

## 13.1 ABNORMAL SPINAL CURVATURE

**AEROMEDICAL CONCERNS:** Excessive kyphosis, scoliosis, lordosis, or combinations of them may make the spine unstable during ejection. Symptomatic conditions may cause distracting backache during flight.

**WAIVER:** Scoliosis over 20 degrees is disqualifying with no waiver for applicants, but can be waived in designated personnel. Kyphosis over 40 degrees is CD, but can be waived up to 45 degrees in designated personnel. Waiver is not normally recommended when there is pain or interference with function or when the condition is progressive.

### INFORMATION REQUIRED:

1. Orthopedic consultation with measurement of any scoliosis by the Cobb method. Films should be taken in a standing position, and the measurements made by the radiologist or orthopedist.
2. Cardiology consultation may be required to exclude pulmonary hypertension in those cases where right axis deviation is seen on EKG.

**TREATMENT:** Scoliosis, if caused by an anatomical short leg, may be improved with a trial of a heel lift on the affected side. OMT/Manual medicine and/or heel lift therapy when successful is NCD. Surgical treatment is disqualifying.

**DISCUSSION:** Curvature beyond 30 degrees poses risk for ejection injury. The center of gravity of the upper torso lies in front of the spine. Whenever loads are applied along the spinal axis, as in ejection, a bending movement is produced which increases as the disparity between the long axis of the spine and the line of application of the force is increased. While a waiver is possible for designated aircrew, there is little point in considering a waiver for applicants as initial training will involve ejection seat aircraft. The long term outcome in cases of scoliosis up to 30 degrees is very favorable, but above 30 degrees is uncertain. Note that there is a 3-5 degree error in measurements taken by the Cobb method. Consideration to disproportional leg lengths and/or pelvic torsion as an insult to cause symptomatic excessive spinal curvature should be considered. OMT/Manual medicine with an experienced physician may provide greater spinal normalization and relief of symptoms.

### ICD-9 CODES:

**737 Abnormal Spinal Curvature**

**737.0 Kyphosis**

**737.2 Lordosis**

**737.3 Kyphoscoliosis**

**737.31 Scoliosis, within standards**

## 13.2 ANKYLOSING SPONDYLITIS

**AEROMEDICAL CONCERNS:** Cramped cockpit conditions for prolonged periods may exacerbate the eventual disability. Spinal rigidity in advanced cases is incompatible with ejection, may interfere with emergency ground egress, and can cause restriction in peripheral scan by impairing mobility. Concomitant iritis occurs in between 10 and 25% of cases.

**WAIVER:** An established diagnosis with symptoms is CD. Waiver is possible in early cases with normal mobility and no complications.

### **INFORMATION REQUIRED:**

1. Orthopedic or rheumatology evaluation

**TREATMENT:** The cornerstone of treatment while continuing a flying career is a regular exercise routine which the patient must follow scrupulously. Physical rehabilitation may be necessary following flare-ups. Long term maintenance therapy with non-steroidal anti-inflammatory drugs is usually not considered for waiver.

**DISCUSSION:** Sacroiliitis is often the earliest manifestation of the disease, and can be noted on an AP view of the pelvis. The HLA-B27 gene is present in 90% of Caucasians and 50% of African Americans with ankylosing spondylitis. The ESR and C-reactive protein are usually elevated. Clinical diagnosis should be suspected with a history of chronic back pain, loss of motion of lumbar spine, limited chest expansion, and radiographic evidence of sacroiliitis. Complications include cardiac conduction defects, aortic incompetence, uremia arising from amyloidosis, and chest rigidity giving rise to ventilation/perfusion abnormalities. Spinal cord damage can arise from fractures of the rigid cervical spine, and spontaneous subluxation at the atlantoaxial joint with quadriplegia has been described.

### **ICD-9 CODE:**

**720.0 Ankylosing Spondylitis**

## 13.3 CHRONIC BACKACHE

**AEROMEDICAL CONCERNS:** Chronic back pain, somatic dysfunction, and/or osteoarthritis of the spine and/or pelvis can make it difficult to remain seated for long periods and can hamper performance. If symptoms are chronic and/or recurrent, if the member has required hospitalization, or if the member requires regular medication beyond occasional FS approved NSAIDs, then the condition is CD.

