

HISTORY: Max is seen for a routine follow-up at this point. He is still wearing his brace and really is staying pretty active though he has dropped some of his sports activity compared to previous years. He has no specific complaints of pain at this point.

PHYSICAL EXAMINATION: Max continues to have a marked valgus deformity of his right leg. He tends to externally rotate himself at the hip to make this a little bit more stable. When the leg is internally rotated so that the front of the knee is pointing anteriorly he has approximately 40 degrees of valgus and instability laterally on testing at this point. His patella has also subluxated further laterally than previously was the case. His ankle is in a little bit more varus but can be brought to a neutral position at that level. He has some weakness of dorsiflexion that has persisted due to his mild perineal nerve injury on the left side.

RADIOGRAPHS: AP xray of the lower extremities demonstrates an increased amount of valgus deformity. It appears that the medial half of the distal femur is growing but there is a tethering at the mid point where this injury had occurred.

RECOMMENDATIONS: I have spoken with Max's mother and with Max to some degree that I think surgical treatment is needed now at this juncture.

My recommendations are for use of an Ilizarov frame, an osteotomy ~~in the distal femur which will be a combination of an opening wedge osteotomy, some translation, and a limb lengthening of the femur at the same time to equalize leg lengths.~~ I also believe that medial epiphysiodesis of the distal femur is needed at this same time to prevent recurrence. After he has completed growth and the growth plates are closed in the proximal tibia I believe that either use of an allograft hemi-joint or a hemi-arthroplasty of synthetic material may be necessary to provide stability but once the leg is straighter I think the next step would then be to try to use a hinged knee brace to try to allow Max to participate in athletic type activities. I told Max/s parents that use of either an allograft or use of an artificial hemi-arthroplasty would lead to recommendations of no running activities.

VERNON T. TOLO, M.D.

PAGE 1 OF 2

CONSERVA, MAX  
96 20 54

ORTHOPAEDIC CENTER  
MARCH 30, 1994

CHILDRENS HOSPITAL LOS ANGELES

AMBULATORY ORTHOPAEDICS

Max's parents are in agreement with this surgical approach and would like to have it in June of this year. We will work with Max's family and through our Ilizarov team to further explain this and work with them so that this can be relatively well accepted when the time comes for this lengthy surgical treatment. Estimated time of Ilizarov frame use would be somewhere between 4 and 6 months.

VTT:nws

PAGE 2 OF 2

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96 20 54

ORTHOPAEDIC CENTER  
MARCH 30, 1994

VERNON T. TOLO, M.D.

CHILDRENS HOSPITAL LOS ANGELES

AMBULATORY ORTHOPAEDICS

CONSERVA, Max  
096 20 54  
6/2/94

Page Two

**X-RAYS:** X-rays including a scanogram show his femoral limb length discrepancy to be 3.8 cm. The tibial limb length discrepancy appeared to be approximately 3.2 cm., but this is with the tibia in a diagonal position on the scanogram. I repositioned it longitudinally and found basically no limb length discrepancy in the tibia. He has about 30 degrees of procurvatum deformity of the distal right femur. He is missing essentially the entire right femoral condyle. The tibial plateau appears to be complete however. The patella is located far laterally in the space where the femoral condyle used to be. It appears that he has about a 30 degree external rotation deformity of the tibia at the knee joint from this missing condyle. He has almost a lateral of the tibia when we seen an AP of the femur and visa versa. Similarly at the ankle, the tibia so far externally rotated that an AP of the foot is a lateral of the tibia and visa versa. His quadriceps are only 2+ strength because he cannot achieve full extension.

Bone age shows his skeletal age to be approximately 11 to 11-1/2 years old. Long leg x-rays from the pelvis to the ankles from last fall showed him to have a 25 degree femoral tibial angle.

