



TC-PLUS Solution. First Results with a New Unconstrained Total Knee Design

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Implant Description

The TC-PLUS Solution* is a new unconstrained duocondylar total knee design. It is available in cemented and cementless versions and offers PCL retaining, ultracongruent and posterior stabilized options.

The cementless version features a new two-layer vacuum plasmaspray pure titanium porous coating with an average height of 250 microns.

The tibial and femoral component have an anatomic asymmetrical shape with tribologically optimized contact surfaces.

The all-poly patella component has a symmetrical biconcave surface for better tracking.

The implant is available in 6 sizes with polyethylene inserts ranging from 9 to 15 mm height.



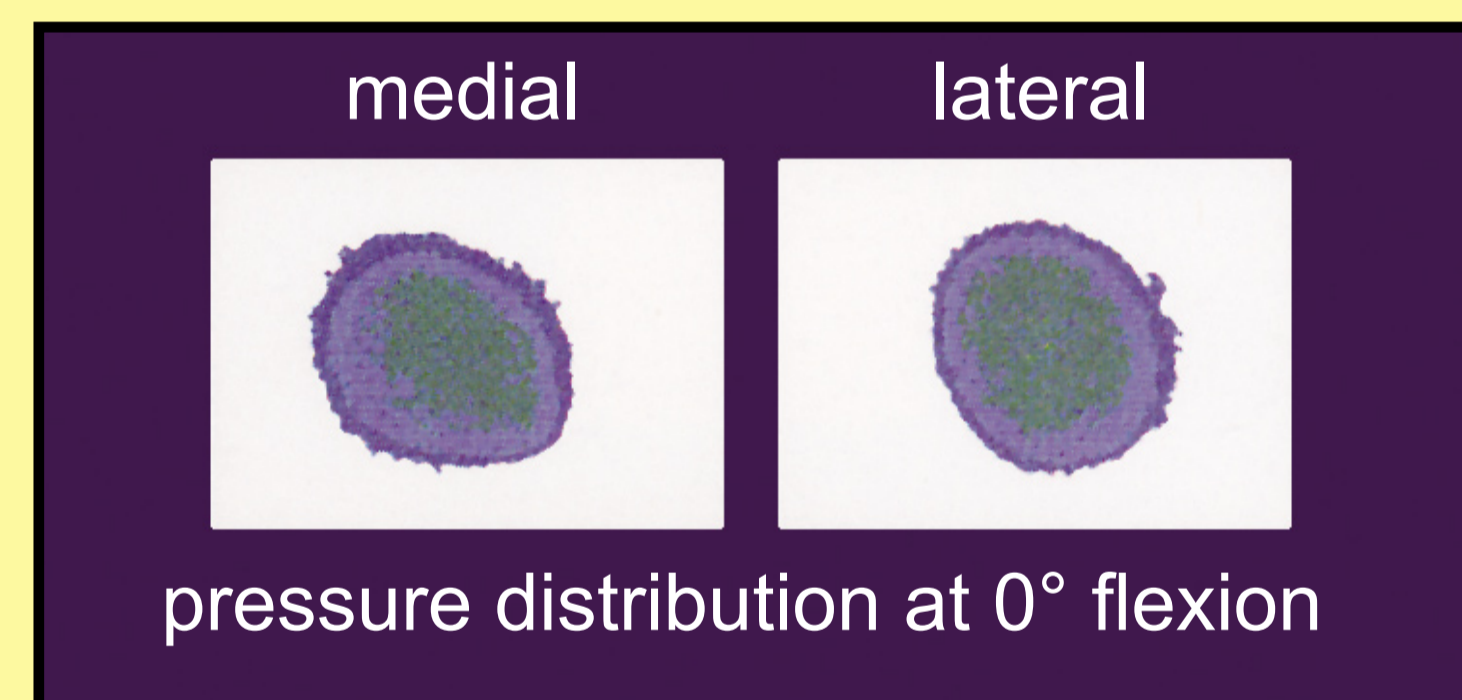
* PLUS Endoprothetik AG, Switzerland



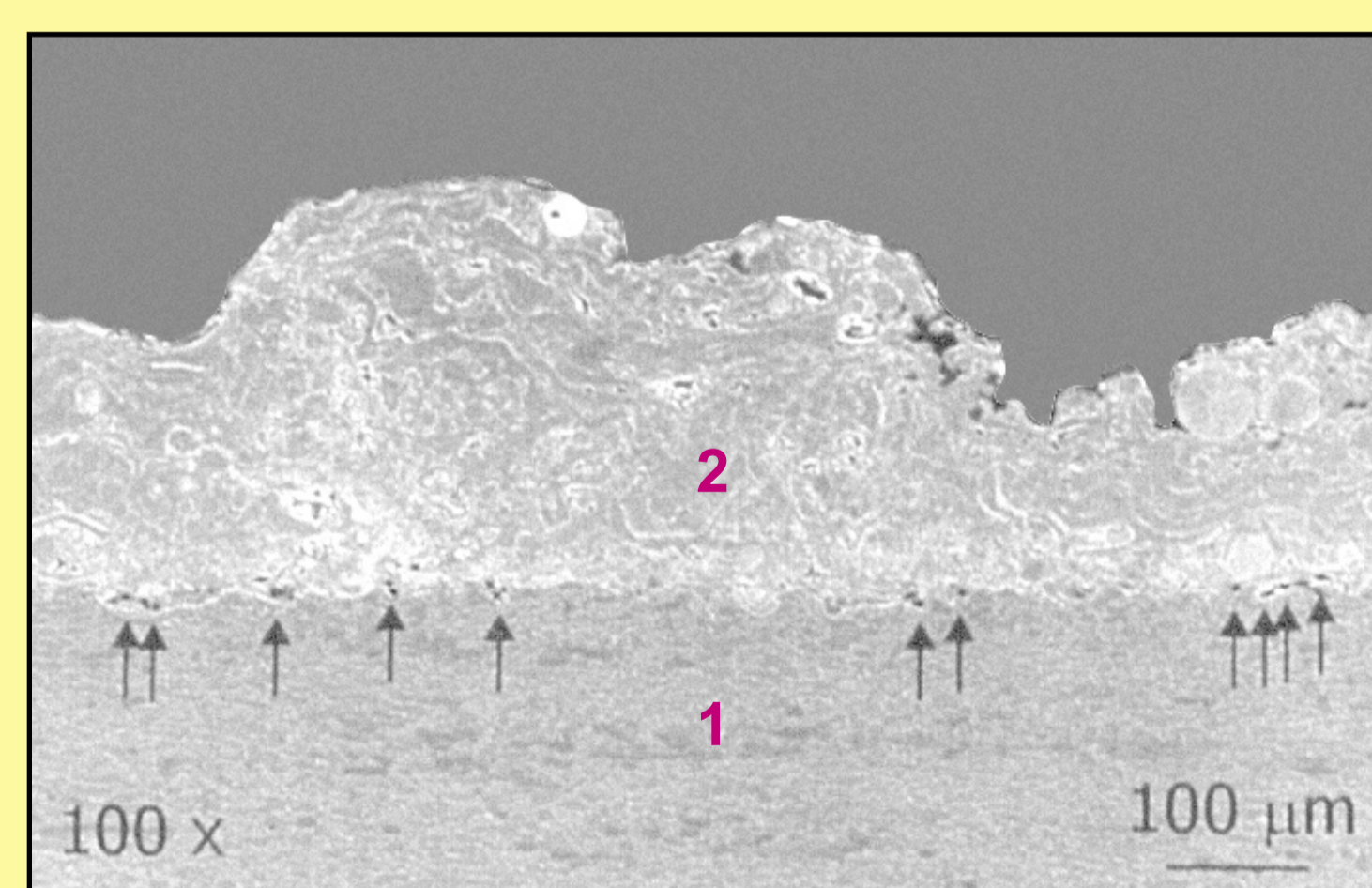
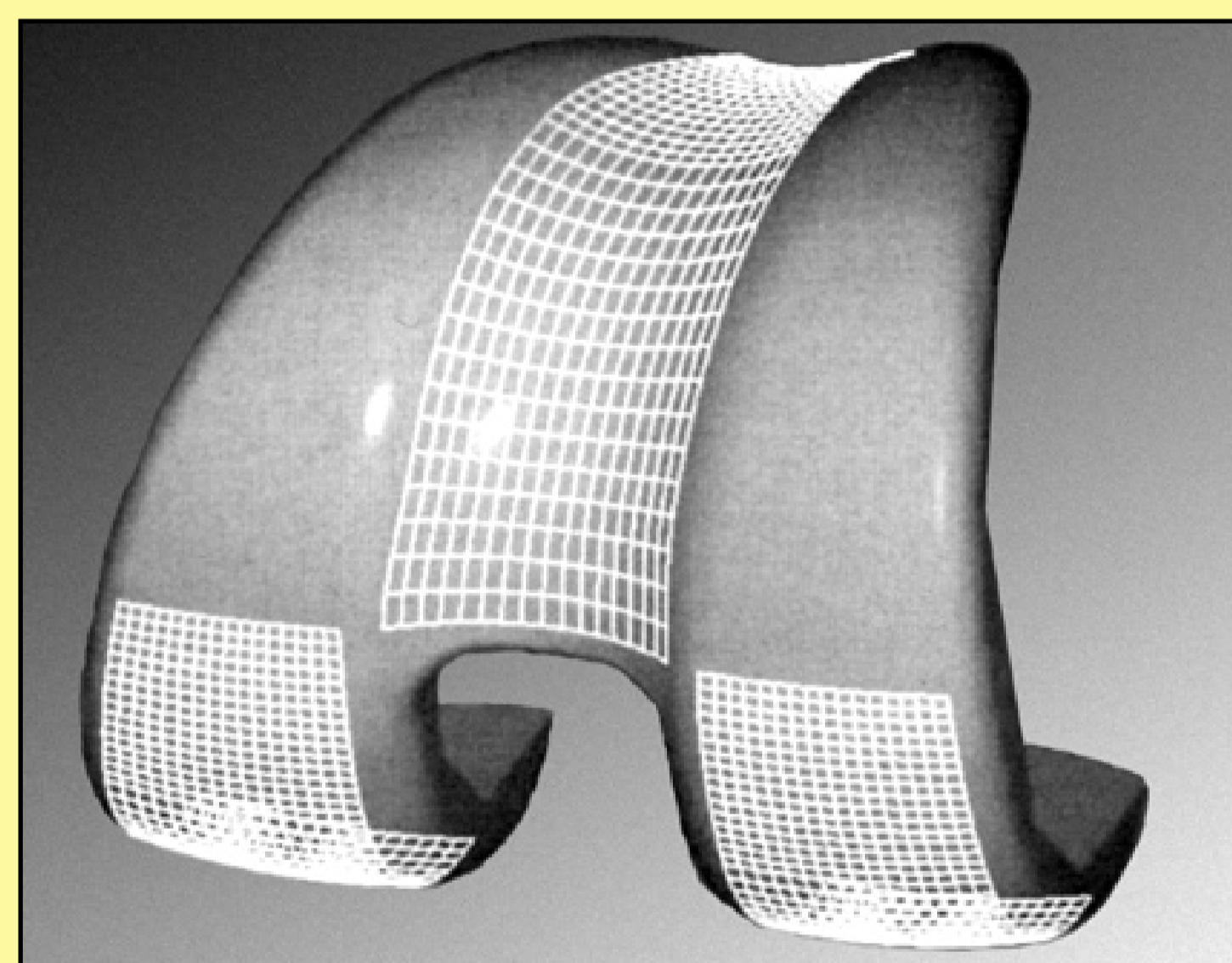
Tibial tray: the surface is polished in order to prevent intrinsic abrasive wear.