**WAIVER:** Waiver may be recommended when the pain is controlled by conservative, non pharmacologic means, and is not associated with an organic cause. Designated personnel with osteoarthritis requiring low dose NSAIDs who can maintain close supervision by a Flight Surgeon may be considered for waiver on a case by case basis. Somatic dysfunction which is amenable to OMT/Manual medicine, unless persistent, is NCD.

### INFORMATION REQUIRED:

1. Exclude specific causes of back pain such as prolapsed intervertebral disc, metabolic bone disease, metastatic bony deposits, myeloma, ankylosing spondylitis, rheumatoid arthritis, infection, structural defects, somatic dysfunction, and/or injury.
2. Reports of any imaging studies or lab work obtained.
3. Orthopedic, rheumatological and/or OMT/Manual medicine consult are also required if obtained.

**TREATMENT:** Simple conservative measures such as early mobility with remedial exercises or physiotherapy may be beneficial. Bed rest greater than 2 days is rarely of assistance. OMT/Manual medicine with a physician may be beneficial in reducing or alleviating mechanical pelvic-spinal pain. Occasional use of FS prescribed NSAIDs and/or acetaminophen may be used provided there are no subjective side effects and daily use does not exceed 10 days. Drug treatment for the pain of arthritis is not usually waiverable.

**DISCUSSION:** Ninety five percent of back pain is caused by biomechanical derangement of the spine and/or sacroiliac joints when harder tissue encroaches on soft nerve tissue causing symptoms of pain, spasms, and numbness. This is also known as somatic dysfunction that can often be reduced or alleviated by physicians with training in OMT/Manual medicine. Muscular weakness is not generally found in the diagnosis of somatic dysfunction. The incidence of backache only occurring during flight has been reported to be 13% in pilots. Helicopter pilots reported a higher incidence than fixed-wing pilots. Degenerative changes in the cervical spine are common over the age of 30 years. Many mechanical back injuries are preventable, and it should be the flight surgeon's responsibility to educate his squadron members on how to avoid these problems.

### ICD-9 CODES:

**721.9 Chronic Backache**

- 739.1 Somatic Dysfunction, C-spine region**
- 739.2 Somatic Dysfunction, T-spine region**
- 739.3 Somatic Dysfunction, L-spine region**
- 739.4 Somatic Dysfunction, Sacroiliac region**
- 739.8 Somatic Dysfunction, Rib cage**

## 13.4 INTERVERTEBRAL DISC DISEASE

**AEROMEDICAL CONCERNS:** Discomfort or pain can degrade flying performance, and the forces of ejection, excess G forces, catapult launches and arrested landings can exacerbate the condition. One case of acute quadriplegia under G stress has been reported.

### **WAIVER:**

**Applicants:** A history of symptomatic HNP with or without surgery is disqualifying. Waivers may be considered on a case-by-case basis.

**Designated Personnel:** In designated personnel who are currently asymptomatic, the condition is CD but is usually considered for a waiver. Students already under instruction may also be considered for a waiver. All dispositions and waiver requests must be based upon the following criteria, defined by region:

### **Cervical:**

1. **Without radicular symptoms:** Clinical presentation is neck pain, occasional spasms, and/or occasional crepitus. Radiographs show narrowing, osteophytes, or are normal. Treatment is symptomatic with NSAIDs, analgesics and cervical traction. OMT/Manual medicine by an experienced physician may also be helpful. Condition is typically seen in the 4<sup>th</sup> decade of life. **Aeromedical disposition is NCD**
2. **With radicular symptoms:** Clinical presentation is as above but with motor, sensory, and/or DTR changes consistent with radiculopathy. Levels usually are C-4/5, C-5/6 (most common) C-6/7, or C-7/T-1. Radiographs/MRI may show hard disks, foraminal narrowing, and/or disk space narrowing. Treatment is same as above. Soft cervical collar may also be helpful. Failure to respond to conservative therapy and/or progressive symptoms may necessitate neurosurgical consultation. Surgeries are generally anterior cervical fusion (ACF) and occasionally posterior cervical laminectomy. ACF may be performed with graft only, or with graft plus internal fixation.

### **Aeromedical disposition:**

- a. **Symptomatic patient without surgery: NPQ, Waiver Not Recommended (NPQ, WNR)**
- b. **Surgically treated:**
  - i. One level corrected by ACF, 6 months post op, pain free, and with no radicular symptoms. Radiographs demonstrate healing with no instability in flexion and extension views. **NPQ, WR including rotary wing and ejection seat aircraft.**
  - ii. TWO levels corrected by ACF, 6 months post op, pain free, and with no radicular symptoms. Radiographs demonstrate healing with no

instability in flexion and extension views. **NPQ, WR excluding rotary wing and ejection seat aircraft.**

**Note:** With one cervical level fused, expect a 5 degree loss of rotation and a 15 degree loss with two levels fused. Flexion/extension is generally not compromised.

