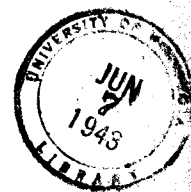


**Staff Meeting Bulletin  
Hospitals of the » » »  
University of Minnesota**



**Complications in Fractures  
of Shaft of Femur and Tibia**

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William A. O'Brien, M.D.

I. LAST WEEK

Date: April 30, 1943  
Place: Recreation Room,  
Powell Hall  
Time: 12:15 to 1:20 p.m.  
Program: "Venous Pressure in Pregnancy"  
Chas. E. McLennan

Discussion  
 John McKelvey  
 Irvine McQuarrie  
 Cecil Watson  
 Gerald Watson

Attendance: 99

Gertrude Gunn,  
Record Librarian

- - -

II. MEETINGS1. ANATOMY SEMINAR

Saturday, May 8, 11:30 a.m.,  
Institute of Anatomy.

"Genetic factors in relation to age of  
appearance of leukemia in mice."  
Arthur Kirschbaum

"Ampho-oxophilic protein in basophilic  
erythroblasts."  
E. M. Schleicher

- - -

2. PATHOLOGY SEMINAR

Monday, May 10, 12:30 p.m.,  
104 Institute of Anatomy.

"Phosphatase, with special reference to  
the kidney."  
Dr. Harry A. Wilmer

- - -

3. SCIENTIFIC MEETING OF THE  
ST. PAUL SURGICAL SOCIETY

Thursday, May 13, 7:30 p.m.  
at University Club of St. Paul in  
Lounge Room.

"An Evaluation of Liver Function Tests"  
Fred Hoffbauer

"An Evaluation of Radiotherapy in the  
Treatment of Certain Malignancies."  
K. W. Stenstrom

- - -

4. MINNESOTA STATE MEDICAL ASSOCIATION

Monday, Tuesday, Wednesday,  
May 17, 18, 19, 1943, Radisson Hotel,  
Minneapolis.

- - -

5. AMERICAN COLLEGE OF CHEST PHYSI-  
CIANS, REGIONAL MEETING

Monday, May 17, Radisson  
Hotel, Flame Room, Minneapolis:  
9:00 A.M.

"Bronchiectasis"

H. C. Hinshaw

"Bronchial Tuberculosis"

R. J. Davies

"Experiences in a Program for the Control  
of Pulmonary Tuberculosis in Chicago."  
Richard Davison

11:00 A.M.  
"Silicosis"

A. E. Russell

Discussion.

- - -

6. SPECIAL CONFERENCE ON SILICOSIS

Center for Continuation Study,  
Sunday, May 16, 10:00 A.M. to 5:00 P.M.

- - -

7. TOMORROW NIGHT

Enuf Said!

- - -

### III. COMPLICATIONS IN FRACTURES OF SHAFT OF FEMUR AND TIBIA

Arnold G. Schwyzer

In all types of fractures rigid immobilization is absolutely necessary for union. In the case of the shaft of the femur, traction, preferably skeletal traction, is essential for the closed conservative treatment. The application of a hip spica for fractures of the shaft of the femur without some type of internal fixation, usually leads to overriding and non-union. The reason for this is that the musculature of the femur serves as an extensive padding between the bone and cast and makes real immobilization impossible. There are two types of intertrochanteric fractures, the abduction and adduction varieties. The adduction variety, in which the fracture line extends from the outer side superiorly to below the lesser trochanter medially, can be fixed and maintained in a plaster spica. However, for the abduction variety application of a plaster spica should not be done, as the line of fracture is such that adduction and consequent overriding of the lower shaft may occur. Intertrochanteric fractures can be treated by traction with or without an abduction splint. The Robert Jones abduction splint, with continuous traction, is an excellent way of dealing with these fractures. The application of a Moe plate may also be done for intertrochanteric fractures.

