anti-inflammatory and wound-healing effects of haldi, they do not doubt there is science. Indeed they try to patent the knowledge as though they have discovered the science! They simply ignore its origin and invalidate it by ignoring the Sanskrit texts and the logic in them.

The true question about pseudoscience is why the Ayurvedic community does not counter charges with skilful tarka.

The main issue is not that mainstream medical powers call Ayurveda pseudoscience. The main issue is that Ayurvedic stakeholders allow this to happen! The rule-makers in the west decided that only drugs and surgeries and technological interventions of radiology are the gold standards. Why did we accept the racist Flexner report of the USA and adopt allopathic standards? Many say it was because Mohandas Gandhi got no relief for his piles from Ayurveda, but modern surgery cut away his problems so he converted to supporting modern medicine. Modern medical regulations took our brightest minds through education, seducing them to become doctors and engineers, not to study Sanskrit and the ancient sciences. It was a clever move by the ruling imperialists. Certainly, if we follow history from 1920 to 1980, we see a disturbing trend of lack of advocacy by the overwhelming majority of vaidyas for their own science. The notable exceptions are Dr JB Roy, Pandit and MP Shiv Sharma, MM Malviya, and the Kerala vaidya families.

We need to articulate the science of Ayurveda in a way that penetrates both the brain and hearts of the people. The problem is not the science behind Ayurveda. The problem is that the people controlling the practice, trades and regulation of Ayurveda are not professionals and they do not set proper professional standards. First, most do not have the skill sets they need to be in their jobs. No one has trained them to be good teachers, clean clinicians, good articulators and skilful communicators, good honest researchers, and curious students.

The head of one of India's biggest institutions stammers during speeches. Another shouts into the microphone as though on a battlefield, even while explaining a medical procedure. Another does not even know how to make the medicines for which he is HOD. Another has no interaction skills but claims to be a clinician. Yet another holds an international post but cannot write reports with any focus or proper scope. Another heads a research project but cannot gather the available science in the literature. Another lecture worldwide but cannot give concise explanations. Another cannot even gather the immense clinical data already collected and create a useful scientific report. Why have they not been trained in AV, how to sit in front of a video conference, and how to organize their talks? India is filled with talented coaches and trainers that could train Ayurvedic physicians. Why is this not a priority for each and every institution?

Secondly, the people sitting in the highest posts of Ayurveda lack the ethics to put Ayurveda first. The ones making decisions choose their friends or the companies they previously worked for. Loyalty comes before competence and an honest eye. They embezzle funds from construction projects, furniture renovations, and falsify receipts for reimbursements. They steal books from the libraries. They falsify data. They force students to sign documents that are lies. Nepotism and the nephew rules who gets appointed to committees and inspections and faculty appointments. There is no setup for young Ayurveda practitioners to excel, gain needed skill sets and be part of the decision-making.

High professional standards for education based on competence need to be enacted. The laws related to Ayurveda need to be updated from the archaic British language through health policy fellowships for BAMS graduates. The regulation of Ayurvedic medicine-making, trade, import and export need to be delegated to bhaisajya kalpana experts and not a pharmacy
and medicinal chemistry experts who are not clinicians.

See the amazing entrepreneur spirit alive in the IT community in India. It has spread worldwide into nearly every leading IT venture. Why is this spirit not extended to the Ayurveda community? Ayurveda graduates now want a job in the government or a corporation because they are not trained to set up their practice as a business. In the USA, medical graduates are constantly reminded of their potential as clinicians, but also as authors, filmmakers, medicine makers, instrument makers, speakers and every field of enterprise in which they can further their medical knowledge. Ayurveda graduates do not usually want to invent an idea and start their own venture. At the very least, more small private practices and hospitals are needed to make Ayurveda come alive in the community.

We need to bring Ayurveda back to the hands and hearts of the people. The problem with making it commonly known to the people though is that Ayurvedic doctors fear it will lose value, and they will lose consultations. It is a false fear that is propagated by those who do not understand the deep science of Ayurveda and its use in serious diseases. People will always need Ayurveda for serious treatment of severe ailments.

Why does modern medicine see Ayurveda as a pseudoscience? The frames of reference are limited in modern science. They see from the nanoscale to the kilo scale,10-9 to the meter scale, 10+1. And the sciences that see these perspectives are all in conflict with each other, with no smooth interface of validation between physics, chemistry, pharmacy, botany, geology and material science.

In contrast, Ayurveda is seamlessly interfaced with all the ancient sciences. We bridge astronomy of understanding the round earth with the mathematics of yoctometers which work at the size of the influence of the apparent charge radius of electrons and quarks that influence the avyakta. We bridge the asadya nature of clinical medicine with the immense potential of shifting mahabhutas in the body through ecological harmony with botanical substances. We bridge the seasonal and ecological rhythms that cause bhuta and krimi of pandemics with the understanding of metallurgy and how to make medicines that work to counter their effect on our body. We bridge archaeology of the Saraswati river with the science of waters, the principles of the maha-gunas with the principles of economics and the lessons of history. We have priceless knowledge in the pharmaceutics of medicines and bhasmas, ancient chemistry in the iron non-rusting pillars, and the knowledge of using hard gems as bhasmas to fortify our bodies.

Certainly, Ayurveda is touted as an ancient science and has been available to us for thousands of years. It existed before the scientific method of experimentation evolved and is thus called pre-scientific. It also transcends the philosophy of positivism, which looks only at data proven in the logic of modern science, which is blind to the larger frames of reference. It is our task to unite positivism with a larger frame of reference that includes Ayurveda.

JUVENILE IDIOPATHIC ARTHRITIS

Juvenile Rheumatoid Arthritis is an auto-immune disease and the most common pediatric rheumatologic health concern leading to physical disabilities and chronic morbidities among children. JRA is characterized by chronic inflammatory changes in one or more joints of a child below 16 years of age persisting for at least 6 weeks as per the American College of Rheumatology (ACR). Recently the International League of Associations for Rheumatology (ILAR) has proposed the term Juvenile Idiopathic Arthritis (JIA) instead of JRA1. Present criteria divide JIA into mutually exclusive 7 categories based on a number of joints involved, presence and absence of RF factor, extra-articular manifestations etc.

Persistent or extended oligoarthritis (Pauciarticular)

- Most common type (50 – 60%)
- Predominantly seen among girls under 5 years
- Asymmetric pattern involving major joints (≤ 4 joints)
- In Persistent type, not more than 4 joints are affected throughout the whole course of disease whereas, in extended type, more than 4 joints are affected after the first 6 months of disease.
- RF Factor negative and ANA positive in 50% cases, Asymptomatic iridocyclitis is a common complication

Polyarticular (RF negative)

- Constitutes about 20 – 30% of JIA cases
- Seen predominantly among girls of pre-school age
- Often asymmetric involving both minor and major joints (≥ 5 joints)
- ANA may be positive and has a risk of developing iridocyclitis

Polyarticular (RF positive)

- omprises 5-10 % of all JIA cases
- Most common among girls of adolescent age group
- Symmetric involvement of both minor and major joints (≥ 5 joints) with a positive RF Factor on at least 2 occasions, tested 3 months apart
- RF Factor is positive and ANA positive in around 75% of children
- Condition is similar to that of adult rheumatoid arthritis and may develop erosion of surrounding bones, subcutaneous rheumatoid nodules and swan deformity are common features.