***Lumbosacral:***

1. **Without radicular symptoms:** Also see section 13.3 above, titled CHRONIC BACK PAIN. Clinical presentation is low back and/or sacroiliac joint area pain with occasional spasms. Sacroiliac joint dysfunction may have subjective symptoms of radicular-like symptoms in the pelvic girdle and/or lower lumbar spine area but symptoms generally do not extend below the knee. Clinically, no neurological deficits are demonstrated. Radiographs upon initial presentation without recent trauma are rarely helpful. Radiographs may show narrowing of disk spaces and/or osteophytes or be normal. Treatment is symptomatic with NSAIDs, analgesics, and traction. OMT/Manual medicine by experienced physician may be helpful. **Aeromedical disposition is NCD.**
2. **With radicular symptoms:** Presentation is as noted above, but with the presence of radiculopathy. Neurological examination demonstrates motor, sensory, or DTR changes and/or positive straight leg raise. MRI or myelogram demonstrates HNP with nerve root impingement consistent with the observed neurological deficit. All patients should undergo a period of symptomatic treatment.

**Aeromedical disposition:**

- a. **Symptomatic patient without surgery; NPQ, Waiver Not Recommended (NPQ, WNR)**
- b. **Asymptomatic patient with radicular history over the previous year (treated either operatively or non-operatively): NPQ, WR including rotary wing and ejection seat aircraft.**

**Notes:** An MRI diagnosis of "HNP" at any level of the spine, in the absence of clinical findings, is meaningless. 20-30% of ASYMPTOMATIC people have herniated disks by MRI. Spinal strengthening and range of motion routines with non-impact aerobic training are to be initiated as soon as allowed by the operating surgeon. Following successful surgical or conservative treatment, waiver is possible at six weeks if the following conditions are met:

1. Essentially pain free with no medications other than Flight Surgeon approved NSAIDs and/or acetaminophen.
2. Good flexibility and range of motion.
3. Can pass USN PRT (minus sit ups for lumbar patients).
4. Released to full duty and flight status by the operating surgeon.
5. Recommended for waiver by Flight Surgeon or Local Board of Flight Surgeons.

With the exception of the above noted circumstances, **multi-level discectomies** will be considered to be permanently disqualifying. Waivers are not likely, but may be considered on a case-by-case basis.

#### **INFORMATION REQUIRED:**

1. Orthopedic or neurosurgical consult.
2. If surgically fused, post-operative lateral flexion and extension x-rays must also be submitted as evidence of stability.
3. Orthopedic or Neurosurgical consult documenting return to full duty.
4. Documentation of the member's ability to pass a USN PRT.

**TREATMENT:** See above. Consider surgery after a reasonable course of failed conservative management. Adequate after-care is essential in maintaining strength and flexibility without symptoms for any treatment approach.

**DISCUSSION:** In 50% of cases of lumbar disc protrusion there is a history of trauma, straining, or lifting heavy weights. Cervical symptoms may arise as a result of high-G maneuvering, particularly in crew members other than the pilot in control of the aircraft. Conservative therapy yields a 20% cure rate, while the remainder of patients experiences some pain or discomfort. Surgical treatment of selected cases where root compression is symptomatic and progressive can yield complete relief from symptoms in up to 80% of cases. Operative vs. non-operative outcomes after five years have demonstrated essentially the same outcome. OMT/Manual medicine by an experienced physician may be helpful in providing a clinical diagnosis and reducing down time while improving patient satisfaction and reducing the number or required diagnostic tests. Acute onset of a neurological deficit requires prompt orthopedic or neurosurgical assessment.

