A STUDY ON

MUZHANKAAL VAATHAM

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Department of Noi Nadal
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INTRODUCTION

The tremendous advancements made in the field of basic sciences namely physics, physical chemistry, chemistry, organic chemistry, electromagnetism and other varied fields of specialties have strengthened the basis of modern medicine. Modern medicine heavily depends upon the gross, material (molecular) aspect of the vital processes, which are involved in maintaining the pulsating life.

In contrast to this, the great Siddhars who have established the siddha medicine have emphasized the greater importance of recognizing the subtle and causal aspects of all vital processes. This they did, because they wanted to have a complete and précised understanding of the gross, subtle and causal forces and powers that are at play in the living organism.

Without such a total grasp of vital process, it is not possible to understand a state of affairs that are found in health and disease. If subtle and causal aspects are excluded, our knowledge will be partial, and approach will be piecemeal. That is why Siddhars solidly recognized three bodies, namely gross body, subtle body and causal body. Interestingly, they also explained five
Koshas (Annamaya kosham, Manomaya koham, Pranamaya kosham, Vignnaanamaya kosham and Anandamaya kosham). This establishes the fact that human body is not merely a machine. But human being is composed of different dimensions namely physical, mental, supra-mental and spiritual which all should work in harmony. So that perfect health is maintained. In short, the Siddhar’s thoroughness and extraordinary knowledge that proceeded from the metaphysics of ancient India which is eternal.

Siddha means “Wisdom”. Siddhars knew Cosmo-genesis (Pirabhanja urpathi) and explained them and also proclaimed that the macrocosm and microcosm are one at the real basic level.

This led to the understanding of the position of man in this universe and his relationship with it.

This goal of Siddhars was to achieve a perfect state of health by converting the mortal body into an immortal one (Kaaya siddhi) and also to merge with Godhood which they called the “MUKTHI” i.e. real release from the cycle of birth and death. They were able to convert their body into light or
space as they deemed fit. They lived in the immortal body till their purpose is fulfilled for the sake of fellow human being. Then they vanished from the world and merged in the glory of god.

All the things in the universe and also man are made up of pancha-boothas in their gross state as well as in the subtle state. In the siddha system of medicine, all vital processes (physiological, biochemical-metabolic) have been classified under three functional heads namely VALI, AZHAL, IYYAM (vaatham, pitham, kabam) these are called three Uyir-thaathukal. It is interesting to note that one and the same basic uyir-thaathu differentiates itself into three functional divisions-Vali, Azhal, Iyyam (VAI). The meaning of Uyir-thaathu is the route cause and basis of life.

The Siddhars even gave a mathematical formula that VAI exist in a ratio namely $1:1/2:1/4$. If this equilibrium is maintained, then perfect health is maintained. If this equilibrium is altered by vitiation or excitation of one or more of the above mentioned three, then disease results.

“Doctors of medicine deem that, as indicated by pulse,

Flex, bile and phlegm, in excess or short, cause disease”

---Thirukkural.941
Thus the cause of good health and cause for disease have been well defined. Only thing is that they considered all the vital processes in the three functional patterns, i.e. VAI.

The VAI in healthy state are called as Uyir-thaathus, and in the vitiated state are called three-dhoshams (thirthosham). This three have the pancha boothaic components given below.

**ARUSUVAI:**

- Sweet: Earth element + Water element
- Sour: Earth element + Fire element
- Salty: Water element + Fire element
- Bitter: Space element + wind element
- Pungent: Wind element + fire element
- Astringent: Earth element + Wind element
The significant of taste is that it not only gives a clue to the pancha bootha makeup but also the VEERIUM of a particular substance, all of which decide the medicinal properties of the substance. They are the potential properties which either aid or vitiate the three VAI. It should be mentioned that the body constitution (Yaakkai) is also defined and described on the basis of Vali, Azhal, Iyyam as three major body types and “Dwandha”-combination recombination of body constituents. These three thaathus VAI function in the seven Udal thaathukal and also in the subtle dimensions of mind, buddhi, siddham, ahankaaram (Antha karanam-4).

The Pulse reading (Naadi) forms the main diagnostic mode of Siddha medicine. Again this Naadi characteristic is also based on Vali, Azhal, Iyyam. All the diseases are brought under the three major divisions of Vali, Azhal, Iyyam as well as combination and recombination types.

The Siddha system is unique in that it recognizes disease conditions individually as well as in strict reference to the three-doshas principle. All diagnostic modes are designed to take into serious consideration the symptoms, signs, characteristics of the diseased conditions and rationally evaluate them in strict accordance with the three-dhosha principle.
The Siddha medicine also reveals its thoroughness of understanding the pathological states by advocating the eight fold evaluation (En vagai thaervugal). This important procedure forms the diagnostic methodology in investigating the disease, by examining the following eight categories i.e. Tongu (Naa), Complexion (Niram), Speech & Voice (Mozhi), Eye (Vizhi), Pulse reading (Naadi), Touch sensation (Sparisam), Faeces (Malam) and Urine (Moothiram). This was systematized from earliest times as evidenced by the Siddhars like Thaeraiyar and others. Similar diagnostic method is also found in Ayurvedha in the name “Asta sthaana pareeksha”. It should be mentioned that advanced research finding in all fields of sciences only strengthen the basic siddha concepts.

The Siddha system is first to recognize health as a perfect state of physical, psychological, spiritual and social components of human being.

“One that cures physical ailment is medicine

One that cures psychological ailment is medicine

One that prevents ailment is medicine

One that bestows immortality is medicine”

-Thirumoolar.
Siddha medicine is a perfect science and also has incorporated arts, science, philosophy, ethics and yoga. In olden days, a siddha physician was a highly evolved spiritual being and had an in-depth knowledge about three biological humors, eight-fold diagnostic methods, geographical and seasonal variations.

The great principles of siddha have to be explained in terms of modern science in order to gain the recognition and also to rediscover the truths. So in the present dissertation, an integrated attempt is made by considering both siddha aspects and corresponding modern medical aspects.

In the present dissertation, “MUZHANKAAL VAATHAM” which is one of the commonest degenerative diseases of loco-motor system is taken up for study. The pathological aspects of MUZHANKAAL VAATHAM are analyzed on the basis of siddha concepts namely, cause of disease, diagnostic methods and factors influencing this condition.
SIDDHA PHYSIOLOGY

Basically the anatomical, physiological and pathological view of the human body in siddha system abruptly differs from modern conventional medicine.

Anatomical view $\Rightarrow$ body – mind – soul

Physiological view $\Rightarrow$ Tri – humors theory

- Vali
- Azhal
- Iyyam

Pathological view $\Rightarrow$ Thri-dosha theory

- Disequilibrium of Vali
- Disequilibrium of Azhal
- Disequilibrium of Iyyam.

The ancient Siddhars clearly depicted, the human body have the reciprocal relations of

**PARABRAMA $\Rightarrow$ PANCHAPOOTHAS $\Rightarrow$ 96 BASIC FACTORS**

(பாப்பாக்களும்) (பாத்தும்) (அருப்பாக்களும்)

**UDALTHATHUS $\Rightarrow$ AATHARAS $\Rightarrow$ ARUSUVAIHAL**

(உடல்ததும்) (அங்காங்களும்) (அருப்பாக்களும்)

**UYIRTHATHUS**

(உயிர்ததும்)
In terms of etiology, the above indicates

- **Base of the gross physical body** – “Panchapootham”
- **Base of the subtle physical body** - “Tri humors”
- **Base of the soul body (causal body)** - “Parabrama”

**According to Siddhar’s view:**

The 96 Basic Factors are located in the human body in the view of **soul-mind-body** constitution. When the sperm fertilize the ovum, the human embryo have the 96 Basic factors and is developed by the Functioning of “Tri-humors” physiologically.

- Vali Predominant for 33.4 years.
- Azhal predominant for 33.4 years.
- Iyyam predominant for 33.4 years
- 100 years
**Tri-humors Theory:**

Dynamic Force

Vali means (or) Creative Force

(or)

Motivative Force

Azhal means (or) Static Force

(or)

Metabolic Force

Iyyam means (or) “Which hold things together”

(or)

“Provide Substance”

(or)

“Destructive Force”
These three functional energies working in the body through six vital points i.e., called “ATHAARAS”. Six vital points in our body having the capacity of secreting hormonal substances, and these hormonal substances are working in cellular level. That means Vali, Azhal, Iyyam activities. Hence the food products (ARUSUVAIGAL) metabolized, and again three types of humors are formed.

