AGC
Total Knee System

Dual Articular™ 2000

BIOMET Europe

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Design Rationale

The Dual Articular Knee has been in use since 1991 and offers a flexible reconstructive solution for total knee surgery; for both revision and complex primary indications where high degree of varus/valgus support is required[1].

The key benefits offered by the Dual Articular include the increased varus/valgus support provided by an extended intercondylar post on the tibial bearing. A key limitation of highly constrained devices is that the function of the reconstructed knee becomes limited to hinge like movements as rotation is constrained. This can compromise the kinematic function of the knee as well as placing extremely high stresses on the intercondylar polyethylene post, leading to post failure and premature loosening.

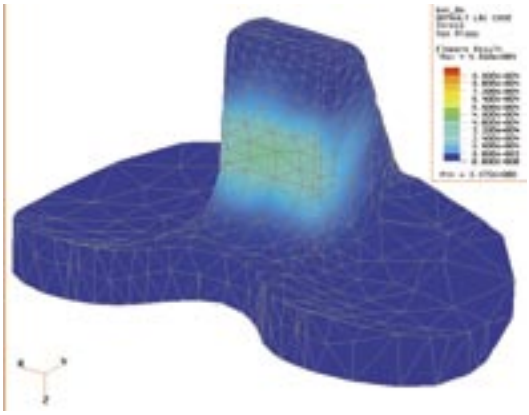
The Dual Articular overcomes this potential limitation by employing a unique rotating tibial bearing which has a bi-helical articulation with the tibial tray. This allows dissipation of the torsional forces transmitted through the femur as it rotates, and mimics the natural screw home mechanism of the normal knee. As the bearing rotates, it ramps up the helical surfaces, generating a centralising force and tensioning the soft tissues, thus stabilising the knee.

Summary of Key Design Criteria

Stability
The DA2000 articulation maintains full contact area up to 130 degrees, with no limit on further flexion if required. The tibial bearing post is 27.5mm tall and provides complete varus / valgus stability. Resistance to dislocation is provided by the large hop height at 90 degrees of 21mm for all component sizes.

A design optimisation of the polyethylene post means thicker polyethylene and decreased stress compared to the original and well proven AGC DA. The result from finite element analysis is predicted stresses much lower than the yield point of the polyethylene.

Versatility
Indications include severe primary as well as revision procedures where severe bone loss and / or ligament deficiency often requires augmentation.



Minimum potential for polyethylene wear
ArCom™ direct compression moulded polyethylene tibial bearing for gold standard results clinically proven in the AGC*.

Accurate instrumentation
Instrumentation provides intramedullary referencing for accurate component positioning. Compatibility with T-1™ referencing instruments ensures accurate joint line restoration.

System Integration
The Dual Articular 2000 is part of the clinically proven AGC™ Knee System [2, 3].

Femoral Component

The femoral component is manufactured in cast cobalt chromium alloy for high strength, superb wear resistance and excellent bio-compatibility. The anatomical design incorporates a large lateral anterior flange with a deep patellar groove set at a valgus angle of 7 degrees.

There are 5 sizes of component; 55, 60, 65, 70 and 75mm, left and right, to ensure optimal patient fit.

The femoral component is fully interchangeable with any of the tibial components to ensure optimal bone coverage.

The intercondylar box provides a location for the tibial post to provide a high degree of medio-lateral stability. It allows controlled flexion to 130 degrees without impingement.

The intercondylar box also prevents hyper extension and provides an attachment for the intramedullary stem extensions.

Full compensation for bony deficiency is possible with separate distal and posterior augmentation blocks which securely bolt to the femoral component.

The anterior flange of the femoral component is set close to the femoral stem boss to prevent overstuffing of the patello femoral joint.

Tibial Component

The tibial component is manufactured in cast cobalt chromium and features an integral post to provide a point around which the bearing can rotate while retaining stability.

The underside of the tray has a central boss for the attachment of the optional modular tibial stems. The stems are securely locked via the combination of a morse taper and a locking screw which passes through the tibial post.