**ASSESSMENT:** 1. Approximately 4 cm. limb length discrepancy all in the femur.

2. Genu procurvatum and valgum deformities secondary to missing lateral femoral condyle.
3. Partial peroneal nerve palsy with a resulting varus and adduction deformity of the right foot from unopposed tibialis anterior and posterior tibial muscles.
4. External rotation deformity of the tibia at the knee.

**PLAN:** CT scan is ordered of the right knee to better delineate the shape of the distal femur and proximal tibia. He is to return after the CT scan is back. We discussed with the mother and the patient the many options including:

1. Tendon transfers to balance the foot forces.

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CONSERVA, Max  
096 20 54  
6/2/94

Page Three

2. Femoral lengthening and angular correction to correct the genu valgum deformity.
3. Epiphysiodesis distal medial femur to prevent recurrence of the genu valgum.
4. Allograft versus prosthetic repair of the lateral femoral condyle after lengthening is done to provide stability and a joint surface for the tibia.
5. Possible epiphysiodesis, left knee to prevent continued overgrowth of the normal side.

DT:mds

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**SUBJECTIVE:** Max is a 13 year 3 month old male who was involved in an auto versus peds accident on 8/4/89, sustaining a deep abrasion to his lateral right knee, resulting in traumatic loss of most of his femoral condyle and some of his tibia plateau with an associated peroneal nerve palsy, which is partially recovered. He has developed a progressive valgus deformity of his left knee, along with a limb length discrepancy. He was evaluated in the Ilizarov clinic to consider angular, as well as limb length discrepancy deformities. He denies pain in the knee or the ankle. He has been walking with a KAFO. He would like to participate in sports.

**OBJECTIVE:** Clinically, the patient has approximately a 40 degrees genu valgus deformity of the right knee with a very prominent medial femoral condyle, no palpable lateral femoral condyle and a patella which is subluxed laterally. He has scar tissue on the lateral side of his thigh and calf. Patella motion is painful and the patella cannot be placed centrally. His knee range of motion goes from 0 to 140 degrees passively. ~~Actively,~~ he can extend the knee to approximately 30 degrees short of full extension. Neurologically, he has 1+ peroneals, 4+ tibialis anterior, 4+ posterior tibialis, 2+ toe dorsiflexors, 4+ toe plantar flexors and 5+ gastrosoleus. He has approximately 20 degrees of right heel varus and an associated forefoot adductus, giving him a clubfoot type appearance to this right foot. He can ambulate full weightbearing on this leg, but in a crouch position.



ORTHOPAEDIC CLINIC

CONSERVA, Max  
096 20 54

June 2, 1994

Dale Townsend, M.D.  
Richard Reynolds, M.D.

CHILDRENS HOSPITAL LOS ANGELES  
**AMBULATORY ORTHOPAEDICS**

**OPERATIVE RECORD**

**PREOPERATIVE DIAGNOSES:**

Traumatic injury involving right distal femoral lateral condyle and right proximal lateral tibial plateau; 50 degrees valgus deformity, right knee; 3-4 cm leg length discrepancy.

**POSTOPERATIVE DIAGNOSES:**

Traumatic injury involving right distal femoral lateral condyle and right proximal lateral tibial plateau; 50 degrees valgus deformity, right knee; 3-4 cm leg length discrepancy.

**PROPOSED OPERATION:**

Ilizarov application, tibia and femur, with distal femoral osteotomy and medial distal femoral epiphysiodesis.

**OPERATION/PROCEDURE:**

Ilizarov application, tibia and femur, with distal femoral osteotomy and medial distal femoral epiphysiodesis.

**INDICATIONS FOR SURGERY:**

This is a 13-year-old boy who, six years ago, sustained a motor vehicle accident which resulted in traumatic loss of his entire lateral femoral condyle. He also had about 50% of his proximal tibial plateau on the lateral side removed. He had a resultant partial peroneal nerve palsy, which has resulted in weakness around his ankle, with a varus and slight equinus position. He also developed a severe valgus deformity of the knee, measuring approximately 50-60 degrees. This is secondary to one lack of lateral column, but also secondary to overgrowth of the medial column. It was felt that an Ilizarov lengthening to gradually correct the angular deformity to prevent further peroneal nerve injury was indicated.

