

TKA and extensor mechanism dysfunction

Val D'Isère 2012



J. Vlaeminck MD, PhD

Extensor dysfunction

- Neurological
 - * Congenital
 - ✓ spine bifida
 - * Acquired
 - ✓ poliomyelitis
 - ✓ parkinson
- Mechanical: # ext. mech.
 - * Traumatic
 - ✓ tendon rupture
 - ✓ patella fracture
 - * Degenerative

Extensor dysfunction

- Neurological
 - * Congenital
 - ✓ spine bifida
 - * Acquired
 - ✓ poliomyelitis
 - ✓ parkinson
- Mechanical: # ext. mech.
 - * Traumatic
 - ✓ tendon rupture
 - ✓ patella fracture
 - * Degenerative

Spina Bifida



Extensor dysfunction

- Neurological
 - Congenital
 - Spina bifida

Not a good indication for TKA

- * Mechanical: if ext. mech.
 - Traumatic
 - anterior exposure
 - posterior fracture
 - Degenerative

E.D. 38 y spina bifida

- Two crutches
- Very difficult and painful gait



Extensor dysfunction

- Neurological
 - Congenital
 - spina bifida
 - Acquired
 - poliomyelitis
 - parkinson
- Mechanical: # ext. mech.
 - Traumatic
 - Degenerative

N.P. 57 y

- R knee poliomyelitis sequelae
- Deteriorating valgus and dysfunction R
- L knee progressively symptomatic



N.P. 57 y

- R knee poliomyelitis sequelae
- Deteriorating valgus and dysfunction R
- L knee progressively symptomatic



N.P. 57 y

- Quad's L: 5/5 - R: 3/5
- Hyperextension 10° R
- Shortening R



QUID?

Osteotomy R femur



Was this a good idea?

6 weeks



3 months



4 months



6 months



8 months





Surgical Management of Gonarthrosis in Patients With Poliomyelitis

Brendan M. Patterson, MD,* and John N. Insall, MD†

Abstract: The authors reviewed nine cases of degenerative disease of the knee in patients with a history of poliomyelitis. All patients were treated with a constrained total knee arthroplasty. The average follow-up period was 6.8 years (range, 6 months to 13 years), and the average follow-up knee score using the Hospital for Special Surgery rating scale was 70. Three of the patients required revision total knee arthroplasty to a more constrained implant. Pain relief was predictably very good and knee stability was initially improved. However, many of the patients suffered a decline in ambulatory ability with time. **Key words:** knee, arthroplasty, poliomyelitis.

Total Knee Arthroplasty in Patients With Poliomyelitis

Louis Jordan, MD, Mordechai Kligman, MD, and Thomas P. Sculco, MD

Abstract: Between 1991 and 2001, 37 primary total knee arthroplasties were performed in 25 patients with knees affected by poliomyelitis. Eight patients had a constrained cruciate knee design, 8 a posterior stabilized design, and 1 a hinged design. Mean follow-up was 40.3 months. The mean Knee Society knee score improved from 45 preoperatively to 87 postoperative. Knee stability was obtained in all patients, including 4 patients with less than quadriceps strength. Radiologic evaluation showed satisfactory alignment with no signs of loosening. Complications included 1 case of deep venous thrombosis and 2 knees that required a manipulation for stiffness. Pain relief, functional improvement, and knee stability can be achieved after constrained total knee arthroplasty in patients with poliomyelitis despite impaired quadriceps strength, and extensive and soft tissue abnormalities. **Key words:** poliomyelitis, total knee arthroplasty, constrained cruciate knee.

© 2007 Published by Elsevier Inc.