**Metabolic level:**

\[
\text{ARUSUVAIGAL (Food)} \quad \rightarrow \quad \text{Anabolism} - \text{அப்பொன்} \\
\text{} \quad \rightarrow \quad \text{Cell} \quad \rightarrow \quad \text{Metabolism} - \text{அம்மன்} \\
\text{} \quad \rightarrow \quad \rightarrow \quad \text{Catabolism} - \text{கதபொன்}
\]

Finally the humors derived as 1:1/2:1/4
The above lines indicate the importance of pathological and diagnostic knowledge than Drug knowledge.
Origin and Development of the Disease:

Dietary changes  Micro organisms  Suppression of
Reflexes
Seasonal changes  Genetic factors  Immoral activities
Environmental changes  Immunological causes  Social Factors

[Soul – Mind – body]  ↓
Reflected

Anatomical - Pathology  Patho - Physiology  Patho-psychology

In correct “7 Thathus”  In correct “Tri humors”  Incorrect

“Incorrect “Thrigunas”

1. Saaram
2. Senneer  Vali Thosam  Sathuvam
3. Oone
4. Koluppu  Azhal Thosam  Rajotham
5. Enpu
6. Moolai  Iyya Thosam  Thamo
7. Sukkilam  ↓
Disease  V
Diagnosis

Basic causes for pathology are three types.

❖ **Exogenous Causes.**

❖ **Endogenous Causes.**

❖ **Psychological Causes.**

The pathological lesions are reflected as three types.

❖ **Anatomical pathology** ↔ Changes in “7 thathus”

❖ **Patho-physiology** ↔ Changes in “Tri-humors”

❖ **Patho-psychology** ↔ Changes in “Thri-gunams”
**Nature of the Disease:**

Diseases results from complex interaction between man, agent and the environment.

- **Agent**
  - Biological, Nutrient, physical, chemical, mechanical, social agents etc.

- **Man**
  - Demographic characters, Biological, genetic characters, Immunological characters life style changes, social, economical etc.

- **Environment**
  - Seasonal characters (PARUVAKAALAM) - பருவகாலங்கள்
  - Type of Living palces (THINAIGAL) - பல்லவிகள்
  - Astro-climatical, Biological, Psycho-Environmental, etc……

These factors affect the **soul-mind-body** constitution and Reflected as anatomical, physiological and psychic lesions. Hence the patients suffered from Disease and clinical Diagnosis through by 8 fold of Examination in siddha aspect.
Relationship between “7 Thathus and Dhosas”:

Thathus ➔ Denotes structural components.

Dhosas ➔ Denotes functional components.

Gunams ➔ Denotes characteric components.

**UDAL THATHUS:**

When the food materials digested, they are absorbed as saaram.

**7 Thathus:-**

When food enters:

1st day ★ Rasam – Plasma
2nd ✿ Rattham – Blood
3rd ✿ Mamisam – Muscular tissues
4th ✿ koluppu – Fat
5th ✿ Asthi – Bones and cartilages
6th ✿ Majjai – Marrow & Nervous system
7th ✿ Sukilam – Reproductive fluids

If there is any alteration in the process, first Reflected as Vatha Diseases and associated with other two humors like pitha, and kapha respectively.

Because vatha Diseases comes under “Asta Maharogas”.
1) Saaram (Rasam)

Rasam is the essence of Digested food, and circulated all over the body by “Vyana Vayu”. The main Function of Rasam is Nourishing and production of blood.

- **Increased State:**
  
  It indicates provoked Iyyam symptoms like
  
  1. Excessive salivation
  2. Anorexia
  3. Body ache, Cough, Excessive Sleep. etc...

- **Decreased State:**
  
  1. Wasting of muscles
  2. Sound intolerance
  3. Generalized weakness etc.

2) Senneer (Rattham)

Rattham is produced from Rasa thathu. It is responsible for sustenance of life and provides color and complexion to the skin.

**Increased State**

- Haemangiomas
- Splenomegaly
- Leprosy
- Jaundice
- Mental Disorders
Blood disorders

Hyper pigmentation

Decreased State:

- Anaemia
- Dry skin
- Nervous weakness
- Desire for sour foods

3) Oone (mamisam)

It means, they are muscular tissue in the body. It produced from Rattham.

Increased State:

- Tumours
- Carcinoma
- Goitre
- Cyst
- Musculature

Decreased State:

- Wasting
- Dryness
- Cracking sound in joints etc.

4) Koluppu (Medas)

It means, circulated fat (lymph) and Deposited fat (Adipose tissue).
Increased state:

- Associated with mamisam Disorders, like tumours.
- Obesity
- Increased musculature with deposition of fatty tissue.
- Hypercholesterolemia.

Decreased state:

- Wasting of muscles.
- Decreased stability of Hip joint and other joints.
- Lethargy (or) sluggishness.

5) Enpu (Asthi)

It indicates bones and cartilages, and gives the structural framework to the body.

Increased State:

- Hypercalcinosi
- Extra tooth formation.
- Hypertrophy of bone.

Decreased State:

- Osteoporosis
- Rickets

6. Moolai (Majjai)

It denotes Bone marrow, nerves, grey and white matter of central nervous system (Nervous tissue)
Increased State:

- Bone and joint Diseases.
- Ulcers.
- Feeling of heaviness in eyes and body.

Decreased State:

- Demyelination
- Osteomylities
- Delusion
- Giddiness

7) Sukra Thathu (Sukkilam)

It denotes reproductive fluids of both male and female.

Increased State:

- Stone – in urethra
- Increased sexual Desire

Decreased State:

- Impotency
- Infertility
- Weakness
Correlation with Tri-humors:

1. Vali Dhosam - Exaggerated
   - Darkness of motion.
   - Body Pain.
   - Pricking pain.
   - Constipation.
   - Mental Distress.
   - Paralyzed limbs.

2. Azhal Dhosam:
   - Exaggerated
     - Yellowish discoloration of skin,
     - Increased appetite
     - Increased Thirst
     - Burning Sensation.
     - Decreased Sleep

   - Decreased
     - Difficulty in work
     - Impairment of Intelligence.
     - Giddiness.
     - Increased Iyya Symptoms.
3. Iyya Dhosam:

SEASONAL VARIATION (PARUVAKAALAM):

“All three humors Disturbed”

1. Kaarkalam
   (Kaarkalam) → Vali → Aggravated
   (வார்க்களம்) → Azhal → Accumulated
   (சுவர்க்களம்) → Iyyam → Slightly changes

2. Koothirkaalam
   (Koothirkaalam) → Vali → Normal
   (குதிரைக்களம்) → Azhal → Aggravated
   (வுடுப்பிள்ளைக்களம்) → Iyyam → Normal
3. Munpani Kaalam

(எழுவதுக்கு காலம்) ➞ “All are neutralized”
(வாசகமிட்டு, காது)

4. Pinpani Kaalam

(மூடப்படுது காலம்) ➞ Iyyam ➞ Accumulated
(மாறி, பாதல விளக்கு)

5. Elaveanir kaalam

(சிலைத்தோல்வு காலம்) ➞ Iyyam ➞ Aggravated
(சுற்றுலாய், செக்கான்)

6. Muthuvenir Kaalam

(முழுவதோல்வு காலம்) ➞ Iyyam ➞ Normal
(அழுதி, அுய்ம்)

Vali ➞ Accumulated

The routine -- This is happening in our body corresponds with paruvakaalam
Environmental Changes – Living places:

There are 5 types of places in siddha aspect.

1. Kurinchi ➞ Iyyam accumulated, Anaemic fever, abdominal mass may develop.

2. Mullai ➞ Vali Diseases.

3. Marutham ➞ Place for live.


5. Paalai ➞ Place for lot of Diseases.
AIM AND OBJECTIVE

The aim of the present work is to do a realistic contribution to the development of pathological and diagnostic modes of research of the condition “MUZHANKAAL VAATHAM” which is one of the 80-types of Vaatham mentioned in siddha literatures.