In subtrochanteric fractures, below the lesser trochanter, there is flexion of the proximal part of the femur from the pull of the iliopsoas. The fractures must be treated by immobilization in 60 degrees flexion, 45 of abduction, and slight external rotation. This may be accomplished by skeletal traction. For all subtrochanteric fractures the application of the Roger Anderson well-leg traction apparatus is an excellent procedure. In this method the normal leg is enclosed in a long leg plaster with the knee extended. A short leg plaster, incorporating a pin driven through the tibia one or two inches

above the ankle joint, is applied to the injured leg. By a cross-bar the legs are joined below, parallel to each other and abducting the injured leg. By tightening the special screw on the crossbeam pressure is made on the normal leg, and traction is made on the injured leg. Care must be taken not to dislocate the normal hip. One advantage of this method is that the patient may sit up, which guards against hypostatic pneumonia, especially in elderly patients, and against formation of renal calculi. By an open operation a Moe plate may be applied to the lateral aspect of the femur.

Case - In this case a very small inadequate plate, held only by three screws, was used, and the wound was contaminated when the patient was admitted to the University Hospitals. The screws and plate were reviewed, and the infection was treated by the closed plaster method. A larger plate, as the Moe plate or the blade-plate with many screws is necessary for real fixation.

In the case of fractures of the femur through the shaft skeletal traction through the condyle of the femur, through the tibial tuberosity, or through the os calcis is usually essential. In adults the pin or wire is placed through the condyle, about an inch above the adductor tubercle, but if used in children it should be placed higher up, away from the epiphyseal line. An open operation, as plating, is usually unnecessary with simple fractures, unless muscle tissue intervenes and prevents approximation of fragments. If possible, an operation should be avoided as there are other complications beside infection. Stripping off of the periosteum and muscle impair blood supply to the bone. Removal of the fracture hematoma also delays repair. Intermuscular adhesions tend to form, especially in the quadriceps and to limit motion of the knee joint. It is important to apply traction immediately, before overriding has taken place, if possible.

If the fracture is extensively comminuted, as Case - S.W., the fragments may be held with a plate. These extensively comminuted fractures often do better than

might be expected, because, as in oblique and spiral fractures, in which the medullary cavity is widely opened, there is a large vascular area for tissue growth, medullary callus is more extensive than in simple transverse fractures.

Case - This patient was admitted with an overriding fracture of the femur. He had been injured two months before admission, and owing to the severity of his head injury, no one paid any attention to the injured leg. Application of skin traction or skeletal traction could have been done almost at any time. Under intravenous pentothal anesthesia the fracture was broken up, and the fragments pulled down, by skeletal traction, and now he has a good result. However, while lying in bed with traction, the patient developed renal complications with the development of kidney stones. This and also the long convalescence could have been avoided by applying traction immediately after the accident.

Case - This is another case in which traction was removed much too early, and also in which weight-bearing was allowed much too early. This case was admitted with an overriding fracture of the shaft of the femur, with three inches shortening. The patient states that before his admission to the University Hospitals the distal fragment was pulled down several times, but after some walking with full weight-bearing, the overriding recurred. It was found impossible to break up the overriding manually, and the fragments were separated with an osteotome and mallet, traction was applied for three weeks, after which time the fragments were in an end to end position. At the time of operation it was noted that in the center of the callus and scar tissue a definite pseudarthrosis with a joint cavity and synovial fluid was being formed. Three weeks later a massive graft was inserted.

In the cases of fractures of the shaft of the femur not only is traction until union has taken place essential, but also the femur must be protected from weight-bearing by means of an ischial-

weight-bearing brace for nearly six months. Lateral angulation is a very common sequela of unprotected weight-bearing.

Case - In this case by means of traction a good union of the femur was obtained, and everything seemed to be all right for some time. However, when sent to the University Hospitals the patient had a marked angulation of the femur. At the site of the old fracture the bone was osteotomized, and the fragments were held in normal position with the Roger Anderson pin fixation method.