Systemic Onset JIA

- Comprises of 10-20% of the cases, affecting both the genders equally and the onset of the disease may be in any age group
- Arthritis involving one or more joints associated with fever lasting up to 2 weeks, occurring once or twice a day (often in the late afternoon or evening) with normal baseline temperatures in between.
- Extra-articular symptoms like non-pruritic evanescent macular rashes, lymphadenopathy, hepato-splenomegaly, pericarditis, interstitial lung disorders may be associated.
- Generally, both RF factor and ANA are negative, risk of iridocyclitis is absent but there is always a risk of a life-threatening complication called Macrophage activation syndrome in this subtype

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Enthesitis Related Arthritis

- Constitutes around 15% of JIA cases
- Seen predominantly among boys of adolescent age above 8 years
- Often associated with the presence of the HLA-B27 antigen in 80% cases, RF & ANA is generally negative.
- Asymmetric pattern involving major joints and axial skeleton (≤ 4 joints)
- Symptomatic acute iridocyclitis in 20% of cases
- A positive family history of sacroiliitis, enthesitis, IBD

Psoriatic Arthritis

- Constitutes 5-15% of the JIA cases, age of onset is mid-childhood
- Diagnosed based on clinical features such as; the combination of arthritis and psoriasis or, arthritis and at least 2 of the following; dactylitis, nail-pitting, onycholysis, or psoriasis in a first-degree relative.
- Psoriatic arthritis is typically asymmetric in its pattern affecting both major and minor joints

Undifferentiated Arthritis

This group is diagnosed when a child with clinical features of JIA fulfils criteria in none of the above subtypes or combination of 2 or more of the subtypes-2,3,4,5,6.

Investigations

There are no tests that confirm the diagnosis but it helps us to understand the different stages or subtypes of disease and as a marker tool to assess the changes before and after treatment.

- CBC, ESR & CRP – Seen elevated in the active phase of the disease, elevated ESR and low Hb count generally seen in the later chronic phase
- RF & ANA more than diagnostic, act as important prognostic factors
- X-Ray – in later stages to assess the narrowing of joint spaces and erosion of articular surfaces
- MRI – detects early changes in jointsBone mineral density assessed in long-standing cases
- Slit-lamp examination for iridocyclitis
- HLA typing to classify Enthesitis related JIA Synovial fluid aspiration – in case of monoarthritis to differentiate septic arthritis
- Bone marrow aspiration – generally to exclude Leukemia condition

Ayurveda View

Since JIA is an umbrella term with 7 subtypes which are mutually exclusive in their presentations, it is difficult to co-relate this condition to a single disease entity under Ayurvedic concept. In clinical practice, the presenting complaints and history of presenting complaints pointing towards the aetiology of the condition and proper assessment of doshas (functional unit of the body) vitiated, the Srothas (channels), Dhathus (tissues – forming structural units of the body) and Malas (excretory products) involved in the course of the disease would aid us to draw a proper Samprapthi (pathophysiology) and precise diagnosis of the condition.

Generally based on the common symptoms of JIA, such as pain, swelling and stiffness of joints associated with fever, it is usually correlated to Amavatha Vyadhi. Also, the disease is manifested in children below 16 years (Baalavastha) which is a Kapha dosha predominant Kaala. But all the seven subtypes cannot be co-related to pure ama Vatha condition. There are divisions which have clinical features pointing towards Raktha Dushti and in such Raktha Pradoshaja symptoms, it is always better to consider the spectrum of Vatha Raktha too. For example, the Pauciarticular conditions, Systemic onset JIA, Polyarthritis RF negative divisions are similar to Amavatha condition whereas Polyarthritis RF positive type, Psoriatic JIA is more constituting towards Vatharaktha spectrum. JIA is considered as an idiopathic condition, but there are few environmental triggers such as infections, psychological stress, trauma which are contributing to the onset of the disease but the exact role of these factors are still unknown. Apart from that, there are subtypes associated with Major histocompatibility complex (MHC) associated genetic predisposition and Complement system activation that precipitates these conditions. While analyzing these environmental triggers we can easily infer that there are factors that vitiate rasa Dhathu (psychological stress) and Raktha Dhathu (infections and trauma). The Nidanas of Amavatha and Vatharaktha has few common factors such as Virudhaannam (habituation of incompatible food), Virudha Cheshta in Amavatha and Vidhiheenam cha Swapna Jaagara Maithunam in Vatharaktha explains the improper daily regimens, Nishchalatha in Amavatha and Achankramana Sheelinam in Vatharaktha are the features that point toward the role of a sedentary lifestyle in precipitating these diseases.

Amavatha is a Rasadhathu Pradoshaja Vyadhi where Nidanas (aetiology) like Virudhaahara Cheshta (intake of incompatible food and improper regimens), Mandagni and Nishchalatha which cause partial digestion and un-assimilation of food leading to the formation of toxic metabolites (Amadosha). Snigdham Bhukthavatho Hyannam Vyaayaamam Kurvathasthatha (indulging in physical activity after having unctuous food) may be considered as a disease-specific Nidana. In the Samprapthi (pathophysiology) of Amavatha, the Amadosha formed gets dislodged to Sleshma Sthana, especially Sleshaka Kapha in sandhi Sthaana due to the disease-specific Nidana causing inflammation in the joints. Repeated indulgence of Nidana leads to exacerbation of Amadosha, circulating them all over the body with the help of Prakupitha Vatha dosha through Dhamanis and vitiating all the three doshas. This makes rasa Vaha Srothas all over the body more Abhishyandi (producing more secretions) and Pichila (slimy) leading to Shrothorodha (obstruction in the channels) and featuring multisystem manifestations.

Clinical features of Aamavata includes general symptoms like Angamarda (body ache), Aruchi (anorexia), thrishna (thirst), Aaalasya (malaise), Gaurava (feeling of heaviness), Jwara (fever), Apaaka (indigestion), Shunataanganam (swelling/inflammation of body parts) and sthabdham cha kuruthe gaathram (stiffness of the body, especially morning stiffness). During this phase, the condition is rasaashritha, causing inflammation of connective tissues surrounding the joints. In the chronic stage, doshas exacerbate and manifest karothi sarujam shotham (pain and inflammation in all major joints) along with other constitutional symptoms and lastly Jaadyata (stiffness, loss of movement) or Akarmanyataa (inability of joint to perform its normal function) develops in the patient which is the most crippling form of the disease.

Vatharaktha is a raktha pradoshaja vyadhi where apart from the common aetiology shared with amavatha, the disease specific nidana that leads to the vitiation of raktha dhathu and srothas are intake of vidaahyannam (food causing burning sensation during digestion), abhighatham (trauma) and ashudhi (abstaining purificatory therapies). The vitiated vatha circulates throughout the body in abnormal directions (vimargagamanam) and gets obstructed by the vitiated raktha. The doshas get dislodged mainly on distal joints of feet and hands of persons who are accustomed to a sedentary lifestyle (achankramana sheelinam, yaanayaanaadyai pralambau).