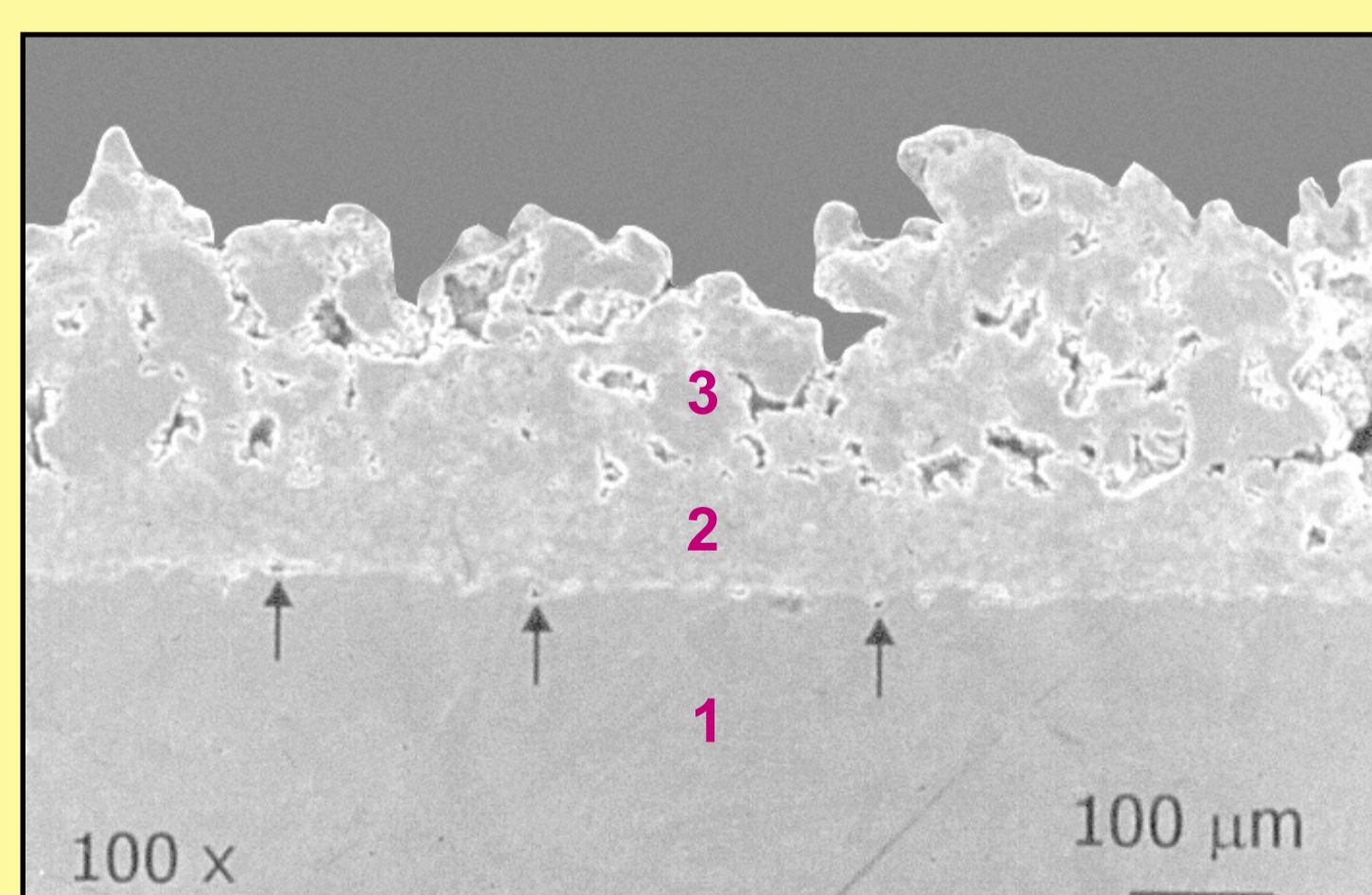
In the cementless version, the tibial stem remains uncoated to reduce stress shielding effects.



