A. PURPOSE

1. **UTMB Orthopaedic Resident Handbook**: “An orthopaedic surgeon must be able to critically evaluate new knowledge and new methods of treatment to determine where they will fit into his or her armamentarium.”

2. **Accreditation Council for Graduate Medical Education (ACGME)**:
   a. “Residents should have knowledge of the basic principles of research, including how research is conducted, evaluated, explained to patients, and applied to patient care.”
   b. “Residents should be able to apply knowledge of experimental design, hypothesis testing, and basic statistical methods to participate in or conduct a clinical or basic research project.”

3. **At the DOSR, each resident is responsible for initiating, conducting and disseminating 2 original research projects, which merit submission to a peer-reviewed, preferably indexed, journal.**
   a. “Research is the studious inquiry or examination; especially: investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws.”

B. REQUIREMENTS

1. Residents should declare their interest in pursuing a specific research project by submitting a formal proposal to the Research Committee in accordance with the “Guidelines and Checklist for Writing a Resident Research Proposal”. Once a research proposal is submitted, residents can elect *one of two pathways*:
   a. Resident (and mentors) can elect to forgo any/all Research Committee assistance and proceed with scheduling the presentation of their research project to the entire Department. All resident research projects that forgo Research Committee assistance and are deemed acceptable by the DOSR faculty, will be approved for six months with milestones. Continued project approval will be dependent upon the resident meeting their six-month milestones. Three month approved project extensions can be requested, but these requests will require Research Committee approval. 
   b. Resident (and mentors) can elect to have the project evaluated by the Research Committee with the expectation that the trainee (and mentors) are willing to consider the Committee’s recommendations and will attempt to address the Committee concerns before the project is cleared to be presented to the entire Department for faculty approval. All resident research projects that involve Research Committee input and are approved by the DOSR faculty will also have to establish six-month project milestones. Continued project approval will be dependent upon the resident meeting these six-month milestones. Three month approved project extensions can be requested, but these requests will require Research Committee approval.

All projects that require the support of Department Endowment funds must be reviewed by the Research Committee.

2. All methodologies of research that have potential to benefit the practice of orthopaedic surgery and improve patient outcomes are acceptable. This may include but is not limited to:
   - Fundamental, basic science studies
   - Clinical studies: Levels of evidence I - IV are acceptable. Level IV, Case series, are only acceptable when driven by a clear research question. See Guidelines/Checklist document for definitions
   - Educational or practice management
Meta analyses or systematic reviews are acceptable

Note: Case studies or reports, descriptive reviews, and book chapters, even though they are a scholarly effort when done well, are not acceptable as resident research projects.

C. ROLES: RESIDENT, MENTOR, RESEARCH COMMITTEE, FACULTY, MEDICAL STUDENTS

1. **Resident**: The resident is expected to be actively engaged in all the aspects of the conduct of two research projects.

2. **Faculty mentor**: The resident should expect the mentor to be actively engaged in every aspect of the project, including dissemination of results in presentations and publication. The mentor will approve all major steps in the project. **Examples**: Idea germination. Guidance for key literature/materials to enable an in-depth literature search.

3. **DOSR Research Committee**: The resident can elect to receive guidance from the research committee aimed at optimizing the quality of the research projects, through a process of proposal approval and progress updates. If committee participation is selected, the committee may request proposal revisions as necessary. If all requirements are fulfilled, the committee will provide a recommendation for the resident to present the proposal to the DOSR faculty for approval, prior to conducting the study. The committee membership is interprofessional in make-up, allowing for a broad spectrum of research projects.

   The committee will review proposals using the following criteria: (See Guidelines/Checklist for details)
   - Relevance, clarity of research questions, and justification for objectives and hypotheses
   - Methodology
   - Resource availability, including cost
   - Feasibility
   - Timeline to completion
   - Clarity of the description of the role of the resident, mentors, medical students and other collaborators.

