ANALYSIS OF FUNCTIONAL OUTCOME FOLLOWING TOTAL KNEE ARTHROPLASTY IN PATIENTS FROM LOW SOCIOECONOMIC STATUS

Dissertation submitted in partial fulfilment of regulation for the award of

M.S. Degree in ORTHOPAEDICS(Branch 1I)

The Tamilnadu

Dr. M.G.R. Medical University

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CERTIFICATE

Certified that this is the bonafide dissertation done by **Dr.K.GUNALAN** and submitted in partial fulfilment of the requirements for the Degree of M.S., orthopaedics, Branch 1I of The Tamilnadu Dr. M.G.R. Medical University, Chennai.

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DECLARATION

I solemnly declare that the dissertation titled **"ANALYSIS OF FUNCTIONAL OUTCOME FOLLOWING TOTAL KNEE ARTHROPLASTY IN PATIENTS FROM LOW SOCIO ECONOMIC STATUS"** was done by me from June 2009 to September 2011 under the guidance and supervision of **Professor Dr.S.DHANDAPANI,Dorth,M.S.(orth),Mch(orth)**

This dissertation is submitted to the Tamilnadu Dr. MGR Medical University towards the partial fulfilment of the requirement for the award of M.S. Degree in Orthopaedics (Branch 1I).

Place: Coimbatore **Dr. K.GUNALAN**

Date:

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ABSTRACT

Background & Objectives: To study the functional outcome following total knee replacements in patients from low socioeconomic status and assess the set of problems unique to this group.

Method: In our study, we had analysed the functional outcome of patients with chronic arthritis of knee between the age of 40-70 and had undergone total knee replacement in Coimbatore medical college or other private hospitals under state government scheme but had followed up in our hospital due to financial constraints. A total of 42 to patients who had undergone knee replacement 28 female patients, 14 male patients. We had evaluated the functional outcome using American knee society score, pain relief and documented the complications. The satisfaction of the patient was also analysed, based on the patients level of activity, pain relief,mode of transport

Results: In our study, 66 % of the patients comprised of females and 34 % of males. In this study 20% of patients of patients had excellent results, 23% of patients had poor results, 58 percent of patients had good to fair results. Satisfaction among patients was poor 58% of patients were not satisfied with their

replaced knee. A number of patients had developed complications, knee stiffness , infection, persistent pain were predominant complications

Conclusion: In our study we saw that patients from low socio economic status had lower levels of satisfaction, also the patients in the study had a higher rate of complications. The patients also had lower functional outcome. Patients from lower socioeconomic who had excellent outcomes may be considered as the ideal candidate for joint replacement. From this study we conclude that patients from lower socio economic status are not very ideal candidates for joint replacement.

Key Words: Chronic arthritis, Total knee replacement, Low socio economic status, complications of total knee replacement, functional outcome

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Introduction

INTRODUCTION

Degenerative arthritis of knee is a common affliction in our Indian population causing a great amount of hardship and suffering for patients. It has major functional, medical, psychosocial and financial effects on the affected person, family and society.

Management of severe degenerative arthritis by conservative methods yields poor results. Degenerative arthritis is not a static condition hence with conservative treatment we cannot stall the process of degeneration. Degenerative arthritis causes pain, functional restriction, and deformities. Knee replacement provides a way to overcome all afflictions of arthritis. Knee replacements is one of the most successful orthopaedic surgery with immence patient satisfaction.In the modern era of orthopaedic surgery, replacements constitute a major modality of providing souccer to patients with arthritis.

In the past several techniques were used for the management of an arthritic knee with unsatisfactory results. The methods consisted of analgesics, heat, physiotherapy, osteotomies, arthrodesis all produce suboptimal results.Of all the methods replacements gives the best results consistently and reproducibly . With replacement the patients pain is relieved, functional mobility is obtained, if any preexisting deformity is present can be corrected.

The implants for total knee replacement has seen a paragidm shift in design and materials. Since 1973,when Insall and others had began the modern era of knee replacement there has been a lot of activity in prosthesis design leading to longer prosthesis life, better performance, increased mobility and numerous other benefits.

Over the years, also the techniques of replacements have seen a dramatic improvement resulting in superior outcomes. The usage of preoperative antibiotics, tourniquets, laminar flow theatres, appropriate patient selection has resulted in good results.

In our group of patients, who are from the socially deprived section, have certain set of problems, which need to be addressed. These people are attracted to government hospitals as services provided are free and of reasonably good quality. People from low socio economic group, have occupations which require great amount of physical exertion making them poor candidates for replacement also their life style, means of transport, activities of daily living cause increased wear on the prosthesis. Also the patients are high risk patients as they have poor general condition, usually present late, thereby invariably having deformities, poor nutritional status.

Aims & Objectives

AIM OF THE STUDY

The aim of this study is

1. To analyze the functional outcome following total knee replacement in patients from lower socio-economic status.

2. To determine the factors affecting the outcome following a total knee replacement and early complications.

Review of Literature

REVIEW OF LITERATURE

Total knee arthroplasty is an well accepted procedure world over with promising results, in our study patients were selected from people from low socioeconomic status who were selected based on modified kuppusamy scale-2007 update Kumar et all, the above paper had changed the criteria as of 2007 rates. The scale is based on three criteria income, educational status, occupation. This scale is an valuable tool in hospital and community based research. Using the above scale people are classified into high, middle and low socioeconomic groups. [14]

Mayilee can˜izares,j et all in their study [15] had studied the relationship between arthritis , racial ,regional, cultural and socioeconomic status. This was a landmark study as it had detailed the inter relationship between the above factors and severity of arthritis. In the study the authors had concluded that low socioeconomic status had a profound influence on arthritis. The individual and regional factors were found to contribute to variations in the prevalence of arthritis, although significant unexplained variation remained.

Jonathan skinner et all in 2006[16] in their publication ‘The Influence of Income

and Race on Total Knee Arthroplasty in the United States" had stated there is good evidence that women, and black and Hispanic women in particular,

have substantially higher rates of knee osteoarthritis, also they added that higher-income Medicare recipients are less likely to have osteoarthritis but are more likely to have a total knee arthroplasty. This study validates that disparities are present due socioeconomic reasons greatly causing poor response in patients from lower strata of society, as they present late and with numerous complications. Patients with lower income levels are currently less likely to undergo total knee arthroplasty, despite a similar or greater prevalence of osteoarthritis.

Ellis, Henry B.a et all in 2010 [8] had stated in their study that, an individual's socioeconomic status, typically based on income and educational level, has been shown to have an effect on the outcomes of total joint arthroplasty. Acknowledging the differences in outcomes and discovering ways to reduce the disparity will be beneficial to individuals undergoing total joint arthroplasty. The disparity of outcomes associated with total knee and hip arthroplasty is crucial in the treatment of arthritis. Disparity in health care occurs in a variety of demographics and is on the front lines of health care policy. The study states that people from low income group are more likely to develop complications.

Davis ET et all in 2008 [9], in their study published in the journal of international quality of life, state , Patients with lower incomes appeared to have a greater need

for total knee arthroplasty. However, level of income, and educational status did appear to affect the final outcome following total knee arthroplasty. Patients with lower incomes appeared not able to compensate for their worse pre-operative score and obtain poorer outcomes post-operatively.

Carol A Mancuso et all[10] had studied about another aspect of arthroplasty, they had reviewed the expectations of patients undergoing arthroplasty and their satisfaction levels post surgery. The authors had come to the conclusion that patients having severe arthritis had high expectations following joint replacement but poor satisfaction following joint replacement. The study concluded by coming to the decision that patients with severe disease pre operatively fared poorly. This study reinforces that patients with severe degenerative changes had less then satisfactory results following replacement surgery.

Eric R. Bohm et all had studied regarding the complications arising following joint replacement and the factors influencing them. Rehospitalization , revision and infection were the main complications which were taken into account. By this study it was come to the conclusion that patients from poorer social classes fared poorly had either of the above complications compared to the control group. The reasons attributed was that most patients from poorer classes had numerous comorbid conditions, were at risk cases because of their late presentation.

Nelson F soohoo MD et all [2]also had studied about the complications following total knee arthroplasty. In this study there has been an analysis of the factors which led to readmission in large set of patients. In this study age and Charlson comorbidity index showed significant morbidity and readmission.

G. M. Woolhead et all [34]had studied about the qualitative outcome following joint replacement most of the previous studies had only taken quantitative outcomes. This study had shown that patients had a strong desire to state that their TKR outcome was successful despite the continued experience of pain and immobility. Different reasons and rationalizations were made by the participants in an attempt to diminish any disappointment with their remaining pain and disability. A fundamental finding of this study was the process by which the participants struggled to understand and adapt to their outcome. Although TKR has been shown to be a highly effective procedure using quantitative methods, these studies may need to be qualified by these qualitative findings.

Raymond Y L Liow et all in 2000 [20] had done a study to validate the usage of American knee society score. In the study they have investigated the reliability of the American Knee Society Score (AKS), a widely used functional outcome score for knee arthroplasty. . The presence of arthritis in other joints and general debility

did not affect the reliability of the scores. This study also shows that there is only a moderate intra observer variation.

Anna Maria Carlsson[†] in her study in 1983[18][19] done on visual analogue scale states, the visual analogue scale (VAS) is a simple and frequently used method for the assessment of variations in intensity of pain. In clinical practice the percentage of pain relief, assessed by VAS, is often considered as a measure of the efficacy of treatment. As it is an easy and efficient method we have used it in our study for validating amount of pain and pain relief obtained following the replacement surgery

H,Lundblad ,MD et all in 2008 [3] had studied about prevalence of persistant pain following knee arthroplasty. In this study the authors had suggested different mechanisms underlie joint pain at rest and on movement in osteoarthritis. Separate assessment for these two features with a visual analogue scale offers better information. The risk of persistent pain may relate to degree of central sensitization before surgery, a less favourable outcome was observed for patients with high pre operative VAS score for rest pain and low pain threshold which reflects a central sensitsation mechanism. Through the above study we can learn that patients with severe joint disease have residual pain following joint replacement hence reducing the outcome of arthroplasty.

Lisa Berkman, Ph.D., and Arnold M. Epstein, M.D. in their publication in 2008 Studied about socioeconomic status and health[13]. The Journal documents the extraordinary pervasiveness of socioeconomic inequalities in health as well as the varying magnitude of risks. Disparities in socioeconomic status result from numerous risk factors and differential access to a broad range of resources. From this journal we were able to decipher that lower socio economic status leads to late presentation of patients with arthritis and hence at risk case.

David Diduch et all [1] in their long term follow up study had shown that patients undergoing knee replacement had improvement in their daily activity , usually people doing sedentary type of work had started doing occupations requiring certain amount of mobility. J.M.Sikorski M.D [4] in his study describes the importance of alignment he had stated that a deviation of greater than 3 degrees results in reduced longevity of prothesis , B.Pysent MD et all [2] had researched about knee questionnaires and the value in conducting a surgical audit and their study groups had extensively researched about knee arthroplasty .

Chronic arthritis of knee and total knee replacement

Anatomy of the knee

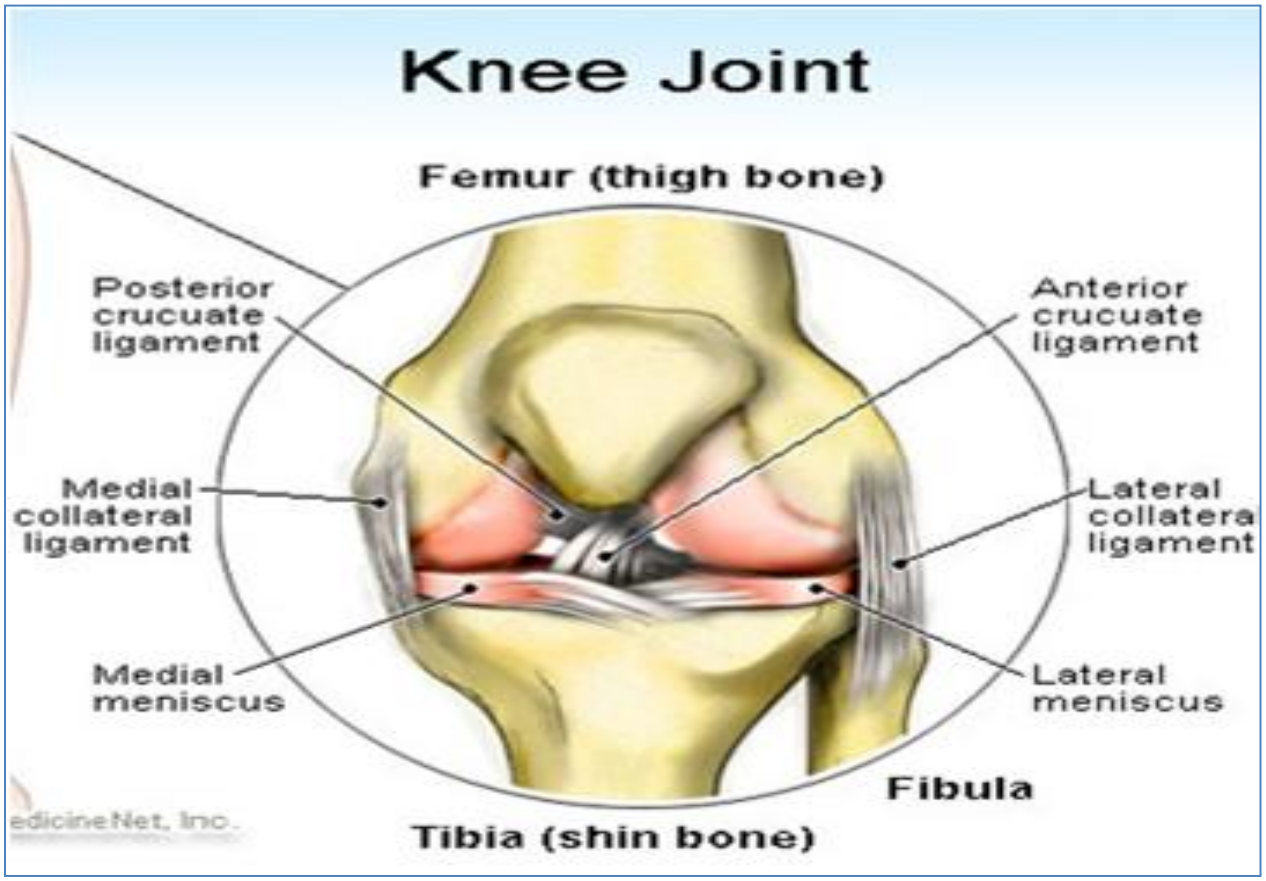
The knee is a complex joint with three major compartments: the patellofemoral joint, the medial tibiofemoral joint and the lateral tibiofemoral joint; the two latter compartments contain the fibrocartilaginous menisci. The osseous structures of the knee joint consist of the patella, the distal femoral condyles, and the proximal tibial plateaus. Two flat surfaces, plateaus or condyles, of the proximal end of the tibia articulate with the femoral condyles. The patellofemoral groove is located anteriorly between the femoral condyles. The patella is a triangular sesamoid bone with a smaller medial and a larger lateral articular facet. The knee

is principally a hinge joint, although some rotation occurs during flexion-extension.The knee is stabilized by the following structures: the articular capsule, the musculotendineous units (including the quadriceps mechanism, gastrocnemius, medial andlateral hamstring groups, popliteus, and iliotibial band), the medial and lateral collateral ligaments, which provide medial and lateral stability, and the anterior and posterior cruciate ligaments, which provide antero posterior support and rotatory stability. Both the medial and the lateral meniscus participate in stability. They are especially important rotatory stabilizers. The knee joint is surrounded by a large synovial membrane which extends up to the

suprapatellar pouch beneath the quadriceps femoris muscle. The following bursae are foundin the knee area: the superficial prepatellar bursa, the superficial and deep

infrapatellar bursae, the pes anserine bursa, and the posterior medial semimembranous and posterolateralgastrocnemius bursae. All three compartments of the knee joint are covered by articular cartilage, which absorbstransmitted forces thereby protecting the underlying bone and enables low-friction and highvelocitymovement between the bones, whereas the menisci are important in reducing stresson the articular cartilage. A healthy knee joint contains about 2.5 ml of synovial fluid.Synovial fluid is essential for the nutrition and lubrication of the articular cartilage and tendons. Knee motion is a combination of flexion, extension and rotation. The tibia rotates internallyon flexion of the knee and externally on the femur on extension. The knee flexes when thehamstring muscles contract and extends when the quadriceps femoris muscle contracts. The normal range of motion of the knee joint is from slight hyperextension (~ 5 degrees) to 140 grades of flexion. The joint permits rotation, which ranges from 5 to 25 degrees when the joint is flexed. No rotation is possible when the knee is in full extension. Rotation of the tibia on the femur is provided by the biceps femoris on external rotation, whereas the popliteus and semitendinosus muscles are involved in internal rotation. The anatomical axis of the knee is the angle between the axis of the shaft of the femur and tibia, and normally the anatomical axes of the femur and the tibia form a valgus angle of 6 ± 2 degrees. The mechanical axis is a line traversing the

center of the hip joint to the center of the ankle joint. This mechanical axis should project through the center of the knee joint.[52]



