VALI AZHAL KEEL VAYU
(DISSERTATION SUBJECT)

For
the partial fulfillment of the requirements to the Degree of

DOCTOR OF MEDICINE [SIDDHA]

BRANCH III – SIRAPPU MARUTHUVAM

THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY, CHENNAI – 600 003
GOVERNMENT SIDDHA MEDICAL COLLEGE
Palayamkottai, Tirunelveli – 627002
SEPTEMBER – 2007
INTRODUCTION

Birth without deformity and life without disease is a boom to human race. It can be established by the following lines,

"அறிவு அறிவு வாழ்க்கைக் குறிக்கும் அறிவு - அறிவியல்
அறிவு ஆனது சுருக்கி போன்றி பிறந்து அறிவு.
- குடாசாமார்

Health is a positive states of well being that is to say every organ of the body functioning normally and perfect functional balance with every other organ.

The condition of the locomotor system is also one of the state of health. The locomotor system includes the muscles, joints and soft tissue structure such as tendons, ligaments.

Medicine as everyone knows is not merely a science but an art as well.

Siddha system is based on Truth and Philosophy according to this system of medicine, man and nature are inseparable and interdependent.

It is not only curative but also possess preventive, Rehabilitation and Rejuvenation aspect of its own than other systems of medicine in the world.

This system has the unique features like removal of the root cause of the disease and perfect remedies for body, mind and soul.

There are many ways to attain the eternal world such as Gnana margam and Kanma margam. Human body is considered to be the media. Further we must have disease less life.

Siddha system of medicine is dedicated bequest of siddhars cheerfully given to the human society to live long and free from disease.
If the natural harmony of the Threethathu becomes altered and this disequilibrium causes various diseases.

Dysharmony of Threethathu may be due to arusuvaigal, climatic changes and habits of the individual.

In the present circumstances with the high level of environmental degradation, westernized life style and scant regard for social and moral values, it is impossible to maintain healthy life. Among the three dhosas vatham is placed first.

In Yugi munivar’s “Vaidhya Chindamani” vatha diseases are classified into 80 types. Keelvayu comes under the 80 types of vatha diseses. In the text book of siddha maruthuvam keelvayu is further divided into 10 types.

Vali azhal keel vayu comes under in this 10 subdivisions.

Author had selected Vali Azhal Keel vayu for the clinical study of the dissertation work which correlate with Rheumatoid Arthritis in modern aspect, on the basis of the siddha concept, the course of the disease, diagnosis and treatment.

The author had chosen the drug Mudakkuvatha Chooranam as internal medicine and vatha thylam as external. As it is a herbal formulation it is purely safe and free from adverse effects.

The author hopes that this dissertation work will help the sufferers of Vali azhal keel vayuin giving new modality of treatment.

This is only a preliminary study.
AIM AND OBJECTIVE

Aim

Rheumatoid Arthritis is not only a polyarthritis, and the name Rheumatoid disease is preferable since it directs attention to whole patient and not just the joints.

Vali azhal keel vayu is a disease which causes so much suffering because of the tendency of crippling without killing. Most of the patients are unable to do their day today activities independently. The mean age of onset of Rheumatoid Arthritis is 40 years. Hence it affects the people in their active period of their life.

Since about majority of the clinical outcomes in today’s medical world pertain to musculoskeletal disorders, lot of interest has been developed in this field.

Complete remedy for this disease has not yet been arrived at all. Here this study was carried out with an intention to formulate an ideal treatment for the Vali azhal keel Vayu.

This being a preliminary endeavor by the author, as if it would be a helping hand to the sufferers. With this view, the dissertation subject was undertaken.

Objectives

❖ To study the clinical cause of the disease Vali azhal keel vayu with observation on the Aetiology, Pathology, Diagnosis, Prognosis, complications and treatment by making use of Siddha aspect.

❖ To expose the unique diagnostic method mentioned by siddhars, to know how the disease Vali azhal keel vayu alters the normal
conditions of the body under the topic Mukkutram, Poripulangal, Ezhu Udal Kattukal and Envagai Thervugal.

❖ To know the extent of correlation of Aetiology, classification, signs and symptoms of Vali azhal keel vayu in Siddha Aspect with Rheumatoid Arthritis in modern medicine.

❖ To have detailed clinical investigation.

❖ To have a clinical trial on Vali azhal keel vayu with Mudakku Vatha Chooranam as internal medicine and Vatha thylam as external medicine.

❖ To evaluate the biochemical and pharmacological effects of trial medicine.

❖ To use modern parameters to confirm and prognosis of the disease.
ABSTRACT

The author had chosen the disease Vali azhal keel vayu for the dissertation subject because it is one of the disorder which affects the individuals in higher incidence. It’s increased occurrence in recent times is due to stress, strain and abnormal dietary habits.

The inscriptions mentioned in the siddha literature about this disease and therapeutics impressed the author very much.

The disease is correlated with rheumatoid Arthritis as mentioned in modern medicine.

The author diagnosed the disease by using siddha parameters like Envagai Thervugal, Kaalam, thinai, Mukkutra Verupadugal and modern parameters like laboratory investigations. 40 patients in either sex had been selected by the author both as in inpatients (20) and out patients (20) and they were administered with the trial medicines.

- Mudakkuvatha Chooranam – 650 mg to 1300 mg thrice a day (Internal)
- Vatha Thylam – External Application
- The trial medicines are subjected to biochemical and pharmacological analysis.
SIDDHA ASPECT

\( \text{A} \times \text{B} \)

\( \text{A} | \text{B} \) \( \text{A} | \text{B} \)

\( \frac{\text{A} | \text{B} \times \text{C}}{\text{A} | \text{B} | \text{C}} \)

\( \text{A} | \text{B} \times \text{C} \)

\( \text{A} | \text{B} | \text{C} \)

\( \text{A} | \text{B} \times \text{C} \)

\( \frac{\text{A} | \text{B} | \text{C}}{\text{A} | \text{B} | \text{C}} \)

\( \text{A} | \text{B} | \text{C} \)

\( \text{A} | \text{B} \times \text{C} \)

\( \frac{\text{A} | \text{B} | \text{C}}{\text{A} | \text{B} | \text{C}} \)

\( \text{A} | \text{B} | \text{C} \)

\( \text{A} | \text{B} \times \text{C} \)

\( \frac{\text{A} | \text{B} | \text{C}}{\text{A} | \text{B} | \text{C}} \)

\( \text{A} | \text{B} | \text{C} \)

\( \text{A} | \text{B} \times \text{C} \)

\( \frac{\text{A} | \text{B} | \text{C}}{\text{A} | \text{B} | \text{C}} \)

\( \text{A} | \text{B} | \text{C} \)
..................................................
..................................................
..................................................  

Áìoklyn ñâû", ô âñô, ū  
Áìoklyn ñy ñâû", čč"á̃aøö ččýú
  °í, ŏñxí, ū  
  áíí Ácxø, Áíí, ø  
  áé|á, æc |áö, úííí |°â“äö ñâø  
  âãö ôxãçã Ácxéíýî ñá, í, ç |Áçõàîõø  
  °|ãö ôxãçã ° ø ñú, ðí, ð¿ö, ° ø č, úíč ç í ø ñâø
Ａｉｘ śāi, icty ḥēdāṣṭhō

"ānaḍ ăi:xāɪ ătōă", o āi:ōdi , 1caffold

AHU "ānīsāsā țuād ăi:xāi:ō
tāns" Á"āi:īi , esse ādēzi:n , i:ī|āyū
AHU s+ ḳācē is! āi:xōcū ṭūkisē"

- "ɔxox+ 2000

Āi x ąi, āi:ēd pōdoi:į sāo țuād , pōdoi:ii , ēu țuād ęyū bōa" , āi , o ātī , ātī , ēdē.

Āi x śi:ōi , iē pāo

"ōxcăāi:į ńōdō ıċċ+ō | ńōsāx ĭi:ii i:ɛmāō āi:ō
ōxcă ĵox̩c+căōō ḯōō , śki:i:ū ĭ:į:osă | āi:ċc , ā āsīćō
āsīćă | xi:ūx āi:xō zānō , čsăi āc+cō ṭō ăāō ăc:xīō
ōō "uāi: āi:xō āeį , ńōnı , ńūcūcē ńūkisă"

- șx"ăă+ āi , ńō

- ńō ği:ū , ńădō ńć+c+i:ći , āsī , ńće āāč , āćē , ēdē , ētē āāć , ācē , ēzē āāō āūūō āeī , o , īō.

"cāćāōō ayēcē xī:nā | țiyēi+ćōxō
يطā če:i:į āeīiō śki:i:ū
ītē|āeį , , ēō ī:ći āćăi:ıōō
āēc|āēe | țı:ōdāu āl" țōorki:isă"

- ńōdāă ți:āeį+

" , , ēō āūūō āćăi:ıōō țāuēcē āāć - ētē īō.

"āi:xō āōĎō ē șāi,b āāēd āāōāc | āūūō

xī:ăcčōćīōō " , , ēō ḱōō , țıōō śki:i:yūō
xī:ōō āōō țēdē Ġōōō ācē
āi:xăă "ā sāoāx āi:xōcū Īācē isă"

- ą , č dēćā+ āāōō "ācēă , ātāō 1000
AAFAI | A1OAO, P1DO, " , , I0 °O, ÇO AÅF, AÅO, ÆF+ °CUO, IOD PÆIÖ.

A1X SÆIÖ, Æ, ÆX, Æ

"A1XSAÅFÉOAKIÅ AÅOÇÅIÔXÅIÎ "A1XAIÔ ÒÇ+1°ÇÅIÔ AKOUO A1XSAI, Ï
ÆXESÅÅÉDUÇ ÇEIIÅÅ{}Î ÏÖ ÅSAÅAIÇ A1X4XO ÆÉÅACE | ÙYÉIASÁ"

A1XO ÆFÉOAKIÅ , I1ÔO 150 ÎÈDÇÇÅXIAIÖ. 150 ÎÇ, 150 ÒÇ+60 , 150AS4IÖO A1X SÅI, Ï 150XOÖ.

"ÒÇ+1°ÇO | Ç100 AO 150ÅE X10E
150+1°Ç ÄÇÉÔM ÉE1, Ï ÇÉÉM
Å1Ô ÇÉÔ -Î ÄÎÔE
Ô1, I ÔÅXÇ, 0 °,ÄÉI | °ÖM
ÔMÇ ÎÉXÉM ÇÉÉX ÄÇÉM
DÅ+°ÇÉD ÖKÅÇAE ÄÇÉÇÅM
AÉM ÓMÅ | ÅMÅÅM SÅIÔE
, ÏO ÅÇXÇÅHÔE <, X | ÅÅÇÅM
-ÅÇÉÅÅÇ "ÇÅ ÇÉÉ, Ô ÄÉÅE
,ÓÅÅÇ ÔÔÅXÉE -ÅE NÚ1, ÇÍXE
-ÅÇ+ÇÇ"Å Ô11, Ô -ÔXÇÇÅHÔE
-ÅÇÉÅÅÇ Ô1, Ô ÅÇ, I ÎÈÔÇÉM
-Ô+1°Ç ÇÇ"Å, Ô -ÔÈM1, ÇÍXE
+ÔÔ °Ç"ÇÉE ÇÉÇM AÔÔMÔE
+ÔÀ×å ÅÇÉXÅ ÅÇÅ SÆIÖ, Ô ,ÉÉÅ"ÇÅI, "ÉÉÅO ÇÅÁM"
- Å1YDÔ, ÇÅO

[AÅFÅD - A1XÖ]

"Õ1 | ÙYÉ , °OSÅIÔ BA+O O+ëEØ
°1X, A1Ö ÅÇXI, ÇOÔ °"ÅÔ4 ÅNÅM
- | ÙYÉ A1ÈÈÔD ÒÇ0X A1OÖ
- , IAO ÆÅÅD ÎÉÒÅ1ÔÔ
A1 | ÙYÉ A, ÔÉE, ÅÇÅÅÇÅèÖ
śziō āō āē

- Aćįiuéō"ţ āńīō "įx, ū (Ai-"ei, iō, "ōči, ēiī)
- ĩc-1°c ¾ōō |Aįōû, ū "ńęô
- ĩc+, īübçæiâxô
- ā"āâçô  ĭ"ęxô
- āēç้าi"xâçô āîêîêôôxô
- " ś+ôôx ā"ââçô xîîxô

"Aççxô , iō, č eii ā-āaça;i xâçàôs;i "ęe
ôççxâê+ sâ;ýâç ïiî ôèâçài xûë s;ięô
îcç-úô aççâç ñê, ī ľêçôô xâxô |âêë+
,ôêôô ôāi, ô |âûëâi+ ,ę |."âo , áaçà;iâo"
- "ē;âć" ,sâî
dūïēç,u

ai,"ņêô, ai, ço ė+ ā;ięô, |xiṅ"xî ,ęôxö , "ćîfâō, " ,
iś ;ięô , índôxô , ī"xîxô +ũûō dūïēç,"ći ,iâî āă ěy śziō
|xiłîîô.

āçç <ęe ,eəãîô

îēçîyî,u

"āi måêxô ,eə;ôâęy âôîêęc ėiüeî s,cęô

"máî+ âôxâðáô p"âî"ôô âāçûçû ,iô
mûî îîôxä æêî,ô mûxâçô +âîî'ôñîôô
,îxî ôéî, âęy"â ,îôîôî ,îî ,îxîôô"
- "ō;âîìç" ,sâî

"ńx -ńx |"āçà;iô ôççôx ;ôâô -ńxîıê , āâçûû ,iũî ūê ė*L ê ,iũûô âćxôë , ââîxô ,óî ,"ęô |âôîkô +ũûî ľêê
îxî,"ći ,iô âçîx,iôî , īî ,iô âçâxô ,ū ,"ľâ ,ęô ,çôx oçâō
+âîî"âôt , ââęx"âõ -ńxîîôî , ai,âęy"â , âîî ,âôx ôççâxô
ôâčö , ęû fâô ôxâçî ľêê .ũô ,iô.

"- .iâ îxîôô âçîxôô y"ââîô
Ai ,ê " , iô âçaîòi ,âxûô
xî ,iê sâétxêç |ââôðûxîô
sâî,iâęçû ôxî+îîxàîô |,iôsäx"
- "ôxâäx" îxâî ,xô xîâîî

"" , iô ,û |âîôôx ,çôx ,âî ,ôè sâçî |âəâîô
xêôô ônîxî ôîxô y"â +êôâîö"
"அச்சாத், இட்டு திகழ்த்து ஒட்டுக்கொள்வது
, ஒலிவல் என்று மெய்வை நிற்புதலே
, பொறியிட்டு அத்தியாயில்லை நோடிக்கப்படுகியிருக்கு
அதை வெளியே தேவையாக்கு
- அருட்சு மது

பிரிவியல்போற்றுணர்வாக

"பிரிவியல்போற்றுணர்வாக" பொறுப்பு வல்லற பிரிவியல்போற்றுணர்வாக நிருத்தக்கும் கையிலும்
கோளங்களை முன்மைகளும் காண்பது வணிமமாகும்.

கற்பிட்டு வருகடந்து

❖ பொழுதைவரியானம்
❖ புலதரமானது
❖ ரூபானது

கோளங்கள் குறிப்பிட்டும் அவர்களைத் தன்னொரு பெருமளவு
தொலைநகராகிறது வகுந்த நிகழ்வை குறிக்கும்.

பதிப்புகள்

1. பொல்வை
2. பரப்பை
3. கல்லு
4. கூக்கை
5. பேரு

புத்தாந்தராக
1. அல்லது
2. கூறு
3. காலம்
4. தனியுமனம்
5. மூகம்

விளக்கம்

விளக்கம் சரமாக செய்யப்பட்டுள்ளது. முதல்வரை கால்வரை கௌராண்டி முதல் பிளிப்பின்மைக்குழு பதியும் ஆபிராமியமுக்கு ஆராத்தை பதியும், கால்வரை, புலமக்கராம் பிளிப்பின்மைக்குழு பதியும், பங்களித்து பல்கலைக்கழக நிறுவன கூட்டமுடன் நிறுவனவினரினரின் மூலமாக குறுக்காக்குதலின் நோக்கத்தினால் ஆபிராமியமுக்கு ஆராத்தை பதியும் பிளிப்பின்மைக்கு கேளுகின்றார்.

சொல்லங்களின் இணைப்பு

சொல்லங்களின் இணைப்பு வெளியில் ஆபிராமியம் முதல்.

"முடியாது செய்ய முடியாது அல்லாஹ் நீங்க வருமானம் போட்டி வருமானம் போட்டிகளின் வருமானம் போட்டிகள்

- தலைப்பு

"செய்யாள்களை அல்லாஹ்நின் புலமக்கராம் கால்வரை கௌராண்டி முதல் பிளிப்பின்மையில் வருமானம்

புலமக்கராம் புலமக்கராம் பங்களித்து புலமக்கராம்

பங்களித்து பங்களித்து பங்களித்து

பங்களித்து பங்களித்து

- பங்களித்து பங்களித்து பங்களித்து

சொல்லங்களின் இணைப்பு
1. மூளை (Pulse)

மூளையில் குறிப்பிட்டால் நூற்றுக்கு வர்க்கங்களாக உள்ளது. மூளை முதலாக சிக்கும் வரையை அறிவுற்றுள்ளோர் குறிப்பிட்டு பார்க்கும் விளக்கு கூறுவதற்கும்.

"குறிப்பிட்டால் மூளை குறிப்பிட்டு பார்க்கும்
பொருளாதாரத்தில் பிரிக்கப்பட்டு விளக்கம்
உடன் முற்பார்க்கும் பயன்பாடு பெருகியோ பிறகு
முற்பார்க்கும் விளக்கம் கூறுவதற்கும்.

மூளைக்கான விளக்க வரையை அறிவதற்கு
முன்னேற்றங்களை வடட்டு வரையை, புது முறுக்காக்காக்கள்
முற்பார்க்கனவாசல் வேறிப்பு 1: 1/2 : 1/4 இலும் முற்பார்க்கப்படும் வரையை விளக்கப்படுவதற்கு.

மாதிரி அறிவு குறிப்பிட்டு வரையை விளக்க வரையை கூறுவதற்கு.

2. தண்பிலை (தண்பிலைக்கதற்கு)

மாதிரி அறிவு குறிப்பிட்டு வரையை விளக்கப்படும் வரையை விளக்கப்படுவதற்கு.

3. மூட் (Tongue)

மாதிரி அறிவு குறிப்பிட்டு வரையை விளக்கப்படும், விளக்கப்படும் கூறுவதற்கு.

4. சின்னம்
5. பயிர்ப்பு
மரத்தில் அப்புக்கு மாறுபடி விபரநாயகியுள்ள மலர்வெட்டியின் குறிப்பிட்டல் நூற்றாண்டு போல் இருந்தது.

6. கீர்த்தி
மரத்தில் அப்புக்கு மாறுபடி கீர்த்தி விழாநகரத்துக் காசனப்படியாய்.

7. மேல்
மரத்தில் அப்புக்கு மாறுபடி மேலும் மாசாண்டு காசனப்படியாய்.

8. புத்தியிருட்டிய
துப்பானிசுக்குறையுள்ள பிற்கிள்கி பங்களித்து புத்தியிருட்டிய அளிப்படும் ஆர்வமாய்.

பிற்கிள்கி

- மிளகால்
- சேர்க்கம்
- மால்கால்
- கல்கால்
- புனே பந்து
- கடன்னுப

அராமத் பபாம்

"ஒன்றியான ஆர்வத்தில் அனல்லா குழந்தையும், அவாக ஆன்தும் அக்காயனார் தொன்நம்பியக்கூடு கூறுதலுள்ளதற்கு தண்ணீராய்விற்கு தோற்றத்தை மலக்கள் தரமல்லது பார்க்கையால் குற்றமல்லே குண்டு சிகிச்சை

திர்கிள்கி அராகண்டிய் சிறப்புக்கூடு குழந்தை

- பபாமாய்

மாஸ் திரு

"ஒன்றியான ஆர்வத்தில் ஒன்று மாஸ்" (அராம-பபாம்)
பிற்பகுதி

"அபத்தில் பாதி ஐ. விக்கிரம" (அய்யிருவிகும்)

ம் பகுதி

"பதுபடுத்து பட்டியல் பொருளியல் கவிஞ்" 

நூற்றாண்டு பகுதி

"அபத்தில் அபத்தில் அவரது
அருமை வந்து அபத்தில் வந்து
விளக்கில் நூற்றாண்டு கவிஞ்" 

பதினான்மீத் பகுதி

நூற்றாண்டில் ஒருநாளில் அபத்தில் அவர் வந்து நூற்றாண்டு கவிஞ்.

பின் பகிர்க்கோட்டை வெளியூட்டல்

కால சுருக்கிப்பொருள்கள்

- காலசுருக்கிப்பொருள்கள்
- காலசுருக்கிப்பொருள்கள்
- காலசுருக்கிப்பொருள்கள்
- காலசுருக்கிப்பொருள்கள்
- காலசுருக்கிப்பொருள்கள்
- காலசுருக்கிப்பொருள்கள்
- காலசுருக்கிப்பொருள்கள்
- காலசுருக்கிப்பொருள்கள்
- காலசுருக்கிப்பொருள்கள்
- காலசுருக்கிப்பொருள்கள்

I. காலசுருக்கிப்பொருள்கள்

மகள் அபத்தில் மீது விளக்கில் காலசுருக்கிப்பொருள்கள் நூற்றாண்டு கவிஞ் பாதுபோற்றுகிறார்.

II. காலசுருக்கிப்பொருள்கள் (குறுக்கு விளக்கில் எண்ணுக்கோட்டை)

மகள் அபத்தில் மீது விளக்கில் எண்க, காலம் பாதுபோற்றுகிறார்.

19
III. 2.முறைக் கோண்டுகள்

20

மாணவுர்

முறைக் கோண்டுகள்

அபார்வாகம், மலை, மலைகள், குத்தகள் கிழிற்பும், கருப்படிகள், சீர்ப்போ வியுவுவு, நிறமை, ருளநுக்கு காட்சியான குழுத், துளைகள், பெயர்க்களையும், ஆணாட்டை.