The articulating surfaces have been tribologically optimized to achieve a homogenous pressure distribution.



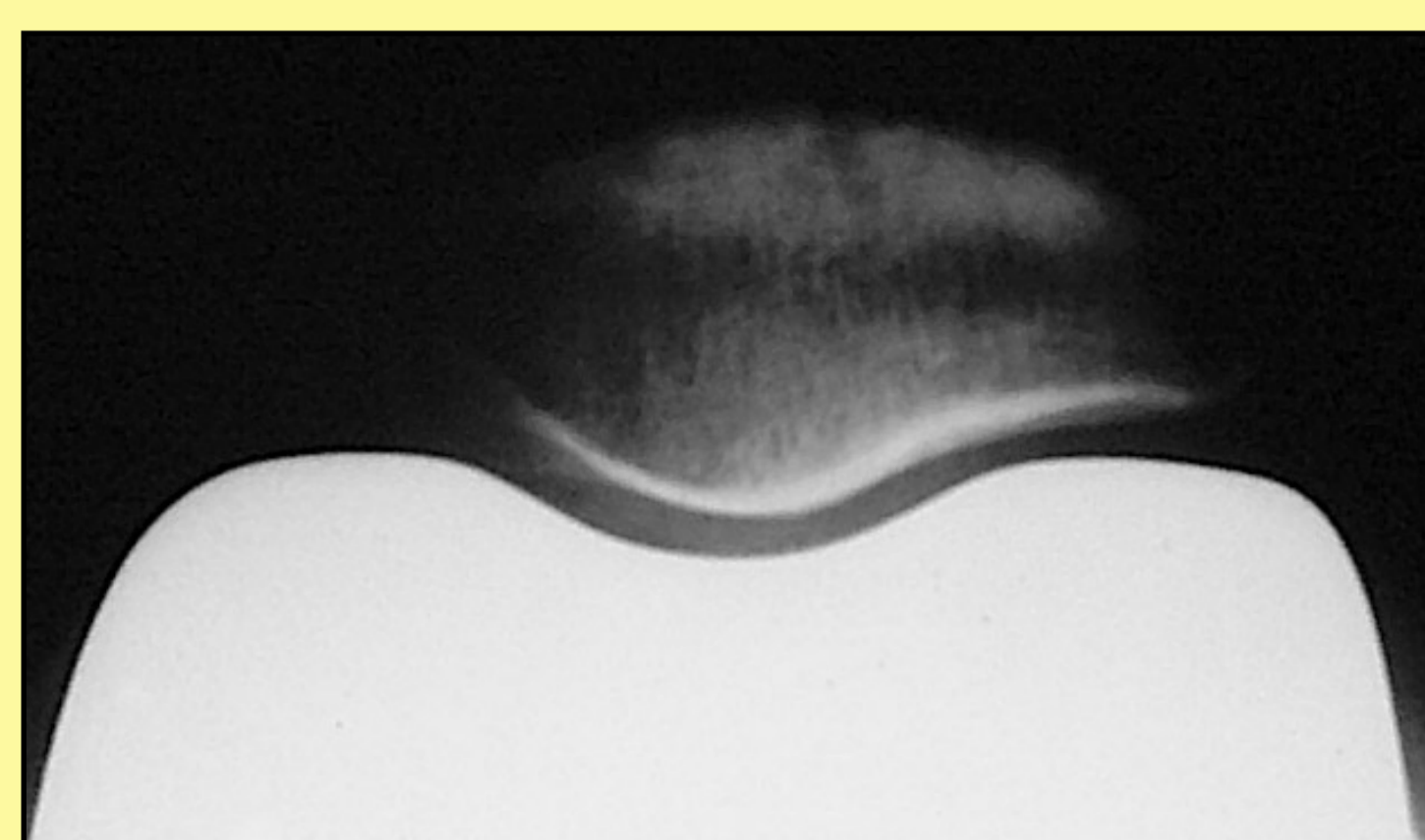