Clinical examination of the knee joint

It is, ,important to examine the patient as a whole taking into account all joints and the patient's general condition. It is essential to obtain a detailed description of the patient's symptoms. A full knee examination includes an observation of the patient both standing and walking. Deviations (valgus and varus deformation) of the knees are best seen with the patient in the standing position. The patient should also be observed walking for evidence of gait abnormalities. Swelling or muscle atrophy

may be noted on inspection, as erythema of the knee area. The knee should first be gently palpated, which allow identification of swelling, tenderness,
warmth, crepitus and effusion of the knee joint. The range of motion should be recorded in maximal extension and flexion of the knee joint. Patellar stability should also be assessed. Collateral ligamentous stability is tested by application of valgus and varus stress to the knee. The stability of cruciate ligaments is tested with anterior and posterior drawer tests, Lachman test and pivot shift test. Radiography is mandatory. Quality of bone, deformities, grade of erosions, position and shape of patella can be evaluated on the radiograph. The anatomical and mechanical axes may be evaluated.

Plain radiography and changes of the knee joint

Conventional radiography is the simplest and least expensive imaging method for assessing osteoarthritis of the knee. Radiography is able to directly visualize osseous features of osteoarthritis, including marginal osteophytes, subchondral sclerosis, and subchondral cysts, and it is used in clinical practice to confirm the diagnosis of osteoarthritis and to monitor progression of the disease. Two views of the involved joint should be obtained. The two views should be obtained in orthogonal planes to one another (i.e., anteroposterior [AP] and lateral). Additional views of weight-bearing joints knees is be necessary[17]. Correlation of

radiographic evidence of degenerative joint changes and symptoms described by patients is important. The radiographic hallmarks of primary osteoarthritis include nonuniform joint space loss, osteophyte formation, cyst formation and subchondral sclerosis. The initial radiographs may not show all of the findings. At first, only minimal, nonuniform joint space narrowing may be present. The involved joint spaces have an asymmetric distribution. As the disease progresses, subluxations may occur and osteophytes may form. Subchondral cystic changes can occur. These cysts may or may not communicate with the joint space, can occur before cartilage loss and have a sclerotic border. Subchondral sclerosis or subchondral bone formation occurs as cartilage loss increases and appears as an area of increased density on the radiograph. In the advanced stage of the disease, a collapse of the joint may occur; however, ankylosis does not usually occur in patients with primary osteoarthritis.

CHRONIC ARTHRITIS

Classification

- Primary osteoarthritis - most common in the older age group as the result of wear and tear on articular cartilage over time.
- Secondary osteoarthritis - results from a previous process that damaged cartilage such as trauma, or inflammatory arthritis.

Arthritis represents one of the most prevalent chronic health problems and is a leading cause of disability .Osteoarthritis is typically the result of articular cartilage damage and wear and tear from repetitive microtrauma that occurs throughout life, although genetic, hereditary, nutritional, metabolic, preexisting articular disease, and body habitus factors may contribute in some cases. As a person ages, osteoarthritis is identified involving the knee joints and hip joints, beginning after the 4th or 5th decade of life . With regard to the knee joints, joint space narrowing is typically asymmetric and most commonly involves the medial femorotibial compartment, possibly with the patellofemoral compartment . Osteoarthritis is a spectrum of clinical entities, ranging from focal chondral defects to established arthrosis resulting from biologic and biomechanical hyaline cartilage failure. Evaluation of the active patient with knee arthritis should include a comprehensive history emphasizing symptom manifestation, activity level, and previous surgical treatment. The physical examination must include an evaluation of extremity alignment, gait patterns, and coexisting disorders of the spine and adjacent joints. Arthritis is the inflammation of a joint, which

osteoarthritis) to those associated with inflammation resulting from an overactive immune system (such as rheumatoid arthritis). The most common form of arthritis is osteoarthritis. Osteoarthritis is a degenerative disease characterized by damage to the articular cartilage, changes in subchondral and marginal bone, synovitis and capsular thickening, typically affecting weight bearing can include infiltration of inflammatory cells (monocytes),synovial hyperplasia, bone erosion and new bone formation, narrowing of the joint space and ankylosis of the joint.[52][53]

The Impact of Low SES on Health

Research suggests that both physical and mental health are associated with Socio Economic Status(SES). In particular, studies suggest that lower SES is linked to

poorer health outcomes. Poor health may in turn decrease an individual's capacity to work, thus reducing their ability to improve their SES.

Low SES is associated with increased morbidity and mortality (Adler et al., 1994; Adler & Coriell, 1997).[21]

Low income individuals are 2-5 times more likely to suffer from a diagnosable disorder than those in the top SES bracket (Bourdon, Rae, Narrow, Manderschild, & Regier, 1994; Regier et al., 1993).[22]

Access to health insurance and preventive services are part of the reason for socioeconomic health disparities (McGinnis, Williams-Russo, & Knickman, 2002).[23]

Those with low SES often experience barriers to obtaining health services, including lack of or limited access to health care, child care and transportation (McGrath, Keita, Strickland, & Russo, 1990)[24]. The above studies have greatly supported the thought that people from lower socioeconomic status have difficulties in health and access to health care .Factors affecting the strata are the physical environment, differences in the services offered, educational status, indifferent attitude to sickness. Of the above indifferent attitude to sickness seems to play a major role in the late presentation of patients with chronic arthritis. Chronic arthritis also aggravates other diseases such as coronary artery disease,

athrosclerosis, diabetes, obesity due to immobility. These disease conditions further complicate the persons earning capacity furthering the vicious cycle.

In India socio economic classification is done using the modified kuppusamy scale [14] it uses three criteria which are enumerated below

(A) Education	**Score**
1. Profession or Honours	7
2. Graduate or post graduate	6
3. Intermediate or post high school diploma	5
4. High school certificate	4
5. Middle school certificate	3
6. Primary school certificate	2
7. Illiterate	1

(**B) Occupation**	**Score**
1. Profession	10
2. Semi-Profession	6
3. Clerical, Shop-owner, Farmer	5
4. Skilled worker	4
5. Semi-skilled worker	3
6. Unskilled worker	2

7. Unemployed 1

(C) **Family income per month(in Rs)**	**Modified Score for 1998**	**Modified Score for 2007**
1. =2000	12 =	13500 = 19575
2. 1000-1999	10	6750-13499 9788-19574
3. 750-999	6	5050-6749 7323- 9787
4. 500-749	4	3375-5049 4894- 7322
5. 300-499	3	2025-3374 2936-4893
6. 101-299	2	676-2024 980-2935
7. =100		1 675 979

Total Score **Socioeconomic class**

26-29	Upper (I)
16-25	Upper Middle (II)
11-15	Middle Lower middle (III)
5-10	Lower Upper lower (IV)
<5	Lower (V)

As there is steady increase in the rupee value based on which a reference index has been formulated using which the persons income is calculated

given below is a table for present day values

Year	**Reference index**
1960	100 (base)
1976	296
1982	490 – 100 (new base)
1998	405
2001	458 – 100 (new base)
2007 April	128

Knee Society Knee Score [20],[6][52]

Patient Category
A. Unilateral or bilateral (opposite knee successfully replaced) **B.** Unilateral, other knee symptomatic **C.** Multiple arthritis or medical infirmity

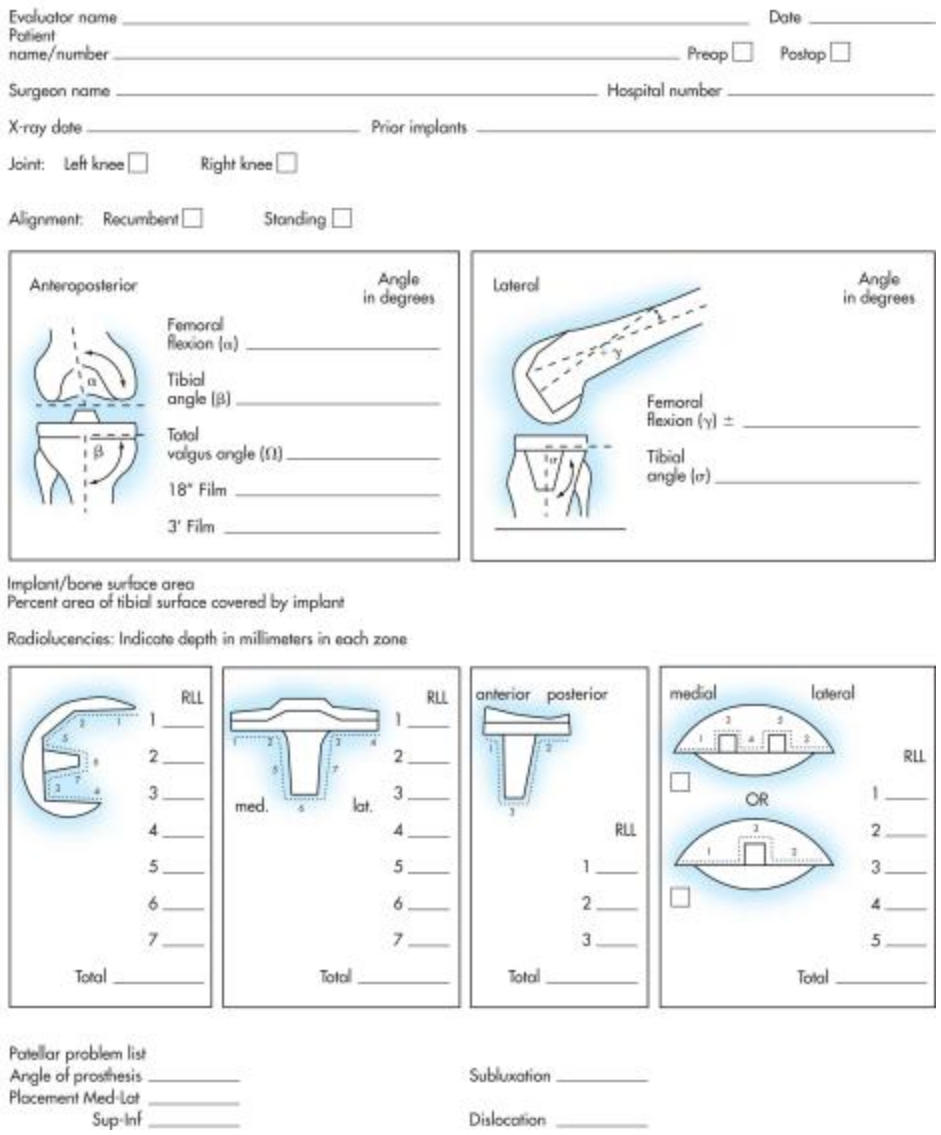
	Points
Pain	
None	50
Mild or occasional	45

	Points
Stairs only	40
Walking and stairs	30
Moderate	
Occasional	20
Continual	10
Severe	0
Range of Motion	
(5 degrees =1 point)	25
Stability (Maximal Movement in Any Position)	
Anteroposterior	
<5 mm	10
5-10 mm	5
> 10 mm	0
Mediolateral	
<5 degrees	15
6-9 degrees	10
10-14 degrees	5
>15 degrees	0
Subtotal	
Deductions (minus)	
Flexion contracture	
5-10 degrees	2
10-15 degrees	5
16-20 degrees	10
>20 degrees	15
Extension lag	
<10 degrees	5

	Points
10-20 degrees	10
>20 degrees	15
Alignment	
5-10 degrees	0
0-4 degrees	3 points each degree
11-15 degrees	3 points each degree
Other	20
Total deductions	
Knee score[*]	
Function	
Walking	
Unlimited	50
>10 blocks	40
5-10 blocks	30
<5 blocks	20
Housebound	10
Unable	0
Stairs	
Normal up and down	50
Normal up; down with rail	40
Up and down with rail	30
Up with rail; unable down	15
Unable	0
Subtotal	
Deductions (minus)	
Cane	5
Two canes	10

	Points
Crutches or walker	20
Total deductions	
Function score[*]	

TKA Scoring System



VISUAL ANALOGUE SCALE :

Visual analogue scale is an tool used for assessing the pain severity in patients also it is helpful to assess the efficacy of treatment,this is an easy method of assessing the pain with minimal intraobserver variation.Also the pictographs are helpful in case of unlettered patients.[18],[19]

Table 1.2

Pain Intensity Category Scale (4 pt)		Pain Intensity Category Scale (5 pt)	
Severe	3	Complete	4
Moderate	2	Lots	3
Mild	1	Moderate	2
None	0	Slight	1
		None	0

