

**Paul Zalzal M.A.Sc., M.D., F.R.C.S.C. (updated Jan 2009)**

Orthopedic Surgeon

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**CURRENT POSITIONS**

<b>McMaster University</b> Assistant Clinical Professor, Faculty of Health Sciences	<i>2006 - present</i>
<b>Oakville Trafalgar Memorial Hospital</b> Orthopedic Surgeon Research Affiliations at Mt. Sinai Hospital, University of Toronto and Ryerson University	<i>2004- present</i>

**EDUCATION**

<b>McMaster University</b> Orthopedic Surgery Residency	<i>1996-2001</i>
<b>McMaster University</b> Medicine	<i>1993-1996</i>
<b>University of Toronto</b> M.A.Sc. Mechanical Engineering / Biomedical Engineering	<i>1991-1993</i>
<b>University of Toronto</b> B.A.Sc. Mechanical Engineering, Honours standing	<i>1987-1991</i>

**FELLOWSHIPS**

Hamilton Arthroplasty Group, McMaster University Adult Reconstruction Drs. Frank Smith and Justin deBeer	<i>2001-2002</i>
Mt. Sinai Hospital, University of Toronto Adult Reconstruction and Revision Arthroplasty Dr. A.E. Gross	<i>2002-2004</i>

**AWARDS AND HONOURS**

First Place, Residents Research Day, \$500	1999
Valedictorian, Medical School Class of '96	1996
Natural Science and Engineering Council (NSERC) PGS A \$15,660 per annum for 2 years	1991-1992
Ingersoll-Rand Undergraduate Scholarship \$4,500 per annum for 4 years	1987-1991
NSERC Summer Research Fellowship, \$4,500	1990
Wallberg Undergraduate Scholarship, \$800	
Constant Temperature Scholarship, \$500	
J. Edgar McAllister Summer Research Fellowship, \$2,500	1989
Grabill Admission Scholarship, \$500	1987

**LICENSES AND CERTIFICATES**

FRCSC Orthopedic Surgery	2001
CPSO Independent License	2001
AO Advanced Fracture Management Course	2000
AO Basic Fracture Management Course	1998
Licentiate of the Medical Council of Canada	1998
Advanced Cardiac Life Support (ACLS)	1996
Advanced Trauma Life Support (ATLS)	1996

**TEACHING EXPERIENCE**

<b>McMaster University</b> Supervise Senior Resident Electives	<i>present</i>
<b>University of Toronto Undergraduate Medical Program</b> Senior Medical Student Seminars, supervision of elective students in Fracture Clinic, Practice Exams	<i>2002-2005</i>
<b>Ryerson University</b> Co-supervisor of Fourth Year Engineering Thesis	<i>2001-present</i>
<b>McMaster University Undergraduate Medical Program</b> Conduct orthopedic teaching rounds for clinical clerks, weekly Clinical skills preceptor for Unit IV - MSK, weekly General clinical skills preceptor for medical students, weekly	<i>1997 - 2001</i>
<b>University of Toronto, Department of Mechanical Engineering</b> Environmental Engineering Year IV: Head Teaching Assistant Solid Mechanics Year III: Teaching Assistant, Laboratory	<i>1991 - 1993</i>
<b>Volunteer Tutor</b> OAC Calculus and Grade 9 Mathematics	<i>1990-1992</i>

**COMMITTEES**

Department of Surgery Residency Education Committee	<i>2000</i>
Orthopedic Program Director Selection Committee Orthopedic Program Resident Selection Committee	<i>1998</i>
McMaster University Undergraduate Medicine Student Council Creator and Editor of M.D. Newsletter Unit II Planning Committee	<i>1993 - 1996</i>
University of Toronto, Institute of Biomedical Engineering Student Association, Vice-President	<i>1991 - 1993</i>
University of Toronto, Department of Engineering Student Council	<i>1987 - 1991</i>