Initially, there is debility and looseness of the body along with itching and feeling of pain, heaviness and numbness over all major joints in an on and off pattern (bhoothwa bhoothwa pranashyanthi muhuraavirbhavanthi cha). When the doshas are residing in twak and maamsa symptoms like skin rashes are manifested. When doshas gradually affect asthi and majja, it leads to the erosion and degeneration in bone causing severe pain and inflammatory changes in the joints resulting in contractures, bone deformities, length discrepancies leading to laming (karothi khanjam pangu).

Allopathic management of JIA includes NSAID (Non Steroidal Anti-inflammatory Drugs) as their first line of therapy. Steroids are used as short term management if NSAID doesn't respond. Disease modifying agents like Methotrexate and newer biological agents like etanercept, infliximab etc are other options. Physiotherapy is of utmost importance as a supportive therapy. Ayurvedic management of Amavatha vaydhi is explained as "langhanam swedanam thiktham deepanaani katuni cha I virechanam snehapaanam vasthayashcha aamamaaruthe II" Langhanam (fasting) and swedanam (sudation therapy) are the basic treatments which are similar to the treatment principle of ajeernam with predominance of kapha and vatha respectively which are apt in this condition. Langhanam is one of the best treatments for amadosha. Swedana will help to alleviate the sthabdhatha (stiffness), gouravam (heaviness) which are one of the main symptoms of aamavatha. Rooksha swedanam like valuka swedam, churna pinda swedam are used in this condition. In pitta predominant situations, kashayadhara with pitta-kapha shamana drugs are more suitable. Internal medicines with deepana and pachana guna should be administered. Katu-pachana drugs in kapha dosha predominant conditions and thiktha-pachana drugs in pitta predominant conditions. Oushadhas such as Rasnasapthaka kashaya, Rasnapanchaka kashaya, Yogaraja guggulu, Simhanada guggulu, Vaishwanara churnam, Bhaagothara churnam, Panchakola churnam Eranda thailam prayogam etc are few drug of choice for internal medication. Virechanam considered as the best remedy to eliminate vitiated pitta-kapha doshas and through samyak virechana karma (appropriate purgation therapy) proper movement of vatha dosha (maruthasya anulomatha), improves digestive capacity (kayagneshcha anuvarthanam) and provides clarity of channels (shrotho vishudhi) may be attained. Here snehapaanam is generally contra-indicated but in this context we should adopt thaila preparations which are generally Vatha-kapha hara in property and snehas having shrothoshodhana property. In amavata both anuvasana as well as niruha basti are recommended. Anuvasana basti removes the rukshata of the body caused by deepana and pachana measures to remove the ama and control the vata by snehana guna. It maintains the function of agni and nourishes the body. Anuvasana vasthi using Saindhavadi thailam is advised and Kashaya vasthi such as Vaitharana vasthi which are rooksha in nature, helps to eliminate kapha-ama doshas, does srotho-shodhanam (cleansing the channels) and will bring back the normal circulation of vatha dosha.

In conditions similar to vatharaktha, treatment principles are different as compared to amavatha vyadhi. Since this a raktha pradoshaja vyadhi, rakthamoksha is also a choice of therapy especially in older children. In the uthana avastha (early stage) when the doshas are twak and mamsa aashritha treatment procedures such as Lepana, Abhyanga, Parisheka and Avagaham are recommended. Warm application of lepanas is advised in Vatha-kapha dosha predominant stage whereas cold applications are more suitable in Pitta-raktha predominance. For lepana, Ellum nishaadi lepam, Griha-dhoomadi lepam may be used. This principle can be adopted in other associated therapies such as abhyanga, parisheka etc. Whereas in gambeera avastha (chronic stage) when the doshas reside in deeper dhathus, shodhana pradhana kriya such as Virechanam, Aasthapanam and Snehapaanam are recommended. Manjishtadi kashayam, Rasnaerandaadi kashayam, Kokilaakshadi kashayam, Kaishora guggulu, Amritha guggulu are few drugs of choice for internal medication. Ksheerabala tailam and Madhuyashtyadi tailam may be used both internally as well as externally. Karaskara ghritham is a wonderful drug for snehapaanam purpose and may also be used in medicated enema therapy.

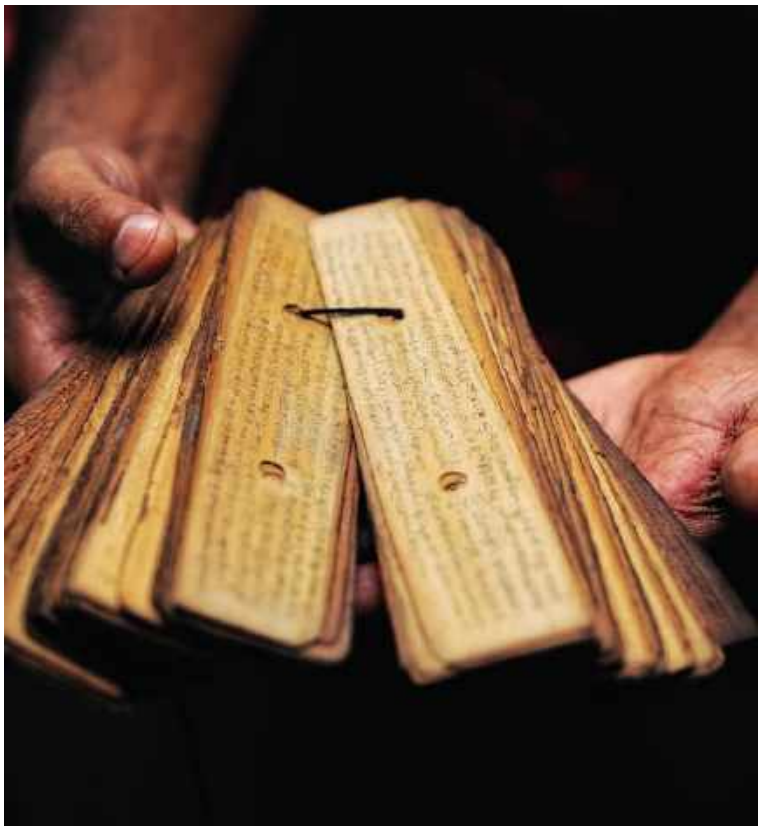
The treatment protocol adopted under Ayurvedic concept by proper understanding of nidanas involved and the doshas and dhathus vitiated, the shrothas involved in the samprapthi gives a precise picture. These understandings help in advising nidana parivarjanam (avoiding the causative factors) and adopting appropriate treatment modalities and medication for sampraapthi vighatanam (breaking the pathophysiology of the condition) which work in tandem to reduce the symptoms. Through proper ayurvedic management, we can definitely reduce the chances of recurrence or remission of this pathology in adulthood in an effective manner.

Dr. Tinku Sasi

ARTHRITIS FACTS

Lepanam or application of Herbal Paste: To reduce arthritic inflammation and reddishness, application of Herbal paste is seen to be very effective. In non-inflamed conditions after applying Lepanam bandage is also done for better results.