LEAST Possible Pain — VAS, PAIN INTENSITY — **WORST** Possible Pain

NO Relief of Pain — VAS, PAIN RELIEF — **COMPLETE** Relief of Pain

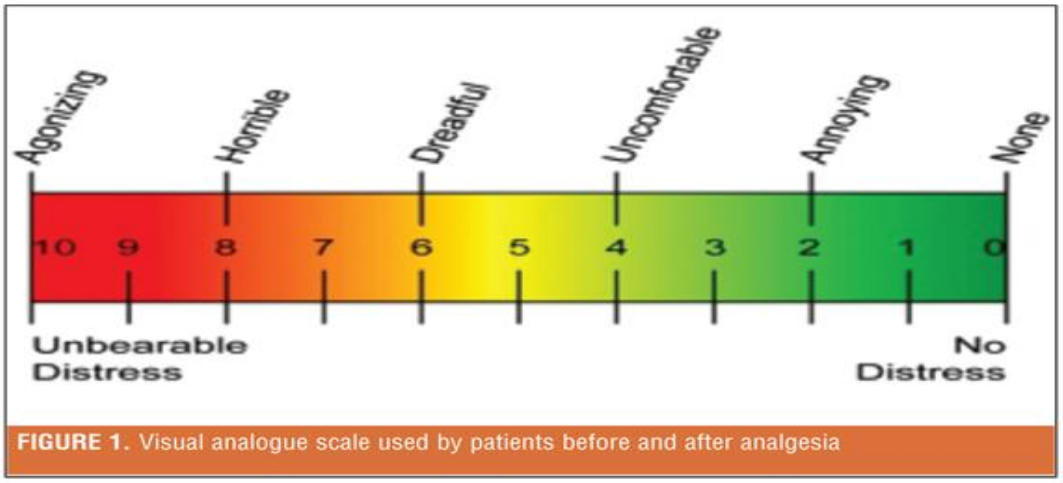
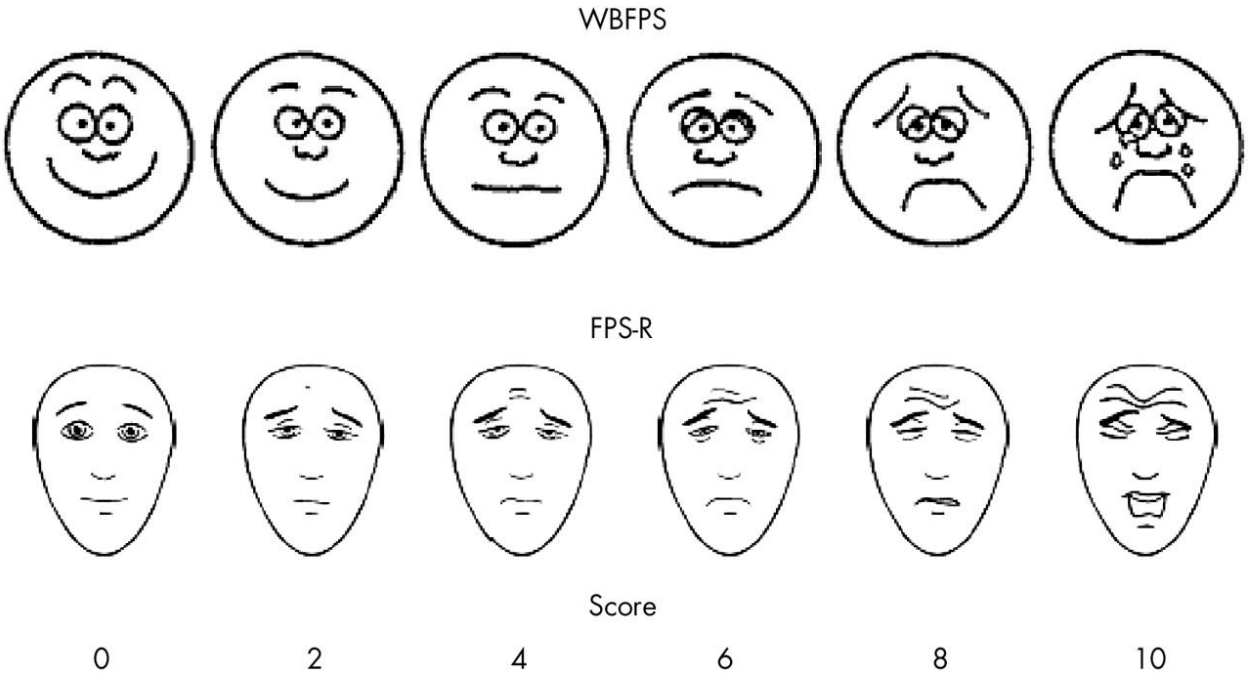


FIGURE 1. Visual analogue scale used by patients before and after analgesia



Total knee arthroplasty

Joint replacement surgery in patients is very challenging and requires experience and surgical skill. Careful preoperative planning is crucial in the treatment of these patients. Individual planning of the postoperative treatment is also important. The timing and order of operations require careful planning. The operative procedure is more demanding if destruction, deformity, contracture and instability are advanced**.** Therefore,TKA should be performed before appearance of too advanced changes in the knee joint.

Total knee arthroplasty: operative technique

The anteromedial parapatellar approach is often used for TKA. This approach allows retracting the patella laterally and allows a good view of the anterior compartment of the knee joint. Sometimes wider access to the joint is needed, and if this is the case, the incision can be extended proximally or the proximal part of the incision can be extended obliquely and medially into the vastus medialis muscle. If standard medial parapatellar arthrotomy is inadequate, a quadriceps snip is helpful. Occasionally exposure will still be limited and a tibial tubercle osteotomy can be helpful (Clarke 2003)[39]. The valgus deformity is common in patients with JRA and ligament asymmetry with longstanding deformities is often seen. In the valgus knee the lateral collateral ligament is shorter than the medial and requires releasing of the lateral capsule and iliotibial band from the femur. This procedure is necessary to obtain a good soft tissue balance. Sometimes release of the tight posterolateral corner is needed. In marked valgus deformity the medial structures are carefully preserved (non-touch). For good long-term results the prosthetic components must be installed accurately. This goal is achieved by a good surgical technique and experience. A proper prosthesis design and instrumentation are also important. There are several manufacturers of knee implants with different designs and instrumentations; both intra- and extramedullar guidance are provided. The accuracy of the classical, surgeon-

controlled operative technique has been questioned as computer-assisted navigation and implantation of total knee prostheses has become possible.

The navigation system allows a significant improvement in the quality of implantation of a total knee prosthesis in comparison to that obtained with classical, surgeon-controlled instrumentation, and the long-term outcome may be improved (Jenny and Boeri 2001).[40]

Development of knee prostheses

In 1861, Ferguson reported his experience of resection arthroplasty of the arthritic knee joint. Two years later Verneuil performed the first interposition arthroplasty of the knee. He inserted a flap of joint capsule between the resected joint surfaces to prevent them from growing together. Later, many other surgeons tried similar procedures and used skin, muscle,fat etc. as interposition material. The success of the arthroplasties was poor. In the 1940s, metallic hemiarthroplasty of the femur and later of the tibia were developed without success. The first attempts to replace both the femoral and the tibial articular surfaces were made in the 1950s; hinged implants were used and the rate of complications was high (Tooms 1987).[41]

Modern joint replacement surgery of the knee was developed in the beginning of 1970s when bi- and tricompartmental prostheses were designed. These prostheses usually consist of a metallic femoral component and a metal-backed high-density polyethylene tibial component (Tooms 1987)[41]. Recently, an all-polyethylene

tibial component has been shown to yield a similar clinical and radiographic outcome in the short-to-medium term as the metal-backed tibial component (Gioe and Bowman 2000, Forster 2003)[42,43]. The cruciate-retaining (CR) and posterior-stabilized (PS) total knee prosthesis represents a prosthetic design for a wide variety of knee deformities. For correction of severe knee deformities, an alternative to the hinge implant is the total condylar III (TC III) prosthesis , which can substitute for a deficient collateral ligament. The TC III is a semi-constrained, unlinked knee prosthesis that provides medial and lateral stability through a rectangular tibial post and a high femoral box. The major

indications for the TC III prosthesis is medial ligament loss, severe valgus or combined deformities. There is the 20 years experience of the low-contact stress (LCS) mobile-bearing TKA . Mobile-bearing knee arthroplasty (MBKA) may have advantages compared with conventional fixed-bearing TKA by allowing unconstrained axial rotation, which can offer greater articular conformity without an increased risk of loosening due to increased axial torque. Increased articular conformity minimizes polyethylene contact stress, thereby reducing linear wear and the risk of

subsurface fatigue failure. Despite these advantages, the long-term clinical results obtained with current mobile-bearing devices are similar to those obtained with well-designed fixed bearing TKA prostheses, with no data suggesting their

superiority. The disadvantages of MBKA are risk of dislocation or breakage of bearing, soft-tissue impingement and a steep technique learning curve. It is essential that flexion and extension gaps are controlled to maintain contact pressure on such bearings to avoid problems of subluxation or dislocation

(Vertullo et al. 2001)[44]. Huang et al. (2003)[45] reported in their long-term study of 495 LCS mobile-bearing knee prostheses that the survival was 88% at 15 years. The survival rate was 83% for the meniscal-bearing prostheses and 92% for the rotating-platform prostheses. The LCS mobile bearing knee prosthesis was not superior to fixed-bearing knees, especially for the menisci bearing design in prevention of polyethylene failure or revision

Ranawat et al. (2004)[46] compared the fixed-bearing press-fit condylar Sigma TKA to the recently introduced rotating-platform version of the same design in a study including 26 patients. At an average follow-up time of 46 months for the fixed-bearing side and 16 months for the rotating-platform side, no significant differences emerged in terms of knee preference, knee pain, range of motion, overall satisfaction, or Knee Society Scores (KSS). No revisions, subluxations, dislocations, or infections occurred. The results of the PFC Sigma rotating-platform, posterior-stabilized total knee, showed excellent patient satisfaction at 1-year follow-up and were comparable

with the clinical and radiographic results of the fixed-bearing version.

Complications of TKA

Many complications may follow knee replacement surgery: infection (early and late, superficial and deep), dislocation of the endoprosthesis, wear and loosening of the endoprosthesis, periprosthetic fracture, malposition, hematoma, neural injury, and thromboembolism. RA is considered to be a predisposing risk factor for surgical infections (Blackburn and Alarcon 1991)[47]. An increased susceptibility to infections is due to impaired general health status and immune suppressive medication, such as glucocorticoids. Delayed wound healing

occurs frequently (about 20 %) in patients with RA (Hämäläinen 1985, Partio et al. 1993)[48]. Wound edge necrosis is not uncommon (Hämäläinen et al. 1995). Most complications are mild and do not require revision of the arthroplasty. Infection after total knee replacement is an infrequent, but a serious complication which is difficult to treat. The reported incidence of infection varies between 0.5% and 12%.Hinged prostheses, rheumatoid arthritis and previous knee surgery are all associated with an increased risk of infection[27]. Infection after primary TKA was rare but devastating and invariably led to a poor outcome. The most common causes for revision surgery in TKA are late infections and aseptic

osteolysis (Rodriguez et al. 1996)[49]. Hämäläinen et al. (1995) found that the femoral

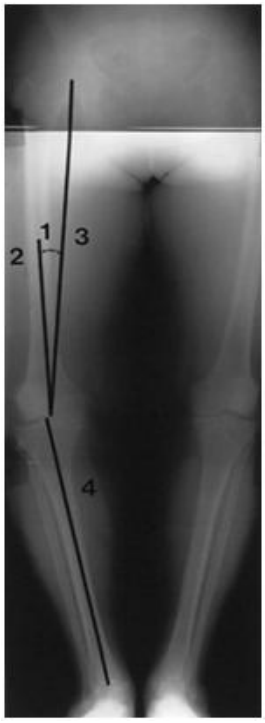
components stay quite reliably both in cemented and in cementless series. In contrast only 69 % of the cementless tibial components and 84 % of cemented

tibial components were successfully in situ after 4 years of follow-up. Injury of the peroneal nerve has been reported in 0.3 per cent to 4 per cent of patients who have had a total knee arthroplasty[28] , and its association with preoperative flexion or valgus deformity has been well documented. The mechanism of injury has been reported to be traction on the nerve as normal alignment is obtained at the time of the joint replacement. Rose et al[30]. and others speculated that compression of the vascular supply of the nerve by the fascia and direct pressure from a tight dressing caused the injury. Limited range of movements have found to have adverse affects on the functional outcome following knee replacement. The patients were described to have knee stiffness when there is a flexion deformity of 15 degree, arc of movement less than 50 degree as stated by Vineet Sharma et all in their study[34].There numerous methods of treatment preffered being manipulation under anesthesia. The usual incidence of stiffness ranged from 1.2% to 2.5%.Deep vein thrombosis is another dreaded complication following any major surgery. The patient may even develop fatal thromboembolism. The incidence of DVT ranged from 1% to 5% in various studies.[12]

Biomechanics of knee

Biomechanics of the knee describes the function of the knee joint in terms of its mechanical components. This description becomes vitally important in trying to understand the behavior of the joint when some inherent disorder exists within the

joint. It is equally important to understand the mechanical functioning of the knee when attempting to rehabilitate patients with disorders of the knee after trauma or surgery. The knee consists of three basic types of structures. Ligaments are passive elastic structures and can be loaded in tension only. Musculotendinous units are active elastic structures and can act only under tension. Bone is essentially nonelastic and serves to take the compressive loads in the joint. A through knowledge of biomechanics is important for understanding about replacement surgery and the rehabilation of an operated patient.[28],[51]



Materials and Methods

MATERIALS

This prospective study was carried out from June 2009 to October 2011 in patients with chronic arthritis of knee in the Department of Orthopaedics, Coimbatore Medical College Hospital, Coimbatore, and Tamilnadu. The patients were operated in the above hospital or underwent knee replacement under the state government scheme at other hospitals and had followed up at our hospital. The patients who had been operated at other private hospitals, followed up in our hospitals because they could not afford to pay for complications and follow up.

A total of 42 patients [28 females and 14 males] with a mean age of 58 , were operated and followed for a period of 6 months to 2 years.