This is done in reference to the Udal thathuvam, type of vitiation of three-thathus (VAI) and explore details present in various siddha texts and bring about an ideal definition, aetiology, classification, symptomatology and pathology etc of the disease.

The study also aims at clinically observing the incidence of the disease in relation to age, sex, occupation, dietary habits and other habits.

A sincere trial is made using Envagai thaervugal to find out how far it is useful in diagnosing “MUZHANKAAL VAATHAM”.

If, by this study, the exact pathological state of “MUZHANKAAL VAATHAM” (as a disease entity) is fixed, then it is easy to select the specific drugs from a large number of therapeutic drugs mentioned and available in siddha literature.
INTRODUCTION ABOUT DISSERTATION TOPIC

In siddha medical literatures, the classification and description of the disease conditions under the heading VAATHA NOIGAL numbering about 80 (with slight variations in different texts regarding the number 80) is found in the following sources;

1. YUGI VAITHIYA CHINTHAMANI-800
2. YUGIMUNI VAITHIYA KAAVIYAM-12,000, PART-1
3. THAERAIYAR VAAGADAM
4. AGATHIYAR AYUL VETHAM-1200
5. AGATHIYAR MANI 4000 aka VAITHIYA CHINTHAMAI VENPA-4000
6. SARABENTHIRAR VAITHIYA MURAIGAL-VATHAROGA CHIKITCHAI
7. PARA RAASA SEKARAM –VATHA ROGA NOTHANA CHIKITCHAI

But it is observed that in 80 types of VATHA NOIGAL, the name shows some differences (in terminology). In some texts, the names are identical and in others, total changes of names are observed.
The following is a list of joint related (articular) disease conditions where systemic involvement is also mentioned

1. KAI MUDAKKU VATHAM
2. KAAL MUDAKKU VATHAM
3. MOOTTU VATHAM
4. MUDANGU VATHAM
5. NARITTHALAI VATHAM
6. MUZHANKAAL VATHAM
7. KANAIKKAAL VATHAM
8. PORUTTHU VATHAM
9. SANTHU VATHAM
10. ARAIYIL SANTHU VATHAM
11. SANTHU SOOLAI VATHAM
12. UTHIRA VATHA SURONITHAM
13. PAYITHIYAVATHA SURONITHAM
14. ASTHI VATHAM
15. SOOLAI VATHAM
16. MAEGA VATHAM
17. BRAMAEGA VATHAM
18. MUDAKKU VATHAM
19. SURONITHA SILETPAM
A deep study of the description in verses reveals that, in most of the above disease conditions, besides the joint involvement, other parts of the body are affected leading to a mixed type of symptoms and signs and hence the causative factors.

But, out of the above 18 conditions, about six disease entities, the description and reference is specifically confined to the knee joint or knee joints only. They are;

1. NARI VATHAM

2. NARIT THALAI VATHAM
3. UTHIRA VATHA SURONITHAM

"தமிழ்மொழியில் கல்லூரிய பொருள்கள் தக்கவைத்து பயிற்சியும் பயிற்சிக்
சந்தையும் கையெழுத்துக் கல்லூரியல் நீண்டு திறன் கிளையும் திக்குகையும் கல்லூரியல்
குழுவாப்புக் கல்லூரியக் கட்டளையான வருவம் ரீதியான ஆய்வாலை குறிப்பிட்டுக்
கொள்ள முடிய உலக நேச்சிய மெற்றை இல்லையாளார் ஆர்டிகுலைப்"  
- புத்தி தமிழ் சிற்றகால் 800, பக்கம் 319

4. PAYITHIYA VATHA SURONITHAM

"குருதிகளின்ச் சட்டக்கல்லூரிய மீண்டும் மாணவர்களுக்குரிய பிரிவானது
சார்பியில் துறையைக் குறிப்பிட்டு உயர்ந்தந்த துறையைக் குறிப்பிட்டு கல்வியுள்ளது
சார்பியில் வாழ்த்தவு குறிப்பிட்டு வாழ்த்தவும் குறிப்பிட்டு குறிப்பிட்டு
புத்தியும் சட்டக்கல்லூரிய புத்தியும் சட்டக்கல்லூரிய பல்புறங்கிகள்"  
- புத்தி தமிழ் சிற்றகால் 800, பக்கம் 320

5. MAEGA VATHAM

"மலக்கியில் கல்லூரிய பின்னர் மீண்டும் மாணவர் வந்து
மலக்கியில் கல்லூரிய குறிப்பிட்டு விளையாட்டு
மலக்கியில் மாணவர் வந்து மீண்டும் மாணவர்
மலக்கியில் விளையாட்டு புதுக்ககாலங்கள்"  
- புத்தி தமிழ் சிற்றகால், பக்கம் 197
6. SURONITHA SILETPAM

“...”

7. MUZHANKAAL VATHAM

“In the above cited verses, MUZHANKAAL VATHAM is clearly dealt specifically with the mono-arthritis of knee joint. Moreover, in Tamilnadu MUZHANKAAL VATHAM is a common term used in day-to-day life by people to refer to this condition. Taking into consideration all these factors it is proposed to select the knee joint affliction as the subject matter for the present dissertation.”
Three following books also describe and deal with the same condition;

a) AGATHIYAR AYUL VETHAM -1200

“அதிகம் பின்பு கதும் நிற்பு பார்த்திருந்து வைக்கப்பட்ட புல்காலினும் தொன்மு அதிகியும் காதல்லாம்”
- அகத்தியர் அப்பைதுள் 1200, பக்த 296

b) THAERAIYAR VAAGADAM

“அதிகம் வாழ்த்தவை விக்கம்சி விளைவென்கிறது
கருது வல்காபைத்தொழில்”
- தேககிரு வாரம், பக்த 217

c) PARA RASA SEKARAM-VATHA ROGA NITHANA CHIKITCHAI.

“சிறிது கொண்டு பின்பு வீடு பற்றிக்கூறினும் கருது
புல்கால் மக்கியின் விளைவுப் போரியும் குர்க்கத்தோண்டு
பெருநில்கு அதிகம் ஒன்று பொருள் பிரிந்துகைக்கூற்று
முன்னணி கொண்டு கற்பிக்கும் வைக்கப் போர்க்கை அழகிக்கை”
- பரார்த்திகிரு--பக்த 182
This topic for dissertation is based on PARA RASA SEKARAM-VATHA ROGA NITHANA CHIKITCHAI. In PARA RASA SEKARAM, vaatham-80 is classified as 40-conditions above the waist and remaining 40-conditions below the waist based on body regions involved. The waist line is kept as a basic dividing line. Perhaps, this may be due to the degree of movement and weight bearing of joints below the waist.

The word “MUZHANKAAL” means knee joint, and “VATHAM” means affliction and impairment in function. The pathological changes are confined to knee joint (weight bearing joint) only.

In the knee joint, whatever the cause, the ongoing pathogenesis it is in two ways; one is degeneration and the other is inflammation. Any inflammatory knee pathology is followed by degenerative pathology. In some conditions mainly degenerative changes predominate with minimal inflammation. So the condition MUZHANKAAL VATHAM indicates only knee joint pathology and has the features of joint swelling, pain (aching, stabbing, throbbing) and late deformity.
READING LINES BETWEEN THE POEM

In Para Rasa sekaram-vaatha roga nithana sikitchai, “MUZHNKAAL VAATHAM” is dealt in the stanza 182 as follows;

“ಕೀಲಕತ್ತ ಕುಟುಂಬಕ್ಕೆ ಕೇಳುವಂತಕ್ಕಾರ್ತಿಯ ಅಪಮಲಾಪಣಗಳಲ್ಲಿ ಪ್ರಾಂತ್ಯ ಸೇವೆ ನೀವಿಯೂ ಪ್ರತ್ಯೇಕ ಅನುಮಾನಗಳನ್ನು ಪರಿಶೀಲಿಸುವ ಅಪರೂಪದ ಕಲ್ಲಿಮೂಡದ ಪ್ರತಿಗ್ರಹಣದಲ್ಲಿ ವಾಣ ವಿಜ್ಞಾನದ ದರ್ಶನ ಪಂಖಳೆಯನ್ನು ರಚಿಸುತ್ತಾ.”