**FINDINGS:**

A medial incision was carried out

(Continued)

SURGEON: R. REYNOLDS, M.D.  
 ASSISTANT SURGEON:  
 RESIDENT SURGEON:

ANESTHESIOLOGIST:

FLOOR:

DATE OF SURGERY: 07-22-94



**Children's Hospital Los Angeles**

4650 Sunset Boulevard, Los Angeles, California 90027 • (213) 660-2450

**PATIENT NAME: CONSERVA, MAX**

**MR#: 0962054**

and the medial distal femoral epiphysis and physis were exposed. This allowed an epiphysiodesis of the medial distal femur. The Ilizarov apparatus was applied, two rings distal on the femur and an arch single ring proximal. This allowed good fixation of the femur. A distal femoral osteotomy was carried out just proximal to the distal ring construct to allow for the angular correction. Two hinges were placed and a motor placed to allow for the angular correction and translation. The tibia had to be included because of the inability to control the knee with no lateral femoral condyle or lateral tibial plateau. The two rings on the tibia were fixed using a half-pin construct. The femoral and tibial frames were then joined using two hinges. The foot was left out of the frame and we are going to try and control this using an AFO type of footplate; however, if this is a significant problem we may have to take him back and add the foot into the frame.

**PROCEDURE:**

The patient was given a general anesthetic and an epidural anesthetic. The right leg was prepped and draped and the epiphysiodesis was carried out through a medial longitudinal incision. The incision was extended proximally to allow for the distal femoral osteotomy. The tourniquet was inflated during this procedure, but then deflated. The proximal arch was then fixed using three half-pins, 5 mm in diameter. The middle ring was a floating ring and the two distal rings on the femur were fixed using a combination of four through-and-through pins and a single half-pin. Good fixation was achieved in the distal construct. The osteotomy was then completed, with the hinges in place. The tibia was then fixed using two carbon fiber rings and four half-pins, 5 mm in diameter. Good fixation was achieved. The tibial and femoral frames were then joined using two hinges. The patient tolerated the procedure well and was transferred to the recovery room, in stable condition.

**PROCEDURE:**

The patient was given a general anesthetic and put in the supine position, with a bump underneath the right hip. The leg was prepped and draped in the usual manner. The above findings were noted. The Ilizarov femoral frame was placed on first, and then the tibial frame placed, and subsequently the frames joined together. The osteotomy was completed with two hinges on the medial side of the distal femoral frame to allow for angular correction and translation. This was preoperatively planned, being cut out. The patient tolerated the procedure well

(Continued)

SURGEON: R. REYNOLDS, M.D.  
ASSISTANT SURGEON:  
RESIDENT SURGEON:

ANESTHESIOLOGIST:

FLOOR:

DATE OF SURGERY: 07-22-94

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**PATIENT NAME: CONSERVA, MAX****MR#: 0962054**

Page 3

and was transferred to the recovery room, in stable condition. The patient had a good neurovascular examination. The patient was able to move his toes postoperatively and was able to have his dorsalis pedis and posterior tibial arteries palpated. The patient will start to be turned one week from now, one to two full turns four times a day.



M.D.

RICHARD REYNOLDS, M.D.

DATE \_\_\_\_\_ TIME \_\_\_\_\_

TL151 D: 07-25-94 T: 07-26-94 Tape: 6643 FN: VOPCONMO.RR-  
PT.: CONSERVA, MAX DICT.: RICHARD REYNOLDS, M.D.

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SURGEON: R. REYNOLDS, M.D.  
ASSISTANT SURGEON:  
RESIDENT SURGEON:

ANESTHESIOLOGIST:

FLOOR:

DATE OF SURGERY: 07-22-94

PATIENT NAME: CONSERVA, MAX  
MR#: 0962054

OPERATIVE RECORD

PREOPERATIVE DIAGNOSIS: Previous traumatic injury to the right distal femur and knee involving loss of lateral femoral condyle and part of the proximal lateral tibial plateau resulting in 50 degree valgus deformity of the right knee and leg-length discrepancy.