Journal of Orthopaedic Research

The Knee

Total knee arthroplasty in patients with poliomyelitis

D. Tigan, P. M. Poco, L. Amendola, L. Rovani

Orthopaedic Surgery University of Michigan Hospital Ann Arbor, Michigan, USA

ARTICLE INFO

Article history: Received 20 February 2005; accepted 14 March 2005
Keywords: Poliomyelitis; Total knee arthroplasty; Dropfoot

ABSTRACT

We performed a retrospective chart and radiograph review of 10 patients with a history of poliomyelitis involving a limb that subsequently underwent primary total knee arthroplasty between 2000 and 2004. One patient had bilateral (BL) knee replacement (mean 23.8 years post-polio), and seven patients (single limb) presented following a mean of 31.2 years post-polio. All patients had dropfoot. The mean age at surgery was 61.4 years (range 4 to 81 years), and patients required muscle or tendon transfers for preoperative contractures. The last patient was followed for four years (mean 10.6 years post-polio). In all cases, a cemented implant at least 2 mm thicker than the original femur was used. The mean knee flexion contracture was 10° (range 0–20°). The mean knee extension contracture was 10° (range 0–15°). The mean knee range of motion was 100° (range 80–120°). The mean knee extensor moment was 1.0 Nm/kg (range 0.6–1.4 Nm/kg). The mean knee extensor moment at 90° was 0.6 Nm/kg (range 0.4–0.8 Nm/kg). The mean knee extensor moment at 120° was 0.4 Nm/kg (range 0.2–0.6 Nm/kg). The mean knee extensor moment at 150° was 0.2 Nm/kg (range 0.1–0.3 Nm/kg). The mean knee extensor moment at 180° was 0.1 Nm/kg (range 0.05–0.2 Nm/kg). The mean knee extensor moment at 210° was 0.05 Nm/kg (range 0.02–0.1 Nm/kg). The mean knee extensor moment at 240° was 0.02 Nm/kg (range 0.01–0.05 Nm/kg). The mean knee extensor moment at 270° was 0.01 Nm/kg (range 0.005–0.02 Nm/kg). The mean knee extensor moment at 300° was 0.005 Nm/kg (range 0.002–0.01 Nm/kg).

TOTAL KNEE ARTHROPLASTY IN LIMBS AFFECTED BY POLIOMYELITIS

By MICHAEL J. GORE, MD, PhD, and DAVID C. LEWISON, MD

Institutionalized at the Department of Orthopaedic Surgery, Mayo Clinic, Rochester, Minnesota

Background: Little information is available regarding the results and complications of total knee arthroplasty in limbs affected by poliomyelitis with severe knee degeneration.

Methods: We performed a retrospective chart and radiograph review of patients with a history of poliomyelitis involving a limb that subsequently underwent primary total knee arthroplasty between 1970 and 2000. Sixteen total knee arthroplasties were performed in limbs affected by poliomyelitis in fifteen patients. Eleven patients were followed for a minimum of two years, one (six knees) died before the minimum necessary follow-up could be completed, and three were followed for less than two years. No patient was lost to follow-up.

Results: There were ten postoperative fractures, one patellar fracture, one pseudotumor, one avulsion of the patellar tendon, and four cases of recurrent instability. These complications were related to the poor bone quality, soft tissue deformity, patella baja, poor musculature, and attenuated soft tissues commonly found in knees affected by poliomyelitis. Knee Society pain and knee scores were improved postoperatively for all nine knees with a two-year follow-up that had had at least antigravity quadriceps strength prior to surgery. However, knee Society function scores remained at 0 or worsened for six of the seven knees followed for at least two years, including three with less than antigravity strength, and four of the nine knees with at least antigravity strength, none of the postoperative fractures.

Conclusion: Pain and knee scores improved following total knee arthroplasty in patients with a history of poliomyelitis and antigravity quadriceps strength. There was little improvement of patients with less than antigravity quadriceps strength. Recurrence of instability and progressive loosening determined in patients in whom there were no other candidates for knee replacement, but they appear to occur more frequently in more severely affected knees.

O.A. 35Y

- Leukemia at age 14
- High dose corticosteroids:
- AVN L hip and R knee
- Infection R knee
- Dropfoot
- Lengthening femur

O.A. 38 y



O.A. 38 y



O.A. 38 y



Extensor dysfunction

- Neurological
 - Congenital
 - ✓ spina bifida
 - Acquired
 - ✓ poliomielitis
 - ✓ parkinson
- Mechanical: # ext. mech.
 - Traumatic
 - Degenerative

Extensor dysfunction

- Neurological
 - Congenital
 - ✓ spina bifida
 - Acquired
 - ✓ poliomielitis
 - ✓ parkinson
- Mechanical: # ext. mech.
 - Traumatic
 - Degenerative