ಪ್ರಸಾರಾಧಿಕೀಯ-ಪಾಲಕಸಾಮರ್ಧ್ಯ: 182

The meaning of the words in this poem is as follows;

- ಕೀಲಕತ್ತಿ - Round shaped gathering of
- ಕುಟುಂಬಕ್ಕೆ - swelled knee joint
- ಅಪಮಲಾಪಣಗಳಲ್ಲಿ - bone ends are coming close and together
- ಪ್ರಾಂತ್ಯ - degeneration, destruction
- ಅನುಮಾನಗಳನ್ನು - gripping pain
- ಪರಿಶೀಲಿಸುವ - pricking pain / Boring pain / piercing pain
- ಅನುಮಾನಗಳನ್ನು - twisting in knee joint (deformity)
- ಪರಿಶೀಲಿಸುವ - flexion / bending in knee joint (deformity)
- ಪಂಖಳೆಯನ್ನು - jostling / struggling / crowdness
- ರಚಿಸುತ್ತಾ - so
- ವಿಜ್ಞಾನದ - normal knee functions like walking etc.
- ದರ್ಶನ - not allow / not permit.
The above lines are summarized as follows;

These lines clearly show the degenerative pathogenesis of the knee joint. Due to the degeneration of knee joint;

- Knee swelling is round in shape due to gathering of bone ends into a mass
- There is degeneration and the bone ends are very close to each other
- Initial gripping pain is followed by stabbing pain
- There is twist-cum-flexion deformity due to forward jostling of the knee joint.
EVALUATION OF THE DISSERTATION TOPIC

A) MATERIALS AND METHODS:

The pathological evaluation of the disease “MUZHANKAAL VAATHAM” was carried out in out-patient as well as in-patient departments at Government siddha medical college & hospital, Palayamkottai during the year 2006-2007.

SELECTION OF CASES:

20 cases with similar symptoms of “MUZHANKAAL VAATHAM” were selected from OP & IP Departments of Government siddha Medical College, Palayamkottai, and followed by the author whose work was under the close supervision of the professor and lecturer of the post –graduate Noi-Naadal Department.

EXCLUSION CRIETERIA:

In addition to “MUZHANKAAL VAATHAM”, patients whoever having other clinical symptoms like, multi-joints pain other than knee joint, other systemic diseases like Diabetes mellitus, hypertension, respiratory diseases and cardiac diseases were carefully excluded from the study.
EVALUATION OF CLINICAL PARAMETERS:

- Detailed history of present and past illness
- Family history
- Personal history
- Occupational history
- Socio-economic status
- Dietary habits.
- Seasonal variations.

SYMPTOMS AND SIGNS OF “MUZHANKAAL VAATHAM”

- Rounded swelling of knee
- Gripping pain
- Stabbing pain
- twist-cum-flexion deformity

SIDDHA CLINICAL DIAGNOSIS:

Envagai thaervugal (8 tools of Diagnosis):

1. Examination of Naadi.
2. Examination by touch.
3. Examination of the tongue.
4. Examination of complexion.
5. Examination of voice.
6. Examination of the eyes.
7. Examination of the stool.
8. Examination of the urine.
MODERN INVESTIGATION:

The following Hematological parameters are done

- TC - Total Count
- DC - Differential count
- ESR - Erythrocyte sedimentation rate
- Hb - Haemoglobin estimation
- Blood sugar
- Blood urea
- Serum cholesterol

Routine Urine Analysis:

- Albumin
- Sugar
- Deposit

X-ray Report:

- Both knee joint – AP view & Lateral view.

CASE PROFORMA:

All clinical signs and symptoms of “MUZHANKAAL VAATHAM”, History of present illness, past illness, personal history, Family history, derangement of mukkutram, and udal thathus, laboratory investigations, and X-rays were systematically recorded in the proforma.
LIST OF SELECTED CASES:

<table>
<thead>
<tr>
<th>S.NO</th>
<th>OP/IP. NO</th>
<th>NAME</th>
<th>AGE/SEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OP.74162</td>
<td>PONNU SAMY</td>
<td>58/M</td>
</tr>
<tr>
<td>2</td>
<td>OP.76358</td>
<td>JEYAMERY</td>
<td>60/F</td>
</tr>
<tr>
<td>3</td>
<td>OP.75847</td>
<td>REETHA</td>
<td>60/F</td>
</tr>
<tr>
<td>4</td>
<td>OP.1403</td>
<td>PONNU SWAMY</td>
<td>50/M</td>
</tr>
<tr>
<td>5</td>
<td>IP.2885</td>
<td>XAVIOUR</td>
<td>61/M</td>
</tr>
<tr>
<td>6</td>
<td>IP.93</td>
<td>MURUGAMMAL</td>
<td>50/F</td>
</tr>
<tr>
<td>7</td>
<td>IP.96</td>
<td>PAPPATHY</td>
<td>50/F</td>
</tr>
<tr>
<td>8</td>
<td>IP.104</td>
<td>MOOKKA PILLAI</td>
<td>72/M</td>
</tr>
<tr>
<td>9</td>
<td>IP.76</td>
<td>SINNA THAMBI</td>
<td>64/M</td>
</tr>
<tr>
<td>10</td>
<td>IP.2867</td>
<td>KUPPU SAMY</td>
<td>55/M</td>
</tr>
<tr>
<td>11</td>
<td>IP.2944</td>
<td>LAKSHMI</td>
<td>60/F</td>
</tr>
<tr>
<td>12</td>
<td>IP.31</td>
<td>VALLA THAAI</td>
<td>65/F</td>
</tr>
<tr>
<td>13</td>
<td>IP.101</td>
<td>RAHMATH BEEVI</td>
<td>50/F</td>
</tr>
<tr>
<td>14</td>
<td>IP.46</td>
<td>PONNU THAAI</td>
<td>50/F</td>
</tr>
<tr>
<td>15</td>
<td>IP.319</td>
<td>PICCHAMMA</td>
<td>55/F</td>
</tr>
<tr>
<td>16</td>
<td>IP.113</td>
<td>MUTHU LAKHSMI</td>
<td>60/F</td>
</tr>
<tr>
<td>17</td>
<td>IP.291</td>
<td>LILLY PUSPHAM</td>
<td>55/F</td>
</tr>
<tr>
<td>18</td>
<td>IP.426</td>
<td>MAANIKKAM</td>
<td>55/M</td>
</tr>
<tr>
<td>19</td>
<td>IP.564</td>
<td>SUBBAIYA</td>
<td>65/M</td>
</tr>
<tr>
<td>20</td>
<td>IP.162</td>
<td>MUTHU PANDIYAN</td>
<td>42/M</td>
</tr>
</tbody>
</table>
B) OBSERVATION AND RESULTS:

1. AGE:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Age</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40 – 50</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>2</td>
<td>51 – 60</td>
<td>9</td>
<td>45%</td>
</tr>
<tr>
<td>3</td>
<td>61 – 70</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>4</td>
<td>71 – 80</td>
<td>1</td>
<td>5%</td>
</tr>
</tbody>
</table>

Among the selected 20 cases, the incidence of disease was found to be higher in the age groups between 51 to 60 (45%).

2. SEX:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Sex</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>9</td>
<td>45%</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>11</td>
<td>55%</td>
</tr>
</tbody>
</table>

The incidence of disease was found to be higher in females (55%).

3. FAMILY HISTORY:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Family history</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Positive</td>
<td>18</td>
<td>90%</td>
</tr>
<tr>
<td>2</td>
<td>Negative</td>
<td>2</td>
<td>10%</td>
</tr>
</tbody>
</table>

There is a strong family history for this disease (90%).
4. OCCUPATION:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Occupation</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White-collars</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>Blue-collars</td>
<td>17</td>
<td>80%</td>
</tr>
<tr>
<td>3</td>
<td>House wives</td>
<td>2</td>
<td>10%</td>
</tr>
</tbody>
</table>

Hard / coolie workers have more incidence of disease. (80%)

5. SOCIO-ECONOMIC STATUS:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Socio-economic status</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rich</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Middle class</td>
<td>8</td>
<td>30%</td>
</tr>
<tr>
<td>3</td>
<td>Poor</td>
<td>12</td>
<td>70%</td>
</tr>
</tbody>
</table>

Among the studied cases, more number of cases belong to poor socio-economic status (70%).