#### **ICD-9 CODES:**

**722 .0 HNP without myelopathy, Cervical**  
**722.11 HNP without myelopathy, Thoracic**  
**722.10 HNP without myelopathy, Lumbar**  
**722.71 HNP with myelopathy, Cervical**  
**722.72 HNP with myelopathy, Thoracic**  
**722.73 HNP with myelopathy, Lumbar**  
**722.4 Degenerative disc disease, Cervical**  
**722.51 Degenerative disc disease, Thoracic**  
**722.52 Degenerative disc disease, Lumbosacral**  
**P80.5 Discectomy**  
**P80.51 Discectomy by laminectomy**  
**P80.59 Intervertebral disc destruction, NEC**  
**P81.00 Spinal fusion, unspecified**  
**P81.02 Anterior cervical fusion**  
**P81.03 Posterior cervical fusion**  
**P81.06 Anterior lumbar fusion**  
**P81.08 Posterior lumbar/lumbosacral fusion**

## 13.5 KNEES - LIGAMENT/MENISCAL TEARS

**AEROMEDICAL CONCERNS:** An unstable knee is a safety factor during rudder/ brake pedal operations, emergency egress, or water and land survival (both training and real life scenarios).

**WAIVER: Meniscal injuries that are surgically repaired do not require a waiver (NCD).** Anterior cruciate ligament injuries in designated personnel that are treated surgically OR conservatively require a one-time waiver with follow-up exams (CD/WR). Applicant personnel who have had surgical ACL repair are eligible for a one-time waiver with follow-up exams (CD/WR). **Conservatively treated ACL injuries (no surgery) are generally not recommended for a waiver, but may be considered on a case-by-case basis.**

### **INFORMATION REQUIRED:**

1. A complete picture of the patient's level of physical activity, limitations, and "normal" documentation.
2. Orthopedic consult must state that the knee is asymptomatic, stable, and if surgery was performed, the successful outcome of the surgery.
3. The patient must not require medication to control pain.
4. Documentation of the patient's ability to pass a USN PRT (swim or run).
5. Normal physical exam of the knee, which must document anterior drawer test, McMurray's test, medial and lateral stability, absence of swelling or effusion, absence of tenderness, and full range of motion.

**TREATMENT:** Surgically repaired ACL's are CD but will be considered for a waiver when asymptomatic and functionally stable. Conservatively treated ACL tears are CD but may be considered for waiver after completion of rehabilitation if patient is symptom free and functionally stable as defined above. Particularly with non-surgical treatment, a careful determination of stability, level of function, and symptoms are crucial for waiver determination.

**DISCUSSION:** Anterior cruciate ligament tears are usually accompanied by associated damage to medial and often the lateral complexes as well. These result from forced flexion or hyperextension injuries in combination with a valgus or varus stress. A positive "anterior drawer sign" is evident on physical exam, usually with findings of medial ligamentous instability as well. Avulsion fracture of the anterior tibial spine may be found on x-ray. Following surgical repair, intensive quadriceps building is required to prevent recurrent injury.

### **ICD-9 CODES:**

**717.3 Medial Meniscal derangement**

**717.40 Lateral Meniscal derangement**

**717.7 Chondromalacia of the patella (patello-femoral pain syndrome)**

**717.83 Knees - Ligament/Meniscal Tears**

**717.83 Anterior Cruciate Ligament disruption, old**

**717.84 Posterior Cruciate Ligament disruption, old**

**P80.26 Knee Arthroscopy**

## **13.6 ORTHOPEDIC HARDWARE, RETAINED**

**AEROMEDICAL CONCERNS:** Discomfort due to retained hardware and risk of refracture are safety of flight and mission completion concerns.

**WAIVER:** Retained hardware in the upper and lower extremities is NCD provided there has been resolution of the underlying orthopedic problem, that the hardware is not subject to trauma, is intact and in the intended location, and does not weaken the bony structure. Retained hardware in the spine is CD in applicants, no waiver. Designated personnel may be considered strictly on a case-by-case basis.

### **INFORMATION REQUIRED:**

1. Orthopedic consultation
2. X-rays (actual films are required, not just reports)

**TREATMENT:** Removal may be a consideration when the retained hardware is associated with the problems noted above.

**DISCUSSION:** Often the underlying orthopedic condition is disqualifying and of greater concern. Retained bioelectric devices (implanted bone stimulators) imply the persistence of a disqualifying condition and are CD, no waiver. If the device has been "curative" then it is no longer required and should be removed. Hardware implanted as a component of a prosthetic joint (arthroplasty) is CD. Most implanted hardware (screws, plates, staples, wires) are used as part of an open reduction and internal fixation of a fracture. After the fracture has healed, the hardware has done its job, and should be removed if it causes discomfort, is easily accessible, and there is minimal morbidity associated with the removal. Some types of hardware are used to affix soft tissue to bone (i.e. knee ligament and rotator cuff repair, shoulder capsulorrhaphy). Removal of these is generally not indicated. Pedicle screws, Harrington rods, circlage wires, and fixation plates too frequently become broken as a result of metal fatigue over time, often with disastrous neurological consequences.

