EDUCATIONAL OBJECTIVES

• Understand new molecular treatment strategies in the management of Giant Cell Tumor of bone (GCT), and learn of preliminary critical outcomes with these new targeted approaches.

• Understand the role of the Methods Center and of the participating clinical sites in prospective randomized collaborative trials.

• Become aware of new collaborative prospective studies within the MSTS.

• Learn of the academic achievements of MSTS members recently honored by the AAOS and the ORS.

• Understand the surgical reconstruction options, including no reconstruction, in pelvic tumors, and reported outcomes of the various surgical options.

NEW! ONLINE EVALUATION
In an effort to further MSTS' green initiative, MSTS has opted to forego paper evaluations. Please use this link to complete the online evaluation:  https://www.surveymonkey.com/s/XFMTDM7

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Schedule at a Glance
Saturday, March 28, 2015

Venetian/Sands Expo Center
Room 3301
7:30 am – 4:15 pm

Richard M. Terek, MD, FACS, MSTS President
Michelle A. Ghert, MD, FRCSC, Specialty Day Chair
Patrick Lin, MD, Specialty Day Co-Chair

7:30 am – 4:15 pm

Breakfast

8:00 am – 8:10 am
Welcome/Outline of the Day
Michelle A. Ghert, MD, FRCSC and Patrick Lin, MD

8:10 am – 9:55 am

SESSION I: DENOSUMAB IN GCT
Francis Lee, MD, PhD (New York, NY); and Tim Damron, MD (East Syracuse, NY)

What's New in RANK Signaling and How it is Changing Treatment of Benign Aggressive Tumors
William Eward, DVM, MD (Durham, NC)

Histological Assessment of GCT Specimens Pre- and Post-Denosumab
Howard G. Rosenthal, MD, FACS (Overland Park, KS)

Initial Clinical Trials of Denosumab in GCT and Subsequent Clinical Experience
Bob Henshaw, MD (Washington, DC)

Our Protocol for Denosumab in GCT and Clinical Experience Thus Far
James Hayden, MD (Portland, OR)

Clinical and Translational Molecular Data of Denosumab in GCT
Jay Wunder, MD (Toronto, Ontario, Canada)

A Translational Study of Denosumab in GCT of Bone
Michelle A. Ghert, MD (Hamilton, Ontario, Canada)

9:55 am – 10:10 am
Break

10:10 am – 12:00 pm

SESSION II: PROSPECTIVE COLLABORATIVE CLINICAL STUDIES
R. Lor Randall, MD, FACS (Salt Lake City, UT); and Thomas Scharschmidt, MD (Columbus, OH)

What is at the Core of a Multi-Center RCT?
Nathan Evaniew, MD (Hamilton, Ontario, Canada)

The Nuts and Bolts of Being a Participating Site of an RCT
Ginger Holt, MD (Nashville, TN)

Developing a Patient-Centered Virtual Sarcoma Registry
Benjamin J. Miller, MD (Iowa City, IA)

RCT Comparing Conventional Extended Curettage + PMMA Cementation vs. Extended Curettage + BP Soaking + BP-loaded PMMA Cementation in GCT
Francis Lee, MD, PhD (New York, NY)

A Multi-Center Prospective Study of Zolendronic Acid Laden Cement in GCT
David Greenberg, MD (Saint Louis, MO)

Multi-Center RCT: Fixation of Metastatic Lesions to the Proximal Femur
John H. Healey, MD, FACS (New York, NY)
12:00 pm – 1:00 pm Lunch and Business Meeting

1:00 pm – 1:30 pm SESSION III: ACKNOWLEDGEMENT OF MSTS/AAOS/ORS AWARD WINNERS 2013-2015

1:30 pm – 4:15 pm SESSION IV: OPTIONS FOR HIP RECONSTRUCTION FOLLOWING MASSIVE PELVIC TUMOR RESECTIONS: THE PROS AND CONS