JEWELS OF AYURVEDA



Like any other evolving science, Ayurveda also has incorporated the changes demanded by changing regions and times. The vast multitude of universal and vernacular literature in Ayurveda is Indicative of the modifications It has Imbibed over the epochs. Unfortunately, we have lost many of the ancient manuscripts completely or partially due to multiple sociopolitical factors. Adding to the agony, many of the published classic works are also running out of print due to the sparse readership they have. But to retrospect, the path Ayurveda has travelled over centuries, and to take It forward amidst a speculative scientific community, It becomes Inevitable that the Ayurvedic community raises the awareness of Its literary wealth and explore, research and exploit it.

This is the background where the column, “Jewels of Ayurveda literature”, has taken its origin. This column is aimed at familiarizing the readers with various works in Ayurveda, that are less read, forgotten, or unavailable. The column would comprise of the advances the particular work has made, in terms of Ayurvedic principles, as well as practice. There would also be explanations these texts give to ideas in the classic texts. Cross-references and similar contents in their contemporary literature available would also be added.

AYURVEDA

Vaidya Karthik K P

From prescription to proscription of cannabis

A Psyche Expedition

Mix

Roll

Trip

“Mix, roll and trip” are three words often heard clandestinely these days because of the proscription of a widely available herb with a narcotic effect. Commonly labelled as marijuana, this drug was used for medical and compassionate purposes throughout the globe. The United Nation declared it in the category of synthetic drug in 1961, followed by illegalization of this herb by several countries across the world.

But deplorably it is the most available and most used illicit drug in this day and age. It is included in 10 classes of drugs causing substance-related and addictive disorder/ substance use disorder as several studies showed addiction on prolonged use. The ill effects on health through addiction was profoundly studied by the majority of health organizations. Several studies have discovered it as a gateway drug to many psychoactive substances including LSD, MDMA, heroin etc. The drug was initially not prohibited in India. However, in 1985, following the trail of other countries, India banned the herb - a herb which served as the backbone for various cultures and traditional medicine.

Cannabis Sativa is popularly known as Indian hemp, with its street names joint, grass, pot, weed, ganja has persisted as a focus of controversy legally, medically and commercially till date.

History of Cannabis Sativa- Indian mythology & Medicine

This large aromatic resinous annual herb with female and male varieties are found wild as well as cultivated in north-west Himalayan ranges and throughout India. The Latin name "Cannabis Indica", later changed to "Cannabis Sativa" indicates that cannabis grows, and is traditionally used in India. The useful parts of the plant are dried leaves and flowering shoots with some narcotic effects. The therapeutic parts of the plant are given unique names. The leaves of male and female plants are named as Bhang, and in certain regions of India the name, Bhang is also used for flowers of the male plant. The name Ganja is given to the flowering tops of the female plant, and Charas is the name for the plant resin. Colloquially, in some parts of India, Ganja is used to denote the cannabis plant as a whole and Bhang is a drink made from Ganja and has ritual importance.

History of cannabis can be traced back to the mythology of Lord Shiva. The first textual reference was noted thousands of years back in Atharva Veda, where it is listed among five sacred plants and signifies it as “guardian angel”. Vedic texts have mentioned its use in Yagna (ritual fire), as a source of happiness and liberation. Other references of Cannabis in the ancient Indian culture can be found in Rig-Veda, Mahabharata and some traditional Indian medical texts.

Ayurveda texts Bhavaprakasha and Dhanwanthari Nighantu explains its quality as kapha hara, pittala, (action on the altering functional elements of body- tridosha), grahi (one which holds), pachini (carminative), laghu-teeksha-ushna (light-sharp and hot in potencies), moda-mada-vak-vahni-vardhini (augment euphoria, intoxication, speech and digestive fire). The synonyms quoted are mainly on its actions, for eg:-madani (intoxicating), Vijaya, jaya (the one which conquers), tandrakrit (causing lethargy) and bahuvadini (causes excessive speech).

There are several therapeutic properties for the cannabis plant explained in Indian medical texts. It ranges from analgesic, digestive, sedative, nervous system stimulant, euphoric, nourishing, aphrodisiac to narcotic. It cures several disorders of body and mind including inflammation of the bladder, skin disorders, wound healing, phthisis, acute psychosis etc. Some traditional and folklore practitioners use Ganja for treating high blood pressure, ensuring digestion and stamina for prolonged work. The cannabis has proved to be effective in palliative care of cancer treatment, nausea in patients undergoing cancer chemotherapy and stimulating appetite in patients with AIDS. Patients who use cannabis medically report that it is as effective, if not more, than opioid-based medications for pain. Clinical trials on medical marijuana are being undertaken in many countries. Apart from these, hemp plant serves as vital raw material for body care products, food supplements and plastic industry around the globe.

Cannabis on brain and mind- anatomical, physiological and pathological perspective Psyche or mind is recognized by the thoughts and behaviours living beings possess as a result of complex chemical reactions inside the master organ, the brain. From many ancient seers of philosophy and medical science to eminent modern scientists have explored the functioning of mind and put forward several hypotheses. It is so fascinating and mystical that none of these works seems to be complete. The main psychoactive chemical in marijuana, responsible for most of the intoxicating effects that people seek, is delta-9-tetrahydrocannabinol (THC). The plant also contains more than 500 other chemicals, including more than 100 compounds that are chemically related to THC, called cannabinoids (CBD). The impact of marijuana depends upon the dose and potency of THC and CBD, which have very different effects on the mind. THC produces feelings of euphoria, can engender paranoia and anxiety, and has addiction accountability. CBD does not have these effects and has more therapeutic potency.

The mind-altering function of marijuana activates the brain reward system. The reward centres in the brain are activated by the neurotransmitter dopamine. This gives a pleasant reward feeling, euphoria and relaxation and thus induces craving. THC’s chemical structure is similar to the brain chemical N-arachidonoylethanolamine (AEA) also known as anandamide, a fatty acid neurotransmitter. The name is derived from the Sanskrit word Ananda, which means joy, bliss, delight. This similarity enables attaching to cannabinoid receptors in different brain areas and activates them, disrupting various mental and physical functions. THC can alter the functioning of the hippocampus (part of the emotional brain) and orbitofrontal cortex, thus enabling a person to form new memories and shift-attentional focus. The functioning of the cerebellum and basal ganglia that regulate balance, posture, coordination, and reaction time are also disrupted. The increased sexual arousal is the result of altered functions of Hypothalamus and pituitary. Altered medulla function results in sleep variations.

Adverse reaction on brain and mind by long terms use of marijuana

The presence of THC can cause a transient effect called intoxication in which consciousness, thinking, perception and behaviour are altered. Further, this can lead to addiction and dependence to the drug, thus hindering the personal, social and professional life. Tolerance is developed when receptors in the brain show less sensitivity to the drug and more dose is needed for activating it. Specific withdrawal symptoms may also develop on the sudden stoppage or lowering doses. The high potency of the drug, prolonged use or inexperience can cause anxiety, fear, acute psychosis and loss of self-identity instead of relaxation and euphoria. In larger doses, they induce coma or death from cardiac failure. Numerous Animal studies have revealed the difficulty in learning and memory, cognitive impairments, structural and functional changes in the hippocampus and altered reward system. Whereas Imaging studies showed altered connectivity, reduced brain volume of areas involved with memory, learning and impulse control. Clinical trials on profound marijuana use have found cognitive impairment, Coronary artery risk development, the difference in IQ, memory impairment, acute psychosis.