Case - This case was admitted to the University Hospitals with a double fracture of the shaft of the femur and with marked angulation of the fragments. The injury occurred in August, 1941. At both sites of fracture the bone was cut across and attached to the remaining bone with wire. The leg is now in traction, and if insufficient callus is formed, a large massive graft will be inserted. At the upper fracture at operation a beginning pseudarthrosis was seen. Too early and unprotected weight-bearing are responsible for the angulation and deformity.

We have two more cases which illustrate complications. Case - This is a case of fracture of the femur, which was plated two months after the injury. For nearly a year he was walking around with a weight-bearing brace, and then he asked whether he could discard it. Although he was unaware of it, there was lateral mobility at the fracture site. A bone graft was inserted, after removal of the plate. With a late fracture plating can often supply excellent fixation, but the stimulus to osteogenesis is lacking. Although it is easier to hold the fragments with a plate, bone is needed for new callus formation and osteogenesis.

Case - This patient had a fracture at the junction of the middle and lower thirds of the shaft of the femur. On admission there was purulent drainage

from the operative wound. Across the fracture there was a short plate with three holes on each side of the fracture. Furthermore, the screws were too short, and did not reach the opposite side of the cortex of the bone. If a plate is to be used a long eight-hole plate, with screws holding in both sides of the cortex, should be inserted. Usually, especially if the fracture is an oblique fracture, a transfixion screw should be used in addition to the vitallium plate.

In this case the plate, acting as a foreign body, was removed, and the wound was packed with vaseline gauze and with cod liver oil ointment mixed with sulfanilamide and sulfathiazole. For good immobilization a full length spica was applied. This case is being treated as an infected compound fracture according to the principles of Orr and Trueta.

Although immobilization in a case or spica is nearly always unsuccessful treatment for a fractured femur, a fracture of the tibia usually can be adequately immobilized in a long leg plaster. It is important to have the knee flexed in order to prevent the tibia and femur from rotating together. Any motion would then take place through the fracture and not through the knee. In applying a long leg plaster, one must guard against clawing of the toes. The cast must be applied to permit full range of motion of toes. Also one must not make the first turn too tight as this tends to pull up the first and fifth metatarsal. In this position clawing of toes and flattening of the transverse arch sometimes occur.

If a simple fracture of the tibia is completely reduced before any swelling has taken place, traction is unnecessary. After the fracture appears united, we have applied a short leg plaster with a walking iron. When the cast is removed, an ace bandage or zinc-gelatin dressing or strapping is temporarily applied to prevent swelling. When there is any lateral displacement of the fragments, they can be properly aligned by means of traction or by wedging casts. In fractures of the tibia which are difficult to reduce one may use a hip spica in conjunction with skeletal traction. Watson-Jones

uses an apparatus, in which the limb hangs vertically down and traction is made with a pin driven through the tibia one inch above the ankle joint. When good approximation is obtained, a cast is applied. In unstable oblique and spiral fractures traction is advisable for three to six weeks. After this the leg is enclosed in a long leg plaster, which incorporates the traction pin.

Plating is often a good procedure for a fresh fracture of the tibia. A long six or eight-hole vitallium plate is the best plate. This should be applied on the lateral aspect of the tibia, where the bony surface is flat and well covered by muscle. There is, however, a period between six weeks and three months after the fracture, in which no surgery should be done. Surgery at this time disrupts the blood supply, and in some cases the tibia has partially melted away. Formerly this frequently happened. With a long plate of vitallium, which provides excellent fixation and is less irritating than other metals, there would have been much less tendency for the absorption of bone after surgery during the early stage of repair. At this time fixation with the Roger Anderson pin fixation method or the Haynes apparatus may be done. Cases - and

Old fractures should not be plated, except in conjunction with a graft. A plate and a bone graft should be used, but not just a plate alone.

The upper part of the tibia has a good blood supply, and non-union is rare here. Case - In this case the fracture occurred just below the tibial tuberosity, and it is being treated by continued immobilization.

