

bioadvance[®]

MEDICAL DEVICES

VAIOS[®]

SHOULDER SYSTEM

ANATOMIC · INVERSE



Jri
Orthopaedics

CE
0473

CE
for instrumentation

VAIOS®

Innovation in Practice

Consultar disponibilidad según país o región

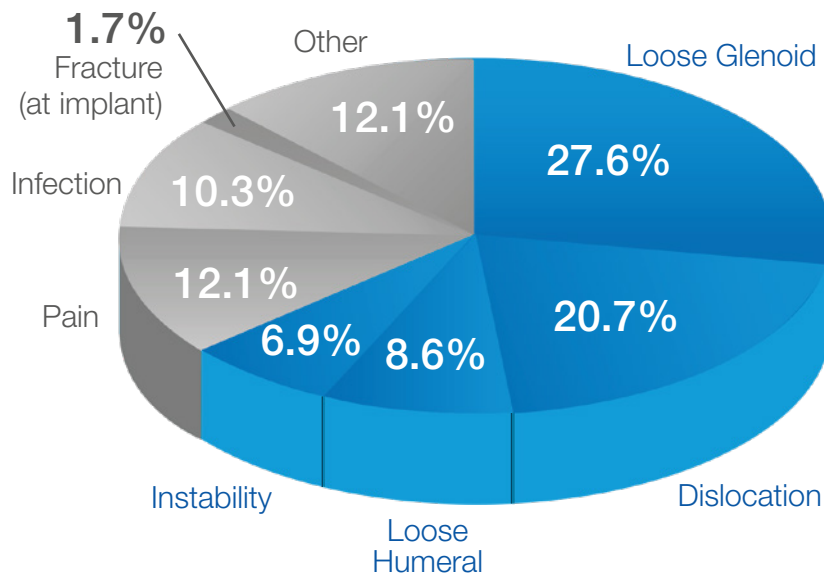
Shoulder replacement has provided good clinical outcomes over the past 15 years. However, a number of challenges have been identified that can compromise the long term success of shoulder arthroplasty often requiring early revision of the prosthesis.

To overcome these well documented failure modes, experts in the field of shoulder replacement surgery, biomechanical engineering, joint replacement design and manufacturing collaborated to develop a shoulder replacement system that is Versatile, Anatomic, Inverse Optimised and Stable (VAIOS®) whilst utilising a minimum number of components and instrumentation.

**Professor
Angus Wallace F.R.C.S.**
Nottingham City Hospital



Why do current designs fail in Shoulder Arthroplasty?



Norwegian Arthroplasty Register 1994 - 2006

VAIOS® has been designed to address the failure modes which account for 64% of early shoulder revisions

PROBLEM	SOLUTION
Glenoid loosening requiring early revision	<ul style="list-style-type: none"> • 4 screws for secure fixation • Superior and inferior locking screws • Curved back to improve load distribution • Limited radial mismatch to preserve polyethylene (poly) • Supravit® H-A.C. coated to maximise secondary fixation • 4 mm of poly, giving up to 20 years of use
Shoulder dislocation and instability	<ul style="list-style-type: none"> • Humeral heads 42, 46, 50 and 54 mm diameter with 3 and 6 mm eccentric offset, adjustable by 360° • Humeral component optimized for offset of centre of rotation (COR) from humeral shaft
Loose humeral component	<ul style="list-style-type: none"> • Fully hydroxy-apatite coated (H-A.C.) coated distal stem and Supravit® Zoned H-A.C. coating on modular neck • Stem designed to give good rotational stability

Versatility

VAIOS® is designed to offer maximum versatility, allowing the surgeon to adapt intraoperatively to meet the patient's clinical needs, whilst minimising the components and instruments required.

COMPLETE SHOULDER REPLACEMENT SYSTEM

- Modular humeral component reduces prosthesis inventory but allows for either uncemented or cemented distal stem options
- Humeral neck design with wiring holes facilitates treatment of proximal humeral fractures
- Unique design allows for an easy exchange from anatomic to inverse shoulder arthroplasty without the need to replace the Glenoid metal-back or humeral stem components. This reduces operative time and preserves bone stock
- Common resection for anatomical and inverse procedures minimising the instrumentation required



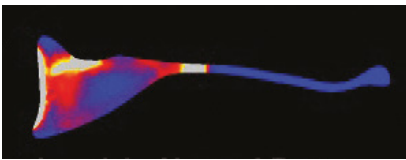
Versatility

GLENOID METAL-BACK

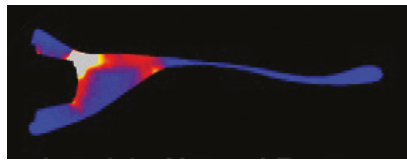
Designed to be used in anatomic and inverse shoulder arthroplasty ensuring maximum intraoperative flexibility with minimum inventory.