4. **Statistical consultation/ collaboration**: During all phases of the research projects, from the proposal to manuscript submission, residents are advised to consult and/or collaborate with a statistician to ensure that research questions are answered using fitting statistical analyses and interpretations. **Projects using large databases or clinical prospective studies are required to have a collaboration with a biostatistician for data access and consultation for data analysis.**

5. **Medical students**: Medical students may assist the resident in the conduct of the study. The role of the medical student should be identified, specified, and the contribution recognized in dissemination of the results.

6. The resident is expected to follow all UTMB legal and ethics policies guiding research. The National Institute of health provides the following statement about honesty in research: “Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.” “IMPORTANT: Research misconduct does NOT include honest error or differences of opinion.” [https://grants.nih.gov/grants/research_integrity/](https://grants.nih.gov/grants/research_integrity/)

D. PROCEDURES

For Details, see Guidelines/Checklist document

**STEPS:**
1. Choose a mentor(s) from the UTMB faculty, or mentors external to UTMB. Inclusion of external mentors needs to be approved by the Chair of the Department prior to starting the project. Authorship will be discussed based on anticipated contribution from the start of the project by all collaborators. Author adjustments could take place based on actual contribution made to the project.
2. Write a proposal and acquire needed approvals.
   - Approval of the proposal by the mentor
   - Recommendation by the DOSR Research Committee to present to the DOSR faculty
   - Prepare a 5-10 min presentation to obtain DOSR faculty approval
3. For projects requiring IRB approval, submit an IRB application.
4. Consult with mentor(s) regularly throughout the research project to ensure timely progress.
5. Submit project abstracts for presentation at regional and national conferences.
6. Write and submit the manuscript for publication in collaboration with mentors.

E. TIMELINE AND DEADLINES

   NOTE: THESE DEADLINES MAY BE ACCELERATED IF DESIRED.

PGY1:
   - Begin to consider research ideas and explore which of the faculty may have the expertise to be mentor(s) for the research idea under consideration.

PGY2:
   - Prepare and complete first proposal.
   - Upon obtaining faculty approval and if needed IRB approval, begin the project.

PGY3:
   - Complete the first project.
   - Submit abstract to regional and national conferences.
   - Submit manuscript to peer-reviewed, preferably indexed, journal by JUNE 30 of the PGY3 year.
   - Identify mentor and formulate idea for second project.

PGY4:
   - Repeat steps for submitting proposal (above) and begin second project.

PGY5:
   - Complete second project.
   - Submit manuscript to peer-reviewed journal by JANUARY 15 OF THE FINAL YEAR.

F. RESEARCH PROGRESS PROCEDURES

1. Progress as expected: Collaborating in a timely manner with study mentors, consultants, and other collaborators, and meeting research deadlines.
2. Lacking progress: Resident should report unanticipated delays immediately to the mentor and DOSR Research Committee.
3. Project withdrawal: Resident should notify the mentor and the DOSR Research Committee that the project will be withdrawn and provide an explanation. In turn, the research committee may also recommend project withdrawal if completion does not seem feasible.

   At least quarterly a progress report should be submitted to the research committee, including 1) if the proposed timeline is met 2) if barriers or delays are encountered and 3) what solutions are proposed to overcome those.

G. RESOURCES:

1. UTMB Library and Research Services:
   a. Guidance for IRB applications https://research.utmb.edu/irb
2. Departmental resources: (for the most current description, see the DOSR website)
   a. Biomechanics: MTS® materials testing machine, motion analysis equipment, EMG, etc.
   b. Bone imaging/ histology: MicroCT scanner, 3D printer, fluorescent microscope, etc.
   c. Clinical research tools: diagnostic ultrasound, surgical tools, drills, composite bones, etc.
d. Assistance with experimental procedures and set up  
e. Statistical consultation (see C)  

3. **Self-study resources:** (available online or in the DOSR library)  
   c. Essentials of writing Biomedical Research Papers; Zeiger, 2\textsuperscript{nd} or more recent edition.  

**SIGNATURES:**  
I hereby declare that I have read and understood the Orthopaedic Residency Research Policies and Guidelines, and will apply them in the conduct of the research.  

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