Score Sheet. M&M Homework #1 - Fall 2010

Name:_____; Email: _____
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Name:_____; Email: _____
Name:_____; Email: _____

1.
   A. _____
   B. _____
2.
   A. _____
   B. _____
   C. _____

TOTAL _____

I/we worked <u>alone</u> on this assignment and followed all other guidelines:

_____ _____
signature date signature date

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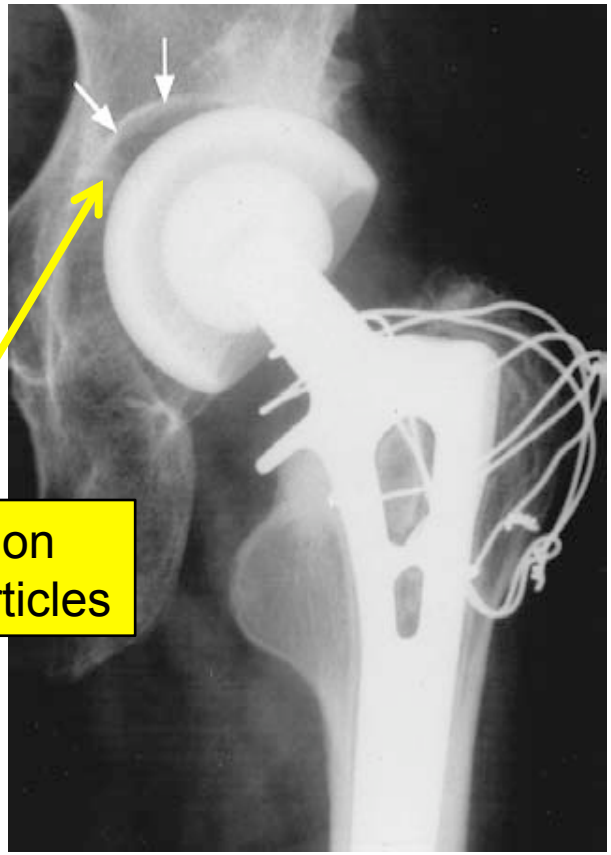
600.445 Homework # 1 - Fall 2008
General Notes and Instructions

1. I would really appreciate typed, double spaced and READABLE output that is firmly attached together. Sketches can of course be hand drawn. I am not looking for beauty, just legibility and room to mark them up. Generous margins are also nice.
2. Put your **name and email address** on each sheet and number the sheets
3. Attach the grade sheet as the first sheet and attach all sheets together.
4. You must include a self-addressed, seal-able 8 ½ x 11 inch envelope if you expect to the homework to be returned (per JHU's interpretation of FERPA).
5. You should work in teams of up to four on this exercise.
6. You are encouraged to make free use of any published materials, the web, etc. in developing your answer but a) you must give full and proper citations to any references consulted and b) you may not consult, discuss, or otherwise communicate about this assignment with any human being except your lab partner(s) or the course instructor.
7. I do not expect truly expert answers at this point, nor am I expecting a great deal of clinical expertise beyond that included in the referenced book chapters. The main purpose of this exercise is to get you thinking analytically about the relationship between systems, application needs, and technology.

Problem Scenario: Resection of Osteolytic Lesions

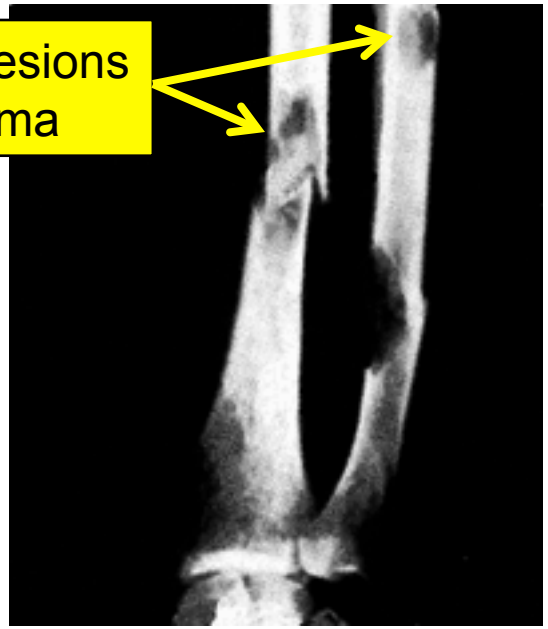
- **Definition**: active resorption or dissolution of bone as part of an ongoing disease process
- **Common causes**
  - Wear particles from implants
  - Multiple myeloma
  - Bone cancer
- **Treatment**
  - Revision surgery (wear particles)
  - Watchful waiting (wear particles)
  - Resection followed by augmentation or reconstruction (cancer)



K. Nakata, et al.,"ACETABULAR OSTEOLYSIS AND MIGRATION IN BIPOLAR ARTHROPLASTY OF THE HIP: FIVE- TO 13-YEAR FOLLOW-UP STUDY," J. Bone and Joint Surgery, pp. 258-264, 1997.

