Scorpio NRG®
PS & CR
Primary Knee System

- Freedom
- Mobility
- Confidence
Scorpio NRG®

Freedom with Conformity

Unlike other modern knee replacement designs, Scorpio NRG® has greater internal and external rotational freedom throughout the full range of motion. Mechanical testing illustrates that the Scorpio NRG® fixed bearing design has comparable rotational allowance to competitive mobile bearing knee systems without sacrificing contact.

The Importance of Rotation

Large degrees of tibial rotation have been reported for the living intact knee. It is also reported that the knee rotates up to 17° after total knee arthroplasty. Insufficient allowance for these rotations can lead to possible polyethylene wear for damage due to stress on the polyethylene.

The Scorpio NRG® Approach

Mechanical testing shows the Scorpio NRG® fixed bearing design maintains low levels of constraint up to ±20° of rotation which is consistent with a mobile bearing philosophy.

Traditional insert designs utilize a less functional partial rotary arc that limits the overall kinematic function of the knee. The Scorpio NRG® tibial insert articulating surface adapts a Spherical Arc in order to realize greater rotational freedom. By meshing a single M/L radius and a Spherical Arc, Scorpio NRG® allows for wider rotational freedom without restricting tibiofemoral contact area.
The Scorpio NRG® knee was designed to accommodate rotations of the intact knee on the articulations surfaces for both PS and CR systems. Additionally, Scorpio NRG® PS accommodates these rotations as well on the post where possible post wear and damage can occur.

Traditional straight cut designs restrict the knee from achieving increasing amounts of I/E rotation. Rotary arc designs, while accommodating increasing amounts of IE rotation, provide less conformity at these angles.

The Scorpio NRG® Spherical Arc design accommodates increased amounts of I/E rotation while still maintaining the single M/L radius.
The Importance of Conformity

Conformity is an important factor as a wear mechanism of polyethylene. If the contact area between two surfaces is too low, the residual stress will exceed the yield point of the polyethylene, therefore greater conformity is desired to potentially reduce the likelihood of a revision. On the other hand, increasing conformity of a total knee implant increases the level of rotational constraint. If the contact area is too great, the kinematic motion of the joint will be limited and the rotational torque will be transmitted directly to the locking mechanisms of the tibial base plate. This method of knee implant design has been shown to exhibit early clinical failure.4

Typical contact area for the Scorpio NRG® system during normal gait

Typical contact area for the Scorpio NRG® system during stair climbing
The Scorpio NRG® Approach

The clinically successful single M/L radius of the Scorpio NRG® design achieves full conformity at all flexion angles. The increased conformity of the Scorpio NRG® knee design results in decreased contact tresses during increasing rotation.

Mobility for the Active Patients

Component design can contribute to patients activity level by providing joint stability and improved function.

The Scorpio NRG® knee design is intended to offer greater improvements over conventional designs.

Multi-Radius Design

Single A/P Radius design is intended to optimize knee-kinematics for less anterior knee pain, faster patient rehabilitation and improved ligament stability.
The Importance of Joint Stability
The traditional knee implant is designed with several axes of rotation that create mid-flexion instability during the transition between radii. This type of instability limits the control a patient feels during common activities such as rising from a chair and ascending or descending stairs.

The Scorpio NRG® Approach
A single axis, single radius design can provide consistent collateral ligament isometry and stability throughout the range of motion. Scorpio NRG® improves upon the Scorpio design by reducing one additional transition radius and extending the single radius to 95 degrees. It has been shown that single radius designs have approximately 70% less center of gravity sway while rising from a chair.6

Single Radius Design
Clinical Confidence

For the surgeon, confidence of the implant design is imperative. The core technology of the Scorpio NRG® knee incorporates several clinically tested concepts from the Single Radius Family. It is essential to evolve products to improve performance, but it is of greater importance that clinical history lay the foundation of the design.

Bone Conservation

Scorpio NRG® design is intended to reduce the amount of bone resection in three areas:

Resection Level
Distal and posterior resection is maintained at 8mm of bone.

No Additional Posterior Cut
Unlike some other knee prosthesis, Scorpio NRG® does not require additional bone resection on the posterior condyles. Even without the additional bone resection, Scorpio NRG® is able to maintain sufficient contact in achieve deep flexion.

No Patella Groove Resection
The traditional component requires patella groove resection to form deep patella groove. Scorpio NRG® does not require additional patella groove resection.
Clinically Proven Single M/L Radius

“High conformity may be achieved without excessive constraint through the use of a single mediolateral radius condylar design. Most common daily activities require 0° to 60° of knee flexion. It is at these flexion angles that maximum contact area and conformity should be maintained to reduce stress on the tibial inserts.

The single mediolateral condylar design demonstrated larger contact area from 0° to 60° of flexion compared with dual-radius designs and statistically equivalent contact area at higher flexion angles.”
“Evidence of wear associated with medial edge loading was not observed in this large, unselected series of contemporary flat-on-flat TKA implants. Concerns of reduced contact area and high contact stresses associated with edge loading were unsupported by these retrieved inserts.”

Scorpio NRG® realizes larger contact area and high rotational allowance using single M/L radius design that has excellent clinical results since Series 3000.
The Scorpio NRG knee incorporates several designs intended to reduce the amount of bone resection in three areas: 

- No Patella Groove Resection
- No Additional Posterior Cut
- 8mm of bone.

Distal and posterior resection is maintained at 8mm of bone. The traditional component requires patella groove resection. Unlike some other knee prosthesis, Scorpio NRG does not require additional bone resection, Scorpio NRG is able to maintain sufficient contact in achieving deep flexion angles. "High conformity may be achieved without excessive constraint through the use of a single radius design that has excellent clinical results since Series 3000."

High conformity may be achieved without excessive constraint through the use of a single radius design that has excellent clinical results since Series 3000.

For the surgeon, confidence of the implant realization is imperative. The core technology of Scorpio NRG’s design is intended to reduce the stress on the tibial inserts. The design is intended to reduce the stress on the tibial inserts. Clinically tested concepts from the Single Radius Design in TKA. Presentated at the 29th Annual Meeting of American Academy of Orthopedic Surgeons, Feb 1-4, Anaheim, California, 1983.

The tibial insertion is included in the trochlear recess to improve performance, but it is of greater importance that clinical history lay the foundation of the design.


Confidence CR
Confidence PR

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•Freedom
•Mobility
•Confidence

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