Ayurveda outlook on treatment

The treatment in Ayurveda focuses on retaining and regaining health by balancing the Tridosha (functional elements). The unique concept of agglomeration of body, mind and soul paves a strong basement for treating disorders at the grass-root level. The intoxication and addiction disorders in Ayurveda are explained broadly under Madatyaya. It addresses the psychological, biological and environmental base of addiction.

Cannabis addiction can cause vitiation of pitta along with prana and vyana vata as it alters the mind and central nervous system. Prolonged use can result in impairment of dhathu (basic constituents of the body) and vitiate ojus, the vital energy of the living. Use of processed clarified
butter in larger doses, followed by fomentation therapy and evacuative regimen can restore the balance of vitiated doshas. External therapies which help in restoration of mind and CNS are advocated. Rasayana in the form of medhya (nootropic) can be adopted for restoring Ojus.

Psychotherapy in Ayurveda also plays a major role in augmenting the mental faculties thus reducing craving and dependence.

Conclusion

There are 27 countries where cannabis use is legal. Most of the countries have banned its recreational use except 11 of them including Canada. It is flummoxing that despite the strong cultural and medical principles kept on the drug, India has marked it under illicit use and can face a few years of imprisonment as a penalty. A few reforms are made in India for legalizing medical use. Small-scale cultivation in Uttarakhand is sanctioned. Notable changes are found as the first medical cannabis clinic in India is said to be commenced in 2020. It is the need of time for research and development in India on the health, business and societal benefits of cannabis. Considering the therapeutic values and fewer withdrawal symptoms compared to other narcotic drugs, cannabis is a potential medicine unless misused. Adverse effects can be grave on prolonged use. Judicious use of cannabis as medicine under prescription will change the visage of many interventions including pain management, palliative care and mental disorders.

Dr Archana Madhavi

Following the Ayurveda lifestyle after considering the Prakriti of the individual, reduces the chance of Rheumatic Arthritis flare-ups. Ayurveda medicines and treatments and practice of yoga is beneficial for people with RA.

ARTHRITIS WITH SPECIAL REFERENCE TO KNEE JOINT

WHAT IS ARTHRITIS?

The swelling and tenderness of one or more of your joints. The main symptoms of arthritis are joint pain and stiffness, which typically worsen with age. The most common types of arthritis are osteoarthritis and rheumatoid arthritis

WHAT ARE ITS SYMPTOMS?

- Pain
- Stiffness
- Swelling
- Redness
- Decreased range of motion

SOME FAST FACTS

- Arthritis refers to around 200 rheumatic diseases and conditions that affect joints, including lupus and rheumatoid arthritis.
- It can cause a range of symptoms and impair a person’s ability to perform everyday tasks.
- Physical activity has a positive effect on arthritis and can improve pain, function, and mental health.
- Factors in the development of arthritis include injury, abnormal metabolism, genetic makeup, infections, and immune system dysfunction.
- Treatment aims to control pain, minimize joint damage, and improve or maintain quality of life. It involves medications, physical therapies, and patient education and support.

PECULIARITIES OF KNEE JOINT

The knee joint is the largest joint in the human body, and the joint most commonly affected by arthritis. The knee joint is a hinge joint, meaning it allows the leg to extend and bend back and forth with a minimal side-to-side motion. It comprises bones, cartilage, ligaments, tendons, and other tissues

Three bones meet and move against each other at the knee joint:

- The bottom of the femur (thigh bone) meets with the top of the tibia (shin bone)
- The patella (kneecap) glides along a groove located at the bottom and front of the femur

ARTICULAR CARTILAGE

Articular cartilage covers the surfaces of the bones where they meet: at the bottom of the femur, the top of the tibia, and the back of the kneecap. Articular cartilage is an extremely slippery, strong, flexible material. The Articular cartilage serves two purposes:

- It allows the bones to glide over each other as the knee bends and straightens
- It acts as a shock absorber, cushioning bones against impacting each other (e.g. during walking)

Articular cartilage also stores synovial fluid, a sticky & viscous fluid that lubricates and circulates nutrients to the joint. When the joint is at rest, the synovial fluid is stored in the articular cartilage much like water is stored in a sponge. When the joint bends or bears weight, the synovial fluid is squeezed out, helping to keep the joint lubricated and healthy.

When cartilage is damaged, the bones may rub and grind against one another at the joint, causing friction

HOW CARTILAGE DEGENERATION OCCUR?

- Injury
- Wear-and-tear over time that can eventually lead to osteoarthritis
- Diseases, such as rheumatoid arthritis or ankylosing spondylitis

HOW DOES DAMAGED CARTILAGE CAUSE PAIN?

Cartilage does not contain nerves, so damaged cartilage itself does not cause pain. However, the friction between the joint's bones and other resulting abnormalities (such as bone spurs) can cause discomfort and pain as well as inflammation.

DOES DAMAGED CARTILAGE EVER HEAL?

Because it does not contain blood vessels, cartilage does not heal itself well. When cartilage has become thinned or damaged, a limited amount of new cartilage may be produced, but the new cartilage cells will grow in irregular, bumpy patterns. The result is that the bones may rub and grind against one another at the joint and this can be a source of pain.

ARTHRITIS IS PRONE TO KNEE

- Osteoarthritis
- Rheumatoid Arthritis
- Gouty arthritis
- Septic Arthritis

WHAT IS MEANT BY OSTEOARTHRITIS?

Osteoarthritis is the most common type of arthritis that affects the knee. Osteoarthritis is a degenerative process where the cartilage in the joint gradually wears away. It often affects middle-age and older people.

Osteoarthritis may be caused by excess stress on the joint such as repeated injury or being overweight. It involves wear-and-tear damage to the joint's cartilage — the hard, slick coating on the ends of bones where they form a joint. Cartilage cushions the ends of the bones and allows nearly frictionless joint motion, but enough damage can result in bone grinding directly on bone, which causes pain and restricted movement. This wear and tear can occur over many years, or it can be hastened by a joint injury or infection.

Osteoarthritis also affects the entire joint. It causes changes in the bones and deterioration of the connective tissues that attach muscle to bone and hold the joint together. It also causes inflammation of the joint lining.

RHEUMATOID ARTHRITIS

Rheumatoid arthritis is a disease that primarily affects the lining of the joint. An important feature of this inflammatory illness is that the body’s immune system targets its tissue as an enemy. In rheumatoid arthritis, the body's immune system attacks the lining of the joint capsule, a tough membrane that encloses all the joint parts. This lining (synovial membrane) becomes inflamed and swollen. The disease process can eventually destroy cartilage and bone within the joint. Joint swelling over a long period can lead to deformity and loss of function in the joint. Because rheumatoid arthritis affects the entire body, many people also experience fatigue, fever and a general sense of feeling unwell. Rheumatoid arthritis can also affect the knees by causing the joint to become inflamed and by destroying the knee cartilage. Rheumatoid arthritis often affects persons at an earlier age than osteoarthritis.