Fig: 1. Gender Distribution

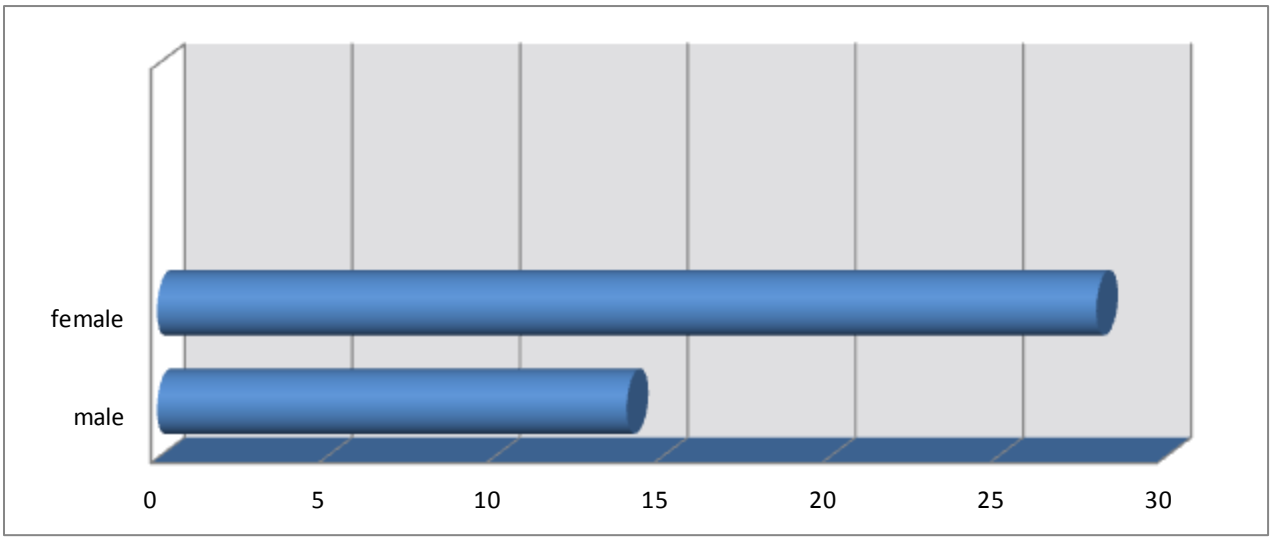
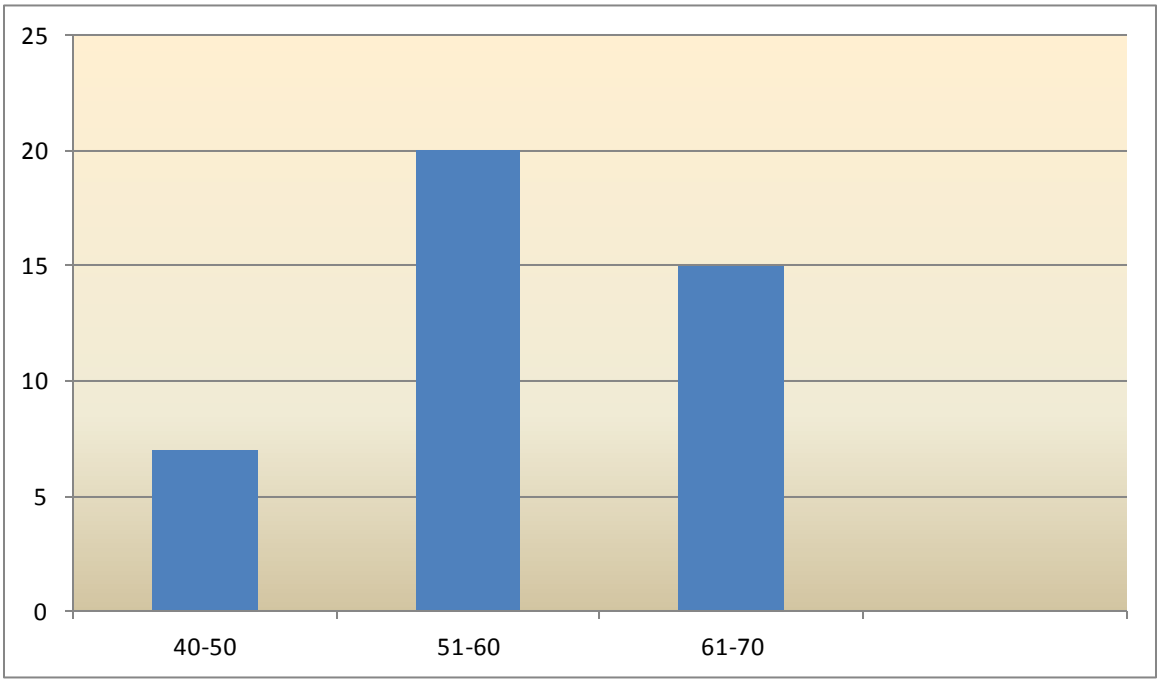
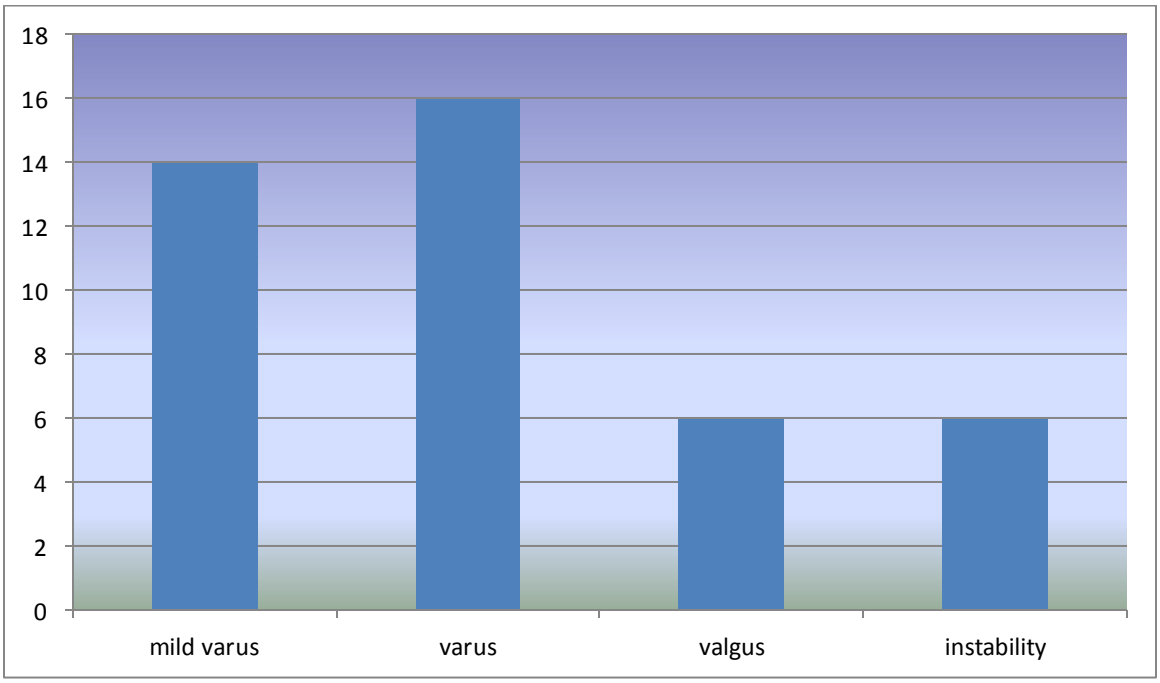


Fig: 2. Age Distribution



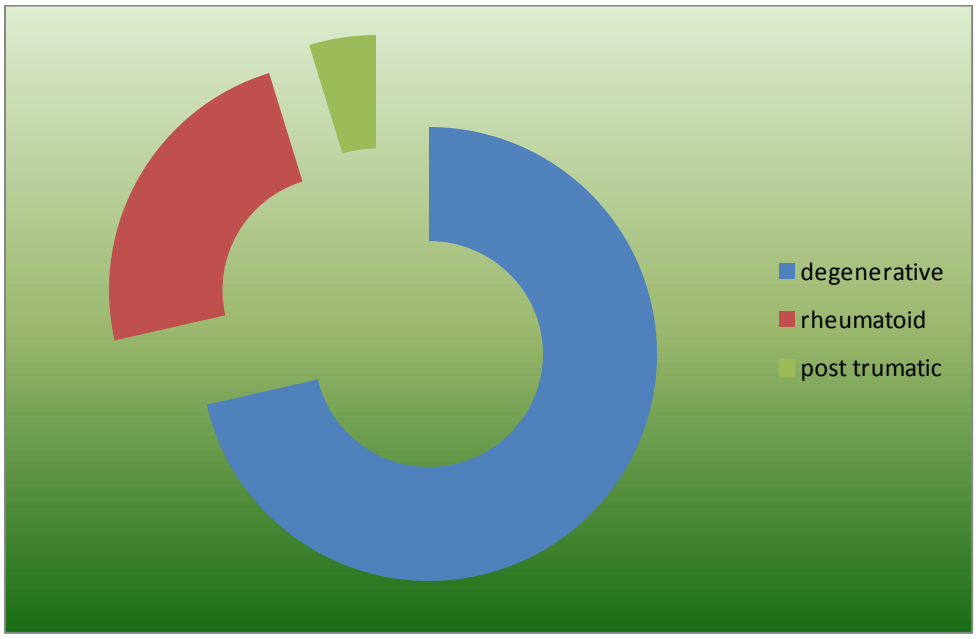
The above chart shows the age distribution of patients in our study, seven patients were between forty to fifty, twenty patients were between fifty one to sixty, fifteen patients were in the age group of sixty one and seventy.

Fig 3: Deformity



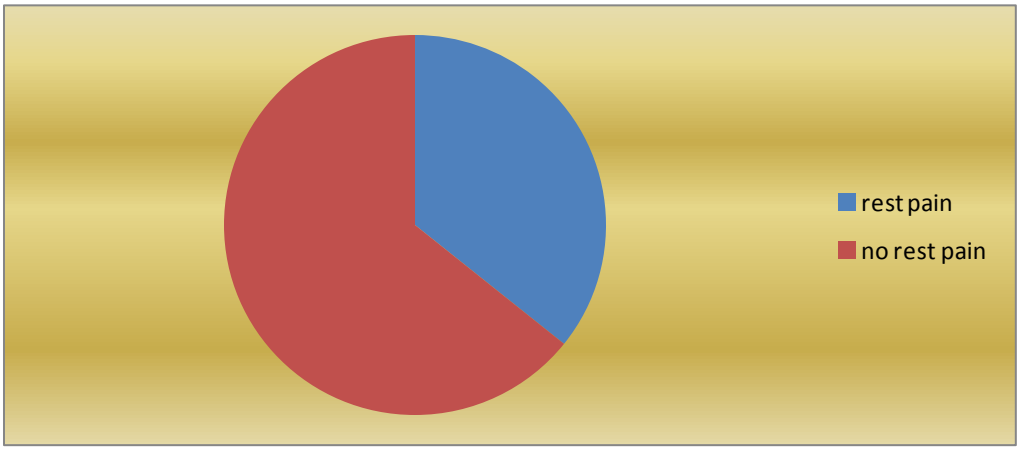
The patients in our study had been classified into four categories based on deformities, patients may have mild varus ,varus ,valgus or instability. Fourteen patients were found to have mild varus, sixteen were found to have varus, six were found to have valgus, six had instability in their knees.

Fig: 4 cause of arthritis



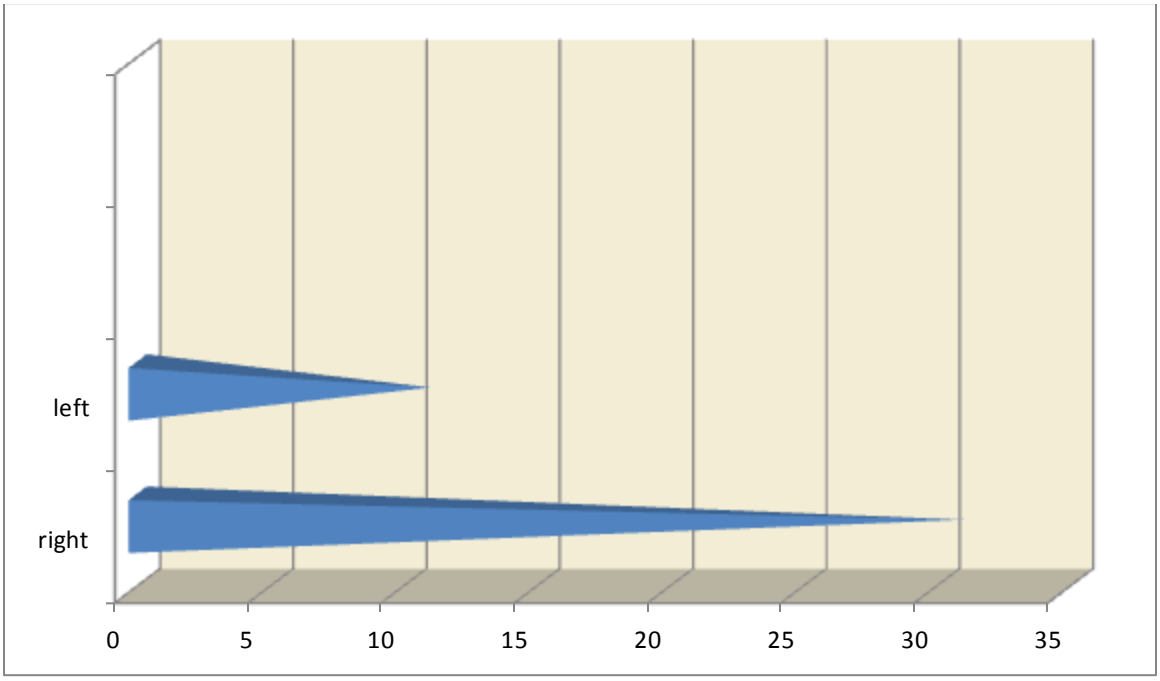
Of the 42 patients evaluated, thirty had arthritis due to degeneration, ten had arthritis due rheumatoid disease, two was due to post traumatic degeneration(fracture distal femur).

Fig: 5.Rest pain on Admission



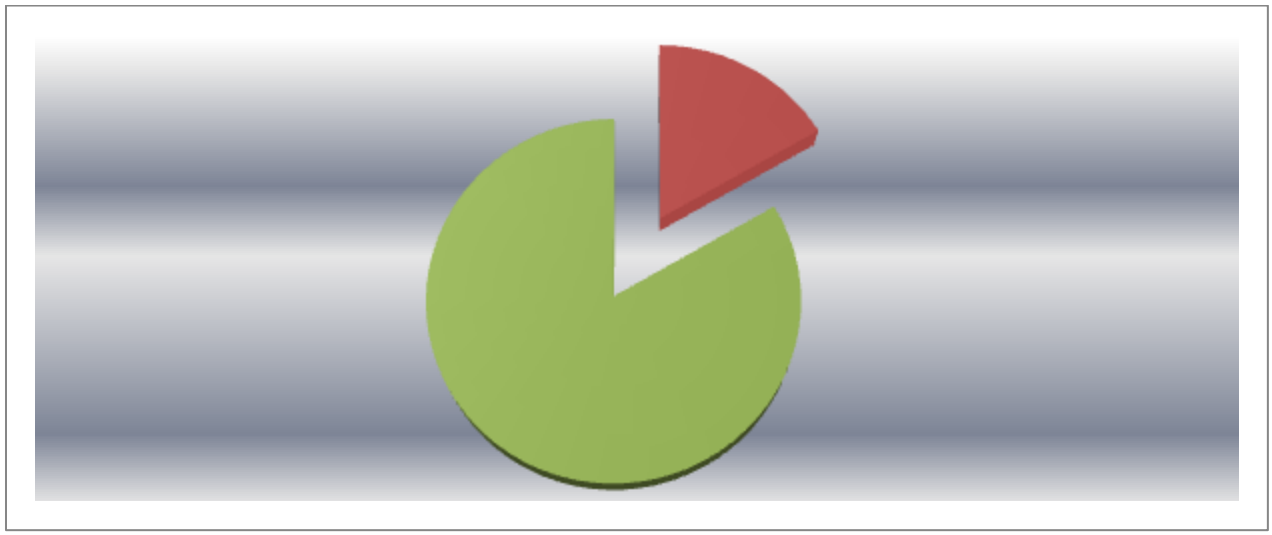
Rest pain was found to have significant prognostic value hence patients were classified into those with rest pain those without. Fifteen patients presented with rest pain on admission ,the rest of patients were having severe pain but no rest pain.

Fig: 6.Side



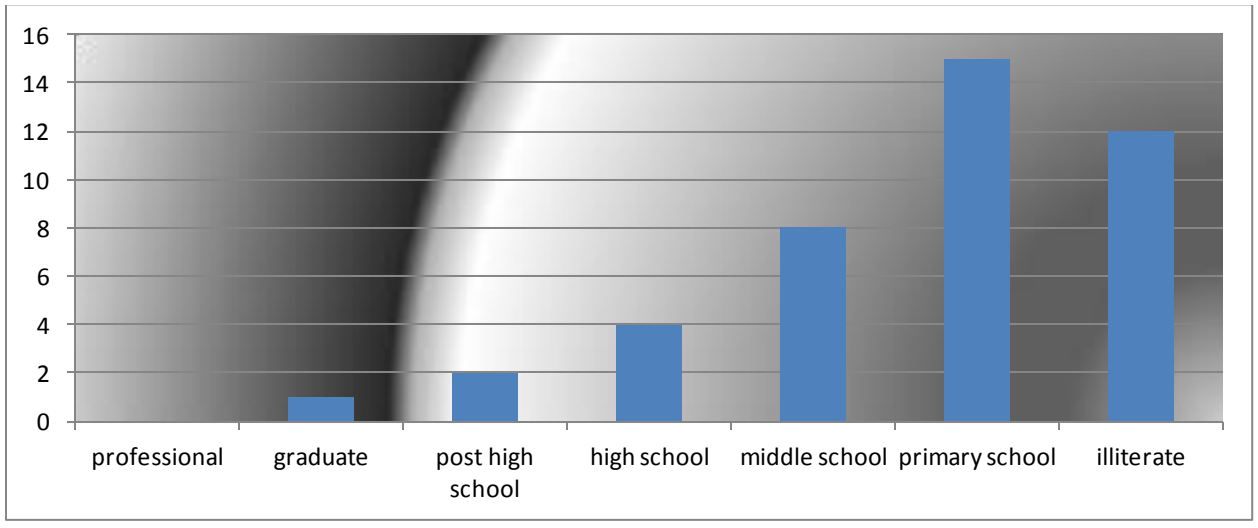
In our study we had seen thirty one patients with right knee replacement, and eleven patients had left knee replacement. In most cases patients had bilateral arthritis but the joint with severe symptoms and more degeneration were operated**.** One patient had undergone bilateral knee replacement.

