Development of a Software Package for Electronic Documentation of Orthopaedic X-Ray Findings

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Abstract

Proper documentation of x-ray findings, including anatomical location, joint position, arthritis location with severity, fracture patterns, bone changes, changes from joint arthroplasty, and ICD-9 coding, are a vital aspect of the orthopedic surgeon’s daily office task. While radiology software is available for certain templated studies, there is little in the way of orthopaedic electronic documentation other than templated “pick-lists” for common findings. The authors developed a software package with line drawings of a selected anatomical area that are color coded to divide individual bones into proximal inter-articular, distal inter-articular, and shaft fractures. Each color coded section of a bone details both fracture patterns and bone changes possible for that area of the bone or joint. When a cursor is moved over each section of the bone, the various fracture patterns and bone changes then appear on the screen. The chosen fracture pattern, along with its associated description, is then electronically recorded coupled with its ICD-9 code including the specific digit when appropriate.

Methods

The authors developed a collection of skeletal line drawings in which the body is divided into five main sections. These sections include the spine, upper extremity, hand and wrist, lower extremity, foot and ankle, and pelvis. With the exception of spine and pelvis anatomy, the line drawings of a selected area are color coded to divide individual bones into proximal inter-articular, distal inter-articular, and shaft fractures. Each color coded section of a bone details both fracture patterns and bone changes possible for that area of the bone or joint. When a cursor is moved over each section of the bone, the various fracture patterns and bone changes then appear on the screen. The chosen fracture pattern, along with its associated description, is then electronically recorded coupled with its ICD-9 code including the specific digit when appropriate.

Conclusions

This documentation can then be transmitted to the physician’s or to an institution’s existing EMR system. Since this is a web-based system, links are provided to American College of Radiology Clinical Guidelines. X-ray findings are also backed up under server listings that contain no patient identifying data other than a system record number for use in an anonymous fracture and arthroplasty registry. The system is faster than a transcription system in testing and allows for complete, accurate coding and documentation of skeletal radiological findings in a standard nomenclature. This format is especially useful in long term studies, clinical trials, and searches of medical records for retrospective studies. Use of this software documentation package should also help to improve communication between the musculoskeletal specialist and non-specialist when describing fracture patterns and other bone and joint x-ray changes taken in out-patient ambulatory and emergency room settings.