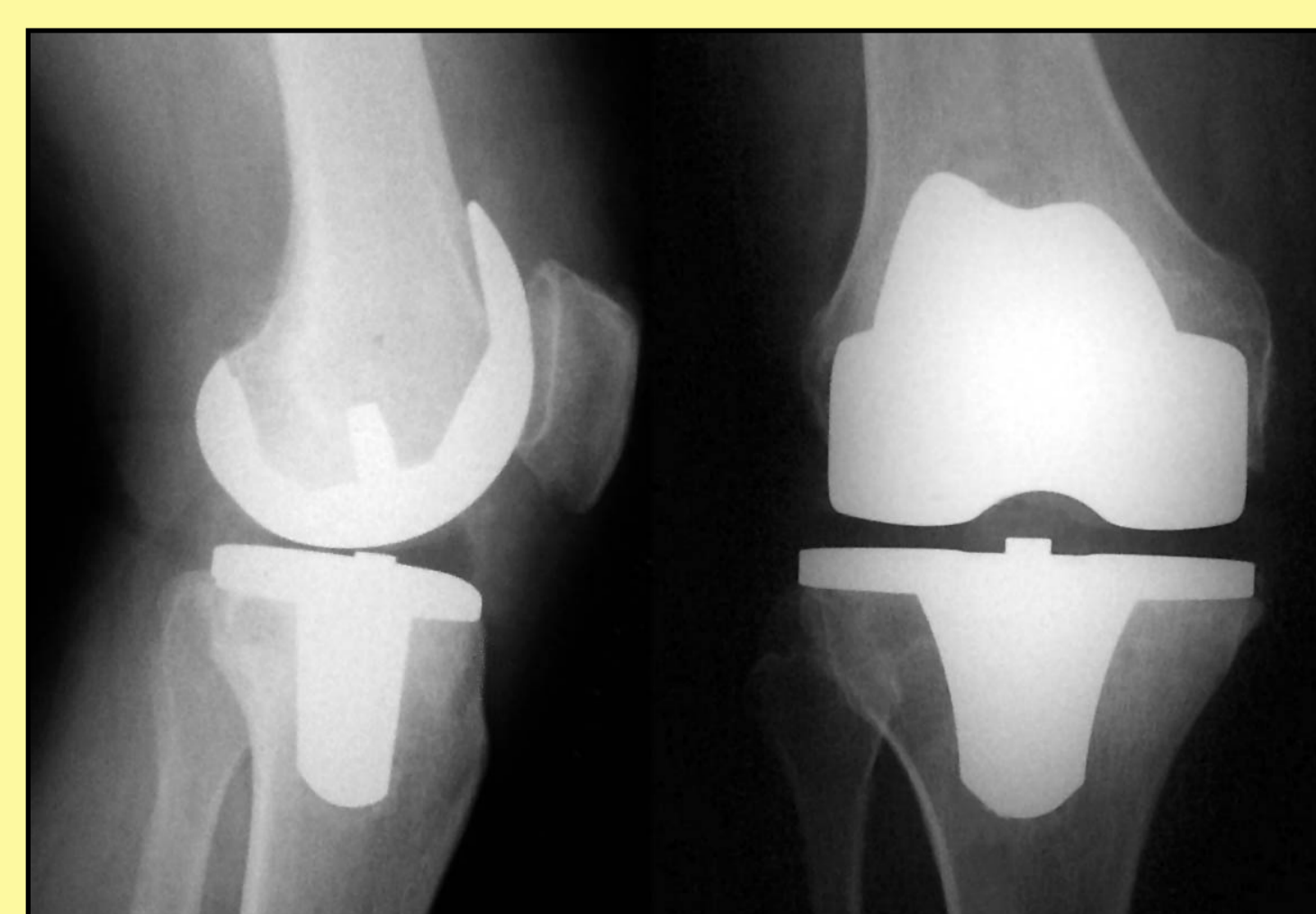
Standard atmospheric plasmaspray coating. Numerous air blisters in the interface (arrows).