Steve Gitelis, MD *(Chicago, IL)*; Peter Rose, MD *(Rochester, MN)*; and J.C. Neilson, MD *(Milwaukee, WI)*

**Customer Made Metal Prosthesis**
John Abraham, MD *(Philadelphia, PA)*

**Pelvic Reconstruction Using a Custom Endoprosthesis Combined with a Vascularized Fibular Graft**
David Geller, MD *(Bronx, NY)*

**Allograft Prosthetic Periacetabular Reconstructions and Defining the Use of Surgical Navigation**
Edward Cheng, MD *(Minneapolis, MN)*

**Spino-pelvic Tumor Resection and Reconstruction**
Panayiotis Papagelopoulos, MD *(Athens, Greece)*

**The Function and Success of Pelvic Reconstruction**
Ernest U. (Chappie) Conrad III, MD *(Seattle, WA)*

**Resection of the Acetabulum and Pelvis: How Do Complications Affect the Patient and Should We Still Offer Reconstructive Options?**
Joseph Benevenia, MD *(Newark, NJ)*

**Pelvic Floor Reconstructions and Hernia Treatment following Pelvic Tumor Resections**
David King, MD *(Pewaukee, WI)*

**The Case for No Reconstruction after Peri-acetabular Resection and Internal Hemipelvectomy**
Valarae O. Lewis, MD *(Houston, TX)*

**Resection of Pelvic Tumors With and Without Reconstruction: The Rizzoli Experience**
Pietro Ruggieri, MD *(Bologna, Italy)*
Session I: Denosumab in GCT

8:10 am - 9:55 am

Moderators: Francis Lee, MD, PhD (New York, New York);
            Tim Damron, MD (East Syracuse, NY)

Speakers:

What's New if RANK Signaling and How it is Changing Treatment of Benign
Aggressive Tumors
William Eward, DVM, MD
Durham, NC

A critically important signaling pathway in bone turnover is the RANK (Receptor
Activator of NF-κB), RANK ligand, and Osteoprotegrin signaling pathway. Activation by
binding of RANK ligand (RANKL) to RANK receptors on osteoclasts induces maturation
and activation, resulting in increased bone resorption. This pathway has been targeted
therapeutically with attenuation of osteoporosis as the original treatment goal.
However, RANK signaling plays a critical role in the pathophysiology of benign-
aggressive tumors. Treatment of Giant Cell Tumor (GCT) of bone, where overactive
RANK signaling is directly responsible for osteolysis, has been revolutionized by the
use of denosumab (a monoclonal antibody against RANKL). This talk reviews the
evidence for the use of denosumab to treat GCT. It also reviews the growing evidence
concerning the use of denosumab to treat other benign-aggressive tumors such as
Aneurysmal Bone Cyts (ABC) and Chondroblastoma. The evidence for managing GCT
with denosumab is strong. There is growing evidence for a potential benefit for
managing ABC with denosumab. There is still little evidence for treating
Chondroblastoma with denosumab.

Histological Assessment of GCT Specimens Pre- and Post-Denosumab
Howard Rosenthal, MD
Overland Park, KS

The various treatment options for resectable and irresectable Giant Cell Tumor as well
as Metastatic disease due to Giant Cell Tumor will be discussed. The role of
Denosumab and its pharmacologic effects on cellular viability of the spindle cell and
osteoclastic giant cell population is presented. The molecular biological features,
molecular markers, and histological response to Denosumab are presented in order to
educate and provide further insight into the treatment options for Giant Cell Tumor of
Bone. Denosumab may be used in an adjuvant fashion with intent to enhance the local
control rate or in a neoadjuvant role, in attempt to convert an irresectable GCT into
one which is resectable. Its use as a treatment option for metastatic GCT as an
alternative to metastatectomy will be presented. The histological assessment and
prediction of “chemo effect” based on tumor kill and diminishment in viable spindle cells will be discussed.

