



5 - Year Results with the RT-PLUS Constrained Rotating Total Knee

U. Malzer, P. Schuler

St.Vincentius - Clinics Karlsruhe, Germany



Implant Description

The RT-PLUS Solution* is a second generation rotating hinge total knee design.

It allows for an enhanced range of motion containing flexion/extension as well as rotation and longitudinal distraction.

The implant is available in a standard cemented version with fixed stems and a modular version with variable stem sizes for cemented and cementless application.

There are five component sizes, different sizes of the tibial and femoral component are widely combinable.

The femoral component has an anatomical condylar shape like a standard primary implant. It also provides a 6 degree valgus trochlear groove in order to maintain a good patella tracking.

The tibial component features a posterior slope of 3 degrees. In combination with the posterior position of the femoral rotation center this allows for anatomical roll-back and thus reduces the load of the quadriceps mechanism in flexion.

The femoral box has been minimized in size to reduce the total resection amount.

To lower the risk of luxation, the rotating peg is 4 cm long. In spite of the long spine, component locking only needs minimum distraction due to a special coupling mechanism.

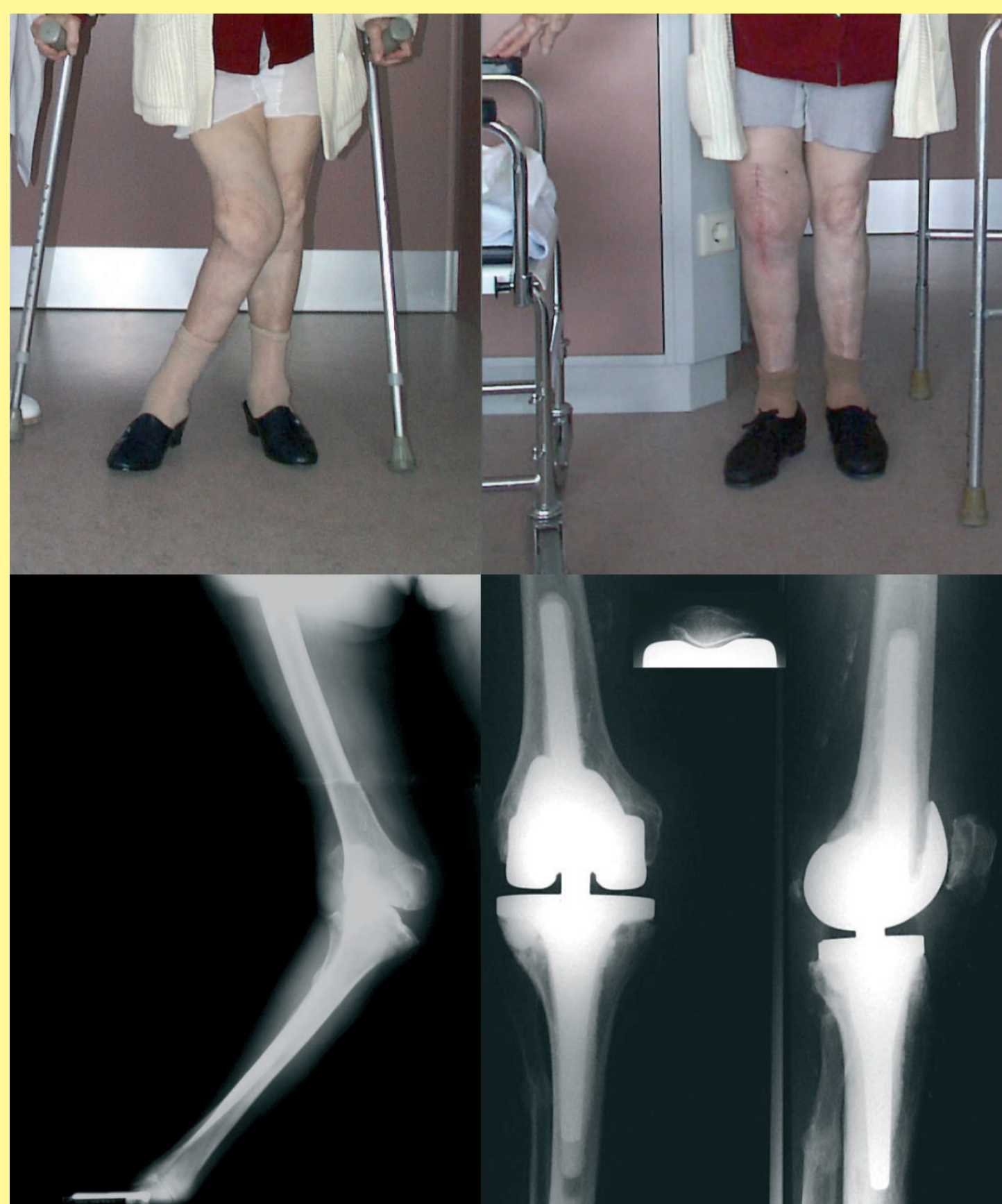
* PLUS Orthopedics, Switzerland



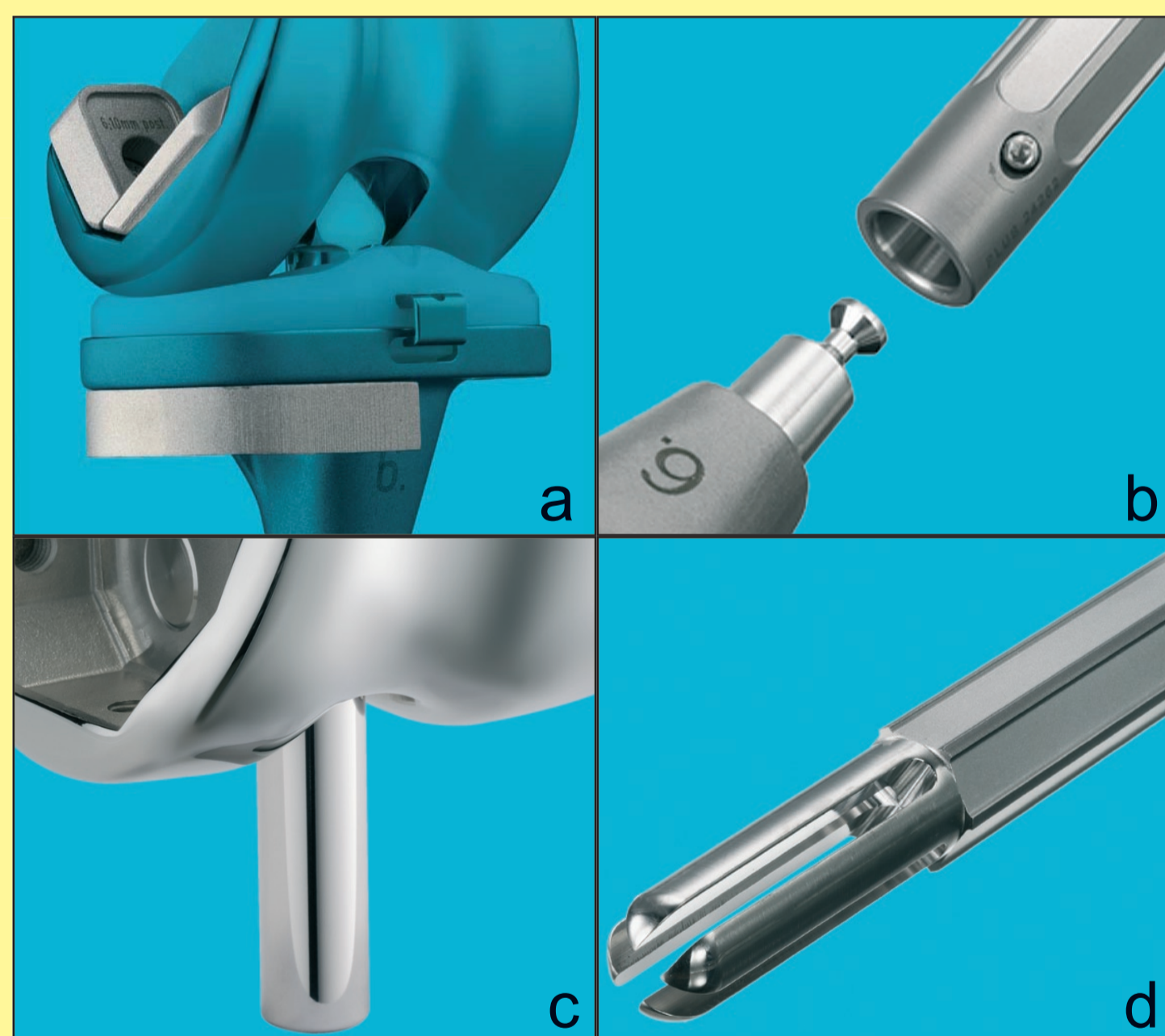
RT-PLUS Standard Version RT-PLUS Modular Version