- **Curved Mounting Surface** - Converts micromotion-inducing shear forces to compression forces at the implant / bone interface, encouraging bone ingrowth into the H-A.C. coating
- **Supravit® Zoned H-A.C. coating** - “clinically proven coating provides high shear strength, designed to increase longevity”
- **Large Glenoid peg** - provides central support to recruit cortical bone
- **Tapered Peg profile** - generates compressive force at the implant/bone interface upon implantation with screws, enhancing fixation and providing stability required for secondary fixation
- **Locking screw caps** - Reduces micromotion and locks the Glenoid firmly in position to reduce the risk of component loosening. Three cortical bone screws located inferiorly where more Glenoid bone stock lies

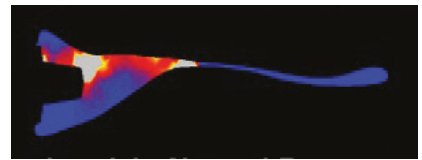
Distribution strain energy density test



Normal anatomy



Anatomic



Inverse



Metal Back

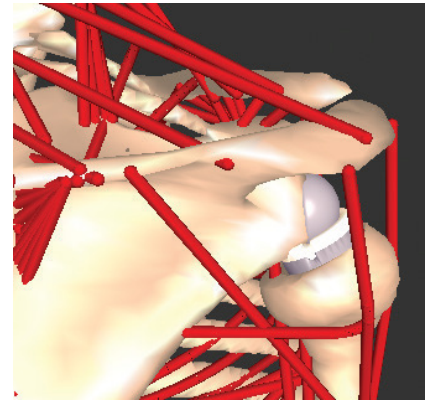


Screw Cap

Optimization

SCAPULAR NOTCHING – STUDIES REPORT 74% NOTCHING RATE

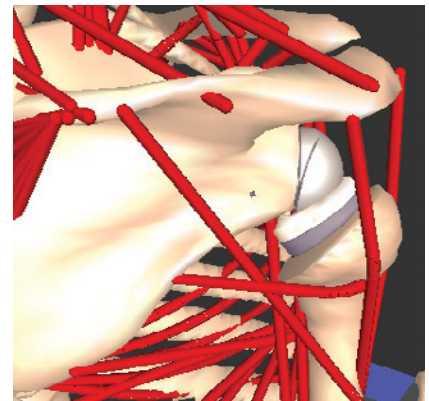
Development of notches can be the result of high contact stresses or bone loss from the contact of the prosthesis with the scapula



Scapular Notching - Delta III

OVERCOMING THE WEAKNESSES OF CURRENT INVERSE ARTHROPLASTY DESIGNS

- Extensive biomechanical modelling at Newcastle University has identified the optimal offset of centre of rotation from the humeral shaft to reduce subacromial impingement of the humerus
- The Newcastle Shoulder Model has identified the optimal cup depth to ensure the stability of the prosthesis is maintained whilst eliminating scapular impingement, thereby reducing the risk of scapular notching



Reduced inferior impingement

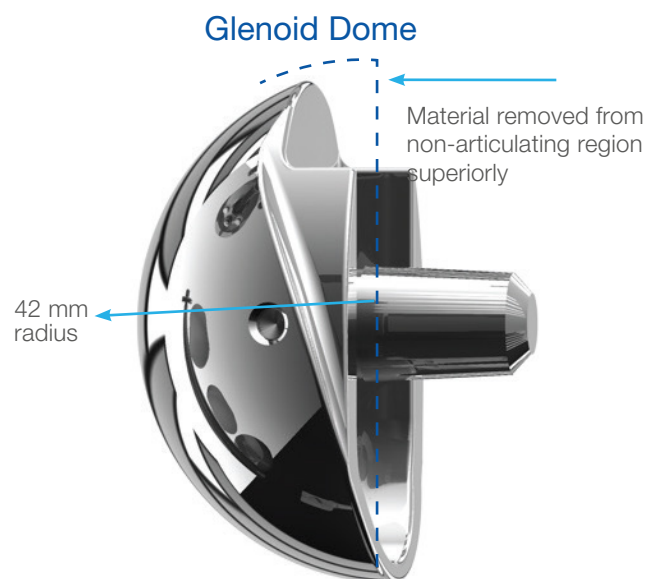
ANATOMIC

- Anatomic head sizing - maintains rotator cuff tension and humeral centre of rotation
- Non-conforming Glenoid (UHMWPE) insert - designed to reduce stress on fixation interfaces