Bone Defects from Cancers

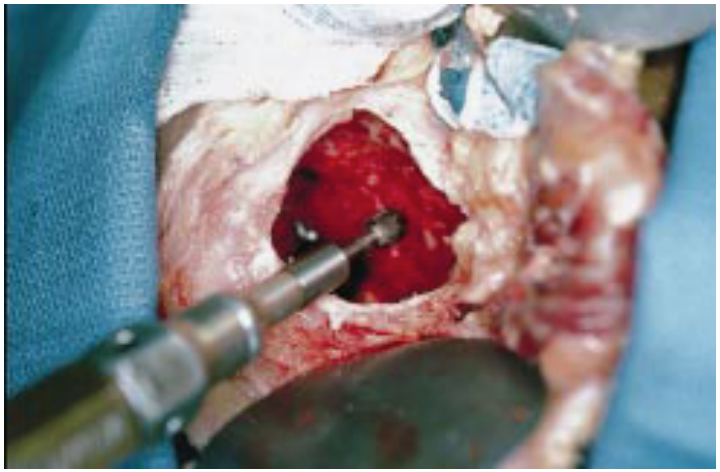
- Multiple Types
  - Myeloma
  - Sarcoma
  - . . .
  - Metastatic
- One treatment option
  - Curettage followed by cyroablation & augmentation
  - Typically requires fairly large exposure to create window into bone

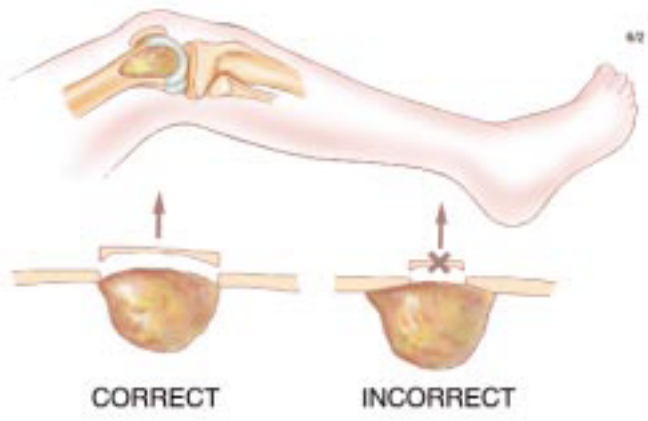


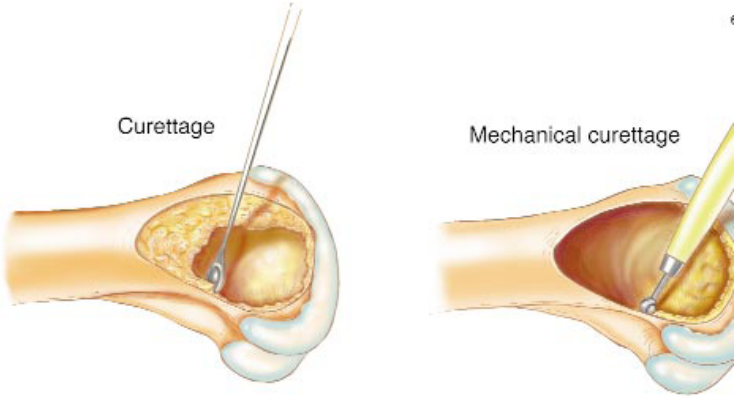
http://www.multiplemyeloma.org

Currettage & Augmentation

- Gain access to bone
- Open window to get access to lesion
- Remove material
- Treat cavity (e.g., cryo.)
- Fill cavity or otherwise reconstruct







M. M. Malawer and P. H. Sugarbaker, *Musculoskeletal Cancer Surgery: Treatment of Sarcomas and Allied Diseases*; Kluwer Academic Publishers, 2001.

A few references

- Mostly, there is a lot of material out on the web. Here are a few sites I found useful
  - www.sarcoma.org
  - www.multiplemyeloma.org/about_myeloma/2.08.php
  - www.bonecancer.org
  - http://www.ajronline.org/cgi/reprint/188/3/855.pdf
  - http://www.medscape.com/viewarticle/421538
  - http://nemsi.uchc.edu/clinical_services/orthopaedic/bonetumors/metastatic_bone.html
- The book

  M. M. Malawer and P. H. Sugarbaker, *Musculoskeletal Cancer Surgery: Treatment of Sarcomas and Allied Diseases;* Kluwer Academic Publishers, 2001.

  is also online at

  http://www.sarcoma.org/main.php-page=mcs.htm

Question 1 – Analysis of existing procedure

A. (20 points) Develop an outline for evaluating this procedure, including such factors as “cost”, “safety”, “effectiveness of pain relief”, “accuracy”, “time”, etc. For each such criterion, include:
   - Short definition or explanation of the criterion
   - Short discussion of how how that criterion should be assessed (e.g., units of measure, means of gathering information)
   - Short discussion of how important each criterion is to each relevant group affected (patient, surgeon, hospital administrator, insurance company, employer, etc.)

B. (20 points) Use this outline to evaluate the existing manual methods using these criteria.

Question 2 – Identifying alternatives

A. (20 points) Sketch an alternative approach using computer assistance to enhance this procedure. Do not write a book. I am looking for 1-2 pages maximum, possibly with a sketch or two.
B. (20 points) Sketch a second, distinct approach using computer assistance, with the same sort of information and discussion included in Part 2.A.
C. (20 points) Develop an outline evaluating the two approaches using the criteria developed in Question 1. Your analysis should compare your approaches to each other and to existing manual practice.

Important NOTE

- There is no single “right” answer to these questions, and I am well aware that people may not have either the experience or the knowledge to make highly credible estimates of things like schedules and costs. The purpose of the exercise is to get you to think.
- In grading the answers, we will be looking more at your reasoning and your approach to the problem than at the specific “correctness” of any technical solutions you come up with.
- At the same time, do try to keep sight of the specific goals of the application, and don’t simply resort to science fiction. An answer proposing well trained termites is not likely to score very well.