**Initial Clinical Trials of Denosumab in GCT and Subsequent Clinical Experience**

Bob Henshaw, MD  
Washington, DC

Industry sponsored clinical trials using denosumab for giant cell tumor of bone have shown remarkable short and long term results in patients, leading to FDA approval of this monoclonal antibody treatment. Histologic changes seen after treatment have led to new insights as to the pathophysiology of this neoplasm. These trials, however, leave significant unanswered questions including the optimal use of this drug, whether this medication is potentially curative, and if there is a risk of tumor transformation while on treatment. A review of the clinical trials and observations of patients treated at a single institution will serve to highlight the good, the bad, and the ugly aspects of treating this challenging disease.

**Our Protocol for Denosumab in GCT and Clinical Experience Thus Far**

James Hayden, MD  
Portland, OR

This presentation is a small case series describing our experiences over several years. The focus is to cite some of our difficulties with denosumab. We hope to stimulate discussion and possible research in the role in denosumab for optimal giant cell tumor of bone therapy. We will review our cases with lengthening the dosing interval and the role of denosumab in long term therapy. We will review some of the pathologic changes for tumors pretreated with denosumab.

**Clinical and Translational Molecular Data of Denosumab in GCT**

Jay Wunder, MD  
Toronto, Ontario, Canada

**A Translational Study of Denosumab in GCT of Bone**

Michelle A. Ghert, MD, FRCSC  
Hamilton, Ontario, Canada

Giant Cell Tumor of Bone (GCT) consists of osteoclast-like giant cells that express Receptor Activator of Nuclear factor-κB (RANK) and mononuclear stromal cells that express RANK ligand (RANKL). The functional interaction between the stromal-cell derived RANKL and the osteoclast receptor (RANK) results in a steady production of osteoclast-like cells in the tumor. Until recently, there were no available effective adjuvant systemic treatment options for patients with extensive or unresectable GCT. Denosumab is a monoclonal antibody that binds RANKL and directly inhibits osteoclastogenesis. Based on histological specimens from patients treated with Denosumab, the drug appears to be biologically active in inhibiting osteoclastogenesis, which would be expected of a monoclonal antibody that binds RANKL. However, the
patient-derived data in this presentation confirms that once the administration of Denosumab ceases, the stromal cells continue to proliferate, albeit to a lesser degree. They also show complete loss of expression of the osteoclastogenic factor RANKL. More importantly, data from recurrent disease post-Denosumab confirms that GCT stromal cells no longer exposed to Denosumab proliferate and induce osteoclastogenesis, and thus tumor recurrence. It is clear that treatment with Denosumab only addresses the therapeutic need of GCT partially by wiping out the osteoclasts but leaving the neoplastic stromal cells proliferative and osteoclastogenic.

### Session II: Prospective Collaborative Clinical Studies

10:10 am – 12:00 pm

**Moderators:** R. Lor Randall, MD, FACS (Salt Lake City, UT)  
Thomas Scharschmidt, MD (Columbus, OH)

**Speakers:**

**What is at the Core of a Multi-Center RCT?**
Nathan Evaniew, MD  
Hamilton, Ontario, Canada

Multi-center randomized controlled trials (RCTs) are the most reliable studies for evaluating treatment effects, but they require rigorous methodology in order to provide definitive evidence. At their core, multi-center RCTs begin with practice-changing research questions, appropriate outcome measures, and large sample sizes. Thereafter, centralized infrastructure, innovative strategies for blinding, collaborative networks, and multiple levels of funding are critical to their ongoing success.