முறைக் கோண்டுகள் பிரிவுகள்

1. பிரிவார்கள் (2.முறைக் கோண்டுகள்)

சுற்றுக் காரர்களை, மற்றை வேறுபாடு. பொருள் கண்டுகாரணம்

2. அபார்வாகம் (சிற்றுறைக் கோண்டுகள்)

சிற்றுறைக் கோண்டுகள் வெளியிருக்கும் தன்னான, அவ்வக வருமான் குறிப்பிட்டு, அந்த காரணத்துடன் செரும் வேளாண்மை விளம்பரிகளை காண்பிடுவதை.

3. முறைகள் (பார்வாகம்)

2 கிராமானா வழுவபும், அத்துவம் பார்வாக காரணத்துடன் விளம்பரிகளை புதுப்பிக்கோம், மாகாணம் வேறுபாடு.

4. காரணார் (சிற்றுறைக் கோண்டுகள்)

2 காரணிகள் காரணத்துடன் விளம்பரிகளை அத்துவம் காண்பிடுவதை.

5. காரணார் (சிற்றுறைக் கோண்டுகள்)

பைக் காரணார்கள் பிரித்து வேளாண்மை மாகாண் விளம்பரிகளை

6. காரணார்
7. குறிப்பிட்டு

நீண்ட்காலம் பிள்ளை பருவமலர்கள், 10வது பாண்டியரின் போருமுனை குற்றங்கள் காரணிகள்.

8. முற்பகுதி

பாளிக்குதி புதுவை, பாளிக்குதி குறைவை எண்ணளவு. துணையாரின் நீரெல்லை எண்ணளவு என்று காரணிகள்.

9. தொடர்ந்தென்று

செய்யுவின் இரண்டு பாதுகாப்பு என்று காரணிகள், சில இசைமா என்று காரணிகள்.

10. தொடர்ந்தென்று

சுருக்கி வலம் பகிர்களும், தீர்மானமையில் சுருக்கி வலம் போக்கும் போக்கும் போக்கும் போக்கும் போக்கும் போக்கும் போக்கும்.

பகிர்கள் என்று விளகியில் பதிவு, பிள்ளை, தமிழ், தமிழ் என்று விளகியில் பாரம்பரிய குற்றங்களாகும்.

அப்பாசன் - பம்சலணி.
பிள்ளை - பெவ்வரே போறுவையில் மனித, மீன்படு குரோம.
வம்பாசன் - பெய்விளகிய, சிறுவராசன.
செய்யுவின் - அப்பாசன், தூத்துக்கொண்டு என்று.

பின்னர் என்று காட்சியும்

1. அங்கிட்டு

2 இலவை பிள்ளைகள் போருமுனை பிள்ளை என்று கூறுவர்.

2. இரண்டு பின்னர்

இரண்டு பின்னர் பிள்ளைகள் போருமுனை பிள்ளைகளின் கதை.

3. சாகரம் பின்னர்
4. பிறங்கல்

சிங்காரலூர் கல்வியமைப்பு செய்தல்.

5. அறிவுகற்றல்

கல்லறைத்திட்டில் பொருள் கற்று விளக்கம்.

மாநிலம் சிறுகல்வியமைப்பு அறிவுகற்றல், சிறுகல்வியமைப்பு அறிவுகற்றல், பாண்டிய கல்வி திறன்.

அறிவுகற்றல் - பாண்டிய நாடு.
சிறுகல்வியமைப்பு - சிறுகல்வியமைப்பு தொடர் பாண்டிய நாடு.
சிறுகல்வியமைப்பு - சிறுகல்வியமைப்பு தொடர் பாண்டிய நாடு.

கல்விக் காண்டம்

1. அரசியல்

கற்றல் சுழுக்காளியின் புதுக் கல்லறைத்திட்டில்.

2. சிறுகல்வியமைப்பு

சிறுகல்வியமைப்பு செய்தல், மாநிலம் சிறுகல்வியமைப்பு அறிவுகற்றல் பாண்டிய நாடு.

3. பொருள்

சிறுகல்வியமைப்பு பொருள் அறிவுகற்றல்.

4. குற்றம்

சிறுகல்வியமைப்பு குற்றம் குற்றம்.

5. சிறுகல்வியமைப்பு

சிறுகல்வியமைப்பு சிறுகல்வியமைப்பு செய்தல் குற்றம் மாநிலம் பாண்டிய நாடு செய்தல்.

சிறுகல்வியமைப்பு சிறுகல்வியமைப்பு செய்தல், சிறுகல்வியமைப்பு செய்தல் பாண்டிய நாடு.

சிறுகல்வியமைப்பு - பாண்டிய நாடு.
சிறுகல்வியமைப்பு - சிறுகல்வியமைப்பு மாநிலம்.
IV. இரண்டாம் வகுப்பு (2 வகுப்பூடம்)

12 வண்டிகளை 10 வகுப்புகளுடன் வரையறுக்கப்பட்ட மாணவர்களும் வரையறுக்கப்பட்ட மாணவர்களும் வரையறுக்கப்பட்டுள்ளன.

<table>
<thead>
<tr>
<th>எண்</th>
<th>மணக்கிளக்கு</th>
<th>காற்று வல்லியும்</th>
<th>பின்வரும் வல்லியும்</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>காற்று</td>
<td>வேதத்தினரால் வர்த்தகமாக்கப்படும், ஓய்வு முறைகள், விளையாட்டு.</td>
<td>ஓய்வு முறைகளுடன் வர்த்தகமாக்கப்படும் ஓய்வு விளையாட்டு. பட்டப்பட்டு. பிரித்து கற்று.</td>
</tr>
<tr>
<td>2</td>
<td>பிரித்து</td>
<td>பாணிபார்க்குத் தீர்மானங்கள், மதனை, ஓய்வு முறைகளுடன் கற்று.</td>
<td>பாணிபார்க்குத் தீர்மானங்கள், மதனை, விளையாட்டின் கற்று. காட்டுப்பட்டு. பிரித்து கற்று.</td>
</tr>
<tr>
<td>3</td>
<td>காட்டு</td>
<td>வேதத்தினரால் கற்று வர்த்தகமாக்கப்படும் விளையாட்டுகளைக் கற்று.</td>
<td>வேதத்தினரால் கற்று வர்த்தகமாக்கப்படும் விளையாட்டு. வுருநூறு விளையாட்டி கற்று. காட்டு கற்று.</td>
</tr>
</tbody>
</table>
4  சங்கவரம்  திருப்பார்க்க நாளையில் வாசகத்தியாக வடிநிலைகளின்
திருப்பார்க்க நாளையில் வாசகத்தியாக வடிநிலைகளின்
நாளையில் வாசகத்தியாக வடிநிலைகளின்

5  சங்கவரம்  காலப்பகுதியில் இறக்கண், செய்யுதல் குறுக்கு, துறை, தொன்மை மேற்குள், இல்லை
காலப்பகுதியில் இறக்கண், செய்யுதல் குறுக்கு, துறை, தொன்மை மேற்குள், இல்லை

6  குமாரன்  காலப்பகுதியின் பரிசுக்கு பிரியத்தில் சுழற்சி, காலப்பகுதியின் தின்சன் வழுப்ப
காலப்பகுதியின் பரிசுக்கு பிரியத்தில் சுழற்சி, காலப்பகுதியின் தின்சன் வழுப்ப

7  பாடுரின்  நீண்டுநீண்டு காலத்தில் பாடுறின், காலத்தில்
நீண்டுநீண்டு காலத்தில் பாடுறின், காலத்தில்

மாணி அம்மக்கணிக்கப்படும் காலம், நீண்டுநீண்டு, காலம், காலம்
பாடுலிப்பால் குறுத்து.

பதிவு காலமாக

மாணி, பிற்கு காலங்களைத் தரும் பாடுலிப்பால் காலம், காலத்தில், கம்பன் காலங்களை
தவண்டு காலங்களைத் தரும் பாடுலிப்பால் அனுக்காலங்களை தரும் பாடுத்தல் காலங்களை, பாடு
தவண்டு பாடல்கள் காலங்களை தரும் பாடல்கள் ஆக பொறுப்புறுமத்தாக

<table>
<thead>
<tr>
<th>சுற்றுச்சூழல்கள்</th>
<th>சூழல் காலம்</th>
<th>அதைக்குறித்து</th>
<th>காலம்</th>
</tr>
</thead>
<tbody>
<tr>
<td>மாணி</td>
<td>திருச்செயன்று காலம் (சிவநல்லறை, சிவநல்லறை)</td>
<td>புத்தகமேற்று காலம் (அலிபரி, அலிபரி)</td>
<td>குரல் காலம் (குரல், குரல்)</td>
</tr>
<tr>
<td>பிற்கு</td>
<td>காலங்கள் (அலிபரி, புர்னராத)</td>
<td>குரல் காலம் (குரல், குரல்)</td>
<td>பொறுப்புக்குரல் காலம் (மாணி, மாணி)</td>
</tr>
<tr>
<td>கம்ப</td>
<td>பாடல்கள் காலம் (மாணி, கம்ப)</td>
<td>பொறுப்புக்குரல் காலம் (மாணி, மாணி)</td>
<td>புத்தகமேற்று காலம் (அலிபரி, அலிபரி)</td>
</tr>
</tbody>
</table>
பாதிக்கும் காரணங்கள் குறிப்பிட்டு (தீப்பிற்குக் காரணிகள்) கால்வாய்ப்புக்கு அறிக்கை கருதுபடுகின்றது.

VI. திறந்தேற்ற

<table>
<thead>
<tr>
<th>திறந்தேற்ற துறைகள்</th>
<th>கால்வாய்ப்புக்கு காரணிகள் திறமை</th>
</tr>
</thead>
<tbody>
<tr>
<td>பாலூடு புல்வெளி</td>
<td>கால்வாய்ப்பு காரணிகள் திறமை</td>
</tr>
<tr>
<td>மருத்துவம்</td>
<td>கால்வாய்ப்பு காரணிகள் திறமை</td>
</tr>
<tr>
<td>விலங்குகள்</td>
<td>கால்வாய்ப்பு காரணிகள் திறமை</td>
</tr>
<tr>
<td>விலங்குகள்</td>
<td>கால்வாய்ப்பு காரணிகள் திறமை</td>
</tr>
<tr>
<td>பாலூடு புல்வெளி</td>
<td>கால்வாய்ப்பு காரணிகள் திறமை</td>
</tr>
</tbody>
</table>

பாதிக்கும் காரணங்கள் பாதிக்கும் காரணிகளை விளக்குறிகள் கருதுபடுகின்றன.

VII. 2வது சிற்றூற்றம

1. திறந்தேற்ற சிற்றூற்றம்

2. கால்வாய்ப்புக்கு

3. செய்முறைக் சிற்றூற்றம்

பாதிக்கும் காரணங்களை விளக்குறிகள் கருதுபடுகின்றன. பாதிக்கும் காரணங்களை விளக்குறிகள் கருதுபடுகின்றன.

பதிக்கிழந்த

1. கால்வாய்ப்பு விளக்க வேனவிடை கால்வாய்ப்புக்கு விளக்கமும் முன்னேறுக்கும் வேனவிடை "பதிக்கிழந்த வேனவிடை"

15 முதல் வேனவிடை கால்வாய்ப்புக்கு வேனவிடை முன்னேறுக்கும் பதிக்கிழந்த வேனவிடை கருதுபடுகின்றது.
II. படைமுறை

- பல்கலைக்கழக காலம் 650 முதல் - 1300 முதல் காலம் அடையாளமான கல்விக்கலை சாத்தியான மன்னர் சூடு செய்ய சந்திக்கும் பாதுகாப்பு.
- மறுக்கு கதையுடைய இயற்கையியல் நூற்றாண்டுகள் கொண்டுள்ளது.
- குறுக்கு.

III. பதிப்பு

1. இந்தியாவின் பொழுது பார்வைகள்

"கன்னன் கருத்தியலாளர்களே குழுவுடன் பார்வைகள் செய்ய மற்றும் விளக்கக்கூறுகள் கிளக்கள். பார்வைகள் செய்யுடைய இடங்கள் பொழுது பார்வைகள் நாகரிகத் துறை விளக்கப்பட்டது இன்று பார்வைதான் முக்கியமான ப்ள்ளியை பார்வைதான்"

-சிவன் பார்வைதான் குழ்முகம்

பொழுது நாட்டு, மண்டலம், நகரகை, பல்வேகமான காலம் அல்லது காலமானது பார்வைகள், கால்வாய், கால்வாய், கால்வாய், கூட்டத்தாக காட்டும் காலங்களை பார்வைதான் பார்வைதான் குற்றுக்களை பதிவு செய்வது.

"புத்துவம் முக்கியத்துடன் பதிவைத்த வழிகாட்டும்"

புத்துவம், வணங்கச்சாம் பார்வைகள் இன்று பார்வை.

2. இந்தியா பொழுதுக்கள் அடை பார்வைகள்

"புத்துவம் ஆரம்பமுதல் பதிப்பு கூறு காலங்களை பாறாக்கும் காலப்பகுதிகள் காலப்பகுதிகள்;
- காலப்பர்னாண்ட பார்வைப்பாடு போரியோ பார்வைப்பாடு போரியோ பார்வை ஆரம்பமுடையப் புத்துவத் தன்னை காட்டி"

வருடா கல்விப்பம் விளக்கம்

மாணிக்கும் வருடம்

"நல்லசூடுகள் விளக்கம் கல்விப்பம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம்

- சபை சின்னார்

காலமாற்றாளியின் வருடம், பார்வை வருடம், காலார் சிறப்பு விளக்கம். வருடம் வருடம், வருடம், வருடம் வெளியுள்ளது. காலம், காலம் விளக்கம் விளக்கம் விளக்கம். விளக்கம், புத்தத்தில் விளக்கம் புத்தத்தில் விளக்கம், காலார், புத்தத்தில் விளக்கம், விளக்கம் வெளியுள்ளது, விளக்கம், காலம் வெளியுள்ளது. செய்யும் சிறப்பு வருடம்

அய்யனத் வருடம்

"நல்லசூடுகள் வருடம் கல்விப்பம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் விளக்கம் 

-சபை சின்னார்

வானிக்கிய காலார் விளக்கம் பராங்கள் விளக்கம் வெளியுள்ளது. வாரம்மன, விளக்கக் குறிப்பிட்டது குறிப்பிட்டது குறிப்பிட்டது குறிப்பிட்டது குறிப்பிட்டது குறிப்பிட்டது குறிப்பிட்டது. குறிப்பிட்டது குறிப்பிட்டது குறிப்பிட்டது குறிப்பிட்டது குறிப்பிட்டது

துவானிக்கியார்

"கல்வி வருடம் வருடம் கல்வி வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம் வருடம்

-சபை சின்னார்
செயற்கையான, பொருள் நிறை, மற்றும் கல்வி நிறை கையாக்கும் எண்மத்தில் மரபுக்குள் மரபுக்கு மரபு கையாக்கல் நிறையான நிறைய, நடந்து கையாக்கும் பலகைகள் மற்றும் பலகைகளை பருவாய் மற்றும் கையாக்கல் நிறைய நிறைய, என்று சொல்லப்படும் அலபய புரட்சியால் போர்த்தர் புரட்சியின் புரட்சியானார். தொன்றுக் குறிப்பிட்டு அரசியல் பொருளியல் குறிப்பிட்டு மரபுக்கு குறிப்பிட்டு மரபுக்கு மரபு கையாக்கல் நிறைய.
MODERN ASPECTS

Rheumatoid Arthritis

The word Rheumatoid is derived from Greek language (Rheuma : Flux, eidos – resemblance) indicating a condition resembling rheumatism.

‘Le rheumatisme’ the French term refers to musculo skeletal pains and the term gave us rheumatoid arthritis a systemic illness with joint involvement.

Sir Alfred Barring Garrod first proposed the term Rheumatoid Arthritis in 1858.

The potential of the synovial inflammation to cause cartilage destruction and bone erosion and subsequent changes in joint integrity is the hallmark of the disease.

A synovial joint has the following components

- A joint capsule has that isolates the joint from surrounding tissue.
- A joint cavity formed by the surrounding joint capsule.
- A synovial membrane (Synovium) the inner lining of the joint capsule.
- Synovial fluid that is secreted by the synovium and serves as a lubricant and carries nutrients for the joint.
- Bones that come together to form the joint.
- Hyaline (articular) cartilage protecting the ends of the bones that participate in the joint.

There may be other structures present in or near the joint such as discs, cartilage (menisci), tendons and ligaments.
Important characteristics of these structures include:

- The joint capsule is composed of two layers, an outer fibrous layer and the inner synovium. The outer layer has many joint receptors innervating it, but is not well vascularised. The opposite is true with synovium i.e. it is well vascularised but poorly innervated.

- The articular cartilage has two important functions including the ability to minimize friction and wear between two opposing joint surfaces during movement and to dissipate forces on the joint over a wider area, thus decreasing stresses on the contacting joint surfaces.

- Synovial fluid contains hyaluronate (hyaluronic acid) and a glycoprotein called lubricin. Both are responsible for the lubrication of the joint, although they are specific for certain components. Hyaluronic acid is important for the cartilage on cartilage lubrication.

- Synovial fluid is also the medium by which nutrients are carried to, and wastes are carried from the vascular components of the joint.

- The ends of the long bones that form the joints are composed of soft, spongy type of bone called subchondral bone. Hyaline (articular) cartilage covers this bone and protects it. Except for the very ends of the bone, long bones are usually very strong.

Definition

The typical clinical phenotype of rheumatoid arthritis is a symmetrical, deforming, small and large joint polyarthritis often associated with systemic disturbance and extra-articular disease features.
**Epidemiology**

- The prevalence of Rheumatoid Arthritis is approximately 0.8% of the population.
- Women are affected approximately three times more often than men.
- The prevalence increases with age and sex differences diminishes in the older age group.
- Rheumatoid Arthritis is seen throughout the world and affects all races. The prevalence is lowest in black Africans and Chinese and highest in pima Indians.
- The onset is most frequent during the fourth and fifth decades of life, with 80% of all patients, developing the disease in between the age of 35 and 50.
- Rheumatoid Arthritis is uncommon in men under the age of 45.
- The incidence of Rheumatoid Arthritis is more than six times greater in 60 to 64 year old woman compared to 18 to 29 year old woman.

**Aetiology**

No single factor had been identified to data.

1. Host genetic factor
2. Immuno regulatory abnormalities and auto immunity
3. A triggering (or) persisting microbial infection

**Genetic Factor**

- Evidence for the importance of genetic susceptibility comes from higher concordance rates in monozygotic (12-15%) than in dizygotic twins (3%)
- Severe Rheumatoid Arthritis is found at approximately 4 times the expected rate in first degree relatives of
individuals with disease associated with the presence of the auto antibody, Rheumatoid factor.

- One of the major genetic factors in the aetiology of Rheumatoid Arthritis is the class II major histocompatibility complex (MHC) gene product HLA-DR4.
- HLA-DR4 is the major susceptibility halotype in most ethnic groups, DR1 is more important in Indian and Israelis and DW15 in Japanese.
- Genetic factor influence both susceptibility and severity with DR4 positivity more common in those with severe erosive disease.

**Environmental Factors**

**Infectious Agent**

- It has been suggested that Rheumatoid Arthritis might be a manifestation of the response to an infectious agent in a genetically susceptible host.
- The organisms that have been implicated are Epstein – Barr virus, cytomegalo virus, parvo virus, rubella virus and mycoplasma.
- The microorganism or response to microorganisms might induce an immune response to components of the joints by altering it’s integrity and revealing antigenic peptides.
- Another possibility is that the infecting microorganism might prime the host to cross – reactive determinants expressed with in the joint as a result of “molecular mimicry”.
- Super antigens are proteins with the capacity bind to HLA – DR molecules and patients Vβ gene products and stimulate specific T-cell expressing the Vβ gene products. “Super antigens” produced by a number microorganisms including Staphylococci, Streptococci and M.arthritidis. The sole of
superantigens in the etiology of Rheumatoid Arthritis remains speculative.

- Recently scientists have reported that smoking tobacco increases the risk of developing rheumatoid arthritis.

**Trauma**

Many patients have mentioned traumatic incidents as a precipitating cause.

**Psychological Stress**

The study of identical twins in one of whom rheumatoid arthritis developed tends to support this concept.

**Vascular Changes**

Alteration of the normal, peripheral vascular bed perhaps by autonomic influence has been suggested as the primary abnormality.

**Neurogenic**

Neuropeptides can cause inflammation. Reflex sympathetic areas through the spinal cord could account for the contralateral distribution. Rheumatoid Arthritis affects the non-paralysed side much more severely in a hemiplegic patient.

**Autoimmunity**

**Antigens**

The antigens are the substance, which induce specific immune reactions in the body.

**Types**

1. Auto antigens - the antigens present on the body’s own cells like ‘A’ antigen and ‘B’ antigen on the RBC’s.
2. Foreign antigens - the antigens entering the body from outside.
**Antibodies**

Antibodies or immunoglobulins (Ig) are produced by plasma cells in response to the presence of antigens.

Immunoglobulins are circulating antibodies synthesized in B lymphocytes and plasma cells in response to the invasion of foreign compounds.

**Classes and Subclasses**

There are five major classes of immunoglobulins present in humans. They are IgG, IgA, IgM, IgD and IgE.

The differentiation of the classes is based on their molecular weight, structure, electrophoretic mobility, ultra centrifugal properties and immunological properties.

IgG and IgA are further subdivided into subclasses such as G₁, G₂ and G₃ for IgG and A₁ and A₂ for IgA.

**Auto immune disease**

Normally the body has the tolerance against the self antigen. However, in some occasions, the tolerance fails or becomes incomplete against the self antigen. This state is called auto immunity.

**Types**

- Organ Specific
- Organ non specific or multisystemic diseases

Rheumatoid Arthritis was classified as an autoimmune disease, following the discovery of IgM Rheumatoid factor in the blood of the patients.

