

## Total knee prosthesis (early results)

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### Total diz protezi (erken sonuçlar)

Mayıs 1990 ile Ağustos 1991 yılları arasında 21 hasta total diz protezi ile tedavi edilmiştir. Bunlardan 9'u kinematik kondiler diz protezi olup posterior çapraz bağ koruyucu tipte, 12'si ise posterior stabilizan tip total diz protezidir.

Patolojik olarak 18 hasta (% 85.71) gonartroz, 2 hasta (% 9.5) travmatik osteoartrit ve 1 hasta (% 4.7) romatoid artritir. Hastalar pre ve postoperatuar olarak Diz Cemiyeti'nin diz değerlendirme skoru ile değerlendirilmişlerdir. Preoperatif olarak ortalama diz skoru 41.5 (24-60) fonksiyonel skor 33.3 (0-55) olup, postoperatif skor 87 (82-91) fonksiyonel skor 88.1 (64-95)'dir.

**Anahtar kelimeler:** Total diz protezi

Between May 1990 and August 1991, 21 patients were treated by unilateral total knee prosthesis. Nine of them were treated by the kinematic condylar prosthesis with posterior cruciate retaining and twelve by total condylar prosthesis with posterior stabilization. Gonarthrosis in 18 patients (85.71%), traumatic osteoarthritis in 2 (9.5%) and rheumatoid arthritis in 1 (4.7%) was found as a primary pathology.

The average age of patients was 61 (57-72), mean follow-up was 9 months (1-16).

The patients were evaluated by the knee scoring system of the knee society pre and postoperatively.

Preoperatively, mean knee score was 41.5 (24-60), mean functional score was 33.3 (0-55). Postoperatively it was 87 (82-91) for knee and 88.1 (64-95) for function.

**Key words:** Total knee prosthesis

### Introduction

The idea to make the knee joint function better by changing the joint surfaces has been interesting since 19th century. In 1860 Verneuil, in 1861 Ferguson and in 1930 Campbell had been interested in this issue. It was the first time that Campbell and Boyd had used femoral component with metallic interposition in 1940. In 1971 Gunston applied femoral and polyethylen tibial component by using acrylic cement (8, 11).

Total knee prosthesis is indicated in severe pains unresponsive to adequate conservative treatment such as nonsteroidal antiinflammatory drugs, intraarticular injections, activity modification, bracing and weight reduction (15).

Uncommonly primary indication might be for situations such as mechanical failure of the knee, localized degeneration rather than pain (5).

According to another option, total knee prosthesis is indicated in osteoarthritis and primary deformity results from rheumatoid arthritis (9).

Sometimes osteotomy is preferred for those less

than 60 years old, sportsmen, the people using their hands for making their life and the overweighted patients (7).

### Material and method

Between May 1990 and August 1991, 21 patients were treated by unilateral knee prosthesis in Orthopaedic and Traumatology Department of Gülhane Military Medical Academy. Knee society scoring system was used for evaluation of the knee joint in prospective and retrospective studies.

### Clinical findings

Average age of the patients was 61 (51-71) and the mean follow-up period was 9 months (1-16). 16 of these were women (76.1%) whereas 5 were men (23.8%).

Gonarthrosis in 18 patients (85.7%), post-traumatic arthritis in 2 patients (9.5%), rheumatoid arthri-

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tis in 1 patient was found as the etiologic factor.

Nine of the patients were treated by kinematic knee prosthesis, the other twelve by total condylar prosthesis with posterior stabilization.

Preoperative knee score was 35.3 (24-51) and functional score was 28.3 (0-55) for kinematic knee prosthesis. For those treated by total condylar prosthesis with posterior stabilization it was 54 (45-60) for knee score and 43.3 (25-55) for function, preoperatively.

The average score of all patients was 44.5 for knee (24-60) and 35.3 (0-55), for function.

The mean range of motion was 76.1 (50-100). There was flexion contracture in all cases (5-20) and fixed varus deformity in 5 cases (10°-30°).

Postoperatively average knee score was 87 (82-91) and functional score was 88.1 (65-95). The mean range of motion was 94.4 (90-115). In two cases the range of motion was found 90 degrees postoperatively, whereas it was 100 degree preoperatively.