**The Nuts and Bolts of Being a Participating Site of an RCT**
Ginger Holt, MD  
Nashville, TN

Participating in a clinical trial requires a team with a strong commitment and institutional vision and support. The team consists of a research nurse, research coordinator, financial team, a collaborative IRB, educated staff, patients, and an effective team leader. The team leader must continually foster interest from the research team and patients to maintain interest and a desire to participate. The team leader must also gain institutional support and a commitment to the research mission of the trial.
Developing a Patient-Centered Virtual Sarcoma Registry
Benjamin J. Miller, MD, MS
Iowa City, IA

In March 2013 we began enrolling patients into a prospective, online registry to follow the functional recovery of sarcoma patients over time. To date, there are roughly 100 patients who are contributing periodic TESS questionnaires, most of who joined the registry as a result of social media efforts to increase visibility. With continued patient interest and efforts to ensure data quality, this could become a viable source of outcomes data in orthopaedic oncology.

RCT Comparing Conventional Extended Curettage + PMMA Cementation vs. Extended Curettage + BP Soaking + BP-loaded PMMA Cementation in GCT
Francis Lee, MD, PhD
New York, NY

We are proposing a multi-center, prospective, open-label, randomized clinical trial (RCT). While there is anecdotal use of bisphosphonates in the treatment of GCT, there is a paucity of published papers and no meaningful RCT conducted. Our rationale stems from our own basic science, clinical data, and literature. Our previous studies have shown that bisphosphonates (BPs), a well-known inducer of osteoclast apoptosis, also result in apoptosis of GCT stromal cells. Our previous work suggests that concurrent targeting of stromal cells and osteoclasts is strategically advantageous because stromal cells secrete chemokines and cytokines that attract osteoclast precursors and induce pathologic osteoclastogenesis. BPs are heat-stable and BP-loaded bone cements can elute BP over a prolonged period time. We designed a RCT comparing the efficacy of ‘conventional extended curettage and cementation’ and ‘conventional extended curettage, BP-solution soaking, and BP-loaded bone cement’. We will determine whether topical BP solution and BP-loaded PMMA bone cement decrease local recurrence (Primary Outcome) of GCT. Clinical and radiographic findings of local recurrence (pain, mass, recurrent osteolysis, progressive osteolysis) will be compared between the two groups at 3, 6, 9, 12, 18, and 24 months. We will also determine whether topical BP solution and BP-loaded PMMA bone cement improves adjacent host bone and clinical parameters such as pain, function (WOMAC, MSTS Score, and Knee Scores), fever, wound complications, and failure of reconstruction (Secondary Outcomes).

A Multi-Center Prospective Study of Zolendronic Acid Laden Cement in GCT
David Greenberg, MD
Saint Louis, MO

Giant cell tumor (GCT) of bone is is considered a benign but locally aggressive lesion with reported recurrence rates ranging from 18-50%. Controversy exists regarding the optimal treatment, with options ranging from intralesional curettage with or without adjuvant to en bloc resection. Bone destruction in giant cell tumor is mediated by multinucleated osteoclast-like giant cells. An inhibitory effect of bisphosphonates on GCT-derived osteoclastic resorption has been noted. PMMA impregnated with zoledronic acid releases biologically active zoledronate that is cytotoxic to stromal GCT
cells. The purpose of our clinical study is to investigate whether the local delivery of bisphosphonate as a surgical adjuvant can decrease the local recurrence rate of GCT. A multi-center case-control study is underway to compare the local recurrence rate of primary extremity GCT of bone surgically treated with or without the addition of local bisphosphonate. In the control group, no zoledronic acid therapy is utilized. In the bisphosphonate group, 4 mg of zoledronic acid is added to each batch of bone cement. Postoperatively, patients are being followed for a minimum of two years with local recurrence considered the primary endpoint of evaluation. The patients for this study are being recruited from 15 participating centers.

**Multi-Center RCT: Fixation of Metastatic Lesions to the Proximal Femur**
John H. Healey, MD, FACS
New York, NY

The Albuquerque Symposium highlighted the treatment of proximal femoral pathologic fracture as the most important problem facing orthopaedic oncology. The protocol presented here highlights the difficulties in actually defining, funding and performing such studies. Studies of Level IV evidence routinely call for multicenter trials and randomized trials to answer important questions in musculoskeletal oncology. These calls are often naïve in understanding the difficulties in conducting such studies. Indeed, no surgical procedure has been the focus of a randomized multicenter trial by the MSTS. Members are encouraged to draft and conduct such studies.