The Rheumatoid factor – secreting plasma cells have been demonstrated in the Rheumatoid synovium.
Other auto antibodies that occur in the rheumatoid arthritis patients include natural antibodies, anti nuclear antibodies, anti collagen antibodies, anti keratin antibodies and an IgG perinuclear factor. They are considered as associated with the disease process but not directly involved in the pathogenesis.

Another set antibodies identified in Rheumatoid Arthritis patients are directed against antigens present on cartilage such as collagen type II, IX and XI and chondrocyte – specific antigens. The popular hypothesis for induction of autoimmunity is that of “antigenic mimicry”.

PATHOPHYSIOLOGY

The Initial Events

The Macrophages or dendritic cells that serve as the antigen presenting cells are the first to be involved in the human immune response. The relevant receptors on the antigen presenting cells are the class II major histocompatibility complex (MHC) molecule.

The macrophages ingest process and presence of the foreign antigen to T-lymphocytes initiate a cellular immune response and stimulate the B-lymphocytes into plasma cells that secrete antibodies.

Early stage doesnot produce any symptoms.

Organisation of Inflammation

The immune response becomes organised in the perivascular areas in the synovial membrane, as the increase in the number of T-cells leads to the proliferations and differentiation of B-cells.

Macrophage from the synovial tissue secrete cytokines which activate the endothelial cells to proliferate and organize them selves into blood carrying tubes. Also within the synovial fluid of an inflamed rheumatoid joint, there is virtual absence of the
suppressor – inducer T cells and marked increase of the helper T-lymphocytes and presence of of the relevant antigen activate the B lymphocytes in synovial membrane to differentiate into antibody secreting cells. These steps are medicated by interleukin – 2.

The antibodies are immunoglobulins directed against the Fc region of the IgG and have been named as rheumatoid factors. Neutrophils are attracted into the joint cavity by complement 5a, leukotriene B4 and platelet activation factor. More than billion neutrophils enter the rheumatoid joint each day. The neutrophils release enormous quantities of proteinases and additional chemo-attractant molecules.

Presence of larger amounts of the proteinases and their respective natural inhibitors, allowing unrestricted enzymatic degradation of articular cartilage, meincre and ligaments.

Rheumatoid Arthritis becomes symptomatic at this stage.

Hands wrist and knee are the first to be affectd. General fatigue and malaise are caused by cytokines such as interleukin and tumour necrosis factor. Morning stiffness is probably due to incresed fluid in and around the joint proliferated and dialated synovial vessels causes the joint to feel warm, In fair skinned individuals a reddish discolouration of overlying skin may be observed.

The Destruction Phase

The production of proteolytic enzymes and prostaglandins by synovial cells is induced by cytokines [interleukin 1]. Dendritic cell has a high level of collagenase and interleukin 1 production. Besides collagenease, the rheumatoid synovium cells also release stromelysin and both proteinases are capable of destroying almost all matrix protein present in articular cartlage and bone.
Pathogenesis

Intracavitary fibrin clots may initiate pannus formation and
the immunopathology of rheumatoid arthritis.

Two critical steps, probably host dependent, may determine
the development of rheumatoid arthritis an altered regulation of
extravascular haemostasis or an aberrant reactivity of synovial
fibroblasts to the adhered fibrin clots.

Pathogenesis of rheumatoid arthritis as a fibrin induced
disease

1. Exudation of fibrinogen and clotting factors to the joint space
   follows joint swelling
2. Haemostasis activation within the cavity leads to fibrin
   formation
3. Fibrin clots are partially removed by the plasminogen system,
   but most of them get stuck to the synovial intima.
4. Cells at the fibrin-synovium interface migrate into and around
   the deposits.
5. Clot components induce multiple activating pathways in
   synoviocytes by the coupling of specific receptors. These
   include proliferation, secretion of proteinases and synthesis of
   proinflammatory mediators.
6. A fibro proliferative tissue appears underneath the front of
   migrating cells, as a result of remodelling the invaded clots by
   activated cells. In this area, macrophages and blood vessels
   are increased owing to the release of growth factors and
   chemokines.
7. Remodelling induces modifications in the structure of fibrin
   chains, which become immunogenic.

   Epitopes from these transformed autologous peptides are
   presented to T lymphocytes, which in turn initiate a specific
immune reactivity against them. As illustrated in the right panel, continuous deposition of fibrin clots and the advance of the front of migration account for tissue hypertrophic growth at the areas of attachment.

**Clinical Features and Manifestation**

The small joints of the hands and feet are first affected in 70% of the patients. In older patients the shoulder joint commonly involved first. The onset is acute with fever and serious constitutional symptoms in about 20% of cases.

Rheumatoid Arthritis [Peri as well as Polyarticular in site]

<table>
<thead>
<tr>
<th>Pathological Process</th>
<th>Tissue Involved</th>
<th>Results In</th>
<th>Deformitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vasculities</td>
<td>Joint Structures</td>
<td>Synovitis – effusion</td>
<td>Swelling</td>
</tr>
<tr>
<td>Necrosis</td>
<td></td>
<td>Articular cartilage destruction</td>
<td>Stiffness</td>
</tr>
<tr>
<td>Fibrosis</td>
<td></td>
<td>peri capsulitis</td>
<td>Instability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ligamentation</td>
<td>subluxation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>instability</td>
<td>– dislocation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arthritis</td>
<td>intrinsic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>plus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>defromity</td>
</tr>
<tr>
<td>Plasma cell Proliferation</td>
<td>Tendon</td>
<td>Tenosynovitis</td>
<td>Ulnar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rupture</td>
<td>deviation of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>fingers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Concertina</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>collapse of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>fingers</td>
</tr>
<tr>
<td>Granulation</td>
<td>Muslce</td>
<td>Wasting</td>
<td></td>
</tr>
</tbody>
</table>
### Distinct Patterns of onset

#### Palindromic Onset

In about one-fifth of the patients with rheumatoid arthritis, typically the inflammation develops over few hours and is accompanied by erythema and swelling of the affected joints but resolves completely with in 48 to 72 hours leaving no residual features.

#### Explosive Onset

In about 10% of cases the onset of the disease is very rapid, even over night, with sever symmetrical polyarticular involvement.

#### Systemic Onset

This is particularly common in middle aged men in whom non-articular features may dominate the clinical picture although rheumatoid factor is usually present in high titres.
**Insidious Onset**

Rheumatoid Arthritis develop insidiously over weeks or months, it is seen in up to 70% of the cases, associated with a relatively poor prognosis.

**Polymyalgcic Onset**

Limb / Girdle muscle symptoms may precede the onset of an overt arthropathy, particularly in the elderly.

**Mono and Pauci articular onset**

In young women there may initially be very limited joint involvement, particularly involving the knees.

**Acute (or) Subacute Onset**

One third of patients have an acute or sub acute onset.

**Signs and Symptoms**

Pain in the affected joints, aggravated by movement, is the most common manifestation of established RA.

Generalised stiffness is frequent and is usually greatest after periods of inactivity. Morning stiffness of greater than one hour duration is an almost invariable feature of Inflammatory arthritis and may serve to distinguish it from various non-inflammatory joint disorders.

Constitutional symptoms such as weakness, easy fatiguability, anorexia and weight loss are experienced by majority of the patients.

Although fever to 40°C occurs on occasion. Clinically synovial inflammation causes swelling, tenderness and limitation of motion.

Joint swelling results from accumulation of synovial fluid, hypertrophy of synovium and thickening of the joint capsule.

Initially motion is limited by pain. Later fibrous or bony ankylosis or soft tissue contractures lead to fixed deformities.
Warmth is usually evident on examination, especially of large joints such as knee but erythema is infrequent.

**IN VolVEMENT OF INDIVIDUAL JOINTS**

**Hands and wrist**

Rheumatoid Arthritis characteristically involving certain specific joints such as proximal interphalangeal joints and the metacarpophalangeal joints.

Early in the disease there may be soft tissue swelling around the affected joints.

The typical patients show fusiform inflammatory swellings, often with a dusky cyanosis over the inflammatory joints, which produce characteristic **spindle shaped fingers**.

Later marked synovial hypertrophy on the dorsum of the wrist with involvement of extensor tendon sheath results in **dropped finger** affecting the little finger.

Tenosynovitis of the long flexor tendons in the palm of the hand may exacerbate stiffness of the fingers and cause **trigger finger**.

Synovitis at the wrist with in the flexor retinaculum may cause compression of the median nerve with the typical features of the **carpal tunnel syndrome**.

Volar subluxation of the fingers at the metacarpophalangeal joints occurs as a result of destruction of the articular cartilage and subsequent instability of these joints.

**Piano key sign**

Weakening of the distal radio-ulnar ligament by synovitis allow the distal ulnar to migrate dorsally so that it overrides the radius (**caput ulnae syndrome**). The ulna can be depressed by pressure like a piano key.
**Carpal collapse and fusion**

It may occur late in the disease, when instability of the wrist may lead to collapse of the carpal bones causing foreshortening of the carpus and ultimately spontaneous fusion of the wrist.

The eventual functional loss characterized by inability to make a fist, pinch thin objects and weaken grip strength.

Persisting synovitis with destruction of the articular surface, weakening of the joint capsule, muscle wasting with or without tendon rupture leads to characteristic rheumatoid hand deformity which includes,

- Ulnar deviation of the fingers and subluxation of the fingers as a result of instability of these joints.
- Swan neck deformity with hyper extension of the proximal interphalangeal joints with fixed flexion of the distal interphalangeal joints.
- Button hole deformity (Boutonneir’s deformity) which includes fixed flexion of the proximal interphalangeal joints and extension of the distal interphalangeal joints.
- “Z” deformity of the thumb – radial deviation of the wrist, ulnar deviation of the digits after with palmar subluxation of the proximal interphalangeal joints.
- Bull horn deformity – due to rupture of the extensor communis tendon from synovitis near the ulnar styloid.

**Elbow and Shoulder Joints**

- Involvement of the elbow is less common than of the wrist, but severe destructive changes leads to “fixed flexion deformity”.
Radiohumeral joint is more commonly symptomatic than humeroulnar joint.

Periarticular structures (Olecranon bursa, Ulnar nerve) also be affected by synovitis and subcutaneous nodules are commonly found on the extensor surface of the fore arm close to the elbow.

There may be inflammation of the subacromial bursae or supraspinatus tendon in addition to glenohumeral joint synovitis, producing a typical **painful arc syndrome**.

**Feet and Ankle Joints**

- Active synovitis in the metatarso phalangeal joint can produce pain and tenderness, best elicited by the lateral squeezing of the joints.

- The synovial swelling of the active disease together with constriction of the ligament between the metatarsal heads may broaden the forefoot and separate the foot to produce the **Day light Sign**.

- Typical deformities may also developed in the feet including
  - Eversion at the hind foot (Subtalar joint)
  - Plantar subluxation of the metatarsal heads
  - Widening of the fore foot

  Hallux valgus and lateral deviation and dorsal subluxation at the toes. Patient complaints of pain arising in the ball of the foot (Metatarsalgia) which can vary in intensity from a feeling of “**walking on Pebbles to like walking on broken glass**”.

  Chronic Arthritis in the subtaloid and midtarsal region can lead to “**Pes plano – valgus deformity**”.
Knee Joints

- In the knee joint synovial hypertrophy and effusion are often marked.
- Pain and swelling in the back of the knee joint may be caused by extension of inflamed synovium into the popliteal space (Baker’s cyst).
- Wasting of quadriceps is present. flexion contraction may develop.

Axial skeletal

- Spinal arthritis is common, up to 80% of patients demonstrating radiological evidence of the disease in the cervical spine.
- The patients complaints pain in the cervical spine that radiates upwards over the occiput, vertex and to the forehead.
- Instability (lateral or vertical subluxation) of the atlantoaxial joint results them erosion of the odontoid peg or rupture of the supporting ligaments and will be apparent on lateral radiographs of the cervical spine.
- Atlanto axial dislocation may cause vertebro basillar insufficency or may produce neurological signs by direct pressure on the cord.
- Involvement of sacroiliac joint is rare in Rheumatoid Arthritis.

Hip Joints

- The Hip is less commonly involved.
- Pain is usually experienced in the groin and the buttock, but may radiate to the knee sometimes mimicking knee arthritis.
Persistent synovitis in the weight bearing joint soon leads to the destruction of the cartilage and bone. The acetabulum is eroded and eventually the femoral head may get perforated as its floor.

The hallmark of the disease is progressive bone destruction on both sides of the joints without any reactive osteophyte formation. This is often referred to as “aseptic necrosis”.

Other Joints
Hoarseness of voice caused by effusion within the cryco – arytenoid joints.
Temporal – mandibular joint involvements produces pain on chewing.
Acromioclavicular and sternoclavicular joints may also be involved.
Discitis can occur in the lumbar as well as the cervical spine.

EXTRA ARTICULAR MANIFESTATION

<table>
<thead>
<tr>
<th>Systemic</th>
<th>Musculo skeletal</th>
<th>Haematological</th>
<th>Lymphatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fever</td>
<td>2. bursitis</td>
<td>1. Anaemia</td>
<td>2. Splenomegaly</td>
</tr>
<tr>
<td>3. Weight loss</td>
<td>4. osteoporosis</td>
<td>2. eosinophilia</td>
<td>2. felty's syndrome</td>
</tr>
<tr>
<td>4. susceptibility to infection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nodules</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Sinuses</td>
<td>2. Fistulae</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ocular</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scleritis</td>
<td>2. episcleritis</td>
</tr>
<tr>
<td>3. Scleromalacia</td>
<td>4. keratoconjunctivitis sicca</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Vasculitis</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Digital arteritis</td>
<td>2. mono neuritis multiplex</td>
</tr>
<tr>
<td>3. Ulcers</td>
<td>4. visceral arteritis</td>
</tr>
<tr>
<td>5. Pyoderma gangrenosum</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cardiac</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pericarditis</td>
<td>2. Myocarditis</td>
</tr>
<tr>
<td>3. Endocarditis</td>
<td>4. conduction defects</td>
</tr>
<tr>
<td>5. Coronary vasculitis</td>
<td>6. granulomatous aortitis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Pulmonary</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nodules</td>
<td>2. Bronchiolitis</td>
</tr>
<tr>
<td>3. Pleural effusions</td>
<td>4. caplan's syndrome</td>
</tr>
<tr>
<td>5. Fibrosing alveolitis</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Neurological</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cervical cord compression</td>
<td>2. Peripheral Neuropathy</td>
</tr>
<tr>
<td>3. Compression neuropathies</td>
<td>4. mono neuritis multiplex</td>
</tr>
</tbody>
</table>

Low grade fever, weight loss, anorexia and malaise are some of the extra articular manifestation.

Besides these it includes,

**Subcutaneous Rheumatoid Nodules**

Subcutaneous and intracutaneous nodules are the hallmark of the disease.

It develops in 20 to 30% of patients with Rheumatoid Arthritis.
They are usually found on peri articular structures, extensor or other areas subjected to Mechanical pressure.

Common locations include a olecranon bursa, the proximal ulnar, the achilles tendon, the occiput etc., they are also found in the flexor tendon, the sclera, with in the aortic valve, myocardium, larynx and vocal cord.

Histologically, the nodules consist of a central zone of necrotic material, including collagen fibrils, non-collagenous filaments and cellular debris, mid zone of palisading macrophages that express HLA – DR antigens and an outer zone of granuloma tissue.

**Rheumatoid Vasculitis**

It can affect nearly any organ system and is seen in patients with severe form and high titres of circulating rheumatoid factors.

Neurovascular disease presenting either as distal sensory neuropathy or as mononeuritis multiplex may be the only sign of vasculitis.

Cutaneous vasculitis usually presents as crops of small brown spots in the nail bed, nail folds and digital pulp. Larger ischaemic ulcers especially in the lower extremity may also develop.

Vasculitis also involves the lungs, bowel, liver, spleen, pancreas, lymphnodes and testes.

**Renal Involvement**

Renal papillary necrosis and interstitial nephritis occasionnally occur IgA nephropathy associated with elevated serum levels of IgM and IgA is described in Rheumatoid Arthritis.

**Liver Involvement**

This is evident in about 10% of patients with active disease.
There may be mild hepatosplenomegaly and asymptomatic elevation of the serum alkaline phosphatase.

Kupffer cell hyperplasia and lymphocytic infiltration of the portal tracts may be seen.

**Pulmonary Manifestations**

- This is more in men.
- Pleuro pulmonary nodule may occur as singly or in clusters when they appear in individuals with the pneumoconiosis and diffuse nodular fibrotic nodules 0.5 – 5 cm in diameter are seen mainly in the periphery of the lung fields. This association is known as **Caplan’s syndrome**. These nodules may produce pneumothorax or broncho pleural fistula.
- Interstitial fibrosis
- Pleurisy and pleural effusion produces frank synovitis.
- Pulmonary fibrosis is common in rheumatoid arthritis but is often subclinical.
- Pulmonary hypertension due to vasculitis.
- Obliterative bronchiolitis is a rare but rapidly progressive and fatal process.

**Cardiovascular Manifestations**

- Asymptomatic pericarditis
- Pericardial effusion
- Constrictive pericarditis
- Cardiomyopathy
- Coronary artery occlusion
- Acute aortic regurgitation
- Valvulitis

**Hematological Manifestations**

- **Felty’s syndrome**
This syndrome describes the association between rheumatoid arthritis, spleenomegaly and leucopenia with normochromic normocytic anaemia, thrombocytopenia, lymphadenopathy, cutaneous pigmentation, persistent skin ulceration and weight loss.

- **Thrombocytosis**
- **Eosinophilia**

**Neuro muscular Manifestations**

- Peripheral neuropathies - usually sensory or occasionally sensori motor.
- Atlanto axial or mid cervical spine subluxation may produce Vertibro Basilar Insufficiency (VBI) and neurological manifestations due to direct compression of the cord.
- Entrapment neuropathy e.g. Median nerve compression at wrist – **carpal tunnel syndrome**.
- Posterior tibial nerve compression at ankle – **tarsal tunnel syndrome**.
- Ulnar nerve compression at elbow.
- Cervical myelopathy.

**Tenosynovitis and Bursitis**

- “**Triggering**” of the fingers may be associated with nodules in the flexor tendon sheaths which can progress to permanent flexion contractures or tendon rupture if left untreated.

**Muscular Changes**

- Muscle atrophy in Rheumatoid patients is usually attributed to reflex inhibition and disuse because of articular inflammation.

**Ocular manifestations**

- Episcleritis which is mild and transient.
- Scleritis which involves the deeper coat of the eye and is a more serious inflammatory condition.
- Keratolysis (corneal melting)
- Sclero malacia
- Sclero malacia perforans
- Sjogren’s syndrome – Keratoconjunctivitis sicca, Xerostomia and Rheumatoid Arthritis or other connective tissue disorder with the lack of tear and salivary secretions.
- The symptoms are gritty sensations in the eyes, dryness of the mouth, photophobia, dysphasia, recurrent otitis media, chronic respiratory disease and dryness of the skin.

The following are less common:

**Osteoporosis**
- Spontaneous fractures occurring in the long bones, neck of the femur and pelvis are well recognised in patients with Rheumatoid arthritis.
- A small proportion of patients may develop Osteomalacia.

**Lymphnode enlargement**
- Chronic positive RA or the neutropenic patient with Felty’s syndrome is particularly susceptible to infection.
- It has been estimated that death from infections occurs at 8 to 10 times more the rate for the normal population.

**Peripheral Oedema**
- Recurrent oedema of the lower limb is commonly found.
- In some cases it develops around the acutely inflamed ankle joint.

**Diagnosis**

The diagnosis will be based on the pattern of symptoms, the distribution of the inflamed joints, and the blood and X-ray findings.
In rheumatoid arthritis, the small joints of the hands, wrists, feet and knees are typically inflamed in a symmetrical distribution (affecting both sides of the body). When only one or two joints are perform other test to exclude arthritis becomes more difficult.

Rheumatoid factor can be found in 80% of patients.

A test for citrulline antibodies is most helpful in looking for the cause of previously undiagnosed inflammatory arthritis.

The antinuclear antibody (ANA) is also frequently found in patients with rheumatoid arthritis.

The ESR is used as a crude measure of the inflammation of the joints. The sedimentation rate is usually faster during disease flares, and slower during remissions.

Another blood test that is used to measure the degree of inflammation present in the body is the C-reactive protein.

Joint x-rays may be normal or only show swelling of soft tissues early in the disease.

As the disease progresses x-rays can show bony erosions typical of rheumatoid arthritis in the joints. Joint x-rays can also be helpful in monitoring the progression of disease and joint damage over time. Bone scanning, a radioactive test procedure, can demonstrate the inflamed joints.

Analysis of the joint fluid, in the laboratory, can help to exclude other causes of arthritis, such as infection and gout.

The revised criteria of 1987 (American college of Rheumatology)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Morning stiffness</td>
<td>Duration &gt; 1 hr lasting &gt; 6 weeks</td>
</tr>
<tr>
<td>2. Arthritis of at least 3 areas</td>
<td>Soft tissue swelling or exudation lasting &gt; 6 weeks</td>
</tr>
</tbody>
</table>
3. Arthritis of hand joints
   wrists, meta carpophalangeal joints or proximal interphalangeal joints lasting > 6 weeks

4. Symmetric Arthritis
   At least one area, lasting > 6 week

5. Rheumatoid nodules
   As observed by the physician

6. Serum rheumatoid factor
   As assessed by a method positive in less than 5 percent of control subjects

7. Radiographic changes
   As seen on anteroposterior films of wrists and hands

Rheumatoid Arthritis is diagnose if 4 of the 7 criteria are met.

**Investigation**

No test are specific for diagnosing Rheumatoid Arthritis.

**A. Haematological**

- Normochromic normocytic anemia is frequently present in active Rheumatoid Arthritis.
- The WBC count is usually normal, but a mild leucocytosis may be present.
- Eosinophilia when present usually reflects severe systemic disease.
- The Erythrocyte Sedimentation Rate is increased in nearly all patients with active Rheumatoid Arthritis.
- The levels of acute phase reactants including ceruloplasmin and C-reactive protein are also elevated.
IMMUNOLOGICAL

1. Rheumatoid Factor

Auto antibodies other than Rheumatoid Factor in Rheumatoid Arthritis.

