Anatomy Comic Strips

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Comics are powerful visual messages that convey immediate visceral meaning in ways that conventional texts often cannot. This article’s authors created comic strips to teach anatomy more interestingly and effectively. Four-frame comic strips were conceptualized from a set of anatomy-related humorous stories gathered from the authors’ collective imagination. The comics were drawn on paper and then recreated with digital graphics software. More than 500 comic strips have been drawn and labeled in Korean language, and some of them have been translated into English. All comic strips can be viewed on the Department of Anatomy homepage at the Ajou University School of Medicine, Suwon, Republic of Korea. The comic strips were written and drawn by experienced anatomists, and responses from viewers have generally been favorable. These anatomy comic strips, designed to help students learn the complexities of anatomy in a straightforward and humorous way, are expected to be improved further by the authors and other interested anatomists. Anat Sci Educ 00: 000-000. © 2011 American Association of Anatomists.

Key words: gross anatomy; artistic anatomy; cartoons; humor; Korea; medical education

INTRODUCTION

The comic medium has largely been ignored in the scientific disciplines, even as it has begun to appear in the humanities. For long time, comics have been regarded as suitable only for children, because they are neither art nor literature but rather a perverse hybrid arising from popular culture (Locke, 2005; Tatalovic, 2009). And yet comics have enormous power to tell stories and convey messages (McCloud, 1993). Comics can also facilitate efficient and effective communication of complex information. They have been used successfully to disseminate ideas, and their audience has expanded beyond young people to include adults who wish to learn more about myriad weighty issues in fun ways (Green and Myers, 2010).

Science Comics

Comics have been used in science education, including chemistry (Di Raddo, 2006) and biochemistry (Nagata, 1999). One group created a science curriculum that incorporated comic strips and provided students with opportunities to read, discuss, and respond to the contents of these comics. The comic strips stimulated students’ interest in science issues and promoted science literacy (Olson, 2008). In another study, children exposed to science comics were able to give scientific explanations for the comics based on their own experiences (Weitkamp and Burnet, 2007). Spurred by curiosity from science comics in yet another study, children were motivated to look for more information in magazines, newspapers, the Internet, and other sources (Rota and Izquierdo, 2003). Posters that incorporate science-themed comics can enhance the public’s understanding of science across multiple generations (Naylor and Keogh, 1999).

Contemporary comics depict the lives of scientists in addition to the subject of science itself. One series, PhD Comics, depicts the lifestyle of graduate students in the midst of their scientific research (Cham, 2002; PhD Comics, 2011). Lab Bratz, another comic strip, was inspired by the day-to-day activities of a scientific laboratory and office space (Tatalovic, 2009; Lab Bratz, 2011). Such comics have been used for fun and education and are increasingly a topic of academic study.

Medical Comics

Medical comics have been used to promote public awareness and patient literacy regarding various ailments, including
HIV and diabetes (Harvey, 1997; Pieper and Homobono, 2000). The comic medium is particularly appropriate for educating patients, because visual learning can be intuitive in ways that verbal explanations may not (Green and Myers, 2010).

Medical comics also benefit health care professional trainees. Medical students gain knowledge from comics as well as empathic, observational, and communication skills. Students come to regard the patient as a person, much more than a mere subject with a disease. Along this line, medical comics are increasingly being used in the medical humanities (Green and Myers, 2010).

Medikidz (medical information for kids) is a comic book designed to teach children about common disease processes (O’Luanaigh, 2010). These serial comic books each deal with one disease, beginning with asthma, breast cancer, and childhood obesity and continuing on through the alphabet (Medikidz, 2011). The immune system is a dramatic source for comic-type stories (Tatalovic, 2009). One can imagine immunology comics expanding to animated films, where immune cells (heroes) battle against pathogenic microorganisms (villains).

Anatomy Comics
Anatomy has been explored in some comic books, usually aimed at children’s curiosity about the human body. The available commercial comics are not ideal, however, because most cartoonists who write and sketch them have no formal anatomy training (Hwang et al., 2005). Experienced anatomists might be more likely to describe anatomy simply and correctly. The process of translating scripts to images is also crucial, as artists can distort writers’ visions (Tatalovic, 2009). It is, therefore, desirable that an anatomist simultaneously writes and illustrates the comic strip. The project described here was these authors’ attempt to write and illustrate four-frame comics that would help medical students...
learn human anatomy. The creation and educational use of comics is ongoing.

CREATING COMIC STRIPS

Humorous stories related to anatomy and ranging from gross and neuroanatomy to histology to embryology were collected from the authors' and colleagues' memories. Story texts were written in four paragraphs, matching the final frame count of each comic strip. The text of each scenario was illustrated with pencil and paper, and then digitized with Adobe Illustrator CS5 (Adobe Systems Inc., San Jose, CA; Fig. 1), as has previously been described by our group (Hwang et al., 2005).

To set a light tone and make the comic strips approachable for students, Dr. Anatophil was cast as the main character, a comical anatomy professor. The corresponding author of this article (M.S.C.) used himself as the model for the protagonist (Fig. 2). These authors lacked the artistic talent to draw realistic figures, so we used two-dimensional caricatures in our comics. Despite their simplicity, our illustrations include a great deal of the anatomical detail that medical students are required to know. Our past experience of board lecturing without a digital projector helped in drawing these comics.

Over the last decade, 550 comic strips have been created in Korean, with anatomical terms also translated to English according to the Terminologia Anatomica (FCAT, 1998). The first 180 comic strips were published in a Korean comic book (Chung et al., 2006). Some comics were serially published in a popular health science magazine of Korea (Health Chosun, 2007). Others were occasionally introduced in newspapers and on television.