6. KAALAM (LIFE SPAN):

<table>
<thead>
<tr>
<th>S.No</th>
<th>Kaalam</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vaatha kaalam (upto 33yrs)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Pitha kaalam (33 – 66 yrs)</td>
<td>19</td>
<td>95%</td>
</tr>
<tr>
<td>3</td>
<td>Kaba kaalam (above 66 yrs)</td>
<td>1</td>
<td>5%</td>
</tr>
</tbody>
</table>

Out of 20 cases, 95% of cases were found to be in Pitha kaalam i.e. age between 33 to 66 years.
7. SEASONAL VARIATIONS (PARUVA KAALAM):

<table>
<thead>
<tr>
<th>S.No</th>
<th>Paruva kaalam</th>
<th>months</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kaar kaalam</td>
<td>Aug 15 – oct 14</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Koothir kaalam</td>
<td>Oct 15 – dec 14</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>Munpani kaalam</td>
<td>Dec 15 – feb 14</td>
<td>16</td>
<td>80%</td>
</tr>
<tr>
<td>4</td>
<td>Pinpani kaalam</td>
<td>Feb 15 – apr 14</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>Ilavenil kaalam</td>
<td>Apr 15 – jun 14</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Muthuvenil kaalam</td>
<td>Jun 15 – aug 14</td>
<td>1</td>
<td>5%</td>
</tr>
</tbody>
</table>

Most of the cases were coming to get treatment during December to February time i.e. munpani kaalam.

8. THINAI (GEOLOGICAL DISTRIBUTION):

<table>
<thead>
<tr>
<th>S.No</th>
<th>Thinai</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kurinchi</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Mullai</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>Marutham</td>
<td>16</td>
<td>80%</td>
</tr>
<tr>
<td>4</td>
<td>Neithal</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>5</td>
<td>Paalai</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Most of the cases were reported from marutha nilam (80%).
9. DISTURBANCES OF VALI (VAATHAM):

<table>
<thead>
<tr>
<th>S.No</th>
<th>Vali</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Viyaanan</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Praan</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Abaanan</td>
<td>15</td>
<td>75%</td>
</tr>
<tr>
<td>4</td>
<td>Samaanan</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>5</td>
<td>Uthaanan</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Naagan</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Koorman</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Kirukaran</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Devathathan</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Thananjeyan</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Viyanan and samaanan were affected in almost all the cases while abaanan was affected in 75% of the cases.

10. DISTURBANCES OF AZHAL (PITHAM):

<table>
<thead>
<tr>
<th>S.No</th>
<th>Azhal</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anarpitham</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Ranjagam</td>
<td>15</td>
<td>75%</td>
</tr>
<tr>
<td>3</td>
<td>Praasagam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Aalosagam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Saathagam</td>
<td>20</td>
<td>100%</td>
</tr>
</tbody>
</table>

Santhigam was affected in almost all the cases, while ranjagam was affected in 75% of cases.
11. DISTURBANCES OF IYYAM (KABAM) :

<table>
<thead>
<tr>
<th>S.No</th>
<th>Iyyam</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Avalambagam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Kilethagam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Pothagam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Tharpagam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Santhigam</td>
<td>20</td>
<td>100%</td>
</tr>
</tbody>
</table>

Santhigam was found to be affected in almost all the cases.

12. UDAL KATTUGAL (UDAL KATTUGAL) :

<table>
<thead>
<tr>
<th>S.No</th>
<th>Udal kattugal</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Saaram</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Senneer</td>
<td>15</td>
<td>75%</td>
</tr>
<tr>
<td>3</td>
<td>Oon</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>Kozhuppu</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Enbu</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>6</td>
<td>Moolai</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Sukkilam</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Saaram, Oon and enbu were affected in almost all the cases, while senneer was affected in 75% of cases.
Naadi was altered in almost all the cases, whereas naa and malam were affected in 75% of cases.

14. NEIK-KURI (URINE-OIL DIAGNOSIS):

<table>
<thead>
<tr>
<th>S.No</th>
<th>Shape of oil</th>
<th>No. Of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vatha neer-snake like</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Pitha neer-ring like</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>Kaba neer-pearl like</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Kalappu - thontham</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

In nei-kuri, all urine indicated pitha neer i.e. ring like appearance.
## 15. BODY MASS INDEX

<table>
<thead>
<tr>
<th>S.No</th>
<th>OP/IP No</th>
<th>Weight in Kg</th>
<th>Height in Meters</th>
<th>Body Mass Index (BMI = wt / (ht)^2)</th>
<th>BMI Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OP.74162</td>
<td>55</td>
<td>1.58</td>
<td>22.08</td>
<td>Acceptable</td>
</tr>
<tr>
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<td>OP. 76358</td>
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Out of 20 cases, about 60% were found to be over weight (BMI Range 25.00 - 29.90)

BMI ranges:
- **Acceptable Range**: 18.5 - 24.90
- **Over weight**: 25.00 - 29.90
- **Obesity**: 30.00 - 39.90
- **Morbidly Obese**: More than 40
Genu Varus Deformity

Knee joint swelling
17. X-RAY – KNEE JOINT – AP VIEW & LATERAL VIEW:

Soft tissues and synovial membrane are normal in all X-rays.

Generally, all X-rays have the following findings:

- Narrowed joint space
- Osteophytes

In addition to above findings, each X-ray has one or more of the following findings:

- Intercondular notch prominence
- Subchondral sclerosis
- Loose bodies
- Varus deformity

The above X-ray findings indicate the degenerative changes of the knee joint in all cases.
ANATOMY OF KNEE JOINT

The knee joint is the largest and most complex joint of the body. The complexity is the result of fusion of three joints in one. It is formed by fusion of the lateral femorotibial, medial femorotibial and femoropatellar joints. Thus the knee joint is formed by condyles of femur, condyles of tibia and patella. The structures are briefly discussed here.

LIGAMENTUM PATELLAE:

It is the degenerated tendon of insertion quadriceps femoris. It is separated from the synovial membrane of knee joint by the infrapatellar pad of fat.

MEDIAL TIBIAL COLLATERAL LIGAMENT:

It is the degenerated tendon of insertion of adductor magnes muscle.

LATERAL FIBULAR COLLATERAL LIGAMENT:

Laterally, it contains the degenerated origin of the peroneus longus muscle.

OBLIQUE POPITEAL LIGAMENT:

This is an expansion of insertion of semi-membranous muscle.

ARCUATE POPLITEAL LIGAMENT:

This is a Y-shaped posterior expansion from the short lateral ligament.
CRUCIATE LIGAMENT:

These fibrous bands are intracapsular but extra synovial structures. The anterior and posterior cruciate ligaments cross each other within the joint cavity from intercondylar notch of femur to the intercondylar eminence of tibia to maintain anteroposterior stability of the knee joint.

SEMILUNAR CARTILAGES:

There are two fibrocartilagenious crescentric shaped discs called *menisci* (medial meniscus and lateral meniscus) which deepen the articular surfaces of the condyles of tibia. They stabilize the joint by preventing lateral displacement of bones. Compositional changes occur with ageing and degeneration within the menisci; these reduce the ability to resist tensional forces.

Their peripheral zone is vascularized by capillary loops from the fibrous capsule and synovial membrane, while their inner regions are avascular. Peripheral tears in the vascular zone have the capacity to heal which makes repair a possibility.

The meniscal horns are richly innervated compared with the remainder of meniscus. The central thirds are devoid of innervation. Because of their nerve supply, they also have a sensory function. These menisci are not covered with synovial membrane.
Superior aspect of the left tibia, showing the menisci and the attachments of the cruciate ligaments.

Posterior dissection of the left knee. The fibrous capsule has been removed, exposing the unopened synovial membrane (blue). The synovial cavity has been partially distended by injection.
TRANSVERSE LIGAMENT:
This fibrous tissue connects anterior ends of medial and lateral semilunar cartilages.

SYNOVIAL MEMBRANE:
This lines the inner surface of the capsule except posteriorly where it is reflected towards by the cruciate ligaments. The membrane enters the joint on either sides of the cruciate ligaments and ends of the menisci and making them intracapsular but extra synovial structures. In front, it is prolonged upwards as the supra-patellar bursa.

FIBROUS ARTICULAR CAPSULE:
This capsule is very thin and is deficient anteriarly, where it is replaced by quadriceps femoris, the patella and the ligamentum patellae. The Synovial membrane of the joint extends above the patella through this opening and the extension is called as supra patellar bursa.