In one patient the knee score was 87 and the functional score was 65 postoperatively. This is because of the over degeneration of the other knee joint.

Patellar component was changed in 16 patients. Only osteophytes were debrided in 5 cases, because of the intact chondral structure. Retinacular release was made in one case and another case was grafted because of the tibial defect.

The suitability of the components were evaluated by the way of  $\alpha$ ,  $\beta$ ,  $\alpha$  and  $\delta$  angles. Mean  $\alpha$  angle was 96.3 (93-102), mean  $\beta$  85.5 (82-88), mean  $\alpha$  3.3 (1-8) mean  $\delta$  86.2 (84-92) for the patients treated by kinematic total knee prosthesis.

Patients treated by the total condylar knee prosthesis with posterior stabilization had an average  $\alpha$  angle as 95 (93-96)  $\beta$  angle 89 (87-90)  $\alpha$  angle 4.3 (1-7) and  $\delta$  angle 90.3 (89-92). In all of the cases the mean  $\alpha$  angle was 95.8 (93-102),  $\beta$  86.6 (82-90),  $\alpha$  3.6° (1-8),  $\delta$  88.5° (84-92).

According to these results, in kinematic knee prosthesis the femoral component should be placed 6.3° at valgus, tibial component 4.5° at varus. Femoral component at the lateral plain should be 3.3° flexion and tibial component at 2.4° posteriorly curved. For total condylar prosthesis with posterior stabilization the femoral component should be placed 5° at valgus tibial component 1° at varus. On the lateral plain the femoral component 4.3° at flexion and the tibial component 0.3° should be curved posteriorly. In one patient, skin necrosis was seen as a postoperative complication.

## Discussion and results

These are different classifications for total knee prosthesis.

- I. Unicompartmental
- II. Total condylar

A. Anatomic: With its components, it looks like a normal knee anatomy and usually has asymmetrical component for right and left knee and the PCL is preserved.

B. Semianatomic: These designs look like knee joint although it does not consist all of the specialities of a knee joint. Cupping or central cam is substituted by PCL.

- III. Constrained or linked designs

These are for compensating both cruciate and collateral ligaments (7).

In all clinical evaluations up to now we commonly used the scoring system of "The hospital for special surgery" (8). This system compounds with functional component so that the score becomes lesser than expected because of the old aged people, although there is no change in knee score. Knee society proposed a scoring system that evaluates knee joint and its functions separately (6). Up to this, to make a decision about the parameters such as pain, motion and the stability the flexion contracture, extension limitations and the malalignment should be evaluated as negative results. For an instance 125 degree mobility without pain and neglectable instability should be assessed as 100 points.

Radiological evaluation should be made in standard posteroanterior plains. The radiolucency between the bone and the component should be evaluated in terms of millimeters (2). Unfortunately this could not be taken into consideration because of the short follow up period. Ideal position of the component were evaluated by  $\alpha$ ,  $\beta$ ,  $\alpha$  and  $\delta$  angles.

The patients were recalled for controlling on the 1, 5-3-6-9 and 12th postoperative months.

Prophylactic antibiotic was used for 72 hours. Jones bandage was applied postoperatively and it was removed on the fifth day. Hemovac drain was removed on the second day.

Postoperatively, on the first day, quadriceps exercises, and second day passive knee motion, on third and fourth day partial weight-bearing on the seventh day active flexion was allowed and at the end of second week the sutures were removed (4, 12).

Ideally in kinematic knee prosthesis the  $\alpha$  angle is 96 degree and the  $\beta$  88°. For postertory stabilized total condylar knee prosthesis it is 97 degree for  $\alpha$  and 90 degree for  $\beta$  (3).

Lateral release should be applied routinely to provide patellar alignment.

Synovium and the fat pad should be removed to clear out the vision (9).

Patella should be changed routinely in every patient except in those with overweight and with normal cartilage surface (5).

Cement is used only for fixation. The main support is provided by bony structure (10).

Intramedullar system is superior to extramedullar for alignment (1).

As a result, the aim of total knee prosthesis is to provide a stable, painless and mobile knee joint (7). In early period, the patients treated by total knee prosthesis, we have seen noticeable increase in the knee functions. In our belief, for every suitable case total knee prosthesis should be used. However, better observations could be obtained only after getting the long-term follow-up results.

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