Fig: 7 . Stage of arthritis



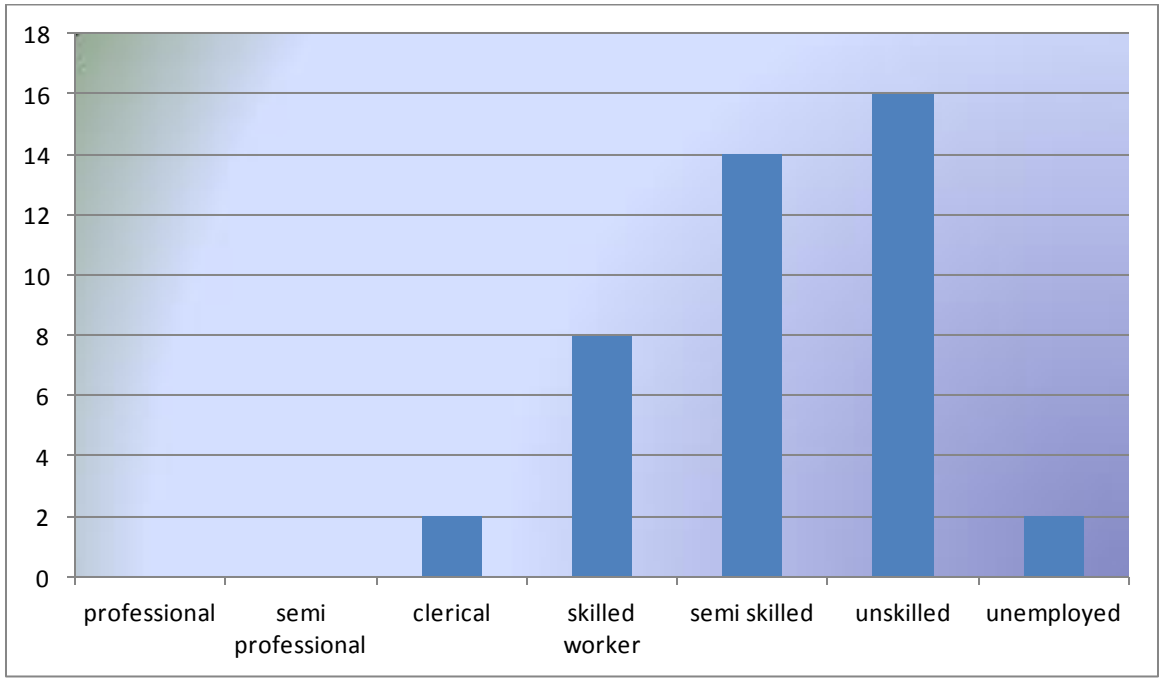
In our study, patients had been classified into three types as described by The Arthritis Foundation and Wheeless Textbook, mild, moderate and severe based on the symptoms and severity , seven patients had moderate arthritis ,thirty five patients had severe arthritis.

Fig8 : Educational status



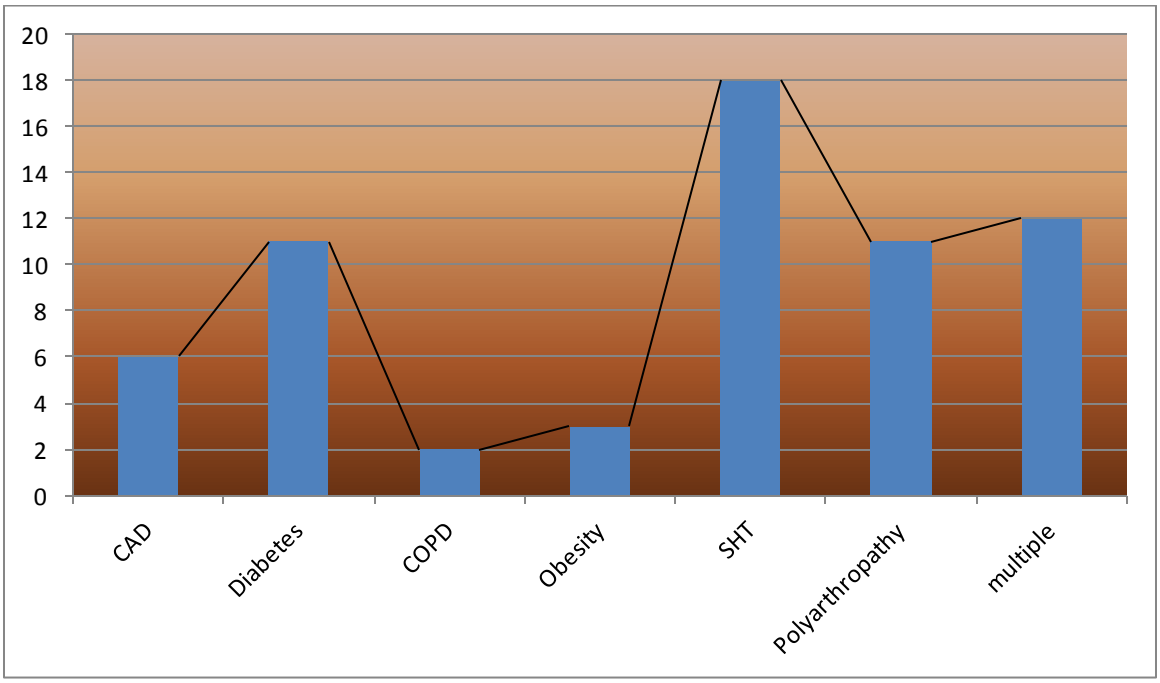
Due to the importance of education in evaluating the socioeconomic status of the person, we found that majority of our patients were illiterate or had only finished primary school .In our study 12 patients were illiterate,15 had attended primary school,8 went to middle school,4 had gone to high school. Only one person had completed graduation.

Fig :9 Occupation



Also a detailed questioning of the patients employment was done, majority of the patients employed either as unskilled or semiskilled workers contributing to about three fourth of our study population. Two patients who were unemployed were previously employed as unskilled laborer but due to the severe pain in the knee joint had quit working.

Fig:10 . Associated comorbid conditions



In our study group we had also evaluated the presence of other co morbid conditions we found that most patients had systemic hypertension, half of which were found during the evaluation for surgery. Eighteen patients were found to have hypertension. Diabetes was second most common associated condition. Also twelve patients had multiple problems. Eleven patients had polyarthropathy.

In our study patients were selected on the basis of the Modified Kuppusamy scale, hence patients who had lower incomes had been included in our study. Patients were selected on basis of their monthly incomes. Also the patients daily activity, mode of transport, patients needs were taken into consideration. The average income of patients in our study was Rs.2600/month.

METHODS

Initial assessment of a patient included detailed clinical history, a thorough physical examination, and an accurate assessment of the patient's current ambulatory status and need. The patients were initially given analgesics and physiotherapy. The patients were also evaluated by dermatology, ENT, Obstretic& gynaecology and dental departments to rule out any foci of infection. If the patient had other co morbid condition, appropriate speciality opinion was obtained. For patients who had undergone surgery at other hospitals we had thoroughly examined their hospital records and also questioned the patients about their preoperative and postoperative status. The patients were questioned in detail regarding their occupation, mode of transport, daily activity

Inclusion criteria:

Inclusion criteria were (a) patients with chronic arthritis of knee joint (b) patient must not have undergone any surgery for knee arthritis (c) age between forty five and seventy.

Exclusion criteria:

The following patients were excluded from our study (a) patients with severe debility (b) active infection around knee, (c)patients with previous knee surgery, (d) patients with cancer, systemic infection, bleeding disorder, extensive skin disease

Plain radiographs and routine blood investigations including markers for infection was obtained. The radiographs were evaluated for varus/valgus angulation of each knee was completely documented. The etiology of arthritis was identified and if required appropriate treatment is iniated.

In all patients a posterior cruciate substituting prosthesis was used.

Surgical procedures:

All patients received pre operative broad-spectrum antibiotics half an hour before anesthesia. The patient under the effect of spinal or epidural anaestheasia was positioned on the operating table.A bump was placed in the foot end to support the hip and knee in about 90 degree flexion.If required a tourniquet was used.

OPERATIVE TECHNIQUE

. **Incision and Exposure:**

The medial parapatellar approach is used, With the patient in the supine position and the knee in flexed position. A straight midline incision is used. Beginning the incision medial to the quadriceps tendon and 3cm-5cm above the superior pole of the patella and Extended it distally to below the level of the tibial tubercle. Then a medial parapatellar capsular incision was made.

PCL Resection:

Since our knee prosthesis is a posterior cruciate ligament substituting design, complete resection of the PCL was made and Checked for symmetry and balance of the flexion and extension gaps. Any differences in the gaps were addressed.

Varus release

Soft Tissue Releases were made by progressive release of the tight medial structures until they reach the length of the lateral supporting structures. To facilitate the release, excise osteophytes from the medial femur and tibia. Posteromedial osteophytes removed after the proximal tibia is resected.

With the knee in extension, elevate a subperiosteal sleeve of soft tissue from the proximal medial tibia, including the deep medial collateral ligament, superficial medial collateral ligament, and insertion of the pes anserinus tendons.

Valgus Release

We approached the valgus knee in a similar fashion to that described for the varus knee,the bone cuts are made before the ligament release .lateral osteophytes were removed, With the knee in extension and distracted with a laminar spreader, we made a transverse incision to cut the arcuate ligament at the joint line. For severe valgus deformities, strip the lateral femoral condyle of its soft-tissue attachments proximally for about 9cm, and then divide the periosteum, the iliotibial tract, and the lateral intramuscular septum transversely from inside out.

Femoral Preparation

When sizing the femoral component, we preferred to select the closest size of the prosthesis. that is within 2mm of the measured anatomy. However, depending on the situation, selecting the closest size could mean either upsizing or downsizing. As the prosthesis used in our series of Knee replacement is a posterior stabilized design, we opted for upsizing.. The resected portion of the medial femoral condyle should be at least 9mm-10mm, while the resected portion

of the lateral femoral condyle will be dictated by the degree of femoral component rotation. We used an anterior referencing technique is used. Resection of 8-10mm from the posterior medial condyle were made and external rotation of the femoral component was done ,in order to create a symmetrical flexion space. With the knee in flexion, remove posterior osteophytes with a 3/4-inch curve-on-flat osteotome . We Used a laminar spreader and the Posterior Femoral Retractor to improve exposure.

Tibial preparation:

We used a extramedullary jig for obtaining the alignment and after the anatomical alignment had been confirmed,we had resected the proximal tibia of about 7-9 mm.

Flexion/Extension Gaps

Flexion and extension gaps were assessed ,With the knee flexed 90˚, start with the thickest Spacer/Alignment Guide that will easily fit between the posterior femoral condyles and the resected tibia. Progressively thicker spacers were used until the proper soft tissue tension is obtained. The resultant flexion space was balanced and found to be symmetrical.

The tibial resection were checked by placing the Alignment Rod through the handle of the Spacer/Alignment Guide. With the last Spacer/Alignment

Guide in place, we extended the knee and again checked the soft tissue tension and the alignment of the joint using the Alignment Rod through the Spacer/Alignment Guide . The tension was equal in both flexion and extension, and alignment was found to be satisfied and correct.

The femoral and tibial components were placed in the respective places along with the trial spacers range of movements were evaluated. Following trial reduction the components are removed and the prosthesis of the desired sizes are fitted into their positions using bone cement. The movement of knee joint may be further checked during closure of capsule.

The patella were examined and osteophytes if present ,were removed patellar resurfacing were not done routinely in our study. The nerve supply patella was abalated using diathermy. Two patients who were suffering from patella femoral arthitis were underwent patellar replacement procedure. Complete heamostasis is secured .The wound is closed in layers over a suction drain..Bulky dressing is applied over the wound.

Post-operative intravenous antibiotics were given for 72 hours, the patients knee was mobilized after three or four days, protected weight bearing was started after five to seven days adequate pain relief was provided , sutures removed on 15thday. One patient had developed an heamatoma in post operative period which was

drained and thorough joint lavage was given. Patients discharged after thorough education regarding activity modification and rehabilitation protocol.

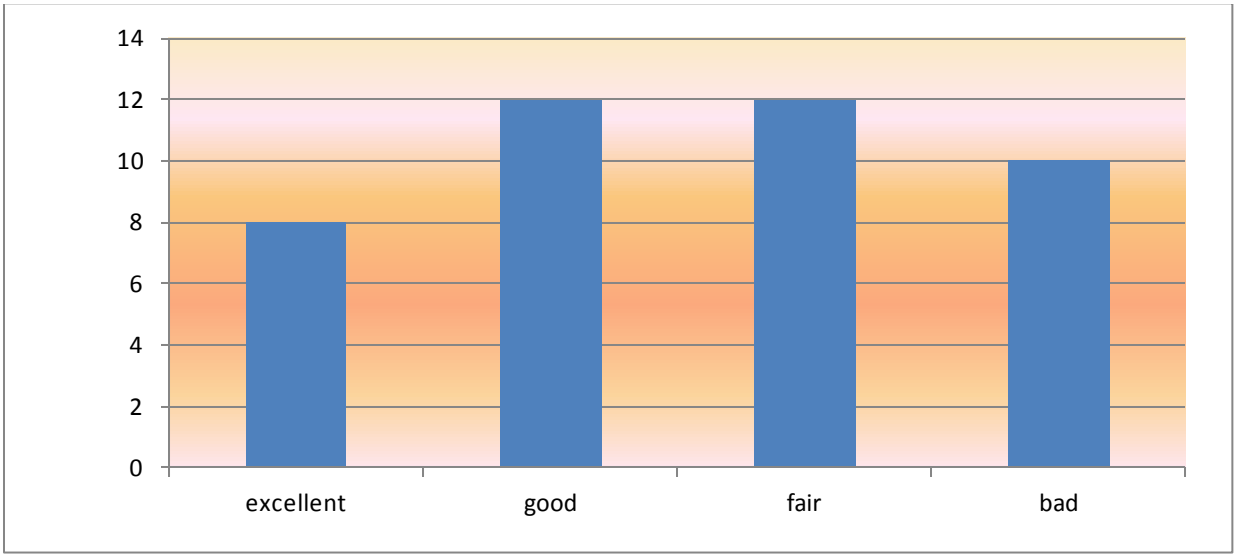
Follow up

Patients were followed in the first, third and sixth month with complete evaluation of knee joint function ,scoring done and radiographs obtained. The longest follow up was 30 months and shortest 6 months with a mean of 13 months.