Optimization

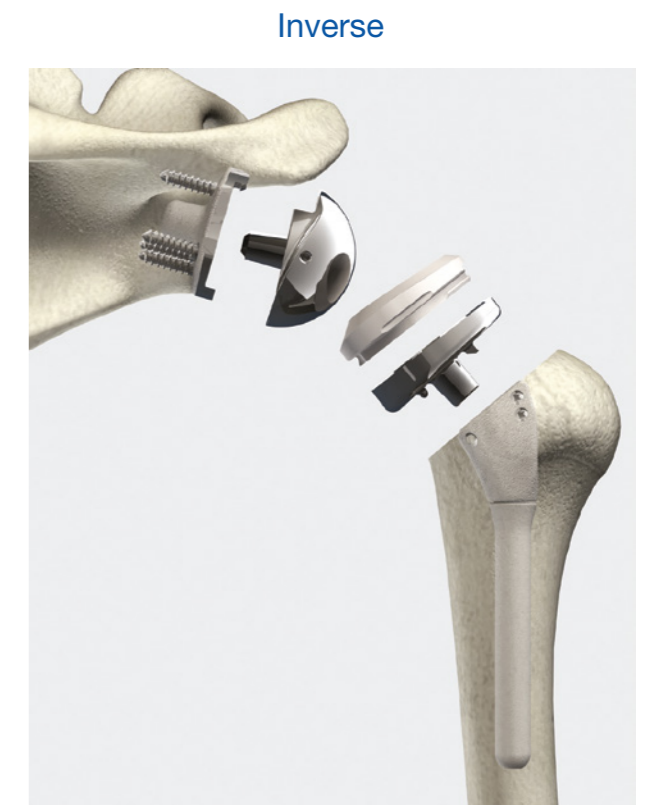
TOTAL SHOULDER ARTHROPLASTY – INVERSE

- **42mm head diameter** – increases the moment arm of the deltoid muscle
 - increases joint stability
 - increases the inferior Glenoid clearance
- **Removal of material in non-articulating region of the head**
 - simplifies implantation of the definitive prosthesis and minimises risk of over stuffing the joint
- **150° Equivalent Neck Shaft Angle** – provides optimal balance between impingement and stability
- **Optimal cup depth** – has been shown by the Newcastle Shoulder Model as being the most effective way of reducing inferior impingement without compromising the joint stability
- **(UHMWPE) insert shape optimised** – a small amount of material has been removed from the impingement area but the stability region is left intact
- **Optimal offset of centre of rotation from humeral shaft** – increase deltoid moment arm and avoid subacromial impingement
- **Locking Glenoid screws** – designed to reduce micromotion at bone / implant interface, whilst securely locking Glenoid into position
- **Curved mounting surface** – converts micromotion inducing shear forces to compression forces at the implant bone interface to facilitate bone ingrowth. Angularly adjustable Glenoid screws allow for recruitment of high quality scapular cortical bone to maximise fixation



Full Modularity

Common Humeral and Glenoid components, combined with the modularity of the VAIOS® system, offers the surgeon complete intraoperative flexibility to perform Anatomic, Inverse, Trauma and Revision shoulder arthroplasty with only three instrument trays.



Maximum Versatility Minimum Inventory

LESS IS MORE!

MAXIMUM VERSATILITY

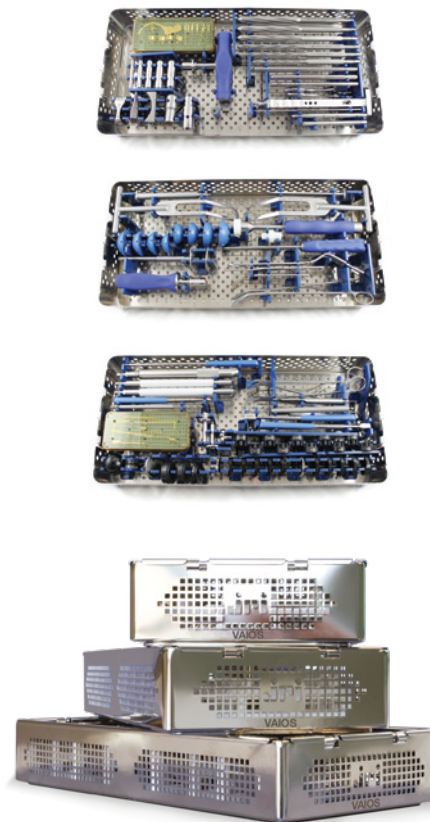
Single instrument set for anatomic, inverse, trauma and revision shoulder arthroplasty

