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# EDUCATIONAL RESEARCH IN ACTION

## Student-Generated Case Reports

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When students create teaching materials, learning can be enhanced. Therefore, a project was designed based on the traditional clinical case report and the chiropractic technique and principles curriculum at the University of Bridgeport College of Chiropractic. The objectives were to increase mastery in a clinical topic, increase awareness of different patient presentations and management options, and enhance information technology skills. Following lectures about the components of a case report and neurological reflexes related to visceral comorbidities and subluxation and joint dysfunction, students created a case report based on a template provided by the instructor. A survey gathered student perspectives on the exercise. More than 70% of the surveyed students felt the project was at least moderately helpful in improving understanding of a case report, the condition investigated, their clinical reasoning, and the ability to integrate information. Most felt that they improved their understanding of neurological reflexes, use of the literature, and the practice of evidence-based care. The majority believed that they identified weakness in knowledge, improved self-learning skills, and increased confidence in managing patients. Most enjoyed it at least somewhat and 70% agreed that the project should be continued. Many believed that they were better prepared for national boards and had improved their writing skills. (*J Chiropr Educ* 2009;23(2):165-173)

**Key Indexing Terms:** case reports (publication type); chiropractic; education

### INTRODUCTION

Over the past 20 years in chiropractic education there has been an increased focus on creating a pragmatic curriculum that produces critically thinking, self-directed learners.<sup>1-4</sup> At the University of Bridgeport College of Chiropractic, this included problem-based learning initiatives, “real practice” learning opportunities (field practice externships), and case-based lectures and laboratories. Continual improvements were desired in these initiatives, so the creation of stimulating learning strategies utilizing integrative approaches was very desirable.

A long-standing aphorism in education is that one of the best ways to master any content area is to teach the material to someone else. Therefore,

having learners create teaching materials could be a useful way to impart new skills and knowledge.<sup>5-7</sup> This notion is supported by the idea that teaching methods that focus on freedom of expression, active participation in the learning experience, and utilization of prior experiences and knowledge when undertaking the learning task are particularly useful for adult learners.<sup>8</sup> In particular, experiential student-centered learning is thought to enhance the learning process<sup>9,10</sup> and may be well suited for chiropractic students.<sup>7</sup> This is in contrast to traditional lecture-based learning and the recently popularized problem-based learning method, which have limitations that have been previously identified by this author.<sup>11</sup> Also, as Bloom suggests, students progressing through a curriculum should encounter content that demands higher level learning skills, which includes a focus on application, analysis, synthesis, and critical evaluation.<sup>12</sup> This is echoed by the work of Ogrinc et al, who have identified a framework of progressive learning objectives for medical students

in regards to knowledge and skills in a practice-based learning and improvement environment.<sup>13</sup> It is clear that teaching strategies that embrace the acquisition of higher levels of skills and cognitive abilities is critical to the success of students as they move from the classroom to clinical practice.

With the above in mind, a 3rd-year advanced chiropractic technique course project was designed based on the traditional case report and key components of the technique and principles curriculum. The case report in particular has utility in preparing students for research and publication opportunities after graduation and has more recently been identified as a neglected but important component to evidence-based practice.<sup>14,15</sup>

Other objectives of this learning activity included improving utilization of the peer-reviewed and other clinical literature, improving writing and information technology skills, increasing mastery in an area of special clinical interest, and increasing awareness of the depth and breadth of clinical presentations with their associated patient management options. A final objective was to help prepare students for their senior thesis.

The purpose of this article is to share this type of multifaceted chiropractic student-centered learning approach (which to the author's knowledge has not been previously described in the chiropractic literature) so that it can be utilized in other courses and institutions. Also the results of a student survey that focused on the quality and utility of the project are presented and discussed.

## METHODS

The involved advanced chiropractic technique course was primarily designed to review previously learned material, introduce students to a specially selected number of new chiropractic techniques, and develop patient management skills. Initial didactic lectures covered the components of a case report, and a number of case vignettes were presented that highlighted unique scenarios and their management. Review was done of important neurological reflex concepts, particularly as they related to visceral comorbidities. This included an in-depth discussion of nine possible neurological reflex categories observed in clinical practice (as noted below). The students were then asked in class on a prepared handout to choose a joint region of the body as the basis for their fictitious patient's chief complaint. All

joint regions had to be chosen before "doubling up" on any one region by a second student.

A case report template (Appendix A) was designed which was given as a handout and discussed in class. It was also placed on the course Blackboard website as a Word document so that students could work from it and ultimately email their completed project. The typical components of a case report were included and each section had points assigned that were earned when that section was completed correctly.

The case report template began with the initial identifying data section, which included name, age, gender, body type/habitus (ecto-, meso-, endomorph), occupation, and other pertinent information (marital status, number of children). The history section started with the chief complaint and utilized the LMNOP acronym (location, mechanism, nature of pain, onset, and palliative/provocative maneuvers), whereby students had to create information for each category.