The lower third of the tibia is one area in which non-union tends to occur. This part of the bone has no vascular foramina, and it is dependent for its blood supply mainly upon the nutrient artery. Owing to the impaired blood supply union in the lower half of the tibia is slow, and it is most important to continue immobilization long enough.

Immobilization must be carried out

longer in the case of an infected compound fracture than in a simple one. Last year the treatment of compound fractures was discussed by Dr. Wallace Cole, and we shall not repeat it at this time. Only when the infection is completely quiescent and there is a real non-union, should grafting be done. Cases - and . and

Before any grafting may be done, the infection must have been healed and thoroughly quiescent for six months to one year. In fractures of the tibia a skin tight plaster with a walking iron may be applied, and some weight-bearing with crutches can be permitted. Steinman pins can be placed through the tibia above and below the fracture and incorporated in the cast. In such cases one must watch out for infection around the pins. The Roger Anderson pin fixation method is an excellent method of immobilizing these fractures. At present we have a patient in the hospitals - Case - , who suffered a compound fracture of the tibia and fibula on New Year's day. On admission the leg was in a posterior metal splint, and six catheters had been placed through the leg, near the fracture, by means of stab wounds through normal parts of the leg. A cast would have been almost as essential to support the soft tissue and prevent swelling as to immobilize the bone. The bones have been held by the Roger Anderson apparatus, and by the closed plaster method the wound had practically closed at the second change of plaster.

Besides infection the other causes of non-union are inadequate immobilization, interposition of soft parts, and ill-advised surgery. If there is any mobility before final union, the growing tissue is broken down, and recalcification ceases. Fibrous tissue is laid down transversely across the bone, and the bone on both sides of the fracture is recalcified and becomes denser. If this goes on long enough, there is a typical pseudarthrosis with a false joint and dense sclerotic bone on both sides of it. Cavitation of the bone at the fracture site is characteristic of pseudarthrosis, and when this stage is reached, immobilization will never bring about union.

Kirk and Watson-Jones emphasize adequate immobilization and the difference between slow, delayed and established non-union. Union may be temporarily delayed by such factors as poor blood supply, age, general health and constitution of the patient. In slow union the x-ray reveals the fracture line, but it does not show cavitation of the surfaces, excessive decalcification, or any sclerosis. Drilling of the fragments may be done to accelerate growth of bone and union. A bone-grafting operation may be done to shorten a very time-consuming convalescence. In delayed union the x-ray shows a fracture line widened into a cavity which is filled with granulation tissue. Some movement at the fracture site has caused decalcification of the fragments, where a reactive hyperemia was already present. Complete immobilization can still bring about recalcification of the gap. If the gap is too wide, bone-grafting may be undertaken. In established non-union the margins of the fragments are smooth, and often there is recalcification with consequent sclerosis. It is of the utmost importance to distinguish between delayed union and established non-union.

If infection has been present, it is necessary to wait for six months to a year before implanting a bone graft. It is often a good precaution to give the area some massage to stir up any latent infection, which may still be present. If a previous unsuccessful bone grafting operation has been done, the screws or wires should be removed, and the fragments drilled. At this time no grafting should be done, if infection was the cause of the previous failure. Drilling of the fragments allows the ingrowth of new granulation tissue, bringing about a new vascularity to the bone and causing decalcification. This was done in the Case -

If a large anemic scar overlies the area of non-union, this should be excised and replaced by a pedicled skin flap. Occasionally the new vascularity brought about by the pedicled flap is followed by union. In a fresh fracture there is

abundant blood supply, while in a pseudarthrosis the tissues are markedly anemic. To decalcify the sclerosed fragments the marrow cavity, which has been sealed off by dense bone, is drilled, and oblique drill holes are made through the fragments. With ingrowth of granulation tissue there is a hyperemia. The fractured surfaces are also freshened up. After this procedure the general picture resembles more that of a fresh fracture.

