

Clinica Ortopedica e Traumatologica
 Università degli Studi di Pavia

Fondazione IRCCS Policlinico San Matteo

Direttore: Prof. F. Benazzo



Why I choose this type of prosthesis ?

F.M. Benazzo, S.M.P. Rossi

**TKR:
 should be a work of art**



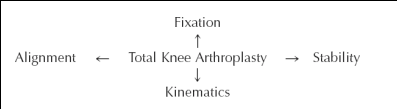
What are we talking about

Nex Gen family

Why?

Our experience started with the Natural Knee

Insall's TKR goals:



G. R. Scuderi, Knee Arthroplasty handbook Springer, 2006

What are we talking about

Nex Gen family

Why?

We've always followed Insall's concepts in total knee arthroplasty

- 1. Restoration of the mechanical axis
- 2. Restoration of the joint line
- 3. Balancing of the soft tissues
- 4. Equalization of flexion and extension gaps
- 5. Restoration of patellofemoral alignment and mechanics

What are we talking about

Nex gen family

Why?

Active participation in the development of:

- MIS concepts and philosophy
- New instruments
- New Implants

MIS concepts

Let's try to avoid misuse, misunderstandings and overuse...

MIS is not anymore something new
 MIS must be considered as a current mentality and a philosophy acquired in total knee replacement

Because:

Starting from the idea of a mini-incision MIS has pushed a new philosophy of respect of tissues, giving the opportunity to develop:

- New concepts: TSS and progressive partial substitution of the knee
- New instruments: precise and friendly
- New implants

MIS/TSS and the Time Machine concept

"Time machine" surgery:
 the knee is set back to the conditions existing before the OA disease occurred, with the purpose to let it work in the same manner as a fully healthy knee

Where are we now?

Minimally-invasive (MIS)

New instruments

New implants

+

High-Flexion
Fixed/Mobile Bearing

Highly reproducible

Reproducible approach

Evolution of the technique

2003-2005 2005- 2008

Quad Sparing 232	Mini Midvastus VMO snip 290 Trivector 125
Mini Midvastus VMO snip 71 Trivector 23	Quad Sparing 34

Reproducible approach: Mini-midvastus snip and trivector

ADVANTAGES:

- Small incision of extensor mechanism
- Frontal Approach
- Easy displacement of the patella
- Easy releases and ligament balancing

DISADVANTAGES:

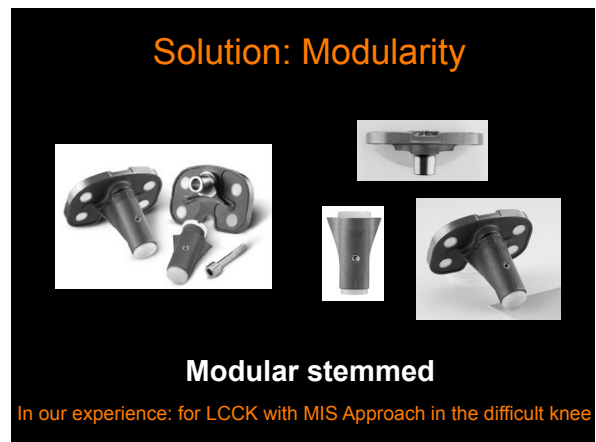
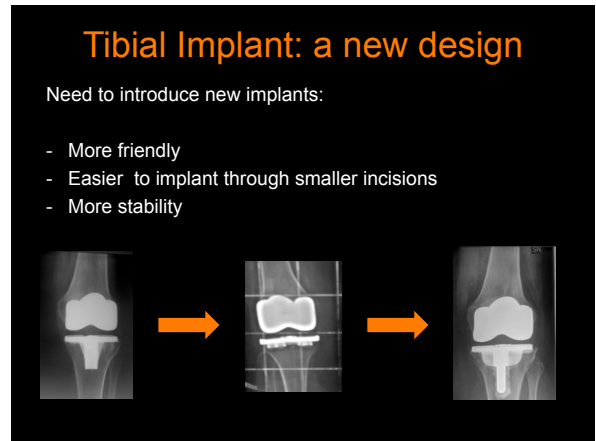
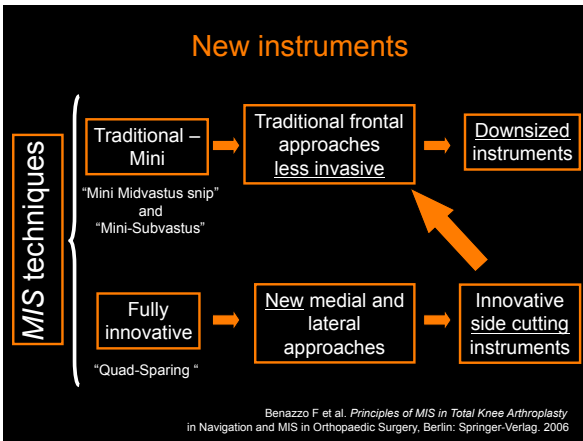
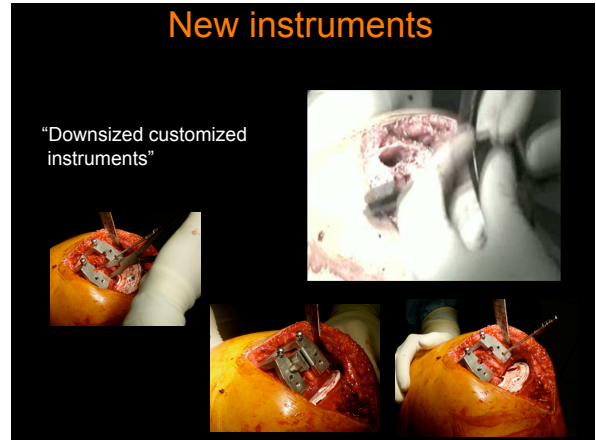
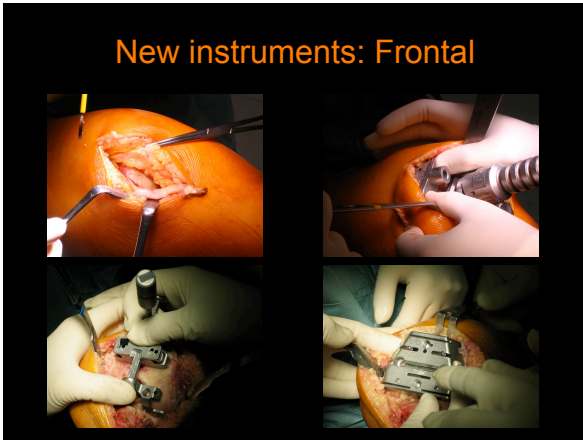
- If muscular tension on the VMO possible increase of the SNIP dimensions (Trivector)

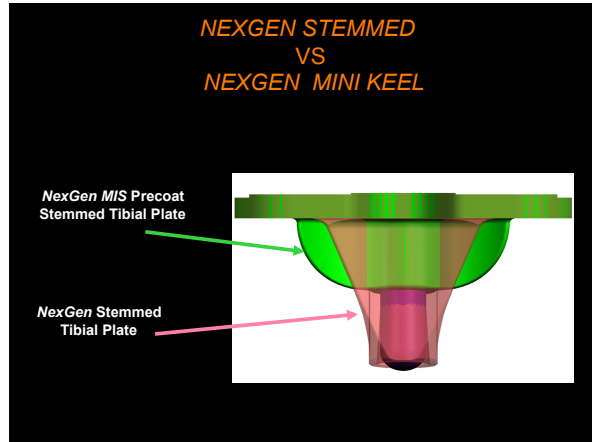
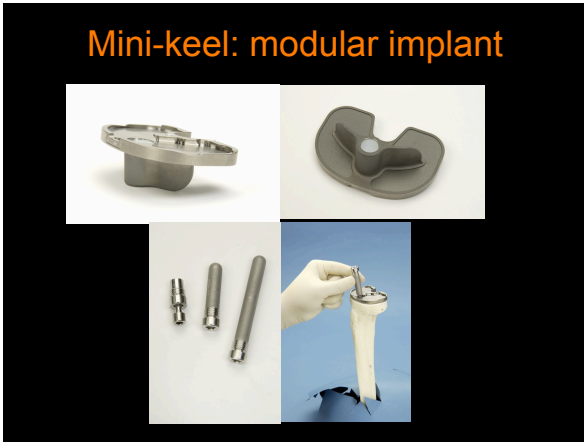
Reproducible approach: trivector

VMO SNIP of 1,5-2 cm + 1 cm parapatellar incision of the QUAD tendon

- Increased patellar displacement
- Useful in stiff knees or thick patella

New instruments: medial/QS





Mini-keel

- Easier implantation compared to the stemmed plate
- Technique comparable to the pegged plate (modularity)
- Increased bone-implant contact surface (mean + 5.60% comparing to the stemmed plate)
- Increased primary stability

Mini-keel: experience with Fixed bearing

2005-2008

345 Implants in 320 patients (25 bilateral)

200 women, 120 men.