BURSAE AROUND THE KNEE:
As many as 13 bursae have been described around the knee; four in anterior, four in lateral and five in medial.
BLOOD SUPPLY:

The knee is supplied by the anastamosis around it. The chief sources are:

- Five genicular branches of popliteal artery
- The descending genicular branch of the femoral artery
- The descending branch of the lateral circumflex femoral artery
- Two recurrent branches of anterior tibial artery
- The circumflex fibular branch of posterior tibial artery

NERVE SUPPLY:

- Femoral nerve
- Genicular branches of common peroneal nerve
- Genicular branches of tibial nerve
- Descending genicular branch of posterior division of the obturator nerve
MICROSTRUCTURES OF KNEE JOINT

To understand the pathogenesis of osteoarthritis, we have a closer look at the embryological, histological and biochemical aspects of articular cartilage.

EMBRYOLOGY OF ARTICULAR CARTILAGE:

Cartilage is also formed from mesenchyme. At a site where cartilage is to be formed, mesenchymal cells become closely packed. This is called mesenchymal condensation. The mesenchymal cells then become rounded and get converted into cartilage forming cells or chondroblasts. Under the influence of chondroblasts, the intercellular substance of cartilage is laid down. Some chondroblasts get imprisoned within the substance of this developing cartilage and are called chondrocytes. Some fibers also develop in the intercellular substance.

In hyaline cartilage, collagen fibers are present. In fibrocartilage, collagen fibers are numerous and very obvious. Mesenchymal cells surrounding the surface of the developing cartilage form a fibrous membrane, the perichondrium.

Cartilage is considered to be a modified connective tissue. Cartilage differs from typical connective tissue mainly in the nature of ground substance which is firm and gives cartilage its characteristic consistency. Articular cartilage of knee joint is lined by hyaline cartilage. These articular cartilages provide the bone ends with smooth surfaces between which there is very little friction. They act as shock absorber. Their surface is kept moist by synovial fluid which also provides nutrition to them.
STRUCTURE OF ARTICULAR CARTILAGE:

Hyaline cartilage is so called because it is transparent (hyalos = glass). Its intracellular substance appears to be homogenous. Cartilage lacks blood vessels, lymphatics and nerves. It may have focal areas of calcification

a) **Zone 1 : Superficial stratum / Tangential stratum:**
   Near the free surface of articular cartilage, the cells are small and flattened parallel to the surface. This is the first to show changes of osteoarthritis.

b) **Zone 2 : Intermediate stratum / Transitional stratum :**
   Just deep to the superficial stratum this layer is seen. In this layer, the cells are larger and more rounded. They may lie singly or in groups.

c) **Zone 3 : Radiate stratum :**
   On proceeding towards the deep surface of the cartilage (which is attached to the bone), the cells become still larger and may be arranged in vertical columns.

d) **Deepest calcified layer :**
   The deepest layer of the cartilage just next to bone, which separates hyaline cartilage from subchondral bone.

In the knee joint, the *intra-articular disc* or *menisci* are made up of fibrocartilage that acts as shock absorber. Cartilage has very limited ability for regeneration after destruction by injury or diseases. Defects in cartilage are usually filled in by fibrous tissue. The transformation of hyaline cartilage to fibrocartilage is one of the earliest sign of ageing in the body.
BIOCHEMISTRY OF ARTICULAR CARTILAGE:

Cartilage consists of two components; cartilage matrix and chondrocytes.

**Chondrocytes:**

Primitive mesenchymal cells which form bone cells form chondroblasts which give rise to chondrocytes. However, calcified cartilage is removed by the osteoclasts.

**Cartilage matrix:**

Like bone, cartilage too consists of organic and inorganic material.

Inorganic material of cartilage is calcium hydroxypaptite.

It consists of very high content i.e. 80% of water and remaining 20% consists of type II collagen and proteoglycans.

**Proteoglycans:**

This is the ground substance of articular cartilage rich in proteins-carbohydrates complexes (5:95). These molecules form a meshwork which is filled by water and dissolved salts. The protein is aggrecan. The carbohydrates are chemically long chained polysaccharides called glycosaminoglycans (GAG). They include chondroitin sulfate, keratin sulfate and hyaluronic acid. Matrix comprises 55-90% of Chondroitin sulfate varying on age of the cartilage.

With ageing, the concentration of chondroitin sulphate decreases, whereas that of keratin sulphate increases, resulting in a reduction in water content and impairment of cartilage’s shock absorbing properties.
They carry sulphate groups \((SO_3^-)\) and carboxyl groups \((COO^-)\) which give them a strong negative charges.

The GAGs being poly-ionic, bind cations like \(Na\) and \(K\) and attract maximum possible volume of water by osmotic pressure into extra cellular matrix. High water content (80%) of cartilage matrix gives excellent shock-absorbing properties.

In healthy individual, a balance is maintained between synthesis and degeneration of cartilage matrix. Cartilage degeneration is mediated by enzymes such as *matrix metalloproteinases* and *aggrecanase* that degrade the protein and the enzyme *glycosidase* degrade the GAGs side-chain.

The pro-inflammatory cytokines such as *interleukin-1 (IL-1)* and *tumor necrosis factor (TNF)* stimulate the production of these enzymes and promote cartilage degradation. This is offset by up-regulation of *tissue inhibitors of metalloproteinases (TIMP)*, which opposes the effect of degrading enzymes and protect against cartilage degeneration.
SYNOVIAL MEMBRANE:

The joint space is lined by synovial membrane or synovium which forms synovial fluid that lubricates the joint during movement. The synovium may be smooth or thrown into numerous folds or villi. The synovial membrane is composed of an inner layer of synoviocytes and an outer vascular layer.

On electron microscopy, two types of synoviocytes are distinguished; type A synoviocytes and type B synoviocytes.

Type A – Produces degenerative enzyme and are phagocytic.

Type B – Produces hyaluronic acid and secretes synovial fluid.

Bursae are hollow sacs lined with synovium and contain a small amount of synovial fluid.

SYNOVIAL FLUID:

The surfaces of articular cartilage are separated by a space filled with synovial fluid, a viscous liquid that lubricates the joint. Synovial fluid is an ultra-filtrate of plasma into which synovial cells secrete hyaluronan and proteoglycans.
OSTEO-ARTHRITIS OF KNEE JOINT

Synonyms:

Osteoarthrosis, Degenerative joint disease, Hypertrophic arthritis.

Definition:

It is defined as a chronic, degenerative, non-inflammatory joint disease characterized by destruction of articular cartilage and formation of new bone at the joint surfaces and margins.

PRIMARY OSTEOARTHRITIS OF KNEE JOINT

In this, no obvious predisposing cause is evident.

The process begins by the end of 4th decade and then progressively and steadily increases producing clinical symptoms.

Though exact cause is not known, the following factors are suspected to play an important role in the causation of primary osteoarthritis;

Obesity

Aging, genetics and Heredity

Wear and tear with repeated minor trauma

Occupation involving prolonged standing, sports
SECONDARY OSTEOARTHRITIS OF KNEE JOINT:

There is a clear association with some predisposing conditions.

Major causes for secondary osteoarthritis of knee joint are as follows;

- Obesity, valgus and varus deformities of knee
- Intra articular fractures of the knee
- Rheumatoid arthritis, infection, trauma, T.B, etc
- Hyperparathyroidism
- Haemophilia
- Syringomyelia
- Metabolic diseases
- Neurological diseases like diabetes
- Overuse of intra-articular steroid therapy

Generally, secondary osteoarthritis occurs in the younger age groups and is more severe than the primary. Apart from all features of osteoarthritis, secondary osteoarthritis has the features of the corresponding aetiological condition.
PATHOGENESIS:

In both types of osteoarthritis, the basic pathological processes are the same.

The primary lesion consists of degeneration of the articular cartilage until the bone matrix is exposed. OA principally targets the patello-femoral and medial tibio-femoral compartments of knee joint.

- **Articular cartilage:**

  The mechanism of damage to cartilage in OA appears to be the breakdown of cartilage type II, probably by *IL-1, TNF* and *nitric oxide*. These pro-inflammatory cytokines stimulate production of the degenerative enzymes and promote cartilage degradation.