Thirteen comic episodes have been fully translated into English (see Figs. 3 and 4), and the process continues. They are freely accessible together with all remaining comic strips in original Korean language on the Ajou University School of Medicine Department of Anatomy homepage (Anatomy, 2006).

Figure 2.
The comic strip artist uses himself as the model for the leading character, Dr. Anatophil.

Figure 3.
Two representative anatomy comic strips.
2011). Roughly, a quarter of our comics deal with Korean language and history that may not be familiar to English-speaking readership. We do not plan to translate these comics.

DISCUSSION

Originality of Anatomy Comic Strips

Unlike single-frame cartoons, comics narrate stories through a sequence of frames, so one might say that cartoons are to comics as photographs are to films (Tatalovic, 2009). Comics require more from their viewer than do films, however, because the comic strip reader must reconstruct the story that occurs among frames. The reader’s imagination transforms the physical space among frames into a coherent story. The reader thus becomes an active participant in the narrative and often identifies him or herself with the drawn characters (McCloud, 1993; O’Luanaigh, 2010).

Our anatomy comic strips are quite different from other books or comics. Whereas anatomy coloring books are generally comprised of many unrelated, stand-alone plates (Goldberg, 2007; Goldberg and Ouellette, 2010), each of our comic strips tells one complete story within four frames (Figs. 3 and 4), the typical pattern of such comic strips as PhD Comics and Lab Bratz (Cham, 2002; Tatalovic, 2009; Lab Bratz, 2011; PhD Comics, 2011). Our Dr. Anatophil comic series also differs from other anatomy comic strips in that its target audience is medical students rather than young children (Tatalovic, 2009; O’Luanaigh, 2010; Medikidz, 2011). Our comics contain more adult humor that may be more appropriate and interesting to college students.

Application of Anatomy Comic Strips

Many students struggle to learn anatomy, some because of the large amount of material and others because of the difficulties associated with cadaveric dissection. There is no shortage of stories, however, that make learning of anatomic details more efficient and fun. For example, the median nerve carries the nickname “counting nerve,” because it innervates the palmar surface of the thumb, index finger, and middle finger, which are used to count paper currency. Comic strips’ potential to tell such stories has been proposed by previous authors (McDermott, 1989; Pease, 1991; Weitkamp and Burnett, 2007; Olson, 2008).

Comics also foster medical students’ empathy by offering insight into different aspects of illness (Delp and Jones, 1996; Leiner et al., 2004; Green and Myers, 2010). Students may be able to use comics or jokes to teach their patients about disease processes in appropriate, uncomplicated terms.

Few graduating medical students specialize in anatomical sciences, often stating that the subject matter seems boring. Anatomy comic strips such as ours could be a novel tool for demonstrating the intriguing and worthwhile activities of anatomists to trainees.

Anatomy comic strips are not without limitations. Some have argued that providing pictures to learners does them a disservice, because they are not given a chance to create their own mental images (Hughes, 2005). With a morphological science such as anatomy, where spatial relationships are so important, however, expecting learners to imagine accurate mental pictures from verbal descriptions alone is unrealistic. It has also been reported that science comics, with their striking artwork designed to be fun, might misrepresent the actual science (Tatalovic, 2009). Yet a different study demonstrated that even children were able to appropriately discern scientific fact from fiction (Rota and Izquierdo, 2003). We believe that medical students are generally able to comprehend the humor in our comic strips and, moreover, can learn anatomy from them.

Future of Anatomy Comic Strips

The authors will continue to draw the Dr. Anatophil comic strip series and hope to improve the quality of the illustrations and translations. We have a goal of publishing 1,000 Korean comic strips and translating 750 into English. An exciting possibility would be to convert the comic strips to other media platforms such as an iPhone App (Apple, Inc., Cupertino, CA) or flash animation video.

Objective assessment of how our anatomy comics are perceived by readers and to what degree they aid students’ learning is important. We plan to conduct a comparison study of course grades for students with and without exposure to the
NOTES ON CONTRIBUTORS

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DAE HYUN KIM is a student in the Lawrenceville School, Lawrenceville, New Jersey, and an applicant for medical school. He translates the anatomy comic strips from Korean to English.

MIN SUK CHUNG, M.D., Ph.D., is a professor in the Department of Anatomy, Ajou University School of Medicine, Suwon, Korea. He teaches anatomy by drawing comics on the board.

Anatomically Speaking. He translates the anatomy comic strips from Korea. He teaches gross anatomy to undergraduate and graduate medical students.

Table 1.

<table>
<thead>
<tr>
<th>Reader</th>
<th>Remarks</th>
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<tr>
<td><strong>Medical Students</strong></td>
<td>The comics promoted memorization of anatomy contents.</td>
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<tr>
<td></td>
<td>I could laugh at the comical situations only after acquisition of anatomy knowledge. I recognized how anatomy enriches me.</td>
</tr>
<tr>
<td><strong>Anatomists</strong></td>
<td>The awkward illustrations of anatomical structures have both merits and drawbacks. Schematic drawings are easy to comprehend, but they are also difficult to apply to the real features of cadaveric dissection.</td>
</tr>
<tr>
<td><strong>Clinicians</strong></td>
<td>I included a couple of comics in the PowerPoint slides that I show my students during lecture.</td>
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<tr>
<td><strong>Laypeople</strong></td>
<td>Several comic strips reminded me of unforgettable medical school moments.</td>
</tr>
<tr>
<td></td>
<td>I found anatomy jokes relevant to my specialty and use them to relax patients.</td>
</tr>
<tr>
<td></td>
<td>As a child viewing the comic strips, I could confirm my goal to enter medical school with a better sense of the real experiences of that training.</td>
</tr>
<tr>
<td></td>
<td>I did not understand the jokes. Regrettfully, I developed negative opinions about the perceived privileges of medical personnel.</td>
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LITERATURE CITED