Results

RESULTS

Fig11:Functional outcome

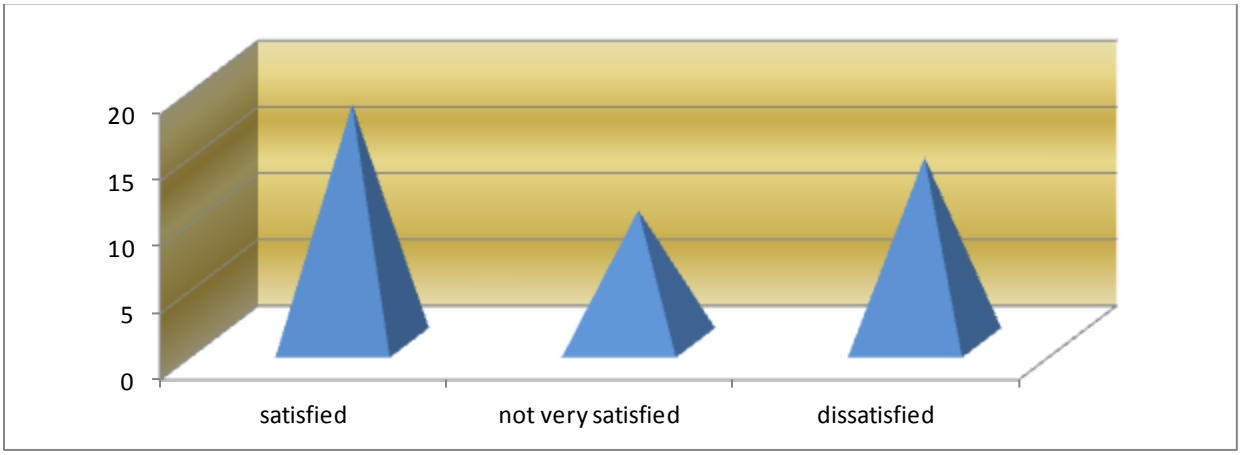


Functional outcome of the patients was evaluated using the American knee society scoring system. Twenty four patients had good to fair results. Ten patients had poor results. Eight patients had excellent results. The patients who had excellent results were independently ambulant, used public transportation, had relief from pain . The patients who bad results were having persistent pain, decreased mobility, poor level of activity. The patients were thoroughly questioned regarding their pain relief, level of activity, mobility, functional scoring was done. Visual analogue score(VAS) was used for quantifying the pain relief.

Patients were questioned regarding their satisfaction of replaced knees .The patients were told to grade their satisfaction regarding the replaced knees .The

patients were asked to classify their outcome into either satisfied, not very satisfied, or dissatisfied.

Fig 12:Patient satisfaction



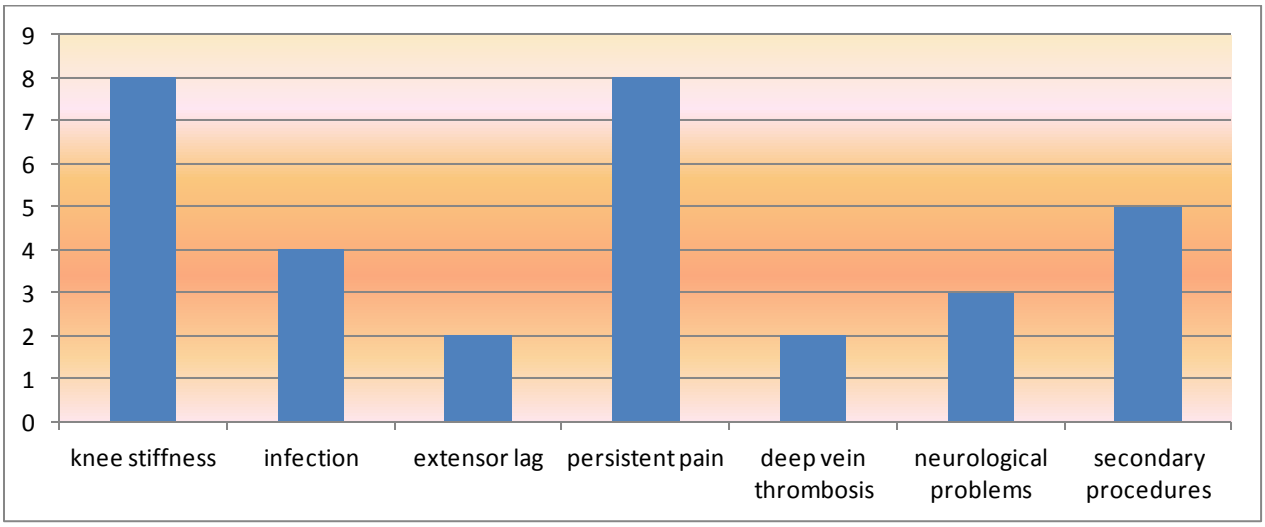
Eighteen patients were satisfied following their replacement(43%),ten patients (24%)were not very satisfied, fourteen patients were dissatisfied(33%).Overall less than 50% of patients were satisfied.

The patients were asked regarding the basis they had described their satisfaction. The patients had sited that the level of daily activity ,mode of transport ,return to occupation were the main determinants for their level of satisfaction .Patients who were self ambulant ,able to do their daily activities without any hinderance ,able to travel in public transport were satisfied with their replaced joints. Patients with reduced mobility ,inability to travel with ease ,other joint problems ,co morbid

conditions which stops the patient from deriving the complete benefit of joint replacement ,complications following surgery lead to lower satisfaction among the patients. Also persistent pain was found to be a major cause for lowered satisfaction.

The patients were evaluated in the immediate post op period and in the period following it. The patients who had developed complications were revaluated and appropriate treatment was started..Complications arising following surgery had reduced the functional outcome of replacement surgery.

Fig 13:Complications



In our study we had numerous complications, around 20%(eight in number) of our patients had developed knee stiffness. These patients were found to have a decreased satisfaction with their replaced knees. Knee stiffness had decreased the overall functional outcome of the knees. Most of these patients had not followed the rehabilitation program.

In our study we had encountered four patients with infection(10%).A patient had infection in the early post operative period for which a reexploration was undertaken and through joint lavage was done. The patients symptoms had subsided and patient had recovered from her symptoms. Later the patient had developed knee stiffness for which manipulation under anesthesia was done but the knee stiffness persisted. In another patient presented with persistent pain, on doing a bone scan we identified low grade infection patient had improved with longterm

oral antibiotics. The most poor result in our study was a patient who had developed infection ,had undergone multiple procedures finally resulting in an arthrodesed knee.

Neurological complication was another special set of complication encountered in our study.Three of our patients had developed foot drop postoperatively, these patients had a valgus knee preoperatively .Peroneal nerve neuropraxia was found to be the causative factor. All patients were managed with foot drop orthotic support all patients had recovered within a period of three to five months.

Deep vein thrombosis(DVT) was an another known complication, routine DVT prophylaxis was not used in our study. Two of our patients had developed DVT, for which appropriate therapy was initiated and regular follw up was done. The patients had uneventful recovery.

Five of our patients had undergone secondary procedures. Three patients underwent manipulation under anesthesia, two underwent procedures following infection. These patients had less than satisfactory results.

Another important complication was persisting pain after joint replacement, eight of the patients in our study had persistant pain. This is a complex problem having multiple causes. Also patients who had rest pain preoperatively had a greater degree of persistent pain.

Discussion

DISCUSSION

Despite the increased success of TKR, questions remain concerning which materials and implant designs are most effective for specific patient populations and which surgical approach is optimal for a successful outcome. Physical, social, and psychological issues may influence the success of TKR, and understanding patient differences could facilitate the decision making process before, during, and after surgery, thereby achieving the greatest benefit from TKR. Total knee replacement is now a commonly done procedure, in our study we have analysed the outcome in patients from low socioeconomic status undergoing total knee replacement. Many studies have shown superior results following total knee replacement, in most cases surgeries were performed in patients from socially well placed communities. In our group of patients from socially deprived section, we faced certain special set of problems unique these people. Joint replacement is undertaken primarily for pain and relief of this is likely to be the most important long-term outcome for a patient. The level of pain correlates with patient satisfaction. The ability to identify pre-operatively those patients who are at risk of a worse outcome following total knee arthroplasty could help in the implementation of measures that could be directed towards them in an attempt to improve their final outcomes. Improved walking, independent walking,

complete pain relief, relief of pain with stair climbing, return of mobility into the knee joint, improved wellbeing, return of good mood, improved activities of daily life were the main expectations of patients. The dissatisfied patients have been patients with bad outcome of the operation, newly occurring pain in the non-operated knee joint (Dickstein 1998) difficulty using stairs, reduced range of motion in the new knee joint .

The patients in our study were evaluated for their functional outcome following total knee replacement. We had in our study had seen that patients from lower socioeconomic status who had lower educational levels, occupations requiring hard work, also have lower incomes ,these combination of problems lead to the patients presenting late for treatment(Henry ellis et all 2010).Due to their late presentation and severity of disease, about 50% patients in our study had only fair to good results, while 25% of patients had poor results.

Patients with a lower income have significantly worse pre-operative Pain and Function scores than those with higher incomes. This finding substantiates the correlation between lower income and worse pre-operative scores according to Edward.T.Davis et all. Factors that may disadvantage patients in the lower socioeconomic groups may include a reduction in comprehension of health literature and risk factors; poor symptom recognition combined with a decreased

ability to navigate the health system and an unwillingness and lack of desire to receive treatment. Pre-operative status has consistently been shown to be the strongest determinant of post-operative pain and functional outcome, both in the immediate post-operative period and up to 2-years post-operatively.(Khaleela mohammeda 2010).In our study most patients were having severe disease hence the patients could expect only poorer results. Nearly 58% of our patients were not completely satisfied with their replaced knee.

The utilization of resources by different socioeconomic groups has been studied by Yong *et al.*, demonstrated that patients who were socioeconomically deprived were approximately twice as likely to be in need of total knee arthroplasty and were less likely to be receiving services. In our study patients had been waiting for a long duration for surgery, and had undergone surgery under the state government illness scheme .The patients in the study had severe joint problems for numerous years, most patients were having problems for an average of 3 or 4 years.

Joint replacement is undertaken primarily for pain and relief of this is likely to be the most important long-term outcome for a patient. The level of pain correlates with patient satisfaction and predicts the need for subsequent revision.(D.W.Murray). Pain was found to be the best single outcome measure, in

that it had the highest correlation with patient satisfaction. In our study a large number of people had pain following surgery thereby reducing the satisfaction levels to a great extent. A reason could be that patients having arthritis for a long duration might have developed central sensitization(.Lundbald et all in 2008) In our study fifteen patients (35%) had rest pain, these patients had persistant pain even following a successful replacement.

Another important factor in analyzing the outcome of a replacement is to know about the preoperative expectation of the patients. Usually certain patients have high hopes regarding the replacement surgery, despite the bad shape of their knees preoperatively(Carol.A.Mancosu et all 2003).It is of paramount importance to explain to the patient about the expected outcome.About,40% of patients in our study had expected that following surgery their knee would be same as their normal knee. This high expectation resulted in patients having poorer satisfaction even following a successful replacement.

Many patients in our study had multiple co morbid conditions which created both pre and post operative complications. Patients who had diabetes, polyarthropathy had a greater risk of infection(Peersman et all).Also patients having co morbid conditions had difficulty in obtaining the full benefit of their replaced joint .In our study a large percentage of patients about 55% of them had co morbid conditions.

These combination of factors also had decreased the functional outcome of our patients.

Another important factor for the higher incidence of knee stiffness in our series is the poorer follow up of our patients and reluctance of the patients to take up regular rehabilitation programs. In most studies the incidence of knee stiffness was around 2 to 2.5% ,but in our study nearly about 20% of patients had developed this complication. Most patients had not followed the regular post operative protocol. Three of our patients underwent manipulation under anesthesia, as this is an accepted form of treatment for post operative knee stiffness when encountered within three months (Vineet Sharma et all).These patients who had knee stiffness had difficulty in mobility and doing daily activities. This set of patients had poor functional outcome and also were dissatisfied with their replaced knees.

Neurological complication in the immediate post operative period was another major complication we had encountered. In our study three patients had developed foot drop due to peroneal nerve palsy. All patients had recovered within 3 to 5 months duration and hence these patients did not have significant disability in the long term follow up, however these patients had difficulties in immediate post operative rehabilitation. The incidence of foot drop following total knee replacement in many international studies is between 0.3% to 1%.%.(Adam Jacob et all).These patients were managed with orthotic supports and they recovered

without any residual motor or sensory deficits. Most studies indicate that nerve injury is due to a neuropraxia. (Osaretin B. Idusuyi, m.d et all). [30]

Infection is the most dreaded complication following total knee replacement ,infection can produce devastating results ranging from revision arthroplasty, arthrodesis, to amputation. Four patients in our study had developed infection ,three patients had recovered with routine debridement and antibiotics, one patient did not recover and finally an arthrodesis had to be performed. The factors increasing the risk of infection were prior open surgical procedures, immunosuppressive therapy, poor nutrition, diabetes mellitus, obesity, and a history of smoking.(Laskin et all)[12].Since patients in our study had had complications for which they had take repetitive treatments, this causes a strain on their already weak financial status and makes them desperate and pathetic.

The fact that even after a very successful operation pain and restrictions in daily life remain post-operatively, which are perceived by patients strongly enough to rate their general health as insufficient(C.J.M.Bachmeiner et all).[25]

Total joint arthroplasty is one of the most successful and cost-effective treatments for end-stage arthritis. Understanding the disparity of outcomes associated with total knee arthroplasty is crucial in the treatment of arthritis. Disparity in health care occurs in a variety of demographics and is on the front lines of health care policy. An individual's socioeconomic status, typically based on income and

educational level, has been shown to have an effect on the outcomes of total joint arthroplasty. Acknowledging the differences in outcomes and discovering ways to reduce the disparity will not only be beneficial to individuals undergoing total joint arthroplasty but will also provide a better foundation for future orthopaedic surgeons and health care workers. Identifying individuals' differences in socioeconomic status and making appropriate adjustments should improve outcomes after total joint arthroplasty and prevent further disparities of care(.Howrad Krista)[53]

The real challenge is in creating an environment where patients are able to make well-informed decisions that overcome past biases, language barriers, and distrust of the health-care system.

Conclusion

CONCLUSION

In our study we have demonstrated the complex problems associated in patients from low socioeconomic status undergoing total knee replacement. These patients have more severe disease and more likely to develop complications.

(1).In our study, 20% of the patients had excellent functional outcomes, 28% of patients had good functional results, another 28% had fair outcomes, while 24% of patients had poor functional outcome.

(2)In the study 33% of patients were dissatisfied with their replaced knee, while 23% of the patients were not very satisfied a overall of 58% of the patients were not happy with their knees. The patients from the lower socio economic strata wanted to have independent mobility, travel by public transport, lead a highly active daily life, which was not achieved by many patients having severe disease leading to a high level of dissatisfaction.

(3)Also patients from lower socio economic status had an higher rate of complications which causes an increased strain on patients and family members income leading to premature interruption of treatment.

(4)From the above results we conclude that even though 20% of patients had excellent results , patients from lower socio economic status having severe arthritis are not very ideal candidates for knee replacement as their satisfaction level is suboptimal, have poorer functional outcome and also have an higher rate of complications.