Soon after it is implanted, a bone graft becomes vascularized. N. T. Kirk believes that the rapid vascularization of a graft is wholly responsible for its healing effect. Drilling of the ends of the fracture is followed by ingrowth of new granulation tissue and consequently vascularity. If the marrow cavity has been sealed off, as in the case of pseudarthrosis, it is most important to drill the fractured ends of the bone to expose the marrow cavity.

Recently we have amputated two femora high up near the hip joint. One Case - , aged 82, had a non-union of the shaft of the femur for over a year. On admission he had an extremely large decubitus ulcer on the heel. In view of the fact that a bone grafting operation, followed by long immobilization in a spica would have been the only way to obtain union, it was decided to amputate as the patient was too old to stand the surgery. Another, Case - , was referred to us after she had had an unsuccessful nailing of a hip. On admission there was purulent discharge from the surgical incision. At first the nail was removed in order to clean up the infection. The neck had completely disappeared. Ten months later the femur was disarticulated at the hip joint. In childhood this patient had had infantile paralysis, which left extensive paralysis and weakness of the extremity. The leg was a little shorter than the other one, and she had no power of extension of the knee. While walking she always had to use a cane, which she braced across the knee to prevent it from flexing. Later, at operation, it was found that there was practically no normal muscle left about the hip joint. If she had had normal musculature of the extremity, an osteotomy or reconstruction could have

been done.

### Types of Bone Grafts

Ghormley's Classification of Grafts -  
Annals of Surgery, March, 1942

#### Autogenous Grafts

Cortical bone (usually tibia)  
Cancellous bone (usually iliac crest and wall)  
Osteoperiosteal bone (usually tibia)  
Fibula or rib (combining the foregoing)  
Chip grafts, shave grafts, delayed grafts.

#### Homogenous grafts

Cortical  
Cancellous  
Others as under autogenous

#### Heterogenous grafts

Entire bone  
Cortical ( "os purum"  
Cancellous ( "os purum"  
Os novum, combination of heterogenous and autogenous.

Grafts may be classified according to site as:

- 1) Onlay
- 2) Inlay
- 3) Intramedullary
- 4) Wedge-variation of inlay.

For the tibia and femur osteoperiosteal grafts have very little use except in conjunction with a larger graft, which affords better internal fixation. Os purum is bone which has been freed of fat and connective tissue and protein by a chemical process which leaves the bony canals patent for the penetration of tissue juices and cells from surrounding living tissues. Orell found that freshly implanted bone, boiled bone, or os purum die, but the connective tissue in the bony canals, which he calls "osseous connective tissue" can be reactivated to form new bone. If dead bone is to be used, the bony canals should have been previously freed of their necrotic contents. Similarly, Nageotte and Polletini find that fixing in alcohol greatly delays the transformation and incorporation of stored



bone into the new living bone of the host. Also when os purum is implanted into the host, it should not be packed too tightly, or the canals might be collapsed.

Os novum is prepared by implanting a long narrow strip of os purum under the periosteum of the tibia, where it is left in place for a period of one or two months. After this interval the graft is found to be surrounded by newly formed soft bone, which is excised with a bone spatula. If the os novum is insufficient, the outer layer of the tibia is chiselled off with it. This soft and pliable vascular new bone is particularly well adapted for use in anemic scarred areas and in areas with an irregular contour as the sacro-iliac joint. In pseudarthrosis, where the surrounding tissue is atrophic and poorly nourished, os novum brings about better circulation and often remarkable healing of bony lesions. A simpler method than this is curetting out cancellous bone from the metaphyseal region, and packing it with some endosteum and shavings about the fracture site, as advocated by Matti.

