REVIEW OF LITERATURE
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The principles in the treatment of fractures, namely, reduction and adequate immobilization until the fracture is healed, have evolved since the early medical writings of Greece, Egypt and India.

Intramedullary nailing of femoral shaft fracture, first introduced by Hey Groves in 1918 and later popularised by Kuntscher (1940, 1958, 1967), Bohler (1951), Street (1951) and Lottes (1953). Nicholas (1963), reviewed the results of rehabilitation after femoral shaft fractures, also reported better end-result after intramedullary nailing than after any other method of treatment.

During world war II, Kuntscher’s introduction of the technique of intramedullary nailing for fixation of the femoral shaft and early ambulation was perhaps the first serious attempts at putting these principles to the test.

The consensus of the study reported in a Symposium in 1951, says “It is obvious that in proper hands medullary nailing of the femur is a worthwhile procedure and that the complication, while frequent, are not sufficiently grave to prohibit the use of this method
by those who are skilled in bone surgery and who can work under proper conditions. On the other hand, the operation is serious one and it may be difficult procedure and should not be taken lightly. It is especially advised that the instruments necessary for inserting, withdrawing and cutting the nail be available and that the proper size and length of the nail should be selected before hand and should be on hand before the operation is started. In this way the operating time will be lessened and many of the difficulties will be eliminated."

The nail should firmly grip the inner cortices of the medullary canal both above and below the fractures in order to achieve stability which is the aim of the operation. Thus the technique is limited to the fractures located more than 2 inches distal to the lesser trochanter and more than 7 inches proximal to the adductor tubercle.

The medullary fixation is suitable for any patient over the age of puberty and under the age of senility and debility. The fracture with moderate or severe comminution even in the area ideally suited for medullary nail, skeletal traction followed by cast immobilization is now the treatment of choice.
O'Brien reported "more trouble than with any other method" especially when the standards set by Kuntscher for intramedullary nailing of the femur were not met. Dencher reported a 14 percent technical error with medullary nailing used in series of 435 cases of fracture of femoral shaft, one fifth of which give rise to serious complication. Wickstrom and Corban discovered a 3 percent of deep and superficial infections and 4.3 percent incidence of delayed or non-union in 295 cases. Belder reported deleterious effect on knee occurring as late as five years after the surgery. Wickstrom, Corban reported a 1.5 percent incidence of major vascular complication with open surgery of these fractures.

Perusal of the literature reveals however, some dissatisfaction with the method. The technical performance of the operation is far from uniform and obviously it often fall far short of the standard demanded by Kuntscher. Chronic ostitis delayed union and non-union are sequelae frequently reported after intramedullary nailing (Lauritzen, 1949; Palmer, 1951; Charnley and Guindy, 1961; O'Brien, 1963; Dencker, 1965), reviewing the result of different methods of treatment of femoral shaft fracture in Swedish hospital from 1952 to 1954, concluded that although many of the nailed fractures did quite well, the rate of complications was so high that conservative treatment with traction should still be given preference in routine work.
In all reports sepsis after intramedullary nailing by open technique appears to be greatest drawback. Dencker in 588 fractures of the femoral shaft treated with open methods, noted a 6 percent infection rate; Wilson, Mac Ausland and Eaton have reported encouraging result in the treatment of the complication after establishment of adequate drainage and administration of intravenous antibiotics until the infection is controlled, maintaining rigid intramedullary immobilization until solid union occurs.

A review of 50 femoral shaft fractures treated by open reduction and fixation by Kuntscher clover leaf nail at Campbell Clinic from 1957 to 1967 has been made. The period of observation after surgery ranged from 6 months in one patient to 10 years in 2 patients, an average of 30 months. The age of patient varied from 14 to 85 years. The series included 34 recent fractures, 6 pathological fractures and 10 non-union. Forty eight fractures were close and 10 were open. Among the 50 patients, there were only 2 major complications. One patient died of a pulmonary embolism 15 days after surgery. The other patient developed overwhelming infection which required mid thigh amputation.

They have preferred the clover leaf Kuntscher nail to solid type of nail for three reasons. (1) It is more economical to have in stock nails of one standard
length in variety of diameters. The nail can be cut to proper length. (2) Hollow nail allows more ingrowth of the tissue for healing than does solid nail. (3) The compressibility of this nail probably provides a tighter fit over a longer period than does the solid nail.