POSTOPERATIVE DIAGNOSIS: As above.

OPERATION/PROCEDURE: 1. Distal femoral epiphysiodesis, right leg.  
2. Distal femoral osteotomy, right, with application of Ilizarov device to femur and tibia, right.

INDICATIONS FOR SURGERY: This patient, six years previously had been struck by a truck which led to loss of skin on the lateral aspect of his right distal thigh as well as to loss of lateral femoral condyle and a portion of the proximal tibial condyle. Over a period of years he had been using a brace, but despite this there was an increased amount of valgus deformity at his knee with asymmetrical growth in the distal femur as well as some leg-length discrepancy. Surgical treatment was indicated at this point re-align the lower extremity with plans being at a later stage to consider using an allograft for replacement of the lateral femoral condyle.

FINDINGS: As noted by preoperative exam and x-ray.

PROCEDURE: After general anesthesia was induced the patient was positioned in a supine position. The right lower extremity was prescrubbed and then prepped with Betadine. Sterile drapes were applied.

(Continued)

SURGEON: V. TOLO, M.D.  
ASSISTANT SURGEON:  
RESIDENT SURGEON:

ANESTHESIOLOGIST:  
FLOOR: 6 EAST  
DATE OF SURGERY: 07/22/94



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PATIENT NAME: CONSERVA, MAX  
MR#: 0962054

A tourniquet was used for the initial portion of the procedure which was the epiphysiodesis. After milking of the extremity the tourniquet was inflated. An incision was made in the medial aspect of the distal femur after this was localized using the fluoroscopy. The incision was carried down to the medial distal femoral shaft with elevation of the vastus medialis anteriorly, and the physis was identified. A block of bone of approximately 1 cm in size was removed from the medial aspect of the fibula to allow entry into the physis and to allow for curettage of the growth plate that was remaining on this area. This was confirmed by imaging that sufficient epiphysiodesis had been done.

Attention was turned then to placement of the Ilizarov rings. Two rings were applied on the distal femur, and an arch single ring was applied proximally to the proposed osteotomy site. Using the medial approach a distal femoral osteotomy was carried out just proximal to the lower ring construct to allow for this angular correction. Appropriate hinges and motor were applied to allow for later angular correction, and two rings were placed on the tibia as well to allow for further stabilization of the construct.

After these rings had been placed and appropriate connectors applied, the wound was thoroughly irrigated on the medial aspect of the distal thigh and was closed with reapproximation of the vastus medialis using 0 Vicryl. Closure of the fascia lata was accomplished with 0 Vicryl, subcutaneous closure with 2-0 Vicryl and skin with 3-0 Prolene.

Dressings were applied to all of the areas where the pins had gone through the skin. The patient was awakened at this point and taken to the recovery room in satisfactory condition, having tolerated the procedure well.



M.D.

VERNON TOLO, M.D.

DATE 9-10-94 TIME \_\_\_\_\_

TL186 D: 08/19/94 T: 08/20/94 Tape 8760 FN: VOPCONM1.VT-  
 PT.: CONSERVA, MAX DICT.: VERNON TOLO, M.D.



Children's Hospital Los Angeles

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SURGEON: V. TOLO, M.D.  
 ASSISTANT SURGEON:  
 RESIDENT SURGEON:

ANESTHESIOLOGIST:  
 FLOOR: 6 EAST  
 DATE OF SURGERY: 07/22/94

PATIENT NAME: CONSERVA, MAX  
 MR#: 0962054

**PROGRESS NOTES**

**CONSERVA, MAX**

DIVISION OF PLASTIC & RECONSTRUCTIVE  
SURGERY

**CHLA #096 20 54**

**D.O.B.:02/02/81**

**PLASTIC SURGERY  
OFFICE VISIT**

**July 22, 1994**

**HISTORY**

I evaluated Max Conserva in the operating room at Childrens Hospital Los Angeles, and reviewed his X-rays with Dr. Reynolds and Dr. Tolo. Drs. Reynolds and Tolo are planning femoral osteotomy and insertion of orthopedic pins, and application of hardware, to be able to straighten the right knee and lengthen that extremity.