Homogenous grafts, those taken from persons other than the patient, are believed by Ghormley to be successful in some instances, in which the patient does not have sufficient bone for grafting. He has used it in some cases of conventional pseudarthrosis of the tibia, which is the most difficult lesion to graft. Alan Def. Smith has used homogenous grafts in cases of osteogenesis imperfecta and has obtained successful union of the grafts with the host. In some of his cases the donors were of different blood groups from those of the patient, and the results did not vary from those in which both the recipients and donors were of the same blood group. Smith believes that the graft acts only as a scaffold for new bone, and for this reason the blood group is immaterial. As a rule autogenous grafts are far more successful than homogenous grafts. Heterogenous grafts have also been used, but they have also fallen into disrepute. The beef bone peg formerly was quite popular. In many cases the beef bone peg served only as a splint, as a metal plate does, and contributed nothing toward osteogenesis.

They have been found to be surrounded by fluid, and this is a typical foreign body reaction. It has also been noted that beef bones are either not resorbed, or they are resorbed very slowly. In this case the graft does not act as a scaffold for formation of new bone.

Intramedullary grafts have not fulfilled early hopes, despite the excellent fixation afforded by this graft. This is partially due to the fact that the graft destroys the marrow of the host, which supplies much of its vascularity. From experimental work Johnson concluded that the marrow was responsible for seventy-five per cent of the circulation of the bone, and the periosteum twenty-five per cent. At the present time its use is largely limited to the neck of the femur and to implantation of a long tibial graft in the split spinous processes in Albee original spinal fusion. In cases of marked bone atrophy, in which the cortex has been reduced to eggshell thinness, Kirk inserts a massive graft into the fatty mass inside the cortex. This procedure does not disturb the periosteum and muscular attachments, which contribute the only remaining blood supply the bone has left. The conditions of this operation are entirely different from the operation of inserting a large bone graft into a normal marrow cavity.

The sliding inlay graft may be used in the tibia, femur, and the bones of the forearm. One advantage of this method is that it eliminates a surgical procedure on the opposite tibia. The advantage of the wedge graft is that it fits very closely into the groove which has been cut for it. There are two modifications of the inlay graft: the wedge graft and the diamond inlay graft, which Gallie uses in the bones of the forearm. But bone from a normal area and performing a normal function is far better grafting material than that which is obtained about a site of non-union. Some degenerative changes as osteoporosis, eburnation, and sclerosis are present in nearly all cases of fracture, in which grafting is indicated.

Case sliding inlay graft. Case - E.G.

The massive inlay is the graft which involves the simplest surgical technic, is the strongest, and also has by far the most universal application. The massive only graft has been developed by Henderson and modified by Campbell. Besides being a source of new osteogenesis, excellent immobilization can be maintained by this type of bone graft. The eburnated bone is removed from the fractured fragments. Instead of using screws of vitallium or other metal Campbell used autogenous bone pegs, which add to the osteogenetic power. A large full thickness graft is removed subperiosteally from the tibia and split into a strong outer plate of dense cortical bone and a thin layer of marrow, endosteum, and cancellous bone. The graft of endosteum and cancellous bone is inserted into the medullary cavity across the fracture site. The large cortical graft is placed across the fracture site and is held without tension by means of autogenous bone pegs. Tension would cause disintegration of the graft. Cancellous bone is curetted from the condyles of the tibia, from which the graft was removed. In preparing the graft bed Kirk recommends removal of the outer third of the cortex, so that the graft can acquire circulation from the cancellous bone. Also he recommends the excision of scar tissue, freshening up the ends at the fracture site and opening the medullary cavity. The work of Johnson, which has been referred to, shows that the periosteal blood supply nourishes only the outer third of the shafts of the long bones. The inner two-thirds of the shaft is supplied by the nutrient artery and metaphyseal vessels anastomosing with it. The cutting of a bed for the graft breaks through the sclerosed bone effectively and promotes better circulation for the graft, especially in a case of pseudarthrosis.

Large cortical grafts may be used to fill a benign bone cyst and giant cell tumor which has been curetted out. Besides one or two long tibial grafts the rest of the cavity may be filled up with cancellous bone. Bone cysts frequently come to the surgeon owing to the pathological fracture which they have caused. Cases - H.W. and L.S. The use of bone

transplants in benign and malignant lesions of bone has been extensively studied and reported by Phemister.