  Cartilage degradation is mediated by enzymes such as *matrix metalloproteinases* and *glycosidases*.
The earliest change in OA is in the chemical composition of the matrix which becomes softer. Although the turnover of aggrecan component is increased, the concentration of aggrecan eventually falls. The decrease in size of the hydrophilic aggrecan molecules increases the water concentration and swelling pressure in cartilage, further disrupting the retaining scaffolding of type II collagen and making the cartilage surface (fibrillation), development of deep vertical clefts, localized chondrocytes death and decrease in cartilage thickness. Cartilage loss is focal rather than widespread and usually restricted to maximum load-bearing part of the joint. This results in breaking off of pieces of cartilage exposing subchondral bone. Radiologically, this progressive loss of cartilage is apparent as narrowed joint space.

The erosion of cartilage is not uniform, so relatively at first, the areas of bone are exposed in a patchy fashion and there are intervening islands of relatively normal cartilage.
The OA changes in cartilage encourage the deposition of calcium pyrophosphate dehydrate (CPPD) and apatite crystals. This may result in more overt inflammatory component (stiffness, effusion) and superadded acute attacks of synovitis, which predicts more rapid radiographic and clinical progression.

- **Bone:**

  As a result of cartilage degeneration, the non-articular areas of the bones are elevated above the remainder of the surface and project circumferentially to give the appearance known as **lipping**. At the margins of the joint there is production of new fibrocartilage which then undergoes endochondral ossification to form osteophyte. These are cartilaginous outgrowths at the joint margins which later get ossified. Osteophytes give the appearance of lipping of the affected joint. Irregular outgrowths appear in this area at first, cartilaginous but eventually becoming ossified to form **osteophytes**.

  The denuded subchondral bone appears like polished ivory. There may be erosion of two unprotected bone ends wear on each other. This may ablate the trabaculae and lead to a smooth shiny surface called **eburnation**, often with deep linear grooves. There is proliferation of blood vessels and probably an increase in blood supply to the subchondral bone with thinning of cartilage over the pressure areas, but proliferation of cartilage where there is no pressure. The new bone proliferation is particularly around the capsular attachment. These changes result in remodeling of bone and changes in the shape of joint surface
leading to flattening and mushroom-like appearance of the articular end of the bone. The proliferated cartilage is now invaded by larger blood vessels and finally replaced by bone (osteophytes).

In formation of subchondral cysts in OA, there is initially an oedema in the subchondral marrow, which is followed by the formation mucinous fatty marrow and dilatation of surrounding sinusoids. There is mucoid secretion within the center of this area and expansion of the cyst cavity by osteoclastic resorption of bony trabaculae. Surrounding this, there is some osteoblastic response and a sclerotic wall is formed. Other theory for the cyst is that the cysts arise from herniation of synovial fluid through cracks within the denuded subchondral bone plate. Cysts or holes often develop, possibly the result of small areas of osteonecrosis caused by the increased pressure in bone as the cartilage fails in its load transmitting function.

Loosened and fragmented osteophytes may form free ‘joint mouse’ or ‘loose bodies’

- Synovium:

Initially, there are no pathologic changes in the synovium and capsule. Calcium pyrophosphate dehydrates (CPPD) crystal deposition in association with OA is common in knee joint, may results in obvious inflammatory component (stiffness, effusion) and superadded acute attacks of synovitis.
In advanced cases there is low-grade *chronic synovitis* and *villous hypertrophy*. There may be some amount of synovial effusion associated with chronic synovitis. These changes are secondary. 

*Osteochondral bodies* commonly occur within the synovium, reflecting chondroid metaplasia or secondary uptake and growth of damaged cartilage fragments.

The synovial tags or polyps are insinuated into the joint, and where very exuberant the process is referred to as *lipoma arborescens*. Cartilage formation occurs in these tags and they are then liable to be broken off into the joint, when they form *loose bodies*.

- **Capsule & muscles**:

  Outer capsule also thickens and contracts, usually retaining the stability of the remodeling joint. The muscles that act over the joint commonly show non-specific *type II fiber atrophy*. 
SEQUENCE OF PATHOLOGICAL EVENTS:

- Fibrillation due to loss of water in articular cartilage
- Complete loss of articular cartilage causes pressure on underlying bone
- Sclerosis of bone and later eburnation
- Subchondral cyst due to degenerated microfractures
- New bone formation results in osteophyte formation.

Pathological changes in osteoarthritis.
CLINICAL FEATURES & LOCAL EXAMINATION:

◆ PAIN

➢ Pain is localized to anterior or medial of knee and upper tibia
➢ Patello-femoral pain is worse going-up and down or inclines
➢ Morning stiffness, which subsides over the day after some activity
➢ Joint soreness after periods of overuse or inactivity
➢ Pain is less in the morning and worse in the evening after a day’s activity

◆ OTHER FEATURES:

➢ Joint-line or peri-articular tenderness
➢ Medial ligament enthesopathy, giving tenderness of the upper medial tibia
➢ Coarse crepitus
➢ Bony swelling around the knee joint line
➢ No detectable warmth of the joint to the touch
➢ weakness and wasting of quadriceps muscle
➢ History of locking due to loose bodies within the knee joint
➢ Terminal movements (flexion / extension) are restricted.
Genu varum deformity may be seen in very advanced cases
Less commonly valgus or flexed flexion deformity seen

Showing genu varum with increased distance. Genu varum is said to exist if there is a proper gap between the medial femoral condyles when the legs are together.
INVESTIGATIONS:

Laboratory investigations are usually within normal limits. Radiological examination of the knee joint is the most important diagnostic tool.

The following are the radiological features seen in osteoarthritis;

- **Loss of joint space** – due to destruction of articular cartilage
- **Sclerosis** – due to increased cellularity and bone deposition
- **Subchondral cysts** – due to synovial fluid intrusion into the bone
- **Osteophytes** – due to revascularization of remaining cartilage
- **Bony collapse** – due to compression of weakened bone
- **Loose bodies** – due to fragmentation of Osteochondral surface
- **Deformity and mal-alignment** – due to destruction of capsule and ligaments

OTHER INVESTIGATIONS:

- Synovial fluid analysis – shows non-inflammatory picture
- Bone scan – shows increased uptake of technetium-99m
- MRI and CT – helps to diagnose subchondral cysts and osteophytes etc...

DIFFERENTIAL DIAGNOSIS:

- Acute septic arthritis
- Chronic TB arthritis
- Charcot’s joint
- Rheumatoid arthritis
DISCUSSION

According to PARA RAASA SEKARAM, the vaatha disease classification is particular about regional (local) pathology.

Among the three humors, vaatham is the initiator of all activities of body. The clinical study on all selected patients was done. Investigations were done by both Siddha and modern parameters. The discussion is based on the results observed on various headings.

INTERPRETATION OF OBSERVED CLINICAL PARAMETERS:

1. Age and sex reference:

   The incidence of MUZHANKAAL VAATHAM occurs people above 40 and seems predominantly in females.

2. Socio-economic status:

   The occurrence of disease is common in all groups of peoples.

3. Diet habits:

   On observation, the disease developed predominantly in non-vegetarian habited peoples.

4. Seasonal changes (Paruva kaalam):

   Though the symptoms developed in various seasons of the whole year, 80% of patients were reported during Munpani kaalam.

5. Thinai:

   Most of the patients were reported from Marutha nilam
6. Kaalam (Life span):

Out of 20 cases, 95% of cases were found to be within pitha kaalam i.e. between 33 – 66 years of age groups. In most of cases, the onset of the disease was during Pitha kaalam.

INTERPRETATION OF ENVAGAI THERVUGAL:

1. Naadi:

In the Naadi examination of the suspected patients, the observed Naadi was Pitha vaatham and Vaatha pitham.

2. Sparisam (by palpation):

By palpating the skin on overall body, no characteristic abnormal sense of heat was observed even in the affected joint.

3. Naa:

On examination, paleness was observed in 75% of cases.

4. Niram (skin complexion):

All patients were having mixed complexion i.e. kalappu Niram.