In cases of bony deficiency, tibial augmentation blocks can be securely located over the anti rotation pegs of the tibial component.

The shape of the tibial tray is based on the same proven sizing rationale used for the AGC™ and provides optimal bone coverage[4]. The tibial trays are available in 7 sizes: 59, 63, 67, 71, 75, 79 and 83mm.

Each quadrant of the tibial component articulating surface is highly polished to minimise the potential for polyethylene wear.

Tibial Bearing

Controlled rotation is provided by the unique use of two opposing helical surfaces. As the knee is brought into flexion and the tibia rotates, controlled rotation is allowed by the bearing gliding over the matching helical surface of the tibial plate.

The effect is to extend the joint space until the ligaments and joint capsule tighten. As the knee is brought back into extension, load is progressively applied causing the surfaces to return and 'lock' into the neutral position. This effect has been likened to the 'screw home' principle of the natural knee.

This unique function of the bi-helical tibial mechanism provides the patient with an increased degree of confidence in the stability of their knee replacement[5].

The helical surfaces are fully congruent in the neutral position with at least 17.4cm^2 of contact area for the smallest components. Even at 10° of rotation, 80° area contact is achieved between the matching surfaces of any polyethylene bearing and any tibial tray.

ArCom™
PROCESSED POLYETHYLENE

All Dual Articular 2000 tibial bearings are direct compression moulded from ArCom™ polyethylene, proven to offer superior wear resistance in both laboratory and clinical studies[6, 7, 8].

Improved wear resistance

Direct compression moulding manufacturing process

Better consolidation of polyethylene particles

Higher ultimate tensile strength

Ultrasonic evaluation for quality

Argon packaging and sterilisation

Improved resistance to oxidation and discolouration

Stems & Augments

A full range of stem extensions are available in multiple lengths and diameters to provide a “press-fit” in the femoral and tibial intramedullary canals.

Both femoral and tibial components share a universal design of stem extension. The stems are manufactured from titanium alloy and are designed for cementless use. Stems are available in three lengths; 80, 120 and 160mm and in eight diameters from 10mm to 24mm in two mm increments.

Stems of 16mm diameter and above have a coronal split in the distal tip to reduce stiffness and the possibility of thigh pain. 160mm length stems have an anterior bow in them corresponding to the curvature of the femur.

Tibial Augmentation Blocks

Reconstruction of tibial bony defects is possible utilising tibial augmentation blocks. Augments are available in three thicknesses, 6, 10 and 16mm.

The blocks securely locate over the anti rotation pegs of the tibial component and are locked into place using an allen screw.

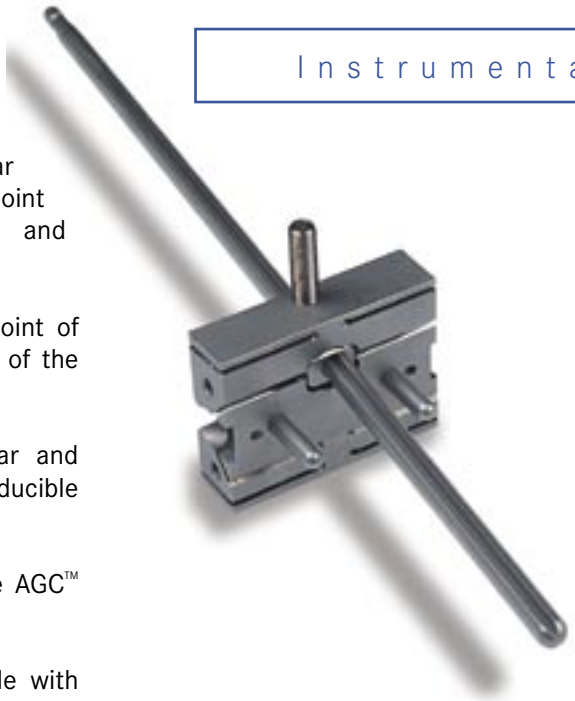
Femoral Augmentation Blocks

Reconstruction of bony defects is possible utilising separate distal and posterior augmentation blocks.