Recent refinements in surgical technique have materially altered intramedullary nailing. The development of image intensifiers have revived interest in closed nailing. Both Kuntscher (1959) and Bohler (1965) reported encouraging report with such a technique. It stated that infection and non-union were eliminated, a claim fully supported by Grass and Giebink in twenty one cases, but only partially supported by other workers. Boher noted a 1.76% infection rate in 308 closed intramedullary nailing procedures in contrast to 4 percent with open nailing technique. Rockananen Slatis and Vaukka, although preferred closed technique, did not find any significant difference in rate of complication with either open or closed intramedullary nailing.

Medullary nailing of fracture of the proximal two-third of the femoral shaft is now established as a satisfactory means of treatment (Muller et al, 1965). Attempts have been made to overcome the instability due to torque by supplementation of the intramedullary nail by external plates (Funk et al, 1968; Burwell, 1971).
Huckstep and his colleagues (1972) have designed a solid medullary nail which has holes at every 15 mm along its length. Following insertion of the nail the proximal and distal fragments are held rigidly in place by screw which pass into the tapped holes in the medullary nail. While external plate and the Huckstep nail certainly overcome the instability due to torque, they have disadvantage that to remove them requires re-exploration of the fracture site which converts the minor procedure of Kuntscher nail extraction into one of greater severity.

Another technique, plate fixation of femoral shaft has also received a great deal of attention in past 10 years. Mann and Sarmiento have recommended that this form of fixation to be used in fresh long oblique, spiral fractures of the femoral shaft only. Gant, Shaftan and Herbsman (1970) in report of experience with the ASIF technique in the treatment of fourteen closed femoral fracture described three cases of double plate breakage and fracture angulation. They therefore recommended that the technique be used only in co-operative patients whose femoral shaft fracture could not be handled otherwise.

In marked contrast to open method of treatment the reports on closed traction treatment have been far more favourable. Martin and Mc-Goey (1961) suggested that traction was well tolerated in younger patients and
recommended it as the method of choice. Lencner, in a comparison of the result of various treatment in 1003 cases found that the incidence of non-union with open method of treatment was 8 percent and that all seven deaths in series occurred with open method of treatment. He concluded that skeletal traction should be standard method of treatment for both closed and open fractures of femoral shaft, regardless of patient's age, the type of fracture and level of fracture unless special circumstances dictated the use of another technique.

Anderson in the study of thirty nine femoral shaft fracture in children and fifty nine in adults treated conservatively in most cases by Russell traction, reported very low and insignificant complication rate, however, he was dissatisfied with the longer hospitalization time, slow ambulation and some time inadequate reduction obtained with this method.

These reports indicate clearly that although open method of fixation has generally led to more perfect alignment of the fractures, the complication rate has been significant, whereas prolonged immobility and joint stiffness were all too common with conservative skeletal traction technique.

The plaster cast brace for use in the ambulatory treatment of fracture of the shaft of the femur was
introduced by Mooney and his colleagues in 1970. The femoral cast brace offers a new dimension to the treatment of femoral shaft fractures. Such fractures have been treated previously by either traction and spica cast or open reduction and internal fixation. The standard non-operative management is time consuming and expensive. Open reduction and internal fixation although generally reliable and less costly does surprise the surgeon and patient with a rare tragedy. The cast brace is particularly appropriate for treatment of the "floating knee", a rheumatoid arthritic knee, patient with mental confusion, severe cardio-pulmonary problems (to get patients up from position in traction), present or previous infection of the femur. The femoral cast brace shortens the hospital stay, in comparison to traction method and avoid complication of open reduction and internal fixation. Weight bearing encouraged soft tissue healing as well as bony union.

Initially John Hunter (1791) when confronted with difficult fracture of the proximal femur instructed the patient "to walk upon crutches and to press as much as on broken thigh as the state of part would admit". The fracture went to unite.

The first brace specifically designed for fracture cases was reported by Smith (1855). This device, which had a waist band, an ischial support and thigh lacer, was to be used for ununited fracture of femur. Smith called the
device a prosthesis, and as the term implies, he believed that the device would substitute for fractured limb. He believed that containment of thigh musculature in laced cuff helped to maintain fracture alignment and much of his surprise, all seven fractures so treated healed.

Delbet (1916) of France reported success in treating femoral fractures with an ischial weight bearing orthotic device.