- Antiperinuclear factor
- Antikeratin antibodies
- Antibodies to cyclic citrullinated peptide (CCP)
- Antibodies to Sa, p68 and calpastatin.

Of these anti-CCP antibodies stand out as the most useful clinically, especially in defining Rheumatoid Arthritis in early.

Synovial Fluid Analysis

Confirms the presence of inflammatory arthritis, although none of the finding is specific.

Synovial Fluid findings in Rheumatoid Arthritis

<table>
<thead>
<tr>
<th>Synovial Characteristics</th>
<th>Rheumatoid Arthritis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Yellow</td>
</tr>
<tr>
<td>Clarity</td>
<td>Cloudy</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Poor</td>
</tr>
<tr>
<td>Mucin clot</td>
<td>Poor</td>
</tr>
<tr>
<td>White blood cell count / mm³</td>
<td>3000 - 50,000</td>
</tr>
<tr>
<td>% Polymorpho nuclear leukocytes</td>
<td>&gt;70</td>
</tr>
<tr>
<td>Glucose Levels</td>
<td>10 - 25 % less than serum</td>
</tr>
<tr>
<td>Total protein</td>
<td>&gt;30 grams / dl</td>
</tr>
<tr>
<td>Complement</td>
<td>Low</td>
</tr>
<tr>
<td>Microscopic features</td>
<td>RA cells</td>
</tr>
<tr>
<td>Culture</td>
<td>Negative</td>
</tr>
</tbody>
</table>
**Synovial Biopsy**

Villus formation with thickening of synovial layer and infiltration with abnormal cells,

**Radiographic evaluation**

- Soft tissue changes around a joint due to an effusion
- Periosteal reaction with new bone formation along the shaft adjacent to where the capsule is attached
- Peri-articular osteoporosis
- Narrowing of joint spaces
- Subchondral erosions
- Subluxation and ankylosis
- Subchondral cyst formation

**Arthroscopy**

In acute rheumatoid arthritis, synovium is oedematous, diffusely erythematous and friable. In more chronic conditions it becomes thickened.

**Renal Biopsy**

Indicated in cases of reduced tubular or glomerular function.

**Pulmonary Biopsy**

Used to distinguish Rheumatoid nodules from carcinoma or to establish diagnosis of fibrosing alveolitis.

**Scintigraphy**

**Urine analysis**

**Biochemical Analysis**

**CT Scan**

**MRI**
**Prognosis**

Patients treated by simple methods show that after 10 years 50% will have improved and 50% deteriorated grading of these patients according to their disability.

- **21% have no disability**
- **41% have moderate disability**
- **27% have more severe (Independent)**
- **11% are dependent others**

A number of features are correlated with a greater likelihood of developing joint abnormalities or disability. These include,

- Presence of more than 20 inflamed joints
- A markedly elevated ESR.
- Radiographic evidence of bone erosions
- The presence of Rheumatoid nodules.
- High titers of serum Rheumatoid factor.
- The presence of functional disability
- Persistent inflammation
- Advanced age at onset
- The presence of comorbid conditions
- Low socio – economic status or educational level
- The presence of HLA – DRBI * 0404.

Remissions of disease activity are most likely to occur during the first year. The median life expectancy of persons with Rheumatoid Arthritis shortened by 3 to 7 years.

**Factors which suggest poor prognosis**

- Insidious onset
- Unremitting disease
- The presence of nodules
- Other vasculitic phenomena
- Severe systemic involvement with a high ESR and anaemia.
- The presence of Serum Rheumatoid Factor in high titre and HLA DR4.

**Treatment**

Treatment has five main aims.

1. Relief of pain
2. Reduction of inflammation
3. Minimizing undesirable side effects
4. Preservation of muscle strength and joint function
5. The return as rapidly as possible to a normal lifestyle

A variety of physical therapy modalities may be useful in decreasing the symptoms of Rheumatoid Arthritis.

Rest ameliorates symptoms and can be as important a component of the total therapeutic program.

In addition splinting to reduce unwanted motion on inflamed joint may be useful.

Exercise directed at maintaining muscle strength and joint mobility without exacerbating joint inflammation.

**Future treatments**

- Treatments that block the action of the special inflammation factors, such as tumour necrosis factor (TNF alpha) and interleukin -1 (IL-1).
- Studies involving various types of the connective tissue collagen are in progress and show encouraging signs of reducing rheumatoid disease arthritis.
- Gene profiling, also known as gene array analysis, is being identified as a helpful method of defining which people will respond to which medications.
- Studies are underway that are using gene array analysis
to determine which patients will be at more risk for more aggressive disease.

- Genetic research and engineering is likely to bring forth many new avenues of earlier diagnosis and accurate treatment in the near future.
- Recent antibody research has found that the presence of citrulline antibodies in the blood has been associated with a greater tendency toward more destructive forms of Rheumatoid Arthritis.

We are at the threshold of tremendous improvements on the way Rheumatoid Arthritis is managed.

**Juvenile Rheumatoid Arthritis**

In 5% of people with Rheumatoid Arthritis the disease develops before the patient is 16 years old. These patients are said to have Juvenile Rheumatoid Arthritis.

In 25% of children with Juvenile Rheumatoid Arthritis, the disease begins with

- Sudden onset of fever of over 39 °C
- Severe malaise
- A morbilliform rash
- Often generalized lymphadenopathy
- Hepatomegaly
- Spleenomegaly
- Sometimes a pericardial effusion, pleural effusion, myocarditis or pneumonitis

These symptoms persist for weeks or months before polyarthritis become evident.
This acute form of Juvenile Rheumatoid Arthritis is called 'Still’s disease' after the English physician Sir George Still who described it in 1897.

In 30% of children the disease is confined to a few joints most often a knee or ankle.

J.R.A differs from R.A in adults. In that

1. Oligo arthritis is more common
2. Systemic onset is more frequent
3. Larger joints are affected more than smaller joints
4. Rheumatoid nodules and rheumatoid factor are usually absent and
5. Antinuclear antibody seropositivity is common.

Genetic susceptibility, abnormal immuno regulation, cytokine production and viral infection may all play a role in the pathogenesis.

**DIFFERENTIAL DIAGNOSIS**

**1. Ankylosing spondylitis**

Ankylosing spondylitis is a chronic, progressive and crippling disease affecting the spine. It is related to certain tissue types of the human leukocytic antigen (HLA) system. The majority of ankylosing spondylitis patient is found to belong HLA – B27 groups.

The disease occurs in the 3rd and 4th decades of life and is more common in males. The patients present with complaints of diffuse pain in the back and vague pain in other joints.
2. **Reiter's disease**

Reiter's disease characterized by triad of polyarthritis, urethritis, conjunctivitis. The joint condition is an acute polyarthritis resembling rheumatoid arthritis, it does not cause destructive changes in the joint structures.

3. **Psoriatic arthritis**

   a. The most common type is the one involving the distal interphalangeal joints of the hands and feet with psoriatic nail. Metacarpophalangeal joints are never involved in psoriatic arthritis.
   
   b. Arthritis mutilans is a severe form where there is marked destruction of joints.
   
   c. Symmetrical polyarthritis type.
   
   d. Oligoarthritic type.
   
   e. Spondyloarthritic type.

**Enteropathic Arthritis**

Chronic inflammatory bowel diseases like regional enteritis (chron's disease) and ulcerative colitis are associated with Arthritic lesion in about 10% of the cases. The joint condition shows remission and exacerbation along with activity of the underlying bowel disease.

**Sjogren's syndrome**

Sjogren's syndrome is an immunologic disorder characterized by progressive destruction of the exocrine glands leading to mucosal and conjunctival dryness (Sicca Syndrome) accompanied by a variety of auto immune phenomena.

Clinical Manifestations

Keratoconjunctivitis and Xerostomia.
Renal involvement produces mild interstitial that may result in renal tubular acidosis.

Vasculitis - Cutaneous palpable (or) hypersensitivity vasculitis of the lower extremities

Sensory polyneuropathy and mononeuritis multiplex.

Pulmonary involvement generally takes the form of an interstitial pneumonitis.

**COMPLICATIONS**

**Septic Arthritis**

It may complicate Rheumatoid Arthritis, particularly in patients with longstanding nodular sero-positive disease. In debilitated patients, fever and leucocytosis may be absent and the signs of infection limited to malaise and slight exacerbation of inflammation in one or more joints.

Staphylococcus aureus is commonly implicated secondary to invasion from an ulcerated nodule or infected skin lesion.

**Amyloidosis**

It is a complication of prolonged active disease and is formed in 25% to 35% of patients at autopsy, making Rheumatoid Arthritis a leading cause of secondary amyloidosis.

**Fixed Deformities**

Early assessment and planning should prevent postural deformities that will result in joint contractures.

**Muscle weakness**

Even mild degree of Myopathy or neuropathy when combined with prolonged inactivity may lead to profound muscle wasting and weakness.
Joint Rupture
Occasionally the joint lining ruptures and synovial contents spill into the soft tissue.

Spinal Cord compression
It is a rare complication of cervical spine instability.

Systemic Vasculitis
This is a rare but potentially serious complication.

Management
The current concept regarding the management of rheumatoid arthritis emphasize medical therapy, physical occupational therapy and education to the patients.

Rest
It plays an important part in the acute stage of arthritis in which the inflammed joints are painful even at the slightest movement.

Diet
Maintaining a healthy diet is the best diet however. Eating a diet, which is replete with vegetables, fruit and fish is most likely to be helpful.

Vitamins
Calcium and Vitamin D have been proven to be beneficial in the treatment of osteoporosis.

ADJUNCTIVE TREATMENTS

Rehabilitation
Rheumatoid Arthritis patients require rehabilitative measures that include physical therapy, and special splints and appliances to help them and manage their own self care activities like dressing and diet.
**Physical Therapy (Physiotherapy)**

Physiotherapy includes
- 1. Active exercise
- 2. Passive joint movements
- 3. Local heat
- 4. Massage
- 5. Electrical stimulation of muscles
- 6. Ultra sound therapy
- 7. Light therapy, ultraviolet rays and infrared rays

**Exercise therapy**

Once inflammation is satisfactorily controlled, appropriate and regular exercises is essential to strengthen muscles weakened by disease.

**Fore arm**

- Elbows bent, turn palm of the hand and then back of the hand towards face.

**Wrist**

- Keeping forearm steady, move the wrist up and down as in waving.
- Again hold forearm steady, move the wrist up and down as in hand shaking.
- Make circle with hands.

**Hand and fingers**

Make tight fist.

- Open fingers as wide as possible
- With the hand open spread fingers away from each other and then together.
- Touch tip of the thumb to the tip of each finger.
- Bend the thumb in toward palm of the hand.
Lower Extremities

Knee

Sit with your feet off the floor. Lift the leg and then allow it to return to the bent position slowly.

Ankle

- Pull foot up and in, and then push back down.
- Make circle with foot.
- Pull foot in toward other foot.
- Pull foot to outside.

Toes

- Pull up on toes then curl toes under.

Exercises for the Neck

- In the sitting position, twist your head as far as possible in each direction.
- Sit or stand with your hands on the hips. First circle the head clockwise, then anti clockwise.
- In the sitting position, try to touch each shoulder with your head.
- In the sitting position look behind as far as possible and then look at your toes.

Exercise benefits for individuals with Arthritis

- Helps to preserve muscle strength and normal mobility of joints.
- Relieves pain and stiffness.
- Prevents further deformities.
- Improves over-all physical fitness.
- Improves coordination.

Heat and Cold Treatment
Heat and cold treatment are effective means of relaxing muscles and relieving pain in arthritis joints. A hot bath, hot pads, paraffin wax and cold compresses are some methods frequently used.

**Massage**

A special method of rubbing is called Massage.

Massage is the practice of applying structured or unstructured pressure, tension, motion, vibration — manually or with mechanical aids to the soft tissues of the body, including muscles, connective tissues, tendons, ligaments, joints, lymphatic vessels, organs of the gastrointestinal system and reproductive system to achieve a beneficial response.

**Massage Techniques**

- Tapping
- Kneading
- Rubbing
- Squeezing

**Tapping**

Tapping should be done with open palms and relaxed fingers. Wherever the body gets tapped circulation increases. It strengthens the muscles.

**Kneading**

Kneading creates activity inside the cell walls of the muscles and the circulation of life giving chemicals commences. This helps growth and development of the body and rejuvenates the body.

**Rubbing**

There are two different ways in which rubbing is done.

- Dry
With oil

Rubbing is an exercise for the skin, it excites circulation and increases the heat in the area massaged because of friction.

**Squeezing**

While squeezing, special pressure should be applied at the pressure points.

**Therapeutic Massage**

- General weakness
- Rheumatism
- Paralysis
- Insomnia
- Arthritis
- Neurasthenia
- Sciatica
- Muscular atrophy

**Uses**

- It is excellent for relieving muscle aches, muscle weakness, muscular atrophy and it is a powerful non drug method to promote sleep by using medicated oils.
- Improve the circulation of blood to the affected parts, nervous system and lymphatic system.
- It works on the body both levels of physical and mental.
- It balances the three Dhosams.
- Rubbing of the body produces heat and increases the blood circulation.

**Special Medicine**

Yogaasanam, Piranayamam and Thiyaanam are the special medicines in the treatment of Vali azhal keel vayu and they are done as a supportive therapy for quick relief.
**Yoga**

Yogam means mixing up

**Stages of Yoga**

‘Eyamam’ stands for good habits.
‘Niyamam’ denotes good action.
‘Aasanam’ means seat.
‘Piranayamam’ is meant for breathing exercise.
‘Prathiyakaaram’ is the control over the five senses.
‘Dharanai’ is the act of controlling breathing and mind.
‘Diyanam’ is to control one-self.
‘Samaathi’ mixing with Brahmam.

The three main aspects of yoga are -

**Asanas or poses**

"Asana", means simple postures and a path to unity of spirit.

The practice of asanas promotes:

- Muscle flexibility.
- Tendon strength.
- Massages the internal organs.
- Brings various internal and glandular functions into balance.

**Pranayama or breathing**

Pranayama can be called the singular most important aspect of yoga as they are means to purify the subtle energies flowing through the body. Yogic breathing techniques are an effective tool to calm, energize, harmonise and tranquilise the body and mind. All poses are to be properly coordinated with inhalation, exhalation and holding of breath.

**Meditation**
Meditation means the continuous flow of the mind towards “Soul” through the total exclusion of all ideas foreign to it. Concentrated attention of object of thought or awareness.

The English word meditation comes from the Latin meditatio, which originally indicated every type of physical or intellectual exercise.

**Purposes and effects of meditation**

Improved concentration, awareness, self-discipline and equanimity through meditation. This is extremely helpful while responding to stressful situations. Meditation can be used for personal development.

**BENEFITS**

**Physical Benefits**

Yoga creates a toned, flexible, and strong body in order to improve respiration, energy, and vitality. It helps to maintain a balanced metabolism, promotes cardio and circulatory health and relieve pain. It also helps to look and feel younger while improving the athletic performance.

**Mental Benefits**

Yoga helps to relax and handle stressful situations more easily. It teaches how to quiet the mind so can focus the energy where we want it to go. Yoga encourages positive thoughts and self-acceptance.
MATERIALS AND METHODS

The disease Vali azhal keel vayu has been dealt in the book Siddha Maruthuvam according to Sabapathy Manuscript; patients were selected according to the symptoms as mentioned in Vali azhal keel Vayu.

Selection of Patients

For these clinical study 20 patients of both sexes and of varying age groups suffering from Vali azhal keel vayu were selected and admitted in the In-patient ward of post Graduate Department of Sirappu Maruthuvam, Government Siddha Medical College, Palayamkottai.

Evaluation of Clinical Parameters

In this study the detailed clinical history was taken from the patients. Special attention was laid on the pain, swelling and stiffness, regarding their nature, site of occurrence, mode of onset and severity. The seasonal variation and precipitating factors like emotional stress, trauma, and change of climate were enquired. Constitutional symptoms like easy fatiguability, anorexia, loss of weight, pyrexia were noted; extra articular features like conjunctivitis, iritis, episcleritis, vasculitis etc were noted carefully.
Socio economic status, family history and other significant disease was already treated were noted.

**Study of Siddha aspect of diagnosis**
A case sheet was prepared on the basis of siddha methodology (ie) Envagaithervugal, Uyirthathukkal, Udalkattugal, Poriyal arithal, Pulanal arithal, Vinathal etc. Besides an individual case sheet maintained for each case in the In-Patients ward.

**The clinical Investigation**
The diagnostic tests such as Blood test for TC, DC, ESR, Hb, Sugar, Urea, Serum Cholesterol, Rheumatoid factor, Urine analysis for sugar, albumin deposits and stools examination for ova, cyst to rule out any systemic illness were done.

Pharmacological evaluation of the trial medicines were conducted at the pharmacology department in Government Siddha Medical College, Palayamkottai.

Bio chemical analysis of the test medicine was conducted at the department of Bio chemistry in Government Siddha Medical College, Palayamkottai.

**Management**
The treatment is aimed to neutralize the vitiated vatham, Pitham, kabam.

‘Viresanathal Vatham Thazhum’

This quotation emphasizes that vitiated vatham can be brought down by means of laxatives (or) purgatives. Since Vali azhal keel Vaya is under vatha disese. Vellai ennai which is one among the laxative in siddha system was selected. All patients were advised to take.

This drug was not repeated for the next day onwards.
The trial medicines used for this study were,
1. Mudakkuvatha Chooranam 1 gm thrice a day with honey or water (Internal)
2. Vatha thylam (External application)

RESULTS AND OBSERVATIONS

For the clinical study 20 in-patients and 20 out-patients cases were selected and treated in Post Graduate Department of Sirappu Maruthuvam, Government Siddha Medical College Hospital, Palayamkottai. Results were observed with respect to the following criteria.

1. Sex distribution
2. Age distribution
3. Kalam
4. Constitution of the Body
5. Gunam
6. Paruvakalam
7. Thinai
8. Socio-economic status
9. Aetiological factors
10. Mode of onset
11. Clinical manifestations
12. Duration of illness
13. Systemic examination
14. Gradation of pain, joint swelling and restricted Movements
15. Duration of morning stiffness
16. Deformities of joints
17. Deep tendon reflexes
18. Locomotor system
19. Individual joint involvement
20. Disturbances in mukkutram
   i. Derangement of vatham
   ii. Derangement of Pitham
   iii. Derangement of kabam
21. Diagnostic Parameters
22. Involvement of Ezhu udal Thathukkal
23. Radiological Examination
24. Grading of Rheumatoid arthritis
25. Grading of result.
1. Sex Distribution

Table 1: Illustrates sex distribution and its relative percentage

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Sex</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>17</td>
<td>85%</td>
</tr>
</tbody>
</table>

For this study 20 in patients were selected among them, out of 20 in patients 15% were males and 85% were females.

From the above table it is clear that, females were mostly affected than males.
**2. Age distribution**

Table 2: Illustrates Age distribution and its relative percentage

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Age</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>10 – 30 years</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>2.</td>
<td>31 – 40 Years</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>3.</td>
<td>41 – 50 Years</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>4.</td>
<td>51 – 60 Years</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>5.</td>
<td>61 &amp; above</td>
<td>5</td>
<td>25%</td>
</tr>
</tbody>
</table>

Among 20 In patients 10% of cases were observed in the age group of 10 to 30, 20 % cases were observed in the age group 31 to 40, 30% of cases were observed in the age group of 41 to 50, 15 % of cases were observed in the age group of 51 to 60 and 25 % of cases were observed in the age group of above 60 years.

Majority of Cases were observed in age group of 41 – 50 years
3. Kalam

Table 3: Illustrates the incidence of disease with respect to life distribution

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Kalam</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vatha kaalam (upto 33 years)</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>Pitha kaalam(33-66 years)</td>
<td>14</td>
<td>70%</td>
</tr>
<tr>
<td>3</td>
<td>Kabha kaalam (above 66 years)</td>
<td>4</td>
<td>20%</td>
</tr>
</tbody>
</table>

Out of 20 In-patients 10% of cases were in the vatha kaalam, 70% of case were in the pitha kaalam, 20% of cases were in the kabha kaalam.

Most of the cases were in the pitha kaalam.
4. Constitution of the Body

Table 4: Illustrates the constitution of the body and its relative percentage.

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Constitution of the body</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vatha thegi</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Pitha thegi</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Kabha thegi</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Thontha thegi</td>
<td>20</td>
<td>100%</td>
</tr>
</tbody>
</table>

Out of 20 in patients all the patients were Thontha thegi.

5. Gunam

Table 5: Illustrates the gunam

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Gunam</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sathuvagunam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Rajothagunam</td>
<td>16</td>
<td>80%</td>
</tr>
<tr>
<td>3</td>
<td>Thamogunam</td>
<td>4</td>
<td>20%</td>
</tr>
</tbody>
</table>
6. Paruvakalam

Table 6: Illustrates the seasonal incidence of the diseases.

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Paruvakalam</th>
<th>Months</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kaar kaalam</td>
<td>Avani-Puratasi (Aug 15 to Oct 14)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Koothir Kalam</td>
<td>Iyppasi-Karthigai (Oct 15 to Dec 14)</td>
<td>9</td>
<td>45%</td>
</tr>
<tr>
<td>3</td>
<td>Munpani kaalam</td>
<td>Margazhi – Thai (Dec 15 to Feb 14)</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>4</td>
<td>Pinpani kaalam</td>
<td>Masi – Panguni (Feb 15 to Apr 13)</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>Elavenil kaalam</td>
<td>Chithirai – Vaigasi (Apr 14 to Jun 14)</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>6</td>
<td>Muthuvenil kaalam</td>
<td>Aani – Aadi (Jun 15 to Aug 14)</td>
<td>1</td>
<td>5%</td>
</tr>
</tbody>
</table>

Maximum number of cases were found to be admitted during koothirkaalam (Iyppasi-Karthigai).
7. Thinai

Table 7: Illustrates the Thinai.

