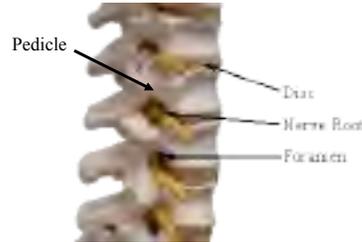


Problem Scenario: Percutaneous Vertebroplasty

Consider the problem of percutaneous vertebroplasty

- Injection of cement into vertebral bodies using large needle inserted through pedicle
- Indications include fractures, osteoporosis, tumors
- Often relieves pain
- Typically performed freehand under x-ray guidance
- CDs will be on reserve in library



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

Question 2 – Identifying an alternative

- A. (50 points) Sketch an alternative approach using computer assistance to enhance this procedure. This should take the form of a short Powerpoint presentation to be shown in class, using the provided template. Include both a technical outline, perhaps a sketch or two, and outline of the clinical workflow.
- B. (10 points) Develop an outline evaluating the your approach using the criteria developed in Question 1. Your analysis should compare your approaches to existing manual practice. You should explain clearly what advantages your approach would have over existing practice. Note that you do not have to be better in all aspects, just in some important aspect
- C. (10 points) Outline the steps that might be required to develop your approach to the point of clinical use, together with the resources and time needed to get there. **Note:** Most students have very unrealistic estimates here (too high or too low). Don't worry about it. Mostly, I just want you to think about the issue.

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.