**RESEARCH FUNDING**

<p>Co-Applicant  <i>Project:</i> Factors Affecting the Development of Fat Embolus Syndrome Following Insertion of an IM Device  <i>Source:</i> Natural Science and Engineering Research Council of Canada  <i>Program:</i> Collaborative Health Research Projects  <i>Amount:</i> \$259 543</p>	2003-2006
<p>Co-Applicant  <i>Project:</i> Anterior Femoral Notching During Total Knee Arthroplasty: A Biomechanical Analysis  <i>Source:</i> University of Toronto, Zimmer Grant  <i>Amount:</i> \$10 000</p>	2004
<p>Co-Applicant  <i>Project:</i> IM Nails for the Treatment of Supracondylar Femur Fractures: A Biomechanical Analysis  <i>Source:</i> Ontario Centres of Excellence  <i>Program:</i> Materials and Manufacturing Ontario New Faculty Grant  <i>Amount:</i> \$30 000</p>	2002-2003
<p>Co-Applicant  <i>Project:</i> Biomechanics of Orthopedic Implants  <i>Source:</i> Canadian Institutes of Health Research (CIHR)  <i>Program:</i> CIHR Ryerson University Internal Development Grant  <i>Amount:</i> \$15 000</p>	2001-2003
<p>Co-Applicant  <i>Project:</i> Mechanical Testing of an IM Nail Implanted in a 3<sup>rd</sup> Generation Composite Femur  <i>Source:</i> Ryerson University  <i>Program:</i> Summer/Fall Research Assistant Program  <i>Amount:</i> \$9 300</p>	2001-2002

## COMMUNITY WORK

Intervenor: Assisted deaf, blind, physically challenged university student with activities of daily living on a weekly basis, 1992 to 1996.

Assistant Coach: Micro boys soccer

## SPORTS AND OTHER INTERESTS

Downhill Skiing, Mountain Biking, Golf, Soccer Coach.

## LANGUAGES

English, French

## RESEARCH ACTIVITIES

### Publications List

#### *Published Refereed Papers*

M Papini, R Zdero, P Zalzal, EH Schemitsch: The biomechanics of human femurs in axial and torsional loading: comparison of finite element analysis, human cadaveric femurs, and synthetic femurs. J Biomech Eng. 2007 Feb;129(1):12-19.

Guy Morag, Anna Kulidjian, Paul Zalzal, Nadav Shasha, Allan E. Gross, and David Backstein, Total Knee Replacement in Previous Recipients of Fresh Osteochondral Allograft Transplants J. Bone Joint Surg. Am., 88: 541 – 546, Mar 2006.

Zalzal P, Backstein D, Gross A, Papini M, “Anterior Femoral Notching During Total Knee Arthroplasty: Characteristics That Increase Local Stress” in press, J Arthroplasty 2005.

Safir O, Backstein D, Zalzal P, Gross AE, “Massive Osteochondral Allografts in the Management of Nontumoral Conditions Around the Knee” Techniques in Knee Surgery, 4(2):89-99,2005.

Morag G, Zalzal P, Liberman B, Safir O, Flint M, Gross A, “Outcome of Revision Hip Arthroplasty in Patients With a Previous Total Hip Replacement for Developmental Dysplasia of the Hip” J Bone Joint Surg Br, 87-B: 1068 – 1072, Aug 2005.

Zalzal P, Papini M, Petrucelli D, de Beer J, and Winemaker M, “An In-Vivo Biomechanical Analysis of the Soft Tissue Envelope of Osteoarthritic Knees” J. Arthroplasty 19 (2), 217-223, Feb. 2004. Applicant’s Role: Data acquisition and analysis, wrote paper.

Cheung G, Zalzal P, Bhandari M, Spelt J, and Papini M, "Finite Element Analysis of a Femoral Retrograde Intramedullary Nail Subject to Gait Loading" *Med Eng Phys* 26, 93-98, 2004.

Kassab M, Zalzal P, Azores G, Pressman A, Liberman B, Gross A, "Management of Periprosthetic Femoral Fractures After Total Knee Replacement Using a Distal Femoral Allograft" *J Arthroplasty* 19 (3), 361-368, Mar. 2004.

de Beer J, Petrucelli D, Zalzal P, and Winemaker M, "Single Incision Minimally Invasive Total Hip Arthroplasty: Length Doesn't Matter" *J Arthroplasty* 19 (8), 945-950, 2004.