Mooney et al (1970) reported a 2 years controlled experience with use of cast brace for fractures of the femur. After a mean traction time of 7.3 weeks, the fractured extremity was placed in cast brace and weight bearing ambulation allowed and encouraged. All the fractures healed after a mean immobilization of 7.2 weeks, giving a mean total treatment time of 14.5 weeks and for those treated in traction followed by spica immobilization the mean treatment time of 24.7 weeks.

Mooney et al (1970) described an adjustable plastic thigh section and knee joint for femoral fracture. The term cast brace is used to describe a device that provides circumferential support to a segment of a fractured limb while allowing mobility of nearby joints and thus early functional ambulation.

Adjustable plastic thigh components have the following advantage.
1. Total contact is always available because the straps and flexible brim can be tightened when atrophy occurs, thereby saving cast changes.

2. There is no need to use a separate brim which must be incorporated in the cast.

3. The orthosis is lighter than the earlier type, can tolerate draining wounds and make wound dressings easier.

4. No alignment tool is needed.

5. No shaping of joints is needed. Flexibility of the plastic joints allows them to fit flush on the cast without use of bending irons.

6. Varus and valgus adjustments can be made. Extra holes on the thigh section where the joints attached allow angular and A.P. adjustments simply by removal of two or four screws.

Kaufer (1972) did the study in management of fracture shaft femur by initial traction and later on by post-traction cast or braces in order to avoid the hazards of operative therapy and to reduce the period of hospitalization. He selected 60 patients of fracture shaft femur with transverse, oblique, comminuted, segmental and compound fractures. Initially all the patients were kept
on skeletal traction with average period 22.8 days
(range 11 - 42 days). Then cast was applied extending
from submammary region to supramalleolar region. The
foot and ankle was left free. The sound lower extremity
was entirely free. Ambulation was then started with full
weight bearing prior to discharge. The time between cast
application and discharge was 6 days. Total duration of
hospitalization was an average of 29 days (range 14 - 45
days). The patients started full weight bearing without
external support in an average of 175 days (range 188 -
360 days). In majority of cases the results were
satisfactory but there were angular deformity, shortening,
plaster sores, non-union in few cases.

Joseph Moll (1973) reported on the use of the
cast at Brooke Army Hospital in 178 patients with 184
(6 bilateral) femoral fractures. Most of these fractures
were open combat injuries due to fragment or gun shot
missiles. Only three fractures failed to unite and four
of the open fractures required further surgical procedures
following initial debridement and delayed closure. Initial
reduction was achieved by skeletal traction followed with
application of cast brace as soon as the reaction to the
injury subsided. Average healing time was 7.5 months for
open fractures and 5.5 months for closed fractures with
15 cases of malunion and three cases of non-union and 15
cases of unsatisfactory knee motion.
Connolly et al (1973) reported a quantitative analysis of efficiency of immobilization in skeletal traction and cast brace using the technique of electro-geniometry and cinero-entgenography. They found in a limited number of patients that rotation at the fracture site while the patients was in bed, was less than when wearing a cast brace. Movements of bone fragments during weight bearing in the cast brace was minimal in supra-condylar, intercondylar and mid shaft comminuted fractures but considerable in mid shaft transverse fracture. A follow-up evaluation of 143 fractures shaft femur treated by closed reduction, early application of cast brace and ambulation. The incidence of non-union and malunion was 0.7 percent, of shortening of more than two centimeters 13%, of symptomatic loss of knee motion 5.4%, of refracture 2 percent and pulmonary emboli 3 percent.

Schweigl and Groper (1974) did the comparative study of ambulatory versus non-ambulatory care of femoral shaft fracture. They compared 37 patients treated with a cast brace and an unselected group of 40 patients with fractured femoral shaft. Both these groups were treated by skeletal traction followed by cast brace or single hip spica. The cast brace consists of a quadrilateral socket. Two side bars with an attached heel and a drop lock at knee. The duration of treatment was much less in the cast brace group. This group averaged 41 days (6 weeks) less time in
traction and 66 days (9.5 weeks) less time in hospital stay, compared to spica group. The cast brace group averaged 85 degree range of motion at the end of treatment time compared to 35 degree in the spica group and commenced ambulation 8 weeks earlier than the latter group. The spica group had four non-union, one delayed union and two refractures. None of these complications were seen in cast brace group of patients.

