

# Internet-Based Reference Case Managers for Clinical Practice and Research Collaboration

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Clinical decision making can be a challenge for physicians. Working in a large medical community offers the benefit of peer interaction, but after training, most physicians are no longer affiliated with a large center and cannot consistently interact with their peers. Consequently, physicians often make isolated clinical decisions based on medical training, clinical experience, peer-reviewed journals, and textbooks. The specific guidance and moral support of peer interaction traditionally has been achieved by phone calls, via e-mail, or in moderated chat forums. Each of these required significant amounts of time and follow-through and did not allow for organized, reliable information or group interaction.

The earliest example of a chat forum was the Usenet group founded by Chris Beauchamp and Ian Dickey in 1994: sci.med.orthopaedics. Although it showed potential, its interface was primitive, and it was severely limited in its ability to foster interaction. Today, the Internet has emerged as a tool for information organization and dissemination of digital media in multiple formats across several platforms, and it facilitates immediate response to posted queries.

Historically in medicine, the Internet has been used for unidirectional information extraction via search engines that provide database and literature output. Current Web-based applications, driven by e-commerce, allow submission and reception of digital media and have been used to link specialists and pro-

vide forums for rapid, bidirectional information sharing, thereby encouraging free information flow. Syndicom SpineConnect (<http://www.spineconnect.com>) and others, such as MyPACS (<http://www.mypacs.net>), are new and exciting examples of this technology. SpineConnect, a free service, was established in 2005 to facilitate clinical collaboration among spine care providers. MyPACS, another free service, was founded by Vivalog Technologies, in part with funding from the National Institute of Mental Health. MyPACS offers a forum similar to that of SpineConnect but is directed more toward radiologists; any topic can be shared and discussed in a secure format.

Cases are posted for review on the SpineConnect home page in an anonymous format, following HIPAA compliance guidelines. Typically, cases are presented with a case title (eg, "35-year-old male with L4-5 disk herniation"), a brief clinical history, and relevant clinical images. Readers choosing to evaluate the case can view the presentation in its entirety, including the complete clinical scenario and all associated images. After case review, the reader is able to submit comments and attach instructional images.

Case submission is performed using SpineConnect's Case Wizard, an easy and intuitive interface with on-screen step-by-step instructions. Physicians first attach images relevant to the case (eg, photographs, radiographs). The Case Wizard then guides clinical information input, including region of pathology (eg,

cervical, thoracic), etiology (eg, degenerative, traumatic), pertinent positives and negatives on physical examination, demographic data, and medical history. The priority for case review is selected (emergent, urgent, or routine). A case title is created, and the physician poses the clinical question. The case is then submitted to SpineConnect.

MyPACS has a similar interface, albeit less sophisticated than that of SpineConnect. Once one creates a user account, one can immediately browse the copious teaching files, review the Case of the Week, or search by pathology or region. One also can then submit cases to one's account. The creation of a case is simple and is done on a typical Web browser sheet. The case information is entered and the level of access determined. One can then share with specific others, the general group, or no one at all, thereby using the system as a personal file. The submission of the digital image media is simple and straightforward; performance depends on the size and number of images.

A nice feature of MyPACS is the export option, which allows one to send a case as an HTML file to any e-mail address. The recipient can open the file with a standard browser. There is no need for the recipient to set up his or her own account. An additional useful feature is the ability to save a case to one's own computer as a PowerPoint file. This is a very useful option for those who need an easy way to organize a large file of

case examples (such as in any hotel or airport in the world the night before an important presentation).

The SpineConnect platform is more advanced in the aspect of secure sharing in that it allows participating physicians to create specific discussion groups with assigned permissions. Submitted cases then can be delivered via e-mail or pager to surgeons within the submitting physician's discussion group. This allows physicians to share cases with peers they know and trust. Submitted cases also are posted anonymously to the entire SpineConnect community on the Website's home page. Those reviewing cases can answer the submitted clinical question or ask clarifying questions. All responses are automatically captured, sorted, and filed using SpineConnect's case management system. Submitting physicians are notified of all responses. In addition, physicians can view previously submitted cases and the associated responses.

The potential of these Web-based systems extends beyond case collaboration. The discussion groups are particularly useful in that they allow training programs to maintain contact with former residents and fellows, acting as a natural extension of the mentoring aspect of postgraduate work. Another exciting facet that has emerged is the ability to facilitate Web-based, multicenter research. For example, the SpineConnect case-based discussions have generated research ideas and spawned collaborative multicenter research efforts.

Future directions include efforts to accommodate multicenter databases in compliance with federal regulations for protecting patients. In addition, the clinical applications will ultimately extend beyond spine care. Syndicom is currently developing a case collaboration platform for orthopaedic trauma and joint arthroplasty.

These reference case managers harness the power of the Internet to reduce the sense of isolation felt by many physicians while simultaneously facilitating and enabling orthopaedic clinical and research communities. Internet-based reference case managers are valuable learning tools that permit relevant and timely clinical input. The case management capabilities will prove to be very useful for the academic-based clinician trying to harness an ungainly case example or teaching file, as well as for tracking clinical results of specific cases. These sites also create an opportunity for Internet-based research that facilitates discussion groups, multicenter collaboration, and data collection from both university-affiliated and community-based orthopaedic surgeons. Ultimately, this technology provides great power to unite the orthopaedic community while improving patient care and promoting future innovation.

*Comments on and suggestions for Web and Wireless Review columns may be sent to Ian D. Dickey, MD, FRCSC, at iandickey@md.aaos.org.*

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