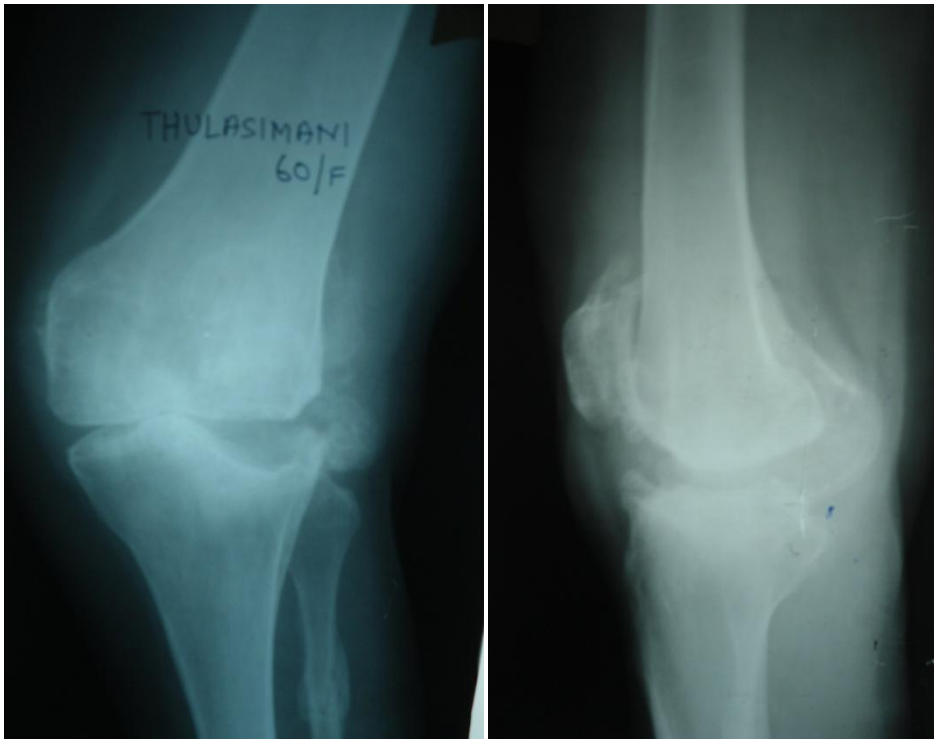
(5)In this study , the patients who had excellent outcomes may be considered as ideal candidates for joint replacement, these patients had low demands , elderly women, moderate arthritis, and no rest pain initially.

Proper preoperative assessment of patients social background, severity of disease, expectations of patient is important, preoperative counseling regarding the rehabilitation and level of activity the person may return to following surgery may go a long way in helping the patient to take an informed decision**.**

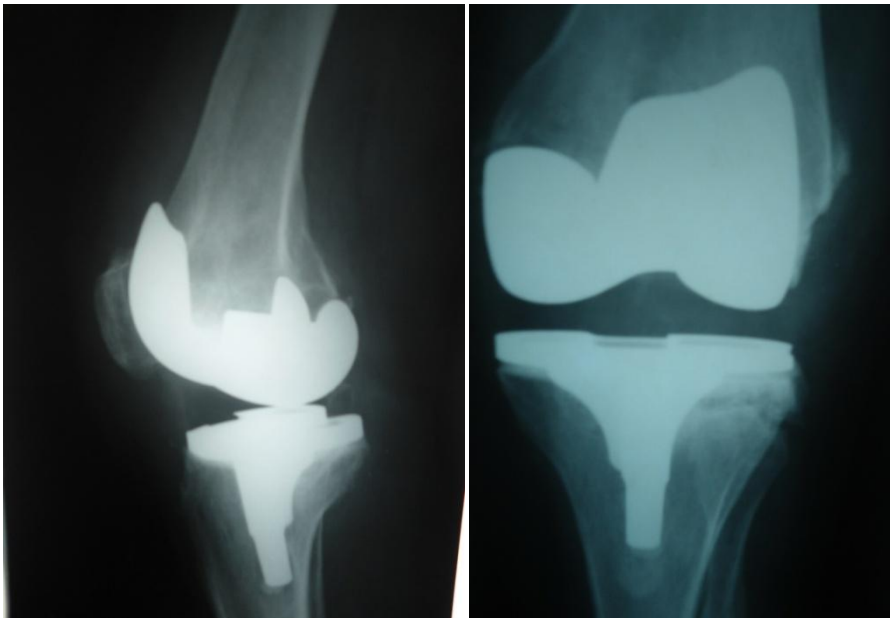
Appendix

ILLUSTARTIONS

CASE NO:1 PRE OP X RAY: Valgus knee with Tricompartmental arthritis , defect in lateral tibial condyle



POST OP X RAY: deformity corrected with prosthesis,bone grafting from femoral cuts for defect



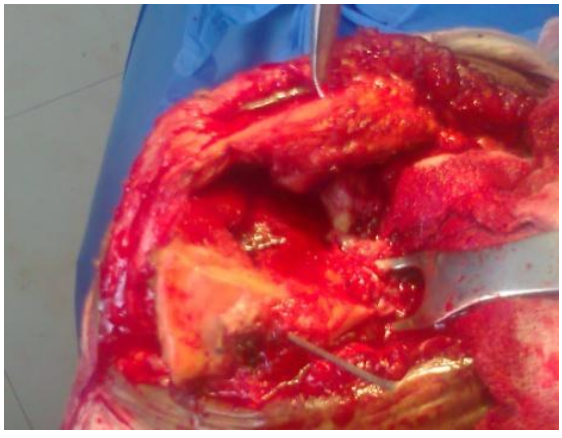
FUNCTIONAL OUTCOME:

Patient had excellent fumctional out come and she is walking independently using public transportation.

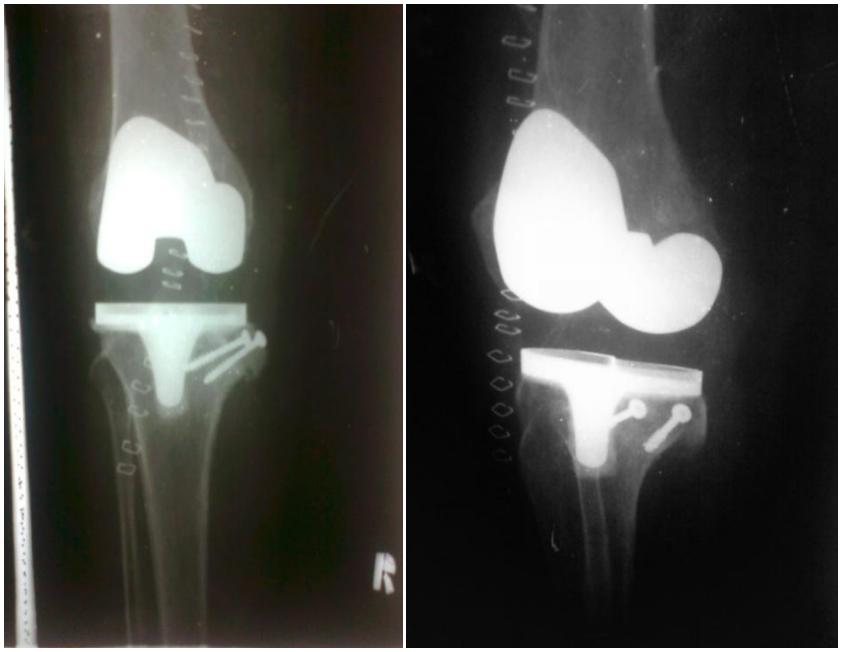
CASE II:

PRE-OP X RAY: severe varus knee with medial condyle defect.

INTRA OP: Per operative picture showing the prosthesis and the cut surfaces of femur and tibia



POST OP XRAY: showing the prosthesis ,bone gaft and cancellous screws fixation for medial condyle defect

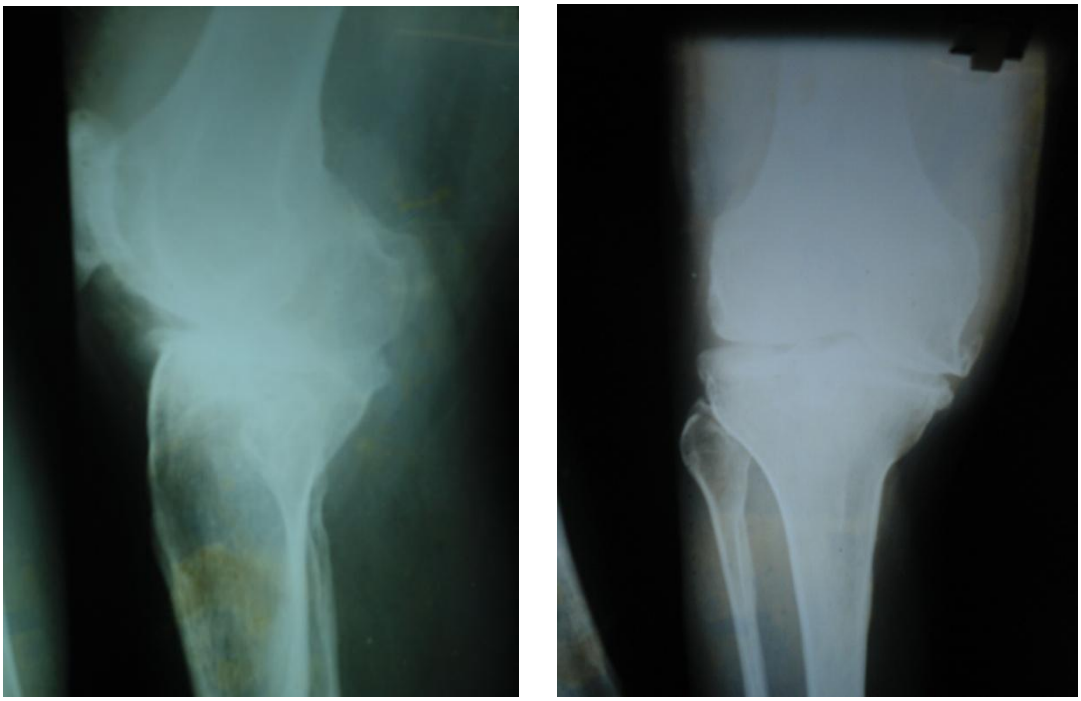


RANGE OF MOVEMENTS:

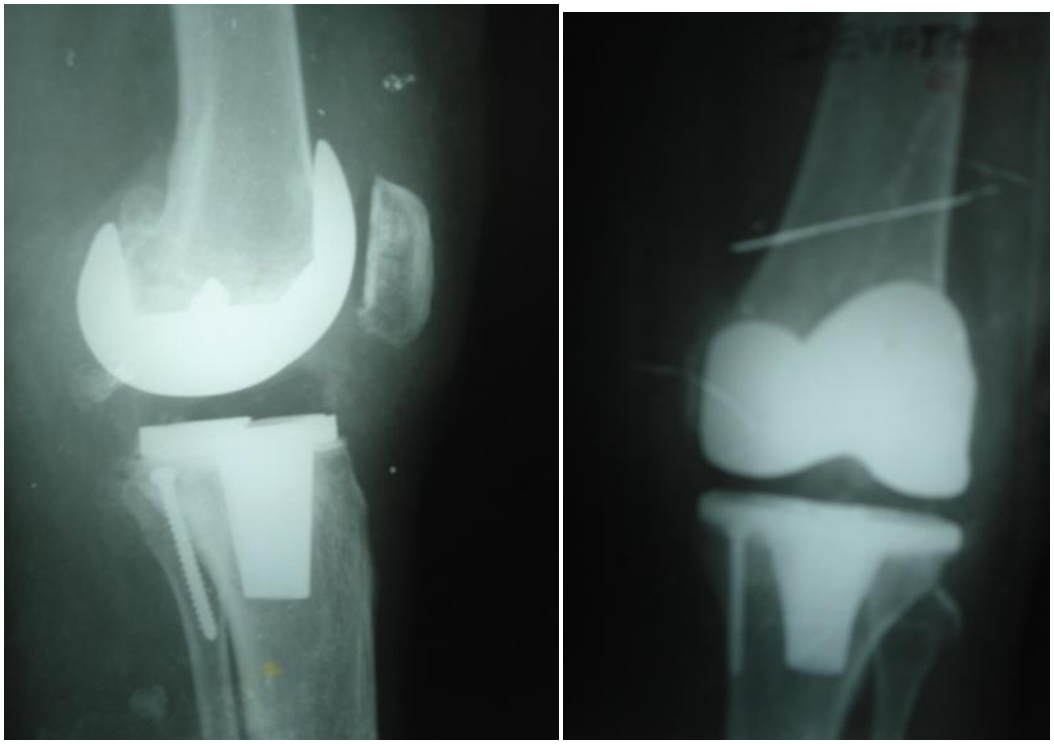
Post operative Flexion and extension movements

CASE III

PRE OP XRAY showing severe tricompartmental arthritis medial condyle defect



POST OP XRAY showing the patella replacement with total knee prosthesis in situ



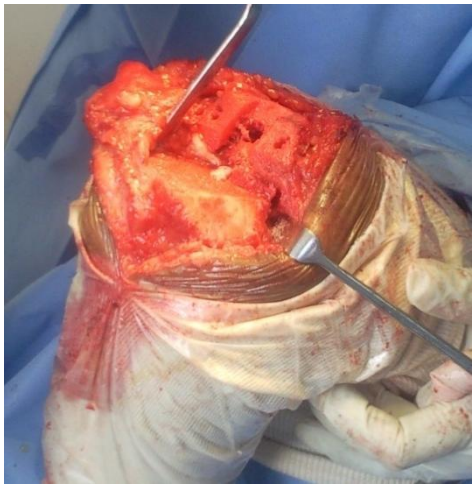
DEFORMITY CORRECTED:

Clinical photo showing the deformity correction.

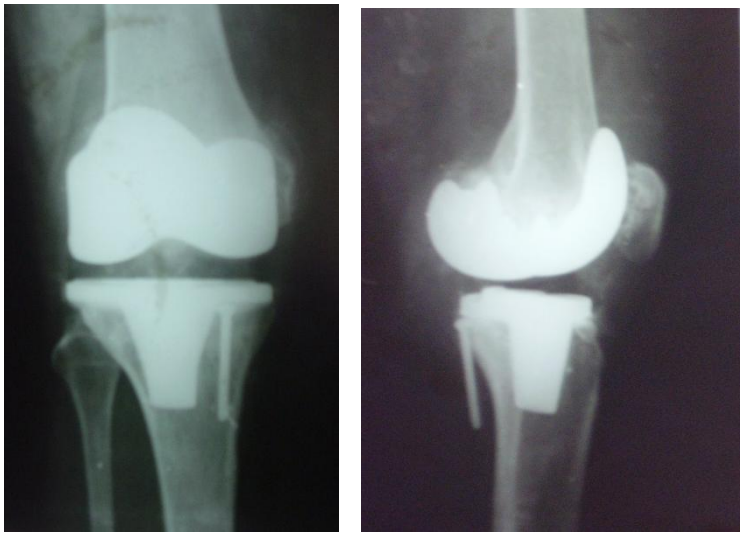
CASE IV:

PRE OP X RAY: showing tricompartment arthritis

INTRA OP PICTURE showing the cut ends of femur and tibia



POST OP XRAY showing the prosthesis in situ.



RANGE OF MOVEMENTS:

Clinical picture showing the flexion and extension movement

CASE V:

PRE OP X RAY showing the severe tricompartmental arthritis

POST OP X RAY showing total knee prosthesis in situ.

