Comprehensive Anatomy and Physiology for ICD-10-CM Coding

Your guide to the anatomical and physiological specificity of ICD-10-CM coding

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Synovial joint structures can be further classified by the movements they allow, including:

- **Ball-and-socket**: Head of a long bone (“ball”) and depression of another bone (“socket”) join. The shoulder (humeral head and glenoid depression of the scapula) and hip joints (femoral head and acetabulum of a coxa bone) are ball-and-socket articulations.

- **Condyloid**: Protrusion of one bone meets a depression of another to form this type of joint. Examples are the wrist (radius and carpals) and knuckles (metacarpal and proximal phalange).

- **Hinge**: Convex portion of a bone meets with the concave part of another to form a hinge joint. The elbow and knee are large hinge joints.

- **Pivot**: Rounded or pointed protrusion of one bone fits into a ring composed of bone or bone and ligaments of another bone. The articulation between the C1 and C2 vertebrae that allows the head to move back and forth is a pivot joint.

- **Planar**: Flat surfaces of two bones glide against one another. The joints between the short carpals (intercarpal joint) and tarsals (intertarsal joint) are planar.

- **Saddle**: One bone has a depression shaped somewhat like an equestrian saddle; the joint is formed by a second bone straddling that depression. An example of this type of articulation is where the trapezium meets the metacarpal of the thumb. This joint allows the unique opposition of the human thumb.

**DEFINITIONS**

- **opposition**: Act of touching the thumb to the tips of each finger on the same hand.
Injuries to the skeletal system are quite common as it is a rigid structure. The bones are also highly susceptible to injury because part of their purpose is to maintain alignment, regardless of extraneous external forces. Fractures, in the bone, are a common injury. There are roughly 6.8 million fractures reported in the United States annually.

ICD-10-CM Official Coding Guideline section I.C.19.c.1. states, “A fracture not indicated as open or closed should be coded to closed. A fracture not indicated whether displaced or not displaced should be coded to displaced.”

These two answers determine the sixth digit of the ICD-10-CM code. However, since fracture codes require a seventh character, even more information is needed. This alphabetic character is based on multiple factors as listed below:

- Is this the initial encounter for the fracture? If yes, is the fracture:
  - open
  - closed
- Is this a subsequent encounter? If yes:
  - Is the healing of the fracture routine or delayed?
  - Is there a nonunion or malunion?
  - Is there a sequela or late effects of the fracture?

Due to the extensive nature of code selection for a fracture in ICD-10-CM, there is a “one-to-many” match between the two coding classes, demonstrated in the table below.
### Coding for Closed Fracture of Greater Tuberosity of the Humerus

<table>
<thead>
<tr>
<th>ICD-9-CM</th>
<th>ICD-10-CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>812.83</td>
<td>S42.251A</td>
</tr>
<tr>
<td></td>
<td>Displaced fracture of greater tuberosity of right humerus, initial encounter for closed fracture</td>
</tr>
<tr>
<td>812.83</td>
<td>S42.252A</td>
</tr>
<tr>
<td></td>
<td>Displaced fracture of greater tuberosity of left humerus, initial encounter for closed fracture</td>
</tr>
<tr>
<td>812.83</td>
<td>S42.253A</td>
</tr>
<tr>
<td></td>
<td>Displaced fracture of greater tuberosity of unspecified humerus, initial encounter for closed fracture</td>
</tr>
<tr>
<td>812.83</td>
<td>S42.254A</td>
</tr>
<tr>
<td></td>
<td>Nondisplaced fracture of greater tuberosity of right humerus, initial encounter for closed fracture</td>
</tr>
<tr>
<td>812.83</td>
<td>S42.255A</td>
</tr>
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<td>Nondisplaced fracture of greater tuberosity of left humerus, initial encounter for closed fracture</td>
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<td>Nondisplaced fracture of greater tuberosity of unspecified humerus, initial encounter for closed fracture</td>
</tr>
</tbody>
</table>

Note that in ICD-9-CM, if a fracture is specified as complicated by a malunion or nonunion, the fracture site is irrelevant as there are only two applicable codes: 733.81 Malunion of fracture, and 733.82 Nonunion of fracture. However, documentation of the site, laterality, and type of complication is imperative in ICD-10-CM, as the same traumatic fracture codes are used but with a seventh character identifying malunion or nonunion.