Due to a special locking mechanism, assembly of the components can be achieved with a minimal amount of distraction.

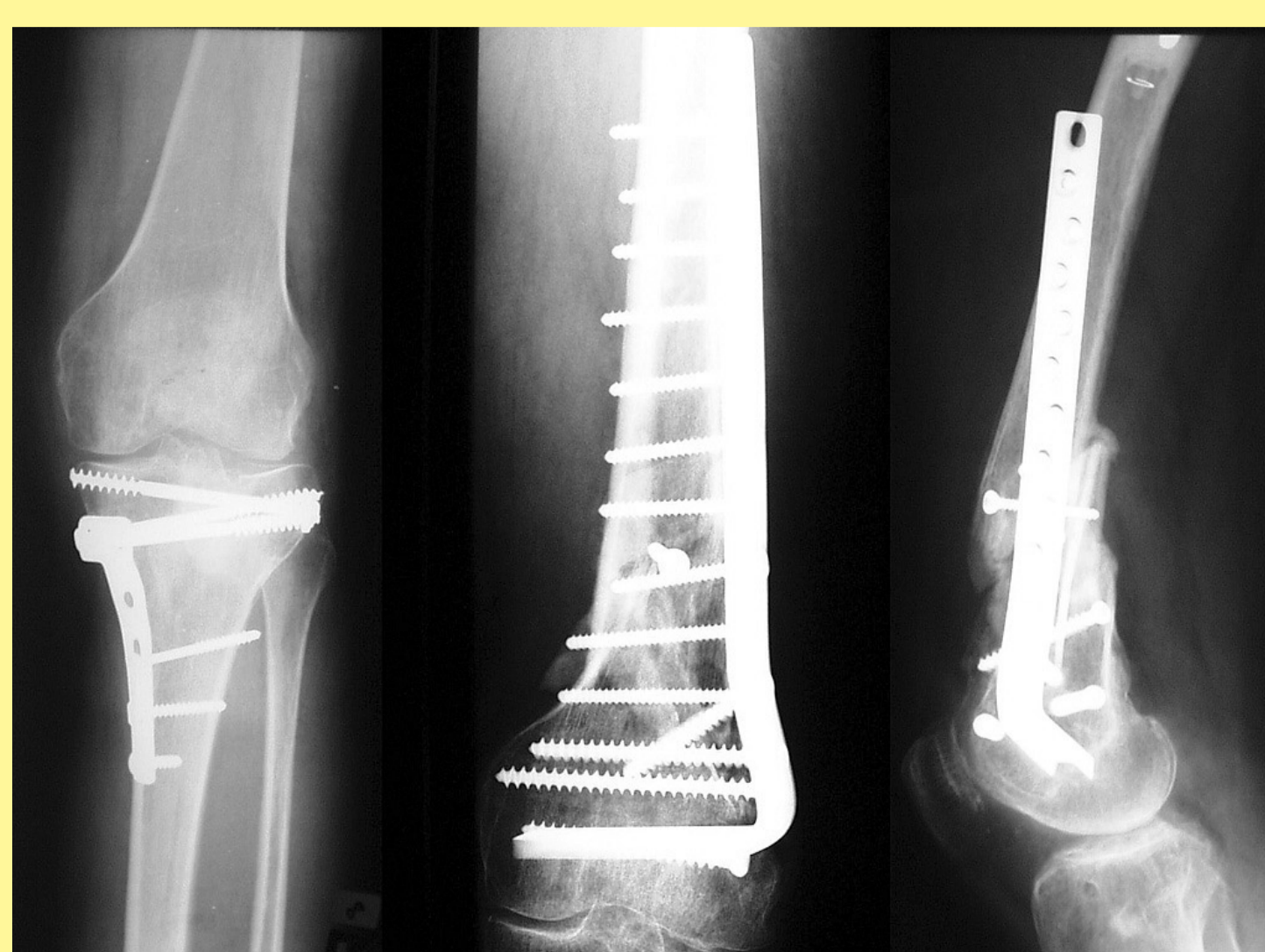


88 year old female with 60° valgus arthritis. Lateral bone defects combined with severe instability. Operative treatment with RT-PLUS, cemented standard version without patella replacement.



Spacerblocks (a) can be used for compensation of larger bone defects. Taper connection (b) of stems is secured by screw. The rotating peg (c) is 4 cm long and allows 2 cm of secure distraction. Long stem versions have slotted ends (d).

82 year old female with posttraumatic arthritis after high tibial fracture and pseudarthrosis after supracondylar femur fracture. She also had undergone total hip replacement. Right: RT-PLUS modular with long cementless stems, pseudarthrosis treated with homologous autograft.



Materials and Methods

For follow-up, we reviewed 31 patients with total knee replacements using the RT-PLUS standard version implanted between May 1996 and December 1999.

We performed an anamnestic and clinical examination, followed by a radiologic analysis including standard, long-axis and patella sunrise view x-rays. Results were validated according to the HSS and Knee Society scores.

The average age of our patients at time of surgery was 72.8 years (min. 56, max. 88).

28 cases (90%) were primary implantations in severe valgus or varus arthritis, in 3 cases (10%) we performed revision surgery due to implant loosening.

Average follow-up time was 82 months (min. 63, max. 98).



83 year old female with combined valgus/varus arthritis and severe bilateral instability. Cemented RT-PLUS standard.

Results

To estimate our patients' overall satisfaction, we asked them to self assess the result of the operation, and all of them were satisfied.

Preoperatively, all patients had severe pain. At review, there was a significant improvement and most patients were more or less pain-free.

Due to the character of the implant, axis deviations could be corrected without runaways in the results. In most cases postoperative range of motion was up to 120 degrees.

In the clinical scores, all patients had poor preoperative values that could be significantly increased by the operation.

There was an improvement of the average HSS score from 35.3 points preoperatively to 83.2 points at follow-up.

