Biomet Cannula

Design Rationale & Operative Protocol

Designed to Reduce lucent lines[7] and prevent early cement interface failure in knee replacement surgery

Improve the bone cement interface with consistent penetration of cement into cancellous bone

Aid to tourniquet-free surgery

Improved Cement Technique in
Total and Unicompartmental Knee Arthroplasty

BIOMET Europe

Design Rationale

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The objective of using the Biomet Cannula is to:

- Reduce lucent lines and prevent early cement interface failure in knee replacement surgery
- Improve the bone cement interface with consistent penetration of cement into cancellous bone
- Decompress long bones during component insertion

The Biomet Cannula was developed in conjunction with Mr K. S. Eyres and Mr M. Norton at the Royal Devon and Exeter Hospital, UK.

There are many predictors of failure in Total Knee Replacement. In cemented knee arthroplasty, the quality of bone surface preparation and method of cementing technique can also influence the outcome.

- Poor cementing technique can adversely affect the outcome of the procedure. To achieve maximum bone cement interface strength, cement penetration of 5-10mm is required.[1]

- Shear strength of the bone-cement interface can be reduced by up to 50% by blood contamination.[2]

- Bleeding pressures also reduce the cement interdigitation, which can compromise the strength of the fixation interfaces.[3]

- The appearance of lucent lines immediately post operatively can indicate poor technique. They can also indicate failure at the bone-cement interface. There is a strong inverse relationship between the depth of cement penetration and the development of radiolucencies.[4]

- Decompression of long bones prior to instrumentation first, then to reduce bone debris and and airborne blood contamination, particularly in absence of tourniquet.

- Advantages of tourniquet free surgery have been demonstrated[5] and continue to increase in popularity

Ordering Information

Re-Order Code	Product Description
32-421385	Biomet Cannula

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Disclaimer

References

1. Krause et al. (1982) Clin Orthop 163:290-299
2. Bannister & Miles. (1989) Eng Med 17:131-133
3. Benjamin et al. (1987) J Bone Joint Surg. 69:620-624
4. Walker et al. (1984) Clin Orthop 185:155-164
5. Abdel-Salam & Eyres. (1995) J Bone Joint Surg. 77:250-253
6. Norton & Eyres. (2000) J. Arthroplasty 15(4): 468-474
7. McAllen & Eyres. Presented at BASK meeting, April 2004
8. Ewald. (1989). Clin Orthop 248: 9-12

Benefits of the Biomet Cannula

- The risk of fat emboli is greatly reduced by the use of suction during the use of long bone instrumentation and the impaction of implant components.
- Bone cement interface is improved by consistent and more efficient penetration of cement.
- In the absence of a tourniquet, using the Biomet Cannula to prepare the bone bed assists in achieving a dry and clean surface.

Features

Trochar and cannula assembly with polished tip for ease of insertion

Threaded attachment of trochar for secure insertion

Perforated cannula tip to improve suction

Hexagonal section for ease of cannula removal

Secure attachment of suction tubing via standard tapered end

Operative Technique

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Preparation of bone surfaces

1a. **Femur:** Prior to resection, drill 3.2mm hole into lateral or medial side of femoral condyle 10mm proximal to cut distal femoral surface. (Fig 1)

1b. **Tibia:** Prior to re-section, drill 3.2mm hole 10mm below proximal tibial surface, either medially or laterally. (Fig 2)

2. Insert cannula complete with trochar into hole and tap into position.

3. Using the cross bar, unscrew and remove trochar from cannula, being careful of the sharp point.

4. Attach suction tubing to end of cannula.
Set vacuum at 125 kPa

5. Wash bone surface thoroughly with pressure lavage and dry with peroxide soaked swabs. Observe fluids draining from bone. If the cannula gets blocked during use, it should be removed and cleared using the trochar.

6. If cannula blocks, remove and resert the trocar.

Fig 1

Fig 2

The trochar MUST be assembled into the cannula whenever the device is being inserted or removed from the bone. Care should be taken not to apply any bending moment to the cannula when it is in position

Cementing Procedure

Application of cement to the bony surfaces will vary depending upon cement used. Palacos bone cement is recommended as lower viscosity cements may over penetrate the cancellous bone.

1. With the cannula in place and with suction on, the bone cement is applied. Ensure that the whole bone surface is totally sealed to generate a negative intraosseous pressure.