Additionally, to appropriately assign a seventh digit for malunion or nonunion of an open fracture, a coder must be aware of the differences between the types of open fractures as described below:

- **Type I**: The wound is less than 1 cm in length and clean.
- **Type II**: The wound is greater than 1 cm in length, clean, and there is minimal to no soft tissue injury.
- **Type III**: The wound is greater than 1 cm in length, and there is significant soft tissue injury. Type III fractures can be further classified as:
  - IIIA: There is enough local soft tissue to cover the wound and bone without the need for skin grafting.
  - IIIB: The injury to the soft tissue is significant enough that skin grafting is necessary to cover the bone.
  - IIIC: The injury is associated with an arterial injury that requires repair.

The differences in coding for malunion and nonunion are captured in the table below. Please note that due to extensive mapping, the table is a sample of the ICD-10-CM codes that represent the various concepts.
**ICD-9-CM** | **ICD-10-CM**
--- | ---
733.44 Aseptic necrosis of talus | M87.874 Idiopathic aseptic necrosis of right foot<br>M87.875 Idiopathic aseptic necrosis of left foot<br>M87.876 Idiopathic aseptic necrosis of unspecified foot<br>M87.174 Osteonecrosis due to drugs, right foot<br>M87.175 Osteonecrosis due to drugs, left foot<br>M87.176 Osteonecrosis due to drugs, unspecified foot<br>M87.274 Osteonecrosis due to previous trauma, right foot<br>M87.275 Osteonecrosis due to previous trauma, left foot<br>M87.276 Osteonecrosis due to previous trauma, unspecified foot<br>M87.374 Other secondary osteonecrosis, right foot<br>M87.375 Other secondary osteonecrosis, left foot<br>M87.376 Other secondary osteonecrosis, unspecified foot<br>M87.874 Other osteonecrosis, right foot<br>M87.875 Other osteonecrosis, left foot<br>M87.876 Other osteonecrosis, unspecified foot

Sometimes the normal curvatures in the spine become deformed. There are three types of these deformities:

- **Scoliosis**, a lateral curvature of the spine
- **Kyphosis**, an abnormal posterior convex curvature of the spine
- **Lordosis**, an exaggerated inward curvature of the lower back

**Kyphosis and Lordosis**

**Scoliosis and Kyphoscoliosis**
Comprehensive Anatomy and Physiology for ICD-10-CM Coding

For the most part, ICD-10-CM mimics ICD-9-CM when it comes to coding kyphosis and lordosis, having equivalent one-to-one mapping or, if there is a one-to-many match, the classification is simply divided by spinal region (i.e., cervical, thoracic, or lumbar). However, there are a few distinct differences surrounding the crosswalk for scoliosis and kyphoscoliosis, category 734.3 in ICD-9-CM. In order to appropriately assign a code for (kypho-) scoliosis in ICD-10-CM, the coder must understand the different physiologies of the disease.

There are four major types of scoliosis:

- Congenital
- Neuromuscular, which is due to spinal muscle weakness or nerve damage
- Degenerative
- Idiopathic, which has an unknown cause and is the most common form of the disease. It can be divided by the age of the patient:
  - infantile: birth to 3 months
  - juvenile: 3 months to 9 years
  - adolescent: 10 to 18 years

ICD-9-CM does distinguish between infantile and other types of idiopathic scoliosis, as well as whether the infantile disease is progressive or resolving. In ICD-10-CM, however, the distinction between the age classifications is further specified, and juvenile and adolescent idiopathic scoliosis are also given their own categories, but the detail of whether the disease is progressing or resolving is lost in ICD-10-CM.

In addition to codes clarifying idiopathic scoliosis, codes have been added in ICD-10-CM for neuromuscular and other secondary forms of scoliosis, such as that caused by disc herniation.