Two-layer vacuum plasmaspray coating (TC-PLUS). Fewer air blisters (arrows) due to vacuum processing.

- 1: CoCr base layer
- 2: Ti base layer

- 1: CoCr base layer
- 2: Ti base layer (50 µm). Small grain size for better bonding.
- 3: Ti surface layer (150-250 µm). Higher grain size for enhanced surface porosity.



Standard and patella skyline radiographs of a cementless implanted TC-PLUS. The patella was not replaced.

Materials and Methods

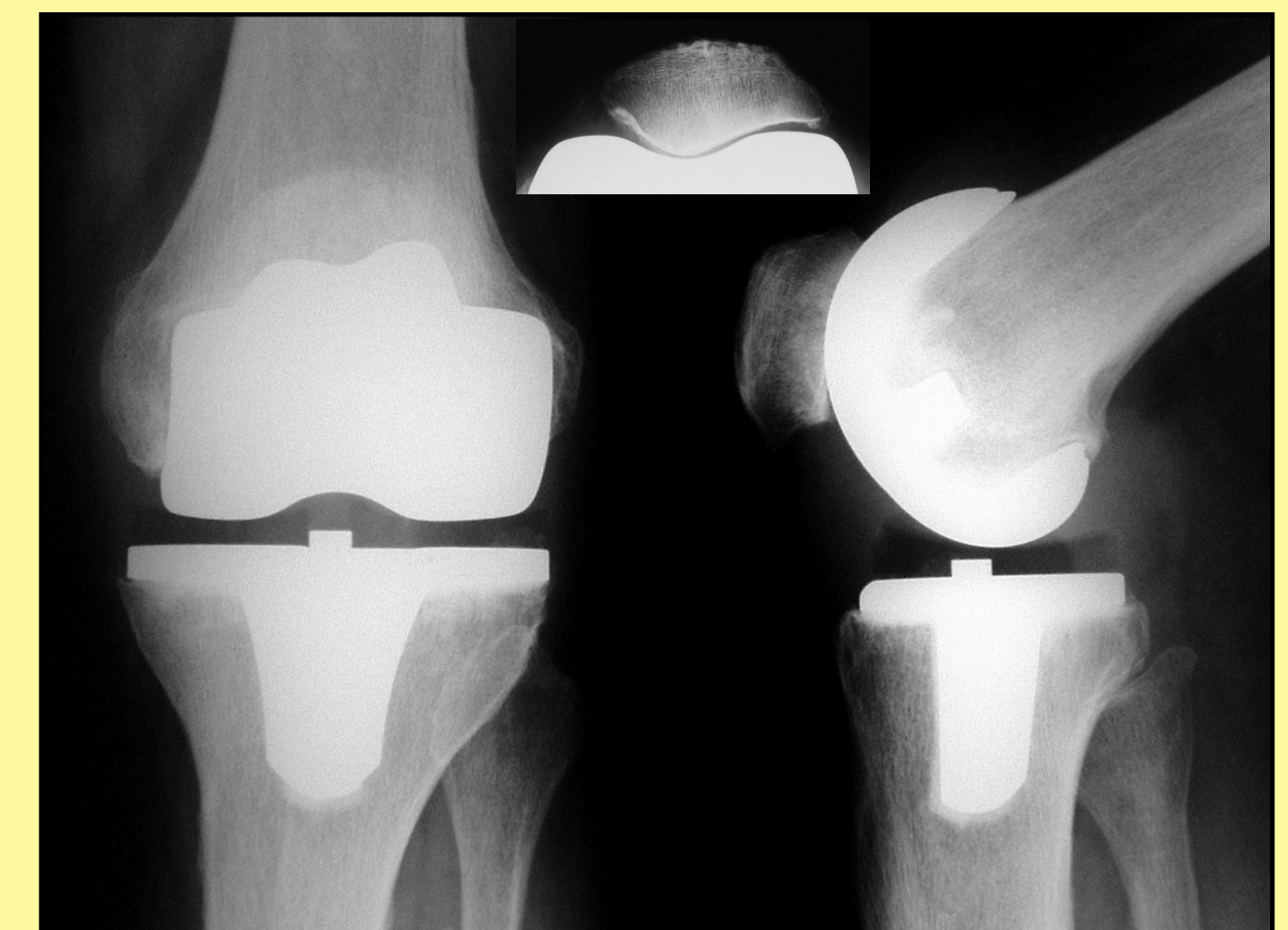
Between March 1999 and March 2000, we performed 183 total knee replacements using the PCL retaining TC-PLUS version. The first 66 of these patients could be reached for follow-up.

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

Average follow-up time was 22 months (min. 16, max. 28). Most implantations were performed using fully cemented (44%) or hybrid technique (36%) with cemented tibial and cementless femoral component. In 20% cases, surgery was performed fully uncemented.

In all cases, the patella was not replaced.

The average age of our patients at time of surgery was 72.5 years (min. 54, max. 87). In most cases, indication was primary osteoarthritis, 3 patients had rheumatoid arthritis and two operations were revisions with change of the implant (1 monocondylar, 1 duocondylar).



Standard and axial patella radiographs of a cemented TC-PLUS without patella replacement.

Results

At follow-up, all patients showed a significant relief of pain and improvement of walking distance.

Most pre-existing flexion contractures could be eliminated. Only two patients showed slight extension deficits under 10 degrees.

In 89% of our patients, the mechanical axis was completely restored, in the remaining cases, the postoperative axis was below 10 degrees.