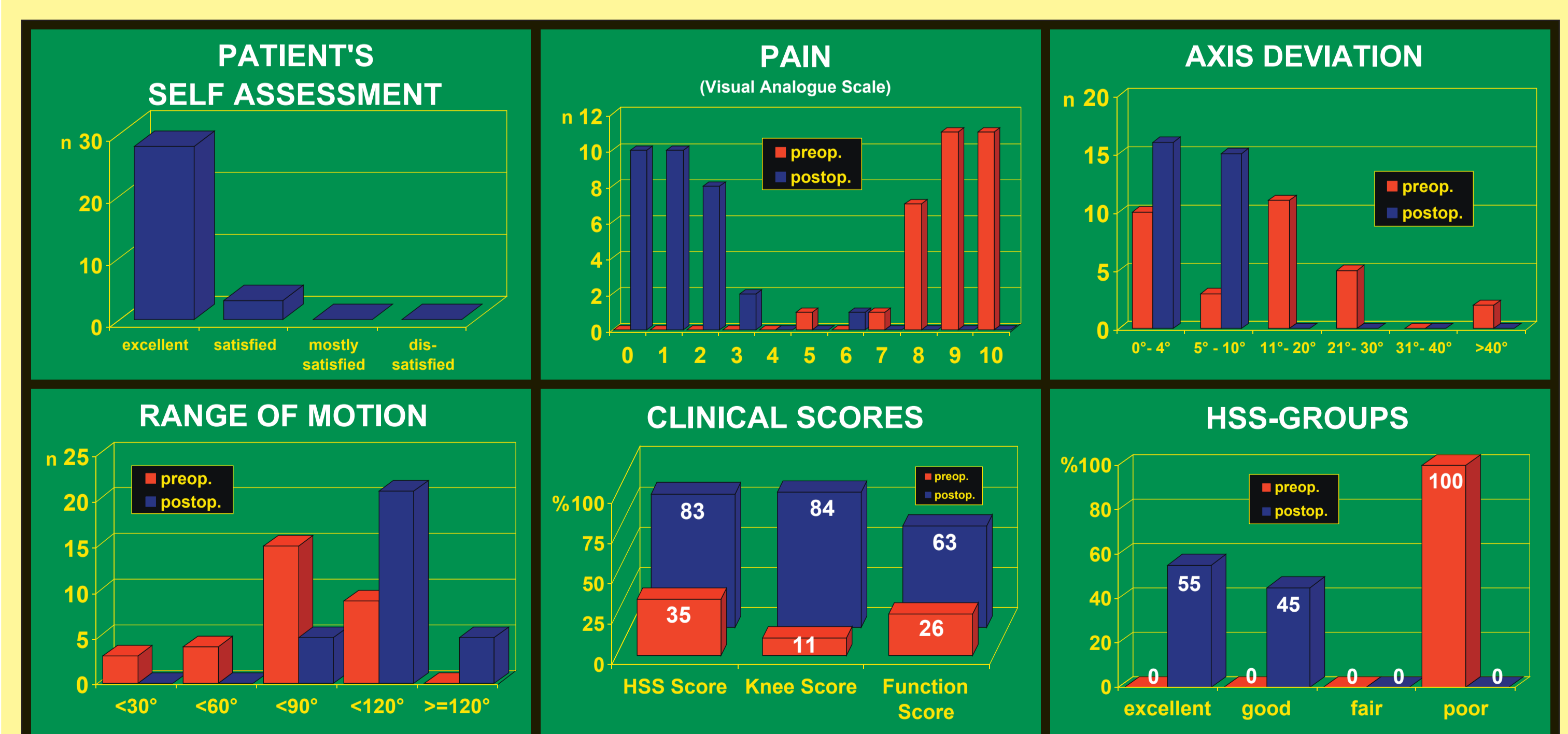
In the KSS rating system, we found an

improvement of the average Knee Score from 11.3 to 83.5 points and the Function Score rose from 25.6 to 63.2 points. These results are only slightly inferior to standard primary total knee replacements which can be easily explained by the specific patient collective.

According to the HSS rating system, our patients showed good and excellent clinical results.

In the radiological evaluation, there was no evidence for implant loosening such as radiolucent lines or implant migration. Two patients showed a moderate osteopenia under the tibial tray due to stress shielding effects, but clinically they were symptom-free.

As complications we found 4 DVT's without thromboembolic complications and one superficial wound dehiscence that healed after revision.



Conclusion:

The results of our 5 year follow-up show, that RT-PLUS Solution is a valuable choice for the treatment of severe joint disorders in primary and revision total knee arthroplasty where constrained devices are indicated.

In addition, the modular version offers

some enhanced options for the management of complex cases.

We believe, that second generation rotating hinges like RT-PLUS are a good alternative to constrained condylar knee ('CCK') devices.