2. The suction is left on for a maximum of 1 minute or until trabeculae appear through the cement, whichever is sooner. (Fig 3)

3. Remove the vacuum tubing, leaving cannula in place.

4. Insert component, observing the fat and blood flowing out of the cannula allowing decompression of the bone.

5. For femoral application, block the IM canal with a bone plug prior to implantation.

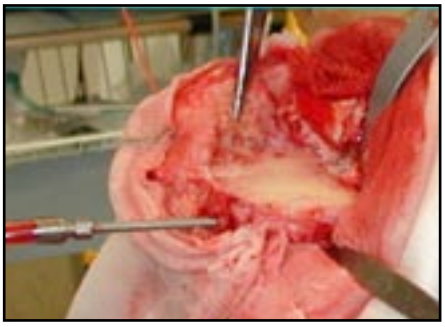

Fig 3

Although the suction is applied to one side of the femur or tibia (preferably the sclerotic side), a universal and consistent penetration of cement is achieved. (Fig 4)

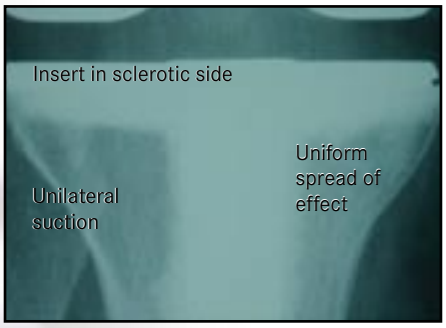

Fig 4

The Influence of Suction Cement Technique on Radiological Outcome in Total Knee Replacement at 5 years.

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McAllen CJP, Eyres, KS.
Presented at BASK meeting, Basingstoke, April 2004

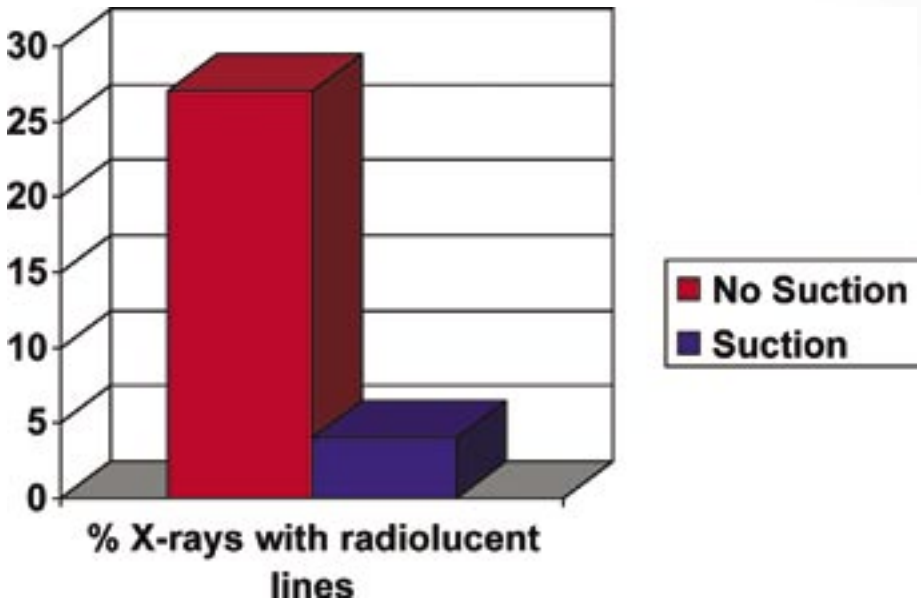
Study to determine whether cement mantle produced when a suction cement technique is used, leads to improved radiological results in the medium term.

Methods

74 patients who had a cemented total knee replacement was prospectively studied. in 51 patients, cement was applied in the standard fashion. in 23 patients, an intraosseous cannula was used to apply suction within the bone to improve cement penetration. The cannula was insert in the medial femoral condyle and medial tibial plateau, prior to bone preparation to vent both bones. Suction is then applied to help dry the cancellous surface and draw cement into the bone. The radiological appearance of the tibial components was then prospectively examined for the appearance of bone lysis

	No suction	Suction
No. Knees	51	23
Mean Patient Age	70	70
Mean Radiological Follow-up (Months)	58	47
Mean Cement Mantle thickness (mm) all zones	2	4
Range of follow up months	17-92	23-61
Appearance of Lucent Lines at the tibial cement-bone interface. (P=0.016 using Fisher's exact test)	14/51 27%	1/23 4%

Appearance of Lucent lines at the tibial cement-bone interface at 5 years



No patients required revision. This study shows that this technique produced superior radiological appearances in the medium term, which may lead to longer implant survival. A previously published study has shown that if TKR is performed with a tourniquet but using suction cement technique, an excellent cement mantle can be reliably produced.

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