### **ICD-9 CODE:**

**V54.90 Orthopedic Hardware, Retained**

## **13.7 RECURRENT SHOULDER DISLOCATION**

**AEROMEDICAL CONCERNS:** Dislocation of the shoulder in flight could lead to disastrous consequences.

**WAIVER:** More than one episode of dislocation is CD for both applicants and designated personnel. The condition, or history thereof, is CD regardless of interval since repair, but may be considered for a waiver. If a unilateral condition has been corrected surgically and heals without complications and full range of motion, the aviator may request a waiver.

### **INFORMATION REQUIRED:**

1. Orthopedic consult
2. Physical therapy consult documenting full range of motion

**TREATMENT:** Surgical correction and rehabilitation. Member should also be taught a method for self reduction.

**DISCUSSION:** The aeromedical concerns are obvious. Initially, annual submission will be required to document the absence of symptoms and recurrence. If the shoulder remains stable for more than one year post-op, less frequent submission may be requested.

### **ICD-9 CODES:**

**718.31 Recurrent Shoulder Dislocation**

**P81.82 Repair of Recurrent Shoulder Dislocation**

## 13.8 SPINAL FRACTURES

**AEROMEDICAL CONCERNS:** An unstable spine can result in sudden spinal cord injury. Spinal fractures may be associated with spinal cord, nerve root, or plexus injuries. There are significant clinical implications related to whether the fractures occur in the cervical, thoracic, or lumbar spine. Statistically, compression fractures cluster at the thoraco-lumbar junction with T12 being the most common vertebral body involved, followed by L1 and T11.

### **WAIVER:**

**Cervical:** Cervical fractures are CD and require waiver, regardless of extent. **Spinous process fractures not involving the lamina, pedicle, or vertebral body are NCD.** A 6 month period of grounding is required for patients with small anterior chip fracture or compression fractures of less than 25%. At 6 months, if the patient is pain-free, has full ROM, no instability on lateral views, and has no radicular symptoms, he will be considered for a waiver for non-ejection-seat aircraft only. At 12 months, if all the above criteria are still met, waiver will be considered for ejection-seat aircraft. Cervical spine fractures with more than 25% compression, with evidence of instability on lateral views, or with radicular symptoms will only be considered on a case by case basis.

**Thoracic:** A three month period of grounding for a single compression fracture with less than 50% compression or a single wedge fracture with no scoliosis on AP views. At 3 months, if the patient is pain free and with no instability, a waiver will be considered for non-ejection seat aircraft only. At 12 months, waiver will be considered for ejection-seat aircraft if all of the above criteria are still met. Thoracic spine fractures with more than 50% compression, with evidence of scoliosis, or more than one compression fracture are NPQ with a waiver considered on a case by case basis.

**Lumbar:** A three month period of grounding is required for a single compression fracture of less than 50% or a single wedge fracture with no scoliosis on an AP view. After a 3 month period of grounding, a waiver will be considered for non-ejection seat aircraft only providing the patient is pain free, no instability, no spondylolysis or spondylolisthesis, and no radicular pain. At 12 months, waiver will be considered for ejection-seat aircraft providing all of the above criteria are still met. If more than 50% compression, instability present on x-ray, radicular symptoms are present, or there is an associated HNP, then the patient is NPQ with waiver possible only on case by case basis.

### **INFORMATION REQUIRED:**

1. Orthopedic or neurosurgical consultation
2. All X-rays
3. MRI scan of regional neuroanatomical structures may also be required.

**TREATMENT:** Stable fractures without neurological injury respond well to conservative management. Those injuries requiring surgical decompression and/or stabilization usually leave the member with permanent disabilities incompatible with return to DIFOPS.