Mittal and Bonadio (1974) worked with cast brace from 1968 to 1970 over 150 patients with various types of fractures. In all the patients with fresh fracture of femur, tibial skeletal traction was used initially to obtain satisfactory position. They preferred to apply the cast brace 3 to 6 weeks after injury when the fracture site was no longer tender, the swelling had subsided and open wound, if any, had healed. Mean time of application of cast brace was 6.4 weeks. After application of cast brace, knee joint motion was instituted and ambulation and weight bearing were started after the cast brace was consolidated and dried completely, with axillary crutches. On an average, full extension to 90 degree flexion was achieved within 8 - 10 days. Eight weeks was average time, the cast brace was required to wear with range of 5 to 35 weeks. Radiological evidence of union and absence of any clinical discomfort at fracture site were criteria for discontinuing the external support. In follow up, at least for three
months after removal of brace, in no case was there any
deterioration in healing and alignment of fractures.

Andrews (1976) supported the use of cast bracing
instead of traction and hip spica or open reduction and
internal fixation under certain circumstances. These
conditions are:

1. The fractures that are poorly suited structurally for
   open reduction and intramedullary nailing.

2. The poor condition of the patient for operation.

3. The need to move the patient to sitting position.

4. The obvious advantage of shorter hospital stay than
   with traction.

5. Particular condition suited to the cast brace such as
   floating knee.

Time of casting in 34 patients with no other
complications was 27 days. Hospital stay averaged above
five weeks (35.5 days). Average time in plaster for 17
uncomplicated cases was 3.9 months. Average shortening
of the leg was 0.4 inches. No patient had greater than
1 inch of shortening. No gross malunion occurred. Knee
motion except in previously injured limb, was excellent.

Adair (1976) in order to relieve the pressure
on an over-worked fracture service, the early mobilization
of patients with fractures of femoral shaft in plaster cast was investigated. The cast is designed to have a weight relieving function and to mould the soft tissue of the thigh around the fracture. Using this method, 40 patients were discharged from hospital in an average of 44 days from injury and all these fractures healed rapidly and successfully.

Pearson (1977) studied 100 cases of closed fracture of the femur admitted to a Nigerian hospital during the year 1954-71 and treated by skin and skeletal traction, the mean time to clinical union was 6 weeks and discharge on protected weight-bearing for 7 weeks. There was no cases of non-union.

Wardlaw (1977) treated nifty eight fractures of shaft of femur over two years 1974 and 1975 and results have been assessed in 69. Of these, 38 were treated by skeletal traction in Thomas Splint and 31 by skeletal traction followed by cast brace. He divided fractures into three groups according to their treatment.

Group I : Traction alone
Group II : Traction and cast bracing.
Group III : Internal fixation.

There were two cases of delayed union both in group II. One fracture took 40 weeks to unite while in other Kuntscher nailing and bone grafting result was
excellent in one year. There were two cases of non-union in each group. Swelling of the knee joint may occur in patients treated by a cast brace. Increased angulation occurred after application of cast brace in 7 patients. The angulation was 5 degree in 4 and 15 degree in 2 cases.

The stay in hospital was 15 weeks average (9-30 weeks) in group I and in group II, 8 weeks average (2-18 weeks). It is concluded that when used with all the judgement and skill it demands, the cast brace method is great advance in conservative treatment.

Lesin, Mooney (1977) over a 6 months period, 23 consecutive patients with 26 femoral fractures that were not considered appropriate for internal fixation were treated by cast bracing. All the patients in this series were treated initially with skeletal traction applied under local anaesthesia. Once the patient's clinical state had stabilized then cast brace was applied. All fractures were followed for at least 9 months. The interval between injury and application of cast brace ranged from 2 to 33 days. The period of hospitalization after cast bracing ranged from 47 to 205 days. In 8 cases, the shortening ranged from 1 mm to 10 mm and in 6 cases from 11 to 15 millimeters. One patient had 20 millimeters shortening. The range of knee movement was 135 degree of flexion or more in majority of the patient. Only in one un-cooperative patient non-union occurred.
Main advantage of this treatment was early mobilization to enhance union and to reduce the cost of hospitalization.

Cortwell (1978) treated a series of 30 patients with fractures of femoral shaft by closed reduction, tibial pin traction for 3 to 6 weeks and early ambulation with crutches in plastic thigh lacer. The goal of treatment of a femoral shaft fracture was the restoration of normal function of limb in shortest possible time. The average hospital stay was 58 days. The degree of residual angulation at fracture site was less than 5 degree in 17 patients. The greatest degree of angulation encountered was 16 degree. In 8 patients shortening was 1 to 2 centimeters. At follow up, the range of motion of knee was greater than 125 degree. The earliest that any patient was allowed partial weight bearing was 17 days. The average convalescence took 4.1 months with a range of 3 to 8 months.