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Thinai</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kurinji</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Mullai</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Marutham</td>
<td>19</td>
<td>95%</td>
</tr>
<tr>
<td>4</td>
<td>Neithal</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>Palai</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Out of 20 in patients 95% of cases were from Maruthanilam and 5% of cases from Neithal nilam.

8. Socio economic Status

Table 8: Illustrates the Socio economic status.

<table>
<thead>
<tr>
<th>SL. 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>4</td>
<td>20%</td>
</tr>
<tr>
<td>3</td>
<td>Poor</td>
<td>16</td>
<td>80%</td>
</tr>
</tbody>
</table>

Out of 20 inpatients 80% of cases belong to poor socio economic status and 20% of cases belong to middle class. Poor people were mostly affected.
9. Aetiological factor

Table 9: Illustrates the Aetiological factors.

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Precipitating factors</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Positive family history</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>2</td>
<td>Positive previous history</td>
<td>7</td>
<td>35%</td>
</tr>
<tr>
<td>3</td>
<td>Miscellaneous</td>
<td>10</td>
<td>50%</td>
</tr>
</tbody>
</table>

Out of 20 inpatients 15% of cases had positive family history, 35% of cases had positive previous history and 50% of cases had Miscellaneous cause.

10. Mode of onset

Table 10: Illustrates the Mode of onset.

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Mode of onset</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acute</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>2</td>
<td>Gradual</td>
<td>15</td>
<td>75%</td>
</tr>
</tbody>
</table>

Out of 20 cases acute onset was observed in 25% of cases and gradual onset was observed in 75% of cases.
11. Clinical Manifestations

Table 11: Illustrates the symptoms.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Symptoms</th>
<th>No. of cases out of 20</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Joint Pain</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Swelling</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>Morning stiffness</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>Restriction to walk</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>5</td>
<td>Difficulty to walk</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>6</td>
<td>Neck pain</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>7</td>
<td>Difficulty in chewing</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Fever</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>9</td>
<td>Sleeplessness</td>
<td>15</td>
<td>75%</td>
</tr>
<tr>
<td>10</td>
<td>Loss of appetite</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>11</td>
<td>Constipation</td>
<td>18</td>
<td>90%</td>
</tr>
<tr>
<td>12</td>
<td>Easy fatiguability</td>
<td>20</td>
<td>100%</td>
</tr>
</tbody>
</table>

Almost all cases were affected with symptoms of joint pain, Swelling, Morning stiffness and easy fatigability, 50% of the cases were affected with symptoms of difficulty to walk, loss of appetite and neck pain. 25% of cases were affected with the symptoms of restriction to walk and fever. 75% of cases were affected with the symptoms of sleeplessness. 90% of cases were affected with constipation.
12. Duration of illness

Table 12 illustrates the duration of illness.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Duration of illness</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Below 1 month</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>1-3 months</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>3</td>
<td>3-6 months</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>4</td>
<td>6-9 months</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>9 months – 12 months</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>6</td>
<td>1-2 years</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>7</td>
<td>Above 2 years</td>
<td>4</td>
<td>20%</td>
</tr>
</tbody>
</table>

Out of 20 In Patients

In 20 % of cases the duration of illness was from 1-3 months
In 20 % of cases the duration of illness was from 3-6 months
In 5% of cases the duration of illness was from 6-9 months
In 20% of cases the duration of illness was from 9 months – 12 months
In 15 % of cases the duration of illness was from 1 – 2 years
In 20 % of cases the duration of illness was above 2 years.
13. Systemic Examination

Table 13 illustrates systemic examination.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Signs</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Subcutaneous nodules</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>Muscle wasting</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>Ophthalmic manifestation</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Hepatomegaly</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Spleenomegaly</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Respiratory system</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Cardiovascular system</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Central Nervous system</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Out of 20 In Patients 10% of cases had subcutaneous nodules and 10% of cases had muscle wasting.

14. Gradation of Pain, joint swelling and Restricted Movements

Table 14 illustrates grades of signs and symptoms.

<table>
<thead>
<tr>
<th>S.no</th>
<th>Sign and Symptoms</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.of cases</td>
<td>Percentage</td>
<td>No.of cases</td>
</tr>
<tr>
<td>1</td>
<td>Pain</td>
<td>6</td>
<td>30%</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Joint Swelling</td>
<td>10</td>
<td>50%</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Restricted Movement</td>
<td>1</td>
<td>5%</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Muscle wasting</td>
<td>2</td>
<td>10%</td>
<td>-</td>
</tr>
</tbody>
</table>

Among 20 In patients, pain was mild in 30% of cases, moderate in 50% of cases and severe in 20% of cases. Joint swelling was mild in 50% of cases, moderate in 35% of cases and severe in 15% cases, Restricted movement was mild in 5% of cases moderate in 15% of cases and severe in 5% of case.

No severe muscle wasting are noted.
### 15. Duration of morning Stiffness

Table 15 illustrates the duration of morning stiffness.

<table>
<thead>
<tr>
<th>S.No</th>
<th>IP. NO</th>
<th>Duration of morning Stiffness</th>
<th>Before Treatment in mts</th>
<th>After Treatment in mts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>783</td>
<td></td>
<td>30 -70</td>
<td>20-40</td>
</tr>
<tr>
<td>2</td>
<td>931</td>
<td></td>
<td>60 -90</td>
<td>30-60</td>
</tr>
<tr>
<td>3</td>
<td>999</td>
<td></td>
<td>60 – 120</td>
<td>20-60</td>
</tr>
<tr>
<td>4</td>
<td>1062</td>
<td></td>
<td>70 – 100</td>
<td>60-90</td>
</tr>
<tr>
<td>5</td>
<td>165</td>
<td></td>
<td>15 – 30</td>
<td>10-20</td>
</tr>
<tr>
<td>6</td>
<td>2325</td>
<td></td>
<td>80 – 100</td>
<td>60-100</td>
</tr>
<tr>
<td>7</td>
<td>2461</td>
<td></td>
<td>60 – 120</td>
<td>30-90</td>
</tr>
<tr>
<td>8</td>
<td>2531</td>
<td></td>
<td>30 – 80</td>
<td>10-30</td>
</tr>
<tr>
<td>9</td>
<td>2446</td>
<td></td>
<td>120 – 160</td>
<td>60-140</td>
</tr>
<tr>
<td>10</td>
<td>2719</td>
<td></td>
<td>160 – 180</td>
<td>30-60</td>
</tr>
<tr>
<td>11</td>
<td>2849</td>
<td></td>
<td>60 – 90</td>
<td>30-60</td>
</tr>
<tr>
<td>12</td>
<td>2642</td>
<td></td>
<td>100 – 120</td>
<td>90-100</td>
</tr>
<tr>
<td>13</td>
<td>2352</td>
<td></td>
<td>30 – 60</td>
<td>20-30</td>
</tr>
<tr>
<td>14</td>
<td>2869</td>
<td></td>
<td>30 – 60</td>
<td>20-40</td>
</tr>
<tr>
<td>15</td>
<td>2857</td>
<td></td>
<td>60 – 120</td>
<td>30-60</td>
</tr>
<tr>
<td>16</td>
<td>2953</td>
<td></td>
<td>90 – 120</td>
<td>60-100</td>
</tr>
<tr>
<td>17</td>
<td>64</td>
<td></td>
<td>30 – 60</td>
<td>20-40</td>
</tr>
<tr>
<td>18</td>
<td>2849</td>
<td></td>
<td>100 – 120</td>
<td>60-100</td>
</tr>
<tr>
<td>19</td>
<td>22</td>
<td></td>
<td>60 – 80</td>
<td>30-60</td>
</tr>
<tr>
<td>20</td>
<td>338</td>
<td></td>
<td>60 -180</td>
<td>20-60</td>
</tr>
</tbody>
</table>

Among 20 In patients all the cases had morning stiffness ranging from 1 hour – 3 hours
16. Deformites of joints

Table 16 illustrates deformities of joints

<table>
<thead>
<tr>
<th>S.No</th>
<th>Deformites of Joints</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Interphalangeal joints</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Metacarpo phalangeal joints</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>3</td>
<td>Wrist joint</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>4</td>
<td>Elbow joints</td>
<td>8</td>
<td>40%</td>
</tr>
<tr>
<td>5</td>
<td>Shoulder joint</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>6</td>
<td>Hip joint</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>7</td>
<td>Knee joint</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>8</td>
<td>Ankle joint</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>9</td>
<td>Metatorso phalangeal joint</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>10</td>
<td>cervical Spine</td>
<td>10</td>
<td>50%</td>
</tr>
</tbody>
</table>

Among 20 Inpatients 100% of cases had deformities in the interphalangeal and metatarsophalangeal joints 50% of cases had deformities in the metacarpophalangeal, Knee joint and cervical spine. 30% of cases had the deformities in the wrist joint and shoulder joint. 40% of cases had the deformities in the Elbow joint. 25% of cases have the deformities in the ankle joint and 15% of the cases had the deformities in the hip joint.
17. Deep tendon Reflex

Table 17 illustrates results of deep tendon reflexes.

<table>
<thead>
<tr>
<th>S.no</th>
<th>Deep tendon reflexes</th>
<th>Exaggerated</th>
<th>Diminished/absent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of cases</td>
<td>Percentage</td>
</tr>
<tr>
<td>1</td>
<td>Jaw</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Biceps</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Triceps</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>Supinator</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Knee</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Ankle</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Out of 20 In patients 15% of cases had exaggerated Biceps and Triceps, 5% of cases had exaggerated knee jerk and ankle jerk.

18. Locomotor System

Table 18 Illustrates involvement of Extremites.

<table>
<thead>
<tr>
<th>S.no</th>
<th>Involvement of extremities</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Upper extremity</td>
<td>12</td>
<td>60%</td>
</tr>
<tr>
<td>2</td>
<td>Lower extremity</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>3</td>
<td>Both upper and lower extremity</td>
<td>2</td>
<td>10%</td>
</tr>
</tbody>
</table>

Most of the cases had the history of upper extremity involvement.
19. Incidence of joint involvement

Table 19 illustrates incidence of joint involvement.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Joints involvement</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proximal inter phalangeal Joint</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Metacarpo phalangeal joint</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>3</td>
<td>Wrist joint</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>4</td>
<td>Elbow joint</td>
<td>8</td>
<td>40%</td>
</tr>
<tr>
<td>5</td>
<td>Shoulder joint</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>6</td>
<td>Temporo mandibular joint</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Sterno clavicular joint</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Cervical Joint</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>9</td>
<td>Hip joint</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>10</td>
<td>Knee joint</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>11</td>
<td>Metatarso phalangeal joint</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>12</td>
<td>Ankle joint</td>
<td>5</td>
<td>20%</td>
</tr>
</tbody>
</table>

It was observed Metacarpo phalangeal joints and Metatarso phalangeal joints were involved in cent percentage of cases. Knee joint, Cervical joint were involved in 50% of cases. Elbow joint was affected in 40% of cases. Metacarpo phalangeal joint, wrist joints and shoulder joint were affected in 30% of cases. Hip joint was affected in 15 % of cases. Ankle joint was affected 20% of cases.
20. Disturbance in Mukkutram

Table 20 illustrates the disturbances in Mukkutram

A. Disturbance in Vatham

<table>
<thead>
<tr>
<th>S.No</th>
<th>Vatham</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pranan</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Abanan</td>
<td>18</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>Viyanan</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Uthanan</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Samanan</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>Nagan</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>15</td>
<td>75</td>
</tr>
<tr>
<td>10</td>
<td>Thananjeyan</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Out of 20 cases observed Viyanan and Samanan were affected in all cases. Abanan was affected in 90% of cases and Devathathan was affected in 75% of cases.

B. Disturbances in Pitham

<table>
<thead>
<tr>
<th>S.no</th>
<th>Pitham</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anarpitham</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>Ranjagam</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>Prasakam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Alosakam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Saathagam</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

Out of 20 cases Ranjagam was affected in 75% of cases. Anarpitham was affected in 50% of cases. Saathagam was affected in almost all cases.
C. Disturbances in Kabham

<table>
<thead>
<tr>
<th>S.no</th>
<th>Kabham</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>10</td>
<td>50%</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 cases and kilethagam in 50% of the cases.

21. Diagnostic Parameters

Table 21 illustrations the conditions of the diagnostic parameter.

<table>
<thead>
<tr>
<th>S.no</th>
<th>Envagai thervugal</th>
<th>NO. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Naa</td>
<td>16</td>
<td>80%</td>
</tr>
<tr>
<td>2</td>
<td>Niram</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Mozhi</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Vizhi</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Naadi</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>6</td>
<td>Sparism</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>7</td>
<td>Malam</td>
<td>16</td>
<td>80%</td>
</tr>
<tr>
<td>8</td>
<td>Moothiram</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

In almost all the cases it was observed that Naadi and Sparism were affected. Naa and Malam were affected in 80% of cases.

In all case Neerkkuri and Neikuri were studied. Neikkuri was observed like Aravilaazhi in 60% of the in patients. it was observed as Aazhiyir aravu in 40% of in patient cases.
22. Involvement of Udal Thathukkal

Table 22 illustrated the conditions of the udal Thathukkal.

<table>
<thead>
<tr>
<th>S.no</th>
<th>Udal Thathukkal</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>Senner</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>Oon</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>Kozhuppu</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>5</td>
<td>Enbu</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>6</td>
<td>Moolai</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>7</td>
<td>Sukkilam/ Suronitham</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

In almost all cases Saaram, Senner, Oon, Kozhuppu, and Enbu were affected. Moolai thathu was affected in 50% of cases.

23. Radiological examination

<table>
<thead>
<tr>
<th>S.No</th>
<th>IP. No</th>
<th>Radiological Examination</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>783</td>
<td>Both wrist joints AP view</td>
<td>Osteoporosis</td>
</tr>
<tr>
<td>2</td>
<td>931</td>
<td>Both Knee joints AP view</td>
<td>Subchondral sclerosis seen in both tibia</td>
</tr>
<tr>
<td>3</td>
<td>999</td>
<td>Both hands AP view</td>
<td>Rheumatoid Arthritis</td>
</tr>
<tr>
<td>4</td>
<td>1062</td>
<td>Both Knee joints AP view</td>
<td>Osteoporosis</td>
</tr>
<tr>
<td>5</td>
<td>165</td>
<td>Both wrist joints AP view</td>
<td>Rheumatoid Arthritis</td>
</tr>
<tr>
<td>6</td>
<td>2325</td>
<td>Both hands AP view</td>
<td>Normal study</td>
</tr>
<tr>
<td>7</td>
<td>2461</td>
<td>Both wrist joints AP view</td>
<td>Rheumatoid Arthritis</td>
</tr>
<tr>
<td>8</td>
<td>2531</td>
<td>Both hands AP view</td>
<td>Rheumatoid Arthritis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Both Knee joints AP view</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2446</td>
<td>Both Knee joints AP view</td>
<td>Rheumatoid Arthritis</td>
</tr>
<tr>
<td>10</td>
<td>2719</td>
<td>Both wrist joints AP view</td>
<td>Normal Study</td>
</tr>
<tr>
<td>11</td>
<td>2849</td>
<td>Both wrist joints AP view</td>
<td>Rheumatoid Arthritis</td>
</tr>
</tbody>
</table>
24. **Grading of Rheumatoid Arthritis**

Table 24 illustrates grading of Rheumatoid Arthritis.

<table>
<thead>
<tr>
<th>S.no</th>
<th>Grade</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>II</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Grade</td>
<td>Description</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>No restriction of ability to perform normal activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Moderate restriction but with an ability to perform most activities of daily life.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Marked restriction with an inability to perform most activities of daily living and occupations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 20% of cases belonged to Grade II
- 60% of cases belonged to Grade III
- 20% of cases belonged to Grade IV
Assessment of the effect of Therapy

The patients were treated with the trial medicines, at the end of the treatment the results were categorized as follows:

Good : Complete subsidence of pain and disappearance of swelling
Fair : Relief of pain, reduction in swelling and increasing range of movement
Poor : No improvement.

25. Gradation of Results:

Table 25 illustrates Gradation of Results.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Grade</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good</td>
<td>8</td>
<td>40%</td>
</tr>
<tr>
<td>2</td>
<td>Fair</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>3</td>
<td>Poor</td>
<td>6</td>
<td>30%</td>
</tr>
</tbody>
</table>

Out of 20 In patients

- 40 % of cases showed good response
- 30 % of cases showed Fair response
- 30 % of cases showed Poor response
DISCUSSION

For this Dissertation study out of 25 patients the author had selected 20 Inpatients and they were admitted in the In-patient ward Government Siddha Medical College Hospital, Palayamkottai. A case sheet was prepared and maintained individually for all the 20 Inpatients.

**Sex distribution**

Among the 20 patients 3 were male and 17 were female. From this study the sex incidence was higher in females (85%) than in male (15%)

Indicating Valiazhal keelvayu is predominate in females

**Age distribution**

Among 20 cases 10% of cases were in the age group between 10 – 30 years. 20% of cases were in the age group of 31 – 40 years. 30% of cases were in the age group of 41 – 50 years. 15% of cases were in the age group 51-60years and 25% of cases were in the age group of 61 and above.

No age group is exempted for Rheumatoid arthritis but the usual incidence is during 4th and 5th decade.

**Kaalam**

According to siddha literature life span has divided into three kalam. They are

- Vatha kaalam - First 33 years and 4 months
- Pitha kaalam - Second 33 years and 4 months
- Kabha kaalam - Third 33 years and 4 months
From this study the occurrence of this disease is as follows

Vatha kaalam 10%
Pitha kaalam 70%
Kabha kaalam 20%

The maximum number of cases were observed in pitha kaalam which correlates with that of modern concept age incidence 4th and 5th decades.

**Paruvakaalam**

45% of cases were admitted in koothirkaalam
30% of cases were admitted in Munpanikaalam
5% of cases were admitted in pinpanikaalam
15% of cases were admitted in Elavenil kaalam
5% of cases were admitted in Muthuvenil kaalam

In koothir kaalam vatha gets thannilai adaithal and pitha gets vetrunilai valarchi. So this disease occurs derangement of vatham and pitham due to seasonal variations that leads to thannilai valarchi and vetrunilai valarchi of vatham and pitham in the body.

**Thinai**

Maximum, number of cases from maruthanilam.

**Aetiology**

15% of patients had a positive family history.
35% of patients had a previous history.
50% of patients are affected by miscellaneous reason.

Literary evidence indicates that the disease Vali azhal keel vayuis common in winter and genetic predisposition as a cause for Vali azhal keel vayu.

**Mode of onset**

The onset of Vali azhal keel vayuwas acute in 25% and gradual in 75%.
The incidence was more in gradual onset.

**Clinical manifestations**

Vali azhal keel vayu present with articular and extra articular manifestations in this study both this manifestation were noticed and recorded. Cent percent of patients had joint pain, swelling, Easy fatigue and morning stiffness, 25% of cases had restriction to walk and fever, 50% of cases had difficult to walk, neck pain and loss of appetite, 75% of cases had sleeplessness, and 90% had habitually constipated.

Joint pain was assessed by the words of the patients and was classified into mild moderate and severe. Mild pain was noticed in 30% of cases moderate pain was noticed in 50% of cases and severe pain was noticed in 20% of cases.

Swelling of the affected joints were noticed in all the cases. Swelling of the joints were measured by means of a non elastic measurable tape. Areas of maxium level of swelling around the joints were measured both before and after treatment. The joints subjected to measurements were knee joint, ankle joint, wrist joint, proximal interphalangeal joint of index finger, middle finger and Little finger.

The degree of joint swelling was observed. Thus mild swelling in 50% of cases, moderate swelling in 35% of cases and severe swelling in 15% of cases measurements were taken after treatment reveals that 40% of cases under regular treatment had marked reduction in swelling 30% of cases showed mild reduction and 30% showed no signs of improvement.

Almost all the patients experienced early morning stiffness ranging from 1 to 3 hours. After treatment it gradually came down to 60 minutes.
Restricted movements or decreased range of movements were seen in 25% of cases. Asking the patients to move the joint in a particular direction assessed restricted movements of patients when the active movements of other joint was impossible movements were considered as restricted or decreased range of motion.

After treatment with Mudakkuvatha chooranam (internally) and vatha thylam (Externally) along with Thokkanam in most of the cases increased range of movement was noticed.

Involvement of extremities

The incident of initial involvement of joints of upperlimb was noted in 60% of cases and in 30% of cases in the lower limb was involved first. 10% of cases involved both extremities.

Incidents of individual joint involvement

Proximal interphalangeal and metatarsophalangeal joints were involved in cent percentage of cases. Metacarpophalangeal, wrist, shoulder joints were affected in 30% of cases. Elbow joint was affected in 40% of cases. Cervical spine, knee joints were affected in 50% of cases. Hip joint was affected in 15% of cases. Ankle joint was affected in 20% of cases.

Deformities of joints

Cent percentage of cases had deformity in the interphalangeal joints. 50% of cases had flexion deformity of the knee joint and 50% of cases had deformity of the spine.

Elicitation of extra articular manifestations

Along with the symptoms told by the patient certain signs were also noted. These include Hepatomegaly, splenomegaly, presence of subcutaneous nodules, Respiratory symptoms, cardiovascular symptoms, muscle wasting, reflexes and ophthalmic
manifestation etc., 10% of cases had mild muscle wasting in the thenar and hypothenar muscles and subcutaneous nodules.

Hepatomagaly and spleenomegaly were not present in any case. Likewise ophthalmic manifestations and cardiovascular manifestations were not present.

**Uyir thathukkal**

Uyirthathukkal constitute vatham, pitham and kabam.

Disturbances in Uyir thathukkal lead to disease entities.

**Disturbances in vatham**

Abanan was affected in 90% of cases. Viyanan and samanan were affected in cent percent of cases, Devathathan was affected in 75% of cases.

Affected Abanan produce constipation. Affected viyanan produce pain and restriction of movement in joints.

Affected samanan produce loss of appetitie. Affected Devathathan produce sleeplessness.

**Disturbances in pitham**

Among 20 inpatient sathaga pitham was affected in cent percentage of patients causing difficulty to carryout regular works.

Anarpitham was affected in 50% of Inpatient and cause loss of appetite.