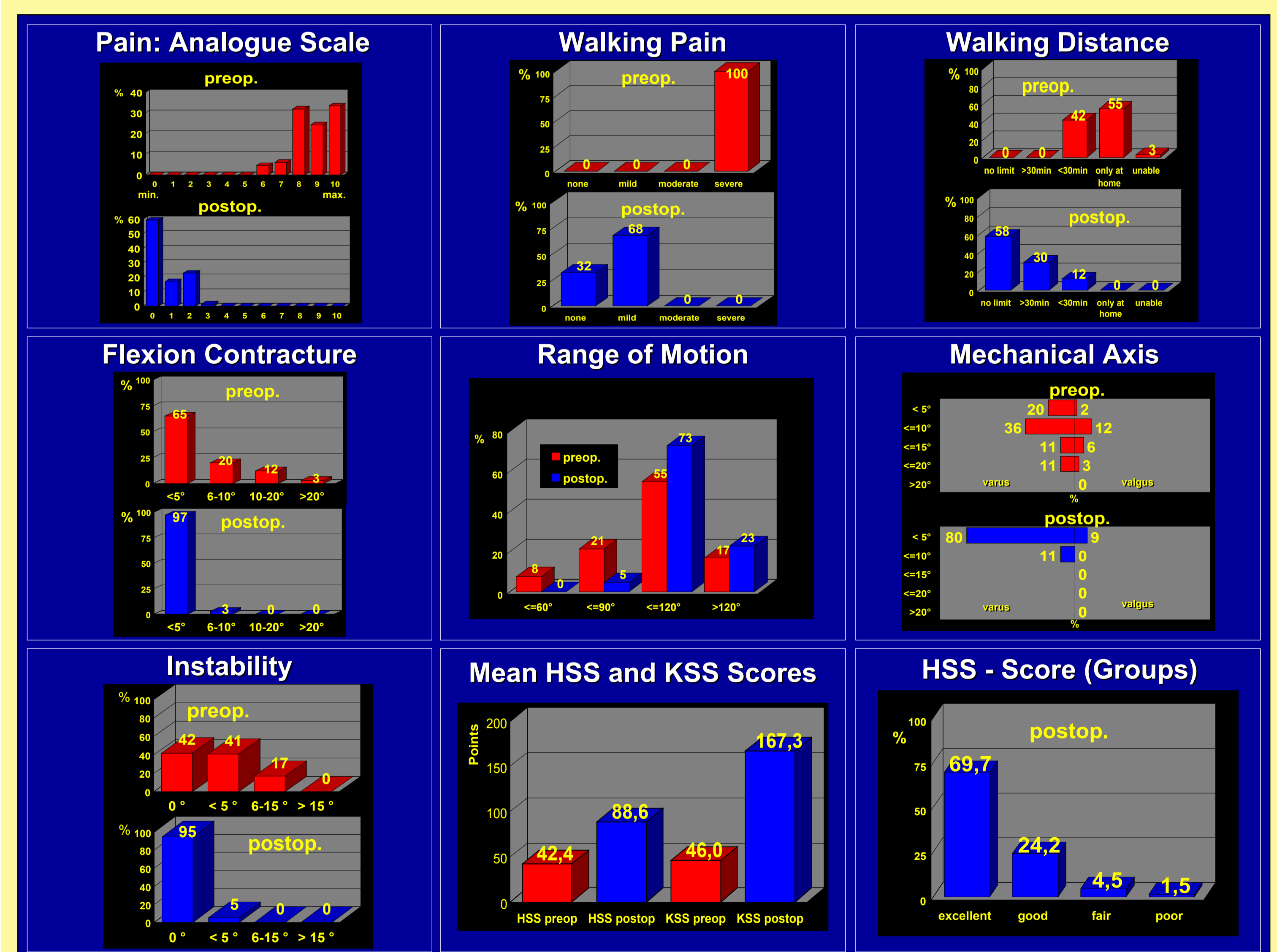
Range of motion was also improved, but improvement was not very pronounced due to relatively high pre-operative values.

Preoperative instabilities could also be largely resolved by the operation.

As complications we found 8 DBVT's that healed under therapy, 1 (traumatic) patella dislocation and one superficial infection that required wound revision. Deep infections did not occur. We also did not find radiological signs of implant loosening.

The average Knee Society Score improved from 46.0 to 167.3 points, the HSS score from 42.4 to 88.6 points.

According to the HSS rating system, 94% of our patients showed good and excellent results.



Conclusion:

Our experience shows, that all clinical and functional parameters could be improved with the TC-PLUS Solution.

The total outcome of 94% good and excellent results is comparable to other

contemporary designs. We could not find any severe early complications and we believe that also good mid- and long-term results can be expected from this new total knee prosthesis.