Students then progressed to the general history section, which utilized the AMPLE acronym [allergies, medications, past medical history (ie, hospitalizations, injuries, diabetes, tumors, operations, and youth diseases), last menstrual period/last meal, and events (personal changes, concerns with care, sleep patterns, diet, tobacco, alcohol consumption, substance abuse)], and a response had to be created for each item.

Family history followed and students had to create one issue regarding either the patient's parents, siblings, children, or spouse. The last item was a psychosocial history, which also required the creation of one issue.

For the review of systems section, a response was required for each of the following: general condition (weight change, fever, fatigue), skin, head, eyes, ears, nose and sinuses, mouth and throat, breasts (male and female), respiratory, cardiac, gastrointestinal, urinary, genitoreproductive; peripheral vascular, musculoskeletal, neurological, hematological, endocrine, and psychiatric. Responses could include "no abnormalities detected" but at least one clinical condition had to be created.

Examination findings that correlated with the previously identified clinical issues then had to be described for each of the following: vital signs, inspection [based on the acronym DASEDD (ie, discoloration, abrasions, scars, edema, deformity, and distortions), palpation (soft tissue, static, and

motion joint palpation), percussion (describe findings), ranges of motion (listing what was done, the results, and normals), orthopedic tests (listing five appropriate tests, identifying the positive ones), and neurological tests (including muscle, reflexes, and sensory exams and/or cranial nerves or others, if applicable)]. X-ray or special imaging procedures and laboratory tests had to be described by creating the findings and were also graded based on whether the patient's condition(s) warranted such tests.

The differential diagnosis section involved listing three possible diagnoses for the chief complaint, beginning with the patient's probable condition. Students also had to name at least two specific subluxations or joint dysfunctions that would likely exist.

The management and treatment section followed and students had to describe the initial care for the chief complaint. This included passive care (in-office adjustments, other manual therapy and/or modalities) and active care (outside of the office). It also required a description of the long-term care, including determination of the end point of care and consideration for elective or supportive chiropractic care.

The final sections involved discussing the clinical significance of the initial identifying data, each AMPLE issue (for medications the effects and side effects were required), and the family history issues and describing the clinical management of the psychosocial issues. Students then had to choose one nonmusculoskeletal issue from the systems review, define it, describe the pathophysiology, and discuss their broader complementary and alternative medicine care as well as the typical traditional medical care that would be expected. They subsequently had to identify an example of each of the following nine reflexes potentially involved in the case: somatovisceral, somatopsychic, somatosomatic, viscerosomatic, viscerovisceral, visceropsychic, psychosomatic, psychovisceral, and psychopsychic.

Finally, students had to list at least five references used in this project (at least two from peer-reviewed journals) utilizing proper referencing style as per the senior thesis. They also had to note how each reference was used to create the case.

Each student was required to hand in a hard copy as well as email the completed Word document to the instructor by the due date. The case studies were graded, returned within 2 weeks, and discussed at that time.

At the end of the spring 2007 semester, a written survey with no identifying data was administered to the students in the course and collected in a blinded manner (Appendix B). The survey was developed utilizing 13 Likert scale questions culled from two previously published student questionnaire studies found in the higher education literature.<sup>16,17</sup> Three open-ended questions were included that were designed to elicit feedback and identify areas in need of improvement. The Likert scale results were analyzed using descriptive statistics (mean and standard deviations) and the open-ended questions were tabulated and utilized for quality improvements.<sup>18</sup> The university's institutional review board approved this study; it met the exempt criteria listed in the U.S. Department of Health and Human Services Codes of Federal Regulations (45 CFR 46).

## RESULTS

All of the 30 students in the course completed the project on time. Grades ranged from 68 to 99, with a mean of 88.9 (SD = 6.38). Three students requested a meeting after the papers were returned for further discussion and clarification of the grading.

Of the 30 students in the course, 28 responded to the in-class survey. From the Likert scale questions on the survey, 78% of the students felt that the project was "moderately helpful" or more so in improving understanding of the components of a case report, their clinical reasoning abilities, and their ability to integrate information from other classes. Seventy-one percent believed that they "gained a lot" or a "gained a great deal" in understanding the clinical condition that they investigated. Over 64% felt that the project helped them make significant gains in confidence in managing patients, understanding the nine different neurological reflexes that may exist, applying published clinical information, practicing evidence-based chiropractic care, and improving self-learning skills. Seventy percent believed that the project was at least "moderately helpful" in identifying areas of knowledge in need of improvement. Sixty-three percent enjoyed the project "somewhat," "a lot," or "a great deal," while 70% agreed that the project should be continued as part of the course. In terms of improving professional writing skills, 37% believed that they "gained somewhat" or "a lot."