**Session IV: Options for Hip Reconstruction following Massive Pelvic Tumor Resections: The Pros and Cons**

1:30 pm – 4:15 pm

**Moderators:** Steve Gitelis, MD (Chicago, IL);
Peter Rose, MD (Rochester, MN);
J.C. Nielson, MD (Milwaukee, WI)

**Speakers:**

**Custom Made Metal Prosthesis**
John Abraham, MD
Philadelphia, PA
Pelvic reconstruction following an internal hemipelvectomy remains extremely challenging. Procedures necessitating the resection of both the acetabulum and the ilium are particularly difficult, owing to the limited amount of remaining bone, the quality of remaining bone and the orientation of the remaining bone relative to normal weight-bearing forces. Combining the inherent reconstructive benefits of an endoprosthesis with the biologic benefits of a supporting vascularized fibular graft offers a number of advantages. Use of an endoprosthesis allows for a patient-tailored implant, early relative stability, and the use of highly porous metallic surfaces which facilitate bony ingrowth and long-term interface stability. The vascularized fibular graft allows for biologic bone healing and subsequent remodeling in response to weight-bearing forces, providing long-term support and protection of the endoprosthesis. This technique may offer select patients undergoing extensive pelvic surgery a reliable and reproducible limb-salvage option.

Spino-pelvic Tumor Resection and Reconstruction
Panayiotis Papagelopoulos, MD
Athens, Greece

Significant advances have been made in the management of spinopelvic tumors in the past two decades. These include more complex surgical approaches for tumor resection with clear surgical margins and improvements in reconstruction using plastic and microsurgical techniques, structural bone grafting, and spinopelvic stabilization using new segmental instrumentation techniques such as the pedicle screw-rod construct for more rigid fixation. The most common indication for spinopelvic tumor resection and reconstruction is primary pelvic, sacral, or spinopelvic malignancy requiring resection. The goals of spinopelvic tumor resection and reconstruction are to achieve negative-margin tumor resection and pelvic reconstruction with maximum postoperative stability. Major spinopelvic resections have been classified into 4 types. The type of pelvic resection depends on the area involved and the extent of the tumor. Spinopelvic tumor resection and reconstruction is technically demanding and fraught with potential complications. Wound complications are most common. Other reported complications include intraoperative hemorrhage, nerve and visceral injuries of the ureter, bladder and bowel, lower-quadrant hernia, resection of an ischemic terminal ileum, late venous thrombosis, and psychological effects and depression. Patients with spinopelvic resection may require colostomy care, chronic pain management,
physiotherapy, occupational therapy, psychological support, and use of an artificial limb. Advances in spinopelvic fixation instrumentation will decrease the risk of catastrophic fixation failure after wide tumor resections, and improved microsurgical techniques will enable durable wound flap closure.

The Function and Success of Pelvic Reconstruction
Ernest U. (Chappie) Conrad III, MD
Seattle, WA

Pelvic reconstructions are a critical opportunity to maintain function in patients with sarcomas. While those reconstructions are challenging surgical procedures for anatomic and functional reasons, significant long-term function can be achieved. Reconstructive choices vary from amputation/hemi-pelvectomy or minimal (flail) procedures to complex composite allo-prosthetic, hemi-pelvic reconstructions. Patients and surgeons make their surgical decisions based on their experience and willingness to assume risk. Surgical options, their outcomes and the associated "risks" will be outlined and reviewed.