MINIMUM INVENTORY

Minimum components - reduced complexity without compromising clinical choice



Other Systems



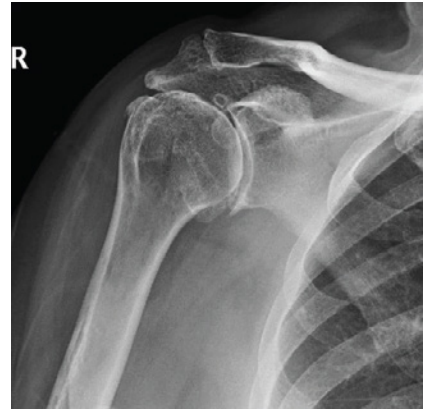
VAIOS System

Case Studies

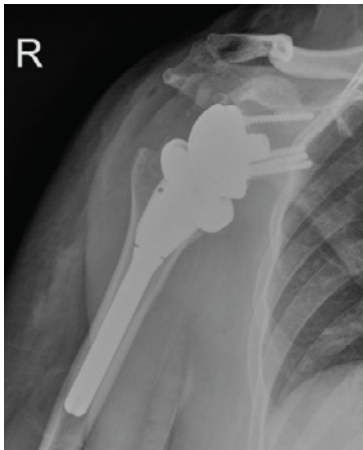
VAIOS INVERSE TSA

Female; Aged 64
Systemic Lupus Erythematosus
Stiff painful Right shoulder

At surgery supraspinatus very fibrotic and tight. Initially shoulder prepared for an Anatomical TSA with insertion of the Glenoid baseplate and humeral stem and neck. The supraspinatus was then found to be avulsed and the Anatomical was changed to an Inverse before completion of the operation.



*Very tight arthritic right shoulder
Pre-Op x-ray on 05 Jan 2010*



*Right shoulder VAIOS Inverse TSA 09 Jun 2010
Post-Op x-ray on 10 Jun 2010*

Case Studies

VAIOS INVERSE TSA

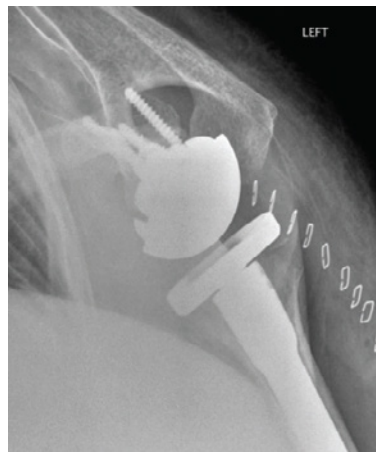
Female; Aged 56

Massive Rotator Cuff Tear (5x6cm) Left shoulder. Previous Right Massive Rotator Cuff Tear successfully repaired in 2008. Repair attempted at operation but not possible. Operation converted to a VAIOS® Inverse TSA on the table.

This patient had bilateral massive Rotator Cuff Tears. The right shoulder (shown) was successfully treated with a RC repair operation in 2008. The left shoulder was similar but x-rays are not available. The x-rays of the right shoulder represent similar pre-operative appearances to those of the left shoulder.



Massive RC Tear Rx VAIOS® Inverse
Pre-Op x-ray 10 May 2007



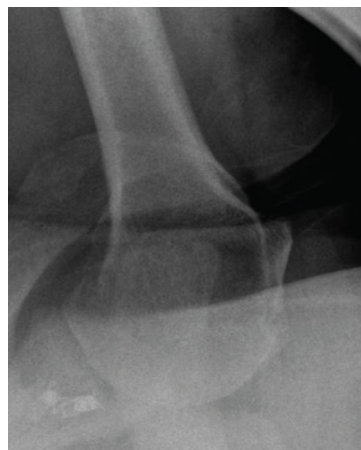
Lt shoulder VAIOS Inverse TSA 16 June 2010
Post-Op x-ray on 17 June 2010

Case Studies

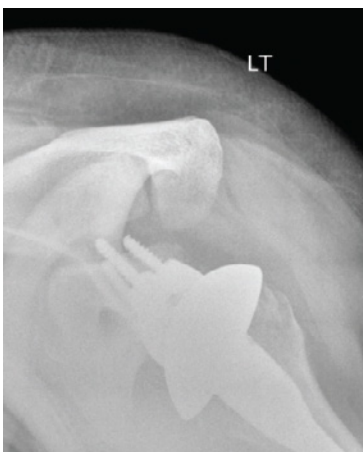
VAIOS ANATOMIC TSA

Female; Aged 49

Secondary OA following recurrent anterior dislocation. Bankart operation leading to early degenerative change with pain