5. Moothiram:

a) Manam (odor) – No abnormal smell was found

b) Nurai – No abnormalities were found

c) Niram (color) – Dark yellow color of urine was found in all cases

d) Edai – No abnormal was found

e) Engel – No deposition was found in all cases
6. neik-kuri (Urine-Oil diagnosis):

A drop of sesame-seed oil was dropped over the urine contained tray. After a few minutes, there was a gradual spreading of drop like ring (Aazhi).

7. Mukkutra nilaigal:

a) Vali – Out of 20 cases, Viyaanan and Samaanan were affected in all cases, while Abaanan was affected in 75% of the cases.

b) Azhal – Ranjagam was affected in 75% of cases, whereas Saathagam was affected in almost all cases.

c) Iyyam – Santhigam was found to be affected in all cases.

8. Udal Kattugal:

Saaram, Oon and Enbu were affected in all cases, whereas Senneer was affected in 75% of cases.

INTERPRETATION OF MODERN PARAMETERS:

Out of 20 cases, about 60% were found to be overweight (BMI Range: 25.00 - 29.90)

Blood total count and differential count were normal in all cases. Hb may below normal level in 75% of cases.

In X-ray study, all cases were having narrowed joint space and osteophytes. In addition to the above findings, subchondral sclerosis, bony cysts and loose bodies were found in three cases.
CONCLUSION

The clinical study of MUZHANKAAL VAATHAM is mainly based on siddha diagnostic methods. At the same time, the author also has conducted modern investigations relevant to MUZHANKAAL VAATHAM. It reveals that, all the MUZHANKAAL VAATHAM patients have findings of Osteoarthritis of knee joint.

MUZHANKAAL VAATHAM is a degenerative disease commonly occurs in Pitha and kaba kaalam of one’s life cycle. This is also stressed in modern science.

The bio-chemical derangement of muco-polysaccharides of cartilage is the main and foremost pathology in MUZHANKAAL VAATHAM.

Cartilage fibrillation, cartilage degeneration, eburnation of bones, osteophyte formation, narrowing of joint space, subchondral sclerosis, bony cysts, loose body formation, these are the basic pathological changes in MUZHANKAAL VAATHAM.

Crepitaion, pain & tenderness over medial tibial condyl, swelling, varus deformity are the clinical diagnostics.

Clinical diagnosis, Nei-kuri (ring like appearance), X-ray are playing a great role in the diagnostic purpose of MUZHANKAAL VAATHAM.
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Complaints and duration:

History of present illness:

History of previous illness:

Personal history including habits:

Family history:
GENERAL CONDITIONS ON EXAMINATION:

1. Consciousness
2. General appearance
3. Stature
4. Nourishment
5. Skin changes
6. Pallor
7. Jaundice
8. Cyanosis
9. Clubbing
10. Lymphadenopathy
11. Abdominal distension
12. Jugular venous pulsation
13. Engorged veins
14. Koilonychia
15. Pedal oedema
16. Generalized oedema
17. Temperature
18. Pulse: rate
   Rhythm
   Volume
   Character
   Peripheral pulses
   Pulses paradoxes
19. Respiration:
   Rate
   Rhythm
   Character
20. Heart rate
   Upper limb (Lt):
   Lower limb (RT):
   Lower limb (Lt):
22. Body weight:
23. Miscellaneous:
SIDDHA ASPECT:

I. Nilam:
   a. Kurinchi
   b. Mullai
   c. Marudham
   d. Neidhal
   e. Paalai

II. Pauvakaalam
   a. Kaar kaalam (Aavani - Purattaasi)
   b. Koodhir kaalam (Aippasi - Kaarthigai)
   c. Munpani kaalam (Maargazhi - Thai)
   d. Pinpani kaalam (Maasi - Panguni)
   e. Ilavaenil kaalam (Chitthirai - Vaihaasi)
   f. Mudhuvenil kaalam(Aani - Aadi)

III. Yaakai (Udal)
   a. Vazhi udal
   b. Azhal udal
   c. Iyya udal
   d. Thontha udal

IV. Gunam
   a. Satva gunam
   b. Rajo gunam
   c. Thamo gunam

V. Pori Pulangal
   a. Mei -- Sensation
   b. Vaai -- Taste
   c. Kann -- Vision
   d. Mookku -- Smell
   e. Sevi -- Hearing

VI. Kanmaenthiriyam / Kanma vidayam
   a. Kai -- Dhaanam
   b. Kaal -- Kamanam
   c. Vaai -- Vasanam
   d. Eru vaai -- Visarkam
   e. Karu vaai—Aanantham
VII. **Udkaayam**  
Thol porutthu  
Puyam  
Muzhankai porutthu  
Sayam  
Kai-kulasu  
Karabam  
Anguli  

**Athakaayam**  
Iduppu porutthu  
Thodai  
Muzhankaal porutthu  
Munkaal  
Kudhi kaal  
karabam  
Anguli  
Vamsi  

VIII. **Mummalam**  
a. Malam  
b. Mootthiram  
c. Viyarvai  

IX. **Pira Uruppugalin nilai**  
a. Irudhayam  
b. Puppusam  
c. Eraippai  
d. Manneeral  
e. Siru-kudal  
f. Perun-kudal  
g. Siruneeragam  
h. Siruneer-pai  
i. Moolai  
j. Karuppai  

X. **Uyir thaathukkal**  
(1) **VATHAM:**  
a. Piraanan  
b. Abanan  
c. Viyaanan  
d. Udhaanan  
e. Samaanan  
f. Naagan  
g. Koorman  
h. Kirukaran  
i. Deva dhatan  
j. Dhananjeyan
(2) PITTHAM:

a. Anarpithham
b. Ranjaga pittham
c. Saadhaga pittham
d. Aaloasaga pittham
e. Piraasaga pittham

(3) KABAM:

a. Avalanbagam
b. Kiledhagam
c. Poadhagam
d. Tharbagam
e. Santhigam

XI. Udal thaathukkal

a. Saaram
b. Senneer
c. Oon
d. Kozhuppu
e. Enbu
f. Moolai
g. Sukkilam/Suronidham

XII. Envagai thaervugal

a. Naa
b. Niram
c. Mozhi
d. Vizhi
e. Sparisam
f. Malam
   • Niram
   • Eadai
   • Irugal
   • Ilagal
LABORATORY INVESTIGATIONS:

1. BLOOD:
   TC : cells/cu.mm
   DC : p %, L %, E %, M %
   ESR: 1/2 hour:
       1 hour:
   Hb%:
   Blood sugar: fasting:
       Postprandial:
   Serum cholesterol:
   Uric acid:
   Urea:
   VDRL:

2. URINE:
   Albumin:
   Sugar:
   Deposits:

3. MOTION:
   Ova:
   Cyst:

4. IMMUNOLOGICAL:
   R.A.factor:

5. Radiographic Evaluation:

6. Serological Test For Syphilis:

7. Synovial Fluid Analysis:

8. Arthrography:
LOCOMOTOR SYSTEM:

INSPECTION:

  Overlying skin: Color
    Scars and Ulcers
    Peri articular swelling
  Bones: Deformity
    Unusual posture
    Muscle changes
    Symmetrical distribution
    Joint movement
    Gait

PALPATION:

  Skin temperature
  Soft tissues
  Bony enlargement
  Crepitus
  Subcutaneous nodules
  Rheumatoid vasculitic lesion
  Lymphadenopathy
  Pitting oedema

RANGE OF MOVEMENT:

EXAMINATION OF INDIVIDUAL JOINTS: (RT & LT)

  Cervical spine
  Thoracic spine
  Lumbar spine
  Sacro-iliac joint
  Shoulder joint
  Elbow joint
  Wrist joint
  Interphalangeal joints
  Hip joint
  Knee joint
  Metatarso phalangeal joints
## INDEX OF OSTEOARTHRITIS: (WOMAC)

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<td>3. rising from sitting</td>
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<td>4. standing</td>
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<td>5. bending to floor</td>
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<td>6. walking on flat</td>
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<td>7. getting in or out of car</td>
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<td>8. going shopping</td>
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<td>9. putting on socks</td>
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<td>10. rising from bed</td>
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<td>11. taking off socks</td>
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<td>12. lying in bed</td>
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<td>14. sitting on chair</td>
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<td>15. getting on or off toilet</td>
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<td>16. heavy domestic duties</td>
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<td>17. light domestic duties</td>
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**Total**
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## 16. Laboratory Investigations

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EC - Epithelial Cells,