Resection of the Acetabulum and Pelvis: How Do Complications Affect the Patient and Should We Still Offer Reconstructive Options?
Joseph Benevenia, MD
Newark, NJ

Tumor resection in the pelvis presents a challenge for musculoskeletal oncologists. If resection does not include the acetabulum then patients can often achieve near-normal function without needing to restore pelvic continuity. However, preserving a functional limb is more difficult when the resection includes the acetabulum. There are many different methods to reconstruct the skeletal defect left after periacetabular tumor resection. Each option has its pros and cons and in many cases the extent of the resection determines the best reconstructive method. Resections that do not involve the femoral head can be reconstructed by iliofemoral, ischiofemoral, or pubofemoral arthodesis/pseudarthrosis by transposing the femur to the remaining portion of the ilium, ischium, or pubis, respectively. Massive hemipelvic allografts or allograft-prosthetic composites can be used to reconstruct large defects left after a more extensive resection. Other reconstructive options include the saddle prosthesis and several varieties of custom made megaprostheses. There are many factors which must be considered when choosing the optimal reconstructive method after resection of a periacetabular tumor, including the extent of the resection, the type of lesion, and the functional status of the patient. Many lesions that were historically treated by external hemipelvectomy are now suitable for limb salvage using one of the methods mentioned above. Despite good functional results, patients need to be aware of the high complication rate associated with these reconstructive procedures.
Pelvic Floor Reconstructions and Hernia Treatment following Pelvic Tumor Resections
David King, MD
Pewaukee, WI

The resection of malignant pelvic tumors results in extensive loss of bone and soft tissue to obtain negative resection margins. Wide resection can leave a large dead space that increases the patient’s risk of hematoma and seroma formation with subsequent infection. Loss of bone and soft tissue restraint can additionally lead to internal organ herniation with accompanying bowel and bladder issues and discomfort for the patient. This presentation will discuss the options for reconstruction of soft tissue and bone defects following pelvic tumor resection. We will discuss the advantages and disadvantages of available biologic repairs, synthetic options, as well as rotational flaps. Finally, we will show site-specific examples of various reconstruction techniques to assist in pelvic floor reconstructions.

The Case for No Reconstruction after Peri-acetabular Resection and Internal Hemipelvectomy
Valarae O. Lewis, MD
Houston, TX

In order to maximize the oncological and functional recovery of cancer patients, it is important to validate our results and improve our treatment paradigms. This is especially true of the sarcoma patient that has undergone a hemipelvectomy. While there are many treatment options for patients with pelvic sarcoma, due to the rarity of the disease, functional outcome data for the various surgical manipulations is lacking. Without such functional data it is difficult to appropriately recommend and discuss these treatment options with our patients.

Resection of Pelvic Tumors with and without Reconstruction: The Rizzoli Experience
Pietro Ruggieri, MD
Bologna, Italy

The Authors reviewed the experience of the Istituto Ortopedico Rizzoli with pelvic resections with and without reconstruction over the last 24 years. An analysis of different types of resection and different types of reconstruction was done evaluating all complications and MSTS functional results. An attempt was made to desume from this experience a better definition of the indications to reconstruction, considering type of resection and age of the patients. 283 cases of pelvic resections performed between 1990 and 2014 were reviewed, including 164 cases treated with reconstruction and 119 without reconstruction. Our philosophy has been and remains that of favoring the choice of reconstruction whenever feasible.
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This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American Academy of Orthopaedic Surgeons and the Musculoskeletal Tumor Society. The American Academy of Orthopaedic Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

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• **Joseph Benevenia, MD:** Submitted on: 02/16/2015
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• **Shari Centrone:** (This individual reported nothing to disclose); Submitted on: 02/11/2015

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• William Eward, MD, DVM: (This individual reported nothing to disclose); Submitted on: 02/12/2015

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  Gilead Sciences: Stock or stock Options
  Musculoskeletal Transplant Foundation: Board or committee member
  Pfizer: Research support
  Springer: Publishing royalties, financial or material support