Femoral augmentation blocks are available in two thicknesses; 6 and 10mm.

Micromotion of the augments is prevented via locking screws that bolt the blocks securely to the femoral component.

Instrumentation



The instrumentation for the Dual Articular 2000 allows accurate restoration of the joint line and provides for balanced flexion and extension gaps.

The intramedullary canal is used as the point of reference to allow for accurate positioning of the femoral and tibial prostheses.

The trial instrumentation is fully modular and includes augmentation trials to ensure reproducible restoration of the patients' anatomy.

The instrumentation is compatible with the AGC™ and Maxim® knee systems.

The Dual Articular 2000 is also compatible with T-1™ instrumentation which assists in accurate repositioning of the anatomical joint line.

Implant Listing

Femoral Components

154800	55mm	D/A 2000 Femoral Component	L/H
154801	60mm		
154802	65mm		
154803	70mm		
154804	75mm		
154805	55mm	D/A 2000 Femoral Component	R/H
154806	60mm		
154807	65mm		
154808	70mm		
154809	75mm		

Tibial Components

154810	D/A 2000 Tibial Tray	59mm
154811		63mm
154812		67mm
154813		71mm
154814		75mm
154815		79mm
154816		83mm

Tibial Bearings

154817	D/A 2000 Tibial Bearing	59mm x 8mm
154818		59mm x 10mm
154819		59mm x 12mm
154820		59mm x 14mm
154821		59mm x 16mm
154822		59mm x 18mm
154823		59mm x 20mm
154824	D/A 2000 Tibial Bearing	63/67mm x 8mm
154825		63/67mm x 10mm
154826		63/67mm x 12mm
154827		63/67mm x 14mm
154828		63/67mm x 16mm
154829		63/67mm x 18mm
154830		63/67mm x 20mm
154838	D/A 2000 Tibial Bearing	71/75mm x 8mm
154839		71/75mm x 10mm
154840		71/75mm x 12mm
154841		71/75mm x 14mm
154842		71/75mm x 16mm
154843		71/75mm x 18mm
154844		71/75mm x 20mm
154852	D/A 2000 Tibial Bearing	79/83mm x 8mm
154853		79/83mm x 10mm
154854		79/83mm x 12mm
154855		79/83mm x 14mm
154856		79/83mm x 16mm
154857		79/83mm x 18mm
154858		79/83mm x 20mm

Femoral Augmentation Blocks

145310	Distal Femoral Augment	6mm x 55mm	ML/LR
145311		6mm x 60 mm	ML/LR
145312		6mm x 65mm	ML/LR
145313		6mm x 70mm	ML/LR
145314		6mm x 75mm	ML/LR
145350	Distal Femoral Augment	10mm x 55mm	ML/LR
145351		10mm x 60mm	ML/LR
145352		10mm x 65mm	ML/LR
145353		10mm x 70mm	ML/LR
145354		10mm x 75mm	ML/LR
145320	Distal Femoral Augment	6mm x 55mm	MR/LL
145321		6mm x 60mm	MR/LL
145322		6mm x 65mm	MR/LL
145323		6mm x 70mm	MR/LL
145324		6mm x 75mm	MR/LL
145360	Distal Femoral Augment	10mm x 55mm	MR/LL
145361		10mm x 60mm	MR/LL
145362		10mm x 65mm	MR/LL
145363		10mm x 70mm	MR/LL
145364		10mm x 75mm	MR/LL
145330	Posterior Femoral Augment	6mm x 65mm	ML/LR
145331		6mm x 60mm	ML/LR
145332		6mm x 65mm	ML/LR
145333		6mm x 70mm	ML/LR
145334		6mm x 75mm	ML/LR
145370	Posterior Femoral Augment	10mm x 55mm	ML/LR
145371		10mm x 60mm	ML/LR
145372		10mm x 65mm	ML/LR
145373		10mm x 70mm	ML/LR
145374		10mm x 75mm	ML/LR
145340	Posterior Femoral Augment	6mm x 55mm	MR/LL
145341		6mm x 60mm	MR/LL
145342		6mm x 65mm	MR/LL
145343		6mm x 70mm	MR/LL
145344		6mm x 75mm	MR/LL
145380	Posterior Femoral Augment	10mm x 55mm	MR/LL
145381		10mm x 60mm	MR/LL
145382		10mm x 65mm	MR/LL
145383		10mm x 70mm	MR/LL
145384		10mm x 75mm	MR/LL