Mean age: 72,3 anni

Mean Follow-up 2,5 anni (8 months ÷ 4 years)

Clinical and x-rays evaluation at 3-6-12 months and yearly

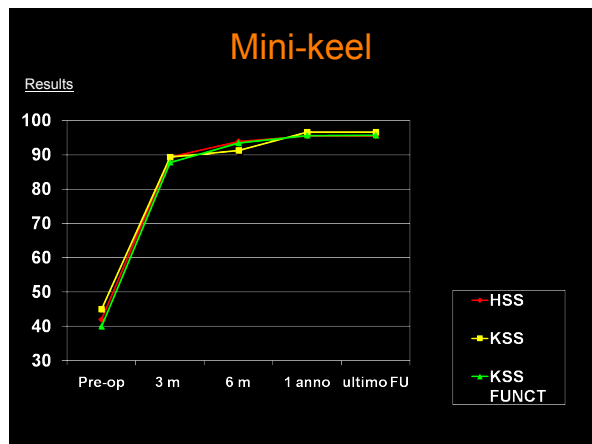
Mini-keel

Flexion

3 months
Mean 119,5° (110÷125)

6 months
Mean 124° (110÷140)

Last follow-up
Mean 128,2° (115÷140)



Mini-keel

X-rays results

Post-op alignment:

5,4° valgus (mean pre-op 8,2° varus
→ range 25° varus – 20° valgus).

KSS evaluation system :

- Tibia: mean β 89,8° (89+91), and σ 84,4° (83+87)
- Femur: mean α 94,3° e γ di 5,1°.

Mini-keel

Complications:

6 revisions

- 1 infection
- 1 periprosthetic fracture after trauma
- 1 Instability
- 3 malpositioning
 - 1 case of femoral malrotation
 - 2 malpositioning of tibial plate

In 1 case arthroscopy for stiffness without revision

CT scan data

*Benazzo F, Rossi SMP et al
Cement distribution and accuracy of implant of a modular tibial component for minimally invasive total knee arthroplasty: an in vivo ct-scan study.
Efort 2008, Nice*

CT scan evaluation:
On 30 cases

Total cement volume:

10,03 cm³ (min 6,99 max 14,4)

The measure proportionally correlates with the size of the implant but does not correlate with the bone density

Ct scan data

Cement thickness around the drop-down:

Proximally (just below the keel):
Coronal: 4,1mm
Sagittal : 3,3 mm ante – 4,7 mm poste

Medium-distal third:
Coronal: 2,5 mm
Sagittal: 2,4 mm ante – 3,4 mm poste

Cement distribution around the tibial stem was higher posteriorly

Ct scan data

Cement thickness around the keel:

Coronal: 4,1 mm
Sagittal: 1,1 mm ante - 1,8 mm poste

Cement distribution around the keel was higher posteriorly

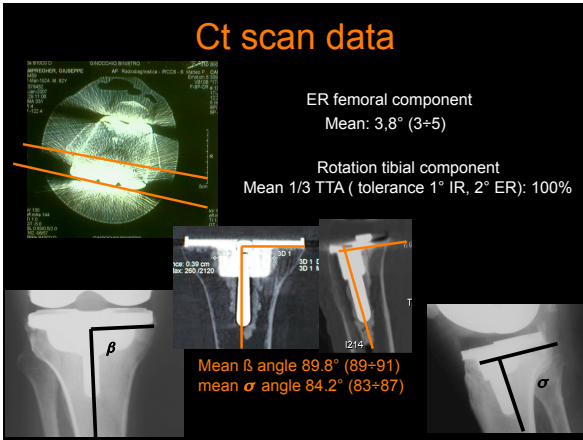
Ct scan data

Cement thickness under the tibial plate:

Coronal:
Lateral: 2,9 mm ante – 2,8 mm poste
Medial: 2,7 mm ante – 2,6 mm poste

Sagittal:
Anterior: 3,4 mm
Posterior: 2,5 mm

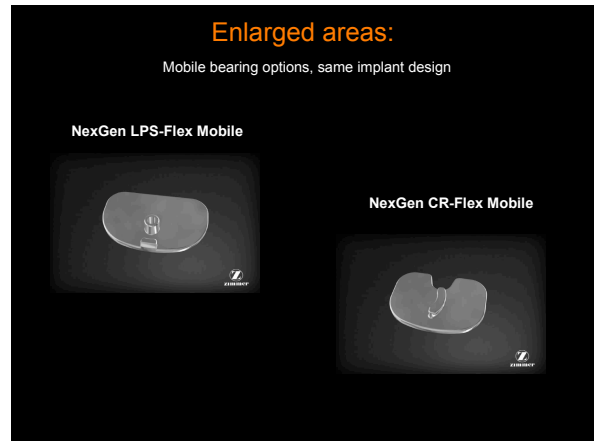
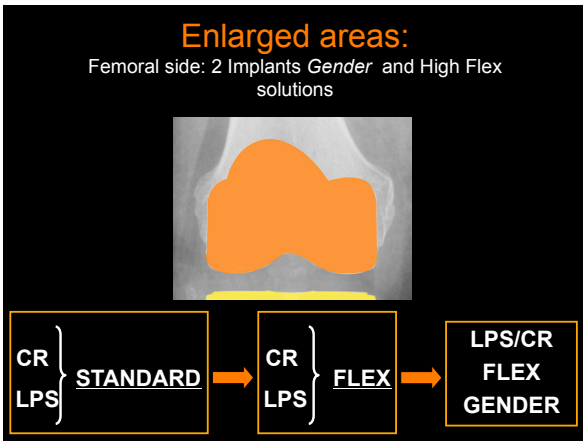
Cement distribution beneath the tibial plate was higher anteriorly



Mis-mini keel study groups

Prof. Benazzo	Pavia
Prof. Aglietti	Firenze
Dr. Bombelli	Bolzano
Dr. L. Solimeno	Milano
Dr. Terragnoli	Brescia
Dr. Boniforti	Cefalù

I study (september 2006)	II study (February 2008)
- Prospective	- Prospective
- Multicentric	- Multicentric
- 5 centers (Pavia, Firenze, Milano, Brescia, Cefalù)	- 5 centers (Pavia, Bolzano, Milano, Brescia, Cefalù)
- 30 patients each center	- 30 patients each center
- MIS Mini Keel	- MIS Mini Keel: 15 with and 15 without drop down
- Follow up: 3 years	- Follow up: 3 years
- Clinical and x-rays evaluation	- Clinical and x-rays evaluation



Surgical Technique Mini-Keel - LPS-Flex

Evolution in surgical technique : actual surgical technique

- Trivector approach, patella first
- Preliminary First distal cut (free hand)
- More information on ER based on anterior cortex

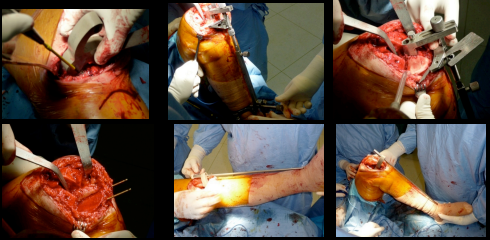
Surgical Technique Mini-Keel - LPS-Flex

Evolution in surgical technique : actual surgical technique

- Evaluation of posterior condyles parallelism
- Free hand removal of hypertrophic condyle
- Posterior Reference

Surgical Technique Mini-Keel - LPS-Flex

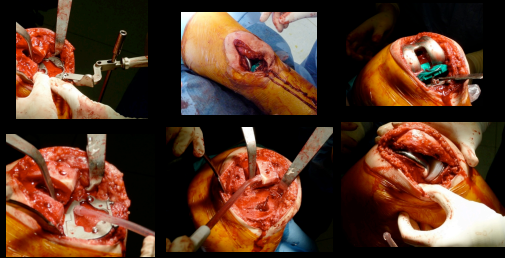
Evolution in surgical technique : actual surgical technique



- Tibial cut for 10mm spacer
- Gap evaluation in flexion/extension

Surgical Technique Mini-Keel - LPS-Flex

Evolution in surgical technique : actual surgical technique



- Decision on fixed or mobile bearing
- Final result

CONCLUSIONS

My choice was based on:

- technical considerations and on known and proved surgical principles
- direct involvement in development of implants and instruments as conceptor
- possibility of grouping surgeons for multicenter studies

Satisfactory results