**PHYSICAL EXAMINATION**

On physical examination, Max has a severe valgus deformity at the knee. His previously placed skin graft has healed nicely, and is relatively soft and supple. It does not seem to be the critical factor in terms of limiting motion at the knee. The skin anterior and posterior to the graft has stretched and could conceivably, at some point, be used to partially or totally excise the graft. However, Drs. Tolo and Reynolds do not wish to have that done at present, because they feel that they need as much soft tissue and skin as possible, since they are considering possible knee replacement surgery in the future. Therefore, I would not recommend any specific surgery regarding the skin graft at present. I anticipate that the graft, and scar tissue anterior and posterior to it, will stretch with gradual lengthening and change in angulation of the right lower extremity using the orthopedic hardware. If, however, the scarring and/or skin graft do limit orthopedic movement, I told them that we could consider either incising the graft and adding further graft, or possibly Z-plasty.



Gerald M. Sloan, M.D.  
Division of Plastic Surgery  
Childrens Hospital Los Angeles

GMS:rtm

## DISCHARGE SUMMARY

**ADMISSION DIAGNOSIS:** Right leg-length discrepancy and valgus angulation of right knee secondary to motor vehicle accident in the past.

**PRINCIPAL DIAGNOSIS:** As above.

**ADDITIONAL DIAGNOSIS:**

**COMPLICATIONS, HOSPITAL INFECTIONS, DRUG REACTIONS:**

**OPERATIONS/PROCEDURES:** Right lower extremity osteotomy with an Ilizarov apparatus placement which included both tibial and femoral osteotomies.

**BRIEF HISTORY:** The patient is a 13-1/2-year-old male who is status post injury to his right lower extremity in March of 1991 during pedestrian vs. motor vehicle accident, at which time portions of his distal lateral femur and proximal tibia were lost secondary to this injury. The patient progressively previously had incision and drainage with split-thickness skin grafts, but with growth in the last two years he has had a leg-length discrepancy and valgus deformity of his knee. He is being admitted now for Ilizarov placement and osteotomies for repair of leg-length discrepancy in the angulation.

**HOSPITAL COURSE:** The patient underwent surgery on July 22, 1994, without any complications. He had a good postoperative course on 6 West with adequate pain control, and eventually he was transferred to 6 North. One week postoperatively he was started on turns of his Ilizarov frame for leg lengthening, initially at two full turns four times a day for rapid repair of his angulation and deformity. However, this was lessened, secondary to increase pain and some sensory changes, to one full turn four times a day which the patient tolerated very well with return of comfort and return of sensation to normal.

Initially the patient had epidural anesthesia postoperatively in the postanesthesia care area and did very well with that. He was managed on the ward with oral pain medicine and Keflex antibiotic. The patient began progressively weight bearing on the leg and is able to walk with rehabilitation. It was noted that one of his pin sites was causing slight erythema cutting through the skin with the

(Continued)



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ADMITTED: 07/22/94  
DISCHARGED: 08/04/94  
ATTENDING PHYSICIAN: R. REYNOLDS, M.D.  
FLOOR: 6 NORTH

PATIENT NAME: CONSERVA, MAX  
MR#: 0962054

Page 2

lengthening of his leg. The patient was instructed in regards to adequate pin care and is to continue his Keflex.

**DISCHARGE INSTRUCTIONS:**

Continue one full turn four times a day on the Ilizarov frame.

Continue pin care.

He is taking Tylenol #3, one to two tablets p.o. every four hours and Keflex 250 mg p.o. t.i.d.