Pre-op X-rays 25 Feb 2010



*Right shoulder VAIOS Anatomic TSA 7 July 2010
Post-Op x-ray on 8 July 2010*

Implants Information

CODE	DESCRIPTION
801-42-03	Anatomic Head 42 mm O/D 3 mm Offset
801-46-03	Anatomic Head 46 mm O/D 3 mm Offset
801-50-03	Anatomic Head 50 mm O/D 3 mm Offset
801-54-03	Anatomic Head 54 mm O/D 3 mm Offset
801-42-06	Anatomic Head 42 mm O/D 6 mm Offset
801-46-06	Anatomic Head 46 mm O/D 6 mm Offset
801-50-06	Anatomic Head 50 mm O/D 6 mm Offset
801-54-06	Anatomic Head 54 mm O/D 6 mm Offset
801-09-10	Glenoid Metal-back, Small
801-09-11	Glenoid Metal-back, Large
801-05-42	Small Glenoid Insert 42 mm I/D
801-05-46	Small Glenoid Insert 46 mm I/D
801-05-50	Small Glenoid Insert 50 mm I/D
801-05-54	Small Glenoid Insert 54 mm I/D
801-05-58	Small Glenoid Insert 58 mm I/D
801-06-42	Large Glenoid Insert 42 mm I/D
801-06-46	Large Glenoid Insert 46 mm I/D
801-06-50	Large Glenoid Insert 50 mm I/D
801-06-54	Large Glenoid Insert 54 mm I/D
801-06-58	Large Glenoid Insert 58 mm I/D
802-03-42	Cemented Glenoid Small, 42 mm I/D
802-03-46	Cemented Glenoid Small, 46 mm I/D
802-03-50	Cemented Glenoid Small, 50 mm I/D
802-03-54	Cemented Glenoid Small, 54 mm I/D
802-03-58	Cemented Glenoid Small, 58 mm I/D
802-04-42	Cemented Glenoid Large, 42 mm I/D
802-04-46	Cemented Glenoid Large, 46 mm I/D
802-04-50	Cemented Glenoid Large, 50 mm I/D
802-04-54	Cemented Glenoid Large, 54 mm I/D
802-04-58	Cemented Glenoid Large, 58 mm I/D
802-04-54	Cemented Glenoid Large, 54 mm I/D
802-04-58	Cemented Glenoid Large, 58 mm I/D

CODE	DESCRIPTION
801-01-08	Humeral Stem, H-A.C. 8 mm Diameter
801-01-10	Humeral Stem, H-A.C. 10 mm Diameter
801-01-12	Humeral Stem, H-A.C. 12 mm Diameter
801-01-14	Humeral Stem, H-A.C. 14 mm Diameter
801-01-16	Humeral Stem, H-A.C. 16 mm Diameter
801-02-00	Humeral Neck
801-08-01	Locking Screw Cap
801-08-20	Screw 20 mm Long
801-08-25	Screw 25 mm Long
801-08-30	Screw 30 mm Long
801-08-35	Screw 35 mm Long
801-08-40	Screw 40 mm Long
802-01-06	Humeral Stem, Cemented, 6 mm Diameter
802-01-08	Humeral Stem, Cemented, 8 mm Diameter
802-01-10	Humeral Stem, Cemented, 10 mm Diameter
802-01-12	Humeral Stem, Cemented, 12 mm Diameter
802-22-08	Humeral Stem Long (220 mm), Cemented, 8 mm Diameter
802-22-10	Humeral stem Long (220 mm), Cemented, 10 mm Diameter
803-01-00	Inverse Cup Baseplate
803-03-01	Inverse Dome (42 mm O/D)
801-09-12	Dome Taper Retaining Screw
803-02-00	Inverse Cup Insert (42 mm I/D), 0 mm
803-02-03	Inverse Cup Insert (42 mm I/D), +3 mm
803-02-06	Inverse Cup Insert (42 mm I/D), +6 mm
801-02-01	Baseplate Taper Retaining Screw
870-01-00	Guide-wire (Disposable)
25-1605	Foam Tipped Drying Swab

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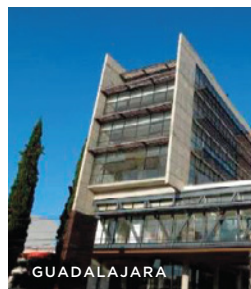
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