Zalzal P, Gandhi R, Petrucelli D, Winemaker M, deBeer J, "Fractures at the Tip of Long Stem Prostheses Used for Revision Hip Arthroplasty" *J. Arthroplasty* 18 (6), 741-745, Sept. 2003.

Zalzal P, Ojha M, Ethier CR, Cobbold RSC, Johnston KW, "Visualization of Transitional Flow" *Physics of Fluids* 6 (6), June 1994.

*Accepted or In Press Refereed Papers*

Bahen J, Gaber O, Behdinan K, deBeer J, Zalzal P, Papini M, Zagher M, Computational Fluid Dynamics Modeling of the Effect of Rotation During Reaming into the Intramedullary Canal of a Long Bone, *Fluid Dynamics and Materials Processing*, in press (2006).

Gaber O, Behdinan K, deBeer J, Zalzal P, Papini M, Zagher M, Computational Fluid Dynamics Modeling of Insertion and Advancement of a Reamer into the Intramedullary Canal of a Long Bone, *Medical Engineering & Physics*, in press (2006).

Dobrzanski D, Saghir Z, Behdinan K, Zalzal P, deBeer J, Papini M, Pressure Distribution in the intramedullary canal during insertion of an intramedullary device into a long bone: An experimental parametric study using a synthetic bone analogue, accepted to *J. Arthroplasty* (2006).

*Submitted Refereed Papers*

Kandel R, Grynpass M, Pilliar R, Waldman S, Zalzal P, Hurtig M, Repair of Osteochondral Defects in Sheep with Biphasic Cartilage-Calcium Polyphosphate Constructs in a Sheep Model. submitted to *Biomaterials*.

Papini M, Zdero R, Zalzal P, Schemitsch E, The Biomechanics of Human Femurs in Axial and Torsional Loading: Comparison of Finite Element Analysis, Human Cadaveric Femurs, and Synthetic Femurs, submitted (2005) under review.

Saadetian P, Dobrjanski D, Behdinan K, Papini M, Saghir Z, Zalzal P, deBeer J, A finite element simulation of the insertion of an intramedullary implant, submitted (2005).

*Presentations as Guest Speaker:*

Zalzal P, Gross AE, "Osteochondral Allografts: Procurement and Use" presented at the Combined Orthopaedic Research Societies Meeting, Banff, Alberta, Canada 2004.

Zalzal P Moderator, Arthroplasty Section, Combined Orthopaedic Research Societies Meeting, Banff, Alberta, Canada 2004.

Backstein D, Zalzal P, Papini M, Gross A, "Anterior Femoral Notching During Total Knee Arthroplasty: Characteristics That Increase Local Stress" Annual Meeting of the John Insall Club, Sorrento, Italy, June 2004.

Petrisor B, Zalzal P, Bhandari M, Smith F, "Clinical Outcomes with a Mobile Bearing Tibia" presented at the Preservation Uni-Compartmental Knee Program Reconstructive Training, Chicago, October 2002

*Published Abstracts*

Zalzal P, Dobrjanski D, Saghir Z, Behdinan K, deBeer J, Papini M, How can the risk of fat embolus syndrome be minimized? to be presented at the Annual Meeting of the Canadian Orthopaedic Association, Toronto 2006.

Zalzal P, Papini M, Zdero R, Schemitsch E, "The Biomechanics of Femurs, Three Techniques" to be presented at the Annual Meeting of the Canadian Orthopaedic Association, Toronto 2006.

Zalzal P, Safir O, Backstein D, Elfassy S, Clouatre E, Olshewski E, Gross A "Factors Influencing the Outcome of Fresh Osteochondral Allograft Transplants in the Knee" presented at the Annual Meeting of the Canadian Orthopaedic Association, Montréal 2005.

Zalzal P, Papini M, Backstein D, Gross A, "Anterior Femoral Notching During Total Knee Arthroplasty: A Finite Element Analysis" Annual Meeting of the American Association of Orthopaedic Surgeons, Washington 2005.

Zalzal P, Morag G, Kulidjian A, Gross A, Backstein D, "Total Knee Arthroplasty in Recipients of Fresh Osteochondral Allograft Transplants", presented at the ICRS Meeting, Belgium 2004.