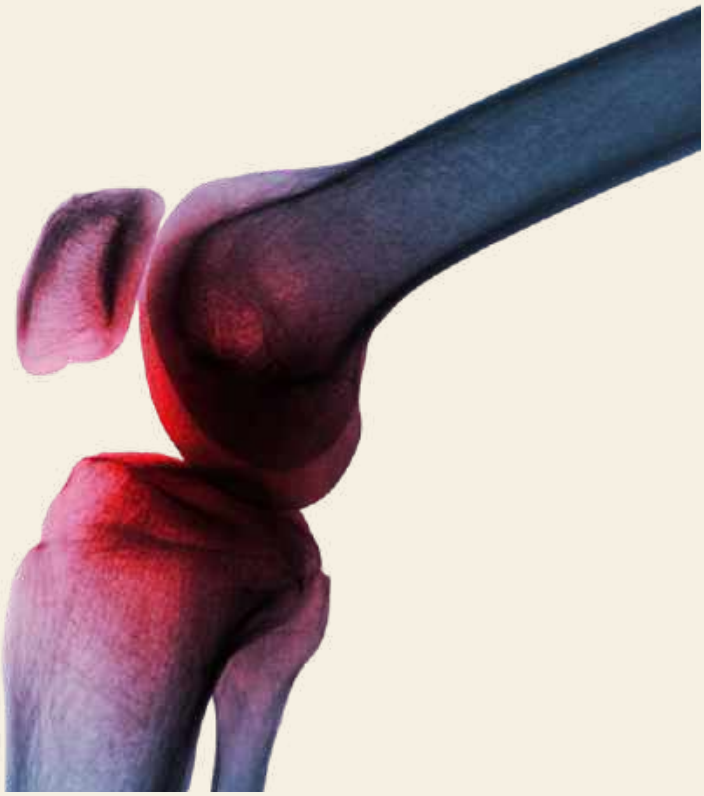
GOUTY ARTHRITIS

A gout is a painful form of inflammatory arthritis that usually affects the big toe but can develop in any joint, including one or both of the knees. It forms when the body has high levels of uric acid. This acid forms sharp crystals that cause sudden bouts of pain, swelling, and tenderness.

SEPTIC ARTHRITIS

Septic arthritis is a painful infection in a joint. The infection can come from germs that travel through your bloodstream from another part of your body. Septic arthritis can also occur when a penetrating injury delivers germs directly into the joint. Infants and older adults are most likely to develop septic arthritis. Knees are most commonly affected, but septic arthritis can also affect hips, shoulders and other joints. The infection can quickly and severely damage the cartilage and bone within the joint, so prompt treatment is crucial.

Treatment involves draining the joint with a needle or surgically. Antibiotics also are usually needed to treat the infection.



WHAT ARE THE RISK FACTORS OF ARTHRITIS?

1. Family history: Some types of arthritis run in families, so there may be more chance to develop arthritis if parents or siblings have the disorder. Such patients' genes can make them more susceptible to environmental factors that may trigger arthritis.
2. Age: The risk of many types of arthritis, including osteoarthritis, rheumatoid arthritis and gout, increases with age.
3. Sex: Women are more likely than men to develop rheumatoid arthritis, while most of the people who have gout, another type of arthritis, are men.
4. Previous joint injury: People who have injured a joint, perhaps while playing a sport, are more likely to eventually develop arthritis in that joint.
5. Obesity: Carrying excess pounds puts stress on joints, particularly your knees, hips and spine. People with obesity have a higher risk of developing arthritis.

COMPLICATIONS OF ARTHRITIS

- Difficult to do daily tasks.
- Discomfort in walking or sitting up straight.
- Joints may become twisted and deformed.

DO'S

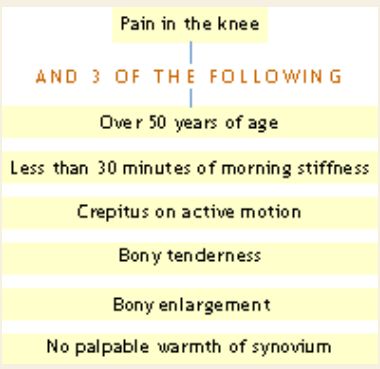
- Keep joints moving
- Use good posture
- Know limits, avoid exertion
- Manage weight
- Quit smoking

DON'TS

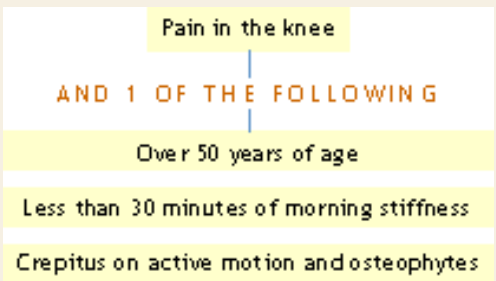
- Running & jumping
- Tennis
- High-impact aerobics
- Repeating the same movement, such as a tennis serve.

HOW TO DIAGNOSE OA WITH ACR CRITERIA:

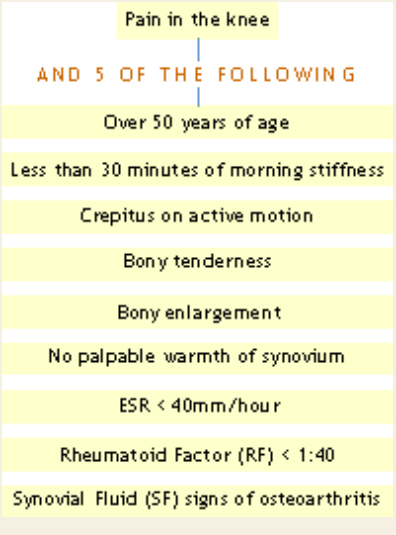
With history and clinical findings



With history, clinical findings and laboratory findings

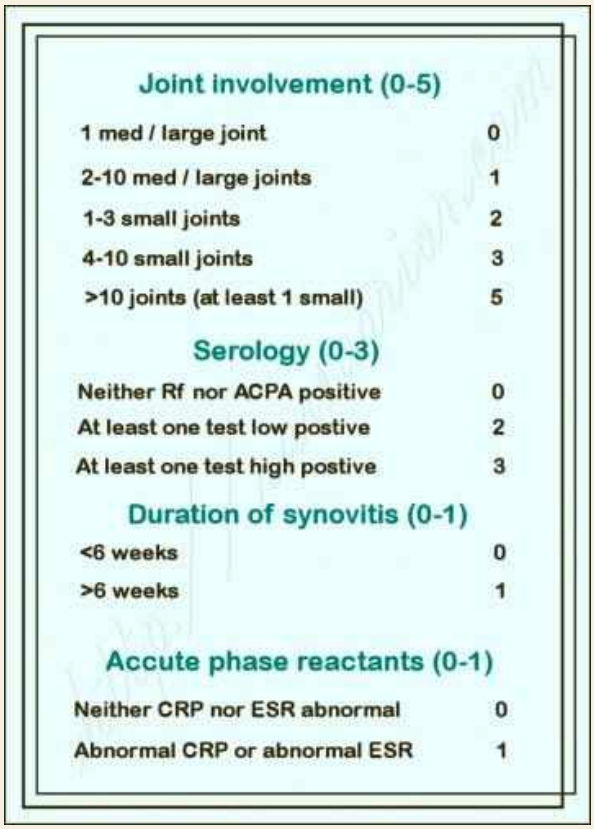


With history, physical examination and laboratory findings



WHAT IS ACR/EULAR CRITERIA FOR RA?