Tibial Augmentation Blocks

154866	Tibial Augment	59mm x 6mm	LL/RM
154867		59mm x 6mm	LM/RL
154868		59mm x 10mm	LL/RM
154869		59mm x 10mm	LM/RL
154530	Tibial Augment	63mm x 6mm	LL/RM
154537		63mm x 6mm	LM/RL
154544		63mm x 10mm	LL/RM
154551		63mm x 10mm	LM/RL
154531	Tibial Augment	67mm x 6mm	LL/RM
154538		67mm x 6mm	LM/RL
154545		67mm x 10mm	LL/RM
154552		67mm x 10mm	LM/RL
154532	Tibial Augment	71mm x 6mm	LL/RM
154539		71mm x 6mm	LM/RL
154546		71mm x 10mm	LL/RM
154553		71mm x 10mm	LM/RL
154533	Tibial Augment	75mm x 6mm	LL/RM
154540		75mm x 6mm	LM/RL
154547		75mm x 10mm	LL/RM
154554		75mm x 10mm	LM/RL
154658	Tibial Augment	79mm x 6mm	LL/RM
154659		79mm x 6mm	LM/RL
154662		79mm x 10mm	LL/RM
154663		79mm x 10mm	LM/RL
154660	Tibial Augment	83mm x 6mm	LL/RM
154661		83mm x 6mm	LM/RL
154664		83mm x 10mm	LL/RM
154665		83mm x 10mm	LM/RL

Femoral and Tibial Stem extensions

141610	Femoral/Tibial Stem	80mm x 10mm	DIA
141612		80mm x 12mm	DIA
141614		80mm x 14mm	DIA
141616		80mm x 16mm	DIA
141618		80mm x 18mm	DIA
141620		80mm x 20mm	DIA
141622		80mm x 22mm	DIA
141624		80mm x 24mm	DIA
141652		120mm x 12mm	DIA
141654		120mm x 14mm	DIA
141656		120mm x 16mm	DIA
141658		120mm x 18mm	DIA
141660		120mm x 20mm	DIA
141662		120mm x 22mm	DIA

141872	Fem/Tib Stem	160mm x 12mm DIA-BOWED
141874		160mm x 14mm DIA-BOWED
141876		160mm x 16mm DIA-BOWED
141878		160mm x 18mm DIA-BOWED
141880		160mm x 20mm DIA-BOWED
141882		160mm x 22mm DIA-BOWED

154871	Femoral/Tibial Plug

Instrument Listing

32-420 896	DA 2000 Instrument Set Complete (excluding Patella Instruments)
32-420 072	DA2000 FEM Frames Case 4 Complete
32-420 541	DA2000 TR ST Xtensions No.8 Complete
32-420 543	DA2000 TIB Trials Case No.3 Complete
32-420 809	DA2000 Femoral Trials No.6 Complete
32-420 814	DA2000 TIB Resect Case No.1 Complete
32-420 816	DA2000 TB T/Plate Case No.2 Complete
32-420 818	DA2000 TB TRL AUG Case No.4 Complete
32-420 861	DA2000 FEM AUG Trial No.7 Complete
32-420 875	DA2000 STM Reamer Case No.2 Complete
32-420 881	DA2000 FEM Sizing Case No.1 Complete
32-420 886	DA2000 FEM Contour Block No.3 Complete
32-420 899	DA2000 General FEM INST No.5 Complete

32-401 294	AGC V2 Patellar Instr Case c/w Instr

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Biomet UK Limited
Waterton Industrial Estate
Bridgend, South Wales, CF31 3XA, United Kingdom

Tel. +44 (0) 1656 655221
Fax. +44 (0) 1656 645454

BIOMET Europe

www.biomet.co.uk

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