**Coding for (Kypho-) Scoliosis**

<table>
<thead>
<tr>
<th>ICD-9-CM</th>
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<tbody>
<tr>
<td>737.30</td>
<td>Scoliosis, idiopathic</td>
</tr>
<tr>
<td>M41.112</td>
<td>Juvenile idiopathic scoliosis, cervical region</td>
</tr>
<tr>
<td>M41.113</td>
<td>Juvenile idiopathic scoliosis, cervicothoracic region</td>
</tr>
<tr>
<td>M41.114</td>
<td>Juvenile idiopathic scoliosis, thoracic region</td>
</tr>
<tr>
<td>M41.115</td>
<td>Juvenile idiopathic scoliosis, thoracolumbar region</td>
</tr>
<tr>
<td>M41.116</td>
<td>Juvenile idiopathic scoliosis, lumbar region</td>
</tr>
<tr>
<td>M41.117</td>
<td>Juvenile idiopathic scoliosis, lumbosacral region</td>
</tr>
<tr>
<td>M41.119</td>
<td>Juvenile idiopathic scoliosis, site unspecified</td>
</tr>
<tr>
<td>M41.122</td>
<td>Adolescent idiopathic scoliosis, cervical region</td>
</tr>
<tr>
<td>M41.123</td>
<td>Adolescent idiopathic scoliosis, cervicothoracic region</td>
</tr>
</tbody>
</table>

(Continued on next page)
20. The three types of spinal curvature abnormalities are:
   a. __________________
   b. __________________
   c. __________________

**KNOWLEDGE REVIEW ANSWERS: SKELETAL SYSTEMS AND ARTICULATIONS**

1. True or false. The mandible is the only bone in the face that moves. True
   
   **Rationale:** The face consists of 13 stationary bones and one that is mobile. The mandible (jawbone) is the only facial bone that moves, and it is also the largest and strongest bone of the face.

2. The bony spine is also called the vertebral column, named after the 24 individual bones that it comprises.
   
   **Rationale:** The vertebral column is the support for the head and trunk of the body, as well as protection for the spinal cord. It is composed of 26 individual bones. Of these bones, 24 are vertebrae that are separated by cartilage called intervertebral discs.

3. There are how many vertebrae in each section of spine?
   a. 7 cervical
   b. 12 thoracic
   c. 5 lumbar
   
   **Rationale:** The vertebrae can be divided into three groups: 7 cervical (C1-C7; C1 is also known as atlas, C2 as axis), 12 thoracic (T1-T12), 5 lumbar (L1-L5).

4. The clavicle and scapula form the shoulder girdle.
   
   **Rationale:** The shoulder girdle consists of two bones on each side, the clavicle, or collar bone, and the scapula, or shoulder blade. The clavicle is found on the anterior side of the shoulder and the scapula on the posterior.

5. What is the lowest portion of the coxal bones called? Ischium.
   
   **Rationale:** This area is identified in the illustration of the pelvis.

6. The acetabulum is where the head of the femur sits to form the hip joint.
   
   **Rationale:** When you look at the acetabulum, you will see the upper epiphysis of the femur.

7. True or false. Both the thumb and big toe have more phalanges than the other toes. False
   
   **Rationale:** There are only two. Similar to the fingers, all of the toes have three phalanges—proximal, middle, and distal.

Each chapter includes an extensive knowledge assessment with 15 questions or more.

Answer key and answer rationale are presented in a separate appendix.

Tests with answer rationale sharpen the skills needed for front-line, everyday coding challenges.
Target your ICD-10-CM training efforts efficiently. The higher degree of specificity in the ICD-10-CM code set is going to require more documentation and more coding precision. Coders will need to have a strong command of human anatomy and physiology to code accurately in the new coding system. Where the knowledge of anatomy will really count is in the thousands of ICD-10-CM codes that don’t have a one-to-one match with the ICD-9-CM codes. This new ICD-10 coding tool from Ingenix will help you to focus your anatomical lessons on those areas that offer multiple ICD-10-CM code choices. You’ll be able to use your new understanding of anatomy to assign the correct ICD-10-CM codes.

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