Above or equal to 6 calculated using this criteria is considered as confirmation for rheumatoid arthritis.



Joint involvement (0-5)	
1 med / large joint	0
2-10 med / large joints	1
1-3 small joints	2
4-10 small joints	3
>10 joints (at least 1 small)	5
Serology (0-3)	
Neither Rf nor ACPA positive	0
At least one test low postive	2
At least one test high postive	3
Duration of synovitis (0-1)	
<6 weeks	0
>6 weeks	1
Accute phase reactants (0-1)	
Neither CRP nor ESR abnormal	0
Abnormal CRP or abnormal ESR	1

HOW CAN WE DIFFERENTIATE KNEE OA & RA RADIOLOGICALLY

- Space reduction is symmetric in RA, asymmetric in OA.
- Osteophyte formation seen in OA
- Osteoporosis seen in RA

WHAT IS THE PROGNOSIS OF ARTHRITIS IN KNEE JOINT

Early diagnosis and proper management is the key point in the prognosis of arthritis affecting a weight bearing joint. Living with arthritis includes following points

- Healthy eating
- Regulated exercise joint care
- Maintain proper weight
- Occupational therapy

WHAT IS KOCHER'S CRITERIA FOR SEPTIC ARTHRITIS?

Points	Likelihood of Septic Arthritis
0	0.20%
1	3%
2	40%
3	93%
4	99%

Kocher Criteria	No (0 points)	Yes (1 point)
Non-Weight Bearing	□	□
Temp > 38.5° C (101.3° F)	□	□
ESR > 40 mm/hr	□	□
WBC >12,000 cells/mm^3	□	□

WHAT IS THE AYURVEDIC MANAGEMENT PROTOCOL FOR ARTHRITIS

- Amahara , Jwarahara, Sophahara management initially.
- Change to internal sneha prayoga after checking upasaya (NB. avoid external taila prayoga)
- Rasayana to maintain the result obtained.
- Yoga and Rehab to strengthen affected joints

WHICH ARE THE COMMON AYURVEDIC MEDICATIONS USED IN ARTHRITIS MANAGEMENT?

As per the condition of the patient, it may differ. Commonly used Kashaya include

Amrutothara, Pachanamruta, Rasnapanchaka, Punarnavadi, Chinnodbhavadi, Rasnerandadi, Dasamoolarasnadi etc. *Guggulu* preparations are included along with *kashaya* as *prakshepa*. Usage of various *Toya* with indigenous drugs give added benefit. For example, use of *Guluchi, Punarnava and Nagara* etc. Usage of *Eranda tailas* are very specific in the reduction of *ama, sopha and soola* due to arthritis. External application of medicinal usage should be wisely monitored to avoid flare up.

Dr. Gikku Alias Benny

NALIKA PUPA / MEDICINAL PUTTU

Easy & Healthy Recipie

Puttu is a widely favoured traditional breakfast relished across Kerala. An easy to cook and wholesome recipe when added with medicinal herbs provides therapeutic benefits too.

1. **Kuthari: 500gms**
2. **Ghee: 2 teaspoon**
3. **Jeera (Cumin): 1 teaspoon**
4. **Shredded coconut: 200gms (2 cups)**
5. **Salt: As required**
6. **Palm Jaggery: As per one's taste (Optional)**
7. **Water/ Milk: As required**
8. **Medicinal Herbs: 20gms each (Can be chosen according to the availability)**

Kuthari can be substituted with wheat flour for persons with diabetes

Preperation:

- Wash and soak Kuthari in water for 6 hours. Drain out the water completely.
- Grind the soaked rice, jeera and the medicinal herbs in a blender to make rice flour and sieve it to get fine rice flour
- In an empty skillet, get the rice flour fried lightly for about 5 minutes till the dampness of the rice flour goes.
- Add Ghee to the flour.
- Adding Palm jaggery to the Puttu depends upon one's taste and choice.
- Add salt as required and knead the flour using water or milk thoroughly.
- Steam the flour in steam pot layering it with shredded coconut.
- Cook for 5 - 7 minutes

Medicinal Value:

- Kuthari has high fibre content and a low glycaemic index compared to polished white rice. It is also high in magnesium and vitamins A and B.
- With the goodness of medicinal herbs, this recipe has a therapeutic and restorative effect, especially in urogenital disorders.

S. No.	Botanical Name	Sanskrit Name	Malayalam Name	Part Used	Medicinal Properties
1	Biophytum sensitivum	*Viparitha lajjalu*	*Mukutty/ Teendanaazhi*	Aerial parts	Anti hemorrhagic, insulinotropic, expectorant, stimulant and tonic
2	Aerva lanata	*Bhadra*	*Cherula*	Aerial parts	Diuretic, anthelmintic, demulcent, anti diabetic, vermifuge
3	Vernonia cinerea	*Sahadevi*	*Poovankurinji*	Aerial parts	Antipyretic, antihelmintic, antibacterial, antiviral, antifungal, anti-inflammatory, diuretic, and stomachic
4	Eclipta prostrata	*Bhringaraja*	*Kaiyunni*	Shoots, Leaves	Enhance Basal metabolic rate, liver metabolism. Hepato protective and blood purifier
5	Cissampelos pareira	*Laghu Pata*	*Malathangi / vatta valli*	Leaves	Used in the treatment of venereal diseases and heart complaints. Vasodilator, anticancer properties
6	Azima tetracantha	*kundali, trikantajata*	*Yasank/ Shankhukuppi*	Leaves * Remove the thorns before use	Antimicrobial, expectorant, analgesic, anti-inflammatory, hepatoprotective, nephroprotective
7	Curculigo orchioides	*Musali*	*Nilappana*	Leaves	hepatoprotective, immunostimulant and antioxidant activities

Dr Reshmi M Nair

ARTHRITIS FACTS

WHO has recognised Ayurveda as a complete system of natural medicine. The first-ever study of a traditional medical system sponsored by WHO, was of Ayurvedic treatment for Rheumatoid Arthritis, conducted in collaboration with the Indian Council for Medical Research (ICMR) and the Ayurvedic Trust, Coimbatore. This study indicated the Ayurveda system is safe and effective for RA, without any side effects.