Ranjaga pitham was affected in 75% of the In patients producing anaemia.

**Disturbances in Kabham**

Among 20 in patients santhigam was affected in cent percentage of cases. Affected santhigam cause pain and swelling in the joints.

Kilethagam was deranged in 50% of Inpatients cause loss of appetite.
Involvement of Ezhu Udal Thathukkal

Among 20 In-patients Saaram, Senneer, Oon, Kozhuppu, Enbu were affected in cent percent of the cases, Moolai thathu was affected in 50% of the case and Sukkilam / Suronitham was found normal.

Affected saram produced easy fatiguability (100%)
Affected senneer produced anaemia (100%)
Affected Oon produced muscle wasting (100%)
Affected kozhuppu produced pain in the joints (100%)
Affected Enbu produced joint pain (100%)
Affected Moolai produced swelling of the interphalangeal joints.

Envagai thervugal

In 60% of In-patient the naadi was vathapitham and 40% belonged to pithavatham.

Sparisam was affected in cent percent of Inpatient producing warmth in the painful joints Naa was affected in cent percentage of the Inpatient producing either coated tongue due to constipation or paleness of the tongue due to anaemia.

Malam was affected in 90% of inpatient cases producing constipation.

Neikkuri was observed like aravilaazhi in 60% of the inpatient. It was observed as Aazhiyir aravu in 40% of inpatient cases.

Grading of Rheumatiod Arthritis.

Among 20 Inpatients

20% of the cases belonged to Grade II
60% of the cases belonged to Grade III
20% of the cases belonged to Grade IV
Investigation

Routine Examinations of blood, urine and stools were done during the time of admission and discharge.

Among 20 In – patients 70% of cases showed decreased Hb% and cent percent of cases showed increased ESR.

The investigations include Blood sugar, Blood urea, serum cholesterol, RA factor. Some of the patients were advised to do the test outside lab with their consent not in compulsion.

The patients were also subjected to radiological examinations. Serological test for syphilis was done in some patients.

X-ray both hands with wrist joints

Anteroposterior view was taken in 11 inpatients. If showed osteoporosis, reduction in interphalangeal joint spaces, synovial thickening, periarticular erosions, soft tissue swelling, deformities etc.,

X – ray of both the knee joints

Anteroposterior and lateral view was taken in 12 in patients the reports revealed osteoporosis with reduction of joint space.

X-ray Both feet with ankle joints

Anteroposterior view was taken in 2 In patients synovial thickening, sclerosis and narrowing of the joint space were noted.

X-ray cervical spine

Oblique view was taken in 2 In – patients.

The pharmacological analysis of Mudakkuvatha chooranam

- Moderate acute anti inflammatory action
- Moderate chronic anti inflammatory action
- Significant anti pyretic action
- Significant analgesic action
**Vatha Thylam**

- Significant acute anti-inflammatory action

Biochemical analysis of the trial drug shows the presence of sulphate, ferrous, reducing sugar, aminoacid.

With the above studies the management of the disease brought by viraeshanam with vellai ennai 15ml at early morning in empty stomach with warm water before the administration of trial drug.

Thokkanam was done to all patients after the application of external oil and then advised to take hot water fomentation.

All patients were advised to take complete bed rest before the subsidement of the inflammation.

Yoga and regular simple exercise were advised to follow up.
SUMMARY

The disease Vali azhal keel vayu which is correlates with the Rheumatoid Arthritis in modern medicine.

The aetiology, pathology, pathogenesis, clinical features, course and prognosis of the disease were collected from numerous literatures both in siddha system as well as modern medicine.

About 70 cases were treated as In-patient and Out-patient cases in post graduate department of sirappu maruthuvam, Government siddha medical college, palayamkottai.

The diagnosis of Rheumatoid Arthritis was based on the criteria mentioned in American Rheumatoid Association and Graded according to the CECIL Textbook of medicine. After through evaluation of history, clinical findings and laboratory results, Envagai thervugal were used for the diagnostic purpose.

The diagnosing criteria mainly the morning stiffness, joint pain, swelling and restriction to walk are noted for the clinical assessment of the prognosis.

The present study was chosen with an eager to treat Vali azhal keel vayu with the mudakku vatha chooranam internally and vatha thylam externally.

The efficacies of the medicines Mudakku vatha chooranam and vatha thylam were studied during the course of this research.

Clinically marked reduction of pain and swelling in the joints along with an improvement to do their day to day activities, while treated with the trial medicine.

No signs of complications were reported.

Laboratory investigations were encouraging after the treatment. Clinically the drugs were free from adverse effects.
CONCLUSION

Clinically the drugs were free from adverse effects. In this research the treatment of Vali azha keel vayu with Mudakkuvatha chooranam and vathathyham showed remarkable improvement clinically.

Hereby the author concluded that the treatment with mudakku vatha chooranam and vatha thylam showed remarkable improvement.

It will be very effective in the point of efficacy, safety and low cost in the treatment of Vali azhal keel vayu.
Annexure - I

Preparation and properties of the trial medicines

Mudakku vatha chooranam (Internal Medicine)

Ingredients
1. Nannari verpattai chooranam - 10 parts
2. Parangi pattai chooranam - 10 parts
3. Seemai Amukkara chooranam - 10 parts
4. Chittarathai Choornam - 5 parts

Preparation

These four chooranas are mixed together and bottled up.

Dose and adjuvant

10 to 20 graines (650 – 1300mg) may be given thrice a day well mixed with honey or other suitable anupanams.

Indications

All sorts of joint lesions including rheumatoid arthritis and skin lesions are controlled.

Evidence

English Name : Winter Cherry
Botanical Name : Withania Somnifera
Family : Solanceae
Part used : Root and Leaves
Suvai : Kaippu
Thanmai : Veppam
Pirivu : Karppu

**Therapeutic Action**

Tonic, alterative, diuretic, nervine sedative, deobstruent.

**Chemical Constituents**

Somniferin, reducing sugar, phytosterol, mixture of saturated and unsaturated fatty acids.

**Therapeutic uses**

Root is used in rheumatism, all cases of general debility. In rheumatism decoction of the root is used internally. The powder of the root given internally with honey cures the diseases due to vatham and kabham.
English Name : China Root, Bamboo Briar root
Botanical Name : Smilax China linn
Family : Liliaceae
Part used : Rhizomes
Suvai : Inippu
Thanmai : Thatpam
Pirivu : Inippu

**Therapeutic Action**

Alterative, antisyphilitic, aphrodisiac

**Chemical constituents and pharmacological action**

Tannin, resin and cinchonin along with smilacin and a steroidal saponin yielding on hydrolysis. Sarsasapogenin have been identified in the tuberous roots. The presence of flavonoid glycosides and three saponins one of which yield diosgenin has also been reported. Seeds yield 11.1% fatty oil and leaves contain rutin.

**Indication**

The decoction is used with the three myrobalans in cases of piles, fistula, carbuncle, diabetes, digestive, laxative, depurative, aphrodisiac, diuretic, febrifuge and tonic. They are useful in
syphilis leprosy, skin diseases, epilepsy, insanity, scrofula, vitiated conditions of vatha, flatulence, dyspepsia, colic, neuralgia, constipation, helminthiasis, psoriasis, fever, strangury, increase the semen count and general debility.

**Therapeutic Action**

Alterative, Tonic, Demulcent, Diuretic, Diaphoretic.

**Indication**

Nannari has diaphoretic, diuretic, tonic, laxative actions, lesions, inflammation and it is good for tooth ache.

It is used in treating loss of appetite, fever, syphilis, leucorrhoea and inflammation of urinary passage. A liquid extract of it is given as a tonic for skin diseases and as an alterative in chronic rheumatism.

- Medicinal plants in Srilanka
**Phyto active**

The flavonoid glycosides identified in the flowers of Hemidesmus indicus were hyperoside, isoquercitin and rutin whereas in the leaves, only hyperoside and rutin were identified.

(Subramaniam & Nair) 1968

Tannin are present in leaves in an amount of 2.5%. The roots were reported to contain sitosterol, a new ester identifies as lupeol octacosanoate in addition to the known compounds V12 lupeol – amyring, lupeol acetate and hexatriacont an.

**Sūvai**

**English Name** : Lesser Galangal  
**Botanical Name** : Alpina officinarum  
**Family** : Zingiberaceae  
**Part used** : Rhizome  
**Sūvai** : Karppu  
**Thanmai** : Veppam  
**Pirivu** : Karppu

**Therapeutic Action**

Expectorant, Febrifuge, stomachic.

"அசத்திக்கு கர்ப்புப்பான மரக்கு சிப்பங்களத்து
சோண்டலம் துறையார்த்தற்கு பூநயன் - பூநேல்கனா
பொருளற்றகத்தாக உடியாமை துணைகளும்
சிகிசிக்கும் பாலாண்டிகளும் நீளாம்"  
- சூலங்கள் குறைவாக்க மறை, முக்காண்பன், கர்ப்பான, மரா, கோகரைகள், கிண்ண, முக்காண்பன், பலகாண், முக்காண்பன் போ க்காண்.
மாது மகள் (அமரி மரணம்)

உரைகள் கருத்திரா

- புழுக்கு செல்வு
- வேலாம்பு செல்வு
- மரணநிலை செல்வு
- புரிதல்குச் செல்வு
- தண்டு செல்வு - மாதத்தில் ½ பாக

- ஒப்பந்தக் கூற்று
- மத்தியும்
- பரம்
- பகுதிபாடி
- குறுக்கு
- பிள்ளை
- குறும்பு
- கிருட்சம்
- குடும்பம்
- காண்பிக்க
- கருவிகளின்
- சிற்றியலின்
- - மாதத்தில் ½ பாக
- காண் - வேலாண்டணக்கு அளவு

சர்வாய்வு:

மாது மகள் கருத்திரா கருத்திரா கரு விளை அவற்றின் கருத்திரா விளை நன்கு விளை பகுதிகள் தொடர்கி பகுதிபாடின் குறுக்குப் படிப்பாக்கியம்.

பிரிவங்குதல்:

ஒப்பந்தம் பிரிவங்குதல்.

சிற்றியலின்
80 மாதத்தில் பிரிவாக.

சுருக்கம்

செயற்கை உரைகள் கருத்திரா (பகுதிய. 45)
**Milagu (Milagu)**

- **Common Name**: Milagu
- **Botanical Name**: Piper nigrum
- **Family**: Piperaceae
- **Part used**: Dried unripe fruit
- **Suvai**: Kaippu, Karppu
- **Thanmai**: Veppam
- **Pirivu**: Karppu

**Therapeutic Action**

- Anti periodic, Anti vatha, Anti dote.

**Chemical Constituents**

- Chavicine, piperine, piperidine, piperetine, aromatic oil.

**Castor Oil (Castor Oil)**

- **English Name**: Castor Oil
- **Botanical Name**: Ricinus Communis
- **Family**: Euphorbiaceae
- **Part used**: Oil
- **Suvai**: Kaippu
- **Thanmai**: Veppam
- **Pirivu**: Karppu
**Therapeutic Action**

Anti vatha

**Chemical Constituents**

- Nimbin
- Nimbinin
- Nimbidin
- Azadirachtin
**Trapa (Sweet flag)**

**English Name** : Sweet flag  
**Botanical Name** : Acorus Calamus  
**Family** : Araceae  
**Part used** : Rhizome  
**Suvai** : Karppu  
**Thanmai** : Veppam  
**Pirivu** : Karppu  

**Therapeutic Action**

Stimulant, Stomachic, Antiperiodic, Carminative, Nauseant, Emetic, Disinfectant, Germicide.

**Chemical Constituents**

Acorin, Acoretin, Calamin, Starch, Calamen, Calamenol, Asarone.

**Indication**

- → "பாலம்பர்கி துள்ளுக் புகழ்மலர் மீனறியநிறப்பன் தண்டி இடைநிலவர் தந்தி குறுக்கின்றது
  கைத்தவர் இல்லாதிரியாக துள்ளது குழந்தைகள் தந்திகளுக்கு
  விழாவமாக காண விளங்குகிறது கறிந்து வைத்துக்கள்
  தந்திகள் காண்மிக்க விளைவுற்றது இந்திகாட்கின்று பிள்ளையார்"  
- பக்தர்க்கு தானியக்கம்

- நெருக்கள் பானங்கள், பெய்கள் பானங்கள், உணவணை, குளிர், திருத்த விளக்கம்,
  எடைந்துகொள்ளும், கூடா, பெப்பர்ட்டி, திருமல், மரு பெரியகன், பாலாட்சகள், பிள்ளையார் உள்ளிட்டவை

**Indication**

- சிறுவருக்கு தந்திகள் காண்பது குழந்தைகளுக்கு மீனறியநிறப்பன் தண்டி இடைநிலவர் விழாவதான்.
**Therapeutic Action**
Stimulant, Carminative.

**Chemical Constituents**
Piperine

- Zingiber (Dried Ginger)

**English Name** : Dried Ginger
**Botanical Name** : Zingiber officinalis
**Family** : Zingiberaceae
**Part used** : Rhizome
**Suvai** : Karppu
**Thanmai** : Veppam
**Pirivu** : Karppu

- Long Pepper

**English Name** : Long Pepper
**Botanical Name** : Piper longum
**Family** : Piperaceae
**Part used** : 
**Suvai** : Karppu
**Thanmai** : Veppam
**Pirivu** : Inippu
**Therapeutic Action**

Stimulant, Stomachic, Carminative.

**Chemical Constituents**

Phellandrene, Gingerol, Gingerin.

---

**திருப்பு**

"தாம் பிளீஸ்ஸில் தாம் தெரியும்
முதலாம் முதலாதம் முதலாதம் மீதியாக
சுத்தின் செடிபுக் கூட்டு கனவாங்காக
சுத்தின் செடிபுக் கூட்டு கனவாங்காக
சுத்தின் செடிபுக் கூட்டு கூட்டு கூட்டு
சுத்தின் செடிபுக் கூட்டு கூட்டு
சுத்தின் செடிபுக் கூட்டு கூட்டு
சுத்தின் செடிபுக் கூட்டு கூட்டு
சுத்தின் செடிபுக் கூட்டு கூட்டு
சுத்தின் செடிபுக் கூட்டு கூட்டு
சுத்தின் செடிபுக் கூட்டு

(தலுறுது தானைப்பலம்)

மாத்திரிக்கை, மாத்திரிக்கை, மாத்திரிக்கை, மாத்திரிக்கை, மாத்திரிக்கை

**துளைப்பு (Dill)**

<table>
<thead>
<tr>
<th>English Name</th>
<th>Dill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botanical Name</td>
<td>Anethum Graveloens</td>
</tr>
<tr>
<td>Family</td>
<td>Umbelliferae</td>
</tr>
<tr>
<td>Part used</td>
<td>Seed</td>
</tr>
<tr>
<td>Suvai</td>
<td>Inippu, Karppu</td>
</tr>
<tr>
<td>Thanmai</td>
<td>Veppam</td>
</tr>
<tr>
<td>Pirivu</td>
<td>Karppu</td>
</tr>
</tbody>
</table>

**Therapeutic Action**

Carminative, deobstruent, diuretic, emmenagogue, stimulant, stomachic, antispasmodic.
Chemical Constituents

Anethine, Phellandrene, Apiol.

Botanical Name: Picrorrhiza Kurroa
Family: Scrophulariaceae
Part used: Root
Suvai: kaippu, Karppu
Thanmai: Veppam
Pirivu: Karppu

Therapeutic Action

Anti periodic, Cathartic, Stomachic

Chemical Constituents

Picrorhizin, Kutkin, Kutkisterol
English Name : Ceylon lead wort
Botanical Name : Plumbago zeylanica
Family : Plumbaginaceae
Part used : Root
Suvai : Karppu, Viruviruppu
Thanmai : Veppam
Pirivu : Karppu

**Therapeutic Action**

Anti periodic, Diaphoretic.

**Chemical Constituents**

Plumbagin

"கல்பகிளி தோடுகிறிகள் கரைகள் அதேன் கொண்டிருக்கும் காணுடைய தலையிலிருந்து குறுக்குகள் வந்து காணுடைய கரைகள் அமைவிலையும் ஆன்று அவசரியமளிப்பு

- அசத்துப்பாகும் கரைகள்

குரு, பூச்சி, குப்பை, மற்றும் அதேன் கரைகள் அமைந்து காணுடைய, கரைகள் விழாவறை, கரைகள் புளர், கரைகள் சுருக்கள், கரைகள் தற்காலம், கரைகள் பற்றியத் தகுந்தம்.
**Botanical Name**: Celophyllum Apatalum  
**Family**: Guttiferae  
**Part used**: Oil  
**Suvai**: Kaippu  
**Thanmai**: Veppam  
**Pirivu**: Karppu

**Therapeutic Action**  
Anthelmintic, Caustic.

**Chemical Constituents**
Karanjin, pongamol, glabrin.

---

**Botanical Name**: Pongamia Pinnata  
**Family**: Fabaceae  
**Part used**: Oil  
**Suvai**: Kaippu, Thuvarppu  
**Thanmai**: Veppam  
**Pirivu**: Karppu

**Therapeutic Action**  
Anti septic, stimulant
Garlic

English Name : Garlic
Botanical Name : Allium Sativum
Family : Alliaceae
Part used : Bulb (தீவு)
Suvai : Karppu
Thanmai : Veppam
Pirivu : Karppu

Therapeutic Action
Carminative, stomachic, tonic, alterative, stimulant, expectorant, diuretic, anthelminitic.

Chemical Constituents
Allicin, Allisatin.
**Bishops Weed (Trachyspermum Ammi)**

**English Name:** The Bishops Weed  
**Botanical Name:** Trachyspermum Ammi  
**Family:** Umbelliferae  
**Part used:** Seed  
**Suvai:** Karppu  
**Thanmai:** Veppam  
**Pirivu:** Karppu

**Therapeutic Action**
- Stomachic, antispasmodic, carminative, anti septic, stimulant, tonic, sialogogue.

**Chemical Constituents**
- Thymol

**Cloves (Syzygium aramaticum)**

**English Name:** Cloves  
**Botanical Name:** Syzygium aramaticum  
**Family:** Myrtaceae  
**Part used:** Dried buds  
**Suvai:** Karam & Viruviruppu  
**Thanmai:** Veppam  
**Pirivu:** Karppu
Therapeutic Action

Anti spasmodic, Carminative, Stomachic.

Chemical Constituents

Eugenol, Caryophyllene, Eugenin.

---

**المعادل**

"مثليث اسباديكيهت كارمينات كابور - فرك
كابور كارمينات كابور - فرك
مثليث ااسباديكيهت كارمينات كابور

- مثليث اسباديكيهت کارمنات كارمینات

زارگار، تورده، کانگرال، کانگرال کارمنات، کارمنات کارمنات کارماز
کارمینات کارمنات کارمنات.

**الأعشاب (Asafoetida)**

**English Name**: Asafoetida
**Botanical Name**: Ferula Asafoetida
**Family**: Apiaceae
**Part used**: Gum (پود قطن)
**Suvai**: Kaippu, karakarapu
**Thanmai**: Veppam
**Pirivu**: Karppu

**Therapeutic Action**

Stimulant, carminative, antispasmodic, expectorant, laxative, anthelmintic, diuretic, aphrodisiac, emmenagogue.

**Chemical Constituents**

Umbelliferone, sulphur, ferulic acid.

---

"مثليث اسباديكيهت کارمنات کارمنات
کارمنات کارمینات کارمانات کارمینات
کارمنات کارمینات کارمنات کارمینات کارمنات کارمینات کارمنات کارمنات کارمنات کارمنات کارمنات کارمنات کارمنات کارمنات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمنات کارمینات کارمنات کارمینات کارمنات کارمینات کارمینات کارمنات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارمینات کارم

119
English Name : Gingilee Oil  
Botanical Name : Sesamum indicum  
Family : Pedaliacea  
Part used : Oil  
Suvai : Inippu  
Thanmai : Veppam  
Pirivu : Inippu  

**Therapeutic Action**  
Demulcent, Laxative, Nutritive, Emollient. 

**Chemical Constituents**  
Sesamin, Sesamolin, Phytosterol, Vitamin E.
புதிய பள்ளிவாசல், புதிய தொழில் நிறுவனங்கள், பல வலுவறை விளைந்து கொண்டுவரும் குறுக்கான் கலாசாரம், கல்வியியல், கலாசாராசுக் கல்வி, கல்வி நிறுவனங்கள், பல பொறியியல் மற்றும் பயின்று, திசையுறு கல்விகள், பல மானிக்கிலையான கலைநிறுவனங்களாக கருதப்படுகின்றன.
Annexure - II
Govt. Siddha Medical College, Palayamkottai
Bio- Chemical Analysis of Mudakku Vatha Chooranam

Preparation of the extract

5 gms of Choornam was weighed accurately and placed in a 250ml beaker. Then 50 ml distilled water is added and dissolved well. Then it is boiled well for about 10 minutes. It was cooled and filtered in a 100ml volumetric flask and then it is made up to 100 ml with distilled water. This fluid is taken for analysis.

