Practical Research Symposium:
Responsibilities of a Research Mentor

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Limb Lengthening and Reconstruction Society
Association for the Study and Application of the Methods of Ilizarov–North America
July 19, 2013
Ilizarov Devices and Mentoring

Ian A.F. Stokes
Professor of Orthopaedics & Rehabilitation
University of Vermont

Mechanical Modulation of Vertebral Body Growth
Implications for Scoliosis Progression

Ian A. F. Stokes, PhD, Holly Spence, BS, PT, David D. Aronsson, MD, and Nicholas Kilmer, MD

Figure 7. The load-growth response curve for loaded vertebrae as a function of the applied load. The load was expressed as a percentage of the animal’s body weight. The regression line has a statistically significant $R^2$ value of 0.44.
Ilizarov Devices and Mentoring

• An outstanding mentor and dear friend
• 13 co-authored papers with Stokes and Iatridis at University of Vermont
IVD remodeling in response to dynamic compression: Rat tail model

- Gene expression kinetics in response to a single loading event: 1 MPa & 1Hz for 90 minutes
- Jeffrey MacLean
  - 2000 – BS student UVM Mech Eng
  - 2001-2004 – MS Student UVM Biomed Eng
  - 2005-2009 – MD Student UVM
  - 2009-present – Orthopaedic Resident UCSF
- First R01 grant

MacLean et al. 2003, 2004, 2005
Does excessive axial compression induce injury?

Remodeling of the IVD in response to cyclic dynamic compression.

– 1.0 MPa @ 1 Hz for 1.5 or 8 hrs per day for 2 & 8 weeks
– Sham

• Wuertz et al., JOR 2009

• Karin Wuertz, PhD
  – 2006-2007, Post-doc, Orthopaedics, UVM
  – 2007-2008, Research Associate, UVM
  – 2008-2011, Faculty, Head, Spine Research Group, University of Zurich
  – 2012-present, Faculty, ETH, Zurich
Orthopaedic Research Laboratories
Outline

• Responsibilities of a Research Mentor (& Mentee)
• Orthopaedic Research Society Mentoring Activities
Mentoring

- Formal and informal mentoring
- Formal mentoring program at Mount Sinai
  - Guidelines for mentor & mentee from Mount Sinai
- Formal guidelines for mentor suggest mentor is expected to:
  - Be available (fewer students/trainees allow more time for each)
  - Review skills assessment and documents prepared by mentee
  - Execute meetings and observe mentee progress
  - Give feedback
Role as a Mentor

- Be available
- Be engaged
  - Constructive criticism, praise, suggest options for ‘fixing’ problems
- Be courteous
  - Sufficient notice before changing meetings, respond to emails and phone calls promptly
- Be in touch
- Be honest about the relationship
  - Clarify your role and exactly what the mentee expects of you
- Play a role in career advancement
  - Talk about your mentee’s accomplishments within the institution, introduce them to others, and recommend them for national events
- Help establish goals
  - What do you and your mentee hope to accomplish?
Mentee

Formal guidelines for mentee suggest mentee is expected to:

- Build your mentoring committee
- Review your role as mentee
- Complete a self-assessment
- Create a personal development plan
- Meet with committee members
- Review and adjust your personal development plan
## Personal development plan

<table>
<thead>
<tr>
<th>Define your goal</th>
<th>Is my goal long term or short term?</th>
<th>Assess the resources and skills needed to achieve set goal.</th>
<th>How do I obtain the necessary resources and/or skills?</th>
<th>How can my mentoring committee help me achieve this goal?</th>
<th>Create a timeline to achieving my goal.</th>
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- Articulate goals for research projects.
- Articulate goals for mentoring relationships.
Mentoring a research project

- Spend time creating, designing and reviewing the project
  - Each research project takes more of your time and your mentor’s time....so respect that time
  - Engage early in the process to create and refine the best project
- Set realistic goals for your research mentee
  - What do they want out of this? What do you want out of this? Where is the common ground?
  - What is realistic to accomplish within the constraints (time and skills) of the trainee?
- Review progress
  - Provide positive feedback for what is accomplished and constructive critiques for areas for improvements.
- Celebrate successes
Writing it up

• Be an active author not a passive recipient
• Help define ‘final figures’ and talking points together
• Work together to develop a detailed outline
• Iterate on the outline and early drafts
• Be prepared to write certain sections and to edit the entire document
• Celebrate accomplishments
Celebrate Successes

Orthopaedic Research Society Meeting,
March 2-5, 2008

- Korecki CL, Tuan RS, Iatridis JC: Notochord cell conditioned medium stimulates mesenchymal stem cell differentiation toward a young nucleus pulposus phenotype, Transactions of the Orthopaedic Research Society, Poster #1404, 2008.
- Korecki CL, Kuo CK, Tuan RS, Iatridis JC: Intervertebral disc cell response to dynamic compression is age and frequency dependent, Transactions of the Orthopaedic Research Society, Poster #1424, 2008.
Outline

- Responsibilities of a Research Mentor (& Mentee)
- Orthopaedic Research Society Mentoring Activities
The ORS as a Springboard for Career Development: What ORS Offers for Clinician Scientists

Joan E. Bechtold, PhD

University of Minnesota – Orthopaedic Surgery, Mechanical/Biomedical Engineering
Minneapolis Medical Research Foundation
Excelen Center for Bone & Joint Research
President, ORS
CLINICIAN-SCIENTIST DEVELOPMENT PROGRAM
**Mission:**
To advance the global orthopaedic research agenda through excellence in research, education, collaboration, communication and advocacy.