**DISCUSSION:** In C-spine injuries, the key element in determining aeromedical disposition is stability of the spine. Often times, the bony injuries heal with no residual instability. Ligamentous injuries, in contrast, may heal with various degrees of instability. Early on, instability is detectable by obtaining lateral views in flexion and extension of the C-spine. Chronic instability results in degenerative changes such as disc space narrowing and asymmetry. Also, osteophytic changes and foraminal narrowing are seen in the oblique views. The common wedge or chip fracture, often seen at the C4-6 level with no instability noted, has an excellent prognosis. Lumbar compression/wedge fractures generally heal with no instability. Purely ligamentous injuries of the L-spine are uncommon, however, there is potential for degenerative disc disease which could lead to herniation. Spinal compression fractures are a common ejection injury (20 - 30% of ejections), with most fractures occurring between T9 and L1. For this reason, all survivors of ejections should undergo complete spine x-rays. Finding a compression fracture on x-ray often raises the question of the age of the fracture. Widening of the paraspinous line on x-ray and symptoms appropriate to the location of the identified fracture are indicative of an acute injury. A radioisotope bone scan may remain "hot" for up to two years post compression fracture. Once healed, the damaged area does not appear to be unduly susceptible to repeat fracture. The USAF has records of six pilots with compression fractures who ejected a second time without suffering injury. One aviator ejected four times without subsequent injury. Patients with persistent pain after fracture healing and no other radiological evidence of disease or trauma may benefit from OMT/Manual medicine consultation. C-spine treatment and evaluation should only be undertaken by the most experienced physicians. Somatic Dysfunction with traumatic fractures occurs frequently. C-spine treatment and evaluation should only be undertaken by the most experienced physicians.

**ICD-9 CODES:**

**805 Spinal Fractures**

**805.0 Fracture of Cervical spine, closed, without spinal injury**

**805.2 Fracture of Thoracic spine, closed**

**805.4 Fracture of Lumbar spine, closed**

## 13.9 SPONDYLOLYSIS

**AEROMEDICAL CONCERNS:** This condition can be a cause of low back pain, but may also cause instability leading to spondylolisthesis. Often time patients are asymptomatic and the condition is noted as an incidental finding. Distracting pain and nerve root impairment are incompatible with safe flight operations.

**WAIVER:** CD with no waiver for non-designated personnel. For designated personnel, a waiver may be considered on an individual basis.

### **INFORMATION REQUIRED:**

1. Orthopedic, neurological or neurosurgical consultation.
2. X-rays.
3. CT and MRI scans may also be required in patients with radicular symptoms.

**TREATMENT:** Conservative treatment may achieve temporary relief of symptoms, however upon resumption of vigorous physical activities symptoms usually return.

**DISCUSSION:** The defect in the pars interarticularis (neck of the "Scotty dog") may be acquired from acute trauma, or more commonly, may result from chronic stress (stress fracture). Rarely is it of congenital origin. These occur primarily at L5-S1 and somewhat less at L4-L5. There is an inherited proclivity for the condition (dominant transmission) with an incidence that increases with age up to the end of the fourth decade. It exists in about 5% of the general population, but is much higher in certain races (Japanese, Eskimo) where it may be as high as 45%. Instability of the posterior spinal elements is associated with the development of spondylolisthesis, which is frequently progressive. This condition is likely to be accelerated by the physiological stressors of military flight activities.

### **ICD-9 CODE:**

**721.9 Spondylolysis**

## 13.10 SPONDYLOLISTHESIS

**AEROMEDICAL CONCERNS:** Spondylolisthesis is unlikely to cause incapacitation in flight but, if symptomatic, will cause considerable distraction. Theoretically, spondylolisthesis could cause severe problems on ejection.

**WAIVER:** CD with no waiver for non-designated personnel. For designated personnel, asymptomatic grade I spondylolisthesis is CD but may be considered for a waiver. Higher grades of spondylolisthesis or symptomatic grade I spondylolisthesis are also CD, but waivers may be considered on an individual basis. Patients who have had successful surgery and are currently asymptomatic may also be considered for waiver on a case by case basis.

### **INFORMATION REQUIRED:**

1. Orthopedic consult
2. Neurology consult
3. Rheumatology consult
4. OMT/Manual medicine consult (if available)

**TREATMENT:** Treatment includes education in proper body mechanics and use of the back, along with a program of daily back exercises.

**DISCUSSION:** Aircrew who has frequent symptoms should not continue to fly. Further slipping of the vertebra (usually L5) can occur with exposure to excessive gravitational forces, ejection, or even during normal activities on the ground. Aviators with infrequent symptoms who do not require surgery may still be restricted from ejection seat aircraft or carrier catapult launches and traps.

### **ICD-9 CODES:**

**738.4 Acquired spondylolisthesis**

**756.12 Congenital spondylolisthesis**

**756.18 Traumatic spondylolisthesis**