INVESTIGATION IN

Hepatobiliary Disorders

Dr. Nidhin Valsan

Hepatobiliary disorders include a group of diseases of the Liver and biliary system caused by viral, bacterial and parasitic infections, neoplasia, toxic chemicals, alcohol consumption, poor nutrition, metabolic disorders and cardiac failure. In this article, we will have a look at Liver function tests indicated in hepatocellular necrosis, cholestasis and biosynthetic functions of the liver, and also look at the indications for liver biopsy in this article. A carefully taken history and physical examinations are equally important.

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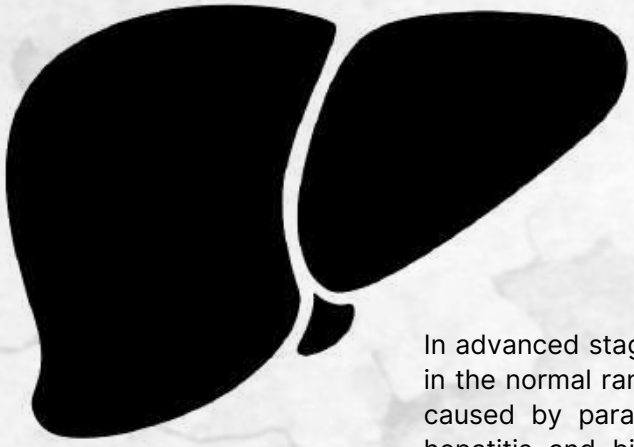
MARKERS OF HEPATOCELLULAR NECROSIS



Aminotransferases like Aspartate aminotransferase (AST/SGOT) and Alanine aminotransferase (ALT/SGPT) are sensitive indicators of hepatocellular injury. ALT/SGPT is primarily found in the liver while AST/SGOT is found in the liver, myocardium, skeletal muscles, pancreas, kidney and brain. Hepatocellular injury leads to leakage of these enzymes into circulation.

In advanced stages of fibrosis or cirrhosis serum level of Aminotransferases can be in the normal range. The highest value of ALT/SGPT is seen in acute toxic injury as caused by paracetamol overdose followed by acute viral hepatitis. In alcoholic hepatitis and biliary obstruction serum transferase levels are usually less than 300U/L. In acute cases of biliary obstruction however, these values may go up transiently. These values, however, come down rapidly in case of biliary obstructions.

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In case of raised values of aminotransferases, depending on clinical impression perform the following investigations as well:

- Viral hepatitis: Serology for hepatitis A, B, C and E
- Autoimmune markers like ANA
- Metabolic: Serum Ceruloplasmin, ferritin, etc
- Investigations for Alcoholic and non-alcoholic liver disease
- Coeliac disease: Anti TTG

Another important point to look for is the relative levels of SGOT/SGPT ratio.

1. SGOT/SGPT ratio < or = to 1 indicate acute hepatocellular injury with an exception of alcoholic hepatitis. In alcoholics, without liver disease and patients with Non-alcoholic fatty liver disease, the value will usually be < 1
2. SGOT/SGPT ratio > or = 2:1 or 3:1 is highly suggestive of alcoholic liver disease. A lower level of SGPT than SGOT in patients with alcoholic liver disease is due to Vit B6 deficiency and poor nutritional status of these patients. The value of SGPT however never exceeds more than 300U/L
3. SGOT/SGPT value > 1 is also seen in patients with cirrhosis due to any cause and in Wilson's disease.

MARKERS FOR CHOLESTASIS

Cholestasis is the reduced flow of bile due to liver infection, gallstones or pancreatic cancer. Alkaline phosphatase, 5'-nucleotidase and GGT are markers of cholestasis.

Alkaline phosphatase or ALP is produced in small amounts in the liver but most notably in osteoblasts. Its value is physiologically elevated in children and adolescents during the period of rapid bone growth and pregnancy. It may rise after a fatty meal, hence must be checked in fasting. If the values of GGT, 5'-Nucleotidase are normal, evaluate for non-hepatic causes. If these values are also raised, perform abdomen USG or CT. Look for causes for intra/extra-hepatic cholestasis.

In biliary obstruction, the rise in 5'Nucleotidase may lag behind elevations in ALP and GGT. Serum bilirubin level is an indicator of prognosis in parenchymal liver diseases. The higher the level, the worse the prognosis. Liver disease is associated with elevated serum level of conjugated bilirubin. It has to be noted that this elevation usually does not occur until the liver has lost 50% of its excretory capacity. In familial defects of hepatic excretory function such as Dublin Johnsons and Rotors syndrome, there can be isolated conjugated bilirubinaemia without any abnormality in other routine lab tests. Unconjugated hyperbilirubinemia may happen as a result of conditions like hemolysis, ineffective erythropoiesis, muscle injury or conjugation defects like Gilbert syndrome. Urinary bilirubin is also helpful in identifying liver diseases. Only conjugated bilirubin is filtered through the kidney. Therefore any bilirubin found in urine is conjugated bilirubin and its presence implies conjugated hyperbilirubinaemia and liver disease.

MARKERS FOR BIOSYNTHETIC FUNCTION

- **Prothrombin time (PT)**

In acute and chronic hepatocellular disease PT may be considered a prognostic indicator. Prolonged PT is also suggestive of poor long term outcome in chronic liver disease. If PT returns to normal or improves by at least 30% within 24hrs of a single injection of VIT K, it suggests parenchymal function is good and hypovitaminosis K was responsible for prolonged PT. So marked prolongation of prothrombin time not corrected by Vit K indicates hepatocellular disease.

- **Activated Partial Thromboplastin Time (aPTT)**

It is the time in seconds that's required for a clot to form in citrated or oxalates plasma. It is a performance indicator of both the intrinsic & pathways. Increased aPTT has seen in Patients on Heparin Therapy, Von – Willebrand's disease, Disseminated Intravascular Coagulation, early Stage liver failure/ Wilson's disease and along with Haemophilia.

- **Albumin level**

Serum albumin is synthesised exclusively in the liver. Low level of serum albumin is common in chronic liver disease such as cirrhosis and usually indicates advanced liver diseases

PROGNOSTIC INDICATORS IN LIVER DISEASES

Child -Turcotte-Pugh (CTP) scoring and Model Of End-Stage Liver Disease(MELD) are the utilized models for determining prognosis in liver disease. CTS scoring system utilises the parameters of bilirubin, Albumin, prolonged prothrombin time, INR along with two clinical parameters of ascites and hepatic encephalopathy to determine overall liver function and prognosis. A CTP score of more than 7 indicates a decompensated liver with cirrhosis. This is one of the criteria for listing the patient for a liver transplant. MELD is a better-suited model with three variables of serum creatinine, serum bilirubin and INR. Currently, this is in practice for selecting patients for allocation of cadaveric livers for transplants.

LIVER BIOPSY

It is the ultimate and most specific investigation for assessing the nature and severity of the liver disease. Liver biopsy is indicated in situations like grading and staging of liver diseases, unexplained hepatomegaly, hepatocellular diseases of unknown aetiology, pyrexia of unknown origin and to assess the effectiveness in treatment for liver disease.

Advancements in medical science and imaging studies have also emerged which aid in diagnostic, therapeutic and prognostic understandings of liver diseases. A good approach will be to utilise the information gathered from investigations and imaging to good use for the diagnosis and management of the patient.

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