



## Innovative wrist arthroplasty system

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### Information Summary

Reference code:	ROI 08004
Technology overview:	Orthopedic implant for radiocarpal arthritis
Application:	An innovative medical implant, specific tooling and method to treat wrist fractures. Implant is based on patient's anatomy.
Validation:	Prototype designed and a cadaver test completed.
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### Technology Description

Wrist replacement and arthroplasty is currently difficult to achieve because of the complexity and multitude of bone, tendons and ligaments involved in the wrist/hand. Standard of care for radiocarpal arthritis in the young patient (in their 3<sup>rd</sup> to 6<sup>th</sup> decade) is wrist fusion, either partial or complete. Long term side effects, arthritis and bone necrosis, require further surgery later in patient's life to replace or fuse further progression of disease. Options used in older patients are partial or total wrist replacement. Such surgeries are non-anatomic, destructive and patients never retrieve the same functional flexibility of the wrist / hand. The high failure rate of these procedures (close to 100%) totally rules out their use in the younger patient and questions their use in the older target population. Scaphoid fractures account for 60% of wrist fractures. The scaphoid bone is particularly difficult to heal since blood circulation is limited. If not treated properly, the fractured scaphoid

bone leads systematically to radiocarpal arthritis. The current invention establishes a new method for an anatomically designed implant to replace the arthritic scaphoid bone (and others).

### Performance

The invention consists of an implant based on the mirror image of patient's contra-lateral scaphoid bone (achieved through a CT scan or an MRI). Such implant fits perfectly with patient's peri-scaphoid anatomy allowing replacement of only the diseased area.

### Benefits

- Anatomically designed implant – Implants are based on the contra-lateral image of the non-fractured scaphoid bone and reproduces perfectly the patient's fractured scaphoid bone (personalized medicine).
- Minimally destructive surgery – This surgery does not require replacing other bones in the wrist in addition to the fractured scaphoid bone. This uniquely does not burn any bridges in the eventual treatment of the patient. Further injury requiring partial or complete wrist fusion (current gold standard) can still be performed facily.
- Fewer side effects – Treating a wrist fracture with this implant and method completely restore patient's wrist flexibility and functionality. The current gold standard therapy (fusion) is disabling.

### Medical Need and Opportunity

In 2005, in the US alone over 2 million osteoporotic-related fractures were accounted for. Among them, 19% were wrist fractures or 380,000 fractures. This number is expected to increase because of the aging population. The current invention represents a major advancement in the management of wrist fractures. Fully developed, this method and system will fill a currently unmet niche. It will also apply to the existing partial wrist replacement market targeting older patients.

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Education

2002	MSc. (Experimental Surgery), McGill University
1989-1994	Orthopaedic Surgery Residency, McGill University
1985-1989	Doctor of Medicine MDCM, McGill University
1981-1985	Honors Bachelor of Science H.BSc (Biophysics) University of Western Ontario, London, Canada

Dr Harvey (MD MSc FRCSC) is currently the Chief of Orthopaedic Trauma and Director of Upper Extremity Surgery at McGill University. He is the co-Director of the JTN Wong Laboratories for Mineralized Tissue Research. He has an illustrious track record in orthopedic research with 28 research awards at the regional national and international levels. He has 75 publications as well as being principle investigator in 12 successful peer-reviewed grant competitions in the last 8 years. Dr Harvey is a recognized international influence on orthopaedic trauma care and research. He has been the course director of 12 orthopaedic meetings and has been a chosen speaker at assorted meetings over 200 times. Currently he is the head of orthopaedic trauma at the Canadian Orthopaedic Association and sits on the board of directors of the Orthopaedic Trauma Association.