In a late fracture with a definite non-union, a bone graft is indispensable for union. A late fracture should definitely not be plated, but grafted. The plate may be used as an accessory to the graft to give better immobilization. Case - M.S. In this case a long tibial graft was applied to the fracture site, and ninety degrees from it, in another plane, a plate was screwed across the fracture site. Another procedure which has recently been used by Dr. Cole in grafting a tibia is to remove a flat graft subperiosteally from the lateral aspect of the tibia and insert it on the lateral aspect of the fractured tibia, with a plate over it. The plate holds the graft firmly against the bone, and this firm adherence is necessary for a successful "take" of the graft. If one screw should become loose, the plate would still hold the graft well in place. Besides excellent immobilization another advantage of this method is that the graft is buried under muscle. The more a graft is buried under muscle, the better are its chances of "taking" as it can obtain a better blood supply. The graft with a plate over it has been used in two adults. Cases - L.P. and M.C. In the latter case it was found impossible to reapproximate the skin over the graft. A relaxing counter-incision was made to cover the graft, and this incision was packed with vaseline gauze, and it closed by granulation tissue. This method of grafting was also used in two cases of congenital pseudarthrosis of the tibia, one Rita Flachenrein and U. H. and one case at Shriners' Hospital, Case - I.G. This is a case of a compound fracture of the tibia, which was plated at the time of the injury. Plating is indicated in many compound fractures as the absolute rest and immobilization gained by it are essential to healing of the infection. There was some absorption of bone about the screws, which permitted motion at the fracture site. The plate broke, and the case went on to non-union. The infection had disappeared, and subsequent grafting was successful. In this case the graft

was inserted posteriorly, and the screws were driven through the bone and then into the graft below it. Although there was an extensive slough of the skin, the graft united. Being posteriorly it was well buried under muscle and also protected from infection. Boyd believes that one cannot be sure of a good union in these cases until the x-ray shows reformation of the marrow cavity.

In cases of non-union in which previous bone grafting operations have been unsuccessful Ghormley recommends the use of delayed grafts, a procedure also recommended by Key. At the first operation the bed is prepared, and the graft is cut but left in situ. A few days later the graft is transferred to the bed. Leriche and Policard find the osteogenesis with this method to be superior over that of other methods, and they believe that trophic and nutritive disturbances take place, with consequent rarefaction, and make the graft more permeable to invasion by connective tissue.

Another method of causing rarefaction of the tibia prior to grafting is to give the patient a reflex hammer and have him strike the tibia quite frequently for about a week before surgery. The marked vascularity resulting from this causes a decalcification and rarefaction of the tibia.

Extensive loss of substance in the tibia, from gunshot wounds or other severe injuries, is a difficult problem. Carrell has developed a technic of transplanting the fibula into the place of the tibia. Usually only one end of the fibula is transplanted at a time. Since in this procedure the fibula retains much of its original blood supply, it can be undertaken in cases which have been infected much sooner than grafting operations.

Case of Dr. Wallace Cole. In this case the transplanted fibula has been almost completely changed into the contour of a normal tibia. As one end of the fibula was transplanted at a time, the fibula was not in this case a free graft. The transformation does show that bone is

not an inert substance but is living tissue that can adapt itself to new functions.

Instead of transplanting the fibula into the remaining ends of the tibia, Watson-Jones does a tibia-fibular synostosis. This procedure is especially indicated in cases in which a large part of the tibia has been destroyed by virulent infection and dense avascular scar tissue lies between the fragments. An attempt to bridge the gap by bone grafting might easily reactivate the infection. By this procedure the gap in the tibia is short-circuited, and the site of the old infection is avoided. Bone peg grafts are inserted through the upper and lower ends of both bones. In a case of an infected compound fracture of the tibia, tibio-fibular synostosis may be done preparatory to further grafting, even when there is little or no loss of substance of tibia.