Acute quad's rupture after TKA



Acute quad's rupture after TKA



Extensor mechanism rupture after TKA

- Simple repair often disappointing
- Repair and augmentation grafting for selected cases
- Allograft reconstruction of extensor mechanism in chronic insufficiency
 - Post-infection
 - Multi-revision

Extensor mechanism reconstruction with allograft

- Emerson 1990, 1994: fixation in flexion
 - Extension lag occurred
- Nazarian and Booth 1999: tight fixation in extension
 - Improved early results

Extensor mechanism reconstruction with allograft

- 20 consecutive cases
 - 7 minimal tension: all failures with mean extension lag of 59°
 - 13 tight tension in full extension: all successes with mean extension lag of 4.3° at 24 months

RS Burnett, RA Siegler, Q Dell'Osso, SH Sparto, JJ Jacobs, WG Pinczewski, AG Rosenberg. Extensor Mechanism Allograft Reconstruction After Total Knee Arthroplasty. *J Bone Joint Surg* 2005;87:175-184



Extensor mechanism allograft reconstruction



RJ Burstein, RA Bergen, CJ Della Valle, SM Sparto, JJ Jacobs, WVG Pappas, AG Rosenblatt. Extensor Mechanism Allograft Reconstruction After Total Knee Arthroplasty. *J Bone Joint Surg*. 2005;87:175-194.

Extensor mechanism allograft reconstruction



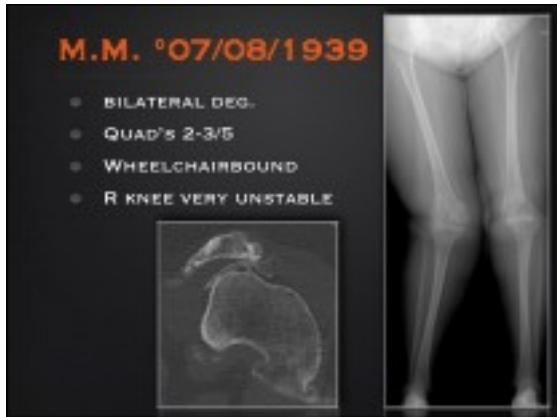
RJ Burstein, RA Bergen, CJ Della Valle, SM Sparto, JJ Jacobs, WVG Pappas, AG Rosenblatt. Extensor Mechanism Allograft Reconstruction After Total Knee Arthroplasty. *J Bone Joint Surg*. 2005;87:175-194.

Extensor mechanism allograft reconstruction



Extensor dysfunction

- Neurological
 - Congenital
 - spina bifida
 - Acquired
 - poliomyelitis
 - parkinson
- Mechanical: # ext. mech.
 - Traumatic
 - Degenerative



M.M. °07/08/1939 L KNEE



M.M. °07/08/1939



M.M. °07/08/1939



M.M. °07/08/1939



M.M. °07/08/1939



Extensor dysfunction

- Neurological
 - * Congenital
 - ✓ spina bifida
 - * Acquired
 - ✓ poliomyelitis
 - ✓ parkinson
- Mechanical: if ext. mech.
 - * Traumatic
 - ✓ tendon rupture
 - ✓ patella fracture
 - * Degenerative

Extensor dysfunction

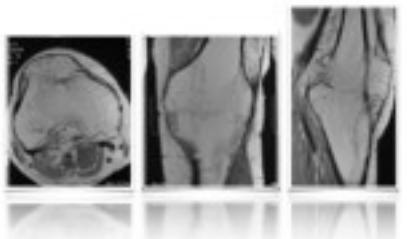
- Is one of the few remaining indications for arthrodesis of the knee



Case F.N.



Case F.N.



Case F.N.



- Has problems with
 - Sitting
 - Rising from a chair
 - Walking
 - Foot hygiene
- Overloads his ankle, hip, lumbar spine and contralateral knee

Why arthrodesis of the knee

- Creation of a limb that is
 - Stable
 - Painfree
 - Durable
 - And allows gait
- Function after arthrodesis of the knee is superior to that after above knee amputation



Carney JD, Marin MR, Riescoza HP. Arthrodesis of the knee. J Bone Joint Surg 2004;86:831-848