**Goal:**
To be the world’s leading forum for new musculoskeletal research findings.
Core Values of ORS

In Research:
• Facilitating the rapid exchange and communication of current and innovative musculoskeletal research.

In Education:
• Encouraging and fostering the development and professional growth of our members.

In Collaboration & Communication:
• Building bridges from the society to stakeholders dedicated to the advancement of orthopaedic research.

In Advocacy:
• Promoting the importance of orthopaedic research and the need for increased, sustainable funding.
ORS is committed to encouraging mentoring of young scientists as a crucial component in development of a career in science.

NEW INVESTIGATOR MENTORING COMMITTEE

- Current Committee (2013)
- Tamara Alliston, PhD, Chair
- Randall L. Duncan, PhD
- Tammy L Haut Donahue, PhD
- James C. Iatridis, PhD
- Francis Young-In Lee, MD
- Jinxí Wang, MD
New Investigator Mentoring Events at ORS Annual Meeting in San Antonio

- Meet the Mentors Lunch
- Professional Advancement Series:
  - Professional Networking
  - Funding
  - Advocacy
  - Industry Careers in Biomechanics
- Poster Tours
- Grant Writing Workshop
- ORS Mentoring Website

2013 ORS Annual Meeting
Bridging Innovation
Mentoring

- Associate Membership
- Awards:
  - Collaborative Exchange Award
  - New Investigator Recognition Awards (NIRAs)
  - ORS/OREF Travel Awards in Orthopaedic Research Translation
- Grant Writing Workshops
- Meet the Mentors Luncheon
- Meet the Industry Members Luncheon
Mentoring

- OREF/ORS Residents Research Symposia
- Professional Advancement Series
- OREF/ORS Presentation Skills Workshop
Grant Writing Workshop

- **ORS/OREF Grant Writing Workshop**
  - held at the ORS Annual Meeting

- **ORS/OREF/AAOS Grant Writing Workshop**
  - held in Spring (by invitation only)
Grant Writing Workshop

- Designated for new investigators who are in the process of writing their first grant proposals.
- Two grants (one initial and one revised) are chosen for review
- Includes mock study section
- NIAMS/NIH representative joins faculty panel
- Includes interpretation of the score sheet
Collaborative Exchange Award

• Provides investigators at any stage of their career an opportunity to visit a research lab for the purpose of collaboration and knowledge exchange.

• The award can be used towards travel, accommodation, and living costs for investigators to visit research institutions to foster collaboration in orthopaedic related-research areas and to facilitate the exchange of new research methodologies and techniques.

Total funding up to $7,500 available each year to award 2 recipients
New Investigator Recognition

Presented to individuals during the ORS Annual Meeting for their work as young investigators

Recipients are selected based on the quality and presentation of material in the abstract, the quality of the poster, and the ability to discuss their research project.

- 10 winners are selected each year
- $500 honorarium is awarded to each winner
ORS/OREF Travel Awards in Orthopaedic Research Translation

- Recognizes clinician scientists and clinical investigators in the early stages of their career who have played a key or leading role in an original research project in clinical or translational medicine, and who have demonstrated excellence in training and a commitment to orthopaedic research.

- 5 award recipients are selected each year
  - Honorarium of $500
  - Travel reimbursement for attendance at the ORS Annual Meeting (up to $1,000) pending submission of receipts for transportation and hotel
  - Two years free registration for attending the ORS Annual Meeting
Meet the Mentors Luncheon

✓ Held at the ORS Annual Meeting
✓ Designed to provide advice to young and/or new investigators and researchers
✓ Focuses on importance of identifying mentors
✓ Informal, interactive format promotes active discussions
✓ Mentees choose their mentors
✓ Mentors come from academic and corporate environments
www.ors.org

http://www.ors.org/clinician_scientists.html

http://www.ors.org/awards.html
Conclusions

• ‘Writing about music is like dancing about architecture.’
  – Anonymous but oft attributed to Elvis Costello

• Be the mentor that you wanted to have as a trainee.

• Enjoy the people you work with and respect the time everyone puts into your projects.
Acknowledgements

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Exploratory Research
Collaborative Research Center

ORS 2013
Guidelines for Mentees

• Have realistic expectations
• Establish the nature of the relationship
  – Formal or informal
  – Set goals for the relationship – what will you get out of it?
  – Frequency of meetings
• Ask for specific advice and be receptive to input
• Be critical of feedback and advice
  – Solicit second opinions as appropriate
• Evaluate the relationship
  – Ease of scheduling, meetings get cancelled, etc.
• Take responsibility for relationship
• Follow-up
  – Act on advice when your mentor offers good advice
• Keep in touch
• Be considerate
• Relationships are dynamic
• Take advantage of opportunities to work with senior women & men
• Confidentiality
• Appreciation