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9. Orell, Svante  
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10. Phemister, Dallas  
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11. Phemister, Dallas B.  
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12. Platt, Harry.  
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14. Blount, W. P.  
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15. Boyd, H. B.  
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IV. GOSSIP

The American Medical Association, the American College of Surgeons, and the American College of Physicians are planning a series of War Time Graduate Medical Meetings in the forts and camps. The programs will vary from one day meetings at a central point with several outstanding speakers or teams of lecturers who will address groups in camps on successive nights. The regional committee consists of Edward H. Rynearson (A.C.P.), James M. Hayes (A.C.S.), and yours truly representing the American Medical Association. We have been assigned Minnesota and Iowa. There are not many medical organizations in this area...To the Fifty-First Annual Meeting of Minnesota State Conference of Social Work at Hotel Lowry to speak before the council of agencies for the Blind and the Minnesota Society for the Prevention of Blindness on Basic Problems of Vision. It is surprising how many different conditions may interfere with vision. These may develop in practically any situation. The accidental loss of an eye is a tragedy. Air guns seem to be an unnecessary article of play. I always think of them as being used to shoot harmless birds, children's eyes and targets. There are so many other target games that the air gun could be ruled out for the duration and thereafter. Medicine is well represented on the program. Here is rheumatic fever - M. J. Shapiro, Delinquency - Harold B. Hanson, Medical Care for the Rural Population - F. D. Mott. Health and Welfare of the Industrial Worker - J. G. Townsend, the Beveridge Plan - J. J. Mallon, Identification and Treatment of Psychiatric Cases in our Armed Forces - Philip H. Heersema, Health and Medical Care of Children Placed Outside Their Homes - Barbara Ann Hewell, Services Available to Rejected and Discharged Service Men - Conrad Sommer and Walter P. Gardner.... This week we have a course in Refraction at the Center. Dr. William Crisp of Denver, best known man in his field, is giving a series of lectures in the morning (with our staff men). The plan of assigning two physicians to a staff member in his office over town in the afternoon is working surprisingly well. Others go to clinics and hospitals for the instruction. We learn best when we (1) are told about something, (2) have it demonstrated for us,

(3) do it under supervision, (4) do it without supervision, and have our result checked by someone who knows more about it than we do...The course in Obstetrics this week attracted a great deal of interest. Many of the men who came had not been away to medical meetings for some time. They enjoyed their contact with the other physicians and with the faculty...At the St. Paul Safety Conference to discuss the Problems of Women in Industry. Some males with the old tradition of looking upon women as inferior creatures find it difficult to work with them in the plants. In one place the poor gals were given one piece coveralls to wear. There were only two sizes, those that fit and those that did not. Those that fit soon ran out. A little woman with a big suit didn't help her morale, or a big woman in a little suit staggers the imagination. Contrary to usual reports the absentee record in women is not bad. They have a stake in this war and they are giving their all. In some places in response to praise (which helps all of us), they have worked until they have almost dropped. Their safety record is not bad although they do take chances. Their health is good and they are doing a lot of things which no one believed they could do....To the meeting of the Nurses' Recruitment Committee and the local O.W.I. office to discuss ways and means of getting scholarships for nurses. All organizations are to be asked to sponsor a nurse in training.... In the course in electrocardiography last week the T.W.I. plan of instruction was employed. Lecture in the morning followed by a clinic, tracing reading in groups in the afternoon followed by a study period and examination. The plan was unusually successful....To the district meeting of Rotary where I heard the old story about the alcoholic who came late to dinner. There was only one seat left, and that one was at the head table. The alcoholic went straight to the place. After some time he noticed he was sitting next to a Chinaman. To make conversation he asked him if he liked the foodee. Later in the evening the Chinaman gave the main address, using perfect English. When he sat down he asked the alcoholic how he liked the talkee. The Rotarians expressed great and good sentiments for post-war days....