• Joel Mayerson, MD: Submitted on: 10/30/2014
  AAOS: Board or committee member
  American Journal of Orthopedics: Editorial or governing board
  American Orthopaedic Association: Board or committee member
  Journal of Surgical Oncology: Editorial or governing board
  Millenium Pharmaceuticals: Research support
  National Comprehensive Cancer Network: Board or committee member
  Ohio Orthopedic Society: Board or committee member

• Benjamin J Miller, MD: (This individual reported nothing to disclose); Submitted on: 10/01/2014

• John Curtis Neilson, MD: Submitted on: 02/11/2015
  Musculoskeletal Transplant Foundation: Other financial or material support
• Panagiotis J Papagelopoulos, MD: (This individual reported nothing to disclose); Submitted on: 06/01/2014

• R Lor Randall, MD: Submitted on: 02/19/2015
  - AAOS: Board or committee member
  - American Orthopaedic Association: Board or committee member
  - American Society of Clinical Oncology (ASCO): Board or committee member
  - Annals of Surgical Oncology: Editorial or governing board
  - Association of Bone and Joint Surgeons: Board or committee member
  - Biomet: Paid presenter or speaker
  - Children's Oncology Group: Board or committee member
  - Children's Oncology Group (COG): Board or committee member
  - Clinical Orthopaedics and Related Research: Editorial or governing board
  - Connective Tissue Oncology Society: Board or committee member
  - Journal of Surgical Oncology: Editorial or governing board
  - Musculoskeletal Transplant Foundation: Board or committee member; Research support
  - Musculoskeletal Tumor Society: Board or committee member
  - National Cancer Institute: Board or committee member
  - National Cancer Institute, National Institute of Health: Board or committee member
  - National Comprehensive Cancer Network: Board or committee member
  - Peer Case: Editorial or governing board
  - Sarcoma Foundation of America: Board or committee member
  - The MHE Research Foundation: Board or committee member
  - World Journal of Orthopaedics: Editorial or governing board

• Deena Rawlings: (This individual reported nothing to disclose); Submitted on: 10/06/2014

• Peter S Rose, MD: Submitted on: 12/09/2014
  - Collaborative Spine Research Foundation: Board or committee member
  - Journal of Surgical Oncology: Editorial or governing board
  - Journal of the American Academy of Orthopaedic Surgeons: Editorial or governing board
  - Minnesota Orthopaedic Society: Board or committee member
  - Yearbook of Orthopedics: Editorial or governing board

• Howard G Rosenthal, MD: Submitted on: 01/07/2015
  - Carbo-Fix: Unpaid consultant
  - Medtronic: Paid presenter or speaker
  - Zimmer: Paid consultant; Paid presenter or speaker

• Pietro Ruggieri, MD: Submitted on: 10/06/2014
  - Exactech, Inc: Paid consultant
  - International Society of Limb Salvage: Board or committee member
• **Thomas J Scharschmidt, MD**: Submitted on: 12/10/2014  
  BMC Cancer: Editorial or governing board  
  Journal of Surgical Oncology: Editorial or governing board  
  Millenium Pharmaceuticals: Research support

• **Amy Sherwood**: Submitted on: 02/02/2015  
  Merck: Stock or stock Options

• **Jay Wunder, MD**: (This individual reported nothing to disclose); Submitted on: 02/16/2015
VISION: The Musculoskeletal Tumor Society will be a recognized authority on all aspects of orthopaedic oncology, an influential participant in policy-making for orthopaedic oncology services, and responsive to the needs of orthopaedic oncologists and their patients.

MISSION: The Musculoskeletal Tumor Society will advance the science of orthopaedic oncology and promote high standards of patient care through excellence in education and research.

OBJECTIVES

MEMBERSHIP: Serve and engage current and prospective orthopaedic oncologists

EDUCATION: Serve as the premier provider of education in musculoskeletal oncology

RESEARCH: Encourage and support meaningful, relevant, and timely research for the advancement of knowledge in musculoskeletal oncology

ORGANIZATIONAL EXCELLENCE: Become and maintain a healthy and viable Society

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