Hardy, White and Williams (1979) treated 79 cases of fracture of femoral shaft by cast brace at Middle. More hospital between July 1974 and January 1977. Many of the cast brace applied with the hip in neutral position but in many cases no note was made of the position of the hip at the time of application.
Six patients were left with flexion contractures of the knee, the contracture was between 5 to 10 degree in 6 patients. Seven patients were left with less than 90 degree of flexion. No patient had a valgus or varus deformity greater than 20 degree. Deformity between 16 to 20 degree occurred in 4 patients, between 11 to 15 degree in 9, between 6 to 10 degree in 29 patients, while 37 patients had less than 5 degree of malalignment. Thirty six of the 79 cast brace were applied within the first 28 days. The mean femoral shortening for the 64 patients was 1.63 centimeters. 54 patients claimed to be aware of some shortening, 22 had at some stage worn a heal raise. Four femoral refractures were noticed after removal of cast brace, all within first month of removal of brace.

Discrepancy in femoral length was assessed by scanogram. The cases were analysed to relate the incidence of shortening greater than 2 centimeters to the type and site of fracture and the time which elapsed from injury until the cast brace was applied. Such shortening encountered most frequently when the cast brace was applied within the first two weeks from injury or after 6 weeks in those patients with comminuted fracture of middle third of femur.

Dhann, Sharma and Sankaran (1979) conducted a study of cast bracing as a treatment of fracture shaft.
femur. The purpose of the study was to determine whether
cast bracing technique would allow patient to achieve
even earlier ambulation than had been possible before and
perhaps a shorter period of hospitalization.

Eighteen patients were treated by sustained
traction initially either by skeletal or skin traction.
Out of these, 8 patients were treated by reduction and
immobilization in plaster hip spica. In the remaining
10 patients traction was continued till the fracture
became sticky. Then cast brace was applied to the average
period of 4 weeks. The results were classified as follows:

**Excellent**: Shortening less than 1.5 centimeter, no
angulation or rotation, knee flexion 90 to 135 degree,
return to normal work.

**Good**: Shortening 1½ to 2½ centimeters, 5 to 10 degree
rotation or angulation deformity. Knee flexion upto 45 to
90 degree, return to normal work but with reduced efficiency.

**Poor**: More than 2½ centimeter shortening, more than 30
degree rotation or angulation.

The overall results were: excellent-15 cases,
good-3 with no poor case.

Two patients developed shortening upto 2½
centimeters, both had compound comminuted fracture of
middle third femur. In no instances there was non-union.
The average hospital stay of patients was 11 weeks. Union was rapid, infection was avoided and good knee motion maintained when fracture united.

Maini, Mudgal and Dahiya (1985) treated forty cases of fracture shaft femur initially by skeletal traction followed by the application of functional thigh brace of low density polyethylene which moulded individually for each patient. The primary goal in the management of a patient with fracture is to achieve an early osseous union with minimal or no deformity and maximum return of extremity functions.

Skeletal traction was continued till intrinsic stability developed at the fracture site and there was evidence of callus formation on roentgenograms. This was followed by application of functional thigh lacer brace. After application of the brace, the patients were encouraged to do active and passive motion exercises for hip, knee and ankle joints, and were encouraged to walk gradually with the help of crutches.

For the proximal fractures, the classical brace was modified by adding a pelvic band and hip hinge in 20 degree valgus to avoid varus angulation. Average period of skeletal traction was 34 days and union occurred on an average at 15.2 weeks. None of the patients had less than 90 degree of knee movements at the end of treatment and
the overall results were good in 82 percent cases. Shortening of the limb of less than 1 centimeter was seen in 10 cases, 1 to 2 centimeter in 16 cases and 2-3 centimeters in 4 and more than 3 centimeters in two patients. Result were good in 33 patients, fair in 5 and poor in 2 cases.

The polyethylene functional brace was light in weight, adjustable (can be loosened and tightened) washable, removable for personal hygiene and was economical as well.

Bhalla, Agrawal and Labo (1985) treated a series of 28 patients with unilateral fracture of the shaft of femur by upper tibial skeletal traction on Bohlar Braun splint. An effort was made to reduce the fracture within 4 to 5 days by traction alone. Manipulation under sedation was used to improve the position, where adequate reduction was not obtained. The thigh lacer was applied when the swelling had resolved and wound had healed. Thigh lacer was made up of polyethylene high density sheet, according to measurement of individual's thigh. The thigh lacer was washable and was opened for hygienic purposes.