Qualitative analysis:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Experiment</th>
<th>Observation</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Test for Calcium</strong></td>
<td>No white precipitate is formed</td>
<td>Absence of Calcium</td>
</tr>
<tr>
<td></td>
<td>2ml of the above prepared extract is taken in a clean test tube. 2 ml of 4% Ammonium oxlate solution is added to it</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td><strong>Test for Sulphate</strong></td>
<td>A white precipitate is formed</td>
<td>Presence of Sulphate</td>
</tr>
<tr>
<td></td>
<td>2ml of the extract is added to 5% barium chloride solution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td><strong>Test For Chloride</strong></td>
<td>No precipitate is formed</td>
<td>Absence of chloride</td>
</tr>
<tr>
<td></td>
<td>The extract is treated with silver nitrate solution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td><strong>Test for Carbonate</strong></td>
<td>No brisk effervescence is formed</td>
<td>Absence of Carbonate</td>
</tr>
<tr>
<td></td>
<td>The substance is treated with concentrated HCL.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Test for Starch</strong></td>
<td>No blue colour is formed</td>
<td>Absence of Starch</td>
</tr>
<tr>
<td>---</td>
<td>----------------------</td>
<td>--------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>The extract is added with weak iodine solution</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Test for Iron</strong></td>
<td>No blue colour is formed</td>
<td>Absence of Ferric iron.</td>
</tr>
<tr>
<td></td>
<td>Ferric: the extract is treated with glacial acid and potassium Ferro cyanide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Test for Iron Ferrous</strong></td>
<td>Blood red colour is formed</td>
<td>Indicates trace amount of Ferrous is present</td>
</tr>
<tr>
<td></td>
<td>The extract is treated with concentrated Nitric acid and ammonium thio cyanide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Test for Phosphate</strong></td>
<td>No yellow precipitate is formed</td>
<td>Absence of Phosphate</td>
</tr>
<tr>
<td></td>
<td>The extract is treated with ammonium Molybdate and concentrated nitric acid</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Test for Albumin</strong></td>
<td>No yellow precipitate is formed</td>
<td>Absence of Albumin</td>
</tr>
<tr>
<td></td>
<td>The extract is treated with Esbach’s regent</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Test for Tannic Acid</strong></td>
<td>No blue black precipitate is formed</td>
<td>Absence of Tannic Acid</td>
</tr>
<tr>
<td></td>
<td>The extract is treated with ferric chloride</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Test for unsaturation</strong></td>
<td>It gets decolourised</td>
<td>Absence of unsaturated compound</td>
</tr>
<tr>
<td></td>
<td>Potassium permanganate solution is added to the extract</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Test for the Reducing Sugar</strong></td>
<td>Colour change occurs</td>
<td>Indicated the presence of reducing sugar</td>
</tr>
<tr>
<td></td>
<td>5 ml of Benedict’s qualitative solution is taken in a test</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
tube and allowed to boil for 2 mts and added 8-10 deops of the extract and again boil it for 2 minutes

| 13. | **Test for Amino Acid**  
One or two drops of the extract is placed on a filter paper and dried it well after drying 1% Ninhydrin is sprayed over the same and dried it well | Violet colour is formed | Indicated the presence of Amino Acid |
ANNEXURE III

PHARMACOLOGICAL ANALYSIS

ANALGESIC ACTION OF
MUDAKKU VATHA CHOORANAM

Introduction
According to siddha medicine the Muddakku vatha chooranam is indicated in vatha diseases. From this indication the drug Muddakku vatha chooranam might possess analgesic activity.

Aim
To study the analgesic effect of Muddakku vatha chooranam on albino rats by tail flick method

Materials and Methods
Preparation of the test drug
100mg of Muddakku vatha chooranam was suspended in 10 ml of water as suspending agent. This 1 ml contained 100mg of the test drug.

Equipement
Hot water bath

Procedure
Six male albino rats (weighing 80 -100gms) were used in three groups. The animals were allowed to free access to food and water until they brought for the experiment. The animals which showed the positive response to the stimulus within a given time were selected for the study.
After the selection of animals which were responding to stimulus within 2 seconds, they were divided into 3 groups, each group consisting of two rats.

The hot water was maintained at 55°C. The tip of the tail was immersed into the water bath and the time was noted when the rat flicked the tail.

First group was administered with Muddakku vatha chooranam at a dose of 100mg / 100 gm body weight of the animal.

Second group was administered with paracetamol at a dose of 20mg /100gm of body weight. Third group was given to the 1 ml of water and kept as control.

After the drug administration, the reaction time of each rat after half an hour and one hour were noted in each group (when a rat fails to flick the tail, it should not be continued beyond 8 seconds to avoid injury) and the average was calculated.

The results of control group, standard group and drug treated group were tabulated and compared.
## Results

**Effect of mudakku vatha chooranam**

<table>
<thead>
<tr>
<th>Serial No</th>
<th>Name of the drugs / Groups</th>
<th>Dose / 100 gram body weight</th>
<th>Initial reading</th>
<th>After drug Administration</th>
<th>Mean difference</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mudakku Vatha Chooranam</td>
<td>100 mg / 1ml</td>
<td>3.0</td>
<td>3.5 / 1 hr Average, 4.5 / 1.5 hr Average, 5.5 / -</td>
<td>-</td>
<td>Significant</td>
</tr>
<tr>
<td>2</td>
<td>Paracetamol</td>
<td>20mg / 1ml</td>
<td>2.5</td>
<td>4.0 / 1 hr Average, 5.0 / 1.5 hr Average, 6.5 / -</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Water</td>
<td>1ml</td>
<td>2.5</td>
<td>2.5 / 1 hr Average, 2.5 / 1.5 hr Average, 3.0 / -</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Inference**

From the above tabulation it is noted that Mudakku vatha chooranam has **significant analgesic action**.
ANTI - PYRETIC STUDY ON
MUDDAKKU VATHA CHOORANAM

Aim
To study the anti-pyretic activity of the Muddakku vatha chooranam.

Procedure

Three groups of healthy albino rats were taken, each weight about 100 – 200 gm and divided into three groups, each group consists of two rats. All the rats were made hyperthermic by subcutaneous injection of 12% suspension of yeast at a dose of 100mg / 100ml of body weight.

10 hours later one group of rats were given the test drug (Muddakku vatha chooranam) at a dose of 200mg/ 100gm of body weight. The other group received distilled water at a dose of 2ml / rat and kept as control. The last group was given paracetamol at a dose of 20mg / 100gm of body weight and kept as standard.

The mean rectal temperature for 3 groups was recorded at 0 hour, 1½ hours, 3 hours, and 4½ hours after the drug administration. The difference between the mean temperature of the control group, standard and the test drug were noted and compared.
# Effect of mudakku vatha chooranam

<table>
<thead>
<tr>
<th>Serial No</th>
<th>Name of the drugs / Groups</th>
<th>Dose / 100 gram body weight</th>
<th>Initial temperature in Centigrade</th>
<th>After drug Administration</th>
<th>Mean difference</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mudakku Vatha Chooranam</td>
<td>100 mg / 1ml</td>
<td>36.5</td>
<td>1½ hr. Average</td>
<td></td>
<td>Significant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.0 hr Average</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4½ hr Average</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Paracetamol</td>
<td>20mg / 1ml</td>
<td>37.5</td>
<td>36.0</td>
<td>35.5</td>
<td>34.0</td>
</tr>
<tr>
<td>3</td>
<td>Water</td>
<td>1ml</td>
<td>37.0</td>
<td>37.5</td>
<td>38.0</td>
<td>39.0</td>
</tr>
</tbody>
</table>

**Inference**

The test drug Mudakku vatha chooranam has **significant antipyretic action.**
ACUTE ANTI-INFLAMMATORY STUDIES ON MUDAKKU VATHA CHOORANAM

Aim
To study the acute anti-inflammatory effect on Mudakku vatha chooranam.

Method:
The acute anti-inflammatory activity of Mudakku vatha chooranam was screened by rat hind paw oedema method.

Preparation of the test drug
200 mg of Mudakku vatha chooranam was suspended in 10 ml of water. From the above test drug 1 ml was administered orally and this 1 ml contain 100 mg Mudakku vatha chooranam.

Procedure
The anti-inflammatory activity of mudakku vatha chooranam was studied in healthy Albino rats weighing 100 – 150 gms. Six rats were selected and divided into three groups, each containing three rats. The first group was given distilled water 1 ml, internally and was kept as control. The second group was given the test drug at a dose of 100 mg / 100 gms, body weight. The third group was given ibubrufen at a dose of 20 mg / 100 g body weight.

Before administration of the drug, the hind paw volume of all rats were measured by dipping the hind paw upto the tibiodorsal junction in a mercury plethysmography. Soon after measurement, the drug was administration internally.
An hour after administration of the drugs a subcutaneous injection of 0.1 ml. Of 1% W/V of carrageenin in water was injected in the plantar surface of both the hind-paw and volume was measured once again. The difference between the initial and final volumes would show the amount of inflammation. Taking the volume in the control group as 100% of inflammation, the inflammation or anti-inflammatory effect of the drug was calculated. Tabulations of the results were recorded.
### Results

**Effect of Mudakkuvatha chooranam**

<table>
<thead>
<tr>
<th>Serial No</th>
<th>Name of drug / groups</th>
<th>Dose / 100 gram body weight</th>
<th>Initial Reading average</th>
<th>Final reading average</th>
<th>Mean difference</th>
<th>Percentage Inflammation</th>
<th>Percentage Inhibition</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mudakku vatha chooranam</td>
<td>100mg / 1ml</td>
<td>0.8</td>
<td>1.2</td>
<td>0.4</td>
<td>44.5</td>
<td>55.5</td>
<td>Moderate</td>
</tr>
<tr>
<td>2.</td>
<td>Ibu brufen</td>
<td>20mg / 1ml</td>
<td>0.80</td>
<td>0.85</td>
<td>0.05</td>
<td>6.25</td>
<td>93.75</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Water</td>
<td>1ml</td>
<td>0.65</td>
<td>1.5</td>
<td>0.85</td>
<td>100.0</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Inference**

From the above experiment it is observed that the test drug Mudakkuvatha chooranam has **moderate acute anti inflammatory action**.
CHRONIC ANTI INFLAMMATORY STUDY BY COTTON - PELLETS GRANULOMA METHOD

Aim

To study the chronic anti inflammatory activity of the drug in albino rats by cotton pellets implantation (granuloma) method.

Procedure

Cotton pellets each weighing 10mg were prepared and sterilised in an autoclave for about one hour under 15 lbs atmosphere pressure. Six albino rats each weighing between 100 – 200gms were selected and were divided into 3 groups. Each rat was anaesthetized with ether and cotton pellets were implanted subcutaneously in the groin, two in each side.

From the day of implantation, one group of animals received mudakku vatha chooranam at a dose of 200mg of body weight. Another group of animals were received distilled water. Last group was given ibubrufen at dose of 20mg/100gm body weight.

On the eighth day the rats were sacrificed and the pellets were removed weighed. Then they were put in a incubator at 60°C - 80°C and then weighed.

The concordant weight was noted for all groups and compared.

The effect of mudakku vatha chooranam in chronic anti inflammatory study.
**Results**

**Effect of Mudakkuvatha chooranam**

<table>
<thead>
<tr>
<th>Serial No</th>
<th>Name of drug / groups</th>
<th>Dose / 100 gram body weight</th>
<th>Pellet weight (mg)</th>
<th>Pellet weight of the Granuloma of drugs (mg)</th>
<th>Mean difference</th>
<th>Percentage Inflammation</th>
<th>Percentage Inhibition</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mudakku vatha chooranam</td>
<td>100mg / 1ml</td>
<td>10</td>
<td>155</td>
<td>-</td>
<td>62</td>
<td>48</td>
<td>Moderate</td>
</tr>
<tr>
<td>2.</td>
<td>Ibu brufen</td>
<td>20mg / 1ml</td>
<td>10</td>
<td>56</td>
<td>-</td>
<td>22.4</td>
<td>77.6</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Water</td>
<td>1ml</td>
<td>10</td>
<td>250</td>
<td>-</td>
<td>100.0</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Inference**

The mudakku vatha chooranam show **moderate chronic anti inflammatory action**.
ANTI – INFLAMMATORY STUDIES ON VATHA THYLAM

Procedure

Anti-inflammatory activity of vatha thylam was studied in healthy albino rats, weighing between 100 – 150 gms. For studying acute inflammation, rat hind paw oedema method was used.

Six albino rats were selected and divided into three groups each containing two rats. To first group distilled water was given and kept as control. Before the application of the drug, the hind paw volume of all rats were measured. This was done by dipping the hind paw upto the tibiodorsal junction in Mercury plethysmograph.

Subcutaneous injection of 0.1% of carrageenin (W/V) in water was made into plantar surface of both the hind paw of each rat. To the test group, Vatha thylam was topically applied frequently over the inflamed surface in a thin layer. To the control group, no drug was applied over the inflamed surface. One and half hours after injection the hind paw volume was measured once again. The difference between the initial and final volumes would shows the amount of inflammation.

Taking the volume in the control group as 100% of inflammation, the inflammation or anti-inflammatory effect of the group is calculated.
## Results

### Effect of Vatha thylam

<table>
<thead>
<tr>
<th>Serial No</th>
<th>Name of drug / groups</th>
<th>Dose / 100 gram body weight</th>
<th>Initial Reading average</th>
<th>Final reading average</th>
<th>Mean difference</th>
<th>Percentage Inflammation</th>
<th>Percentage Inhibition</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vatha thylam</td>
<td>External</td>
<td>0.9</td>
<td>1.1</td>
<td>0.2</td>
<td>22.2</td>
<td>77.8</td>
<td>Significant</td>
</tr>
<tr>
<td>2.</td>
<td>Ibu brufen</td>
<td>20mg / 1ml</td>
<td>0.80</td>
<td>0.85</td>
<td>0.05</td>
<td>6.25</td>
<td>93.75</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Water</td>
<td>1ml</td>
<td>0.65</td>
<td>1.5</td>
<td>0.85</td>
<td>100.0</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Inference:**

It is observed that Vatha Thylam has **significant anti-inflammatory action**.
Annexure - IV
CASE SHEET PROFORMA FOR VALI AZHAL KEEL VAYU
GOVERNMENT SIDDHA MEDICAL COLLEGE,
DEPARTMENT OF POST GRADUATE
PALAYAMKOTTAI, TIRUNELVELI.
BRANCH III – SIRAPPU MARUTHUAM

I.P.No   :   Occupation   :
Bed. No   :   Income   :
Ward   :   Nationality   :
Name   :   Date of admission   :
Age   :   Date of discharge   :
Sex   :   Diagnosis   :
Permanent address   :   Result   :
Medical officer   :

Temporary address   :

Complaints and duration

History of Present illness

Personal history and Habit

Family History
**General condition on Examination**

Consciousness
General appearance
Stature
Nourishment
Skin changes
Facies
Pallor
Jaundice
Cyanosis
Clubbing
Lymphadenopathy
Abdominal distension
Jugular venous pulsation
Engorged veins
Koilonychia
Pedal oedema
Generalised oedema
Temperature
Pulse
  - Rate
  - Rhythm
  - Volume
  - Character
  - Peripheral pulses
  - Pulses paradoxus
Respiration
  - Rate
  - Rhythm
  - Character
1. திருத்தல்
என்று என்று
மூடல்
மறல்
சுருக்கம்
பாதுகாப்பு

2. புதுக்காலம்
காற்ற காலம் (குட்டுமுழு - புண்டுக்காலம்)
சுற்றி காலம் (குட்டுமுழு - காற்றும்காலம்)
பொய் காலம் (காற்றும் - பொய்)
பிள்ளைக்காலம் (பொய் - பிள்ளைக்காலம்)
சிறுவுக்காலம் (சிறுவுக்காலம் - சிறுவுக்காலம்)
பத்மீஸ்வர காலம் (பத்மீஸ்வரம் - சுற்றுக்காலம்)

3. பாதுகாப்பு (புதுமுன்)
 பாதுகாப்பு
 பிள்ளைக்காலம்
 சுற்றுக்காலம்
 காற்றும்

4. குறுக்கம்
சிறுவுக்காலம்
பாண்டிக் குறுக்கம்
குறுக்க குறுக்கம்
5. இலக்கு, புலவர்கள்

அம்ம (ஏதைய வரசைத்து)
மாம் (சதம)
சாத்து (பாரசைத்து)
சுக்கத (சுக்கது)
செம்மு (செம்மு)

6. தமிழ்நாட்டின் இறுதிப்பு/ தமிழ்நாட்டின் இறுதிப்பு

சாத்து (சாத்)
சாத்து (சாத்)
மாம் (மாம்)
சாத்து (சாத்)
சாத்து (சாத்)
சாத்து (சாத்)

7. ஸ்ரீகர் அருகியவை

பாவம்
சாத்து
 காதல்
பாவம்

8. வேயல்

பாவம்
சுற்றுசை
மின்கைலம்

9. பிற உணவரியின் விளை

சிற்றுசை
புலம்பு
சிற்றுசைப்பொல
சுற்றுசை
மாமைப்பொல
சிற்றுசை
புலம்பு

10. முகலோசத்துடன்

a) கைது

பிரிவுச்சராக
அமரசிராக
மின்வாசாக
சுரங்கசாக
சுந்தரசாக
நுாபசாக
நஞ்வூஸாக
திருநவாசாக
தேவரங்கம்

b) பிரிவு

அலை பிரிவு
நிதான்கள் பிரிவு
வாக பிரிவு
அலைநாகப் பிரிவு
பிதாக பிரிவு

c) குழா

அலைநாகம்
சித்தாசோகம்
சேனாசம்
சாம்பலம்
சுந்தரம்
சந்திகம்

141
11. வழிவகுத்துடன்

காசூப்
செக்குறி
செயல்
சின்னமுப்
செயல்
சுருக்க
சுருக்கல் / சுருக்கல்

12. போன்று வேலை

போன்று
சின்னமுப்
செயல்
சுருக்க
சுரு
சுரு

சுருக்க

4. சுருக்குகளில்

சுருக்க
சுருக்க
சுருக்க
சுரு
சுரு
சுரு
**Laboratory Investigation**

**Blood**

TC : cells / cu. mm

DC : P %  
L %  
E %

ESR

½ hour : mm
1 hour : mm

Hb

Blood sugar : F / PP / R

Serum cholesterol

Uric acid

Urea

VDRL

**Urine**

Albumin

Sugar

Deposits

**Motion**

Ova

Cyst

**Immunological**

RA factor

**Radiographic evaluation**

**Serological test for syphilis**
Synovial fluid analysis
Arthrography

**Locomotor system**

Inspection
  - Overlying skin
  - Colour
  - Scars and ulcers
  - Periarticular swelling

Bones
  - Deformity
  - Unusual feature
  - Muscle changes
  - Symmetrical distribution
  - Joint movement
  - Gait

Palpation
  - Skin temperature
  - Soft tissues
  - Bony enlargement
  - Crepitation
  - Subcutaneous nodules
  - Rheumatoid vasculitic lesions
  - Lymphadenopathy
  - Pitting oedema
RANGE OF MOVEMENT

Examination of individual Joints
Cervical spine
Thoracic spine
Lumbar spine
Sacroiliac joint
Shoulder joint
Elbow joint
Wrist joint
Interphalangeal joint
Hip joint
Knee joint
Metatarso phalangeal joint

Examination of individual joints (Affected joints)

Measurement
Knee joint
Ankle joint
Wrist joint
Elbow joint
Index finger
Middle finger
Ring finger
Little finger
Examination of other system
Respiratory system
Cardiovascular system
Gastro intestinal system
Central nervous system

Signs and Symptoms
Management:

DAILY PROGRESS

<table>
<thead>
<tr>
<th>Date</th>
<th>Symptoms</th>
<th>Drug</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GOVERNMENT SIDDHA MEDICAL COLLEGE
HOSPITAL
POST GRADUATE RESEARCH CENTRE
BRANCH - III SIRAPPU MARUTHUVAM
PALAYAMKOTTAI, TIRUNELVELI - 627 002.

ADMISSION - DISCHARGE SHEET FOR "VALI AZHAL KEEL VAYU"

I.P. No : Occupation :
Bed no. : Income :
Ward : Nationality :
Name : Religion :
Age : Date of admission :
Sex : Date of discharge :
Permanent address : Diagnosis :

Temporary address

CLINICAL PICTURES

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>During Admission</th>
<th>During Discharge</th>
</tr>
</thead>
</table>

PLACE:
DATE:

Signature of the medical officer
BIBLIOGRAPHY

1. Gunapadam – Mooligai – Dr. Murugesan Mudaliyar
2. Kannusamiyam ennum vaithya sekaram
3. Man murugiyam ennum tamil maruthuva nool
4. Noi naadal Noi mudhal naadal I & II – Dr. M. Shunmuga Velu
   H.P.I.M
5. Pathartha Guna vilakkam
6. Siddha Maruthuvam – Dr. Kuppusamy Mudaliyar
7. Siddha maruthuvanga churukkam – Dr. K. S. Uthamarayan
8. Thirumoolanayanar Sikicha ratna theepam
9. Yugi Vaidhya Chinthamani
10. Agathiyar 2000 I, II Part
11. Theriyar Vagadam
12. Yugi munivar perunool vaidhya kaviyam 1000
13. Sathaganadi
14. Agathiyar Nadi
15. Agathiyar Gunavagada thirattu
16. Agathiyar vaidhya vallathy 600
20. Mercer’s orthopaedics surgery book
21. Harrison’s Text book of medicine
22. Wealth of India
23. Pharmacopoeial standards of herbal plants
24. T.V. Samba sivam pillai Tamil – English Dictionary
25. Indian Medicinal Plants
27. Fundamentals of Biochemistry for medical students – Ambika Shanmugam
28. Text Book of Medicinal Botany – Dr. S. Somasundaram
29. www.wikipedia.org
30. www.yogaonline.com
31. www.photos.google.com
ACKNOWLEDGEMENT

The author first of all expresses his elegance to the almighty for all his manifold mercies, who gave the will power and showered blessings to complete the dissertation work.

The author should devote cheerful thanks to her parents for their unvarying cooperation, pleasant encouragement during the whole study period.

The author warmly acknowledges ardent thanks to the Vice Chancellor of the Tamil Nadu Dr.M.G.R. Medical University, Chennai for permitting to under take this study and the Special Commissioner, Directorate of Indian Medicine and Homeopathy, Chennai who avow the dissertation with gay.

The author take up this opportunity to thank the Joint Director, Directorate of Indian Medicine and Homeopathy, Chennai for giving due recognition for the dissertation work.

The author sincerely extend gratefulness to the Principal Dr.M. Thinakaran M.D.(S) and Vice Principal, Government Siddha Medical College, Palayamkottai for granting permission to use the facilities available in this institution to bring out the dissertation a successful one.

Words seem to be inadequate to express grateful to Dr.K.Somasekaran B.Sc., B.I.M. M.D(S) Head of the Post Graduate Department of Sirappu Maruthuvam, Government Siddha Medical College, Palayamkottai for his valuable suggestions and necessary advise in every step of the dissertation work. He provided very good guidance during this study for which the author deeply thank him.
The author show a deep sense of gratitude to Dr.K.Saibudeen M.D(S) Assistant Lecturer, Post Graduate Department of Sirappu Maruthuvam, Government Siddha Medical College, Palayamkottai for his support.