He is to full weight bear on bilateral lower extremities as tolerated.

Prior to discharge the patient is to be taken to the outpatient clinic before leaving the hospital for change of his lengthening rod.

  
M.D.  
GREGORY HEINEN, M.D.

DATE 8/10/94 TIME 1030pm

TL186 D: 08/04/94 T: 08/06/94 Tape: 7550 FN: VDSCONM1.GH-  
PT.: CONSERVA, MAX DICT.: GREGORY HEINEN, M.D.

**Children's Hospital Los Angeles**

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ADMITTED: 07/22/94  
DISCHARGED: 08/04/94  
ATTENDING PHYSICIAN: R. REYNOLDS, M.D.  
FLOOR: 6 NORTH

PATIENT NAME: CONSERVA, MAX  
MR#: 0962054

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**HISTORY:** This is a young gentleman who is well known to the clinic. He is status post osteotomy with Ilizarov placement for a valgus deformity of his knee secondary to an injury years ago, resulting in damage to his lateral femoral condyle. The patient was discharged today from Childrens Hospital, Rehab Section and was referred here for xray and further management.

**PHYSICAL EXAMINATION:** It is noted that the patient's pin sites were all doing well with the exception of the lateral-posterior pin site on the distal femur which had some erythema and tinting around it. On evaluation of his frame in the xrays it was felt necessary to shorten him by a centimeter on the medial aspect of the Ilizarov frame as well as to change the lateral lengthening rods to provide further lengthening ability on the lateral aspect. In regards to his pin site, using a Betadine prep and one cc of Novocaine anesthesia and an 11 blade scalpel, the distal aspect in longitudinal manner was released. Otherwise there are no complications.

**RADIOGRAPHS:** On evaluation of his xray the patient was noted to have 3 centimeters of lengthening of his leg so far as well as 26 degrees of valgus deformity remaining.

**RECOMMENDATIONS:** Patient is to follow-up in one week.

GH:VTT:nws

CONSERVA, MAX  
96 20 54

ILIZAROV CENTER  
AUGUST 4, 1994  
GREGORY HEINEN, M.D.

VERNON T. TOLO, M.D.

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CHILDRENS HOSPITAL LOS ANGELES  
AMBULATORY ORTHOPAEDICS

**HISTORY:** The patient is a 13 year old who is status post motor vehicle accident versus peds, with damage to his right lateral femoral condyle, as well as his tibial plateau, with resultant extreme valgus deformity. He previously had placement of an Ilizarov with correction of most of his valgus deformity. Now he is down to 12 degrees. The patient now presents without complaints, except for some slight erythema around a couple of his pins.

**PHYSICAL EXAMINATION:** On physical examination, his pin sites around his knee have some erythema and some tinting, however, it is less than what was seen last week. Sensation is grossly intact distally. His valgus correction is doing well.

**X-RAYS:** On x-rays, the osteotomy site is starting to heal with visualization of the callus. In valgus, his knee is now 12 degrees. However, there is medialization of his knee joint in reference to his femoral shaftline.

**ASSESSMENT:** The patient is status post right lateral knee injury with bone loss, who currently has an Ilizarov with correction of his valgus deformity.



ILIZAROV CLINIC

CONSERVA, Max  
096 20 54

August 18, 1994

Gregory Heinen, M.D.  
Richard Reynolds, M.D.

CHILDRENS HOSPITAL LOS ANGELES  
**AMBULATORY ORTHOPAEDICS**

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**RE: CONSERVA, Max**  
**096 20 54**  
**August 18, 1994**

**Page Two**

**PLAN:** The patient is to continue the Ilizarov and have him continue twisting the lateral pins and shortening on the medial pins as previously discussed. He is to continue Keflex. The erythematous pins were released using a Betadine prep and a number 11 knife. The patient is to return in one week with the addition of an additional frame which will help center his knee joint under his femur.

**GH:sah**

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