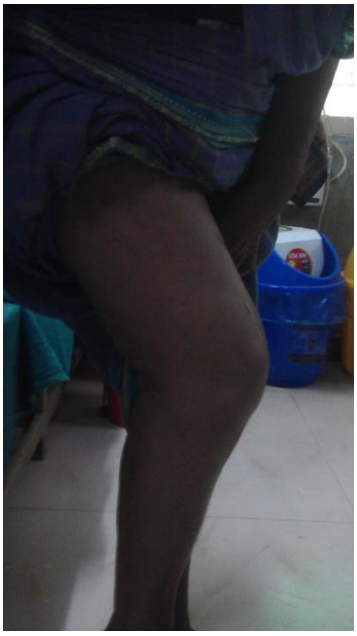
Functional outcome:

Public mode of transsportation-post operatively.

COMPLICATIONS:

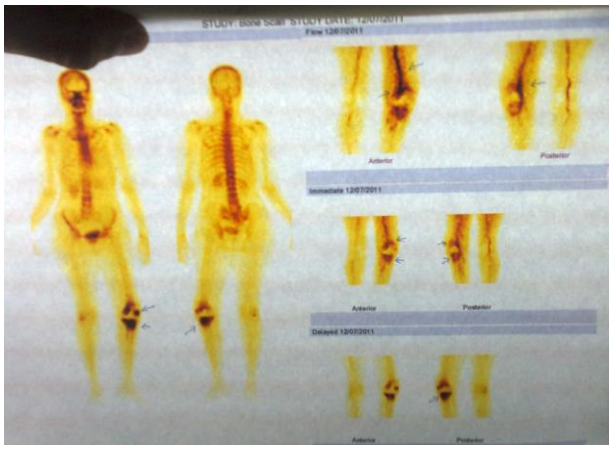
Knee stiffness:

Clinical photo showing the knee stiffness.



INFECTION :

Post operative radio graphic and bone scan picture showing evidence of infection



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22.Low income individuals are 2-5 times more likely to suffer from a diagnosable mental disorder than those in the top SES bracket (Bourdon, Rae, Narrow, Manderschild, & Regier, 1994; Regier et al., 1993).

23.Within families, economic hardship can lead to marital distress and disrupted parenting which in turn may increase mental health problems among children, such as depression, substance abuse, and behavior problems (Conger et al., 2002).

24.Educational and employment opportunities may be hindered by mental health problems (Murray & Lopez, 1997).

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PROFORMA

1 NAME :

2 AGE :

3 SEX :

4 OCCUPATION :

5 ADDRESS & PHONE NO :

6 MONTHLY INCOME :

7 IP.NO/ OP .NO :

8 DATE OF ADMISSION :

9 DATE OF SURGERY :

10 DATE OF DISCHARGE :

11 DURATION OF SYMPTOMS :

12 SIDE /REST PAIN :

13 ASSOCIATED CO-MORBID CONDITIONS :

14 PREVIOUS PROCEDURES :

15 PRE-OP VALGUS / VARUS ANGULATION :

16 PRE-OP AMERICAN KNEE SOCIETY SCORE :

17 PRE-OP DAILY ACTIVITY LEVEL :

18 PRE-OP PAIN PERCEPTION :

(VISUAL ANALOGUE)

19 PRE-OP MODE OF AMBULATION :

(TRANSPORT)

20 ANAESTHETIST ASSESSMENT GRADE :

21 ANAESTHESIA TYPE :

22 DURATION OF SURGERY :

23 TORNIQUET CONTROL :

24 POST-OP COMPLICATIONS

a) **INFECTIONS :**

b) **STIFFNESS :**

c) **THROMBOEMBOLISM :**

d) **PERIPROSTHETIC FRACTURES :**

e) **PATELLO-FEMORAL :**

COMPLICATION

f) NEUROVAASCULAR COMPLICATION :

g) SECONDARY PROCEDURE :

25 DURATION OF ANTIBIOTIC COVERAGE :

26 DEEP VEIN THROMBOSIS PROPHYLAXIS :

27 TYPE OF IMPLANT :

28 PATELLA REPLACED OR NOT :

29 POST-OP VALGUS / VARUS ANGULATION :

30 LIMB LENGTH DISPARENCY :

31 POST OP EVALUATION

a) DURATION FOR WEIGHT BEARING :

b) DURATION FOR DISCHARGE :

c) AMERICAN KNEE SOCIETY SCORE :

AT DISCHARGE

32 FOLLOW UP KNEE SCORES

a) AT 1 MONTH :

b) AT 3 MONTHS :

c) AT 6 MONTHS :

33 PATIENT SATISFACTIONAFTER SURGERY :

34 POST-OP DAILY ACTIVITY LEVEL :

35 POST-OP PAIN PERCEPTION :

(VISUAL ANALOGUE)

36 POST-OP MODE OF AMBULATION

(TRANSPORT) :

Master chart

Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column 12	Column13	Column14	Column15	Column16	Column17
S.NO	AGE	SEX	SIDE	DEFORMITY	CAUSE	RESTPAIN	STAGE	EDUCATION	OCCUPATION	KNEE SOCIETY SCORE	CO-MORBID CONDITION	KNEE SCORE POST OP		COMPLICATIONS	FUNCTIONAL OUTCOME	PATIENT SATISFACTION
												1 MONTH	6 MONTHS			
1	50	F	RIGHT	VARUS	RHEUMATOID	NO	SEVERE ARTHRITIS	HIGH SCHOOL	UNSKILLED	10	HYPERTENSION	35	85	FOOT DROP	EXCELLENT	SATISFIED
2	65	F	RIGHT	VARUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	PRIMARY SCHOOL	UNSKILLED	15	DIABETES MELLITUS,HYPERTENSION	25	80	NIL	GOOD	SATISFIED
3	53	F	LEFT	VARUS	RHEUMATOID	NO	SEVERE ARTHRITIS	PRIMARY SCHOOL	UNSKILLED	20	POLYARTHROPATHY	25	70	FOOT DROP	FAIR	NOT VERY SATISFIED
4	60	F	LEFT	VALG	DEGENE	NO	MOD	PRIMA	UNSKIL	15	HYPERTENSION	30	85	NIL	EXCELL	SATISFI

				US	RATIVE		ERATE ARTHRITIS	RY SCHOOL	LED						ENT	ED
5	65	F	RIGHT	VARUS	DEGENERATIVE	YES	SEVERE ARTHRITIS	PRIMARY SCHOOL	UNSKILLED	10	HYPERTENSION,CORONARY ARTERY DISEASE	25	75	NIL	GOOD	SATISFIED
6	55	F	RIGHT	VARUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	HIGH SCHOOL	UNSKILLED	15	OBESITY, DIABETES MELLITUS	20	55	SECONDARY PROCEDURE	BAD	NOT SATISFIED
7	60	F	RIGHT	VARUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	ILLITERATE	UNSKILLED	15	DIABETES MELLITUS,	20	75	SECONDARY PROCEDURE	GOOD	SATISFIED
8	49	M	LEFT	VARUS	DEGENERATIVE	YES	SEVERE ARTHRITIS	PRIMARY SCHOOL	UNSKILLED	20	COPD	25	80	KNEE STIFFNESS	FAIR	SATISFIED
9	47	F	LEFT	VALGUS	DEGENERATIVE	YES	MODERATE ARTHRITIS	PRIMARY SCHOOL	SEMISKILLED	20	POLYARTHROPATHY	25	80	KNEE STIFFNESS	GOOD	SATISFIED
10	48	M	RIGH	VARUS	DEGENERAT	NO	SEVERE	ILLITERATE	UNSKILLED	20	HYPERTENSION	25	70	INFECTION	FAIR	NOT VER

			T		IVE		ARTHRITIS									Y SATISFIED
11	70	F	LEFT	VALGUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	ILLITERATE	SEMISKILLED	15	POLYARTHROPATHY	25	55	KNEE STIFFNESS	BAD	NOT SATISFIED
12	47	F	RIGHT	MILD VARUS	DEGENERATIVE	NO	MODERATE ARTHRITIS	HIGH SCHOOL	UNSKILLED	15	POLYARTHROPATHY	25	85	NIL	FAIR	NOT VERY SATISFIED
13	48	F	RIGHT	MILD VARUS	DEGENERATIVE	YES	SEVERE ARTHRITIS	PRIMARY SCHOOL	SEMISKILLED	20	DIABETES MELLITUS,HYPERTENSION	30	85	NIL	EXCELLENT	SATISFIED
14	46	M	RIGHT	MILD VARUS	POST TRAUMATIC	NO	MODERATE ARTHRITIS	GRADUATE	SKILLED	25	HYPERTENSION	30	85	NIL	EXCELLENT	SATISFIED
15	53	F	RIGHT	MILD VARUS	DEGENERATIVE	NO	MODERATE ARTHRITIS	PRIMARY SCHOOL	SEMISKILLED	25	DIABETES MELLITUS,HYPERTENSION	15	75	INFECTION	GOOD	NOT SATISFIED
16	54	M	RIG	MILD	DEGENE	NO	MOD	ILLITERA	SEMIS	20	HYPERTENSION	15	70	PERSISTE	FAIR	NOT

			HT	VARUS	RATIVE		ERATE ARTHRITIS	TE	KILLED					NT PAIN		VERY SATISFIED
17	57	F	RIGHT	VARUS	RHEUMATOID	YES	SEVERE ARTHRITIS	ILLITERATE	UNSKILLED	15	POLYARTHROPATHY	30	80	NIL	GOOD	SATISFIED
18	59	F	LEFT	VARUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	MIDDLE SCHOOL	SEMISKILLED	15	DIABETES MELLITUS	25	85	KNEE STIFFNESS	EXCELLENT	SATISFIED
19	57	M	RIGHT	VARUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	PRIMARY SCHOOL	SKILLED	15	COPD	25	75	NIL	GOOD	SATISFIED
20	59	F	RIGHT	VARUS	DEGENERATIVE	YES	SEVERE ARTHRITIS	PRIMARY SCHOOL	UNSKILLED	10	HYPERTENSION	20	85	PERSISTENT PAIN	EXCELLENT	SATISFIED
21	56	F	RIGHT	INSTABILITY	DEGENERATIVE	NO	SEVERE ARTHRITIS	ILLITERATE	UNSKILLED	0	POLYARTHROPATHY	10	60	PERSISTENT PAIN	BAD	NOT SATISFIED
22	57	M	RIGHT	VALGUS	DEGENERATIVE	NO	SEVERE ARTH	HIGH SCHOOL	CLERICAL	20	CORONARY ARTERY DISEASE	35	65	NEUROLOGICAL PRO	FAIR	NOT VERY SAT

							RITIS							BLEM		ISFIED
23	58	F	RIGHT	MILD VARUS	RHEUMATOID	YES	SEVERE ARTHRITIS	ILLITERATE	SKILLED	15	HYPERTENSION,CORONARY ARTERY DISEASE	25	85	SECONDARY PROCEDURE	EXCELLENT	SATISFIED
24	57	F	RIGHT	INSTABILITY	DEGENERATIVE	NO	SEVERE ARTHRITIS	MIDDLE SCHOOL	SKILLED	0	DIABETES MELLITUS,HYPERTENSION	25	65	EXTENSOR LAG	FAIR	NOT VERY SATISFIED
25	59	F	RIGHT	INSTABILITY	DEGENERATIVE	YES	S`	MIDDLE SCHOOL	SEMISKILLED	0	POLYARTHROPATHY	25	75	KNEE STIFFNESS	FAIR	NOT VERY SATISFIED
26	58	M	LEFT	MILD VARUS	RHEUMATOID	NO	SEVERE ARTHRITIS	MIDDLE SCHOOL	CLERICAL	20	OBESITY	35	80	PERSISTENT PAIN	GOOD	SATISFIED
27	58	F	RIGHT	MILD VARUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	ILLITERATE	UNSKILLED	25	DIABETS MELLITUS,POLYARTHROPATHY	10	50	DVT	BAD	NOT SATISFIED
28	55	M	RIGHT	VARUS	DEGENERATIVE	YES	SEVERE ARTHRITIS	POST HIGH SCHOOL	SEMISKILLED	20	POLYARTHROPATHY	15	55	PERSISTENT PAIN	BAD	NOT SATISFIED
29	59	F	LEFT	MILD VA	RHEUMATO	NO	SEVERE	MIDDLE SCH	UNEMPLO	20	DIABETES MELLITU	25	80	KNEE STIF	GOOD	SATISFIED

				RUS	ID		ARTHRITIS	OOL	YED		S,HYPERTENSION			FNESS		
30	58	M	LEFT	VARUS	RHEUMATOID	YES	SEVERE ARTHRITIS	POST HIGH SCHOOL	SKILLED	10	POLYARTHROPATHY	20	70	KNEE STIFFNESS	FAIR	NOT VERY SATISFIED
31	61	F	RIGHT	MILD VARUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	MIDDLE SCHOOL	SKILLED	20	DIABETS MELLITUS,POLYARTHROPATHY	10	55	INFECTION	BAD	NOT SATISFIED
32	62	F	RIGHT	VARUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	PRIMARY SCHOOL	SEMISKILLED	10	POLYARTHROPATHY	30	85	SECONDARY PROCEDURE	EXCELLENT	SATISFIED
33	64	F	RIGHT	INSTABILITY	DEGENERATIVE	YES	SEVERE ARTHRITIS	ILLITERATE	SKILLED	0	DIABETS MELLITUS,HYPERTENSION	25	65	NEUROLOGICAL PROBLEM	FAIR	NOT VERY SATISFIED
34	65	F	LEFT	VALGUS	RHEUMATOID	NO	SEVERE ARTHRITIS	ILLITERATE	SEMISKILLED	15	OBESITY	25	55	PERSISTENT PAIN	BAD	NOT SATISFIED
35	65	F	RIGHT	MILD VARUS	DEGENERATIVE	NO	SEVERE ARTHRITIS	MIDDLE SCHOOL	SKILLED	10	HYPERTENSION	25	75	SECONDARY PROCEDURE	GOOD	NOT SATISFIED
36	66	M	RI	MI	POS	N	SE	PRI	SE	10	DIABETE	20	55	INFE	BA	NO

			GHT	LDVARUS	TTRAUMATIC	O	VEREARTHRITIS	MARYSCHOOL	MISKILLED		SMELLITUS			CTION	D	TSATISFIED
37	67	M	RIGHT	VARUS	RHEUMATOID	YES	SEVEREARTHRITIS	PRIMARYSCHOOL	UNSKILLED	20	CORONARY ARTERY DISEASE	25	65	NIL	FAIR	NOTVERYSATISFIED
38	69	F	LEFT	MILDVARUS	DEGENERATIVE	NO	MODERATEARTHRITIS	ILLITERATE	SEMISKILLED	20	HYPERTENSION	25	75	PERSISTENTPAIN	GOOD	SATISFIED
39	65	M	RIGHT	VALGUS	DEGENERATIVE	YES	SEVEREARTHRITIS	MIDDLESCHOOL	SEMISKILLED	15	HYPERTENSION	20	65	DVT	FAIR	NOTSATISFIED
40	66	F	RIGHT	INSTABILITY	RHEUMATOID	YES	SEVEREARTHRITIS	PRIMARYSCHOOL	SEMISKILLED	0	OBESITY	25	75	KNEESTIFFNESS	GOOD	NOTSATISFIED
41	67	M	RIGHT	INSTABILITY	DEGENERATIVE	YES	SEVEREARTHRITIS	PRIMARYSCHOOL	UNSKILLED	0	HYPERTENSION,CORONARY ARTERY DISEASE	20	55	NIL	BAD	NOTSATISFIED
42	69	F	RIGHT	MILDVARUS	DEGENERATIVE	NO	SEVEREARTH	ILLITERATE	UNEMPLOYED	10	DIABETES MELLITUS	15	55	PERSISTENTPAIN	BAD	NOTSATISFIED

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