It is the author’s duty to place a record of profound sense of gratitude to Dr.S.Ramaguru B.Sc., M.S (Ortho) Head of the Orthopedic Department, Tirunelveli Medical College Hospital.

The author extent sincere thanks to Dr.S. Bagirathy M.B.B.S., Clinical Pathologist, Dr. Padma M.B.B.S., DMRD., Radiologist for their help in this study.

The author should utter ardent thanks to Mr.M.Kalaivanan M.Sc., Lecturer Pharmacology Department, Mrs.Nagaprema M.S., M.Phil., Head of the Department of Bio-Chemistry for this keen cooperation in eliciting the Pharmacological evaluations and Bio-Chemical studies of trial work.
## CASE SUMMARY OF IN-PATIENTS

<table>
<thead>
<tr>
<th>S.no</th>
<th>I.P. No</th>
<th>Name</th>
<th>Age/Sex</th>
<th>Duration of Illness</th>
<th>Date of admission</th>
<th>Date of Discharge</th>
<th>No.of Days Treated</th>
<th>Treatment with Medicine dose</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>783</td>
<td>Maria</td>
<td>36/F</td>
<td>1Year</td>
<td>12.04.06</td>
<td>27.04.06</td>
<td>15</td>
<td>Mudakku vatha chooranam 650mg -1300mg thrice a day with Honey or Hot water (Internally) Vatha Thylam (Externally)</td>
<td>CR</td>
</tr>
<tr>
<td>2</td>
<td>931</td>
<td>Sukumari</td>
<td>25/F</td>
<td>6months</td>
<td>24.04.06</td>
<td>23.05.06</td>
<td>30</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>3</td>
<td>999</td>
<td>Kanagalakshmi</td>
<td>50/F</td>
<td>2months</td>
<td>02.05.06</td>
<td>23.05.06</td>
<td>21</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>4</td>
<td>1062</td>
<td>Subhulakshmi</td>
<td>27/F</td>
<td>3months</td>
<td>11.05.06</td>
<td>29.05.06</td>
<td>18</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>5</td>
<td>165</td>
<td>Kupammal</td>
<td>44/F</td>
<td>7years</td>
<td>19.07.06</td>
<td>30.08.06</td>
<td>42</td>
<td>CR</td>
<td>PR</td>
</tr>
<tr>
<td>6</td>
<td>2325</td>
<td>Pappa</td>
<td>42/F</td>
<td>6months</td>
<td>19.10.06</td>
<td>01.11.06</td>
<td>45</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>7</td>
<td>2461</td>
<td>Pappa</td>
<td>40/F</td>
<td>6months</td>
<td>06.11.06</td>
<td>15.11.06</td>
<td>09</td>
<td>CR</td>
<td>PR</td>
</tr>
<tr>
<td>8</td>
<td>2531</td>
<td>Lakshmithai</td>
<td>50/F</td>
<td>1year</td>
<td>15.11.06</td>
<td>31.11.06</td>
<td>16</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>9</td>
<td>2446</td>
<td>Narayanavadi</td>
<td>63/F</td>
<td>3 ½ years</td>
<td>03.11.06</td>
<td>04.12.06</td>
<td>31</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>10</td>
<td>2719</td>
<td>Gnanapoo</td>
<td>75/F</td>
<td>3months</td>
<td>29.11.06</td>
<td>09.12.06</td>
<td>10</td>
<td>CR</td>
<td>PR</td>
</tr>
<tr>
<td>11</td>
<td>2849</td>
<td>Kodiyan</td>
<td>60/M</td>
<td>2years</td>
<td>13.12.06</td>
<td>01.01.07</td>
<td>19</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>12</td>
<td>2642</td>
<td>Sankaravadi</td>
<td>72/F</td>
<td>1year</td>
<td>21.11.06</td>
<td>16.12.06</td>
<td>25</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>13</td>
<td>2352</td>
<td>Balakrishnan</td>
<td>60/M</td>
<td>1year</td>
<td>23.10.06</td>
<td>10.12.06</td>
<td>48</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>14</td>
<td>2869</td>
<td>Essakiammal</td>
<td>40/F</td>
<td>2years</td>
<td>14.12.06</td>
<td>12.01.07</td>
<td>29</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>15</td>
<td>2857</td>
<td>Alagammal</td>
<td>65/F</td>
<td>6months</td>
<td>13.12.06</td>
<td>22.01.07</td>
<td>40</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>16</td>
<td>2953</td>
<td>Lakshmi</td>
<td>60/F</td>
<td>2years</td>
<td>24.12.06</td>
<td>16.01.07</td>
<td>23</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>17</td>
<td>64</td>
<td>Packiam</td>
<td>50/F</td>
<td>3years</td>
<td>10.01.07</td>
<td>10.02.07</td>
<td>31</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>18</td>
<td>2849</td>
<td>Chellammal</td>
<td>45/F</td>
<td>3months</td>
<td>10.01.07</td>
<td>01.02.07</td>
<td>22</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>19</td>
<td>22</td>
<td>Arumugam</td>
<td>71/M</td>
<td>4years</td>
<td>08.01.07</td>
<td>22.01.07</td>
<td>14</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>20</td>
<td>338</td>
<td>Avudaiammal</td>
<td>35/F</td>
<td>8months</td>
<td>13.02.07</td>
<td>27.01.07</td>
<td>44</td>
<td>PR</td>
<td>PR</td>
</tr>
</tbody>
</table>

CR - Clinically Relieved

PR - Partially Relived
## CASE SUMMARY OF OUT PATIENTS

<table>
<thead>
<tr>
<th>S.no</th>
<th>O.P. No</th>
<th>Name</th>
<th>Age/Sex</th>
<th>Duration of Illness</th>
<th>No. of Days Treated</th>
<th>Treatment with Medicine dose</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>62304</td>
<td>Rukmani</td>
<td>30/F</td>
<td>3Years</td>
<td>39</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>2</td>
<td>69980</td>
<td>Mayandi</td>
<td>42/M</td>
<td>3months</td>
<td>53</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>3</td>
<td>41648</td>
<td>Saral</td>
<td>43/F</td>
<td>3years</td>
<td>55</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>4</td>
<td>45150</td>
<td>Andal</td>
<td>29/F</td>
<td>6months</td>
<td>38</td>
<td></td>
<td>PR</td>
</tr>
<tr>
<td>5</td>
<td>71110</td>
<td>Jasmine</td>
<td>40/F</td>
<td>1year</td>
<td>47</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>6</td>
<td>66662</td>
<td>Arunachalam</td>
<td>55/F</td>
<td>3years</td>
<td>39</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>7</td>
<td>68771</td>
<td>Visalatchi</td>
<td>37/F</td>
<td>10days</td>
<td>57</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>8</td>
<td>66705</td>
<td>Rajam</td>
<td>29/F</td>
<td>2years</td>
<td>43</td>
<td></td>
<td>PR</td>
</tr>
<tr>
<td>9</td>
<td>63504</td>
<td>Muthulakshmi</td>
<td>28/F</td>
<td>4months</td>
<td>38</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>10</td>
<td>2376</td>
<td>Somasundaram</td>
<td>46/M</td>
<td>2months</td>
<td>32</td>
<td></td>
<td>PR</td>
</tr>
<tr>
<td>11</td>
<td>219</td>
<td>Joy</td>
<td>40/F</td>
<td>1month</td>
<td>35</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>12</td>
<td>2403</td>
<td>Aandal</td>
<td>58/F</td>
<td>1month</td>
<td>32</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>13</td>
<td>68509</td>
<td>Devi</td>
<td>25/F</td>
<td>1year</td>
<td>59</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>14</td>
<td>76343</td>
<td>Piramu</td>
<td>52/F</td>
<td>6months</td>
<td>33</td>
<td></td>
<td>PR</td>
</tr>
<tr>
<td>15</td>
<td>70805</td>
<td>Subbiah</td>
<td>57/M</td>
<td>2years</td>
<td>55</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>16</td>
<td>71151</td>
<td>Indhrani</td>
<td>50/F</td>
<td>3years</td>
<td>54</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>17</td>
<td>72525</td>
<td>Muthammal</td>
<td>50/F</td>
<td>10years</td>
<td>42</td>
<td></td>
<td>PR</td>
</tr>
<tr>
<td>18</td>
<td>76366</td>
<td>Alice</td>
<td>40/F</td>
<td>4months</td>
<td>40</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>19</td>
<td>71126</td>
<td>Aachiappan</td>
<td>45/M</td>
<td>15days</td>
<td>48</td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>20</td>
<td>44468</td>
<td>Sudalaivadivu</td>
<td>24/F</td>
<td>6years</td>
<td>42</td>
<td></td>
<td>PR</td>
</tr>
</tbody>
</table>

CR - Clinically Relieved
PR - Partially Relieved

Mudakku vatha chooranam 650mg - 1300mg thrice a day with Honey or Hot water Internally
Vatha Thylam (Externally)
<table>
<thead>
<tr>
<th>S.No</th>
<th>IP NO</th>
<th>Knee Joint</th>
<th>Ankle Joint</th>
<th>Wrist Joint</th>
<th>Index Finger</th>
<th>Middle Finger</th>
<th>Ring Finger</th>
<th>Little Finger</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BT</td>
<td>AT</td>
<td>BT</td>
<td>AT</td>
<td>BT</td>
<td>AT</td>
<td>BT</td>
</tr>
<tr>
<td>1</td>
<td>783</td>
<td>12</td>
<td>11</td>
<td>8</td>
<td>7.5</td>
<td>6.5</td>
<td>6</td>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
<td>931</td>
<td>12.5</td>
<td>12</td>
<td>9</td>
<td>8.5</td>
<td>7.1</td>
<td>6.8</td>
<td>2.3</td>
</tr>
<tr>
<td>3</td>
<td>999</td>
<td>13</td>
<td>11</td>
<td>7.8</td>
<td>7.5</td>
<td>6.5</td>
<td>6</td>
<td>2.2</td>
</tr>
<tr>
<td>4</td>
<td>1062</td>
<td>12</td>
<td>11.5</td>
<td>8.5</td>
<td>8</td>
<td>7.5</td>
<td>7</td>
<td>2.5</td>
</tr>
<tr>
<td>5</td>
<td>165</td>
<td>12.5</td>
<td>12</td>
<td>9</td>
<td>8.5</td>
<td>6.8</td>
<td>6.5</td>
<td>2.1</td>
</tr>
<tr>
<td>6</td>
<td>2325</td>
<td>13</td>
<td>12.5</td>
<td>9.5</td>
<td>9</td>
<td>6.5</td>
<td>6.3</td>
<td>2.3</td>
</tr>
<tr>
<td>7</td>
<td>2461</td>
<td>13.5</td>
<td>12.5</td>
<td>10</td>
<td>9</td>
<td>7.6</td>
<td>7.2</td>
<td>2.5</td>
</tr>
<tr>
<td>8</td>
<td>2531</td>
<td>13</td>
<td>12.5</td>
<td>9.5</td>
<td>8</td>
<td>7.2</td>
<td>7.1</td>
<td>2.3</td>
</tr>
<tr>
<td>9</td>
<td>2446</td>
<td>14</td>
<td>13</td>
<td>11</td>
<td>10.5</td>
<td>6.5</td>
<td>6.2</td>
<td>2.4</td>
</tr>
<tr>
<td>10</td>
<td>2719</td>
<td>13.5</td>
<td>12.5</td>
<td>10.5</td>
<td>10</td>
<td>7.4</td>
<td>7.1</td>
<td>2.5</td>
</tr>
<tr>
<td>11</td>
<td>2849</td>
<td>11.5</td>
<td>10.5</td>
<td>10</td>
<td>9.5</td>
<td>7.5</td>
<td>7.2</td>
<td>2.6</td>
</tr>
<tr>
<td>12</td>
<td>2642</td>
<td>13.5</td>
<td>12.5</td>
<td>12.5</td>
<td>11.5</td>
<td>7.6</td>
<td>7.1</td>
<td>2.2</td>
</tr>
<tr>
<td>13</td>
<td>2352</td>
<td>14</td>
<td>13.5</td>
<td>9.5</td>
<td>9.1</td>
<td>7.2</td>
<td>7</td>
<td>2.5</td>
</tr>
<tr>
<td>14</td>
<td>2869</td>
<td>12.5</td>
<td>12</td>
<td>10.5</td>
<td>10.3</td>
<td>7.1</td>
<td>6.5</td>
<td>2.6</td>
</tr>
<tr>
<td>15</td>
<td>2857</td>
<td>13</td>
<td>12.5</td>
<td>8</td>
<td>7.5</td>
<td>6.8</td>
<td>6.5</td>
<td>2.2</td>
</tr>
<tr>
<td>16</td>
<td>2953</td>
<td>14</td>
<td>13</td>
<td>11.5</td>
<td>10.5</td>
<td>7.4</td>
<td>7.1</td>
<td>2.4</td>
</tr>
<tr>
<td>17</td>
<td>64</td>
<td>13.5</td>
<td>12.5</td>
<td>10.5</td>
<td>10</td>
<td>7.2</td>
<td>7</td>
<td>2.5</td>
</tr>
<tr>
<td>18</td>
<td>2849</td>
<td>13</td>
<td>12.5</td>
<td>9.5</td>
<td>9</td>
<td>7</td>
<td>6.5</td>
<td>2.2</td>
</tr>
<tr>
<td>19</td>
<td>22</td>
<td>14</td>
<td>13.5</td>
<td>10</td>
<td>9.5</td>
<td>7.4</td>
<td>7</td>
<td>2.4</td>
</tr>
<tr>
<td>20</td>
<td>338</td>
<td>13</td>
<td>12</td>
<td>9</td>
<td>7.4</td>
<td>7.3</td>
<td>2.3</td>
<td>2.1</td>
</tr>
</tbody>
</table>

BT – Before Treatment
AT – After Treatment
<table>
<thead>
<tr>
<th>S.No</th>
<th>IP NO</th>
<th>Knee Joint BT</th>
<th>Ankle Joint BT</th>
<th>Wrist Joint BT</th>
<th>Index Finger BT</th>
<th>Middle Finger BT</th>
<th>Ring Finger BT</th>
<th>Little Finger BT</th>
<th>Knee Joint AT</th>
<th>Ankle Joint AT</th>
<th>Wrist Joint AT</th>
<th>Index Finger AT</th>
<th>Middle Finger AT</th>
<th>Ring Finger AT</th>
<th>Little Finger AT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>783</td>
<td>11.5</td>
<td>11</td>
<td>8</td>
<td>7.6</td>
<td>6.6</td>
<td>5.8</td>
<td>2.5</td>
<td>2.3</td>
<td>2.6</td>
<td>2.2</td>
<td>2.5</td>
<td>2.3</td>
<td>1.8</td>
<td>1.6</td>
</tr>
<tr>
<td>2</td>
<td>931</td>
<td>13</td>
<td>12.5</td>
<td>10.5</td>
<td>10</td>
<td>6.8</td>
<td>6.5</td>
<td>2.3</td>
<td>2.1</td>
<td>2.3</td>
<td>2.1</td>
<td>1.8</td>
<td>1.6</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>3</td>
<td>999</td>
<td>12.5</td>
<td>11.5</td>
<td>9.5</td>
<td>9.1</td>
<td>7.2</td>
<td>6.8</td>
<td>2.4</td>
<td>2.2</td>
<td>2.2</td>
<td>2</td>
<td>2.2</td>
<td>1.8</td>
<td>2.3</td>
<td>2.1</td>
</tr>
<tr>
<td>4</td>
<td>1062</td>
<td>11.5</td>
<td>11</td>
<td>9</td>
<td>8.5</td>
<td>7.6</td>
<td>7.2</td>
<td>2.5</td>
<td>2.3</td>
<td>2.4</td>
<td>2.2</td>
<td>2.1</td>
<td>1.6</td>
<td>2.2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>165</td>
<td>10.5</td>
<td>10</td>
<td>10.5</td>
<td>10</td>
<td>7.2</td>
<td>6.8</td>
<td>2.6</td>
<td>2.4</td>
<td>2.6</td>
<td>2.2</td>
<td>2.2</td>
<td>2</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>6</td>
<td>2325</td>
<td>12.5</td>
<td>12</td>
<td>11.5</td>
<td>10.5</td>
<td>6.5</td>
<td>6.2</td>
<td>2.1</td>
<td>1.8</td>
<td>2.5</td>
<td>2.1</td>
<td>2.5</td>
<td>2.2</td>
<td>2.3</td>
<td>2.1</td>
</tr>
<tr>
<td>7</td>
<td>2461</td>
<td>12</td>
<td>11.5</td>
<td>9.5</td>
<td>9</td>
<td>5.7</td>
<td>5.5</td>
<td>2.3</td>
<td>2</td>
<td>2.2</td>
<td>1.8</td>
<td>2.3</td>
<td>2.2</td>
<td>1.8</td>
<td>1.5</td>
</tr>
<tr>
<td>8</td>
<td>2531</td>
<td>13.5</td>
<td>13</td>
<td>10.5</td>
<td>10</td>
<td>7.8</td>
<td>7.5</td>
<td>2.5</td>
<td>2.1</td>
<td>2.6</td>
<td>2.2</td>
<td>2.1</td>
<td>1.5</td>
<td>2.1</td>
<td>1.8</td>
</tr>
<tr>
<td>9</td>
<td>2446</td>
<td>13</td>
<td>12.5</td>
<td>10.5</td>
<td>9</td>
<td>7</td>
<td>6.5</td>
<td>2.3</td>
<td>1.8</td>
<td>2.4</td>
<td>2.1</td>
<td>2.4</td>
<td>1.8</td>
<td>2.5</td>
<td>1.9</td>
</tr>
<tr>
<td>10</td>
<td>2719</td>
<td>12.5</td>
<td>12</td>
<td>8</td>
<td>7.5</td>
<td>6.6</td>
<td>6.2</td>
<td>2.5</td>
<td>2.2</td>
<td>2.2</td>
<td>1.6</td>
<td>2.6</td>
<td>2.1</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>11</td>
<td>2849</td>
<td>13.5</td>
<td>13</td>
<td>9.5</td>
<td>9</td>
<td>7.2</td>
<td>7</td>
<td>2.4</td>
<td>2</td>
<td>2.4</td>
<td>1.8</td>
<td>2.3</td>
<td>1.6</td>
<td>1.8</td>
<td>1.5</td>
</tr>
<tr>
<td>12</td>
<td>2642</td>
<td>14.5</td>
<td>13.5</td>
<td>10.5</td>
<td>10</td>
<td>7.6</td>
<td>7.2</td>
<td>2.3</td>
<td>2.1</td>
<td>2.3</td>
<td>1.5</td>
<td>2.6</td>
<td>2.2</td>
<td>1.8</td>
<td>1.6</td>
</tr>
<tr>
<td>13</td>
<td>2352</td>
<td>12.5</td>
<td>12</td>
<td>11.5</td>
<td>10.5</td>
<td>7.2</td>
<td>7</td>
<td>2.1</td>
<td>1.8</td>
<td>2.5</td>
<td>2</td>
<td>2.4</td>
<td>2</td>
<td>2.2</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>2869</td>
<td>13</td>
<td>12.5</td>
<td>9.5</td>
<td>9.3</td>
<td>6.4</td>
<td>6.2</td>
<td>2</td>
<td>1.8</td>
<td>2.3</td>
<td>2.1</td>
<td>2.2</td>
<td>1.8</td>
<td>2.4</td>
<td>2.1</td>
</tr>
<tr>
<td>15</td>
<td>2857</td>
<td>13.5</td>
<td>13</td>
<td>10.5</td>
<td>10.5</td>
<td>7.5</td>
<td>7.2</td>
<td>2.5</td>
<td>2.3</td>
<td>2.6</td>
<td>2.3</td>
<td>2.5</td>
<td>2.3</td>
<td>1.6</td>
<td>1.2</td>
</tr>
<tr>
<td>16</td>
<td>2953</td>
<td>11.5</td>
<td>11</td>
<td>11.5</td>
<td>11.2</td>
<td>6.8</td>
<td>6.5</td>
<td>2.3</td>
<td>1.8</td>
<td>2.3</td>
<td>2.1</td>
<td>2.1</td>
<td>1.8</td>
<td>2.3</td>
<td>2.1</td>
</tr>
<tr>
<td>17</td>
<td>64</td>
<td>13.5</td>
<td>12.5</td>
<td>8.5</td>
<td>8.2</td>
<td>7</td>
<td>6.5</td>
<td>2.2</td>
<td>1.6</td>
<td>2.4</td>
<td>2.1</td>
<td>2.3</td>
<td>1.6</td>
<td>2.1</td>
<td>1.8</td>
</tr>
<tr>
<td>18</td>
<td>2849</td>
<td>12.5</td>
<td>12</td>
<td>10.5</td>
<td>10.2</td>
<td>7.2</td>
<td>6.5</td>
<td>2.5</td>
<td>1.8</td>
<td>2.2</td>
<td>1.6</td>
<td>2.1</td>
<td>1.8</td>
<td>2.5</td>
<td>2.3</td>
</tr>
<tr>
<td>19</td>
<td>22</td>
<td>14</td>
<td>13.5</td>
<td>9.5</td>
<td>9.3</td>
<td>6.4</td>
<td>6.2</td>
<td>2.3</td>
<td>1.6</td>
<td>2.6</td>
<td>2.2</td>
<td>2.2</td>
<td>2</td>
<td>2.3</td>
<td>2.1</td>
</tr>
<tr>
<td>20</td>
<td>338</td>
<td>13.5</td>
<td>13</td>
<td>11.5</td>
<td>11.2</td>
<td>6.6</td>
<td>6.2</td>
<td>2.1</td>
<td>1.5</td>
<td>2.1</td>
<td>1.8</td>
<td>2.5</td>
<td>2.1</td>
<td>1.6</td>
<td>1.8</td>
</tr>
</tbody>
</table>

BT – Before Treatment
AT – After Treatment