Zalzal P, Cheung G, Bhandari M, Spelt J, and Papini M, "The Load Sharing Characteristics and Stress Concentrations of a Locked, Retrograde, Intramedullary Femoral Nail" presented at the Annual Meeting of the Canadian Orthopaedic Association, Calgary 2004.

Zalzal P, Kyte B, Papini M, Gross A, "Acetabular Defects in Primary and Revision Total Hip Replacement: A Finite Element Analysis" presented at the Annual Meeting of the Canadian Orthopaedic Association, Calgary 2004.

Morag G, Liberman B, Zalzal P, Safir O, Flint M, Gross A, "Survivorship and functional outcome of revision hip arthroplasty in patients with a previous total hip replacement for developmental dysplasia of the hip" presented at the Annual Meeting of the Canadian Orthopaedic Association, Calgary 2004.

Safir O, Flint M, Zalzal P, Morag G, Gross A, "Proximal Femoral Allograft for Revision Arthroplasty of the Hip" presented at the Annual Meeting of the Canadian Orthopaedic Association, Calgary 2004.

Liberman B, Zalzal P, Backstein D, Gross A, "Minimally Invasive Two-Incision Hip Arthroplasty, the First 15 Cases" presented at the Annual Meeting of the Canadian Orthopaedic Association, Calgary 2004.

Zalzal P, Petrisor B, Bhandari M, Smith F, "Functional Outcomes After Unicompartamental Knee Arthroplasty" Presented at the Annual Meeting of the Canadian Orthopaedic Association, Winnipeg, ON, 2003.

Zalzal P, Papini M, Bhandari M, "Stresses at the End of a Distal Femoral Plate: Implications for Refracture" Presented at the Annual Meeting of the Canadian Orthopaedic Association, Winnipeg, ON, 2003.

Zalzal P, Papini M, Petrucelli D, de Beer J, Winemaker M, "An In-Vivo Biomechanical Analysis of the Soft Tissue Envelope of Osteoarthritic Knees" Presented at the Annual Meeting of the Canadian Orthopaedic Association, Winnipeg, ON, 2003.

Zalzal P, Camazzola D, Petrucelli D, Winemaker M, de Beer J, "Factors That Affect Short Term Recovery After Total Hip and Total Knee Arthroplasty" Presented at the Annual Meeting of the Canadian Orthopaedic Association, Winnipeg, ON, 2003.

Kassab M, Zalzal P, Azores G, Pressman A, Liberman B, Gross A, "Management of Periprosthetic Femoral Fractures After Total Knee Replacement Using a Distal Femoral Allograft" Presented at the Annual Meeting of the Canadian Orthopaedic Association, Winnipeg, ON, 2003.

Kassab M, Zalzal P, Azores G, Pressman A, Liberman B, Gross A, "Traitement des fractures supracondyliennes périprothétiques du genou par allogreffe de fémur distal et

prothèse totale de genou” Presented at the Societe Francaise de Chirurgie Orthopedique et Traumatologie (S.O.F.CO.T), 2003.

De Beer J, Petrucelli D, Zalzal P, Winemaker M, “Minimally-Invasive Primary Total Hip Arthroplasty” Presented at the Annual Meeting of the Canadian Orthopaedic Association, Winnipeg, ON, 2003.

Pressman A, Cayen B, Zalzal P, Azores G, Liberman B, Backstein D, Gross A, “The Management of Periprosthetic Femoral Fractures After Total Hip Arthroplasty Using A Proximal Femoral Allograft Composite” Presented at the Annual Meeting of the Canadian Orthopaedic Association, Winnipeg, ON, 2003.

Camazzola D, Zalzal P, Petrucelli D, Winemaker M, de Beer J, “Factors Influencing Speed of Recovery After Total Joint Arthroplasty” Presented at the Annual Meeting of the Eastern Orthopaedic Association, Amelia Island, Florida, October 2002.

*Non-refereed Contributions:*

Papini M, Zalzal P, Third Generation Composite Femur Solid Model, Biomechanics European Laboratory (BEL) Finite Element Mesh Repository,  
[www.tecno.ior.it/VRLAB/researchers/repository/BEL\\_repository.html](http://www.tecno.ior.it/VRLAB/researchers/repository/BEL_repository.html)