The lacer was applied at the earliest at one week and was delayed for maximum of 8 weeks. In most of the patient lacer was applied within 3 weeks. An average period of confinement to bed was 4.9 weeks. The earliest crutch walking was at 18 days in 2 cases and latest was
8.5 weeks. The average hospital stay was 7 weeks. The thigh lacer was discarded only when there was radiological evidence of union. The average period of union was 14.41 weeks.

Average angulation in antero-posterior plane was 10.57 degree and in lateral plane 9.14 degree. Shortening was seen in 6 cases. After an average follow-up of 11.5 weeks the results would be improved to excellent in 78.57 percent and good in 21.43 percent cases.

Bansal, Singhal, Singh and Arora (1985) treated 25 cases of fracture shaft femur by open reduction, Kuntscher nailing and early mobilization with the help of functional cast bracing applied on an average of 12th post-operative day. Patient was then mobilized first with partial weight bearing and finally full weight bearing. The cast was discarded in cases of solid union.

Twenty (80 percent) cases united between 6 to 12 weeks, with an average period of union being 9 weeks. Superficial infection was noted in 2 patients, loosening of cast brace in another two patients and in one patient angulation of 20 degree was noted. In most of patients there were knee movements more than 90 degrees. The overall results were good in 23 patients, satisfactory in one and poor in 1 patient.
Agarwal, Potukuchi, Dhaon and Das (1985) treated fifty two closed fracture of femoral shaft in patients above the age of 16 years by open reduction and Kuntscher intramedullary nailing followed by immediate cast bracing. In addition to this, 20 cases each were treated either by nailing alone or by bracing alone during the same period. The results were compared by same parameters like clinical union, radiological union, duration of hospital stay, time of full weight bearing and return to work; and the range of knee movements. Quadriceps wasting and limb shortening were also assessed at the completion of treatment and compared.

The average period of clinical union was in Kuntscher nailing with cast brace 8.8 weeks. In Kuntscher nailing alone 11.3 weeks. In traction with brace 10.1 weeks. The average period of radiological union was in Kuntscher nailing with cast brace 15 weeks, in Kuntscher nailing alone 24.6 weeks and in traction with cast brace 15.1 weeks. The average hospital stay was 3.3 weeks in Kuntscher nail with cast brace, 6.2 weeks in Kuntscher nail and 6 weeks in traction with cast brace. Full weight bearing was 5.6 weeks with Kuntscher nail with cast brace, 12.9 weeks with Kuntscher nail and 9.1 weeks with traction and cast brace. Return to work was 10 weeks with Kuntscher nail and cast brace, 13.1 weeks with Kuntscher nail and 10 weeks with traction and cast brace.
Open reduction and internal fixation with Kuntscher nailing has the distinct advantage of accurate opposition, decreased hospital stay and better functional end-results. Kuntscher nailing with cast bracing combines the benefits of surgery as well as bracing. Many of patients of this series attended office and returned to sedentary occupation while still in the brace.

Bhalla et al (1988) conducted a comparative study of ambulatory treatment of fracture shaft femur by nailing and by thigh lacer. They treated 20 cases of femoral shaft fracture with intramedullary nailing (Group I) and equal number with thigh lacer (Group II). The average duration from injury to nailing was 1.9 weeks. Whereas thigh lacer was applied as an average of 3.3 weeks post-injury. Patients were ambulatory as early as possible, the average duration being 4.1 and 4.8 weeks respectively in nailing and thigh lacer group. Average hospitalization was about 2 weeks more in group II. In nailing it was 4.4 weeks against 6.3 weeks in group II. There were no case of non-union. The average duration of union being 18.5 weeks and 17.6 weeks in group I and II respectively. In group I two patient developed infection and loosening of nail, while in group II, two patients each had significant shortening and varus deformity. According to grading of results at the time of union in nailing group, 69 percent achieved excellent, 24 percent good and 7 percent fair
results among the 19 cases of nailing. In thigh lacer group 65 percent had excellent and 35 percent had good results at the time of union. These results were further improved to 85 percent excellent and 15 percent good with later follow-up. The other advantage of thigh lacer treatment is free from operative complications. The quality of union was always better in thigh lacer group of patients with good callus sleeve.