For the open-ended question "What did you like about the case report project?" the three most

common responses were that it helped to integrate different aspects of case management, it improved knowledge of a specific clinical condition, and it helped prepare for national boards. For the question "What did you dislike about the case report question?" the three most common responses were that the project was too long, the timing of the project during the semester was burdensome, and working through the nine reflexes was difficult. Suggestions for improvements included giving more time to do the project, increasing lecturing on the nine reflexes, and increasing the number of different cases and treatments to consider.

## DISCUSSION

Students were required to work on their own, but were encouraged to discuss their cases with each other and the instructor either during class meetings or by email. It should be noted that class lectures were not held during the 4 weeks of the project so that students had ample time to do quality work, but lab classes were held twice per week so that face-to-face contact with the instructor was assured. Additionally, students were always able to contact the instructor through email and replies were made within 24 hours.

A number of limitations exist in regards to the student survey and its results. These included a lack of further validation of the survey questions, a possible halo or horn effect due to students feeling rewarded or coerced when participating in the survey, and the limited number of students actually surveyed (28 respondents from a cohort of 30 students), which prevented more rigorous forms of statistical analysis. As such, any strong conclusions about the quality of learning must be guarded. Despite these limitations, the responses of the students gave some indication about the utility of the project and identified areas of improvement.

The results for the Likert scale questions suggest that a strong majority of the students felt that the project was worthwhile and improved their clinical abilities on a number of levels. Whether this truly happened is an area in need of further investigation. Similarly, the open-ended question responses confirmed their belief that they gained valuable clinical understanding, but time constraints were a common issue among students. This might be a result of procrastination however, because students were given the project in the 2nd week of the

semester and had 6 weeks in which to complete it. Possibly some form of continuous feedback and encouragement and midproject partial completion dates would be useful to help students stay on task and on time. One of the best additional outcomes of the project is that it has created a wealth of case studies from which the instructor can develop teaching materials for future classes.

## CONCLUSION

A student-centered learning approach utilizing fictitious self-written case reports has been described and analyzed. Students believed that creating their own case report was a worthwhile clinical education endeavor that improved a number of abilities. Further investigation should be done to determine the extent that clinical knowledge, skills, and attitudes have actually improved.

## CONFLICT OF INTEREST

No funding was obtained for this study. The author has no conflict of interest to declare.

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## APPENDIX A Case Report Project Template

(Available for download from [www.journalchiroed.com](http://www.journalchiroed.com))

Project: Create a clinical case report by addressing the following items. You must hand in a paper copy and email a Word document copy to the course instructor. The title of your word document should be: **Topic Last name Course number Spring 07**

This form can be found at: <http://bb.ctdlc.org>, user: \_\_\_\_\_, password: \_\_\_\_\_, See: My courses>6th Semester Technique>Assignments

Due: Week 8 in class. Spelling, grammar, and punctuation count. (-.5 for every error)

Student name (1 pt)

ID number

Date

Region:

1. Initial Identifying Data (create information on the following) (6 pts)

Name

Age

Gender

Body type/habitus (ecto-, meso-, endomorph)

Occupation

Other (marital status, number of children)

2. History:

a. Chief complaint: LMNOP (create info on the following, 10 pts)

Location

Mechanism

Nature of pain

Onset

Palliative/Provocative

b. General history:

i. AMPLE (5 pts)

Allergies (create one, name it) (1 pt)

Medications (name one) (1 pt)

Past Medical History (create 1 issue from the following) (1 pt)

Hospitalizations, Injuries, Diabetes mellitus, Tumors, Operations,  
Youth Diseases

Last Menstrual Period/Last Meal Contents (date for each) (1 pt)

Events (create 1 issue from the following (1 pt): Personal changes,  
concerns with care, sleep patterns, diet, tobacco, alcohol consumption,  
substance abuse

ii. Family history (create at least 1 issue, 2 pts)

Include parents, siblings, children, and spouse

iii. Psychosocial history (create 1 issue, 2 pts)

iv. Review of systems (1 issue from the following, 2 pts):

General (weight change, fever, fatigue), skin, head, eyes, ears, nose  
and sinuses, mouth and throat, breasts (male and female),  
respiratory, cardiac, gastrointestinal, urinary, genitoreproductive,  
peripheral vascular, musculoskeletal, neurological, hematological,  
endocrine, psychiatric

3. Examination. Create findings for each of the following (18 pts, 2 pts each):

Vital Signs

Inspection (DASEDD, including posture analysis) (describe findings)

Palpation (give findings for soft tissue, static, and motion joint palpation)

Percussion (describe findings)

ROM (list what was done and results, give normals)

Orthopedic Tests (list 5 appropriate tests, identify the positive ones)

Neurological Tests (MRS and/or Cranial Nerves or others, if applicable) (name tests performed)

X-Ray or Special Imaging (describe findings on films or special imaging)

Lab Tests (describe findings, if any)

4. Differential Diagnosis (7 pts)

Give 3 possible DDXs for the chief complaint. List the patient's probable condition as the first one and give the rationale for why it is the primary diagnosis. (4 pts)

Name at least 2 specific subluxations/joint dysfunctions and give rationale as to why they exist (3 pts)

5. Management/Treatment

a. Describe the initial care for chief complaint as follows:

Passive care (in office)

Adjustments (2 pts)

Other manual therapy (2 pts)

Modalities (2 pts)

Active care (outside the office) (2 pts)

b. Describe the long-term care. How would you determine the end point of care? Discuss consideration for elective or supportive care. (4 pts)

c. Discuss the clinical significance of the Initial Identifying Data on this case. (2 pts)

d. Discuss the clinical significance of each component of the Chief Complaint. (5 pts)

e. Discuss the clinical significance of each AMPLE issue. For medications, give the effects and side effects (5, 1 pt each).

f. Discuss the clinical significance of the Family History issues (2 pts)

g. Describe your clinical management of the Psychosocial issues (2 pts)

h. Choose one nonmusculoskeletal issue from the Systems Review. Describe the pathophysiology. Discuss your CAM care for this. What would the traditional medical care be? (6 pts)

6. Identify one example for each of the following reflexes possibly involved in the case. (9 pts)

somatovisceral

viscerosomatic

psychosomatic

somatopsychic

viscerovisceral

psychovisceral

somatosomatic

visceropsychic

psychopsychic

7. References: List at least 5 references used in this project. Two must be from peer-reviewed journals. Note how each reference was used to create the case. Proper referencing format (as per your senior thesis) is required. (5 pts)

## APPENDIX B Case Report Project Survey

(Available for download from [www.journalchiroed.com](http://www.journalchiroed.com))

Please circle the answer that best applies to you.

1. How much did the case report project help improve your understanding of the components of a case report?
  1. Was of no help
  2. Was a little helpful
  3. Was of moderate help
  4. Was of much help
  5. Was of very much help
2. How much did the case report project help improve your clinical reasoning abilities?
  1. Was of no help
  2. Was a little helpful
  3. Was of moderate help
  4. Was of much help
  5. Was of very much help
3. How much did the case report project help improve your ability to integrate information from other classes?
  1. Was of no help
  2. Was a little helpful
  3. Was of moderate help
  4. Was of much help
  5. Was of very much help
4. How much did the case report project improve your understanding of the clinical condition you investigated?
  1. I gained nothing/not at all
  2. I gained a little
  3. I gained somewhat
  4. I gained a lot
  5. I gained a great deal
5. How much did the case report project improve your professional writing ability?
  1. I gained nothing/not at all
  2. I gained a little
  3. I gained somewhat
  4. I gained a lot
  5. I gained a great deal
6. How much did the case report project improve your confidence in managing patients with the clinical presentations you investigated?
  1. I gained nothing/not at all
  2. I gained a little
  3. I gained somewhat
  4. I gained a lot
  5. I gained a great deal

7. How much did the case report project improve your understanding of the 9 different neurological reflexes that may exist in patients?
1. I gained nothing/not at all
  2. I gained a little
  3. I gained somewhat
  4. I gained a lot
  5. I gained a great deal
8. How much did the case report project improve your ability to apply published clinical information to patient conditions?
1. I gained nothing/not at all
  2. I gained a little
  3. I gained somewhat
  4. I gained a lot
  5. I gained a great deal
9. How much did the case report project improve your ability to practice evidence-based chiropractic care?
1. I gained nothing/not at all
  2. I gained a little
  3. I gained somewhat
  4. I gained a lot
  5. I gained a great deal
10. How much did the case report project improve your self-learning skills?
1. I gained nothing/not at all
  2. I gained a little
  3. I gained somewhat
  4. I gained a lot
  5. I gained a great deal
11. How much did the case report project help identify your areas of knowledge in need of improvement?
1. Was of no help
  2. Was a little helpful
  3. Was of moderate help
  4. Was of much help
  5. Was of very much help
12. How much did you enjoy doing the case report project as a method of learning?
1. I enjoyed nothing/not at all
  2. I enjoyed it a little
  3. I enjoyed it somewhat
  4. I enjoyed it a lot
  5. I enjoyed a great deal
13. Should the case report project be continued as part of this technique course?
1. Absolutely not
  2. Probably not
  3. Not sure
  4. Probably should
  5. Yes, absolutely

#### **Open-ended questions**

1. What did you like about the case report project?
2. What did you dislike about the case report project?
3. What would you do to improve the case report project?)